CONTENT USED IN THE TEACHING PROCESS

CONTENTS

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1. Introduction

A relevant education is more important today than ever because today' s world demands a workforce that understands how to use technology as a crucial tool for productivity and creativity. These skills include "information reasoning" , a process in which reliable sources of information are identified, effectively accessed, understood, contextualized, and communicated to colleagues. Furthermore, employers require workers to have the skills necessary to collaborate, work in teams, and share information across global networks, that is, to analyze issues from a multidisciplinary perspective. Because these networks are international, employers seek out individuals who have the capacity to effectively interact with others.

2. eLearning

eLearning has become a key adjunct to the actual world. The traditional educational institutions (schools, universities) use it to prepare learners adapted to the society needs, organizations use it as a powerful strategy to better leverage their intellectual capital and to create new skills and increase performance in their employees.

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Traditional methods are often seen as out of touch with our wired world but our problem is how to integrate the traditional learning/instructional and not to deny the old methods.

To be successful in the emerging e*Learning Space*, however, we had shifted our thinking from designing relatively static distance learning solutions (such as class-room extended, course-based experiences, and reconfiguring existing courses and content resources) to digital, interactive, reusable objects that can be used in different virtual spaces, in multiple scenarios and instructional sequences. The challenge calls for highly personalized learning solutions that help learners respond to their defined needs and allows them to manage their own learning experiences.

3. eContent

We develop our eLearning modules (eContent) following two major principles: **high quality training materials,** for **learners coming from different countries and cultural backgrounds**.

Better trained personnel has emerged as one of the major challenges for the global knowledge society, and the solution for it is lifelong training. The previous notions of a divided lifetime of acquiring knowledge (in school and universities) and applying knowledge (in working life) have become untenable. Professional activities are

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knowledge-intensive in a continuously changing Europe. It cannot be expected for the workforce to acquire all the knowledge needed for a lifetime in advance. The half-life period of knowledge keeps decreasing and thus lifelong learning has become integral part of work activities in the form of continuous engagement in acquiring and applying knowledge and skills in the context of a current task at hand.

The new geographic boundaries of Europe impose a new concept of union, the union seen as a global assignment at an economical, social, and partly political level, a legislative harmonisation done for different cultural environments.

The accent is therefore on the optimisation of the European Union through structural laws, but also on maintaining a cultural independence of each and every country.

Based on these new approaches SIVECO has developed and applied an innovative framework of ideas in the field of professional learning for multicultural and multi languages environments. Summarizing this framework we can say that productive learning must be done in the local language and needs a learning by doing environment where learners make things collectively, tackling real problems, where they can share ideas with others, where we help them to reflect on their projects and assumptions, where lecturing felicitously complete

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learning by doing giving learners the knowledge they need to perform the activities that are the core of their daily work.

Our eContent design is focus on providing adult, individual learners with the tools, resources, and tactics for achieving their specific learning/training outcomes. An intermediary step has been for our instructional designers to emphasize the reconfiguration of traditional, classroom-oriented instructional and training experiences to digital, online versions of the same. At this moment the stake has changed, we no longer want to copy the traditional learning but to apply a new theory of "eLearning" bases on two important aspects: what the IT&C offers as learning means and resources and what are the new competencies and objectives of the eLearning process to be added to those of the traditional learning.

Our solution offers not only knowledge, information, communication, interactivity but also a friendly virtual environment, a place for changing experience, and a community to belong to.

Our eLearning tools can provide individualized, personalized learning by profiling variables such as interests, learning and cultural styles, presentation preferences and performance requirements. They can diagnose skill gaps and prescribe professional development activities ensuring the link between learning events and on-the-job practice. Individuals can monitor their own progress and determine what the

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next step in their professional development should be. Learning resources, ranging from individual objects to online communities of professional practice can be available when and where the learner needs those resources.

We focused on a complete solution of eContent that include dynamic development and efficient translation/localization and maintenance mechanisms. We know that the time factor is essential in implementing the changes so we have a methodology and tools that provide quality and efficiency.

The eContent is developed to support the instructional process, designed to cover the scientific content required by the project curriculum and presented in a modern, attractive form. It proposes an exhaustive approach of the subject relying on learning methods that enhance the instructional performance and therefore, contribute, by achieving the instructional objectives, to the development of skills, aptitudes and abilities required by both the curriculum and the needs of the social and professional insertion of the learners.

The cognitive strategies used in the developed courses are open, heuristic, problem oriented. They are complementary to acknowledged instructional algorithms, while the active-participative methods used contribute to develop in learners' abilities, skills,

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attitudes and behaviours and not only mere memorizations of information or behavioural routines.

The variety of materials is the necessary support for an efficient instructional practice, where the learner takes an active part in the construction of his/her own learning process, is permanently required to provide feedback and to take decisions.

The process of understanding the notions relies on methods defined by interactivity, cooperation, communication. The degree of assimilation and understanding of the notions is definitely superior to the degree achieved by classical instructional methods, since the whole process is aimed at forming a structure in which the learner is meant *to learn how to learn*, the accent being on the development of the critical thinking.

A major benefit of such curriculum presentation is the possibility to transform a virtual reality into an instructional environment. This environment makes it possible to have activities that could never take place in a classical learning environment: experiments, simulations of processes or phenomena, virtual tasks modelled after real situations that learners face at their work places.

The eContent development methodology has the following advantages:

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- It permits the multi-sensorial stimulation, thus enabling the learners to make use of their personal characteristics/attributes/resources during the learning process.
- It encourages the learner to explore and research on his own
- It provides a large variety of sources of information;
- It stimulates creativity;
- It introduces target oriented learning (operationally defined objectives)

Learners participate directly and the learning process is achieved through experimentation and participation. Constant feedback has a major contribution to the continuous monitoring of the way in which knowledge is accumulated.

4. The Structure of SIVECO eContent

SIVECO eContent is structured in *reusable learning objects (RLOs)*. Each **object** is a complex software designed to give access through a customized interface to a virtual learning environment developed by the concatenation of various *multimedia resources*, using the principles of instructional design, an appropriate pedagogical theory and web access and navigation standards.

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The idea of these „*reusable learning objects*" is to divide the instructional content into smaller parts that can be reused in different learning environments and can easily be meta-labelled, thus offering all the information/knowledge required by the instructional plan and all the functionalities for an easy search.

Traditionally, the content is presented in packs, with duration of several hours. The learning objects are a new method of planning the multimedia learning content.

The reusable learning objects:

- are small learning units, with a duration that normally goes from 5 to 20 minutes.
- are complex software
- are autonomous – each learning object can be used independently.
- are reusable – the same learning object can be reused in several instructional environments, to various purposes.
- can be grouped – the learning objects can be grouped into larger clusters (collections) of content, including traditional lecture structures.
- are labelled with metadata – each learning object is holding, in its XML file, the descriptive information permitting easy

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identification and effective search within the various groups of terms.

- are produced to be used in several virtual learning environments, on LMS, LCMS (in SCORM 3.0 packages) or with various browsers.
- are easy to modify/update/translate (XLM, XLIFF files, external texts, skilfully designed textboxes) and strictly follow the beneficiaries instructional policies.

The **eContent** is developed to support the instructional process and designed to cover the scientific content required by the project curriculum, presented in a modern, attractive aspect. It proposes an exhaustive approach of the subject relying on learning methods that enhance the instructional performance and therefore, contribute, by achieving the instructional objectives, to the development of skills, aptitudes and abilities required by both the curriculum and the needs of the social and professional insertion of the learners.

The RLOs are developed and organized according to the project instructional plan, starting with elementary notions and up to advanced notions, offering an ideal formula for the blended courses.

Each RLO has clearly defined instructional attributes and precise instructional objectives dedicated to the subject at hand and required by the curriculum. The major advantage of a modular approach of

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the learning process is the possibility to structure the courses according to the curriculum, but with a view to the learners various levels of understanding and perception.

The cognitive strategies used in the lessons are open, heuristic, problem oriented. They are complementary to acknowledged instructional algorithms, while the active-participative methods used contribute to develop in learners' abilities, skills, attitudes and behaviours and not only mere memorizations of information or behavioural routines.

The variety of materials is the necessary support for an efficient instructional practice, where the learner takes an active part in the construction of his/her own learning process, is permanently required to provide feedback and to take decisions.

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- It permits the multi-sensorial stimulation, thus enabling the learners to make use of their personal characteristics/attributes/resources during the learning process.
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Learners participate directly and the learning process is achieved through experimentation and participation. Constant feedback has a major contribution to the continuous monitoring of the way in which knowledge is accumulated.

- The high learning performance is achieved by the specific design of the RLOs, that permit: a) multisensory stimulation in the presentation of the information; b) individual activities of exploring/researching/processing the information; c)

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exchanging information and co-operation in task solving; d) to identify relevant sources of information from a variety of resources; e) to stimulate critical thinking; f) target oriented learning (operationally defined objectives); g) enhanced chances of adjusting to the learner' s own characteristics and knowledge experience.

5. eLearning eModules Development

The educational content is subjected to a standardized development process, the initial stage being the Theme Initialization followed by three major stages of development, each with its own requirements:

1. Instructional Design (Instructional Analysis, Design);
2. The Graphical User Interface (GUI) Design and Accessibility Model (Graphic and Access Analysis, Design);
3. Technical Development (Implementation).

The last stage is the Testing (Evaluation) of the eContent.

These stages follow the global dynamic of an Instructional System Design called ADDIE (acronym for Analysis, Design, Development, Implementation and Evaluation).

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6. Development Teams And Roles

- Design (1. Instructional Design and 2. GUI Design and Accessibility Model)

At the design stage, the *team* includes the Pedagogue Knowledge Manager (PKM), who leads the course design process. With a comprehensive understanding of learners' needs and types, institutional requirements, and experience in eContent design, the PKM together with the Instructional Designers are responsible for reviewing course content for pedagogical conformity and correctness. The PKM is responsible for the selection of the appropriate delivery and validation methodology. In this stage, the personnel involved include Interface designers, Copyright coordinators, and Assessment specialists.

The central *product* of an eLearning course design process is the *storyboard*. During the development of the course storyboard, the instructional design team communicates with the technical development and delivery teams for any technical and production related issues.

Instructional designers are specialists in pedagogy and instructional strategies and also have experience in choosing the best resources, tools and applications to design multimedia resources. Based on the content types and the interactivity level, they will incorporate

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instructional strategies and techniques best suited for the selected target groups.

In developing course contents, subject matter experts may decide to use copyrighted materials from different sources (images, links, texts, diagrams, etc.). To cope with this instructional designers work with copyright coordinators to negotiate the use of these copyrighted materials. If necessary the materials' copyrights will be bought and every object will have in the metadata information about the copyright of each resource used.

Interface designers also decide on the presentation of eContent. The most important issue to consider is that the learning must take place in a user-friendly environment. They work with instructional designers to create a consistent and unitary interface for all specific eLearning courses. These decisions are documented in the interface, navigation and access model (GUI DOC).

Following the overall goals and objectives of the course, assessment specialists design various assessment/evaluation/test strategies (educational games, different types of tests and quizzes) to measure students' performance.

- Technical Development and Testing

At the course development stage, the Development team creates the online course based on the course Storyboard created during the

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instructional design stage. The Technical Leader coordinates the eLearning development process. Team members include, but are not limited to: the developers (course integrators), programmer, graphic artist, multimedia resources developer, photographer/videographer, editor, learning objects specialist, and quality assurance responsible.

The Technical leader makes sure that the timeline is maintained for all deliverables. The eLearning development process is a highly collaborative one. All tasks are planned and resources allocated using MS Project Server. Continually emerging issues may demand new changes and modification in the eLearning process even in the last stages of development. The presence of the instructional designer and the evaluation specialists are required all along the development period to support the development team.

7. Instructional Design

By Instructional Design we understand the foreshadowing of a strategy that materializes into an instructional routine to be followed to achieve learning that is to attain specific, pre-established objectives. In the case of eContent development, instructional design relies also on the idea that the educational product developed on the basis of this strategy is *software* and that the learning environment is a *virtual learning environment.*

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In relation to a *reusable learning object* instructional design means therefore a *correlation* between the cumulative action of a number of *multimedia resources* and the instructional objectives proposed, in order to attain the expected educational/instructional effect. This correlation is done using the guidelines of modern instructional theories on the role of the learner, new educational paradigms generated by constructivist approaches like: learner centred instruction and focus on learning/instruction and not on teaching.

The main outcome of this phase is the *Storyboard* (Script or Scenario) that will give to the technical team the information needed for technical development.

There are important elements that improve the quality of the final product (the educational software) that are analyzed and decided in the instructional design phase. They rend the routine more coherent and enhance the product efficiency, if used appropriately. These elements of teaching technology concern:

- the learner' s performances and the analysis of the target population,
- the curriculum design,
- the definition of the instructional objectives that are being targeted,

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- the correlation of the instructional objectives with the multimedia resources, the teaching strategy options.

These elements are taken in account, studied and determined in several *Instructional Analyse* activities (target population analysis, curriculum analysis, etc.). All the outcomes from this stage will be used to design (develop) the *Storyboard (Script).*

Acceptance of the proposed storyboard by the specialists from SIVECO and IBA is a key element in the success of the project. The risks related to storyboard development relate to:

- Vague specification of the storyboards.
- Different understanding of a storyboard from the part of SIVECO specialists, on one hand, and IBA specialists, on the other hand.
- Insufficient input from IBA specialists for the development of the storyboards.
- Vague feedback from specialists on the content of the storyboard.

Feedback to deliverables (especially storyboards!) will be given in only one iteration. Further iterations on the deliverables (specifically on the storyboard) must refer only to issues already mentioned in the previous iteration.

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8. GUI is the acronym for the Graphical User Interface.

This second stage in the development process is analysis and design. During this stage the GUI DOC is defined by the Interface designer and the Accessibility specialist in cooperation with IBA and SIVECO specialists. The document defines the characteristics and features of the course interface.

Visual design has a significant contribution to a clear understanding of the information provided and is consistent with instructional standards as well as with the particularities of the learners.

The GUI will be developed based on two main definitions:

- Structure - how the information is presented;
- Dialogue - the extent to which the user controls the progress of the program.

Final GUI compliance with de definitions is ensured by rules, standards and regulations, yet the GUI designer has a certain degree of freedom to exercise his experience and creativity.

At the end of the GUI DOC the accessibility specialist will describe the accessibility model in accord with the customer specific requirements.

9. Storyboard Matrix

The Storyboard Matrix (SM) is the central document of the instructional Design Phase. The development of the Storyboard is

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mainly based on this document. The information in the SM will help the instructional designer to produce a detailed and well documented Storyboard.

The Storyboard (or the Script) is the detailed, conceptual view of a course. It provides a screen by screen illustration of the instructional strategy with detailed description of actual multimedia resources that will be developed and is the technical team complete roadmap to course development.

The instructional designer writes the Storyboard using a standard template which does not tolerate any diversion from the instructional completeness, as defined in the matrix.

The eContent Storyboards' power lies on two complementary aspects:

- a high degree of standardization;
- a creative description of the multimedia resources done by the script writer.

10. Technical Development Content

The technical development implies the use of the Storyboard and the implementation of the directions laid down at the Instructional Design stage, use of the standard instructions, rules and norms

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specific for the design of interfaces in the domain of data processing systems.

Instructional objects are referenced with metadata. The metadata are separated from the object they refer to and are regarded as resources of the lesson.

During the implementation: the instructional model suggested in the design stage of the Storyboard development is applied.

1. **Analysis and design**

The first stage focuses on defining the elements of design by setting the details of the way in which the elements of design meet the requirements set out in previous phases. Also in this stage are defined the data and the mechanisms for data checking, correction, saving and retrieval.

2. **Development of the multimedia resources**

During this phase all the *multimedia resources* defined in the Storyboard will be developed

3. **Implementation**

Developers write the source code for the XML files, compile, test and eliminate code and system flaws.

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The software development process follows our standard software development methodology.

- **Testing-**Internal Testing - in the initial stages of the project immediately after setting the design and software requirements, a Testing Plan is drawn up, necessary for the documentation of product testing stages. The testing activity relies on the Testing Plan, the main objective being to identify and record the problems occurring in every build.

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