A Virtual Environment Designed for Shoe Design Training

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It is known that one of Leonardo da Vinci General Objectives is to support participants in training and further training activities in the acquisition and the use of knowledge, skills and qualifications to facilitate personal development, employability and participation in the European Labour Market. Another objective is to support improvements in quality and innovation in vocational education and training systems, institutions and practices. In addition, one of the Leonardo da Vinci Operational Objectives is 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. Another one is to support the development of innovative ICT-based content, services, pedagogies and practice for lifelong learning. All these objectives serve to improve the Quality of VET systems and practices, which is one of Leonardo da Vinci European Priorities (in the call for proposals 2007). All these factors contribute to "Learning to learn", which is one of Lisbon Key Competences. The objective of this paper is to introduce a LdV project, titled "Virtual Training Centre for Shoe Design", which is a Development of Innovation project. The scope of the study is the introduction of the steps taken for the construction of a virtual environment for shoe design training. The study consists of two main parts: a) the curriculum developed for the virtual environment, and (b) the virtual environment itself. The first part deals with the content of the curriculum designed for basic and intermediate level. The second part deals with the methodology and approach fitting to ICT use and some sample lessons constructed so far.

Key words: Virtual Environment, Shoe Design, Virtual Training

1. Introduction

1.1. Rationale

Improving the quality and effectiveness in a fast track world with greater demands than before in professions and skills is one of the concrete future strategic objectives in relation to education and training systems in the EU. This improvement covers the continuing education and training for teachers and trainers in terms of development of 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. Facilitating the access of all to education and training systems is the second strategic objective, which includes open learning environment, making learning more attractive, and supporting active citizenship, equal opportunities and social cohesion. One of the Leonardo da Vinci Operational Objectives is 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. This will support the transfer of the development of innovative ICT-based content, services, pedagogies and practice for lifelong learning from one EU country to another. In this way, training and further training activities in the acquisition and the use of knowledge, skills and qualifications in one country will facilitate personal development, employability and participation in the European Labour Market on the part of transferring country. This will also support improvements in quality and innovation in vocational education and training systems, institutions and practices, all of which will lead to improvement in the Quality of VET systems and practices.

It is a fact that advanced computer and information network technology has revolutionized our teaching and learning approaches and methods and this also changed the learning environment. Thus, ICT strategy is very important and training organisations using ICT are significantly ahead in all respects. In addition, integration of ICT and e-learning is politically important in the EU in terms of internationalisation and globalisation of education, student demand and interest in increasing the quality of education through ICT.

It is also known that one of Leonardo da Vinci General Objectives is to support participants in training and further training activities in the acquisition and the use of knowledge, skills and qualifications to facilitate personal development, employability and participation in the European Labour Market. Another objective is to support improvements in quality and innovation in vocational education and training systems, institutions and practices. In addition, one of the Leonardo da Vinci Operational Objectives is to facilitate the development of innovative practices in the field of vocational education and training other than at tertiary level, and their

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1.2. Vocational Education and Training and ICT Use

The European Centre for the Development of Vocational Training (Cedefop) is the European Union's reference centre for vocational education and training. This centre provides information on and analyses of vocational education and training systems, policies, research and practice. According to Seyfried E. (2007), in the past two decades and in most Member States there has been a growing awareness of the importance of quality in vocational education and training [1]. Obviously, the changing demands of the knowledge-based society and the overall trend to increase the efficiency and effectiveness of VET systems constitute major driving forces behind these developments. Undeniably, through its funds and programmes, such as Leonardo da Vinci, the European Commission has contributed to improving education and VET systems by raising the level of the services they offer. For a qualitative approach to VET, the technical working group on quality in VET (TWG) was called to respond to during its mandate (2003 and 2004) in accordance with the priorities of the Council Resolution of 19 December 2002 and the Copenhagen declaration on "enhanced cooperation in vocational education and training" [2, 3]. Finally, a further focus of the work consisted of translating the three European policy priorities- promoting employability of the workforce, access to training with particular emphasis on the most vulnerable groups, and the better matching of training demand and supply- into concrete and measurable objectives [4,5].

One of the objectives of the innovative VET systems is regarded as transparency and distribution of information. This function concerns the potential and actual use of information. There may be different systems and structures of information distribution among the various actors, and in the public. And there are preconditions for creating transparency in the VET system. To improve quality there must be systems for distributing information and certain mechanisms to ensure the circulated information can be used by the various actors in the policy process. The more widespread the distribution, the better the potential use of the data will be – and as a reversal effect, better quality data can be expected, as the actors are able to check the information against their experience and will provide feedback to the systems for gathering data.

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 [6].

1.3. Importance of Virtual Training in VET

During the 60's and 70's, teaching and learning tools were nothing but a piece of chalk and a blackboard eraser, teachers and students who met each other face to face inside the classroom during class. In the 80's, videotape programs were used as teaching aids. In the 90's, one-way teaching by computer arrived. And finally today's advanced computer and information network technology has revolutionized our teaching and learning methods. In accord with the development, learning environment has also changed. 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. Training organizations can conduct professional training directly via the computer network. These learning environments are not so different from a teacher-guided class with discussions and tests as well [4, 5].

In the report "Studies in the Context of the E-learning Initiative: Virtual Models of European Universities", a key concern was how virtual mobility is being supported in European universities through ICT integration and e-learning [7]. The study found that the majority of universities face major challenges in promoting ICT integration. ICT strategy is very important and those universities that have an ICT strategy are significantly ahead in integration of ICT in administration and organisation and networking. Integration of ICT and e-learning is politically important in the EU in terms of internationalisation and globalisation of education, student demand and interest in increasing the quality of education through ICT. At the national level, integration of ICT should become a key priority with national and regional institutions making a commitment to ITC and the development of networks. There must be increased national flexibility with a commitment to support common standards of quality and assessment and to develop national and international metadata standards.

2. VTC-SHOE as A Project

The rapidly changing technologies, as well as the innovative e-learning teaching methods require for adapted modules for lifelong training that keeps continuously up to date with the relevant developments of the European footwear industry. The Virtual Training Centre for Shoe Design is an interactive platform, a meeting point for policy-makers, social-partners, practitioners, researchers and 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.

The project's scientific and pedagogic objectives are in tune with the main priority in Lifelong Learning Programme [8]. Through the various research and development projects, partners have developed training materials for shoe design. 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, can easily be translated to various languages.

In terms of strategic impact and contribution to growth, the VTC-Shoe project is expected to have a very powerful impact in the European footwear industry. Similar to the other projects funded by European Community, it is to improve competitiveness helping footwear companies to have skilled and competent shoe designers. Thus, VTC-Shoe added value for the Community lies in the provision of a training tool that has the dynamics not only to provide valuable training and skills to the targeted beneficiaries but also to empower the processes of the EU footwear industry and thus, increase productivity and competitiveness. This, in its turn, is expected help the industry grow and, thus, increase the demand for more skilled employees.

This virtual training centre to be formed in this field and its application constitute 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.

3. Curriculum for VTC-SHOE

According to Wilson (2006) anything and everything that teaches a lesson, planned or otherwise is a curriculum and humans are born learning, thus the learned curriculum actually encompasses a combination of all of the below- the hidden, null, written, political and societal etc.. Electronic curriculum covers those lessons learned through searching the Internet for information, or through using e-forms of communication (Wilson, 2004). "This type of curriculum may be either formal or informal, and inherent lessons may be overt or covert, good or bad, correct or incorrect depending on ones' views. Students who use the Internet on a regular basis, both for recreational purposes (as in blogs, chatrooms, listserves, through instant messenger on-line conversations, or through personal e-mails) and for research and information, are bombarded with all types of media and messages. Much of this information may be factually correct, informative, or even entertaining or inspirational, but other information may be very incorrect, dated, passive, biased, perverse, or even manipulative." [9]

VTC-SHOE uses a virtual curriculum based on competency at elementary and intermediate level. Each lesson is a module and can be utilized independently according to the needs of the trainers or trainees. The curriculum for VTC-SHOE utilizes the instructional technology to increase access to shoe design training materials. The modules specifically address core competencies needed for successful instruction in shoe design. The curriculum designed for the virtual training environment has coherency and the main concept is in such a way as to utilise the audio-visual aids to support the virtual aspect. The content of the curriculum is based on a concept that seeks the integration of fashion and design to address to the industrial values. By achieving this integration, the existing fragmentation of skills between fashion and design, technical and managerial education places and systems can be minimised. It also supposes that young designers may be supported into becoming successful entrepreneurs and in seeing their ideas materialise into actual products. Obviously this design and fashion integration into the industry can only be transformed in an economic advantage if it is efficiently promoted and protected through the world.

3.1. 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

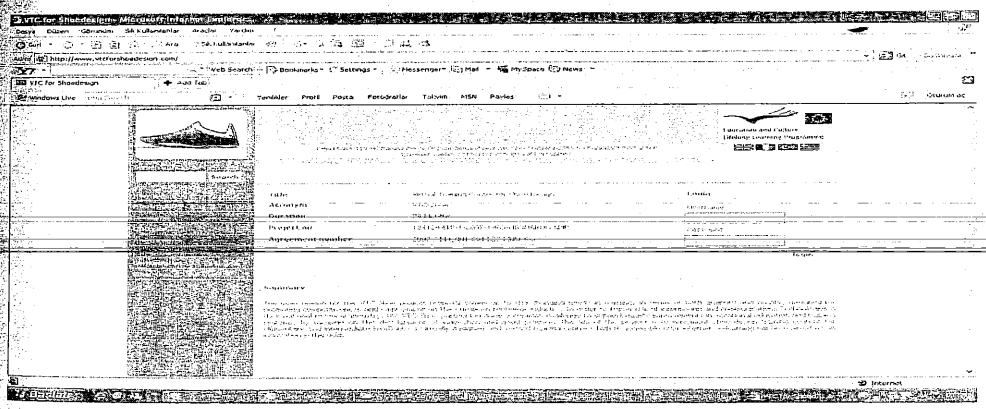
Criteria, Lasts for Footwear Industry, Footwear Technology, Technological Allowances for Pattern Making. The third part is about Measurements and Tools used in shoe design. This part includes Measuring the Foot (foot anthropometrics), Measurement Systems, Tools for Pattern Making. The last part is dedicated 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. Training Centre in Virtual Environment

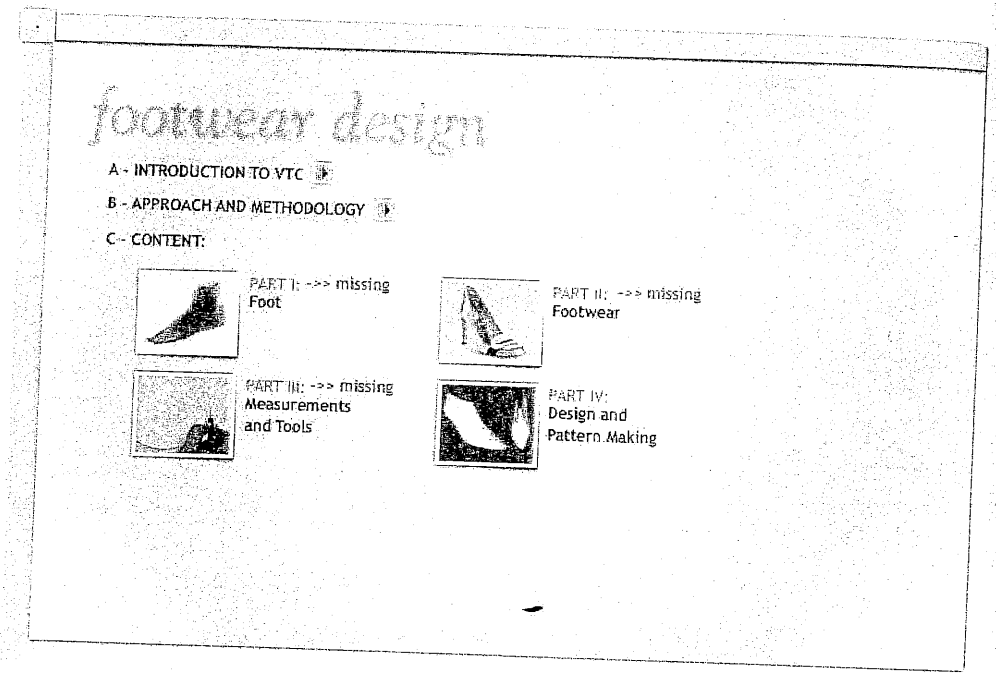
The Virtual Training Centre for Shoe Design is necessary for universities, footwear companies, colleges and training institutions all over Europe and elsewhere, because they are integrating in an organised and illustrative way all the steps required to acquire quickly, easily and in a technologically advanced manner the skills necessary for shoe design, and pattern construction and which will be more clearly and in a more effective educational approach than in an ordinary classroom. Through the network of collaborations of the partnership, the outputs of the training tools can be assimilated in the training systems of a wider spectrum of training organisations. Trainers can broaden their training ability by means of communication over virtual training centre; trainees and apprentices can have better employment opportunities in their countries and especially in other partnering countries; technicians can be a subject to lifelong learning and e-learning as a member of modern society; shoe designers can be more creative by contributing their creative feedbacks. In addition, educational institutions need to modify their existing training methods and techniques in the light of the new curriculum, and distance learning approach can provide them with a better, cost-effective training. Shoe manufacturers can customise their training content according to their own training requirements, which may differ from one manufacturer to another. Also, the training organisations, the SMEs, the universities, colleges, vocational schools, and training centres can increase easily the number of trainees and in this way they can contribute to the employment.

4.1. VTC-SHOE as A Training Tool

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.

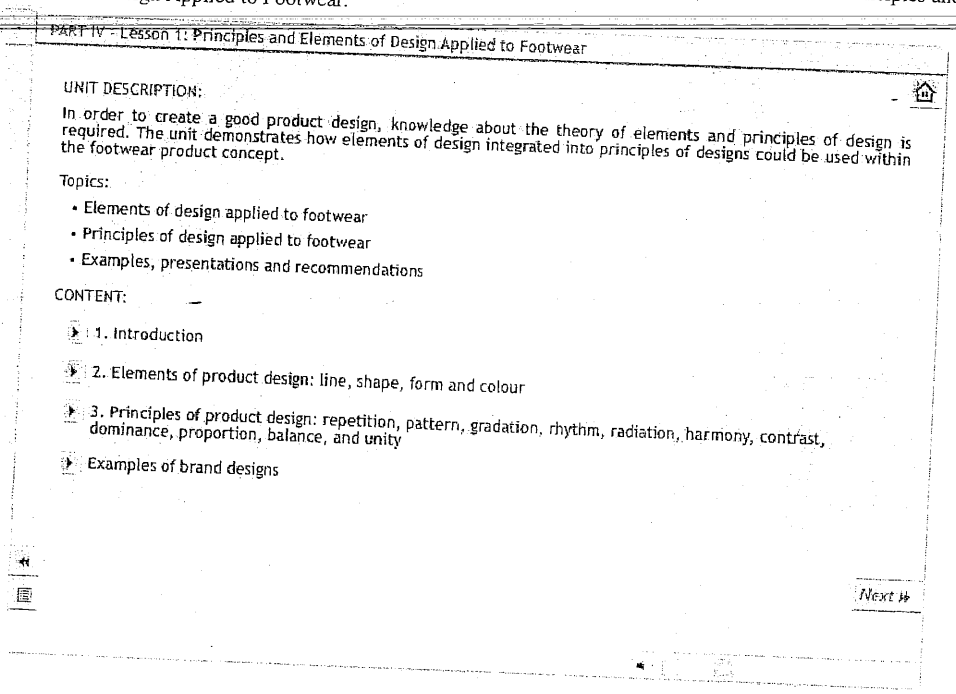


The virtual training centre has an introduction part which gives some insight into the virtual environment its use in training. Then, the approach and methodology upon which the virtual training techniques are settled is given. The main part is the content, which has lessons.



4.2. A Sample Lesson on VTC-SHOE

The following is the sample lesson and how it is displayed as a text supported by audio, pictures, animations and video, which are the essentials of a Virtual training environment. The following is Lesson 1: Principles and Elements of Design Applied to Footwear.



The following is the piece of lesson about the line which is one of the main elements of product design.

PART IV - Lesson 1: Principles and Elements of Design Applied to Footwear

2. ELEMENTS OF PRODUCT DESIGN

2.1. Line

Of all the design elements, line is the most important one. Line is found in each design aspect. According to the way it is being used, line can compose or distort a design. By the way one uses its different aspects, line turns into a very powerful instrument; it can highlight the shape or it can also be an element of decoration.

In the case of a footwear product, we define longitudinal and transversal lines. The longitudinal and transversal lines are exploited to the point that they can "mystify" reality, or create optical illusions. Longitudinal lines give the impression of elongation (figure 1). Transversal lines, used exclusively, could give the impression of a width sense (figure 2). When a longitudinal line crosses a transversal line, the illusion of shape elongation is annulated.

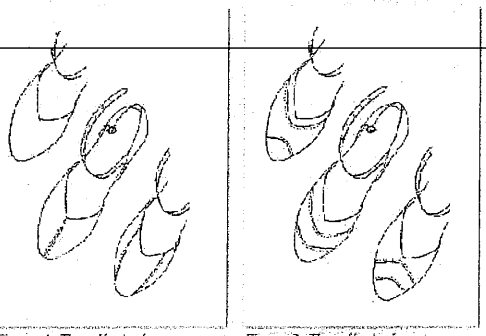


Figure 1: The effect of longitudinal lines

Figure 2: The effect of transversal lines

Next

The following lesson is to display how the footwear shape changes in time in accord with the fashion in textile.

PART IV - Lesson 1: Principles and Elements of Design Applied to Footwear

2. ELEMENTS OF PRODUCT DESIGN

2.2.1.The footwear shape is changing in time

The footwear is a fashionable accessory. Therefore, there is a strong connection between footwear and the fashion line at a certain moment in time (figure 3, 4).

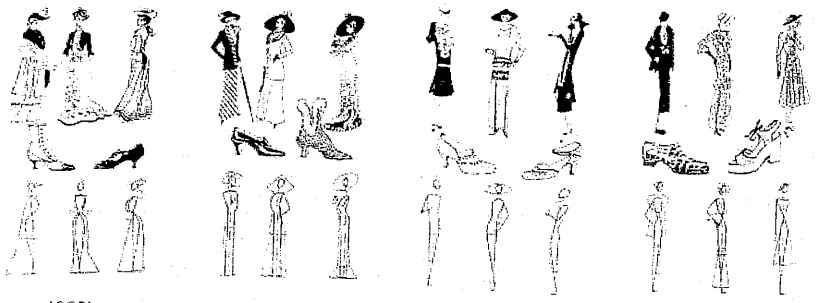


Figure 3: Silhouettes and footwear at the beginning of 20th century

Next

The following is the lesson about the footwear form defined by the last form.

PART IV - Lesson 1: Principles and Elements of Design Applied to Footwear

2. ELEMENTS OF PRODUCT DESIGN

2.2.2. The footwear form defined by the last form

The last form and its dimensions are established starting from the dimensions of the representative statistical population medium foot. The dimensions are determined through anthropometrical measurement. Establishing the form and the dimensions of the last is influenced by:

- The changes undergone by the foot during walking
- The allowed limits of the foot squeeze by the footwear
- The manufacturing technology and the type of footwear taken into consideration
- The constructive elements of the last influenced by fashion (e.g., how high the heel should be and what shape the top should have).

Figure 5: The relationship between footwear and its last (picture downloaded from http://www.thenorthface.com/catalog/sc-brand/northfit.html

Next

5. Conclusion

VTC-SHOE is a virtual environment in which the shoe design training is served according to the curriculum developed for this purpose at elementary and intermediate level. As a training tool, the curriculum on which the

virtual training centre is based 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. In addition, this training tool is multilingual. That means it has English, Romanian, Turkish and Greek version. This can also 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.

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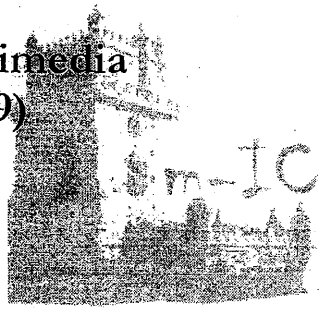

CERTIFICATE OF WORK PRESENTATION

The Organizing Committee of the V International Conference on Multimedia and ICT in Education (m-ICTE2009), held at *Universidade Nova de Lisboa* (Portugal), during 22-24 April 2009, hereby declares that

Mehmet Sahin

has publicly presented and defended the following accepted contribution "*A Virtual Environment Designed for Shoe Design Training*" within the Scientific Program of the Conference, under the Oral presentation mode.

For it to be included on the timely effects, this certificate is issued in Lisbon, Portugal, on 24 April 2009.

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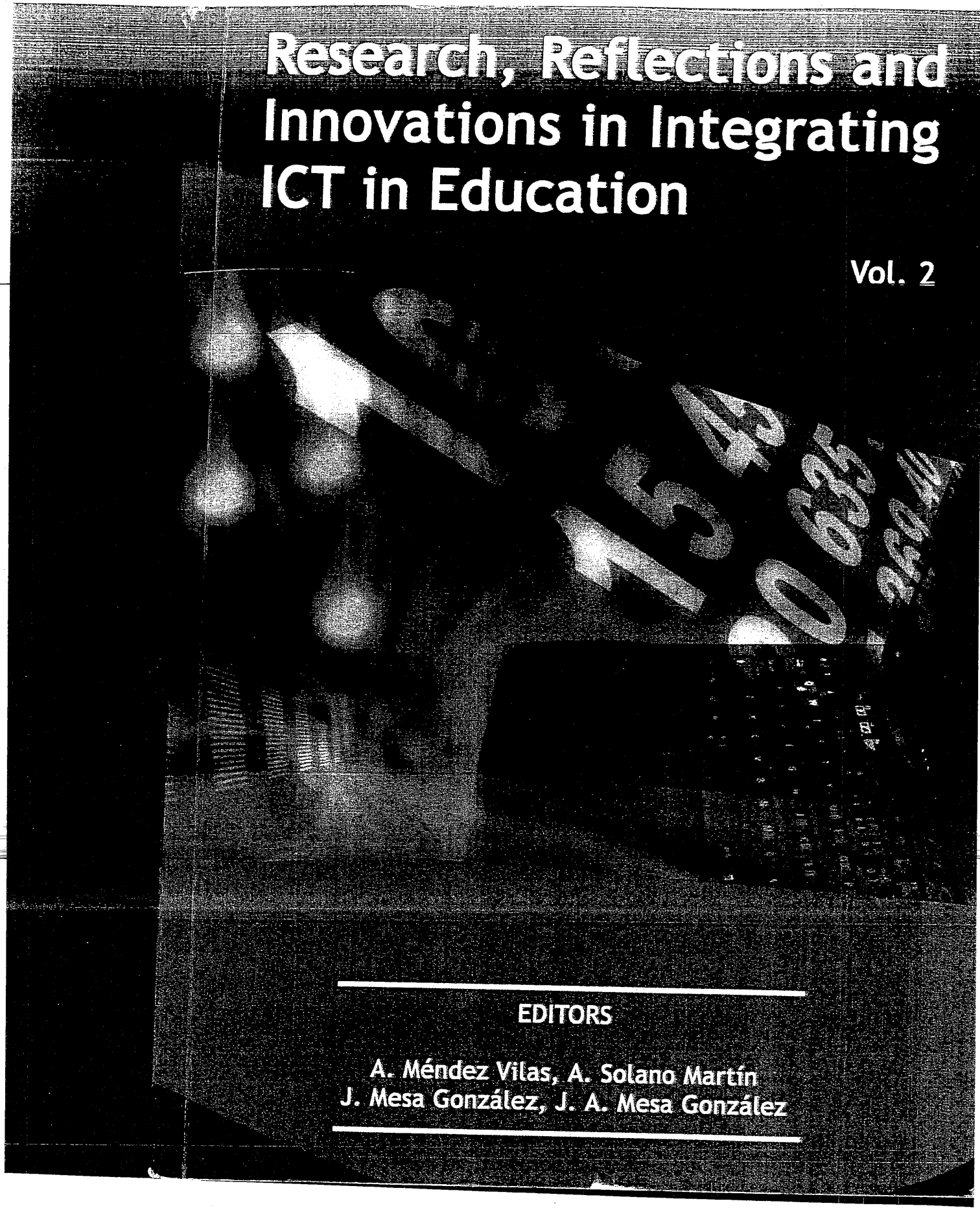

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