SHOE DESIGN TRAINING IN A VIRTUAL ENVIRONMENT

Aura Mihai[1], Mehmet Sahin[2], Süleyman Yaldiz[2], Mariana Pastina[1], Şakir Tasdemir[2]

1. Gh Asachi Technical University (ROMANIA), amihai@tex.tuiasi.ro
2. Technical Science College of Selcuk University (TURKEY)

ABSTRACT

One of Leonardo da Vinci General Objectives is to give support in training and further acquisition and the use of knowledge, skills and qualifications. In addition, to facilitate the development of innovative practices in the field of vocational education and training other than at tertiary level, and their transfer, including from one participating country to others is one of the Leonardo da Vinci Operational Objectives. Supporting the development of innovative ICT-based content, services, pedagogies and practice for lifelong learning is another one. The aim of all these objectives is to improve the Quality of VET systems and practices by contributing to "Learning to learn", which is one of Lisbon Key Competences. The objective of this paper is to present a "Virtual Training Centre for Shoe Design", which has been designed as a product of a Development of Innovation project. The paper displays how the developed content has been transferred to the virtual environment with visual aids. The paper focuses on the modules that are presented practically and animated.

Keywords: Virtual Environment, Shoe Design, Virtual Training

1. INTRODUCTION

During the second half of the 19th century, a piece of chalk and a blackboard eraser, teachers and students and textbooks were the main components of teaching and learning. Of course, there were video tape programmes and one-way teaching by computer too but these were by the end of that period. However, at present, we have advanced computer and information network technology, which has revolutionized our teaching and learning approach, methods and techniques. There are virtual classroom software systems which can deliver an interactive learning environment to students with a PC and an internet connection. It can present the student with a screen consisting of an instructional area. Students can listen to their teacher or trainers in distant classrooms through PCs and get a simultaneous view of their teachers and texts as well. They can ask questions and record the "class" for repeated viewing since the tools are interactive. What's more, training organizations can conduce professional training directly via the computer network. Thus, being virtual and interactive, these learning environments are not so different from a teacher-guided class with discussions and tests as well [1]. Thanks to rapidly changing technologies, the innovative e-learning teaching methods require for adapted modules for lifelong training that keeps continuously up to date with the relevant developments. Therefore, one of the concrete future strategic objectives in the EU, according to Council of the

European Union (2001), is improving the quality and effectiveness of education and training systems in the EU. This includes improving education and training for teachers and trainers, developing skills for the knowledge society, ensuring access to ICT for everyone, increasing recruitment to scientific and technical studies, and making the best use of resources. The second strategic objective is facilitating the access of all to education and training systems. This objective includes open learning environment, making learning more attractive, and supporting active citizenship, equal opportunities and social cohesion [2].

Virtual reality can be defined as a technology allowing a user to interact with a computer-based environment which may consist of a simulation of the real world or an imaginary world. Many of such virtual environments are based on audio and visual experiences reflected on computer screens. These environments can have additional properties with simulations. These simulated environments can be very similar to the real world. Myron Krueger used "artificial reality" as term in the 1970s, but the origin of the term "virtual reality" can be traced back to the French playwright, poet, actor and director Antonin Artaud. Artaud described theatre as "la réalite virtuelle", a virtual reality "in which characters, objects, and images take on the phantasmagorical force of alchemy's visionary internal dramas" [3]. The earliest use cited by the Oxford English Dictionary is in a 1987 article entitled "Virtual reality" [4]. Michael Heim [5] identifies seven different concepts of Virtual Reality: simulation, interaction, artificiality, immersion, telepresence, full-body immersion, and network communication. To Heim, virtual reality already exists and he deigns to communicate to us via the dead tree medium of books. So strap on your virtual eye phones and open the covers and prepare yourself for a roller coaster ride through the labyrinths of hypertext and cyberspace. Heim also identifies the main points that distinguish our external reality from virtual reality? His answer is 1) *natality* (we are born), 2) *mortality* (we die), and 3) *temporality* (we remember past happenings). These limits, he says, "impose existential parameters on reality, providing us with a sense of rottenness in the earth (a finite planet with fragile ecosystems)." I would agree with him, except I consider the earth to have a robust ecosystem, to be a robust planet, not a fragile one.

2. THE AIM OF THE PAPER

This paper aims to introduce VTC-SHOE, Virtual Training Centre for Shoe Design, as a model of virtual training environment used in vocational education and training. The Virtual Training Centre for Shoe Design is a virtual environment for training for all those with an interest in shoe design field of vocational education and training. Experts in the field can share and exchange knowledge and experience with associates within and outside the European Union through this centre. The project's scientific and pedagogic objectives are in tune with the main priority in Lifelong Learning Programme. Through the various research and development projects, partners have developed training materials for shoe design. These materials have been transformed into the native languages of the partners. This indicates that the innovative e-content, developed within the VTC-Shoe project can easily be translated to various languages

too. This virtual training centre formed in this field and its application constitutes the first and good example for virtual learning in national vocational training systems. It helps to improve and upgrade competences and skills of staff and exchange experiences over the virtual training centre. It also increases the work opportunity by helping young generation to use Information Technologies. Virtual Reality is an efficient tool in education and training as education people tend to comprehend images faster than the text lines. Learners can actively participate in the learning process and are attracted by the visual information rather than boring texts. Simulations help them to have the training that would otherwise be too costly. This kind of training is preferred mostly in aviation to train pilots that would be too expensive and dangerous. When we use this training tool in the class rooms, it is certain that it will increase student participation and Classroom activities will use VR tools for hands-on learning, group projects and discussions, field trips, and concept visualization [6].

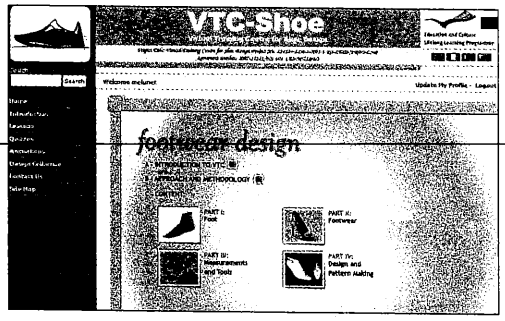
3. THE CONTENT

The content of the curriculum is composed of four main parts. The first part consists of Knowledge on Foot Anatomy and Biomechanics Applied to Footwear Design and Pattern Making. The second part is dedicated to Footwear. It covers Materials Used for Footwear Products, Footwear-Structure, Functions and Classification Criteria, Lasts for Footwear Industry, Footwear Technology, and Technological Allowances for Pattern Making. The third part is about Measurements and Tools used in shoe design. This part includes Measuring the Foot (foot anthropometrics), Measurement Systems, Tools for Pattern Making. The last part is dedicated to Design and Pattern Making in footwear. This part covers Principles and Elements of Design Applied to Footwear, Develop and Present New Design Concepts, Producing Standard Forme of the Last, Producing Design Standard (master pattern), Pattern Making for Women's Court Shoe, and Pattern Making for Men's Casual Shoe (Oxford, Derby), Pattern Making for Children's Shoe, Pattern Making for Slippers, Pattern Making for Boots/High Boots, Pattern Making for Women's Sandals, Producing Lining Patterns, Elements for designing bottom footwear components (insole, sole), Basics for producing footwear patterns from 3D design, Grading 2D footwear patterns and Nesting the Patterns and Material Efficiency Analysis.

4. VIRTUAL TRAINING CENTRE FOR SHOE DESIGN

The virtual training centre (http://www.vtcforshoedesign.com) is a portal which has lessons, Quizzes, Animations and Design Collection. This training tool has a login and password for access. The Virtual Training Centre for Shoe Design consists of three main parts. Part A is a general Introduction to VTC. Part B is about the approach and methodology used in the training centre. Part C is the content of the centre. The content is composed of four parts, all of which are dedicated to lessons. Part I covers the lessons about foot. Part II consists of the lessons about footwear. Part III is about measurements and tool used in footwear design. The last part, Part IV is about design and pattern making. This part can be regarded as mainly practical lessons rather than theoretical ones.

FIGURE 1. VTC Shoe site

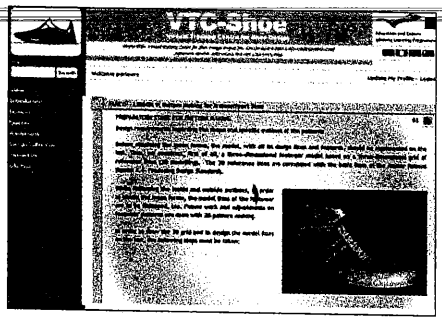


5. PATTERN MAKING FOR TRAINER/SPORT SHOE: SAMPLE LESSON

The sample lesson chosen from Part IV of the training centre is lesson 9: Pattern Making for Trainer/ Sport Shoe. The constructive characteristics of this type of leisure/sport footwear lie in the uppers style as being the same for men, women and children. The uppers can be made from different types or combination of materials. They could have following patterns: split toe cap, outside counter, back tab facing, front facing and side flash (side stripe). The topics of this lesson are presenting principles and concepts of pattern making for trainer/sport shoe; drawing the outline of sectional patterns; obtaining design standard for trainer/sport shoe; making and modifying the working patterns; and maintaining accurate records, documents, sketches, samples, drawings sheets, working progress files. For footwear types as shoes, the VTC Shoe method, within VTC Shoe project, follows up few stages:

- producing the mean form,
- drawing the 3D model directly on the last,
- getting the model form (a kind of mean form with design lines on it),
- positioning the mean form into the referential system,
- copying the model form into the mean form,
- drawing the 2D design standard of the model (Master Pattern),
- sectioning, modifying and obtaining the working patterns.

FIGURE 2. Sample lesson- Pattern making for sport shoe



Before obtaining the mean form, the model, with all its design lines and features, should be represented on the last. Thus, we construct, first of all, a three-dimensional footwear model based on a three-dimensional grid of reference lines (3D Modelling). The 3D reference lines are correlated with the basic lines of the Master Pattern. While flattening the inside and outside surfaces, in order to obtain the mean form, the model lines of the footwear are to be flattened, too. Future work and adjustments on footwear patterns are done with 2D pattern making. In order to draw the 3D grid and to design the model lines on the last, the following steps are taken but here some slides selected for sampling will be given (Figure 3-21.).

FIGURE 3. Step 1: Mark the ball points

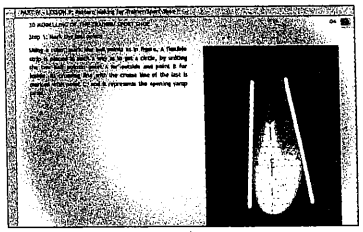


FIGURE 4. Step 2: Draw the girth's reference line

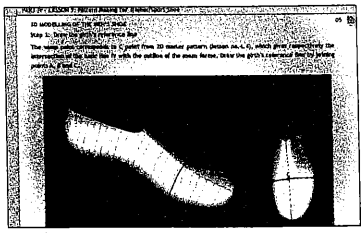


FIGURE 5. Step 3: Mark the height on back

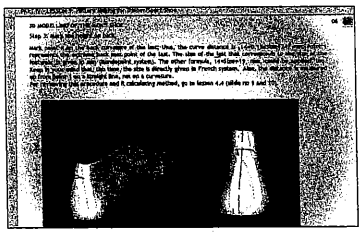


FIGURE 6. Step 4: Draw the reference topline

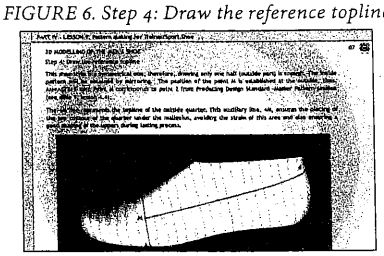


FIGURE 7. Step 5: Mark the instep point

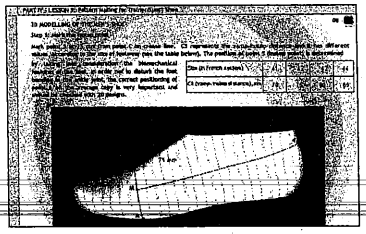


FIGURE 8. Step 6: Draw the auxiliary inste

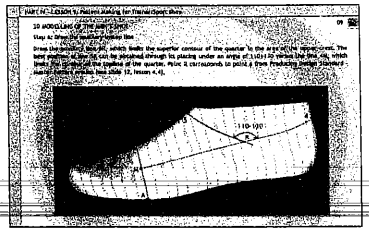


FIGURE 9. Step 7: Draw the topline shape

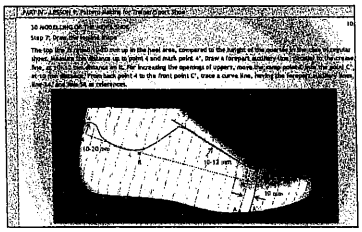


FIGURE 10. Step 8: Draw the front facing

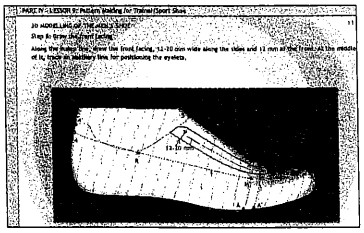


FIGURE 11. Step 9:
Draw the counter and the back tab

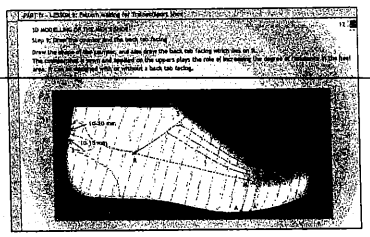


FIGURE 12. Step 10: Draw the toe cap

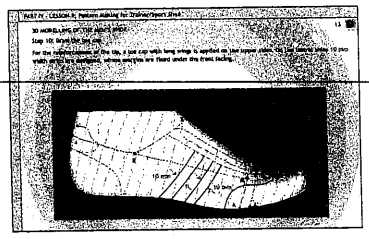


FIGURE 13. Step 1:
Copy the design lines on the mean form.

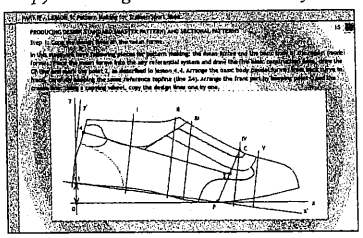


FIGURE 14. Step 2: Correct the design lines.
Step 3: Draw the back curve

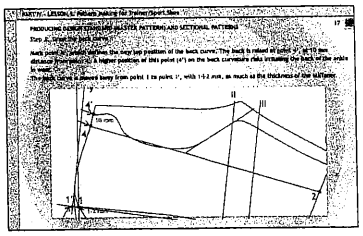


FIGURE 15. Step 4: Draw the lasting allowance

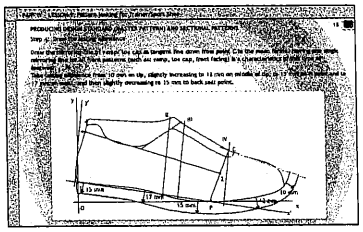


FIGURE 16. Step 5: Mirror the front facing

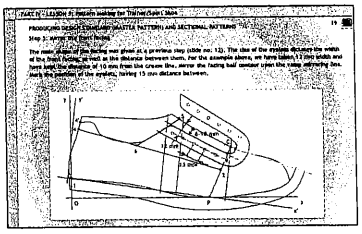


FIGURE 17. Step 6: Mirror the toe cap

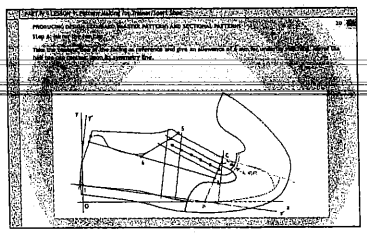


FIGURE 18. Step 7: Obtain the pattern for quarter

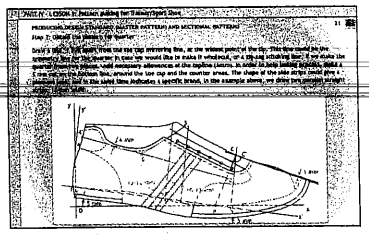


FIGURE 19. Step 8: Mirror the counter and the back tab facing

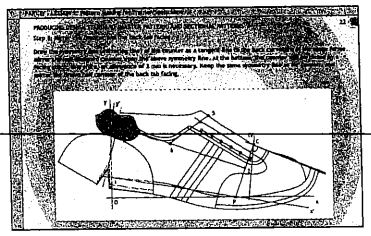


FIGURE 20. Step 9: Obtain the pattern for tongue

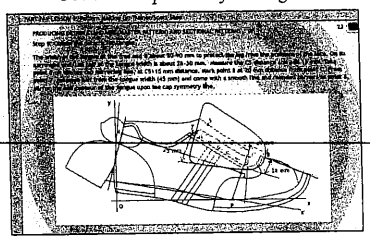
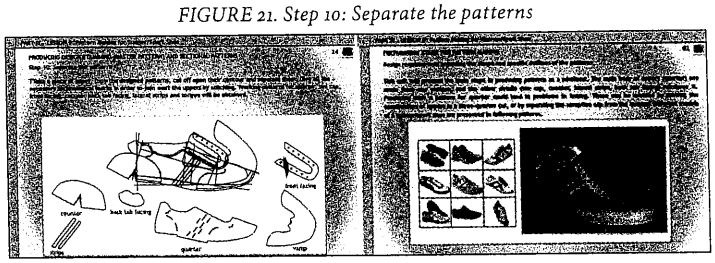


FIGURE 21. Step 10: Separate the patterns



6. CONCLUSION

The aim of this paper is to introduce a Leonardo da Vinci project, titled "Virtual Training Centre for Shoe Design", which is a Development of Innovation project. The project's scientific and pedagogic objectives are in tune with the main priority in Lifelong Learning Programme. Project partners have developed training materials for shoe design in their native language. These materials have to be compared between involved partners in order to get common curricula to be share with future users at a European level. The innovative e-content, developed within the VTC-SHOE project,[1] can easily be transferred in many others European countries.

VTC-SHOE is a multi lingual virtual environment in which the shoe design training is served in English, Romanian, Turkish and Greek according to the curriculum developed for this purpose up to intermediate level.

As a training tool, the curriculum is in accord with the approach, methodology and techniques required for virtual training.

As it is accessible by anyone who has membership or permission, anyone who is interested in shoe design training can benefit from this training tool.

The audio and other visual aids contribute to its attractiveness for a trainee or trainer in this field. In addition, the animations, quizzes and design collection can further contribute this tool to become more attractive and effective in training.

Since this training tool is in English, Romanian, Turkish and Greek version, it can help its scope and effect as a training tool internationally. In this way, it can be transferred to similar fields such as furniture, textile, air conditioning etc.

The approach, methodology and techniques used in this training centre can be used as a model in developing and improving other training programmes in particular in the area of new information technology applications in related sectors.

The VTC-SHOE will establish networks of people who are engaged in footwear business and training. Thus, it will support the entrepreneurial community, including small and medium businesses, through collaboration and community support. The mission of the VTC-SHOE should be to support economic development by facilitating footwear design training that empowers socially and economically diverse people to strengthen and sustain growth opportunities in existing businesses or in the planning and marketing of a start-up business.

ACKNOWLEDGEMENT

This paper presents the e-learning modules developed within the Leonardo da Vinci project titled "Virtual Training Center for Shoe Design", funded by Education and Culture-Lifelong Learning Programme.

REFERENCES

[1] COEU: Council of the European Union, 2001.
[2] Şahin M., Yaldiz S., Ünsaçar F., Yaldiz B., Bilalis N., Maravelakis E., Antoniadis A. (2007),Virtual Training Centre for CNC: A Sample Virtual Training Environment, ICVL 2007: The 2nd International Conference on Virtual Learning, 26-28 October, 2007, Constanta, Romania.
[3] Erik Davis, Techgnosis: myth, magic and mysticism in the information age, 1998
[4] Garb, Yaakov (Winter 1987), "Virtual reality", Whole Earth Review (57): 118ff.
[5] Michael Heim, The Metaphysics of Virtual Reality, Published by Oxford University Press, 1993.
[6] Bricken, M., "Virtual Reality Learning Environments: Potentials and Challenges", Human Interface Technology Laboratory, University of Washington, Seattle, WA: 1991.

IHEPI

7-9 September

2009

HIGHER EDUCATION, PARTNERSHIP, INNOVATION

EDITORS:
Agnieszka Kłaczak-Törő
Andrea Csépe
Dorota Kwiatkowska-Ciotucha

www.IHEPI.net

Creativity and Innovation

CESES

The Careers Service

Wrocław University of Economics

Visegrad Fund

Singapore College of Communication and Business

IHE

IHEPI

7-9 September

2009

Higher Education, Partnership, Innovation

Budapest, 2009

International Conference and Workshops on Higher Education, Partnership & Innovation Proceedings of the IHEPI2009, Budapest 7-9 September 2009

ISBN: 978-963-88332-5-9

Website: www.ihepi.net

IHEPI2009 was organised by Budapest College of Communication & Business with the support of the Hungarian National Assembly and the financial assistance of the Visegrad Fund.

Partners of the Event: Wroclaw University of Economics, Bureau for Career and Professional Promotion and Charles University in Prague, Centre for Social & Economic Strategy.

Published by Publikon Publishers/IDResearch Ltd.
Cover page: Anna Nagy

Publication of this book is funded from the grant provided by the International Visegrad Fund (Serial Number: 20910117, Project category: Scientific exchange, research)

INTERNATIONAL CONFERENCE & WORKSHOPS
on HIGHER EDUCATION, PARTNERSHIP
and INNOVATION

IHEPI Hungarian Parliament Budapest

7-9 September

2009

Creativity and Innovation
European Year 2009

THIS IS TO CERTIFY THAT:

MEHMET SAHIN

HAS PARTICIPATED IN

IHEPI2009

INTERNATIONAL CONFERENCE AND WORKSHOPS ON HIGHER EDUCATION, PARTNERSHIP AND INNOVATION

HELD IN BUDAPEST, 7TH - 9TH SEPTEMBER 2009

IHEPI PROJECT LEADER
Agnieszka Klucznik-Törő, PhD.

RECTOR OF BCCB
Dr. László Vass, CSc.

Visegrad Fund

BUDAPEST COLLEGE OF COMMUNICATION AND BUSINESS BKF

Wrocław University of Economics

The Careers Service Wroclaw University

CESES