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Social Applications for Lifelong Learning

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John Garofalakis & Michalis Xenos

Hellenic Open University
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![LLP Logo]

Projects

SimSafety - "Flight Simulator" for Internet Safety
SoRuraLL - Rural Social Networking for Lifelong Learning

Conference Support

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Preface

The SALL 2010 is a scientific conference held in Patras, Greece on November 4 to 5, 2010. This conference acts as a forum for scientists, engineers, and practitioners to present their latest research, results, ideas, and developments on Social Applications for Life Long Learning.

The conference focused on the following follow topics:

- Pedagogical approaches for Life Long Distance Technology Enhanced Learning
- E-Learning Applications and Experiences
- 2nd Generation (Web 2.0) Technology Enhanced Learning (TEL): e-Learning 2.0
- Methodologies for pilot implementation of innovative ICT based pedagogical approaches in School, Adult Education and Teacher Training
- Pedagogical exploitation of 3D Virtual Environments
- Quality of eLearning Tools
- Social Networking
- Technical and Social aspects of Lifelong Learning in Remote Areas
- Usability of Platforms and tools for Social Networking
- Socializing in Internet Games
- Internet games for children
- Children safety risks during Internet games
- Usability and playability of Serious Games
- Learning through non-serious games
- Game accelerated learning

With the assistance of the Conference and Session Chairs and Programme Committee members, SALL 2010 attracted a number of submissions. A total of 42 papers were submitted, from across the Europe and beyond. Following a rigorous reviewing process, involving at least two independent blind reviews per paper, we have accepted 22 papers (52% acceptance rate). Conference chairs were instrumental in the process as they coordinated the reviewing.

The authors of accepted papers were required to present new, late-breaking and often unpublished data to stimulate energetic discussion.

Conference Chairs

John Garofalakis,
University of Patras, Computer Engineering & Informatics Department and Research Academic Computer Technology Institute

Michalis Xenos,
Hellenic Open University, School of Sciences & Technology
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VALENTE Luis, University of Minho
VALEON'TIS Eytyxis, R.A. Computer Technology Institute
XENOS Michalis, Hellenic Open University
SimSafety: “Flight Simulator” for Internet Safety

The project addresses Internet safety issues with the aim to achieve an in-depth understanding regarding safety breaches and protective measures and actions, primarily within the school and family environment. For this purpose, an Online Virtual Game Environment will be developed, supporting i) role-playing game scenarios, offered in real-time to ii) dynamic groups of online users, iii) exposed to (penalised) safety traps, which should be recognized and overcome through (accredited) appropriate game actions. Within the life of the project, such contextualised game scenarios will be designed and developed at a pilot level simulating situations on the Web where the users (children/teachers/family members) will develop skills in recognising safety pitfalls and dealing with them.

The use of the Internet is very popular among children from a very young age. Research available indicates that totally unsupervised Internet use by children may bear dangers for themselves and their family. Research efforts are currently being made to develop appropriate safety measures such as filtering technology. However it is clear that creating a “risk-free” Internet for children and youths seems an illusion and therefore it is necessary to concentrate on creating a “culture” about safe Internet use.

At a European Level action has been taken for creating a safer Internet environment by promoting use of hotlines, filtering and rating systems as well as awareness-raising through the establishment of national awareness nodes in all EU countries. It is the intention of the project to build on the work already carried out at a national level, a) adding the European dimension through intercultural dialogue between parents, teachers and pupils from 9 European Countries –EL, CY, PT, RO, FI, HU, BG, IT, DE- who will participate in game playing and in the online project community and b) the added value of actually bringing this venture into everyday school and family life.

Target groups addressed will be pupils (9-11 years old) along with their teachers and parents from 2-3 schools in each of the 5 out of 6 participating countries and in 4 non-partner countries.
SoRuraLL: Rural Social Networking for Lifelong Learning

The project aims to investigate the potential for enhanced lifelong learning offered by social networking tools and platforms to those living in geographically and socio-economically disadvantaged rural areas. Experimental learning approaches will be developed and implemented, examining the potential offered by these new trends and tools for the alleviation of the disadvantage suffered by such populations in Europe through the enhancement of opportunities for effective and meaningful lifelong learning. Several technological solutions will be tried in the various sectors of lifelong learning, both formal (school, higher education, VET, adult education) and informal.

Options for citizens’ access to the digital resources will also be examined, making use of good practice examples in areas of work such as the operation of telecenters in disadvantaged areas, the use of satellite broadband in remote rural areas, as well as other open and distant access approaches.
Invited Speech:

From Educational Innovation towards Systemic Impact: a New Discourse for Networks of Practice

*European Association of Distance Teaching Universities (EADTU)*

Dr. C.A. (Kees-Jan) van Dorp

Dr. C.A. (Kees-Jan) van Dorp is Research Director and advisory to the Board and Executive of EADTU. EADTU is the representative organisation of both the European open and distance teaching universities, and the national consortia of higher education institutions active in the field of distance education and e-learning. Van Dorp maintains active involvement in research by coordination of European and US funded projects, task forces, academic initiatives and stakeholder cooperation, viz. the European Commission, the European University Association, the William and Flora Hewlett Foundation, the OpenCourseWare Consortium, and the United Nations Educational, Scientific and Cultural Organization.

He developed multiple Good Practices in strands of Leonardo da Vinci, Socrates Minerva, Information Society Technologies, Lingua, Erasmus, KA4 Multilateral and Jean Monet, relating to European virtual campuses, employability, university-enterprise cooperation, open educational resources, modernisation of HE, and curriculum development. Van Dorp delivered education and research at Maastricht University, contract research at Wageningen University and contract education at University College Maastricht. He obtained various grants from government and foundations for research on knowledge and information management.

Van Dorp has authored and edited several books and dozens of publications. He serves multiple programme committees and is requested keynote speaker, workshop leader, moderator, presenter, panellist, peer reviewer and domain expertee. He obtained his master degree at Eindhoven University of Technology and his PhD degree at Wageningen University.
Session Papers
Impact of Moodle usage practices on students’ performance in the context of a blended learning environment

Andromahi Filippidi, Nikolaos Tselios, and Vassilis Komis

Abstract—In this paper, students’ practices and performance were studied, while using a Learning Management System in a blended learning environment. This is a case study involving 117 students who attended an academic course based upon a blended learning approach, using an open source e-learning environment (Moodle). The course refers to ICT integration in education and has been reformulated to be offered in the context of blended learning. The course’s methodology was mainly based on a problem solving approach. The impact of nine variables depicting the expressed students’ practices while using Moodle was examined (spectrum of use, assignment view, forum add post, forum view, resource view user’s profile inspection, questionnaire and glossary inspection) on their performance. A multiple regression was applied to investigate relation between the students’ practices and their performance. From the analysis of the collected data it was depicted that the system usage is significantly related with the students’ performance, explaining the 20.2% of variance in their total grades.

Index Terms—Blended Learning Environment, Moodle, log files, practices, student performance.

I. INTRODUCTION

During the recent years, a significant volume of research on the effectiveness of the use of ICT in Education in general and the integration of Learning Management Systems (LMS) in particular, have been realized. In the latter, a series of important questions emerge, mainly related to the study of the appropriate teaching methods, the effective design of technological infrastructure and the design of the interaction of students with the system. The last dimension depends largely on the earlier attitudes and perceptions of the learning community’s members like students and teachers.

The Learning Management Systems (LMS) are technological learning environments that support online course delivery. They offer comprehensive synchronous and asynchronous services, and also support collaborative learning. As a result, they play an important role in distance education and are increasingly adopted in the context of typical education.

The main feature that differentiates the ODL systems from the ‘traditional' learning environments is the degree of technology usage and the gradual shift of control and responsibility of the learning process to the learners, giving them the opportunity to learn anytime, anywhere. This shift of control of the learning process to the learners seems to positively influence their learning effectiveness [1]. The objective of a LMS system is (a) to bridge the distance between the learner and the provided learning material and (b) to embed social interactions within the same environment, thus providing to the learners the opportunity to become active participants and not mere receivers of information. In this context, sociocultural theories influence considerably the learning procedure and have strengthened the perceptions of the educational community towards adoption and effective integration of ODL system in the educational process.

This trend runs across all levels of education, while at the same time a significant use in higher education is observed [2]. Usage of those technologies produces new teaching practices and paradigms such as mixed models of traditional learning like blended learning [3], in order to effectively combine the advantages of the real and virtual class simultaneously. However, design and application of a mixed model of learning is not a straightforward task and requires significant modifications of the course’s learning framework. Important predictors of the quality of the learning experience are the amount and the quality of interaction and the sense of commitment to a community of inquiry and learning. Those could be achieved through the effective integration of technology while at the same time exploiting the advantages of a traditional course that includes lectures and meetings [3].

The development of a mixed model of learning is a complex process of transforming an existing educational framework based on the following factors [4]: (a) the context of the lesson should be presented through problem solving...
scenarios, (b) development of appropriate materials and resources, (c) adjustment of platform’s tools to the demands of the problem solving paradigm, (d) inherent support of active participation for all members of the learning community, while transforming the role of teachers to cooperators. The blended learning appears to be a successful combination of different teaching and learning methods, with the subsequent development of innovative methods for material production, course conduct and therefore the teaching results [5]. This mixture concerns both a variety of network technologies and pedagogic theories, but mostly concerns and requires their effective combination [6] in order to make use of the advantages of virtual and real class at the same time. This effort focuses on the quality and the quantity of interaction and also on the perspective of the participants’ commitment to the learning community [7].

In the aforementioned context, critical parameters, that affects significantly the benefits of an ODL, are the attitudes and perceptions of users about them. The formulation of these concepts depends mainly on four factors: the people’s characteristics (such as earlier knowledge and effective use of tools), the level of social support and interaction that users experience, the organization of the technical characteristics of the system and the course’s learning content and the characteristics of the institution and the overall attitude and policy towards ICT [2].

As derived from the previous discussion, a systematic investigation and understanding of concepts, attitudes and practices involved in a blended learning process will contribute to deeper knowledge acquisition, facilitating the design of effective learning interventions and ODL environments. The aforementioned goal could be achieved by a systematic investigation of learners’ beliefs, and attitudes while been enrolled in a distant learning course. The beliefs are a psychological state in which a person believes that an object or a situation is true or that it is a ‘general’ truth. Beliefs are conceptually different from the entity of knowledge, since knowledge is a social, partially validated construction. On the other hand beliefs are entirely individual structures. However, beliefs are expressed as knowledge from the subjects who believe in them. The concepts are complex operations by which a person acquires knowledge of the reality either directly to the senses, or indirectly by the intervention [8]. The term “practices”, refers to all the different uses that students of LMS are carrying out, during their participation to a course.

Recent studies showed that the degree of the ODL’s acceptance by the learners is important [9]. The main advantages, as perceived by them, seem to be usability, accessibility, flexibility and interaction with the system. On the contrary, the limited nature of the interaction between learners and teachers often influences negatively the expected learning outcome [9]. Valuable time was also reported to have been spent in order to retrieve store and print the electronic material. Furthermore, it seems that familiarity with Internet technologies is a strong positive predictor of the ODL’s acceptance [10]. In addition, the students’ attitudes towards usage are substantially affected by the perceived functionality of the system [11]. It is also suggested that the learners’ perceptions of ODL as a means of distant learning are no different than the learners’ perception of ODL as a complementary tool for teaching a lesson in the context of a blended learning [11].

As far as the expressed usage practices are concerned, 3 categories were distinguished [12]: mastery oriented users, task focused users and minimalist in effort users. Reference [12] identified the aforementioned usage patterns, through processing and meaning extraction of quantitative usage data, such as total time of use, usage spreading, times pan across reconnection in the ODL system, intensity of interaction and amount of communication with other learners and/or teachers. Regarding the level of expertise expressed by the students while using the system, often they are distinguished into three distinct groups (the inadequate users, the moderate users and the highly skilled users) [13], [14]. However, excluding the aforementioned efforts, a lack of sufficient studies related to the students’ practices and performance in blended learning environments was observed in general.

The goal of the study presented in this paper was to investigate the design, development and evaluation of a university undergraduate course using an asynchronous ODL. In particular, the aim of this study was to investigate course attendants’ expressed practices. The relation of measured aspects of learners’ practices with their rated performance was also studied. The presented work was primary inspired by the theoretical constructs presented previously. The rest of the paper is organized as follows: First, the method of the study, followed by the analysis of the results and the interpretation of the findings, is presented. Finally, the results and their possible implication are being discussed thoroughly.

II. RESEARCH METHODOLOGY

A. Research objectives

The goal of the study was to identify the factors that influence students’ performance while using an ODL platform, in particular the Moodle system, in the context of a blended learning University course. The objectives of the study were a) to investigate possible relations of students’ practices, as represented using a variety of interaction metrics, with their performance and b) to specify which of the students’ interaction metrics practices were strongly related to their performance.

117 University students of the Department of Educational Sciences and Early Childhood Education, University of Patras, participated in the study. The students attended a compulsory 2nd year course offered in the context of a blended learning approach using Moodle. The course concerning the integration of ICT in Education took place the second semester of the academic year 2008-2009.

A case study approach was adopted, for the implementation of the research [15]. The materials and the didactic approaches
used in the course were gradually reformed from March until July 2007, in order to be suitable with the adopted blended learning approach. The course’s laboratory session was adequately adopted at first, followed by the reshaping of the course that geared primarily to the laboratory part of the course. The LMS used for this purpose was Moodle and the courses’ content is available at http://150.140.160.60/moodle/course/view.php?id=30.

B. Procedure

The course entitled "Information and Communication Technologies in Education" was held in the spring semester of 2009. In particular, the students attended a two-hour compulsory laboratory session for 11 consecutive weeks. Each session dealt with a particular topic, related to the goals of the course. For each laboratory session, except the first two introductory sessions, the students had to deliver a personal report after solving a problem based assignment. During each lab the tutors provided information about the topic and the goals of the session and subsequently explained each assignment given to the students. The materials provided to the students were organized according to each subject and were available to the students until the end of the semester.

Design and delivery of the course was based on a social constructivist pedagogical framework. A number of principles of the blended learning [3] were also adopted with respect to the goals and the context of the course, as described below. In addition, face to face characteristics and online technologies (Moodle) were utilized. The adopted pedagogical model was based on the problem based learning approach proposed by [16]. The proposed approach was characterized by the following principles:

- During the workshops, the students were initially exposed to a problematic situation but not to the related material. In this context, students were forced to anticipate the required concepts and skills to tackle the problem presented to them. By reflecting upon the problems, they internalized the need to learn throughout the process to solve the problem. Each week individual projects were assigned to the students, followed by lab sessions and lectures.

- Concerning the didactic goals, students were informed at the beginning of each lab session for the problem’s goal and the skills that they were expected to acquire. By using this approach, it was expected to minimize the possibility of any disorientation the students may experience towards their effort to solve the given problem.

- Emphasis on selecting the appropriate resources for effective problem solving was given. In order to help students tackle the given assignments, a variety of related resources was offered to them via the Moodle system. In addition, the course’s instructor and two teaching assistants were available providing insight and further clarifications to central concepts, upon request. Such guidance was provided via face to face collaboration with the assistants or by suitable questions posted at the Moodle’s forum. The online resources provided to the students were of complementary type and were delivered in various formats, such as web pages, slides and software online (animations, simulations, interactive hypermedia, encyclopedias, glossary exercises, etc.) pdf documents, analysis grids and self-assessment modules online, but printed resources are usually neglected. A glossary comprising definitions for each new concept entity was also provided.

- An important goal of the adopted LMS was to enhance collaboration among students and instructors. The technological environment could create an active learners’ community outside the strict context of the class. However, in order to enhance the learners’ sense of ownership, the students were asked to provide individual project reports, thus providing their own solutions.

- The goal of the requested projects was mostly related to the creation of suitable learning activities for the kindergarten, using a variety of educational software, or to assess their quality in various dimensions (e.g suitability for learning in specific contexts, technical and interaction quality, using evaluation rubrics).

- According to the requirements of each weekly project, the deliverable was a combination of written essays, software files implementing the requested activity (such as concept maps), powerpoint presentations and completed evaluation rubrics. The students were graded by their deliverables for the laboratory (50%), and a final written examination (50%).

C. Data collection

The procedure used for the data collection and the analysis is described in [17] and comprises 4 phases: 1. data collection, 2. preliminary data preprocessing using appropriate algorithms with respect to the research questions, 3. application of the method (implementation of algorithms for carrying out the results), and 4. interpretation of results and conclusions.

The types of data gathered were learners’ interaction log files, which were extracted from the Moodle and students assignments. The process of extraction meaning from learners’ log files was carried out using a tool developed by the authors to collect and preprocess the data. Subsequently, the data were inputted in SPSS (V. 17) for statistical analysis.

D. Data analysis

For the data analysis, the collected users’ activity data were analyzed through a preprocessing and meta-analysis tool, developed by one of the authors. Subsequently, data collected from the logs of the users’ actions, the students’ worksheets and their exam papers, were coded in a table of categorical and numeric variables. Initial data inspection showed that the learners’ observed behavior could be described by two categorical variables, according to the total usage for each day
and the total number of steps carried out by each user per day. The study of the recording log files led to the construction of the variable “spectrum of use” of the system in a weekly basis”. For the “spectrum of use” variable, the information related to the users’ entrance to the Moodle (date and time of entry), was recorded. Week long intervals were determined and a new variable emerged (with values ranging from 1: “once a week” to 3: “every day”). From the log files, a series of numeric variables depicting the system’s usage in general and the frequency of accessing each service in specific, was also collected: total actions: indicating each user’s total actions while using the system throughout the semester, assignment view: related to the recorded low level actions that the users carried throughout the assignment module, forum add post: indicating forum posts by each user, forum view: the total recorded actions related to the forum inspection, glossary view: indicating how many times a student used the glossary questionnaire view: the numerical data related to the recorded questionnaire inspection (which allowed users to complete online style forms using a variety of user input methods), throughout the semester, resource view: indicating the number of low level actions that each student carried out, to access and study the provided learning material, user view: related to the recorded actions that the users carried out in the entirety of the users profile inspection, user view all: related to the recorded actions that the users carried out in the entirety of the all users profile inspection. From the assessment of the students’ laboratory worksheets and their exam papers, the final grade for each student was calculated.

III. RESULTS

From the analysis of the log files (86435 records in total) it was observed that the majority (79 out of 117, 67.5%) of the students, used the Moodle 3-4 times per week (Table 1). A significant variation concerning the amount of students’ accesses to the Moodle platform was also depicted. However, most of the students expressed moderate to high usage frequency.

TABLE I. SYSTEM USAGE

<table>
<thead>
<tr>
<th>Spectrum of use</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4 times per week</td>
<td>79</td>
<td>67.5%</td>
</tr>
<tr>
<td>Every day</td>
<td>24</td>
<td>20.5%</td>
</tr>
<tr>
<td>1 time per week</td>
<td>14</td>
<td>21.4%</td>
</tr>
<tr>
<td>Total</td>
<td>117</td>
<td>100%</td>
</tr>
</tbody>
</table>

Regarding the students’ performance: 14 (11.96%) students failed to pass the lesson, 10 (8.54%) received a passing degree, 61 (52.13%) performed very good and 32 (27.35%) received an excellent grade.

A multiple regression was used to identify possible relation between the students’ performance and the variables expressing system usage. A total of 9 independent variables were considered as predictors for the multiple regression modeling. The total number of actions for each student while using the system is represented by the independent variable “total actions”. However, since it is significantly correlated with the majority of all the other variables, it was excluded from the analysis [18]. A multiple regression analysis was applied to identify the impact of the remaining independent variables to the dependent variable.

Since multiple regression analysis requires the use of numeric and boolean variables only, the variable spectrum of use was recoded accordingly using two dummy variables (low use and moderate use) [18].

Thus, the independent variables were spectrum of use (low use and moderate use): with values ranging from 1: “once a week” to 3: “every day” which were suitably attributed to the introduced dummy variables: for spectrum of use=1, low use was coded as 1 and moderate use as 0, for spectrum of use=2 or 3, low use was coded as 0 or 1 and moderate use as 1, accordingly, assignment view, forum add post, forum view, glossary view, questionnaire view, resource view, user view and user view all. The dependent variable adopted was the students’ Final Note (with values ranging from 0-10).

TABLE II. MEAN SCORES AND STANDARD DEVIATIONS FOR EACH VARIABLE (N=117)

<table>
<thead>
<tr>
<th>VARIABLE (N=117)</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final_Note</td>
<td>7.111</td>
<td>2.1306</td>
</tr>
<tr>
<td>Spectrum_of_use</td>
<td>2.08</td>
<td>0.589</td>
</tr>
<tr>
<td>assignment_view</td>
<td>96.85</td>
<td>35.142</td>
</tr>
<tr>
<td>forum_add_post</td>
<td>.21</td>
<td>.539</td>
</tr>
<tr>
<td>forum_view</td>
<td>18.15</td>
<td>16.126</td>
</tr>
<tr>
<td>glossary_view</td>
<td>5.85</td>
<td>12.629</td>
</tr>
<tr>
<td>questionnaire_view</td>
<td>153.39</td>
<td>95.140</td>
</tr>
<tr>
<td>resource_view</td>
<td>129.66</td>
<td>55.749</td>
</tr>
<tr>
<td>user_view</td>
<td>15.73</td>
<td>17.357</td>
</tr>
<tr>
<td>user_view_all</td>
<td>13.99</td>
<td>22.687</td>
</tr>
</tbody>
</table>

Referring to the dependent and to the independent variables of the study (Table 2), the mean values and the standard deviations are: Final Note: mean value is 7.111 (SD= 2.1306), Spectrum of Use: 2.08(0.589). Assignment view 96.85 (35.142), Forum add post: 0.21(0.539). Forum view: 18.15(16.126), Glossary view: 5.85(12.629), Questionnaire view 153.39 (95.140), Resource view: 129.66 (55.749). User view 15.73 (17.357), User view all: 13.99 (22.687).

A linear relation between independent (predictor) and dependent (criterion) variables is assumed. SPSS 17 was used for the data analysis. Only regression coefficients (b-weights), which describe the relation between a predictor and a criterion, with a significance of p < 0.05 were considered.

The relation between Moodle usage in students’ performance was estimated by the method of ordinary least squares using multiple regression analysis. The basic unit of analysis was each individual student. The goal was to examine the students’ performance variation in their course attendance, according to their logged system usage.
The multiple regression analysis resulted in a model that explains 20.2% of the students’ performance. Three out of nine independent variables were found to be significant correlated with the dependent variable, $F = 2.679, p = 0.006 < 0.01$, adjusted $R^2 = 0.126$. The three independent variables found to be significantly correlated were: (a) moderate use, $\beta = 0.389, p = 0.013 < 0.05$ (b) questionnaire view, $\beta = 0.255, p = 0.030 < 0.05$ and (c) glossary view, $\beta = 0.206, p = 0.049 < 0.05$ (Table 3).

Table III. Summary of Regression Analysis for Factors Predicting Final Note

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>4.770</td>
<td>.758</td>
<td>.</td>
<td>6.292</td>
<td>.000</td>
</tr>
<tr>
<td>low_use</td>
<td>.892</td>
<td>.696</td>
<td>.195</td>
<td>1.281</td>
<td>.203</td>
</tr>
<tr>
<td>moderate_use</td>
<td>2.545</td>
<td>1.006</td>
<td>.389</td>
<td>2.530</td>
<td>.013</td>
</tr>
<tr>
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<td>.002</td>
<td>.008</td>
<td>.040</td>
<td>.317</td>
<td>.752</td>
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<tr>
<td>forum_add_post</td>
<td>-.022</td>
<td>.393</td>
<td>-.006</td>
<td>-.057</td>
<td>.955</td>
</tr>
<tr>
<td>forum_view</td>
<td>.000</td>
<td>.018</td>
<td>-.001</td>
<td>-.010</td>
<td>.992</td>
</tr>
<tr>
<td>glossary_view</td>
<td>.035</td>
<td>.017</td>
<td>.206</td>
<td>1.993</td>
<td>.049</td>
</tr>
<tr>
<td>questionnaire_view</td>
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<td>.003</td>
<td>.255</td>
<td>2.201</td>
<td>.030</td>
</tr>
<tr>
<td>resource_view</td>
<td>-.011</td>
<td>.006</td>
<td>-.296</td>
<td>-1.812</td>
<td>.073</td>
</tr>
<tr>
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<td>.004</td>
<td>.018</td>
<td>.032</td>
<td>.225</td>
<td>.822</td>
</tr>
<tr>
<td>user_view_all</td>
<td>-.006</td>
<td>.012</td>
<td>-.062</td>
<td>-.486</td>
<td>.628</td>
</tr>
</tbody>
</table>

The regression analysis identified that the dependent variable was predicted by a combination of different independent variables. Although these results do not indicate a causal relationship, they do indicate that the students’ system usage was related to higher scores on the final performance.

In specific, 3 variables mostly contributed to the correlation: spectrum of use and specifically moderate use, questionnaire and glossary inspection. Moderate use refers to the importance of system usage to student’s performance. That indicates that students who used Moodle more intensively and more frequently also received higher grade. Questionnaire and glossary inspection were important due to the problem solving nature of the requested projects. The students had to carefully inspect the course material and questionnaires. Moderate use was related to higher scores on the final performance. This kind of findings stress the importance of providing a variety of complementary sources to the students, in order to enhance understanding, encourage individual explorations and increase sense of knowledge ownership.

IV. Discussion

The results of this research contribute to understand, to some extent, which characteristics of an e-learning course are important for learning performance. They can be seen as a description of students’ expressed behaviours and offer recommendations of how to design academic e-learning courses. The results could be beneficial both to designers of LMS as well as to educators aiming to introduce these systems in their course.

In this paper, an initial effort to explain the results presented above is being made. In order to better understand why specific variables seem to correlate with the students’ performance, the initial numerical data describing the variables of system’s use were compared. Although it was expected that the most critical usage variable is resource view (related to the recorded low level actions the users carried out in the entirety of the course material throughout the semester), this assumption wasn’t confirmed. This could be attributed to the fact that all students inspected the course material frequently, during the semester, at least while attending the compulsory laboratory session. Therefore, even in students with poor performance, a quite high value on the resource view variable is observed. As a result, the effect of resource view was not found significant. So, a crucial role in the models’ construction plays the different usage of the system which seems to be understood in the sense of the different combination variables’ usage.

Since the use of Moodle is an important factor affecting the performance of students, great attention should be given while designing academic courses with the use of LMS. Further investigation should be conducted in order to specify the reasons and the factors that affect students’ expressed practices while interacting with a LMS, to facilitate system’s usability and usefulness and to further encourage and motivate the learners to achieve deeper understanding.

V. Conclusions

In this paper, the impact of students’ usage behavior while using Moodle in the context of a blended learning academic course was examined. From the regression model, it was derived that the recorded students’ interaction practices were significantly correlated to the students’ performance. **Moderate use** appeared as the most critical variable as a predictor in this study. According to the results obtained, it was also revealed that the usage variables that also explain students’ performance are **Questionnaire view** and **glossary view**. Unexpectedly, the resource view was not significantly correlated to the student’s performance. This could be attributed to the fact that all students had to access the learning material in order to gain some initial understanding. It seems that deeper understanding was achieved through careful inspection of materials presented in the glossary and the questionnaire which contained the evaluation rubrics. However the issue requires further investigation, since the correlation trend is quite high and found to be significant at the 0.1 level.

It should be stressed that the multiple regression method applied does not imply causal relationships, but correlation between variables or sets of variables was described instead. In a first attempt to explain the findings of the reported cases study, it is considered that students’ performance is correlated...
with specific aspects of system usage, as depicted in the collected log files. Questionnaire and glossary inspection emerged as significant variables positively correlated to the student’s performance. However, the results are not subjects to generalization since the learning setting and the design of the course’s material greatly affects the obtained interaction data.

The research presented in this study has several limitations. The sample includes exclusively students from a Department of Social and Humanities Studies with specific characteristics such as age, gender, computers skills and experience etc. Further investigation in different contexts and levels of education is required for the generalization of results. In addition, findings from studies related to how learners form their goals, which strategies they follow [19], what criteria they use to evaluate information and how they adapt to any given learning environment [20], can update existing design and evaluation practices for LMS [21] and consequently differentiate to an extent the students’ practices. In addition, the degree of contribution of each interaction’s characteristics and perceptions to the students’ learning outcome requires further examination. The aforementioned limitations constitute future research goals.

VI. REFERENCES


Experiences from Developing Online VR Environments: The ‘SimSafety’ Case Study

Dimitis Kalaitzis, Efthyxios Valeontis, Vasilis Delis and Maria Fountana

Abstract — This work presents the authors’ experience in implementing an online VR platform targeted to young pupils with the aim to achieve an in-depth understanding regarding Internet safety risks, protective measures and actions, primarily within the school and family environment. We a) outline design and technical considerations with respect to ‘SimSafety’ development and b) briefly discuss our progress so far under the “serious game development” paradigm.

Index Terms: game playing, OpenSimulator, Internet Safety, Internet risks, children & RPGs, serious games.

I. INTRODUCTION – PURPOSE & SCOPE

Internet provides significant opportunities as a means for information sharing, communication and learning and is clearly enhancing our society. But there are dark sides to this wonderful resource that present risks and concerns for the well-being of at least children. The recognition that the boundaries between offline and online social presence of kids are particularly elusive (often dissolving) brings forward the need for sophisticated mechanisms and frameworks for effectively negotiating cyberspace and avoiding risks and areas of concern [1].

SimSafety (acronym for “Flight Simulator for Internet Safety” http://www.simsafety.eu, a project co-financed by the Lifelong Learning Programme/Transversal Programme/Key Activity 3: ICT, EU) is an example of how education and technology merge. We aspire to develop a comprehensive virtual world that challenges the existing boundaries between educational and domestic environments by involving kids, parents and teachers into a shared experience that provides information, social activities and fun and ultimately raises kids’ awareness on Internet risks.

Current estimates claim that by 2012, 80% of active Internet users will have a virtual life (e.g. a “second” life) in some form of 3D virtual world environment [2]. Furthermore, experiential learning (based on the work of Dewey, Lewin and Piaget [3]) is increasingly being examined under the Second Life paradigm with very promising results so far [4]. Our approach is similar, in establishing a virtual 3D world that provides conceptually rich scenarios of simulated Internet-related activities, as well as risks and pitfalls, under a “safe” (controlled) mode:

- e-communication within a comprehensive 3D world
- avatar appearance customisation
- avatar interaction simulating social networking (making friends, cyber-bullying, etc.)
- mini games and quizzes (related to Internet safety)
- class multiplayer scenarios
- information spots
- (ro)bot deployment
- etc.

Since entertainment was a prevalent feature among the afore-mentioned desired functions, we restricted our search for suitable open-source platforms providing high quality graphics, advanced communication-chatting and expansion capabilities, finally resorting to the OpenSimulator platform.
In the following sections we a) present a brief outline of the design, technical and functional elements of the SimSafety environment b) contrast our approach to what is recently referred to as “serious game development” and c) conclude by future prospects and limitations of this work.

II. WHY OPENSIMULATOR
Our venture began with extensive research and examination of all available software platforms, able to facilitate the creation and hosting of virtual 3D worlds. During this phase, we had to bear in mind all the limitations imposed by the nature of the project, i.e. the fact that our target group consists of young pupils (of age 10-12) who would hopefully perceive our environment as a “game”. The look and feel of this game should be modern, matching experiences pupils gain from other computer games and game consoles. Impressive, eye-catching 3D graphics where called for.

On the other hand, the out-dated computer equipment that one typically encounters at mainstream school labs (including the project targeted test labs) set the need for compliance to low system requirements, thus narrowing down our initial list of options. In addition, the ideal platform should also support a massive multiplayer environment, turning maturity, stability and sustainability to key features. While many alternatives are available, our attention was almost immediately caught by the OpenSimulator project [6]. While other platforms were technically more mature, OpenSimulator seemed to be the most promising one.

OpenSimulator is a 3D Application Server, able to host massive multiplayer on-line 3D environments. This platform bears many similarities to the popular Second Life environment, since it is a project inspired by Second Life (in an attempt to inverse-engineer and deploy its functionality under open-source terms). Despite being at an early stage of development (hasn’t reached Beta version yet), the platform proves to be quite stable and robust, even when serving many concurrent users. The server side requirements are considered to be quite reasonable and as far as the client software is concerned, the requirements are quite fair.

By default, when having a fresh installation of the OpenSimulator at hand, you are immersed in a virtual island which you can change to your liking. On this island you can start building artifacts and serving content in the form of audio, video and images. Using tools provided by the client software, one can shape the environment to resemble a city, a forest or something completely imaginary. The players navigate through this 3D world using human avatars, whose appearance they can completely customise. Functionality can be later added to each artifact using the built-in LSL Scripting Language supported by the system. Events, such as an avatar touching an object, speaking or visiting a place can be programmed to trigger a system reaction and thus give (traceable) ‘semantics’ to this action. In order to add extra features to the platform, OpenSimulator supports external modules that help programmers enrich existing functionality, create new events and improve the user interface.

Among the most difficult challenges we faced during the development of the environment was the need for conceptually rich activities and scenarios. OpenSimulator and all similar platforms are mainly intended to function as fancy, 3D-boosted chat environments where advanced graphics and artifacts are provided to primarily enhance the social/chat experience. Therefore, concepts that would familiarise kids with Internet-related activities and eventually transfer the virtually gained experience to real life such as friendship tracking, cyber-bullying simulation, addressing a helpline and in general monitoring a user’s (re)actions were particularly difficult (if possible at all) to implement. Guided by the conceptual game framework described in [5], we tried to devise advanced programming techniques and mechanisms to conceptually enrich the environment’s events and services along these lines. Some of those technical constructs are summarised in the following Section.

III. CUSTOMISING-EXTENDING OPENSIMULATOR
Hosting 3D virtual worlds does not by itself render OpenSimulator suitable for hosting a (successful) multiplayer game. Several additions/modifications were required in order to enable gaming functionality and enhance user experience:

A. Database programming
A custom database was created, working side by side with the original OpenSimulator one, in order to store several game-related data (such as scoring, particular user log parameters, several game parameters such as cyber-bullying frequency and type, quiz data, dynamic data, etc.). Since OpenSimulator’s database primarily serves the needs of the platform (in terms of avatar location and movement), the range of stored information is significantly limited while on the other hand not always modeled and indexed in a straight-forward manner. Moreover, persistency of any type, i.e. the ability to store historical data or keeping user states was not originally included in OpenSimulator specifications. Therefore, the information used to model a user’s progress through the game is accommodated by the custom database. This information can be accessed through the environment with the use of in-game scripts and external web services, acting as an interface to the custom database.

B. Module programming
OpenSimulator platform functionality can be extended through the use of modules, which are programmed using a native API (Application Programming Interface) that allows programmers to access and alter core functions and variables of the simulator. These modules constitute the most powerful tool a developer has available, especially when considering game development. In the context of SimSafety, we have created several modules to help us out. The default friends-making procedure of the game was modified and enhanced with additional dialogs in an effort to raise awareness on making friends online and its related risks. A module that
creates disturbances to the players throughout their whole game experience, in a manner simulating real life, has also been developed. Extensive logging of user actions and scoring has been made easy in the same way.

C. Bot programming

Another component usually included in computer games is the NPC (Non-Playing-Character, or robot). NPCs are computer controlled players that can be programmed to perform various tasks and can serve various purposes. In our case, NPCs were employed in order to simulate internet dangers but also to provide guidance to the players. Once logged in, a player may become victim of a cyber-bulling NPC, receive spam or turn to another for help. Providing NPCs with artificial intelligence can be critical to the success of a game since it increases the realistic feel and playability of the game, as NPCs start to behave like normal users. In SimSafety NPCs are quite primitive, in the sense that their list of instructed activities is limited at the moment, but in the future we plan to put serious effort to this extent.

D. The SimSafety portal utility

SimSafety differs from a traditional computer game for two main reasons: a) it is on-line and multiplayer and b) it is an educational game. As a result, besides developing the main game engine, one needs to be concerned with a fair amount of administrative tasks related to user accounts, content management and server maintenance. In an attempt to address these issues we created a web portal to help us organise and control the aforementioned parameters. The portal acts as an external interface to both the system’s and the custom-developed database, providing easy management of user applications, account approvals, user rights, scores and dynamic content (e.g. multilingual information provided by Safer Internet nodes and published in the virtual Info Centre).

IV. THE SIMSAFETY VIRTUAL ENVIRONMENT

In this section we present the main virtual spaces comprising the ‘SimSafety Park’ along with their indented functionality.

Welcome area

This area was designed to give users a pleasant first impression of the game. It mainly consists of a sci-fi building looking like a spaceship with posters containing all the information needed by new users to walk around the SimSafety Park and familiarise themselves with game controls.

The Park

A virtual park with a lake, a small bridge and a boat was designed to make our virtual environment more attractive to the players. It is a place to gather, relax, stroll around the lake, sit on a bench and meet with your friends online. Apart from the entertaining element, in this area a user may randomly find a credit card or a wallet which they can either turn in or keep for themselves (actions related to accessing inappropriate Internet content which are penalised accordingly).

Avatar Customisation area

In order to make the game more engaging we have implemented the Avatar Customisation area which is the equivalent of a real life clothing store in our virtual world. Players have a wide range of jackets, trousers, shirts, etc. to choose from and create their unique outfit.

Information Center

A modern building providing Internet Safety material in the form of posters was among the first to be “built” in the SimSafety Park. This building was designed in a museum-like fashion, so that a classroom could make a visit and learn about current issues concerning Internet dangers and threats. Additionally, there is a special multi-language room where posters hosted can be translated into several languages. Current posters contain information available at Safer Internet nodes (http://www.saferinternet.org).
**Mini Games Zone**

In an attempt to simulate Internet dangers in the best possible way we created a series of multiuser role playing games based on real life incidents of children that had offensive online experiences. Roles are automatically distributed among the players and they are scored based on their “acting” according to their role. By the end of each mini game, each player knows what was the Internet danger involved, what was the correct reaction for each “role”, and how they could cope in similar situations in the future.

**Quiz and puzzles**

“Quiz boxes” and puzzles are scattered throughout the world in various locations frequently visited by the players. Touching a box triggers a quiz dialog consisting of several questions about Internet safety. Based on the player’s answers a quiz score is generated which is added to the player’s total score. Similarly, puzzles are clever constructs implicitly conveying a message (e.g. scrambled pieces of a Safe Internet poster that the player should put in order).

**Cyber-bullying**

Being one of the major Internet threats, particularly among young kids, cyber-bullying is extensively modeled and treated in SimSafety. Several NPCs randomly bullying the players while they walk around are implemented. The NPCs communicate through the players’ native language and the user is judged (gets a score) according to his/her reaction to bullying. The recommended action is to visit the “report center” and “sue” the avatar that bullied them. In this way, apart from increasing their overall score, they won’t be bullied by the specific NPC again.

**Free expression areas**

One of the concerns of the project’s pedagogists team was to foster children creativity by offering them free expression tools. In the SimSafety park “free expression” areas provide kids with the basic OpenSimulator designing toolbox (creating primitive 3D objects like cubes and spheres, geometrically combining them, giving colour and texture or even leave a free message as an image on a shared wall). In this way, using more or less the same tools the developing team used, the players can design their own places, games or activities they wish to share with their classmates.

**Scoring**

We have already referred to a complicated scoring system deployed in SimSafety, in previous sections. A series of score types has been implemented in order to track and evaluate all user actions related to our learning objectives. For example, there are different scores related to a player’s quiz performance, mini game participation, SimSafety world exploration, reaction to random object findings and cyber-bullying management. Apart from being displayed in the Hall of Fame of SimSafety homepage, scores are weighted and summed up to a general user score indicating the player's overall performance in the game.

V. SIMSAFETY VS. SERIOUS GAMES

SimSafety “is a game designed for a primary purpose other than entertainment”. Instead, its primary purpose is to raise Internet safety awareness of the players. According to Wikipedia this is the definition of a “serious game”, a rather new trend in the video gaming industry. According to recent reports [7] this new trend is rapidly growing and is expected to be a 10 billion euro market in the next 5 years.

Serious games have been acclaimed for playing an increasingly important role in learning, psychological development and social change [8]. So far three different models of entertainment education have been utilised:

- the *motivational paradigm* suggests that entertainment elements of a product (in the form of enjoyable add-ons) elicit the specific selection of it
- the *reinforcement paradigm* supports repetitive usage by offering awards after successful completion of a task
- as opposed to the two previous approaches (being at the core of what is frequently termed *edutainment*), the *paralleled experiences* paradigm stands out on its on by postulating that educational components need to be enjoyable and entertainment elements should be closely associated with education

Of course, enjoyment entails a strong personal taste, depending on the user and the situation. Some consider challenge and competition as entertaining while others find
pleasure and enjoyment in role playing, creative work and challenging activities.

The following set of questions was postulated in order to successfully classify a game as “serious”. Considering the current stage of SimSafety development, one could favorably argue:

Does it work? (beta-testing)

Pilot implementation in schools has provided useful feedback in relation to different aspects of the project. In summary we could conclude that:

- SimSafety is robust enough (it effectively supported several dozens of concurrent users during the pilot implementation phase) – so, the system works

What are the learning goals?

How well do the learners achieve those goals?

What else are they learning?

Does it track the learner’s performance? (learning)

Moreover,

- SimSafety is a virtual environment that pupils can take full advantage of provided the support of a dedicated teacher. The primary objective is to make the players (students, parents and teachers) aware of the dangers lurking in the Internet and implicitly indicate appropriate response to potential such incidents
- Often visits to SimSafety minimise the technical problems and highlight the positive aspects
- Mini games are successful when one of the roles is being played by an adult making provocative questions and initiating interesting discussions
- Interesting discussions among teacher and pupils occurred during mini game playing and while answering the quizzes
- Overall, pilot implementation so far has been embraced by teachers and pupils and provides strong indication that this idea may be at the right track towards offering a fresh and up-to-date approach to an equally new and up-to-date problem.

Therefore, our initially set learning goals were achieved to a significant extent.

Is the content accurate and appropriate for target audience? (content review)

The current educational content is provided by a group of experts, including teachers and pedagogists with a long-standing experience in the field, as well as scientists at the forefront of EU activities related to Safer Internet. In addition, the platform itself supports easy and seamless incorporation of additional multilingual content for the non-expert user.

Is it easy to use and easy to learn to use? (usability-navigation)

The interface supported by SimSafety resembles closely that of Second Life environment, a serious application on its own. Pilot implementation proved once more that young kids have an extraordinary way to master computer usage and in particular navigate and take full advantage of the platform’s features, not even visiting the game instruction areas. Older players (parents or teachers) found these particular areas helpful enough to get started the virtual tour and master the main interface functions in a reasonable amount of time. This observation was confirmed by the questionnaires as well.

Is it compelling/engaging for the target audience? (realism, satisfaction)

One of our greatest challenges during the design of the environment was to make it engaging for the players. In this aspect, the relative success of SimSafety can be attributed to several factors, some of which are also summarised in previous sections (apart of course from the main environment components and activities):

- a comprehensive scoring system, which is in turn closely related to a comprehensive set of potential actions, is a strong motivating parameter, especially for young players who are eager to understand ‘right’ and ‘wrong’ moves and actions in order to achieve higher performance
- fancy, high quality graphics count very favorably to the environment’s realism and overall satisfaction
- finally, the “multiplayer” nature of the platform which gives players the opportunity to communicate live and openly using text messages, voice chat or even gestures increases the kids’ willingness to come back to the virtual world for another game session

Does learning in the virtual world transfer to real life? (learning experience)

The resemblance of aspects of the virtual environment to real life led to our early expectation that learning and experiences in SimSafety might transfer to real life in different ways. In several cases during the pilot implementation phase this was intensified by the kids reaction to issues like ethics and professional and/or ethical codes especially when using the Internet, which in some cases led to serious class discussions and probably cultivated a meticulous attitude (to some of the kids) towards (re)visiting the environment and experimenting with the provided activities.

Summarising this section, we could argue under a relatively high degree of confidence that SimSafety has the main ingredients of a serious game. Players become engaged in an entertaining environment which can excite their imagination, need for communication and fun while increasing their awareness and shaping their attitude towards using Internet safely.
VI. CONCLUSION – FUTURE PROSPECTS

In this work we briefly outline under a rather technical perspective our experiences from developing SimSafety, a virtual world targeted to young kids (as well as parents and teachers) who wish to have fun while at the same time learn how to deal with Internet risks and dangers. Although at an early stage of development, our approach seems promising and is expected to flourish in the following years as an immersive learning paradigm.

Regarding current limitations, mainstreaming of the application to multiple school labs both in terms of server performance as well as typical system requirements is among the most important ones. The need to provide conceptually rich activities will always remain a challenge for the designers and the developers of SimSafety. To this extent, future enhancements of the platform indicatively include the following:

- more sophisticated use of audio for the deployment of educational activities
- enhancing AI aspects of NCP behaviour
- automating the import of other OpenSimulator applications’ world and graphics
- experimenting with newer OpeSimulator versions (hopefully to be released soon by its enthusiastic community) in terms of supporting many concurrent users
- codifying and automating the scripting content of certain events, which would subsequently facilitate the deployment of “the quest for hidden treasure”-like scenarios.

REFERENCES


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MobLang—Learning Foreign Languages via Mobile: A Cross-Country Comparison of End Users’ Profiles, Motivation, and Preferences

T. Taraszow, E. Aristodemou, V. Slavidou, J. Burston and Y. Laouris

Abstract—MobLang is a Lifelong Learning Project to provide learning resources for minority languages within certain communities in the EU. It applies Mobile Assisted Language Learning (MALL) to support minority and/or less-frequently used and less-taught European languages. The aim is to promote intercultural dialogue especially in former European conflict regions or regions with many minority groups through promotion of linguistic diversity.

In order to develop mobile language courses that end users are satisfied with and will use potential MobLang end user target groups have been identified and surveyed with respect to their usage habits, learning preferences and wishes.

The results show that—although five different target groups were investigated who live in different environments with different cultural and educational backgrounds—potential MobLang end users are a homogenous group of frequent Internet users who don’t use the Internet via mobile phone due to high costs. Their main motivation to learn another local language is for personal reasons. As reported by the respondents a mobile language course should definitely include survival phrases and dialogues in the form of games/crosswords/puzzles, listening and reading activities as well as find the matching word activity and fill in the missing word activity.

The results will be taken into account during the development of MobLang’s language courses.

Index Terms—MobLang, Mobile Assisted Language Learning (MALL), Second Language Learning.

I. INTRODUCTION

Language barriers between individuals of different ethnic groups living in the same country, or Europeans visiting other countries, hinder natural interaction. Communication in a foreign language can hold back the establishment of friendships and closer relationships, thus preventing fruitful intercultural exchange and dialogue. Exploiting technology and especially the recently emerging developments in mobile learning offer a viable alternative. Mobile phones are optimal learning tools that enable people to learn anytime, anywhere, and at their own pace, even during leisure time.

MobLang (www.moblang.eu) is an innovative foreign language teaching and learning tool aiming at designing, developing, and publishing language learning courses delivered via the mobile phone. MobLang applies MALL to support the following less frequently used and taught languages: Basque in the Basque country, Turkish and Greek in the separate parts of Cyprus, Albanian and Turkish in Greece, and Irish in Northern Ireland. Potential target groups are part of MobLang’s development phase and have been asked for their needs, preferences, and usage habits so as to ensure that the final mobile language course will be of interest, value and usefulness to the end users. User specific micro courses will be embedded in a social and cultural context, which will include activities such as lectures, exercises, games, quizzes, as well as access to a live tutor. The identified target groups for MobLang are listed in Table I.

<table>
<thead>
<tr>
<th>Number</th>
<th>Country/Region</th>
<th>Target Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Basque country</td>
<td>Basque learning Basque</td>
</tr>
<tr>
<td>2</td>
<td>Cyprus</td>
<td>Cypriots Learning Cyprus Languages</td>
</tr>
<tr>
<td>3</td>
<td>Cyprus</td>
<td>University students</td>
</tr>
<tr>
<td>4</td>
<td>Cyprus</td>
<td>High school students</td>
</tr>
<tr>
<td>5</td>
<td>Cyprus</td>
<td>Civil servants</td>
</tr>
<tr>
<td>6</td>
<td>Greece</td>
<td>Greeks related to Albanians</td>
</tr>
<tr>
<td>7</td>
<td>Greece</td>
<td>Greek tourists to Albania</td>
</tr>
<tr>
<td>8</td>
<td>Greece</td>
<td>Greeks with Turkish relations</td>
</tr>
<tr>
<td>9</td>
<td>Greece</td>
<td>Greeks interested for personal reasons</td>
</tr>
<tr>
<td>10</td>
<td>Northern Ireland</td>
<td>10-year old Irish high school student</td>
</tr>
<tr>
<td>11</td>
<td>Northern Ireland</td>
<td>Irish parents</td>
</tr>
</tbody>
</table>

The here presented research was conducted within the MobLang project which is co-financed by the EC ‘Education and Culture’ DG, Lifelong Learning Programme.
The purpose of the study was to answer four research questions:
1. What is the profile of the identified potential target groups (age, gender, usage of mobile phone and Internet)?
2. What is the identified potential target groups’ main motivation to learn a second local language?
3. Which is the identified potential target groups’ preferred way to learn a foreign language?
4. Do the identified potential target groups differ in their profile, motivation, and preference across the participating countries?

We firstly summarize the research that describes the role of vocabulary acquisition in second language learning with research that suggests using mobiles can be well suited for second language learning. Next, we explain the research methods. Finally, we present our results.

II. BACKGROUND AND THEORETICAL FRAMEWORK

A. Second Language Learning

Without grammar very little can be conveyed, without vocabulary nothing can be conveyed [1].

As [1] pointed out, even more important than grammar is vocabulary and its acquisition so as to successfully understand and produce language. This approach is supported by [2] who is in favor of greater attention to basic vocabulary acquisition and therefore against the traditional approach of emphasizing grammar during the teaching process of a second language. [2] identifies five fundamental principles of vocabulary acquisition in foreign language learning:

1. Present new words frequently and repeatedly in the input.
2. Use meaning-bearing comprehensible input when presenting new words.
3. Limit forced output during the early stages of learning new words.
4. Limit forced semantic elaboration during the initial stages of learning new words.
5. Progress from less demanding to more demanding vocabulary related activities.

For foreign language learners, vocabulary acquisition necessarily begins with the learning of word forms, the learning of basic word meanings and the establishment of an association between the two. This is a process that can only be realized through repeated encounters with lexical items in contexts that re-enforce meaning [3], [4], whence the first two principles of [2]. Principles three and four derive from [5] and [2]’s own studies that demonstrate the negative effects on vocabulary retention that results from requiring beginning-level learners to use new vocabulary before it has been adequately acquired. Learners have only so much language processing capacity and whatever has to be expended in extended output activities comes at the expense of the input processing needed to encode word forms. Barcroft’s last principle recognizes that extended output activities, such as the building of semantic networks (e.g., synonyms, antonyms, word families, etc.) have their place in the curriculum, but at later stages of development, i.e., after basic encoding has taken place.

The authors of [6] and [7] stress the critical importance of lower-order skills in the vocabulary acquisition of beginning-level learners. Bottom-up processing, specifically the recognition of orthographical form, is an essential element of word knowledge that must be mastered before higher-order skills can be developed. Inefficient orthographic processing hinders lexical retrieval and thus adversely affects language production as well as comprehension.

[8] identifies three processes necessary for thorough acquisition of new vocabulary: noticing, retrieval, and generative use. Noticing, of course, is the essential first step in any type of language learning [9]. With respect to vocabulary acquisition in particular, Nation relates noticing to decontextualization, i.e., the ability of learners to perceive lexical items as part of the linguistic system as opposed to just being part of the message in which it occurs. Drawing on the work on memory of [10], [8] emphasizes the need not just for repetition, but specifically for repeated opportunities to retrieve, and thereby actively reconstruct, form-meaning pairings. Such retrieval can be either receptive or productive. Receptive retrieval involves perceiving form and retrieving the corresponding meaning. Productive retrieval on the other hand involves starting with meaning and associating it with an appropriate form. While both forms of retrieval are essential to vocabulary acquisition, there is evidence to suggest that the greater effort required for productive retrieval results in better learning [11]. The third process identified by [8], generation, involves the recognition or use of previously encountered words in different contexts, that is to say their recontextualization.

Results of [12]’s study of incidental lexical acquisition lend support to the critical role of retrieval and generation in vocabulary learning. They correlate vocabulary acquisition with task involvement, “the greater the involvement, the greater the learning”. According to [12], three major factors affect involvement: need, search and evaluation. Searching only takes place when one of the constituents of a form-meaning pair has to be recovered. Task involvement with searching is considered to be moderate if learners have to search for the meaning of the item (i.e., receptive retrieval) and strong if learners have to search for the form to express the meaning (i.e., productive retrieval). Evaluation involves the effort involved in determining the appropriateness of the use of lexical items in new contexts (i.e., generation).

The Lexical Approach advocated by the author of [13]-[15] is of particular relevance to the teaching of beginning-level language. Even more so than Barcroft, Lewis insists upon the primacy of vocabulary acquisition in language learning.

Findings from psycholinguistics and corpus linguistics along with second language acquisition insights deriving from Input Processing theory and the Lexical Approach thus combine to provide very good reasons to foster initial foreign
language learning through basic vocabulary acquisition. Specifically, it is known with reasonable certainty that:

1) Language learners intuitively realize that vocabulary mastery is key to language comprehension and production and don’t need to be persuaded of its importance.

2) Input processing constraints dictate that language learners will instinctively attend to lexis more than grammar for comprehensible input.

3) Input processing constraints dictate that grammatical input cannot become part of linguistic uptake until a threshold level of lexical mastery is attained.

4) At beginning levels, the essential task of the learner is to master basic form-meaning relationships.

5) Repeated opportunities to retrieve form-meaning pairs play a critical role in vocabulary learning.

6) At beginning levels, a focus on word forms, especially orthography, is critical to the retention and retrieval of vocabulary.

7) Extensive output activities need to follow, not precede, lexical encoding.

8) Much of the grammar of a language is in fact encoded in the lexicon itself and is extracted from it as linguistic competence increases.

9) Lexical chunking is critical to vocabulary retention and retrieval and is thus essential to language comprehension and production.

B. Mobile Language Learning

One might wonder why use a mobile phone for learning in general and for language learning in specific. This section tries to answer this valid question by summarizing characteristics of mobile learning as well as pointing out advantages.

[15] emphasizes that mobile learning “allows ... students to exploit small amounts of time and space for learning...”, meaning “regular practice in short bursts” [16]. Besides learners’ flexibility of when, where, and how often to learn, mobile technology moreover offers flexibility with respect to course type. Learning courses of the traditional type where the teacher gives information to the learner can be designed. Also, courses that are similar to question-answer-sessions where learners ask questions and receive answer from the teacher are feasible to design. It is also possible to design interactive courses between learner and teacher. This differentiation was made by [17] who distinguishes three diverse modes of operations: (1) push mode, (2) pull mode, and (3) interactive mode. The push mode is a one-way where SMS messages go from teacher to learner. Moreover, management of timing, frequency, and repetition are determined by the teacher. In the pull mode, learners can ask for information based on a list of contents; the information/answer will be delivered from the teacher. In the interactive mode, the teacher’s messages are pushed and pulled, i.e. learners respond to tasks and receive feedback to their performance.

Looking at potentials of SMS messages in specific, they help learners build their command of vocabulary as words can be presented through definitions and examples while using bulk SMS services to define a group of recipients as well as the schedule of SMS sending process [16].

In their study, the researchers used the push mode of operation to send SMS messages to support vocabulary learning at beginner’s level of Italian in order to investigate the acceptability of the push mode [16]. While the majority appreciated the experience and found the SMS either useful or joyful, there was a wide range of acceptable message frequency with some even having had a feeling of intrusion. Moreover, the students expressed a desire to not only reply to the SMS but also receive feedback on their replies. Although the authors claim that the students valued the SMS language course, the results show that a push mode is rather restrictive, not allowing learners to actively participate in their own learning process.

A more sophisticated approach was taken by [18] who used a web based intelligent learning system accessible via PC and mobile in order to teach English vocabulary to intermediary level students. The results show a preference for the web based course with not even half of the participants having used the mobile version. Moreover, mobile learners completed fewer lessons than web learners while being engaged with activities longer via their phone than via PC. Although the results of [18]’s study cannot be generalized due to small sample size, the results not only emphasize that learners’ engagement is important and can be increased by understanding users’ needs as well as showing compelling reasons for usage but also show the potential of mobile language learning.

III. Method

A. Participants

460 individuals (273 females and 179 males; the remaining did not indicate their gender) participated in the survey. The majority with 33% of the participants belonged to the 19-30 age group, followed by the age groups 31-40 with 26%, 40+ with 21%, and 10-18 with 20%.

B. Data Analysis and Measures

In order to investigate needs and preferences regarding second language learning and mobile learning of potential end users, in addition to their mobile usage characteristics a questionnaire was used.

The questionnaire consisted of several sections: demographics (age, gender, nationality, education, and occupation), Internet access and usage via PC and mobile, type of mobile phone, motivation to learn a second language, second language learning and mobile learning of potential end users, in addition to their mobile usage characteristics a questionnaire was used.
and translated by each partner organization in order to fulfill national cultural and ethical standards.

IV. RESULTS

In the following sections, the results giving answer to the research questions will be presented separately according to the identified target groups across the participating countries/regions. For simplicity reasons, in this article the results are only presented for the most frequent target group per region, i.e. Basque learning Basque, Cypriots Learning Cyprus Languages, Greeks related to Albania, Greeks with Turkish relationships, and Northern Irish secondary school students.

A. Basque learning Basque

1) Profile

Seventy one Basques (36 females and 33 males; 2 did not indicate their gender) participated in the survey. The age distribution shows that the majority of the target group ‘Basque learning Basque’ belong to the 31-40 (39%) and 40+ (39%) age groups, indicating that in the Basque country mostly adults showed interest in MobLang. However, the age group 19-30 (21%) also has a significant number of people which cannot be ignored.

The great majority of the respondents (81%) responded to use the Internet almost every day, whereas much smaller numbers use the Internet less often (9% once per week, 7% once per month, and 3% never).

Only a very small number (11%) reported use of the Internet via mobile phone. The most prominent reason that participants gave for not connecting to the Internet via their mobile was no interest in actually doing so (43%). A smaller number of people reported that the reason they don’t connect is because it is too expensive to connect (25%), as well as because their phone does not offer the option to connect (19%). Only 3% reported to not know how to connect.

2) Motivation

Most participants in the survey reported that they want to learn Basque because of personal interest (50%), followed by job related reasons (36%), and thereafter for reasons of communication with family and friends (19%) as well as travelling reasons (17%).

3) Preferences

Respondents were asked to rank their preference regarding the following different types of possible course content: survival phrases/questions, short basic dialogues, vocabulary (i.e. numbers, days, months, and terminology), pronunciation, and access to a native speaker. Survival phrases were ranked number 1, dialogues were ranked 2, vocabulary was ranked 3, pronunciation was ranked 4, and access to a native speaker was ranked 5.

Respondents were finally asked to rank their preference regarding the following different types of learning methods: games/crosswords/puzzles, quizzes, filling in the missing word, matching words (e.g. synonyms, antonyms, definitions), reading comprehension, and listening comprehension. Games/crosswords/puzzles, filling in the missing word, and listening comprehension were ranked number 1 by the majority, reading comprehension was ranked 2, and both matching words quizzes were both ranked 3.

B. Cypriots Learning Cyprus Languages

1) Profile

One hundred thirty one Cypriots (73 females and 54 males; 4 did not indicate their gender) participated in the survey. The age distribution shows that the majority of the target group ‘Cypriots Learning Cyprus Languages’ (CLCL) belong to the 40+ age group (40%), followed by 31-40 (33%) and 19-30 (26%) age groups, indicating that in Cyprus adults of all ages showed interest in MobLang.

Almost all surveyed Cypriots (97%) responded to use the Internet almost every day, whereas a much smaller number reported to use the Internet once per week (3%).

The great majority (80%) stated that their mobile phone has Bluetooth with a minority (8%) who did not know about the Bluetooth capability of their phone. A third (31%) reported use of the Internet via mobile phone. The most prominent reason that participants gave for not connecting to the Internet via their mobile was too expensive fees (23%). A smaller number of people reported that the reason they don’t connect is because they are not interested (17%), they don’t know (15%) as well as because their phone does not offer the option to connect (13%).

2) Motivation

Most participants in the survey reported that they want to learn either Greek, Turkish or both because of personal interest (74%), followed by reasons of communication with family and friends (47%), thereafter for job related reasons (24%), as well as for business (18%) and travelling (17%) reasons.

3) Preferences

With regard to types of course content, CLCL preferred survival phrases (rank 1), closely followed by dialogues (rank 2). Vocabulary was ranked 3, pronunciation was ranked 4, and access to a native speaker was ranked 5.

Looking at learning methods, CLCL had a clear preference for listening activities with rank 1. Reading and matching words activities were both reached rank 2. Games/crosswords/puzzles and filling in the missing word activity both reached rank 3; quizzes landed on rank 6.

C. Greeks related to Albanians

1) Profile

Forty Greeks (26 females and 13 males; 1 did not indicate the gender) who are related to Albanians participated in the survey. The majority of the respondents were young adults belonging to the age group 19-30 years (53%). A third belonged to the age group 31-40 (33%) and a smaller number of respondents to the age group 40+ (13%). The age
distribution shows that mainly adults of younger age are interested in MobLang.

Almost all respondents reported use of the Internet on daily basis (93%); 5% reported to use the Internet weekly and 3% monthly.

A small number of respondents reported use of the Internet via their mobile phone (18%). When asked why they do not use the Internet via mobile phone most of the participants reported to not due to its expensiveness (48%). Some participants stated not to know how to do so (24%) as well as their phone does not offer the possibility to connect (21%). A small number of people responded not to be interested (11%).

2) Motivation
The great majority of Greeks related to Albanians reported to learn Albanian out of personal reasons (75%), followed by small number of people responded not to be interested (11%).

A few students (12%) reported use of the Internet via mobile phone. The top reason that students gave for not connecting to the Internet via their mobile was three fold: phone cannot connect (30%), they don’t know how to connect (30%), and high costs for connecting (27%).

3) Preferences
With respect to course content, respondents’ preference was survival phrases at rank 1, closely followed by dialogues at rank 2. Next the following types of course content followed: vocabulary at rank 3, access to a native speaker at rank 4, and pronunciation at rank 5.

Looking at learning methods, respondents had a clear preference for games/crosswords/puzzles (rank 1). Matching words activity followed (rank 2) and correct answer activities (rank 3). Reading and fill in the missing word activities followed both at rank 4. Listening activities were rated at rank 5 and quizzes at rank 6.

D. Greeks with Turkish relationships
1) Profile
Fifty nine Greeks (39 females and 19 males; 1 did not indicate the gender) who are in relation with Turkish living in Greece participated in the survey. The majority of the target group ‘Greeks with Turkish relationships’ are young adults and belong to the age group 19-30 (44%). Almost a third belonged to the age group 31-40 (27%), followed by the age groups 10-18 (19%) and 40+ (10%). This distribution shows a wide range of interested individuals who want to learn Turkish.

Two thirds (67%) of the respondents reported to use the Internet almost every day; whereas 19% of the respondents reported to use the Internet weekly and monthly (14%) respectively.

A small number of people (21%) stated to use the Internet via mobile phone. The top reason that participants gave for not using the Internet is its expensiveness (45%). The second prominent reason was that the phone does not have the capability to connect to the Internet (24%), followed by not knowing how to do so (15%) and no interest (14%).

2) Motivation
The great majority of the participants (58%) want to learn Turkish for personal reasons. Other reasons mentioned by the respondents were travelling (29%) and communication with friends and family (15%).

E. Northern Irish secondary school students
1) Profile
Sixty two secondary school students (32 females and 30 males), aged between 10 and 18 participated in the survey.

Almost all surveyed students (94%) reported to have Internet access. The majority of those responded to use the Internet on an almost daily basis (57%), followed by Internet usage once a week (23%), and once per month (15%). Only 7% of the students said to have never used the Internet.

A few students (12%) reported use of the Internet via mobile phone. The most prominent reasons that students gave for not connecting to the Internet via their mobile was three fold: phone cannot connect (30%), they don’t know how to connect (30%), and high costs for connecting (27%).

2) Motivation
Most students reported that they want to learn Irish because of personal interest (62%), followed by travelling reasons (26%), and for communication with friends and family (10%).

3) Preferences
Looking at course content, students had a clear preference for short basic dialogues (rank 1) and pronunciation (rank 2), then followed by vocabulary (rank 3), survival phrases (rank 4), and access to native speaker (rank 5).

With respect to learning methods, students showed a clear preference towards games/crosswords/puzzles with rank 1. Quizzes followed with rank 2, followed by reading and listening comprehension, matching words, filling in missing words, and multiple choice questions all on rank 3.

V. Conclusion
The purpose of this study was to mainly investigate motivation and learning preferences of potential end users to MobLang within several European countries. Four research questions guided the study to which the answers will be given here.

1. What is the profile of the identified potential target groups (age, gender, usage of mobile phone and Internet)?
Both females and males showed interest in MobLang although a slightly higher participation of females was observed. In the Basque country and Cyprus mainly individuals between the ages of 31 to 40+, whereas in Greece mainly younger individuals aged 19-40 showed interest in learning another local language via mobile phone. With respect to age potential...
end users in Northern Ireland differ from the other countries as the target group is clearly defined with secondary school students.

The great majority of all target groups reported to use the Internet on an almost daily basis, except for Northern Irish students who reported slightly less usage. With respect to Internet usage via mobile phone as well as reasons for not doing so similar results were obtained from all participating countries: a small number of people use the Internet through their mobile and expensive connecting fees was given as first or second reason for not doing so.

2. What is the identified potential target groups’ main motivation to learn a second local language?

All investigated target groups reported the wish to learn another local language out of personal reasons. Unfortunately, this result does not allow telling for which personal reasons exactly and therefore might include all other answer options (e.g. communication with friends and family, job, travelling). Focus groups with all potential end user groups will be held in order to clarify this issue. In future questionnaires general answer options like this one should be avoided in order to obtain precise and interpretable data.

3. Which is the identified potential target groups’ preferred way to learn a foreign language?

With the exception of Northern Irish students, respondents clearly preferred survival phrases and dialogues to be included in the language course. With respect to learning activities games/crosswords/puzzles were ranked first by three target groups. Moreover, listening and reading activities as well as find the matching words and fill in the missing word activities were under the more preferred learning methods to be included into a mobile language course.

4. Do the identified potential target groups differ in their profile, motivation, and preference across the participating countries?

Although the potential target groups vary with respect to their way of living, cultural and educational background, professional and social status all individuals interested in the MobLang course seem to be quite homogenous in age, Internet usage, motivation to learn another local language, as well as learning preferences and wishes.

The knowledge of who MobLang’s potential end users are and what motivates them is key to creating a solution that they are able to use and will find useful. MobLang development team will use these results in order to develop target specific language courses delivered via mobile phone.

ACKNOWLEDGMENT

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Collaborative storytelling with Wiki: a case study in Spanish rural schools

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Abstract—The isolation of rural communities creates special needs for teachers and students in rural schools. Within the framework of SoRuraLL project, we have investigated the potential of social software tools for enhancing teaching and learning possibilities in rural settings. In this context, a new educational scenario was co-designed by researchers and rural school teachers, which consists of collaboratively writing a story, among distant schools, through the use of a Wiki application. The scenario has been implemented in two Spanish rural schools. This paper aims to describe the Wiki storytelling educational activity, as well as to analyze the related learning outcomes and impacts on the participating rural schools.

Index Terms—Wiki, Storytelling, Choose Your Own Adventure, social software, rural education.

I. INTRODUCTION

It is recognized that rural communities are one of the disadvantaged groups in Europe due to their physical distance and isolation from other communities. Rural schools and teachers, as part of such groups, encounter difficulties in accessing services and resources for working with peers. Although internet access is changing the landscape of the rural teacher, the possibility of working with colleagues in professional development tasks is not completely provided. New opportunities for bridging the gap between rural and urban schools could emerge through the use of ICT tools.

Rural education in Spain has been given special attention and has significantly improved in the recent years [1]. With the political and administrative decentralization of the educational system, each autonomous regional government has developed educational structures and services adapted to the needs of rural schools. However, there are still clear needs to be tackled [2].

Among them, there is a lack of continuous training for rural school teachers aiming to keep pace with new didactical approaches, with the use of ICT in the classroom, with dealing with diversity, and for professional development. Indeed, rural schools need to be re-thought the as embedded within the actual society and its features.

The SoRuraLL project (LLP Program, KA3, 2009-2010) aims to investigate the potential for enhanced lifelong learning offered by social networking tools and platforms to those living in geographically and socio-economically disadvantaged rural areas. Experimental learning approaches are being developed and implemented, examining the potential offered by these new trends and tools for the alleviation of the disadvantage suffered by such populations in Europe through the enhancement of opportunities for effective and meaningful lifelong learning. The project is being implemented in five different countries. In this context, several Spanish rural multigrade primary schools, with students aged between 3 and 12, have been conducting common educational activities enhanced by social networking tools. Their participation has been coordinated by Future Learning research team (www.futurelearning.org), an initiative within the University of Barcelona.

One of the main outcomes of the SoRuraLL project is a web-based platform called SoRuraLL Virtual Learning World (VLW). It has been co-designed by the project’s partners and consists of a user friendly web interface to a private environment adapted to the evolving interests of the rural communities. It integrates several social networking tools carefully structured, organized and interrelated, materializing the concept of a shared space for communication, exchange, and mutual support among users. Content within the platform can be added and edited by registered members of the SoRuraLL network. While certain parts are made public for external audience to read and comment, other parts remain accessible only to the SoRuraLL community. The VLW does not aim to integrate the most powerful, fancy or sophisticated tools; rather, it combines the technologies which, in a natural way, have emerged as appropriate to the context of the rural schools. Within the Spanish network of rural schools, the VLW provides teachers with a private platform integrating several 2.0 applications adapted to the specific needs of the learning scenarios they were willing to implement.

The VLW, by providing a private Wiki platform, enabled teachers to conduct a collaborative Wiki-storytelling activity,
which they would not have been able to conduct within other applications. This activity consisted, for two schools (CEIP Rellinars and CEIP Sant Serni – Prats), in co-designing a hypermedia story of the “choose your own adventure” type, by using a Wiki application.

This paper aims at describing the Wiki storytelling scenario, and at analyzing its impacts and outcomes in the rural schools. The first section gives some background on social software enhanced learning and storytelling. A second section aims at formulating the needs of Spanish rural schools. Afterwards, the article describes the Wiki storytelling educational scenario, as well as its implementation process. Finally, a last section describes the results and learning outcomes of this implementation.

II. SOCIAL SOFTWARE ENHANCED LEARNING

Owen et al. [3] formulate some key attributes of social software in relation to education, such as:
- The communication between groups (to review each others’ actions and to allow those actions to benefit each other member of a community);
- the communication between many people (to publish for a large audience);
- gathering and sharing resources (gathering and making material available);
- collaborative collecting and indexing of information (new ways of organizing and finding knowledge objects);
- new tools for knowledge aggregation and creation of new knowledge.

The most common social software tools, together with their functions, are described in Table 1.

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicative</td>
<td>To share ideas, information, and creations.</td>
<td>Blogs, Audio blogs, Video blogs, IM-type tools, Podcasts, Wikis</td>
</tr>
<tr>
<td>Collaborative</td>
<td>To work with others for a specific purpose in a shared work area.</td>
<td>Editing/writing tools, Wikis</td>
</tr>
<tr>
<td>Documentative</td>
<td>To collect and/or present evidence of experiences, thinking over time, productions, etc.</td>
<td>Blogs, Video blogs, E-portfolios</td>
</tr>
<tr>
<td>Generative</td>
<td>To create something new that can be seen and/or used by others.</td>
<td>Mashups, Virtual Learning Worlds (VLWs)</td>
</tr>
<tr>
<td>Interactive</td>
<td>To exchange information, ideas, resources, materials.</td>
<td>Learning objectives, Social bookmarking, VLWs</td>
</tr>
</tbody>
</table>

According to Désilet and Paquet [5], “Wikis are simple to use, asynchronous, web-based collaborative hypertext authoring systems” (p. 1). Recently, Wikis have been widely used in educational settings, as they can enhance collaborative learning processes. In a Wiki-based learning scenario, students co-write and co-edit web pages. When contributing to a web page, they must read related materials carefully and therefore yield high achievement. Furthermore, being aware of the fact that articles can be read by the public, students may read critically and write responsibly [6]. During such learning processes, peer interaction can motivate participants, who collaboratively construct shared knowledge. Such benefits encourage more and more educators to adopt Wiki-based collaboration. Indeed, these settings are reported to be able to form effective collaborative learning processes.

III. SOCIAL SOFTWARE ENHANCED STORYTELLING

According to Alexander and Levine [7]:

“A story has a beginning, a middle, and a cleanly wrapped-up ending. (…) It follows a trajectory, a Freytag Pyramid—perhaps the line of a human life or the stages of the hero’s journey. A story is told by one person or by a creative team to an audience that is usually quiet, even receptive. (…) Today, with digital networks and social media, this pattern is changing. Stories now are open-ended, branching, hyperlinked, cross-media, participatory, exploratory, and unpredictable. And they are told in new ways: Web 2.0 storytelling picks up these new types of stories and runs with them, accelerating the pace of creation and participation while revealing new directions for narratives to flow” (p. 40).

Currently, collaborative writing is the most common application of educational use of Wikis [8]. Among others, tasks can be storytelling. As an example, Désilet and Paquet [5] present a case study in which primary school students used a Wiki for collaborative storytelling. By using Wikis to write hyperlinked, non-linear stories in teams, children could learn through practice on several fronts. To Alexander and Levine [7], Wikis have emerged as storytelling tools, as they can constitute “platforms for a new form of writing” and “shared writing spaces for authors separated by space and time”. Furthermore, “their accretive function, whereby content piles up over time, is well suited for world-building exercises” (p. 52).

Thus, Wiki enable multiple authors to co-design and co-edit a story, integrating various types of media (pictures, videos, sounds, texts), and using a multilinear style (hypertextual), thus promoting new ways of creating and experiencing narrative, often nonlinear and increasingly media-rich.

IV. NEEDS AND INTERESTS OF SPANISH RURAL SCHOOLS

Two focus group sessions conducted with four rural schools teachers within SoRuralLL project, enabled to formulate several interest and needs of Spanish rural schools, as listed below.

A. Need for communication with other rural communities.

According to teachers, there is a need to communicate and to participate in telematic-based projects with other rural schools featured by the same context and needs. They stress
that social networking tools can help in enhancing common educational projects.

B. Need for support, guidance and familiarization to ICT tools.

Teachers stress that they need training to keep pace with new pedagogical approaches, deal with diversity, and use ICT in the classroom and for professional development. Moreover, they need to find tools that promote the autonomy of students when using computers. They also value the fact of building ICT-based educational resources and share them with other teachers so resources are not lost.

C. Need for language learning.

Teachers stress that social networking tools constitute a perfect context for language learning. Indeed, they could use such tools in order to communicate with other Spanish schools, thus practicing the different Spanish regional/national languages, as well as to learn English in a context of collaboration with schools located in other countries.

D. Need for sharing teaching methodologies.

Teachers stress that social networking tools can enable them to exchange teaching/learning resources and activities with peers.

E. Need for a better visibility of rural schools

In the words of teachers, it is important that the public administration (both at a national and regional level) can see that rural schools can do a lot of things if they are well equipped. Teachers consider rural schools as islands which need tools to be linked.

F. Need for common goal-driven educational scenarios

A need for conducting common educational projects, enhanced by goal-driven scenarios, among distant rural schools, has been identified. Indeed, schools need to be involved in a contextualized collaboration process as they look for meaningful activities adapted to their specific context. They seek for fruitful interactions with concrete and well-defined goals and outcomes.

According to the needs identified, the University of Barcelona research team, together with rural schools’ teachers, co-designed a new learning scenario, so called “collaborative storytelling with Wiki”. Indeed, teachers had previously expressed their curiosity towards the Wiki tools, and stated that they often conduct activities related to storytelling. Thus, the scenario consists in involving several distant schools in co-writing a story type “Choose you own adventure”, in order to work on several learning subjects, such as Spanish, reading, writing and digital literacy.

This scenario aimed at answering to the above specific interests and needs of Spanish rural schools. Indeed, this telematic-based activity would represent a meaningful context to share educational project among different rural schools. Moreover, using a wiki within the classroom would enable teachers to discover a new tool for pedagogical purposes, as well as promoting the autonomy of students when using ICT. As an answer to the need for language learning, the scenario would offer an opportunity, for students, to practice Spanish (most of the students of Catalan schools only use the Catalan language). It was expected that the activity would enhance the visibility of rural schools, as the story would be made public from the SoRuraLL VLW. Finally, the scenario constitutes a common educational project in which different distant schools would interact in order to achieve specific goals, in the context of an activity adapted to their specific context.

More specifically, the specific learning objectives were the followings:
- to practice creative writing skills, artistic skills;
- to practice linguistic communication skills (Spanish);
- to practice reading skills;
- to practice digital skills, such as Internet search, video and image editing, etc.;
- to improve social and collaboration skills, both face-to-face and virtually.

The scenario was designed to enhance the curricular objectives of schools. Indeed, the organic law of education (LOE 2/2006) integrates basic skills in primary education curricular objectives, in order to enable students to reinforce their personal development, social abilities, artistic sensibility, creativity and affectivity, as well as to acquire basic cultural skills related to expression and oral understanding, reading, writing, counting, etc.

V. IMPLEMENTATION OF THE SCENARIO

Two schools participated in the design of the story:
- the CEIP Sant Serni (http://www.xtec.cat/ceipsantserniprats); 16 students, aged between 6 and 12, participated in the weekly sessions.
- CEIP Rellinars (http://www.xtec.cat/ceiprellinars); the school has 63 students aged between 3 and 12. The Wiki storytelling activity was organized through a weekly workshop in which all interested students could participate freely. An average of 10 students attended the workshop each week.

The activity has been organized within weekly sessions of one-two hours conducted during a three month period. Students were assigned to small groups of two-three kids guided by their teacher. Each group wrote a section of the story and illustrated it with pictures and/or videos which they could either make themselves, or search in the Internet. The story was developed through the Wiki application of the SoRuraLL VLW. It was organized in different nodes (each node constitutes a place of the story, in which a specific action takes place) and actions (that go from a place to another). Each node corresponds to a Wiki page. Thus, the story constitutes an interactive hypertextual environment.

The activity was conducted according to the following steps:

a. The first school designed the beginning of the story, by
answering the following questions (brainstorming among teacher and students):
- What is the story about?
- When does the story take place?
- Who is the hero (age, appearance, etc.)?
- What is the objective of the story?

On this basis, students wrote the first section of the story (the first node) in a collaborative way in the VLW Wiki platform, with texts and videos. Moreover, they wrote three possible actions between which the hero would have to choose.

b. The other participating school read the story through a projector. Afterwards, students were assigned in groups and wrote the continuation of one of the actions set by the first school.

c. Phase B repeated until each path arrived to the predefined objective of the story (i.e. the end).

The result of the activity (i.e. the final story) is a consistent multi-ending narrative composed of 23 Wiki pages, including 14 possible endings. Nine pages have been posted by CEIP Sant Serni, and 14 by CEIP Rellinars. The story is available at the following link:


Moreover, two videos of the schools conducting the activity can be found at: http://daisy.cti.gr/sorurall/drupal/es/node/277 and http://daisy.cti.gr/sorurall/drupal/node/251

VI. EVALUATION OF THE ACTIVITY

Observation sessions in the schools, as well as interviews with the teachers of the two participating schools, enabled to evaluate the implementation of the scenario.

The overall evaluation has been generally positive. Benefits, both for teachers and students, have been observed in relation to various educational aspects, such as the familiarization with 2.0 technologies, increased collaboration skills, increased language learning and narrative skills, boost of the motivation, and developing ethical behavior:

A. Familiarization with 2.0 technologies

The activity provided the schools with a context to use 2.0 technologies in learning settings. Indeed, students could experiment new social software applications, such as Wikis. Moreover, they had the opportunity to practice their previously acquired skills with 2.0 tools (e.g. Youtube), and discover new ways of their possible utilizations in educational settings. Indeed, they could appreciate new possibilities of such tools, such as communication, achievement of a common project, co-construction of knowledge and rapprochement.

B. Collaboration skills

As students were aware of the fact that what they wrote would be read and edited by other students, they felt more involved in the activity. Indeed, they realized that they had to adapt their discourse, language and narrative to the other school’s students.

C. Language learning and narrative skills

The activity enabled students to practice Spanish reading and writing, which is important as the two participating schools are located in Catalonia, and most of the students do not have the occasion to practice Spanish.

Moreover, the narrative aspect of the activity enabled students to develop reading, writing and imagination skills, in reaction to what the other students had written.

D. Motivation

The collaborative aspect of the activity increased students’ motivation, who were aware of the fact that their contributions would be read by other students. They were very impatient to see the other school’s feedback. Furthermore, the complete story is open for view from external audiences (i.e. the Internet). This represents a motivational element for students and teachers when conducting the activity. Indeed, as students and teachers are aware that they have an audience which goes outside the classroom, they feel more responsible and involved with the content they publish, and adapt this content according to the type of audience, thus increasing the quality of the produced content.
E. Ethics

As an unexpected outcome, students have learnt and developed ethical behaviors towards external peers. Indeed, it has been observed that schools did not edit the pages posted by others, in order to not offend each other.

Certain aspects of the activity might further be improved. As an example, the story has evolved in many ramifications, which caused difficulties for students in perceiving it globally. Students sometimes got confused and lost in its structure.

VII. CONCLUSIONS

Learning occurs in a socio-cultural system in which learners use various tools and multiple forms of interaction to create collective activities. Social software tools such as Wikis are also pedagogical tools that stem for exchange, communication and information discovery.

The implementation of the Wiki storytelling scenario has enabled to match the main needs and interests of rural schools. Indeed, it enabled teachers and students to communicate with other rural communities featured with similar interests and contexts. Schools could also get familiarized with the use of software tools in educational contexts. Regarding learning, students could practice Spanish and acquire reading / writing skills in a creative manner. Regarding visibility of rural schools, schools were able to show the story to external audiences. Finally, they were able to develop innovative activities with creative content, in which schools collaborated to reach common results.

The implementation of this 2.0 enhanced storytelling scenario has demonstrated a positive approach for integrating innovative tools in learning activities adapted to the specific characteristics of Spanish rural schools, thus contributing to including rural education within the actual Information society.

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An online Collaborative Environment for the Learning of Basic Issues of Telecommunications and Computer Networks: Exploiting the Tools of LAMS and Web 2.0

Maria Kordaki and Haris Siempos

Abstract—This paper presents an innovative description of a collaborative learning method within the context of open source learning design environment such as LAMS [1], with special reference to the learning of essential issues in the area of telecommunications and computer networks. The innovative description of collaborative learning methods in this paper within LAMS is based on the fact that (a) the Jigsaw collaborative method [2] is used in combination with the ‘One minute papers’ [3] collaborative strategy (b) Web 2.0 tools are proposed to be used in the context of LAMS (c) the tasks assigned to students consist of investigation of real world scenarios and not merely the study of learning material as is usually proposed, (d) for the design of collaborative learning activity, an intuitive learning design tool like LAMS is used, and (e) the use of the Jigsaw method within LAMS for the learning of the aforementioned issues has not yet been reported.

Index Terms—Collaboration, LAMS, Web 2.0, Telecommunications, Computer Networks

I. INTRODUCTION

It is widely accepted that e-learning has opened new horizons in education, freeing learning from the constraints of place and time while at the same time offering educators and learners valuable tools that can enhance the learning process of each learning subject [4] - [5]. Nevertheless, a basic requirement for an effective educational procedure is the evolution from a spontaneous activity to a well organized and structured sequence of activities in an environment providing appropriate capabilities [6]. The advantages of the application of collaborative methods in the educational process have been acknowledged in several academic research papers. In fact, the cultivation of the feeling of motivation, the energetic commitment of the students in the educational process [7], the expansion and deepening of the learning experience, the adoption of new approaches in learning [5], the activation of the perceptive ability [8], the interaction in a social environment and the development of feelings of community even in a web based learning environment [9] are some of the advantages of collaboration used in educational settings. Despite these advantages, initially there was a hesitance in the adoption of collaborative learning methods in educational procedures by the teachers [10].

To encourage teams to achieve effective collaboration, some amount of structuring may be necessary [11] - [12]. One way to structure collaboration is through the use of computer-supported collaborative design patterns. A pattern is seen as something that will not be reused directly but can nevertheless assist the informed teacher to build up their own range of tasks, tools or materials that can draw on a collected body of experience [13]. The idea of using collaborative learning patterns is combined with e-learning environments supporting the principles of “Learning Design”. Referring to the term “Learning Design”, it is defined as a description of teaching and learning taking place in a learning unit like a classroom lesson or in every well organized learning activity [14]. An important aspect of this definition is that the pedagogical approach being used is independent from the applied content and context. In this way, several successful pedagogical models can be shared and reused facilitating the comprehension of several learning subjects. However, the importance of active participation of educators in the design of learning scenarios is considered as crucial [15]. The importance of offering user friendly tools in educators to facilitate the process of learning design has also been emphasized [16] - [17]. However, teachers need high level tools with specific educational content in order to understand the meaning of Learning Design [15]. An example of such a tool is the well known learning environment, LAMS [1] that can effectively support the idea of learning design. Nevertheless, Dalziel [1] remarked on the lack of tools supporting efficiently collaborative activities. To this end, recently, a number of collaborative learning patterns have been designed within LAMS [18] – [19].

Especially when it comes to Computer Science (CS) Education, educators have adopted a rather deficient approach...
to ‘learning design’ in general [20] – [21] and to ‘collaborative learning design’ in particular [19], possibly because CS Education is a recently-developed scientific discipline. In truth, CS teachers require more specific support in their learning design practices, such as specific tools and good examples of lesson plans. Thus, CS teacher encouragement and support for learning design is clearly needed.

Taking into account all the above, we have attempted to form the ‘Jigsaw’ collaborative method [2] as a collaborative design pattern within the context of LAMS to construct a sequence of learning activities about essential issues in CS for high school students and especially for issues concerning the telecommunications and computer networks such as:

(a) the evolution phases of telecommunications,
(b) the evolution phases of computers and networks,
(c) the usefulness of telecommunications and computer networks,
(d) the usefulness of Internet,
(e) the inner details of networks operation, and
(f) the future network evolution and the integration of provided services.

Such a sequence of online collaborative learning activities for the learning of the aforementioned concepts in CS by secondary level education students - using the Jigsaw method within LAMS- has not yet been reported.

In fact, this paper contributes to the Jigsaw method being used: (a) to support students in performing investigations in the real world rather than dealing with specific text-based learning materials, as has been the case in other studies (b) in combination with the ‘One minute papers’ collaborative strategy (c) within LAMS and (d) to support sequences of online collaboration activities for the learning of the aforementioned issues in high school CS. High school teachers could implement this activity in their real practices in the context of high school curricula dedicated for the learning of CS concepts. Furthermore, designers of e-learning contexts could exploit the main ideas and the structure of the aforementioned educational activity to form other activities for the learning of various concepts included in school curricula.

In the next section of this paper, a brief description of LAMS and its basic tools is presented, followed by a description of the Jigsaw collaboration method. Then, a sequence of online collaborative learning activities using Jigsaw-within-LAMS with special reference to the aforementioned issues in high-school CS Education is demonstrated. Finally, the design of this sequence is discussed and conclusions and future research plans are drawn.

II. LAMS AND COLLABORATIVE LEARNING METHODS

A. LAMS

LAMS (Learning Activity Management System; http://lamsfoundation.org) is an open source learning environment offering sophisticated tools for the design, management and performance of online collaborative learning activities. LAMS [1], offers a set of predefined learning activities that are displayed to users in a simple and intuitive manner. The main philosophy integrated within LAMS is that knowledge is not produced only from the interaction of students with the educational material, but also, from the interaction of students with their educator and their peers. The creation of these sequential learning activities in which groups of students are participating and interacting in a structured way is known as learning design, which is something that we will rarely meet in e-learning environments. LAMS also enable educators to design, deliver and support learning sequences in a practical and intuitive way. Additionally, LAMS offers tools that support a great variety of learning activities. In the next session there will be a short description of the LAMS tools being used for the design of the proposed activities in this paper.

The assessment tool: allows the formation of a series of questions with great flexibility in such a way so that the weight is attributed in each question.

The chat tool: enables the synchronous discussion between the students.

The chat and scribe tool: combines the chat and scribe activities to display the full summary of a logged discussion, result of a given question.

The forum tool: offers an asynchronous discussion environment for students with the discussion issues posed by the educators.

The forum and scribe tool: combines the forum and scribe tools to display all the given answers for a specific subject.

The mind map tool: enables educators and students to design, modify and study mind maps in the LAMS environment.

The multiple choice activity: allows the creation of automatic assessment questions like multiple choice or true or false.

The notebook tool: could be used for the recording of students’ opinions and comments during their involvement in the proposed learning activities.

The noticeboard tool: offers a simple way to support students with information and content in various forms: like text, pictures, hyperlinks and html packaged content.

The question and answer activity: enables educators to pose questions to the students. After each student’s response, the students may see their colleagues’ responses collected in a cumulative report.

The share resources activity: enables educators to add content in a sequence, such as hyperlinks, compressed webpages, files even learning objects. The LAMS environment enables teachers to add resources in real time.
The **submit files** tool: enables students to submit files to the central repository, easing the examination and correction of students’ assignments by the educator.

The **survey** tool: presents students a series of questions collecting their answers which are displayed only to the teacher. The answers can be characterized as right or wrong.

The **wiki** tool: enables writers to create linked content pages and optionally enables students to collaboratively modify the displayed content.

### B. The Jigsaw Collaborative method

The Jigsaw method [2] is considered to be a strategy that can effectively support collaborative learning scenarios and collaborative learning interactions especially in multicultural learning environments. Several researchers have proposed the application of this method within online learning environments [22], [18], [19] despite the fact that the Jigsaw method was initially proposed as a suitable method for face to face educational activities.

In more details, the Jigsaw learning method can be divided in the following phases: 1) Analysis of the given learning subject in well defined subparts, 2) Formation of the initial heterogeneous base teams (ideal size 4 - 6 students). Assignment of the role and learning subject for each student: each student has to take over the role of the expert trying to comprehend the assigned part of the learning subject in question, 3) Formation of expert groups consisted by students that have taken the same part of the learning subject. Each expert group has the task to study in depth their part of the learning subject and additionally, to design how to provide an interesting and efficient learning experience when they will return to their base teams, 4) Experts return to their base teams, 5) There is a final assessment phase where the students’ understanding is tested on the whole parts of the learning subject in question. A diagrammatic representation of this method –as a design pattern within LAMS- is presented in Figure 1. Specifically, during phase 1, students will be informed about the whole activity using a **Notice board** and also will be provided with appropriate learning materials using the **Share resources** tool. The **Grouping** tool will be also used for the formation of base groups (Phase 2). The **Chat/forum** activities could also be used to help students decide which specific expert group they like to joint. For the formation of the expert groups, the **Grouping** tool, will be also used (Phase 3). The **Data Collection** tool could be used for data collection by each expert group while the **Chat/forum** activities could be used for sharing ideas about the organization of the teaching process. The **wiki** tool could be used for the formation of the learning scenarios that could be realized by the experts when returning to the original groups. Next, the **Chat/forum** activities could be used for the realization of the aforementioned learning scenarios (Phase 4). Finally students’ assessment (Phase 5) could take place through writing group reports (using the **wiki** tool), submit these reports to the teacher (using the **Submit files** tool) and presenting these to the whole class by using the **Dim-Dim** videoconferencing system. Students’ individual assessment could be realized by using the **Assessment** tool.

### C. The One Minute Papers Collaborative method

The One-minute papers [3] is a quick and easy assessment tool that helps teachers to identify where misunderstanding occurs, while it also gives learners an opportunity to test their comprehension. It can also be used as a reflective tool to encourage learners to correlate their personal representations with the newly acquired knowledge. The goals of this method are to encourage students develop their meta-cognitive skills, to facilitate discussion between members of the team as well as to collect feedback about the comprehension of a learning material or a teaching procedure.
students 1 minute to express themselves, 3) Teacher presents the main questions from the students (using the Mind mapping tool). A diagrammatic representation of this method—as a design pattern within LAMS—is presented in Figure 2.

III. DESIGN OF THE COLLABORATIVE ACTIVITY FOR THE LEARNING OF ESSENTIAL ISSUES OF NETWORKS AND COMMUNICATIONS

The designed learning sequence consists of the following phases, 1) Introduction to the learning activity, 2) Formation of the initial groups, 3) The formation of expert groups, 4) Return to base teams, 5) Submission of the group report, 6) Presentation of group reports, 7) Assessment. It is noteworthy that the suggested sequence can be adapted to be used in synchronous and asynchronous educational environments. The only modification that is needed is the replacement of the chat tool with the forum tool and vice versa.

A. General description of the educational activity

The main goal of this educational activity is to encourage students to inquire essential issues concerning the telecommunications and computer networks, through the interaction with a collaborative learning environment. Desirable goals include the comprehension of issues regarding:

1) the evolution phases of telecommunications,
2) the evolution phases of computers and networks,
3) the usefulness of telecommunications and computer networks,
4) the inner details of networks operation,
5) the usefulness of Internet,
6) the future network evolution and the integration of provided services.

Additionally, through the students’ effort to fulfill the learning goals, some side skills can be cultivated, like:

(a) Practice with word processing and slide presentation software,
(b) Familiarization with web search engines functionality,
(c) Acquaintance with Web 2.0 tools helping in the improvement of expression and critical abilities.

Finally, it should be mentioned that the students’ acquisition with new ways of teaching in environments which support the inquiring and collaborative learning, is crucially important.

To achieve the aforementioned learning goals, the organization of the class in groups where each one of them has to study a well defined subject, is suggested. An efficient organization of teams could be the following:

(a) Communications group
(b) Computers network group
(c) Internet Group
(d) Mobile network group

For a more thorough and interesting collection of information, the student groups should not to be limited in the usual search process in libraries or Internet. Each team is encouraged to collect data from real world places where communications and computer networks are used, like: (a) a financial organization e.g. a bank, (b) a telecommunication provider, (c) a mobile telecommunication provider, (d) a university lab specialized in computers’ network research, and (e) an IT company dealing with the design and the installation of computer networks.

3.1. Phase 1: Jigsaw: Introduction to the activity

In this first phase, the students are informed through the use of Noticeboard about the context of the proposed activity. The main educational goals are presented, the issues that the students have to face are drawn out and the sources they have to search to find information about the subject to be learned are provided. Students can exchange their opinions using the chat or forum tools.

3.2. Phase 2: The formation of base groups

Here, students are grouped randomly in groups of 5 students. Initially, each team discusses the presented issues in the Noticeboard to form a mutually accepted framework of ideas regarding the part of the subject they prefer to study. In case of dispute, the teacher can assign roles to the students by himself. Alternatively, an assessment phase can be inserted—before the formation of groups. The aim of this phase is to assess the prior knowledge of students in order to form more representative teams. Of course, there is also the choice to randomly form groups by using the random grouping tool of LAMS.

3.3. Phase 3: Formation of expert groups

Each member of the base teams has to specialize in one of the aforementioned issues by participating in one expert group where all students are occupied to study a well defined subject. Through the bibliographical research and the visiting of the aforementioned real life areas where networks are used, the expert groups should try to form a complete view about the subject they study. Complementary, the students may use social bookmarking tools to avoid unnecessary research in web pages that other colleagues have already visited. Each group has to study a well defined subject that will be described in more detail in the next section.

The Jigsaw Communication Group has to study the historical evolution of telecommunications. The students may focus on the telephone network and the different technologies being used throughout the years. The visit in the facilities of a telecommunication provider can help students to come in touch with the current technologies (their evolution and usefulness) used in telecommunications networks.

The Networks Jigsaw Group may study the inner details of networks operation, the different types of networks, the
different topologies, the provided data rated and the possible applications of computer networks. A university lab or an IT company can offer students useful information about this subject.

The Internet Jigsaw Group may study issues regarding the services offered in Internet and the way it has altered the daily life of common people. Students may explore details about the structure and the technologies behind the function of the Internet. Applications like e-commerce or e-banking can be studied in a financial organization like a bank.

The Mobile Network Jigsaw Group is researching on the future development of telecommunication technologies and the integration of data and voice networks. A visit to an IT Company and a university professor may provide students with interesting information about the future directions that this technological area may follow.

The visits of students can be combined with the production of multimedia content that can be recorded with the use of digital equipment like photo and video cameras. This multimedia content may stimulate students to further discuss what they’ve discovered in the web based classroom. The collected data can be categorized according to specific criteria selected by the students or the educator. If the educator observes that there are questions or misunderstandings, she/he can add material or activities -in real time- to help students better comprehend the learning subject in question. The Live Edit function of LAMS offers such capabilities.

Except the data collection and processing, the expert groups have to organize an interesting and efficient teaching procedure to share their knowledge and experience with their colleagues after the return to their base groups. The exchange of ideas and proposals about the teaching process being followed by the expert groups will be based on the use of the forum and chat tools. The wiki tool may be able to provide students with suitable representations and activities helping them to achieve a better comprehension of the learning subject. Optionally, the students can use an external blogging tool in which they may write down the daily evolution of their work. This unusual for the daily school life activity is enough to keep the students interested in their school work [23].

3.4. Phase 4: Return to base groups

Each expert returning to his base team has to use alternative ways to teach, encouraging students’ interest and reinforcing the critical thinking of students. The main communication mediums among the expert and other students are the chat and forum tools. The main objective of teaching has to be the active involvement of the students in their learning with a main goal to understand and not to memorize the learning issues in question. During the educational activity, each student can ask the teacher to add complementary material or activities to help other colleagues to better understand the learning subject. To this end, it is worth noting that the participation of students in the design of educational activities within the context of LAMS has presented encouraging results [24].

3.5. Phase 5: Group report writing

Each group has to prepare a report that will be submitted to the teacher. In this context, the wiki tool can be used to present each student contribution and the log diary of wiki report. The final report may be formatted in a word processor and be submitted to the teacher using the “File Submit” tool.

3.6. Phase 6: Group report presentation

In this phase, it would be useful for students to be given some instructions and directions about the preparation of an interesting and comprehensive presentation. The web based presentations can be performed using the whole class forum or chat tools or by using a web conference platform like Dim – Dim that can be integrated within LAMS. During the web conference the educator can initiate a question and answer session to trigger a fertile discussion pushing the experts to present their expertise with more details.

3.7. Phase 7: Assessment phase

Here, the teacher can use the tool of assessment to test the level of students’ comprehension. The offered tool supports several types of questions giving the teacher flexibility to form appropriate questionnaires. Additionally, the teacher can use the ‘One minute papers’ technique [3] to expand the questions so as to gather information about students’ possible misunderstandings or their future interests. The goal of such questions is to develop students’ metacognitive skills and reinforce the feeling of participation in the formation of future teaching sessions about this learning subject.

IV. SUMMARY AND CONCLUSIONS

In this paper, an online collaborative activity was presented for the learning of essential issues of networks and communications by secondary level education students (17-18 year old). The main educational goal of this activity was to provide students with opportunities to understand the development phases of networks and communications, to explore the functionality and the applications of the Internet and to study the future developments on the networks area. The key tool for the development of this educational activity was the “Learning Design” tool LAMS in combination with the optional use of Web 2.0 tools. The selected pedagogical approach was based on traditional classroom techniques like ‘Jigsaw’ and ‘One Minute Paper’ in combination with educational material collected by students after collaborative research in the Internet, libraries and areas of daily life where computers and networks are used. For a further evaluation of the proposed collaborative learning activity, a further research on real web based classes is needed. In fact, a research study could be realized using real students where high school
teachers could evaluate the aforementioned activity by integrating it within the context of CS courses dedicated for this level of education. As a result of such evaluation study, possible problems related to the implementation of this learning activity could be addressed and appropriate improvements could be realized.

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Matching the communication needs of rural learners to Web 2.0 tools and services

Sally Reynolds

Abstract—This paper describes the initial mapping of those rural-based user groups who participated in the SoRuraLL project with a view to highlighting their expected needs and requirements. In order to map these needs, users needs and requirements have been highlighted based upon a categorization of users sorted according to where they are located, in rural schools, in rural telecentres or in rural vocational training/professional development centres.

Users in rural schools present with a variety of needs encompassing communication needs as well as needs related to learning opportunities and resources. The same is true for users in rural telecentres and vocational training/professional development centres. Social networking tools can offer a way to meet at least some of these needs and so this paper describes a series of potential tools and services that were of potential interest and value to those targeted in the SoRuraLL project. These have been categorized according to the functionality each offers. The paper also provides a series of examples of the use of Web 2.0 or social networking tools in education and training.

This paper also provides an initial summary of what the partners considered to be success factors related to the way in which social networking tools alleviate various different types of disadvantages faced by rural learners. These factors correspond to the extent to which such tools add value or have an impact on the types of learning processes that the targeted users undergo, the extent to which they add value or have an impact on the notion of inclusion, add value or have an impact on institutional and pedagogical innovation and change and finally the extent to which they add value or have an impact on increasing users’ awareness of any ethical, moral, legal and human security issues arising from their use of such tools in order to make them more informed, secure and aware users of online services of all types.

Index Terms — Rural Learners, Web 2.0, social networking, user needs, success factors.

I. INTRODUCTION

The objective of the SoRuraLL project [1] was to investigate the potential for enhanced lifelong learning offered by social networking tools and platforms to those living in geographically and socio-economically disadvantaged rural areas. During the project, the partners based their work on experimental learning approaches [2] developed and implemented in order to examine the potential offered by social networking tools for the alleviation of the disadvantage suffered by rural populations in Europe. Partners used these tools to provide opportunities for effective and meaningful lifelong learning in several different user settings.

During the lifetime of the project, the partners brought together and further developed content, services, pedagogies and practices for social lifelong learning in rural areas, formulating specific scenarios of use of social networking tools and platforms which were tested with real learners in disadvantaged rural areas, and evaluated in terms of their impact on learning (self-learning, informal peer-learning, formal learning) and inclusion (development of e-skills and competences, linking up of learning communities, building up of new partnerships). This was done in order to consolidate an evidence base on the added-value and impact of social networking tools and platforms for rural learning, with a particular attention to institutional as well as pedagogical innovation and change.

II. DEFINING THE CONTEXT

The first task undertaken by the partners has been to define exactly who this project was aimed at as well as to describe in concrete terms why this work was undertaken. Although not exclusively available in one of the following locations, in general terms opportunities for learning in rural communities are associated with either the local school, the local telecentre or the local training or professional development centre [3], [4].

Rural Schools: Users targeted in rural schools include the following:
- Teachers at both primary and secondary level
- Primary and secondary level pupils
- School administrators
- Parents engaged in supporting school activities
- Support staff including librarians, ICT service providers, etc.

Rural Telecentres: Users targeted in rural telecentres include the following:
- People living in a rural area with an interest in following a course of study for reasons to do with employment or personal interest
- Farmers and others engaged in agriculture related...
activities who want to have more access to learning opportunities to improve their farm management or related skills.

- Members of disadvantaged groups located in rural communities who want to engage in some form of lifelong learning
- Women who wish to enhance their skills and opportunities though learning
- Elderly people who are seeking learning opportunities
- Local entrepreneurs seeking new opportunities by broadening their horizons through informal learning opportunities
- Local professionals including medical professionals with an interest in increasing their skills and knowledge base and in keeping up to date with the latest developments in their profession including legislative changes

Rural Vocational Training/Professional Development Centres: these types of centres cater for many of the groups of users already described under Rural Telecentres, but generally provide more formalised learning opportunities in the form of courses. They are sometimes known as Lifelong Learning Centres and generally cater to the following:

- Young people living in the area or returning to the area who wish to follow a course to improve their employment prospects
- Members of local administration or other publically funded bodies who wish to enhance or optimise their skillset
- Staff in rural SMEs who wish to follow a formal course of study or engage in an informal learning opportunity to enhance their skills relative to their work
- People living in the area who would like to follow a course of study or a retraining opportunity brought about by changes in circumstances including redundancy
- Young mothers returning to employment after pregnancy
- Professionals in a rural community who wish to maintain and/or enhance their professional skills through following courses or other learning opportunities related to their profession. This includes medical staff and practitioners

None of those targeted were expected to have a particularly high level of skills related to the use of ICT, nor was it expected that they would have particular technical infrastructure requirements beyond normal access to a standard PC and the Internet as normally provided by either rural Telecentres, Training Centres or Schools.

III. User Requirements

While it was not possible to define in a rigid way the specific user requirements of each of the groups mentioned, it was useful to provide a broad description of some of the more general requirements of each based on a survey of available literature [5], [6] and the experience of the partners involved in SoRuraLL. During the presentation, these requirements will be presented briefly in table form.

We begin with a broad definition of social networking services, we favour the one provided by Wikipedia [7] which defines a social networking service as: “A social network service focuses on building online communities of people who share interests and/or activities, or who are interested in exploring the interests and activities of others.”

This definition clearly points out the key-element of building a successful online community by means of a social networking service: finding common ground between different users on which they can share experiences. Usually, areas of interest are indicated by means of a profile that every user completes. This way, like-minded people can easily find each other, get together and share information online.

IV. Functionalities

When trying to categorise social networking services, the approach we took was to look at the different functionalities that are commonly considered as being related to social networking:

A. Wiki = Collaborative article writing

A wiki is a page or collection of web pages designed to enable anyone who accesses it to contribute or modify content, using a simplified mark-up language. Wikis are often used to create collaborative websites and to power community websites. The collaborative encyclopaedia Wikipedia is one of the best-known wikis.

B. Blog

A blog (a contraction of the term "Web log") is a Web site, usually maintained by an individual with regular entries of commentary, descriptions of events, or other material such as graphics or video. Entries are commonly displayed in reverse-chronological order. "Blog" can also be used as a verb, meaning to maintain or add content to a blog.

C. Vlog

Video blogging, sometimes shortened to vlogging or vidblogging is a form of blogging for which the medium is video. Entries are made regularly and often combine embedded video or a video link with supporting text, images, and other metadata.

D. Message board or forum

An Internet forum, or message board, is an online discussion site. It is the modern equivalent of a traditional bulletin board, and a technological evolution of the dialup bulletin board system. From a technological standpoint, forums or boards are web applications managing user-generated content. People participating in an Internet forum can build bonds with each other and interest groups will easily form around a topic's discussion, subjects dealt within or around sections in the forum.
E. Personal messaging
A personal message or private message, often shortened to PM, is like an e-mail sent from one Internet forum, bulletin board system or community sites (such as Facebook) user to another user on the same forum.

Audio/video conferencing
Audio and video conferencing is a telecommunications technology where two or more locations interact with one another via two-way audio and/or video transmissions simultaneously.

F. Commenting
A comment is a response from a reader to either the author of the content or to others who have commented previously on the same content.

G. Tagging
A tag is a non-hierarchical keyword or term assigned to a piece of information (such as an Internet bookmark, digital image, or computer file). This kind of metadata helps describe an item and allows it to be found again by browsing or searching. Tags are chosen informally and personally by the item's creator or by its viewer, depending on the system. On a website in which many users tag many items, this collection of tags becomes a folksonomy.

Tagging was popularized by websites associated with Web 2.0 and is an important feature of many Web 2.0 services.

H. Polling
A poll is a way to get answers to questions from and to build interaction with other users of the social networking service.

I. Media sharing (video, photo, audio)
Media sharing services offer individuals or groups the possibility to upload, comment on and share videos, pictures and audio files with the rest of the world.

J. Profile sharing
Profile sharing is the mechanism where individuals state their interests by completing an online profile. This makes it possible for users to get in touch with like-minded people.

K. Social gaming
Social gaming commonly refers to playing games as a way of social interaction, as opposed to playing games in solitude, like some card games (solitaire) and the single-player mode of many video games.

L. Social bookmarking
Social bookmarking is a method for Internet users to store, organize, search, and manage bookmarks of web pages on the Internet with the help of metadata.

M. Content aggregation
Content aggregation is a term depicting the aggregating of syndicated web content such as news headlines, blogs and uploaded videos in a single location for easy viewing.

The following matrix shows the relation between these functionalities and the different content management services and third party tools including those mentioned in the following section with examples.

<table>
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<tr>
<th>CMSS</th>
<th>Web</th>
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<th>Vlog</th>
<th>Forums</th>
<th>Photo</th>
<th>Video</th>
<th>Audio/Video</th>
<th>Larger Video</th>
<th>Commenting</th>
<th>Tagging</th>
<th>Polling</th>
<th>Media Sharing</th>
<th>File Sharing</th>
<th>Social Gaming</th>
<th>Social Bookmarking</th>
<th>Social Networking Tools</th>
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</tbody>
</table>

**LEGEND**
- c : available in core
- e : possible via additional extensions / modules
- d : requires development effort
- x : offered service

V. EXAMPLES OF SOCIAL NETWORKING TOOLS IN USE
During this part of the presentation, several examples of social networking tools used with target users similar to those who took part in SoRuralLL will be presented. It will include examples based on the experiences of the partners in the project as well as other examples of the use of social networking generally in education and training as well as in other related areas. Many of the experiences quoted are European and most examples are related to work carried out by one of the SoRuralLL partners. Practically all the examples quoted are on-going activities.

A. Sample 1: Use of WordPress with teachers in Spain
WordPress (http://wordpress.org/) is an Open Source platform for web publishing and blogs. It is built on PHP and MySQL (i.e. it is a cross-platform application) and licensed under the GPL. Its latest stable version is WordPress (Version 2.7.1). It has been designed as a personal publishing system, but can be used for simple collaboration too. Users can register for free,
thus creating their own blog and post messages and comments. WordPress provides themes and allows templates editing for customizing the blog interface. It provides tagging possibilities and is searchable by search-engines. WordPress has a plug-in architecture and custom plug-ins can be developed to extend its functionality.

Within the Rural Wings project,[8] 20 teachers from a Spanish network of rural schools used a Wordpress blog, in order to share local traditions and local activities carried out in their schools. A high level of participation can be noticed (i.e. 86 posts have been listed since October 2008 - the date of the implementation). Many posts include videos and pictures. Teachers consider it as easy to use, although initially they needed our support and training. The Blog has become the main communication platform of the network, and a public window for its activities. To see this tool in action, visit: URL: http://escuelaruralvirtual.wordpress.com/

B. Sample 2: CIBERA NETWORK Community for Project Practitioners

The CIBERA NETWORK set of services is an open source web environment set up to support collaboration between networks of organizations engaged in common project work linked to the work of RACTI in Greece. Based on PHP/MYSQL this network supports the following services; a product catalogue service (to facilitate the exchange and sharing of information on experiences, products, tools), an e-helpdesk service to provide operational support to the net, a cataloguing service (to share basic information between all organizations participating in the network), a learning material sharing tool to provide information about existing e-learning materials and an intranet tool (including a file sharing service and a forum). For more information, see: http://www.ciberanetwork.net

C. Sample 3: Use of Portal with Multigrade Teachers in Greece

The NEMED portal (http://www.nemed-network.org/) was set up in 2005 for multigrade school teachers in Greece which allowed for the creation of a community of practice for multigrade teachers. It is a networking webspace facilitating communication and exchange, sharing of information and conducting of research, as well as provision of professional development and support opportunities. The portal is divided in six areas, which correspond to the six working groups of the network: ICT for multigrade schools; classroom management in multigrade schools; society, cultures, and the multigrade school; learning modes in the multigrade classroom; educational resources development for the multigrade school; policies for multigrade education. This portal provides a lively virtual space of structured exchange between network partners, participating teachers and schools, as well as any other users interested in multigrade education.

D. Sample 4: Use of iTunes U by Open University UK

The Open University in the UK has set up a free podcasting service using the iTunes U service, see http://www.open.ac.uk/itunes/. Here you can find lectures freely available as educational downloads in various subjects. This service, set up in 2007, is used by several different universities now and plans to expand its services in the future.

E. Sample 5: Communications platform with forum and wiki for Students

The Hogeschool van Amsterdam, University of Applied Sciences have set up a community portal called Yonders.net (https://www.yonders.net) which is intended to support students taking part in an international exchange, work placement or study abroad. It provides a place where students can prepare for their study abroad and to exchange experiences while abroad or after they have come back. Yonders provides a platform with forums, groups and wikis which is free for any student to join.

VI. SUCCESS FACTORS

Measuring user use and satisfaction will form an integral part of the work of the SoRuraLL project and so the success factors or criteria that have been identified are closely linked to the evaluation objectives of the project. According to the proposal, the project aims to "evaluate the potential of social networking tools and platforms for the alleviation of the socioeconomic disadvantage of rural citizens through the enhancement of their lifelong learning opportunities and activities". This leads us to the conclusion that we will describe and analyze what we consider to be success factors in terms of the extent to which users needs are met through the use of social networking tools and the way in which these tools broadly alleviate the various different types of disadvantages faced by rural learners.

To be more specific, our success factors correspond to/address more or less the following:

• The extent to which the use of social networking tools add value or have an impact on the various types of learning processes that the targeted users undergo in the foreseen trials. This includes formal and informal learning taking place in schools, in training centres and in telecentres in the various scenarios described earlier in the chapter dealing with user needs, e.g. teachers engaged in informal learning as part of their efforts to enhance their pedagogical skills, farmers accessing information and remote resources to increase their agro-economic skills, young people engaged in skills enhancing online courses with a view to increasing their employability.

• The extent to which social networking tools add value or have an impact on the notion of inclusion and empowerment that the targeted users undergo in the foreseen trials. This includes the extent to which users develop specific e-skills and competences, the extent to which communities of practice emerge and the extent to which social networking tools allow for the creation of new partnership within the targeted communities and the wider world.

• The extent to which social networking tools add value or have an impact on institutional and pedagogical innovation and change specifically within the targeted user organisations. This includes the schools taking part, the education and
training centres and the telecentres as well as the various organisations which they are linked to and supported by include local administrative bodies and others.

• The extent to which social networking tools add value or have an impact on increasing users’ awareness of any ethical, moral, legal and human security issues arising from their use of such tools in order to make them more informed, secure and aware users of online services of all types.

VII. CONCLUDING REMARKS

It is generally agreed that the use of social networking tools in rapidly increasing in all walks of life according as citizens become more familiar with ICT tools and as services and networks increase and improve. In the same way as mobile telephony has now become ubiquitous, it is to be expected that the use of all types of social networking facilities and tools will soon become the ‘norm’, in the workplace, in the home and in the place of learning, whether that is a school, a college or a training centre.

Rural learners face particular problems when it comes to accessing the most appropriate and effective learning opportunities suitable to their needs due to their relative isolation and an all too common lack of suitable learning resources and facilities.

In bringing rural learners into contact with social networking tools and in testing out various scenarios in a set of related and yet somewhat unique test-beds in different parts of Europe, partners in the SoRuraLL Consortium are confident that considerable insights will be gained which can together form a somewhat unique body of evidence and series of best practices that can be used by others interested in exploiting such tools to support learning in rural communities.

REFERENCES

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The evolution of e-Learning 2.0

Alexandros Soumplis, Eleni Koulocheri, Nektarios Kostaras and Nikos Karousos

Abstract—The term e-Learning 2.0 has been introduced right after the appearance of the term Web 2.0, to describe the transformation of e-Learning systems along with the Web 2.0 growth. Even though Web 2.0 is already established this is not the case for e-Learning 2.0. The term e-Learning 2.0 is the result of the blending between e-Learning and Web 2.0 concept and ideas. This paper records the evolution of Web 2.0 and its influence to traditional e-Learning. There is also a survey relating to numerous e-Learning tools and in which extent they fit to e-Learning 2.0. As a final point this paper concludes that the existing tools are not adequate and there is still way to unleash the full potential of e-Learning 2.0.

Index Terms—e-Learning 2.0, Web 2.0, Personal Learning Environment, Learning Management System.

I. INTRODUCTION

UNDoubtedly the rise of Web 2.0 has influenced and according to various authors [1],[2], altered the Internet. The user has the leading role and he is the one who gives value to a service. This is particularly true for services that exploit social networking and allows users to connect, collaborate and exchange information and experiences with others sharing some common values and interests. Even if one accepts the criticism that Web 2.0 is not the new Web but just the implantation of Web 1.0 in its full potential, the facts remain and the transformation of the Web to be user-centric has been a revolution.

Along with the rapid growth of Web 2.0 researches began to study its effect to traditional e-learning systems but also to the learning process in general [3]-[5]. This led to the term e-Learning 2.0 and a new view of the learning process as not only an instructor-led method but mostly as lifelong and learner-led. This paper is an effort to record the evolution of Web 2.0 and how this influenced learning and e-learning. The main goal of this effort is to record existing e-Learning tools and to identify the Web 2.0 features each one has in order to reveal potential existing gaps towards the e-Learning 2.0 era.

II. THE ROAD TO E-LEARNING 2.0

A. The Web2.0 era

Before year 2003 ends a new buzzword appeared on the Internet. This was Web 2.0. A bloom of social networks occurred during the last five years and a new type of web where the user takes control of its content has been formed. Despite the fact that the first Web 2.0 sites emerged on early 2004, Tim O’Reilly was the first to name the “Web as a platform” as Web 2.0 [6]. Four years later, the same person ascertained that “It’s time to leverage the true power of the platform... the Web is now the world” [1].

The initial definition of Web 2.0 was not accepted instantly and gained lot of criticism, mainly as being a marketing buzzword rather than something new. Tim-Berners Lee argued that originally the web was created with the concept of connecting people. Moreover he pointed that Web 2.0 utilizes Web 1.0 standards, so it should be thought more as an extension instead of something novel [7].

Downes [8] described the Web 2.0 as a short term for the movement, from what was called the “Read Web” to the “Read-Write Web”. This movement gives user the role of leading actor being not just a passive receiver of information, but mostly a self-publisher able to “self-express” himself. The capability of self-publishing gave users the ability to harness the power of the crowd. At this point it is important to note that harnessing the power of the crowd should not be limited to the concept of what is called the “wisdom of crowds”. The term “wisdom of crowds” comes out of the idea of “why the many are smarter than the few and how collective wisdom shapes business, economies, societies, and nations” [9]. The original concept of this idea was not meant to be applied on the Web but it has been very influential on the Web 2.0 style of thinking. On the same category belong folksonomies where users tag information and objects in a social environment [10] as well as crowdsourcing which represent the act of a company or institution to take a function once performed by employees and outsource it to an undefined network of people in the form of an open call [11].

At this point a reference has to be done about one of the most important factors that lead Web 2.0 to evolve as we know today. This factor is openness. Fundamentally Web 2.0 gains power from open spirit, open attitude, open standards, open data formats, open APIs (Application Programming Interfaces) and of course open source software. A special remark belongs to open APIs and open data format. Both enable the Web to operate as a platform and allow users to develop services on top of those platforms working together and exchange data to each other. Openness together sharing, acting globally and peering are the key enablers that allow participants to exchange information freely thus promoting collective intelligence [12].

The Web 2.0 era is at its peak at the moment and there are already questions about the future of the Web and even for Web 3.0. O’Reilly and Battelle [1] argue that the Web is growing up, and we are all its collective parents. The Web is slowly moving towards intelligence and the Web learns. Data collected by and for the web transform it from an unstructured collection of information and knowledge to a structured
ecosystem where people, services, business, data, content and ultimately content co-exist, interact, form each other and create value. These special characteristics formed in a Web 2.0 environment create the conditions for the “emergence of new kinds of open participatory learning ecosystems that will support active, passion-based learning: Learning 2.0” [5].

B. Blending e-Learning with Web 2.0

Traditionally the learning process follows a one-to-many model where the educator leads the learning process in a classroom with all the attendants present in the same time, on the same physical place. Along with the growth of Internet and digital media the learning process evolved to an asynchronous process where the educational content could be delivered to attendants not necessarily to the same physical location and not necessarily on the same time. Moreover, learners have the ability to follow the learning process on their own pace. However there still is the expert figure of the teacher who drives the learning process and defines the learning content.

Ian Davis [13] argued that Web 2.0 is an attitude not a technology. It led the web back to its roots where participation was encouraged and it was a socially open network. This social openness inevitably influenced e-Learning and in general the learning process. The learning process deconstructs to its elements and potentially every learner can be an educator. All participants contribute to the learning process, contribute learning material and share learning experiences. Thus the teacher is not the ultimate expert figure but rather a coordinator of the learning process able to give the primary guidelines in a learn-centric rather than course-centric approach. In the Learning 2.0 era we do not talk about expert-driven courses but for social learning networks which are formed remarkably fast [14].

The term e-Learning 2.0 has been firstly introduced by Downes [29] in 2005 who pointed that learning content is created and distributed in the Web 2.0 manner. He further explains that in e-Learning 2.0 learning content does not follow the traditional route of compose, organize, repackage and distribute. Instead the content is syndicated. Learners aggregate content, remix it according to their own needs and style, then enhance it with additional resources, their own knowledge and experiences and finally they redistribute this new “knowledge packet” to be the input for other learners interested in this topic.

Along with e-Learning the appropriate tools were developed in order to serve as the platform over which the learning process occurs. The tools associated with e-Learning are usually called Learning Management Systems (LMS). The term LMS is used to describe software to deliver and manage educational content and material. On the following sections there is a presentation of the features of these platforms in greater detail. However LMSs by design focus on delivering courses. The learning content gets organized in a standard way similar to the way a course is divided into modules and lessons. These courses usually include, besides the educational material, exercises, practice tests, self-evaluations as well as discussions and forums. In other words, it provides static educational material with relatively poor opportunities for interaction, content-creation and collaboration among the participants. Moreover these systems are typically integrated with an organization’s informational system to provide extended functions such as the measurement of effectiveness and the impact of courses as well as the overall cost of training initiatives [15]. If one calls this situation as the impact of the “Read Web” to the education, and considering that the Web itself has been transformed to the “Read-Write Web”, in accordance with Tim Berners-Lee’s original vision [3], then e-Learning 2.0 is the impact of the latter to education.

The reference to e-Learning 2.0 leads to the concept of Personal Learning Environments (PLEs). PLEs are systems that help learners take control of and manage their own learning [16]. This term is the evolution of what Downes [3] named personal learning portfolios. The personal learning portfolio is a personal online space where a learner creates, maintain and show their work. The PLEs consist of various tools and modules already existent in LMSs, but in a less structured manner along with social characteristics as those are available on the Web 2.0 platform. This fact offers increased adaptability to different learning approaches.

To put it briefly, in the e-Learning 2.0 era there is a shift from course and content oriented learning to a people centered learning. Thus instead of the traditional top down there is an adoption of a bottom up approach. Learners collaborate and interact with each other, with tutors and instructors and they actively participate and often shape the learning courses and material. Moreover learners actively create and contribute learning content being active members of a learning network. A learning network is like an ecosystem; it constantly changes, it is defined by interactions and knowledge is emergent and complex, therefore it has more in common with how human beings learn than traditional approaches to knowledge and learning [8].

III. E-LEARNING PLATFORMS IN THE WEB 2.0 ERA

A. General

The current part of this paper presents a collection of e-learning platforms focusing on their specific modules that address characteristics mentioned earlier. This collection includes e-Learning platforms, from those that are traditional and well-established (from commercial and users perspective) to more recent ones which are obviously closer to Web 2.0 dimensions. This analysis aims to investigate how the existing e-learning platforms approach the Web 2.0 aspects, showing how e-learning platforms started ‘leaving behind’ the Computer Based Training era, passing steadily to the e-Learning 2.0 era.

Both Web 1.0 and Web 2.0, had an important impact on education. Open Educational Resources (namely teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use or re-purposing by others [17]) were resulted by Web 1.0[5]. Web 2.0 changed basic perspectives of educational process encouraging content creation, participation and pretending that learning is no more teacher-centered, but, as we have mentioned above, all
participants become potentially teachers. Services such as blogs, wikis, fora, glossaries, schemes such as social networks, tagging systems, mashups, content syndication and content sharing sites are examples of a new user-centric information infrastructure [5]. Brown and Adler [17] assume that: “This new infrastructure emphasizes participation (e.g. creating, re-mixing) over presentation and also encourages focused conversation and short briefs (often written in a less technical, public vernacular) rather than traditional publication. Moreover, it facilitates innovative explorations, experimentations and purposeful tinkering that often form the basis of a situated understanding emerging from action, non-passivity” [5].

It has already been mentioned that online learning ceases to be a type of content-consumption tool, where learning is ‘delivered’. Instead it becomes more like a content-authoring tool, where learning is created. Thus, e-Learning platforms should give the end-user the capability to create his/her own content simply and efficiently. On the following section there is an effort to present basic Web 2.0 applications along with some e-learning platforms that adopt them. It is an intention to make an e-Learning 2.0 classification of these tools but on the contrary the expected outcome is to identify which of their existing characteristics can serve the purpose of the new era.

B. Selection of tools

Before proceeding with the presentation of the Web 2.0 applications that fit into learning technologies, it is vital to enlighten the factors taken into consideration in order to select the e-learning platforms. This selection is a part of a wider ongoing research on the usability of platforms that can be used for educational purposes. At first, a list of systems and tools have been gathered from several portals such as this of the Centre for Learning and Performance Technologies UK [18], elearninglearning [19], and ACM elearnmag [20]. The next step was the refinement of this generic list. Software that has won (or has been finalist for) one or more awards of SIIA Codie Awards 2009/2010 [21] or Brandon Hall Research Excellence Awards 2009/2010 [22], had higher priority to our list. Platforms that have been included in the list of Top tools for Learning of 2009 [18] organized by Centre for Learning and Performance Technologies UK, had also higher priority. Furthermore, the Edutools website [23] of Western Cooperative for Educational Telecommunications was a useful tool for a comparative review of them.

From Centre for Learning and Performance Technologies [18] Directories, the following platforms were tracked: GoToMeeting, IBM Lotus Learning Sametime, Microsoft Office Live Meeting, NeSis e/pop WebConferencing, Saba Centra Live, TeamViewer, Yuuguu, Zoho Meeting. The following platforms were among the 100 Top tools of the same resource [18]: Adobe Breeze (Connect Suite), Dimdim, Elluminate Live!, Elgg, WebEx Meeting Center.

From SIIA Codie Awards 2010 (Finalists/Winners) [21], the following platforms were found: GoToMeeting, WeBex Meeting Center, Blackboard Learn.

From SIIA Codie Awards 2009 (Finalists/Winners) [21], the following platforms were found: ANGEL Learning, GoToMeeting, Scholar360.

From Brandon Hall Research Excellence Awards 2009 [22], the following platforms were tracked: Adobe Breeze (Connect Suite), Elluminate Live!, eFront, WebEx Meeting Center.

From Edutools Website [23], the following platforms were derived: .LRN, ATutor, Blackboard Learn, Claroline, Desire2Learn, eFront, JoomlaLMS, Moodle, Sakai, Scholar360, OLAT.

Articles and reviews from elearninglearning.com [19] contributed to the selection of the following platforms: Adobe Breeze (Connect Suite), Apex Learning, Blackboard Learn, Dimdim, Docebo, Dokeos, Elluminate Live!, Glance, iCohere, Intralearn, LAMS, Moodle, Saba Centra Live, WebEx Meeting Center, Zoho Meeting.

Articles and reviews from elearnmag.org [20], contributed to the selection of: .LRN, ANGEL Learning, Blackboard Learn, Desire2Learn, Moodle, LearnLinc, Polycom WebOffice, Sakai, TopClass by WBT Systems.

On another note, platforms such as ElluminateLive!, Elgg, IBM Lotus Learning Sametime, ICULive, LAMS v2.3.3, Moodle v1.9, Saba Centra Live have been selected for another reason, they are used by Hellenic Open University for instructional or research purposes.

The composed list of tools was intended to be representative. Therefore, totally web-based e-learning software that follows the cloud computing trend, could not be excluded. Platforms such as Convenos, Genesys Meeting Center, Glance, IBM Lotus Sametime, Microsoft Office Live Meeting, Pixon Picture Talk, WebEx Meeting Center, and Zoho were selected to that extend. Furthermore, positive comments from end-users (included visually/hearing impaired ones) were taken into consideration. In order to make sure that these comments were spontaneous and objective, they were sought out of the official websites of the e-learning platforms. They were retrieved from end-users fora, communities’ sites, even from YouTube. Platforms with positive comments were: .LRN, Adobe Breeze (Adobe Connect Suite), Angel Learning, Blackboard Learn, Claroline, Elluminate Live!, IDEAL, Moodle, NEFISIS e/pop webconferencing, Saba Centra Live and WebEx Meeting Center. Finally, it is important to note the fact that the software license under which each product is released has not been a criterion for its selection.

C. Representative services on e-Learning 2.0 platforms

In this part, there is an inspection of the major services that are provided in the context of the characteristics of the e-Learning 2.0. According to Brown & Adler [5], these services are:

- wikis and glossaries, which may be included under the generic term co-authoring services,
- blogging services,
- fora, namely time-based asynchronous discussion,
- RSS services representing content syndication,
- multimedia sharing representing content sharing,
- audio/video conferencing in the context of communication and the creation of reusable context, as explained below.
Wikis: In general, a wiki is a collection of web pages designed to enable anyone with access to contribute or modify content. Wiki services are often provided by collaborative websites and aim to power community websites [24]. Tools embedded wiki’s creation capabilities, giving the end-user the opportunity to exchange opinions on a topic, moving to a new situation where educational material is authored collaboratively, knowledge is dynamic and intelligence is collective.

Blogs: According to T. O’Reilly [1], “One of the most highly touted features of the Web 2.0 era is the rise of blogging”. Weblogs cannot be used only as an information database, but are also used as a medium for community building, communication and reflection. Among the various possibilities for interaction, weblogs usually offer a commentary function for feedback from readers and the opportunity for different authors to interconnect with one another’s contribution. Learners on a course can use a personal weblog to document their own work or texts chronologically and publish their methods or results for their classmates or ask them for feedback and thereby gain new input and perspectives for the continuing learning process [24]. According to Downes [3], “blogging is very different from traditionally assigned learning content. It is much less formal. It is written from a personal point of view, in a personal voice”.

Fora: Similar with blogs, fora contribute to the facilitation of asynchronous communication among end-users, while they permit them to exchange opinions, ideas and finally knowledge regarding a topic. They contribute also to the creation of a social network of members with common interests. If this social network comes out of the boundaries of a university class for example, it can drive to what Etienne Wegner called in the 1990s “Community of practice”. According to Wegner [25], “a community of practice is characterized by a shared domain of interest where members interact and learn together and develop a shared repertoire of resources which is hold together due to passion and commitment”.

Glossaries: Along the same lines with wikis, blogs and fora, glossaries can also be created by all end-users. Many platforms afford glossary modules that allow users to describe collaboratively new terms regarding a topic. Therefore, learners or teachers participate to the creation of knowledge.

RSS: One of the aspects that define Web 2.0 is content syndication through technologies such as RSS “Really Simple Syndication” which “is used to push out blog updates. RSS allows someone not just to link to a page, but to subscribe to it, with notification every time that page changes” [6]. RSS allows updated information from Web pages to be aggregated in one place using RSS aggregator software. As updates happen in online social network sites or new sites, for instance, RSS feeds enable learners to stay more attuned to friends or world events, respectively, though the range of multimedia information posted [6].

Multimedia sharing: Another aspect of Web 2.0 is interactivity. The new era does not require sophisticated technical expertise but allows users to publish, share, consume and remix content through features that are facilitated [29]. File-sharing, for example, evolves not as a sudden criminality among today’s youth but rather in their pervasive belief that information is something meant to be shared. Sharing content is not considered unethical (as meant to be recently); indeed, the hoarding of content is viewed as antisocial. Open content is viewed not merely as nice to have but essential for the creation of the sort of learning network [3]. Multimedia sharing has been divided into two sub-categories, file sharing (such as documents, presentations etc.) and application sharing.

Audio/video conferencing: As mentioned above, Web 2.0 supports knowledge creation collaboratively, using applications such as blogs and wikis. Taking into account that audio/video conferencing objects can be recorded, reused [30], and delivered to the participants, it they can be considered as content creation. Furthermore, audio/video conferencing contributes to the elimination of geographical barriers, since many of the related platforms, provide synchronous communication among the participants. This also enhances the delivery of knowledge collaboratively.

D. Web 2.0 services of current e-Learning Platforms

On this section, on Table I there is the list of the e-learning platforms and applications as those were chosen according to the criteria specified and analyzed above. On the same table there is marking which of the Web 2.0 modules are supported by each platform.

The analysis of Table I show that none of the platforms presented embeds all services mentioned earlier, as each of them emphasizes to specific services provided. Most of the platforms presented, fall into one of the two following categories: i) Platforms which provide asynchronous services and offline communication and collaboration. These platforms support primarily Wikis, Blogs, Fora and Glossaries. ii) Platforms that support synchronous services and communication such as audio and video conferencing as well as live application and file sharing. The fact that there are no platforms which will support both synchronous and asynchronous services adequately indicates a serious gap and poses further obstacles in learners to move transparently towards the creation of PLEs. Moreover, it is vital to underline that any of these platforms can exploit the potential of Web 2.0 as long as it allows users not only to feed them with their content but also to expand and build on top of these platforms to extend their functionality and adapt them to their own personal needs.

On the other hand, the inexistence of a complete platform that combines both, advocates the flexibility and diversity in the technologies and tools that the multidimensional process in an e-Learning 2.0 environment demands. The openness, which is a fundamental principle in Web 2.0 and existent in most open source platforms, gives the community the ability to adapt a platform to its specific needs and orientation. Data are to be used, transformed and enriched in any way as long as new tools or applications fit to the platform’s framework. This flexibility can be the key strength of an e-Learning 2.0 platform.
IV. POTENTIAL BARRIERS TOWARDS e-LEARNING 2.0 ADOPTION

e-Learning 2.0 is at the beginning of its bloom. It can be argued that as in Web 2.0, e-Learning 2.0 is more an attitude rather than a technology. Certainly the interdependency between attitude and technology, tools and their usage cannot be ignored. As more tools are available, more people will use them. As more people use those tools, there will be new demand for additional tools with enhanced functionality. This never ending circle forms attitudes. Consequently we can expect what we have presented in the previous section. Traditional LMSs add more and more 2.0 features to become more open, allow social interaction, encourage collaboration and ultimately get closer to each learners individual needs. However moving towards adaption of the e-Learning 2.0 attitude there must be special care to digital division. Learners ought to have equal opportunities in accessing educational platforms independently of their skills in new technologies. Moreover there are open issues regarding the expertise level of learners and how the social networks they form can be a win-win scenario for all participants. In case that learners do not have the expected learning outcome and do not benefit from these networks they are likely to drop off them and turn

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<tr>
<th>Product Name &amp; URL</th>
<th>Wiki</th>
<th>Blog</th>
<th>Forum</th>
<th>Glossary</th>
<th>RSS</th>
<th>File-sharing</th>
<th>Application</th>
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<td>Microsoft Office Live Meeting</td>
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to traditional learning methods, thus being again knowledge consumers rather than knowledge contributors. Xenos [26] argues that a negative user impression is hard to change and besides the fact that users eventually focuses only on a small fraction of the provided functionality, expect to be able to locate and exploit all available functions easily.

Another potential barrier towards wide adoption of e-Learning 2.0 is the transition between informal and formal learning. In general, the question is how informal learning outcomes can be evaluated and measured and even further how one can achieve accreditation from established institutions without following their formal learning channels. Related to this issue is the claim that learning networks should deliberately involve educational institutions in order to enhance trust between participants, guarantee a minimum quality level of the learning material created and circulated within these networks and in any case stimulate participants.

V. FURTHER STUDY AND FUTURE GOALS

The ongoing research comprises the usability evaluation of the e-Learning platforms that were investigated in previous sections, through multiple techniques aiming to the extraction of useful conclusions, particularly for those tools that are used by the Hellenic Open University (HOU). Existing evaluation studies [27][28] performed in HOU has focused on traditional e-learning courses thus a new study is expected to focus on a complete e-Learning 2.0 platform and web sites. Further investigation is to be done about the use of Web 2.0 applications – not necessarily standalone alone applications, but also a mash ups, or various integrated tools - as an e-Learning 2.0 platform both in graduate and post-graduate students of the Hellenic Open University and more.

An area of further research is to identify how the learner conceives, manages and evaluates all these multiple sources of information and knowledge. The risk of information overload due to all these applications and knowledge channels has to be addressed while the role of usability and pedagogy should be investigated too. Another trend, “media literacy” comes to include all these issues and potentially to specify new aspects of e-learning. It seems that Web 3.0 arises and it would be motivating to identify how e-learning faces the new circumstances.

VI. CONCLUSIONS

This paper described the concept e-Learning 2.0 and its potential in lifelong learning. It also tracked which features towards e-Learning 2.0 are existent in the current learning management systems. This survey highlighted the gap in e-Learning 2.0 tools and the lack of platforms that exploit the full potential of Web 2.0 and e-Learning 2.0. Moreover it is not clear if and in which way the quality of e-Learning 2.0 platforms is measurable. This is particularly important if there is the ambition to blend informal and lifelong learning into formal procedures or even allow learners to evaluate their progress and certify their knowledge. There is also a need for further research related to the use of e-Learning 2.0 platforms from organized groups (such as groups of students in a course) and how this can benefit the learning process overall.

REFERENCES

Abstract—We report the findings of the EU LifeLong Learning Programme project SoRuraLL! concerning the selection, performance and evaluation of the pilot sites for the innovative social network used for e-learning purposes. The sites in the Beskidy Mountains in Poland were selected based on the experience of ten pilot sites performance in the Interreg IIIB CADSES project Teleaccess and the 6th Framework Programme project “Rural Wings” that preceded SoRuralLL. We present the methodology of ex-ante assessment of specific needs concerning the intensity and the scope of use of broadband internet for learning at all levels in the mountain and rural areas. We compare the rankings of sites resulting from the initial needs assessment with that one derived from the final evaluation and analyse the divergences. Finally, we show how this assessment resulted in the selection of two sites as local information community learning centres out of ten initial satellite internet pilot sites taking part in the 6th FP Rural Wings project. A similar selection process has taken place in Poland, Bulgaria, Greece and Spain – the countries that participated in at least two of three above-mentioned European projects.

Index Terms — multicriteria decision making, evaluation algorithms, learning scenarios, e-learning, rankings and selection

I. INTRODUCTION

DIGITAL DIVIDE problem touches upon over one third of the adult population of Europe, predominantly elderly people and those living in remote mountain, island or rural areas, where ground-based broadband internet is hardly available - or not available at all. An improvement of the internet infrastructure is therefore necessary to bridge the digital divide by ensuring the access to information and e-learning applications to the members of rural communities. In some European regions, such as Greek islands, low-populated Bieszczady mountains in Poland, or northernmost parts of Sweden or Finland, a competitive solution to cope with this problem can be provided by the satellite bi-directional internet technology. Consequently, the European Commission has approved a series of research projects devoted to analyze the needs and find the best technical and organisational solutions for the deployment of satellite technologies for citizens, institutions and learning in rural areas. One of them, the project “Rural Wings” (www.ruralwings-project.net, www.pbf.pl/ruralwings), financed by the European Union within the 6th Framework Programme, started in 16 countries, in January 2006, with the main aim to select, launch, and maintain pilot stations of satellite internet in the bi-directional DVB-RCS (Digital Video Broadcasting - Return Channel via Satellite) technology, cf. e.g. [2], [3], in the remote rural or mountain areas.

It has been intended that the broadband internet access disseminated via WiFi networks could serve local communities in using the web for learning. The specific learning goals of pilot stations have been assisted within the Rural Wings project as well as by later projects targeted at reaching specific educational goals. Specifically, two countries involved in Rural Wings, namely Greece and Poland had been given an opportunity to benefit from the Interreg IIIB CADSES project Teleaccess carried out during the period of 2006-2008 (www.teleaccess.net) while Greece, Poland and Spain have been participating in the LifeLong Learning Programme project SoRuralLL (2009-2010, www.sorurall.eu).

The key issue to be solved when assigning European funds to the local societies was the problem of selecting at most two sites for the latter two projects mentioned above out of ten pilot sites of RuralWings and other candidates that applied for being included in the subsequent projects.

Following [10], in this paper we present the methodology of evaluation of the satellite internet pilot sites performance, and of using its results to select most suitable sites for tele-centers and social learning portal, focusing on the case of Poland.

First, we will present the methods of assessment of specific needs concerning the intensity and the scope of use of satellite internet in the DVB-RCS technology in the remote mountain areas. We will review the operation of the pilot sites in Southern Poland where the bidirectional satellite terminals were installed, then we will analyse their final performance evaluation. In Secs. IV and V we will compare the rankings resulting from the initial needs assessment with that one derived from the final evaluation and show how the evaluation of pilot sites influenced the choice of beneficiaries of subsequent projects. While the technical criteria of needs assessment and evaluation were different, the target goals, i.e. intensity of use, measured as the transmission volume, the number of users and their regularity, measured by the standard deviation of the above, as well as the second goal: filling-in the gaps in the broadband coverage, and the third-one: the number of users willing to use the applications made available

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This work was supported in part by the European Commission within the 6th Framework Programme project Rural Wings and the LifeLong Learning Programme project SoRuralLL!
within the project, were compared as ex-ante expectations at the stage of selecting the pilot sites, and as ex-post evaluation results. To make such a comparison possible, the criteria actually measured were transformed to the measures of the above goals, taking into account the stochastic character of the initial expectations.

The method here proposed allows to derive a set of relevant needs assessment criteria from a larger set of objectives considered at the selection phase of the project. It is also possible to assess the adequacy of the multicriteria decision-making approach applied to derive the initial pilot sites’ ranking. The above approach is universal in the sense that it can be applied to any similar problem, involving an initial ex-ante and ex-post rankings, the latter based on the actual performance.

II. NEEDS ANALYSIS AND SELECTION OF PILOT SITES: THE CASE OF POLAND

As we have mentioned in the previous section, the outcomes of the 6th FP project Rural Wings could serve as a base for the further development of local information societies in selected rural areas. This project aimed at a.o. providing satellite internet access to remote locations and one of its first tasks was the selection of pilot sites. Taking into account that the only geographical regions in Poland where the problems with low broadband access were related to the topography and geographical isolation had been the Beskid mountains in southern Poland, the decision was made to restrict the selection of sites to the counties in Małopolskie and Podkarpackie Voivodships situated in the mountains and fulfilling the low-broadband-access condition.

Following the project’s specific indications as regards the site selection criteria, we elaborated a selection methodology tailored to the specific country needs. The main three groups of selection criteria are listed below:

- **Geographical situation of the site** – according to the project’s goals, the more remote and isolated the site, the more eligible for the Project, but the diversification of geographical locations and an even distribution of sites over the target areas should be taken into consideration as well.

- **Existing internet infrastructure** – the pilot stations should be installed in areas without broadband facilities or – at least - the internet access provided by third parties should have lower transmission rates or be less reliable than the satellite DVB-RCS system. On the contrary, other existing IT infrastructure, such as school computer labs, LAN etc. would be of advantage for the project.

- **Availability of potential end-users** willing and capable to engage in the learning activities of the pilot station.

The assessment of each of the above criteria was based on the evaluation of a set measurable subcriteria, which - in turn - were calculated from the data gathered in two questionnaires assessing the community and individual needs at potential pilot sites. The forms and criteria were enhanced by country-specific additional issues, in Poland relating a.o. to the ability to supply research results via satellite internet. The method to aggregate the data gathered in the questionnaires to the measures of the above criteria, as well as the choice of the multicriteria outranking method to establish the final sites’ ranking are reported in the sequel.

The pilot site selection was performed as the following four-step procedure:

(i) First, the country needs as a whole and the needs of regions, sectors and types of institutions were assessed in order to choose most appropriate target groups and areas.
(ii) Then the questionnaires were mailed to the selected target groups: schools, national parks, local authorities, research establishments, and business support organisations providing adult trainings. The data gathered were then verified during field visits and otherwise.
(iii) Taking into account the volume and the quality of data gathered, we elaborated a method to transform the questionnaire data into the measures of subcriteria. Then we used the multicriteria outranking method based on the reference sets [3] to establish a preliminary ranking of sites.
(iv) The selected sites, were visited in the order yielded by the outranking procedure, to present the project’s implementation plans to the appropriate local authorities. Based on the technical feasibility of installing the DVB-RCS equipment at the selected sites, the results of negotiations, and the final assessment of the viability and usability of site derived from the field visits, the Selection Committee could either decide to eliminate a site from the list, e.g. in case of the lack of support from the school authorities for this site, or to change its rank. The latter might happen usually when the final decision to sign the agreement was postponed by local authorities. Then it followed the installation of DVB-RCS D-Star terminals accordingly to the finally derived order.

The above selection process started in nine European countries in early 2006 from a detailed country needs analysis in the areas of rural learning, DVB-RCS technology, e-learning and other e-services and applications, which should had been provided by the project to the end-users. Recall that e-learning has been one of the top priorities of the „ePoland” [8] programme, which first phase was realised prior to launching the Rural Wings project. It created a background for further development of e-learning, facilitating thus implementation of Rural Wings: Polish educational programmes have been modernized, most schools connected to the internet. The program did also put emphasis on SME training, training of teachers, creating multimedia information centres, educational content and portals, electronic libraries, educational content servers.

Based on the data concerning the broadband access, we refined the study to identify institutions relevant to the project, such as schools, research institutes, national parks, local cultural centres, public libraries etc. with no or only a poor-quality broadband access. Future plans to establish commercial wireless broadband access by local providers were considered as well.

The above analysis pointed out that the sites in Poland should be situated in the Beskid Mountains in the South of the country, except two potential locations in Polish off-shore research stations in Svalbard and Antarctic St. George Island. Due to the geographical configuration, the other potential
implementation region, situated on Northern Poland is more likely to be covered by ground-based wireless internet. Furthermore, the study allowed to determine the main categories of potential pilot stations, namely:
- rural schools and public libraries,
- remote research stations and national parks,
- public access points in local government offices, cultural centres and telecentres, and
- tourist establishments in mountain areas.

The needs analysis in the areas of DVB-RCS technology, e-learning and other Information Society services, technologies and applications, has been performed using the IST foresight results for Poland elaborated during the 5th Framework Programme FISTERA project, cf. [7],[8].

In the second step, the questionnaires were distributed to over 400 institutions in Malopolskie and Podkarpackie regions identified as potential pilot sites. From over 120 replies, about 70 came from eligible pilot stations. Individual site visits and interviews reduced this number to about 40, eliminating 70 potential pilot stations, namely:
- a) Wildlife reservation
- b) Research
- c) Tourism

We have elaborated a dedicated multicriteria site selection methodology which uses the reference sets approach [5] and takes into account the specific country needs.

A preliminary ranking using a set of target reference points was established, so that for each of the above listed four categories of pilot stations a model pilot site was defined, characterized by desirable values of each of the above three metacriteria. The models played the role of non-attainable (ideal) target reference points in the above mentioned outranking method, namely for each of the complete questionnaires received form an eligible pilot site we calculated the distance to the model target point representing an appropriate category. At the same time minimal requirements, specified within the Project, had to be fulfilled by all sites considered, they played the role of status quo reference points, as defined in [5], and had been used as constraints. Additional constraints had been defined as limits of optimality, i.e. such values of the assessment criteria or their linear combinations, which further improvement could not contribute to increase the overall benefit resulting from the Project as the whole. The remaining fourth class of reference points defined in [5], the anti-ideal points, had not been used since the status quo points turned out to be feasible, so a consideration of anti-ideal points would not yield any active constraints.

Ten sites with the highest distance scores were found, to be the candidates for the 1st phase installations of the Rural Wings project in Poland. Only two of them had to be actually installed, while the others remained candidates for the subsequent phases two and three.

In the final, fourth, phase of the selection procedure we investigated the synergy with other projects of the similar nature and goals, that - if carried out in the same area - would constitute a challenge to the project. Each such situation had been investigated in detail and the conclusions could influence the final ranking. For instance, most schools in Poland were equipped with computers connected to internet by the InterKl@sa programme (www.interklasa.pl), that started in 1998. Over 70 thousand PCs were placed in schools within this programme and an institutional co-operation for IT companies (i.e. Intel, Microsoft, Sun, Vulcan, YDP) with

### Table I.
**The Initial Ranking of Candidates to Become Satellite Internet Pilot Sites and/or Local Telecenters**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Name of the Pilot Site</th>
<th>Place, Region</th>
<th>Type</th>
<th>Users</th>
<th>Employees with IT background</th>
<th>Internet connection available</th>
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<tr>
<td>1</td>
<td>Arctowski Research Station</td>
<td>St. George Island, Antarctica</td>
<td>Research</td>
<td>a) researchers</td>
<td>All researchers working at the Station</td>
<td>NONE</td>
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<td></td>
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<td></td>
<td></td>
<td>b) visitors</td>
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<td>2</td>
<td>Babiogórski National Park</td>
<td>Zawoja, Malopolskie (Beskidy Mountains)</td>
<td></td>
<td>a) scientists</td>
<td>Two IT-specialists responsible for maintaining the hardware and LAN</td>
<td>Dial-up connection 64Kb/sec (DSL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>b) visitors</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>c) local community members</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Polish Polar Station – Hornsund</td>
<td>Hornsund Fjord, Svalbard</td>
<td>Arctic Research</td>
<td>a) scientists</td>
<td>All researchers working at the Station</td>
<td>512 / 256 Kb (Sat, high disturbances)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>b) technical staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>c) visitors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Polana Primary School</td>
<td>Polana, Podkarpackie (Bieszczady Mts.)</td>
<td>Primary School</td>
<td>a) schoolchildren</td>
<td>One IT school teacher responsible for the hardware and LAN</td>
<td>NONE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>b) farmers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>c) tourists</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Hucul Horses Stud</td>
<td>Regetów, Małopolska (Beskid Niski Mts.)</td>
<td></td>
<td>a) tourists</td>
<td>One IT-technician responsible for maintaining the hardware and LAN</td>
<td>Dial-up connection 64Kb/sec (DSL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>b) researchers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>c) endangered species protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Magurski National Park</td>
<td>Krempna, Małopolska and Podkarpackie (Beskid Niski Mts.)</td>
<td></td>
<td>a) scientists</td>
<td>One IT-engineer responsible for maintaining the hardware and LAN</td>
<td>Radio ADSL connection (frequent disturbances)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>b) visitors</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>c) local community members</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Gładyszów Primary School</td>
<td>Gładyszów South-Eastern, Małopolska</td>
<td>Primary School</td>
<td>a) schoolchildren</td>
<td>One IT school teacher responsible for the hardware and LAN</td>
<td>Ground-based ADSL connection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>b) farmers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>c) tourists</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
school authorities was created. Furthermore, we took into account the outcomes of the national program "Ikonka" that had been carried out in the country since September 2003 launching broadband Internet access points in most public libraries and cultural centers throughout the country. In Małopolska – one of the two regions selected to install the pilot sites, „Ikonka“ provided Internet access and supplied at least 3 workstations with software and WiFi in 181 out of 182 municipalities, launching totally 218 access points. Thus, the sites already endowed with broadband access from Interkl@sa or Ikonka were not taken into account for the project’s pilot phase, that allowed to eliminate two of ten pre-selected sites. Two further schools could not be considered because of the lack of timely written consent from the local authorities. On the other hand, at this stage we took into account the possibility of organizing a telecenter supported by the Interreg IIIB CADSES programme at two of the DVB-RCS pilot sites that added additional synergy score to one of lower-ranked sites. Finally, the locations the number of initial highest-ranked candidates was reduced to seven.

During the selection process we took into account new opportunities that arose from the contacts with the leaders of local action groups, institutions hosting pilot sites, and local administration, which appeared to be interested mostly in e-government applications and in teaching the members of local communities how to use them.

The results of the above presented selection procedure – seven locations in the Antarctica, Svalbard and in the Beskid mountains - are presented in Tab.I on the previous page.

By the end of June 2006 the phase I of the pilot sites sele-

### Table II.

**THE PILOT STATIONS OF THE DVB-RCS SATELLITE INTERNET IN POLAND, INCLUDING ONE RURAL TELECENTER**

<table>
<thead>
<tr>
<th>ID</th>
<th>Place, host institution</th>
<th>Start of operation</th>
<th>Geographical situation</th>
<th>Description and type of the pilot site</th>
<th>No. of inhabitants /users</th>
<th>Learning goals to be achieved by this site and main target groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>POL 01</td>
<td>ZAWOJA, Habotogórski National Park</td>
<td>2007.03.28</td>
<td>longitude: 19°54', latitude: 49°65', altitude: 550 m asl</td>
<td>The pilot site is situated in the headquarters of the Babia Góra National Park (BGPN), close to Babia Góra (1725 m asl) Site type: Research Station &amp; Wildlife Reservation</td>
<td>6200 / 2000</td>
<td>1. Better environmental education, enriching science learning and scientific activity in remote rural areas: high school and university students, teachers, ‘green schools’ participants 2. Learning at work: researchers 3. Supporting local administration in environmental issues E-learning applications: producing and disseminating videos with observations of the Park’s wildlife</td>
</tr>
<tr>
<td>POL 02</td>
<td>POLANA, Polana Private Salesian School</td>
<td>2007.03.29</td>
<td>longitude: 22°35', latitude: 49°18', altitude: 639 m asl</td>
<td>Polana is a small village in the south-eastern edge of Poland. It is situated in the central area of the Bieszczady Mountains. Site type: rural school</td>
<td>400 / 80</td>
<td>1. Using internet access for learning at school. 2. Using internet access for learning at home. 3. E-learning applications: WebTV - schoolchildren use cameras to record school events, then upload them to the web, e-learning applications supplementing the biology and English lessons</td>
</tr>
<tr>
<td>POL 04</td>
<td>MT. LUBOR, The Astronomical Observatory of the Jagiellonian University</td>
<td>2008.02.22</td>
<td>longitude: 20°08', latitude: 49°75', altitude: 904 m asl</td>
<td>Mt. Lubomir is situated in the north-eastern part of Beskid Makowski Mountains. The site is endowed with indoor WiFi for employees, and outdoor one for visitors. Site type: research station</td>
<td>1234 / 100</td>
<td>1. Using internet access for learning at school. 2. Using internet access for learning at work. 3. E-learning applications: Discovery Space (D-Space) and similar applications allowing to transmit astronomical data from Lubomir via internet and to join the network of similar observatories. With D-Space the visitors of the Observatory are able to compare the views of astronomical objects from different telescopes</td>
</tr>
<tr>
<td>POL 05</td>
<td>ROKICNY, POLANA- LANSKIE, Raba Wyzna Telecenter</td>
<td>2008.02.28</td>
<td>longitude: 19°91', latitude: 49°57', altitude: 550 m asl</td>
<td>Rokicny Podhalaškie is a village in the Raba Wyzna municipality, about 70 km south from Krakow, in the Beskydy Mts. The pilot site serves the local telecenter. The outdoor WiFi, reaches the nearby recreational area. Site type: rural telecenter</td>
<td>254 / 50</td>
<td>1. Intensive e-government-oriented training programs 2. The use of municipal web service of Raba Wyzna 3. Using internet access for learning at school 4. Using internet for learning at home and during leisure time 5. Using internet access for learning at work. 6. E-learning applications: WebTV - trains record relevant events from Raba Wyzna, then upload it to the web. Electronic consultations on local community matters proposed by municipal authorities</td>
</tr>
<tr>
<td>POL 07</td>
<td>NOWY LUPKOW, Primary School</td>
<td>2008.11.06</td>
<td>longitude: 22°05', latitude: 49°15', altitude: 592 m asl</td>
<td>Nowy Lupków is situated in the Podkarpackie Voivodship, in the Bielszowickie Mountains. Site type: rural school</td>
<td>390 / 60</td>
<td>1. Better education: Enriching science learning and scientific activity in remote rural areas 2. Rural school teachers’ training Applications: WebTV, schoolchildren record school events, then upload the movies to the web</td>
</tr>
<tr>
<td>POL 08</td>
<td>KETY, Secondary School No.9 in Kety</td>
<td>2008.11.07</td>
<td>longitude: 19°90', latitude: 49°62', altitude: 514 m asl</td>
<td>The Community of Kety is located in the Sola river valley, at the foot of the Beskidy mountains. Site type: county-level school</td>
<td>19500 / 500</td>
<td>1. Better education: Enriching science learning and scientific activity in remote rural areas 2. Rural school teachers’ training Applications: Teachers’ IT training seminars. Xploara, UNITE platform. Environet have been used to enhance natural science lessons</td>
</tr>
<tr>
<td>POL 09</td>
<td>MYCZKOWICE, Primary School</td>
<td>2009.02.06</td>
<td>longitude: 22°24', latitude: 49°26', altitude: 364 m asl</td>
<td>Myczkowice is a village in the Podkarpackie Voivodeship in southern Poland. Site type: rural school</td>
<td>510 / 120</td>
<td>1. Better education: Enriching science learning and scientific activity in remote rural areas, 2. Rural school teacher training Applications: Cret@quarium, WebTV, e-govt-oriented training</td>
</tr>
<tr>
<td>POL 10</td>
<td>HARKABUZ, Primary School</td>
<td>2009.03.18</td>
<td>longitude: 19°50', latitude: 49°32', altitude: 809 m asl</td>
<td>Harkabuz is a village in the Raba Wyzna municipality, in the Beskid Zachodni Mountains. Site type: rural school</td>
<td>530 / 75</td>
<td>1. Better education: Enriching science learning and scientific activity in remote rural areas, 2. Rural school teacher training. E-learning applications: Cret@quarium, WebTV, municipal web service of Raba Wyzna (e-govt)</td>
</tr>
</tbody>
</table>
tion was completed and working contacts established with the representatives of all selected candidate sites. The Arctowski Research Station, ranked 1, could not get the satellite connection because of the technical infeasibility of the Atlantic Bird 1 B satellite to reach the St. George Island. Furthermore, heavy snowfalls, that came as early as in September, made the installment of the D-Star terminal in Hornsund, Svalbard, impossible. Finally, sites ranked 2 and 4: the Babiogórski National Forest and Polana Primary School turned out to be successful winners of the phase I of the selection process. A similar procedure has been performed for the 2nd phase pilot sites, yielding a list of next-best eight pilot stations. All they are presented jointly in the next section.

III. THE OPERATION OF THE PILOT SITES IN POLAND

First two pilot sites, selected within the above described procedure, were installed in March 2007: the Babiogórski National Park has been endowed with the site in the Park’s headquarters in Zawoja, Beskidy Mountains, Małopolskie Region, and the Polana Primary School, situated in the Bieszczady Mountains, Podkarpackie Region. The selection of sites performed for the second project period yielded eight subsequent sites. All selected sites are shown in the Fig.1 below while their characteristics are presented in Tab.II.

![Fig.1. The situation of Polish satellite internet pilot sites selected for the Rural Wings project](image)

The phase II installations started in two municipalities in in the Beskidy Mountains in Małopolska in 2008: Wiśniowa with the sites at the Lubomir mountain – the didactic astronomical observatory of the Jagiellonian University and in the Wiśniowa Secondary School, and the municipality of Raba Wyżna with sites at the Rokiciny Podhalanskie Telecenter, supported additionally by the Interreg IIIB CADSES Teleaccess project and at the Public Library in Skawa. Following a needs analysis, the sites have been endowed with the software and hardware suitable for the learning scenarios selected, and the terminals were connected to WiFi networks.

The remaining four pilot sites were established at the Primary School in Nowy Łupków, the Secondary School No. 9

### TABLE III.
A REVIEW OF PLANNED IMPLEMENTATION OF LEARNING SCENARIOS IN POLISH PILOT SITES

<table>
<thead>
<tr>
<th>No.</th>
<th>Scenario description</th>
<th>POL01</th>
<th>POL02</th>
<th>POL03</th>
<th>POL04</th>
<th>POL05</th>
<th>POL06</th>
<th>POL07</th>
<th>POL08</th>
<th>POL09</th>
<th>POL10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Entrepreneurship education: A rural e-shop run by students</td>
<td>N</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>N</td>
<td>P</td>
<td>N</td>
<td>XP</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>2</td>
<td>Access to education: A virtual music school for rural students</td>
<td>P</td>
<td>P</td>
<td>XP</td>
<td>N</td>
<td>XP</td>
<td>XP</td>
<td>N</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>3</td>
<td>Students broadcasting local affairs through their own WebTV programme</td>
<td>XP</td>
<td>P</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
</tr>
<tr>
<td>4</td>
<td>Better education: Enriching science learning and scientific activity in remote rural areas</td>
<td>XP</td>
<td>P</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
</tr>
<tr>
<td>5</td>
<td>Rural school teacher training</td>
<td>P</td>
<td>XP</td>
<td>P</td>
<td>XP</td>
<td>XP</td>
<td>N</td>
<td>XP</td>
<td>P</td>
<td>N</td>
<td>P</td>
</tr>
<tr>
<td>6</td>
<td>On-the-field personalized communication and training services for farmers</td>
<td>P</td>
<td>P</td>
<td>XP</td>
<td>P</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
<td>XP</td>
</tr>
<tr>
<td>7</td>
<td>Health emergency training</td>
<td>P</td>
<td>P</td>
<td>D</td>
<td>N</td>
<td>P</td>
<td>D</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>8</td>
<td>Addressing change and innovation competences in rural communities</td>
<td>XP</td>
<td>P</td>
<td>XP</td>
<td>XP</td>
<td>P</td>
<td>XP</td>
<td>XP</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>9</td>
<td>Individual Learning (5 scenarios for different social groups in local community)</td>
<td>XP</td>
<td>XP</td>
<td>P</td>
<td>P</td>
<td>XP</td>
<td>P</td>
<td>XP</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>10</td>
<td>Improving internet access to public services and the electronic office (e-government)</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>XP</td>
<td>P</td>
<td>P</td>
<td>XP</td>
<td>P</td>
<td>XP</td>
</tr>
<tr>
<td></td>
<td>Overall <em>ex-ante</em> expectation of the dominant users’ scenario</td>
<td>R</td>
<td>IAP</td>
<td>T-EL</td>
<td>R</td>
<td>E-G</td>
<td>IAP</td>
<td>T-EL</td>
<td>T-EL</td>
<td>T-EL</td>
<td>T-EL</td>
</tr>
</tbody>
</table>

The numbering of sites (POL01-POL10) in Tab. III is the same as in Tabs. I and II. The site POL05 is the rural telecenter selected for the Teleaccess project. The other symbols used in Tab.III are explained below:

- **XP** - eXtensive use during the pilot phase highly Probable
- **P** - Potential or Planned use at a later date
- **D** - to be Determined, depending on a possible expansion of the target user group
- **N** - No use expected during the Project’s duration
- **R** - Research
- **IAP** - Internet Access Point
- **T-EL** - On site Teaching and E-Learning platform access
- **E-G** - learning related to E-Government
in Kęty, finally, the Primary Schools in Myczkowce and Harkabuz in 2009. The latter sites are situated in the mountains as well: Kęty in the Beskid Żywiecki Mountains, Nowy Łupków and Myczkowce in the Bieszczady Range in Southern-Eastern Poland, and Harkabuz in the Central Beskid Moun-
tains. Basic characteristics of all above-mentioned pilot sites are presented in Tab.II.

The technical and training support activities provided by the National Coordinator were supplemented by monitoring the operation of the pilot sites and collecting the data for final evaluation. They included a.o. on-site consultancy, measurement of transfer rates, consulting concerning hardware of satellite terminals and WiFi installations, monitoring the use of applications supplied by other project’s partners.

Further needs analysis concerning the hardware and software, based on the actual users’ needs elicited during the pilot phase, had been carried out. The National Coordinator’s team reviewed the learning scenarios available in the Rural Wings project in order to plan a most effective project implementation and to assist the users. A new learning package “Improving internet access to public services and the electronic office (e-government) features learning” was defined and included in the scenario portfolio as this has been expected to be the most relevant issue in Poland at time when the project was carried out. Then the recommended scenarios for each pilot sites were chosen. The initial assignment of learning scenarios is presented in Tab.III above.

The ex-ante expectation concerning the use of satellite internet shown in Tab.III served as a base for the ex-post assessment of the operation of sites and project’s goals achieved that are discussed in the next Section.

IV. FINAL EVALUATION OF THE LOCAL IS DEVELOPMENT RESULTS BASED ON SATELLITE INTERNET IN POLAND

The evaluation of results of the local IS development based on satellite internet in Poland during the period of 2006-2009 was used as the base for the decision to select the site for the EU LLP SoRuralL. Specifically, the evaluation process consisted of two components:

- the user-centered, based on the evaluation forms that had been sent to the end-users, filled-in at the training seminars and during other project’s events, and were available on the web to be filled-in on-line
- related to the technical and organizational aspects of the operation of pilot sites. It included the data on the transmission rates (down- and uplink), the information about the use of the terminals, such as the applications used, number and social structure of end-users, time at use, technical problems encountered, etc. The functionality of applications used and their responsiveness to the needs of different groups of end-users have also been evaluated.

While multicriteria outranking approaches based on weighting the individual criteria are commonly prevalent in deriving the rankings from individual scores, we have found out that a similarity measure to the ideal and satisfactory objects defined at the selection phase would better correspond to the ideas underlying the functioning of pilot stations. First, the data characterizing the individual pilot stations’ performance, containing 12 indicators, were gathered and indicators grouped into three groups: technical, intensity-of-use-related, and qualitative. Then the groups of criteria were aggregated to three synthetic objectives: those technical, based on transmission quality, those related to the intensity of use, and those describing the quality of fulfilling the e-learning goals, based on a qualitative assessment and interviews. The final ranking was derived by comparing the values of synthetic objectives with the corresponding values for reference sets containing the model and satisfactory objects.

The results of the ex-post evaluation, as of December 31, 2009, reported until March, 2010, are presented in Tab.IV above. For reference, in Cols. 9 and 10 we include a com-

<table>
<thead>
<tr>
<th>No.</th>
<th>Site name and code</th>
<th>Mean downlink rate (kb)</th>
<th>Standard deviation of downlink (kb)</th>
<th>Mean uplink rate (kb)</th>
<th>Standard deviation of uplink (kb)</th>
<th>Overall technical assessment score [0…10]</th>
<th>Intensity of using dedicated applications</th>
<th>Deviation from ex-ante scenario assignment (Tab.2)</th>
<th>Difference between the ex-post and ex-ante ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ZAWOJA, POL01</td>
<td>1031,795</td>
<td>486,723</td>
<td>68,375</td>
<td>38,715</td>
<td>5</td>
<td>lower</td>
<td>none</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>POLANA, POL02</td>
<td>902,946</td>
<td>538,364</td>
<td>N/A</td>
<td>4</td>
<td>lower</td>
<td>none</td>
<td>-1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>WISNIOWA, POL03</td>
<td>1133,273</td>
<td>508,944</td>
<td>44,300</td>
<td>7,328</td>
<td>lower</td>
<td>none</td>
<td>-1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>MT. LUBOMIR, POL04</td>
<td>720,581</td>
<td>562,458</td>
<td>347,413</td>
<td>304,282</td>
<td>lower</td>
<td>later launch</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>ROKICINY PODHALAŃSKIE, POL05</td>
<td>1417,943</td>
<td>1525,783</td>
<td>58,661</td>
<td>49,041</td>
<td>5</td>
<td>standard</td>
<td>additional e-govt</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>SKAWA, POL06</td>
<td>1344,20</td>
<td>741,87</td>
<td>49,37</td>
<td>16,88</td>
<td>6</td>
<td>lower</td>
<td>none</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>NOWY LUPKOW, POL07</td>
<td>1552,985</td>
<td>350,599</td>
<td>112,845</td>
<td>31,502</td>
<td>8</td>
<td>standard</td>
<td>none</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>KĘTY, POL08</td>
<td>1323,77</td>
<td>665,22</td>
<td>88,01</td>
<td>47,22</td>
<td>7</td>
<td>higher</td>
<td>none</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>MYCZKOWCE, POL09</td>
<td>823,546</td>
<td>467,881</td>
<td>58,091</td>
<td>71,147</td>
<td>4</td>
<td>lower</td>
<td>later launch</td>
<td>-1</td>
</tr>
<tr>
<td>10</td>
<td>HARKABUZ, POL10</td>
<td>922,07</td>
<td>479,05</td>
<td>N/A</td>
<td>N/A</td>
<td>3</td>
<td>standard</td>
<td>later launch</td>
<td>0</td>
</tr>
</tbody>
</table>
comparison with the results of ex-ante assessment and learning scenario expectations presented in Tabs. I and III.

It is to be noted that, despite the deficiencies of the weighting methods, all technical criteria in Tab. IV were aggregated based on an equal weights. Thus the overall technical assessment criterion (col. 7 in Tab. IV above) was a result of rounding and normalising to the scale [0, . . . , 10] of linear combination of the absolute transfer rates (positive weights) with the unreliability of the link expressed by the standard deviation of the down- and uplink rates (with negative weights). Observe that the highest mean values received for downlink in the site POL05 were accompanied by highest connection risk that reduced the technical score. The main, or for most sites even the only reasons of a lower-than-expected use of dedicated applications were lower-than-expected transmission rates, that made the use of some applications more difficult, and the initial lack of the most wanted e-government-oriented learning applications, tailored to Polish circumstances, that was supplied by the National Coordinator during the third year of the project.

Neither the National Coordinator nor the sites themselves had an influence on the technical criteria contained in cols. 3-6 in Tab. IV. The transmission rate values assumed in the project were 4 Mbaud for downlink and 2 Mbaud for uplink, so the values reached actually differ substantially from those initially assumed. Intensity of using project’s dedicated applications by all sites were measured by access time to the specific web pages and supplied by the project’s partner responsible for these measurements. These data were normalised for all sites, taking into account the transmission rates at this site and the assumed number of potential users. Since at the time when this paper was written the results of the holistic evaluation of the project performed by other project’s partner were not available, the ranking in Tab. IV should be regarded as touching upon only the aspects specified in this table, and it might not reflect the assessment of the overall operation of sites. Therefore the differences between the ex-ante (selection-stage) and ex-post evaluation ranks contained in Col. 10 of Tab. IV may serve exclusively as an illustration of the evaluation method and not as the final assessment. On the other hand, the values obtained show a good compliance between the expectations, that served as reference values, and actual results.

An additional aspect of the above evaluation resulting from the interdependence between the (ex-ante) needs analysis and ex-post evaluation of pilot sites, is to justify the rationale for the initial selection of sites. While the technical criteria of needs assessment and evaluation were different, the target goals, i.e. intensity of use, measured as the transmission volume, the average number of users per week and its stability, measured by the standard deviation of the above, as well as the second goal: filling-in the gaps in the broadband coverage, and the third-one: the number of users willing to use the dedicated applications made available within the project, could be compared as ex-ante expectations at the stage of selecting the pilot sites, and as ex-post evaluation results. To assess each individual site, its final outcomes were adjusted to the potential capacity of this site, rather than measured in absolute numbers. The difference between ex-ante expectations at the stage of selecting the pilot sites, and ex-post evaluation results, was taken into account, to measure the progress achieved.

V. SELECTION OF THE MOST SUITABLE SITES FOR THE SORURALL PROJECT

To select the most suitable site for the activities planned within the LLP SoRuralL project, we merged the ranking criteria used at the pre-selection phase and described in Tab. I with the ex-post assessments of the technical performance and of the use of learning scenarios, presented in Tab. III. The comparison of ex-ante and ex-post rankings was regarded as a measure of progress achieved during the pilot phase that could add up to 5 additional points to the total score. Then we included an additional criterion referring to the experience in carrying out projects devoted to the development of local information society within the Interreg, Life Long Learning Programme, or Framework Programmes.

All above criteria were regarded as additive scores that yielded the ranking shown in Tab. V below:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Site name and code</th>
<th>TECH</th>
<th>LEARN</th>
<th>IS</th>
<th>PROG</th>
<th>Σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>KĘTY, POL08</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>2.</td>
<td>ROKICINY PODHA-LANSKIE, POL05</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>NOWY ŁUPKÓW, POL07</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>4.</td>
<td>ZAWOJA, POL01</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>5.</td>
<td>SKAWA, POL06</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>6.</td>
<td>HARKABUZ, POL10</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>7.</td>
<td>WISNIOWA, POL03</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>8.</td>
<td>MT. LUBOMIR, POL04</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>9.</td>
<td>POLANA, POL02</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>10.</td>
<td>MYCZKOWCE, POL09</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

Abbreviations used in Tab. V:
TECH - Technical performance assessment, scale from 0 (lowest) to 10
LEARN - Intensity of implementing learning scenarios, scale [0…10]
IS - Experience in Interreg, LLP, or FP IS programmes, scale [0…5]
PROG - Progress achieved during the pilot phase, scale [0…5]
Σ - Total score (sum of scores from cols 3-6)

Actually, two highest-ranked sites have been selected to implement the SoRuralL activities in Poland. Taking into account that the site POL05 is a rural telecenter, with the strong needs to assure e-participation in governance by supporting local authorities with e-government related learning, the activities of SoRuralL focusing on organising a virtual community within the Virtual learning World application has been carried out at this site. On the other hand, the site in Kęty - a secondary school, could concentrate its activities on schoolchildren networking and on using a variety of general subject learning applications.

The selection approach here presented was elaborated to cope with the specific needs and circumstances related to the
implementation of Rural Wings, Teleaccess and SoruraLL in Poland. However, it turned out that similar ideas have been also used in two other countries where at least two of the above three projects have been carried out, namely in Bulgaria, Greece and Spain the sites chosen for Rural Wings were considered as a performance site for Teleaccess (Spain), then the telecenters developed during the Teleaccess have been selected as sites to implement SoRuraLL (Bulgaria, Greece, Poland, Spain). This is shown in Tab. VI below.

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Site name and location</th>
<th>Site type</th>
<th>RW</th>
<th>TA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgaria/Haskovo</td>
<td>Stambolovo</td>
<td>General-purpose local</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td></td>
<td>Telecenter</td>
<td>telecenter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greece/Kastoria Achaia</td>
<td>Dymi Telecenter, Dymi</td>
<td>Telecenter in the premises of local authorities</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Poland/Malopolska</td>
<td>Raba Wyznia Telecenter, Rokicey Podhalański</td>
<td>Rural telecenter maintained by the municipal authorities, focused on e-learning and e-government</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Poland/Malopolska</td>
<td>Primary School, Harkabuz</td>
<td>Primary school with 75 schoolchildren and 10 teachers in 7 classes.</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Poland/Malopolska</td>
<td>Public Library in Skawa</td>
<td>Rural multifunction library</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Poland/Malopolska</td>
<td>Dabrowska School, Kety</td>
<td>Secondary school with 470 pupils and 38 teachers</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Spain/Galicia</td>
<td>Unitary school of Campos</td>
<td>Rural public school with one tutor and 7 students.</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Spain/Galicia</td>
<td>CEIP Sant Semri, Prats i Sampson</td>
<td>Rural school with 18 pupils and 2 teachers in 2 classes</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Spain/Galicia</td>
<td>CEIP Rellinars</td>
<td>The public multigrade school with 69 pupils and 8 teachers</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Spain/Galicia</td>
<td>CEIP Rebereda</td>
<td>Primary school with 227 pupils and 26 teachers</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

Abbreviations used in Tab. VI:
- RW – Pilot site of Rural Wings project
- TA – Telecenter in Teleaccess project

The Rural Wings satellite internet pilot sites in the three countries concerned that are not shown in the above Tabs. V and VI were either not interested, or non-eligible for the SoRuraLL project or – in case of Greece – the large number of sites would exceed the SoRuraLL’s capacity. On the other hand, the performance of SoRuraLL in the remaining two countries involved, Germany and Ireland, could not base on the Rural Wings outcomes, as this project had not been carried out there due to a.o. a sufficient terrestrial broadband infrastructure.

VI. CONCLUSIONS

Based on the studies carried out during the projects mentioned above, on the outcomes of another foresight project Scenarios and Development Trends of the Selected Information Society Technologies until 2025 [3], and on the data gathered at the satellite internet pilot sites by the National Coordinator for Poland, we can conclude that the ‘most pro-

bable’ Polish Information Society (IS) development scenario until 2025 and beyond assumes a considerable use of satellite internet access in selected remote rural areas. Beyond market principles, the other drivers that foster satellite internet are the duties of local governments to assure a common e-participation, and of the dominating telecom operator to provide broadband access to all citizens, that is imposed by Polish law. These goals can be fulfilled by the DVB-RCS or a similar bi-directional satellite technology in a most efficient and economical way.

The recommendations to the e-learning applications providers, to the teams carrying out subsequent local-information-society oriented projects, and to the authorities responsible for the development of local information societies that result from the implementation and evaluation of the satellite internet pilot stations in Poland can be summarised as follows:
- The installation and operation of the satellite internet access points in the DVB-RCS technology overlaps with the middle-term Information Society (IS) policy goals, as specified in the related Polish IS policy documents [3], and with the statutory duties of dominating telecoms,
- With new generation of satellites, the DVB-RCS internet can provide safe and affordable e-infrastructure with geographically unlimited access,
- The successful operation of the satellite internet terminal installations in public schools depends on the availability of comprehensive e-learning, e-government platforms, content and services,
- A growing role of e-health-related applications, that have to be made available to everyone, without geographical limits, is to be taken into account when designing the future deployment plans of satellite internet technologies,
- The satellite internet access can foster the extension of common intellectual sphere in the e-space and eliminate digital divide in rural areas,
- The permanent surveillance of access points in rural areas and schools is necessary to monitor negative aspects of information technology (ab)use, such as personal alienation through e-gaming and –gambling, uncontrolled dependence on hanging on internet etc., that can endanger especially schoolchildren and internet newcomers,
- The development of local information societies in rural areas based on the satellite DVB-RCS technologies will support a move from the traditional agriculture to the development of innovative, sustainable, environmentally and animals-friendly agriculture that supplies high-quality products and is based on sophisticated IT, such as robotics, monitoring and control. Similarly, other branches of rural economy, such as tourism, specifically agrotourism, will benefit from the satellite broadband access.

Furthermore, the conclusions resulting from the ex-post evaluation of the initial ranking procedure give an insight on the overall evaluation methodology for the satellite internet access points used primarily for learning. The ex-post evaluation of the initial ranking, based on the results of the pilot sites selection compared to the ex-post assessment criteria mentioned in the previous Section, may allow to derive an adaptive learning scheme, which – in turn – can be
useful to assess the adequacy of the selection criteria, the adequacy of choice and correctness of using of the multicriteria outranking procedure applied in the selection process, and the credibility of data supplied by the applicants. To make such a comparison possible, the actually measured criteria need to be transformed to the measures of the above-mentioned goals, taking into account the uncertain character of the initial expectations as regards the sites’ performance. The evaluation process of the functioning of ten DVB-RCS pilot sites in Poland does also allow to derive a subset of relevant needs assessment criteria from a larger set of criteria considered at the selection phase of the project.

A similar approach to the presented above can also be applied to assess the adequacy of the multicriteria decision-making methods that served to derive the final (ex-post) pilot sites’ ranking. The core of the procedure consists in calculating the distance between the initial and final rankings, which reflects the efforts that would be needed to get the results anticipated, as seen ex-post. An aggregated value function, describing the quality of assessment and quality of performance of selected sites is defined as well. In case of repeated decision problems of the same kind, its outcomes can be used as inputs for the above-mentioned learning scheme. This approach is universal in the sense that it can be applied to any similar problems, involving an initial ranking, and the performance of \( N \) selected objects based on this ranking. Specifically, the methodological framework to select satellite internet access points in any country and in the general case, could be based on a similar scheme as the one here proposed.

Finally, let us mention that according to the economic forecasts and scenarios for Poland [3], [8], the infrastructural IT satiation in Poland will come between 2012 and 2015 [9], together with the development of commonly accessible e-learning, e-economy, e-government, and e-health applications [11]. This breakthrough will set the high-quality broadband access and common IT literacy among citizens to one of the top policy priorities.

To sum up, there is a considerable application potential for satellite-based e-learning and e-health in Poland, the latter especially for preventive medicine and m-health applications [6]. One can expect that the development of m-health in remote and sparsely populated areas will make use of the satellite internet, even in the mountain areas where a terrestrial broadband is available. This can be justified by the fact that satellite communication can be more reliable that the wireless-ground-based connections in case of emergencies, in particular the flood emergency, that occurs pretty regularly in the river valleys in the Beskidy mountains. It is also worth mentioning that e-learning, e-health, and e-government related actions, activities and public financing have been included in the Regional Innovation Strategies and Regional Development Strategies in the Polish regions concerned, i.e. in Malopolska and Podkarpackie Regions (Voivodships), which makes future development of local information societies based on the earlier projects feasible.

REFERENCES

A goal (Lifelong Learning), a means (ICT) and an opportunity (Distance): the story of the REVIT project

Nicos C. Sifakis, Demetra Egarchou, Maria Fountana, Thanasis Hadzilacos, and Maria Andreou

Abstract—In this paper we document the design and implementation of an ICT-based distance learning framework that exploits current developments in online distance education, in particular e-learning tools and features that are collectively known as “Web 2.0 tools” (e.g., blogs, podcasting, wikis, social networks). The project aims at training adults living and working in geographically remote areas on a wide array of topics that concern them (among others, using the Internet, learning English for tourism, teaching English as a foreign language). In doing so, the project involves participants in mutual interaction and prompts them to create, share and reuse information. Ultimately, the project implicitly aims at providing useful lifelong education towards shaping the local mentality of the remote community from that of an overlooked inhabitant of a forgotten region to a European citizen, at the same time respecting cultural and linguistic diversities.

Index Terms—Adult education, distance learning, remote areas, web 2.0.

I. INTRODUCTION

ONE OF THE GREAT STRENGTHS of distance education is the facilitation of learning for everyone involved without exclusions. In recent years, advances in information and communication technologies (ICT) have significantly upgraded, simplified and speeded up the process of distance learning course design and implementation. This has in turn prompted the creation of projects aiming at training and, in essence, empowering individuals at a distance.

In this paper, we document a distance learning framework that takes advantage of existing infrastructures and ‘revitalizes’ small, geographically remote educational facilities in an attempt to upgrade their already significant role in the local communities. In particular, we present the project “Revitalizing Small Remote Schools for LifeLong Distance e-Learning” (henceforth, REVIT) whose main purpose was the design, development and implementation of a series of ICT-based distance learning methodologies, tools and educational materials aimed at enhancing existing educational opportunities in geographically remote areas across Europe.

A. Project background

Co-financed by the EU (Lifelong Learning Programme / Transversal Programme / Key Activity 3: ICT - European Commission, EACEA), REVIT (http://revit.cti.gr) is a two-year project whose mission was to develop and implement potentially scalable e-courses integrating state-of-the-art ICT-based distance education instruments as a means of substantially supplementing the scant and often irrelevant educational opportunities normally available to residents of geographically remote and insular regions in the EU. The idea behind this endeavour was to gauge the applicability, economical feasibility and ultimate effectiveness of implementing existing resources and infrastructures at otherwise declining schools and revitalizing their operation in order for them to become multi-purpose local learning centres accessible to all.

Beneficiaries of the REVIT project are adults, professionals or otherwise, who are eager either in complementing their mainstream education, or in receiving further specialised training in their professional domain, or even simply in becoming familiar with the use of ICT in their everyday life. All REVIT e-courses were designed to make the best of the most recent advances in distance education and built on previous award-winning experience [1], integrating synchronous and asynchronous tools based on Web 2.0 technology.

Partners of the REVIT project, with the Research Academic Computer Technology Institute (CTI) acting as the coordinating Institution, are: Kokkola University Consortium Chydenius (Finland), CODN (Poland), Zinev Art Technologies (Bulgaria), Open University of Cyprus (Cyprus), CINECA (Italy), Directorate of secondary education of Cyclades (Greece), Veikko Vionoja Primary School (Finland), Public Primary School in Fornetka (Poland), Kula Municipality (Bulgaria), Community of Palaichori (Cyprus), Biocert (Italy) and represent University departments, Teacher...
II. THE REVIT DISTANCE LEARNING FRAMEWORK

The distance learning framework [2], [3] proposed by the REVIT project provides methodologies for:

- Identifying the educational needs for people living in small and “remote” European areas (REVIT application areas),
- Designing and developing REVIT distance learning courses (e-courses) addressing the above mentioned needs,
- Delivering these e-courses from a distance, exploiting existing infrastructure and using modern ICT tools, such as synchronous and asynchronous distance learning platforms and e-Learning 2.0 tools (e.g. blogs, wikis, 3D virtual environments, social networking software, etc.) in the learning process.

For identifying the educational needs, the methodology includes:

- an investigation of the technical infrastructure of the remote areas (e.g. availability of Internet Connection, availability of PCs etc);
- visits in the application areas and concurrent implementation of qualitative and quantitative research instruments (e.g., small group or public discussions, brainstorming, use of questionnaires etc);
- encouragement of the interviewees to express their actual needs (e.g., the topics should address mostly real educational needs, like “tourism-focused English”, rather than just something that “would be nice to know” like “building web sites”);
- receiving commitment of participation (i.e., making explicit the duration of the courses and the methodological approach to be used, the roles of the people involved in the courses as well as their obligations and duties).

For the design and development of the e-courses and their relevance to the identified needs, the methodology includes:

- the definition and specifications of a REVIT e-course; a REVIT e-course is a structured set of learning activities (including their sequencing), which have to be oriented towards the needs of learners and are aimed at a set of learning objectives (knowledge, aptitude and attitude) for a specific learner profile;
- utilizing advanced multimedia interactive learning objects, with a learner-centric blended distance learning methodology;
- using Web 2.0 tools, and synchronous/asynchronous e-learning environments;
- templates for individual course design and development, as well as guidelines and tools for course developers.

Regarding the delivery of the e-courses, the distance learning model proposed (figure 1) allows target groups/learners participating in the REVIT Distance Learning courses to:
- participate via video conferencing in a lesson delivered by a remote instructor, being able to interact through specific ICT tools, either with the instructor or with other learners (synchronous mode of distance learning);
- attend pre-recorded lessons as delivered by a remote instructor through a specific tool;
- work on their own using appropriate educational material and software on the school’s computers (asynchronous mode of distance learning); and
- communicate and cooperate with their peers and be creative and active participants using the modern e-tools and communication spaces available, through well-designed and well-structured educational activities.

III. THE PILOT IMPLEMENTATION OF THE REVIT DISTANCE LEARNING MODEL

A. The pilot application area in GREECE: CYCLADES

In the case of Greece, the Cyclades prefecture was selected as an application area for the REVIT project early on in the design phase of the REVIT project idea. This selection was based on three different parameters:

The Cyclades islands share similar characteristics depending on their size and their tourism impact. Typical Cycladic nature is rocky, dry, with golden beaches and shores corroded by the sea, while the typical Cycladic island climate is mild during the winter and cool in the summer. Habitants are chiefly occupied in the fishing industry. They also work in agriculture but mainly to sustain their family needs. People on the islands begin working at a very early age, in order to contribute to the family budget. As a result, in many cases, the majority of the middle-aged population hasn’t completed their compulsory education.

Nowadays most of the population also works in tourism. Rapid touristic development has upgraded the living standard on the island, albeit not without a cost, since, as reported by local people, touristic development is dependent upon financial and social conditions, takes place mostly in the
summer, may disorientate the younger generation and influences educational aspirations by undermining their value.

For the REVIT project needs, the participation of two Cycladic islands was decided early on in the project as a safety net because of their particular characteristics: limited population of the islands during the winter, the fact that local people are very busy with tourism-related activities during the summer, the increased probability of technical problems on the islands and their remoteness in general (e.g., slow Internet speeds, limited amount of equipment in the schools, weather conditions influencing access to and from the island, etc.) deriving from previous experience.

Therefore, instead of involving only one island, Koufonissi, it was decided to also involve the larger and more populated nearby island of Ios.

Needs analysis in the Cyclades was conducted in three stages during the design of the REVIT project, early on in the project and just before the pilot implementation stage. The research instruments used incorporated the following: observation and dialogue methods (interviewing local people), organization of Info Days and parallel collection of additional data (questionnaires).

To be more precise, in order to define the profile of the learners and local teachers, contact with the school director, local teachers and local people in the application areas (initially with Koufonissi and later with Ios) was established during two separate phases of the project, by representatives of the Greek project team, collecting information about:

- the local environment;
- the school infrastructure (quality of the available physical resources, i.e., the condition of the various rooms of the school, particularly the condition of the classrooms);
- the technical resources (appropriate equipment, Internet speeds, etc.);
- the staff (computer specialists, teachers of particular subjects);
- the priority areas;
- stakeholders’ expectations regarding planned e-courses, which further included consultation with the teachers on:
  - their potential role on the island during the Revit e-courses;
  - selecting a group of learners to participate in the REVIT e-courses;
  - on forming sub-groups of learners depending on their age, ICT skills, foreign language skills (e.g., English language skills), profession, expectations from the REVIT e-courses regarding their personal and professional development.

The findings of the needs analysis in Ios and Koufonissi showed that people were mainly interested in utilizing Internet services in their profession (e.g., in the case of the teachers, enhancing their teaching skills; in the case of tourism professionals, e-marketing their products) or in their everyday activities. Another need referred to the improvement of their communication skills using English as a foreign language.

B. The pilot application area in CYPRUS: PALAICHORI

The community of Palaichori is the REVIT application area for Cyprus. Palaichori is a village about 50Km southwest of Nicosia, the capital of Cyprus, and is the biggest village in the surrounding mountainous area of “Pitsilia”. It is positioned 1000 meters above sea level and is prone to an average annual rainfall of about 800 millimeters. In the vicinity there are vineyards of the wine producing variety, vegetables, chestnut, walnut, almond and olive trees, fruit trees as well as other local varieties. The village is divided in two by the river (“Serrache”) which springs from the height of the mountain “Papoutsas”. The majority of the population is professionally occupied in Nicosia. The rest earn their living from agriculture, farming and the production of goods from grapes, pork and the processing of milk and other farm products. Craft industry production is limited in Palaichori mainly because people produce their own traditional products as a second part-time job and not as their major job. Palaichori was established 700 years ago and there are a lot of attractions to be seen there, such as churches, museums, the “Cypriot Mother” statue, etc. We were interested in seeing how REVIT could contribute in helping Palaichori, as well as the broader Pitsilia district, develop into a tourist area.

In terms of infrastructure, the regional primary school of Palaichori is surprisingly modern, hospitable and full of traces of educational and artistic activities. Its technical infrastructure is also quite satisfactory. The school has a modern computer laboratory and each classroom is equipped with PCs connected to the Internet. All PCs are equipped with educational software and there is availability for linking printers and projectors onto an interactive whiteboard.

In order to ensure a sustainable interest in the REVIT e-courses, potential learners were informed about REVIT and what their commitment as participants would involve. They were duly informed about the duration of the courses, the e-tools to be used and the ways we intended to use the tools (both synchronously and asynchronously) throughout the duration of the REVIT courses, and their duties, i.e., participating in on-line sessions, using the forum, carrying out activities and exercises, etc. participants were also informed about the REVIT adult e-learning philosophy.

Prospective participants’ educational needs were identified during various visits to the Palaichori community by means of small group discussions, public discussions, brainstorming and handing out questionnaires. Needs analysis showed that people’s interests were quite similar to those identified in the Cyclades. It also identified issues related to regional development, such as agrotourism, marketing local products through the Internet and biological agriculture.

IV. REVIT E-COURSES

As Greek was the common language for people in Cyclades (Greece) and Palaichori (Cyprus) and since common interest was expressed regarding the e-courses they would like to attend, it was decided that common groups of learners will be formed. In the following sections of this paper we describe
the REVIT e-courses that were designed, developed and delivered to the Greek-Cyprian groups of learners in Ios, Koufonissi and Palaichori.

A. Introductory Course on using Web technologies

This course aims at introducing all trainees to the use of web technologies through providing them with specific knowledge, skills and attitudes concerning the utilization of the Internet, at the same time familiarizing them with the REVIT distance learning system and web tools, in order for them to be able to participate in the thematic REVIT e-courses of their interest.

More specifically, its main objectives include:
- **knowledge of terminology**: (e.g. Internet, Web, Upload/Download, tool, search machine, bookmark, browser) and concepts (e.g. Hyperdocument, Information source, information validity, asynchronous communication, synchronous communication);
- **skills**:
  - use of the INTERNET and the WEB for obtaining content, searching for concrete information, communication, publishing, playing/idle, as alternative means of everyday activities and for transactions;
  - active use of terminology and ability to think with various concepts (cf. knowledge above);
- **attitudes**:
  - when confronted with a question or a task they should (a) consider and (b) use Web resources as information source, communication medium and (trans-)action tool;
  - being comfortable with the use of the tools that they will be using in ensuing e-courses.

The introductory course consists of 8 sections, i.e., groups of learning activities, in order to cover various interests and backgrounds of potential learners. Each section concerns a specific action that a learner could be interested in undertaking through the web. These sections along with some examples of learning activities are listed below:

- **obtain content from the web** (e.g. read an article; visit a URL; look at an image; listen to a song; watch a video; download a song, an image, a video; find provocative content);
- **look up (search for)** specific information (e.g. find a recipe; find a song’s lyrics or a poem; compare prices for something I intend to buy; find out the score of yesterday’s football match; enquire localized weather reports; search for a friend’s name in Facebook; find travel info; use an online encyclopedia; translate a text/website/email);
- **communication** (e.g. send an email; online Chat; send a file; make a video call; discuss in a forum; add a friend in Facebook);
- **create/publish content** (e.g. upload a picture in Facebook; contribute to a blog; upload a video on YouTube; create a new page);
- **play/idle** (e.g. use Google Earth; play a game online; participate in a contest; vote/rate);
- **follow alternative routes** for everyday activities (e.g., read the news; follow a course; listen to a radio station; watch a movie online; prepare dinner; see the weather forecast).
- **transactions and services** (e.g., book a trip; purchase books, CDs, clothing, etc; book a seat for the theatre; buy a song for their mp3 player);
- **authorized access** (e.g., create an account; sign in/sign out).

This REVIT e-course was designed and developed in English by a workgroup of ICT teachers and developers from Research Academic Computer Technology Institute (RA.CTI) and The Open University of Cyprus (OUC), according to the specifications for the REVIT e-courses as implemented in the framework of the project. This e-course was later localized to the various languages of the project partner consortium.

Because of the big interest expressed by people in the Cyclades and Palaichori, the Greek version of the Introductory course was delivered four times, by three different tutors, always addressing mixed groups of trainees.

According to the tutors and the results of the focus group discussions that took place in Greece and Cyprus, the delivery of this e-course can be considered as successful. More specifically:

1. The learners believed that the goals of each individual course were achieved.
2. The methodology applied was interesting and it wasn’t very hard for the learners to get familiar with it.
3. Group attendance was high: the teaching assistants and the learners who were already familiar with the Internet assisted the other learners during the online sections.
4. After the introductory course, the learners had the skills to attend the rest of the courses individually; however, they proposed to attend the classes together in small groups of 2-3 people for better results (e.g., solving problems collaboratively, sharing ideas, enjoying their classes).
5. Some of the learners were able to further apply the knowledge gained in their professional environment:
   - searching for information and products;
   - performing transactions;
   - making online orders;
   - communicating via email, Skype and facebook;
6. The learners at Palaichori enjoyed having classmates from Greece and vice versa; they found this opportunity very interesting and managed to become friends with participants from the other country.
7. The learners from Palaichori felt more comfortable to ask questions to instructors they did not know personally. It is important to mention here that, in most of the cases, the instructors were from Greece. Thus, the learners did not have the chance to meet them during the course. On completion of the courses, they are interested to meet their instructors and are happy since they will do so at the
In addition, useful comments and suggestions have derived, such as:

1. Learners, teaching assistants and tutors who participated in the meetings consider that the optimal number of learners, for such kind of courses, should be 4 or 5.

2. Comments from learners’ assignments, other homework and personal remarks about their study, highlight that:
   a. it is important/necessary to have a computer access to the Internet at home, in order use their free time (mainly nights and weekends) to study (five participants have decided to buy their own laptops during the first course);
   b. the time spent on their homework was 5 hours a week on average, sometimes more.

3. Learners also commented the following on e-course design:
   c. the material was appropriate for their level, given that they fulfilled the entry prerequisites;
   d. the fact that synchronous meetings were held once a week was positive;
   e. attending one course at a time was also positive.

B. EFL Teachers’ Course

The two e-courses that were targeted at teachers of English as a foreign language (EFL) involved teachers living and working in Greece, Finland and Poland. The first course focused on lesson planning and spanned two online seminars, while the other focused on classroom discourse and interaction and spanned four online seminars. The course on lesson planning was developed and run by Nicos Sifakis. The course on classroom discourse and interaction were co-designed and taught by Nicos Sifakis and Sophie Ioannou-Georgiou.

In both e-courses, participants were asked to use Web 2.0 technologies in various interesting and innovative ways. They were asked to create audio recordings of their lessons and upload them as podcasts on the REVIT portal. These podcasts were in turn used as a basis for further reflection on the courses’ topics, presented during the weekly (for the lesson planning course) or biweekly (for the discourse and interaction course) synchronous sessions. Such topics were, among others, time management issues, quantity and quality of teachers’ and learners’ mother tongue, modes of interaction between teacher and learners, etc. In their blogs, participants were prompted to read selected papers on the above issues and write their reflections about their own teaching practices, as observed in these podcasts. They were further asked to collaborate on a wiki with an aim to agreeing on the construction of a lesson plan template that would meet their different needs.

The fact that the podcasts and blogs were available to all participants enabled a lively discussion of these topics, which brought participants together despite their different national, cultural and contextual differences. This proved the main purpose of blogs, namely, interactivity and collaboration [4]. More importantly for teacher training, blogs enabled the facilitation of knowledge sharing, reflection, and debate [5] and acted as a vehicle for self expression and self empowerment [6]. It is interesting to note that participants in these e-courses were experienced EFL teachers who had never before used blogs as part of their self-education. In this sense, our experience confirmed the importance of the Internet as a research tool and blogs, in particular, as facilitative in creating a type of virtual community. Blogs acted as both forms of informal self-expression and more formal assignment writing receptacles, a ‘middle space’ situated somewhere between online and traditional classroom settings [7]. Beyond their communicative and collaborative character, blogs and wikis were instrumental in these e-courses as homework assigned and could therefore serve the purposes of assessing the “progress” that participants made.

In the two e-courses described here, blogs and podcasts were tightly linked. The ‘teaching-driven’ potential of educational podcasting [8] was used facilitatively in the lesson planning e-course as a means of getting participant teachers to become aware of their own teaching practices and, in effect, improve the quality of their teaching. Participants readily expressed in their blogs their surprise at realizing how they teach and what quality of discourse they are using with their learners. In this sense, the podcast-blog connection proved especially strong and fascinating for all of our participants.

Despite the fact that, as already mentioned, a wiki of a ‘basic’ lesson plan was uploaded on the REVIT portal, it was not edited at all by participants. The reasons for that are multiple. First, participants’ unfamiliarity with the notion of wikis and their use in teacher training (something that was raised above) probably stopped them from engaging with the wiki. Also, their lack of quality time is another reason, as the lesson planning seminars took place right at the end of the school year and before the summer vacation, which might have prevented participants from seriously reading the articles, which was a prerequisite for working with the wiki. All in all, the wiki proved to be the most demanding of all tasks and the least fun of all web 2.0 tools.

C. English for Tourism Course

This e-course, which was developed and taught by Aikaterini Kotroloou and Penelope Rapti, involved adults living and working in small, remote communities with an active tourist industry. More specifically, it was implemented on the Greek islands of Ios and Koufonisi, as well as in the village of Palaichori of Cyprus. The e-course focused on providing participants with the opportunity to improve their awareness and proficiency of English in relation to the tourism industry by utilizing an ICT-based distance learning framework.

The e-course consisted of ten synchronous and ten asynchronous learning sessions. Synchronous meetings took place once a week on the Elluminate Live! web conferencing system and lasted approximately one hour each. Evening hours were selected, as the majority of learners were working in the morning. Asynchronous communication among learners and between tutors and learners was accomplished through social networking software and other Web 2.0 tools, such as wikis, weblogs.
The syllabus of the e-course primarily incorporated communication-based, task-based and function-based features and topics, and also integrated a variety of basic situational and structural elements of the target language. Synchronous meetings were focused on presenting the core structural, functional and communicational concerns of the lesson and prompted participants to engage in different combinations of language skills. The main aim of these meetings was to engage learners in role-playing activities which served as a springboard for ‘acting out’ different tasks and activities, thereby implementing the language in widely different communicative contexts (e.g., making hotel reservations, giving directions, handling complaints, serving restaurant customers, etc.). In the asynchronous mode participants were asked to follow instructions uploaded on Moodle and carry out various activities that involved pronunciation, vocabulary and grammar practice, as well as further engagement with communicative functions (like complaining, ordering, etc). In both teaching/learning modes, various web 2.0 and other specialized Internet sites were used, among others, “Forvo” (http://www.forvo.com, a multilingual user-generated pronunciation dictionary), “Dvolver Moviemaker” (http://www.dvolver.com, a tool that enables users to create their own animated cartoons), “efl.net” (http://www.eflnet.com/vocab/index.php, an online picture dictionary) etc.

The e-course was hugely successful. As it involved a rather small number of participants, it responded to their basic communication needs (working in the tourism industry) without posing excessive demands on their foreign language proficiency. On the contrary, in a focus group interview that took place at the end of the course, all participants appreciated the opportunities to learn and practice on an online environment, as it offered them both great autonomy as learners and added a sense of authenticity to every learning episode. Many participants also enjoyed the opportunity to collaborate with others and contribute with their own creative talents (for example, we had online exchange of peer feedback on, local recipes).

D. E-Business

The development team consisted of an expert on e-learning pedagogy and technologies, an e-business domain expert, two engineers specializing on multimedia and e-learning technologies, and the tutor of the e-course. In line with the overall pedagogical paradigm and in order to identify the profile of the learners, the training team visited and met with the learners, got to know them and their socioeconomic context. In informal discussions during these visits, the topic of how Information and Communication Technologies can be used to promote local products and services emerged as a top priority. It was therefore decided to design a course on e-business and include topics related to the complete business process for products and services. The course was based on lectured, learning activities, podcasts for acquiring additional exposure in the field and assignments for homework.

The learning methodology for this course included an initial two-hour face-to-face meeting in the school of the village in the presence of the local co-ordinator, aiming to outline the structure of the course and consolidate the use of specific tools. Then, 14 synchronous sessions were implemented in the form of tutorial discussions, using the Elluminate! platform. Asynchronous web tools were also employed in the form of forum wikis and blogs throughout the course. Finally, a specialized e-commerce tool was used to develop e-shops that were subsequently parameterized and personalized by the participants.

The primary aims of this course were twofold: a) to inform participants about the strengths and huge potential of using the Web as a new channel for doing business; and b) to provide them with initial, yet comprehensive, training in directly promoting and marketing their products and services using the Web, selling their products and services through the Web and facilitating some of their business processes with the help of a series of Web-enabled tools.

More specifically, the e-course focused on developing marketing-related skills such as: using web tools to identify competitors’ offers and customers’ needs; defining and describing the processes involved in electronic business; identifying and evaluating different web advertising methods (e.g., banners, paid ads, online coupons, promotional emails, etc.); identifying the critical success factors in e-commerce (ways to support communications, trust enhancing methods, etc). In addition, participants were involved in carrying out activities that helped them understand the fundamentals of logistics related to the distribution of physical products, become aware of legal and ethical obligations regarding direct marketing and e-commerce, becoming familiar with the process of parameterization of a prototype and the reference to a framework that can be used to evaluate alternative e-business implementations, and becoming aware of funding/sponsoring possibilities to support future e-business initiatives.

The activities developed in the e-business e-course prompted participants to: search the web for products and services relevant to their own and evaluate them from a marketing perspective; identify the principles of their electronic retailing (e-tailing) strategy for products or services; promote and advertise a site; describe their own business and e-business needs; customize (parameterize) a template application program to derive their e-business implementation; and evaluate alternative e-business prototypes for their company and decide based on a structured framework.

On completing the e-course, participants evaluated it as successful. They acknowledged to have learned how to use the Web to promote their own business interests, investigate for competitors and products, explore different kinds of online advertising, conduct online surveys, organize online events, become informed about copyright and personal data safety in online transactions, putting together their own e-commerce site. It was deemed that the e-learning methodology adopted was flexible and easy for everyone to follow. Participants found the entire e-learning experience very interesting and were continuously motivated to actively participate, as everything they did in the course related to their own expressed professional needs. While they found the design of the e-course well-positioned and easy to follow, they expressed interesting considerations that would significantly...
improve the e-course in the future; one such consideration referred to weaving earlier in the flow of the course the platform used for the development of e-shops, so that trainees have enough time to complete their own parameterization of their e-shops. Synchronous and asynchronous sessions blended seamlessly, and the time allocated for self-study, homework and assignment preparation and carrying out (one week) was considered to be appropriate. Podcasts were also positively received, as they contained mostly practical examples and no complicated terminology, addressing all the main aspects of e-business.

V. CONCLUSION

In this paper, we presented aspects of the design and implementation of REVIT, an EU-funded project that used an innovative distance learning methodology that integrated Web 2.0 tools to train adults living and working in geographically remote areas on a variety of topics that concern them. The e-courses described here were as diverse as can be: using Web technologies, training professional EFL teachers, teaching English for tourism and e-business. What we have learned from the initial needs analysis carried out, the design and implementation of the courses, as well as from our trainees’ comments during and on completion of the courses is quite enlightening.

As expected, there is an enormous (and rapidly increasing) need for providing sound, focused and well-prepared opportunities for learning at a distance. This raises very particular demands for the design of a distance learning methodology that integrates current developments in ICT and adult education. The distance learning methodology developed by the REVIT e-projects, as documented above, is innovative in many respects:

1. it identifies the learning and professional needs of potential trainees, which form the backbone of the e-projects;
2. it exploits existing infrastructures in geographically remote areas (mainly schools) to attract adults in participating;
3. it engages trainees by making the best of their available time in both synchronous seminars and asynchronous (i.e., self-taught) sessions – in this way, participants develop collaborative skills and are prompted to further hone their skills and explore their interests in their own time;
4. it integrates Web 2.0 technology in ways that actively involve and motivate participants in responding to the various educational demands of the e-course.

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The use of Multiple Intelligence, humor, and technology in the college composition classroom: a practical approach

Katerina Andrioti, Ph.D.

Abstract—Since learning environments online as well as in the traditional college classroom are mostly instructor designed and directed, the drive to devise and implement instructional technologies, strategies, and materials that would address all students’ learning needs is pertinent. The use of humor and the design of instruction for populations who choose to learn at some distance from a traditional classroom present an opportunity to effectively apply Howard Gardner’s Theory of Multiple Intelligences through the general design of course content, the use of specific instructional activities, general communication, and improved participant interaction. Gardner emphasized an individual’s capacity to develop his/her intelligences well beyond biological abilities and regardless of cultural or environmental circumstances. We applied this theory at Briarwood College, Connecticut, USA, in 2003. Our sample included 177 freshmen enrolled in English, Sciences, and Professional courses (such as Occupational Therapy and Psychology). Our research results showed that more students were successful in passing our courses (17% increase) were happier in the classroom not only with the comprehensive instruction but also with teaching methods (96%), and fewer withdrew (12%). As a result, through the use of technology, humor, and Gardner’s paradigm, heightened understanding in students’ learning abilities and perceptions was noted. This type of instruction serves as a fertile ground that nurtures competent learners, in charge of their lives and education.

Index Terms—Distance Learning, E-Learning, Humor, Multiple Intelligences, Howard Gardner, Social Media

I. INTRODUCTION

The “One-Size-Fits-All” outdated instructional model does not apply to our students anymore. According to Walter McKenzie, in fact, many students’ approach to learning requires tools that they do not possess [1]. As the old saying goes, “If the only tool you have is a hammer, everything around you looks like a nail….” Various learning theories confirm that students today have a wide range of intellectual abilities and competencies that cannot be measured or quantified on any standardized test. Clearly, testing measures students’ problem-solving, linguistic, logical-thinking abilities. However, it excludes (especially multiple choice) a large number of students from being successful. That is to say, through current testing methods and procedures, primary, secondary, and higher education institutions practice an exclusive pedagogy that caters to a fairly small number of students whose primary intelligence is either logical/mathematical or verbal/linguistic. However, all-inclusive pedagogy ought to address and accommodate the various intelligences under which the majority of our students operate. Moreover, once this paradigm is coupled with online instruction, through the use of Social Media and humor, the results can be very rewarding for students and faculty alike. Employing humor within the Multiple Intelligence (MI) model can yield a better learning and teaching environment and more successful students; it can further help alleviate job stress, prevent burnout, lower blood pressure, improve blood circulation and boost energy [2]. Additionally, using humor in this sense can increase students’ attention span, diminish anxiety and reduce the threatening nature of a course by changing the tone of the instructional process. That is to say, humor coupled with Gardner’s MI theory is precisely what makes for successful students and happy faculty. Whether this instruction takes place in the traditional classroom, online, in a blended, or a hybrid environment is inconsequential. For according to MI theory, it is vital to utilize all tools available to accommodate students’ learning abilities. As a matter of fact, today consumer experience drives expectations. Clearly, our students have moved from desktop to mobile computing, websites to web experiences, solitary games to participant/group play, from static web content to real-time interaction and collaboration, from telephones to integrated mobile information, and from email to instant video, voice, and text messaging. This is simply an endorsement, a go-ahead of sorts to some of us who are slow to incorporate technology in the classroom. The present study aims to test Howard Gardner’s theory in the traditional or distance learning classroom, so that learning outcomes are assessed.

II. METHODOLOGY

Indeed, Howard Gardner, a Psychologist and Co-Director of Harvard University’s “Project Zero,” the mission of which is to “understand and enhance learning, thinking, and creativity in the arts, as well as humanistic and scientific disciplines, at the individual and institutional levels,” through extensive research on human intelligence, discovered that human beings have “Multiple Intelligences” [3]. At first, Gardner clearly documented seven intelligences which learners may utilize to gain knowledge. Later on, through continuous research he added two additional intelligences [4], [5].
1. Verbal/Linguistic (makes use of the spoken and written word)
2. Logical/Mathematical (makes use of numbers, calculations, logic, classifications, and critical thinking)
3. Spatial (makes use of visual aids, visualization, color, art, and metaphor)
4. Bodily/Kinesthetic (makes use of the whole body and hands-on experience)
5. Musical (makes use of music, environmental sounds, and sets key points in a rhythmic or melodic pattern)
6. Interpersonal/Social (makes use of discussion, cooperative learning, and large group simulation)
7. Intrapersonal/Self (makes use of one’s ability for self-reflection, as expressed in journal writing, computer work, brainstorming sessions, and guided imagery tours)
8. Naturalistic (makes use of students’ love and understanding of nature as expressed in classifying and system building)
9. Existential (makes use of students’ ability to conceptualize and philosophize deeper questions regarding human existence) [4], [6].

Additionally, Gardner [6] explains that MI in context can yield true, authentic learning. Transforming the curriculum, through hands-on, all inclusive pedagogy, can only produce positive results even for those students who have been left behind, have been ignored, or simply have been labeled learning disabled. The only option for educators is either to nurture and strengthen their students’ intelligences or ignore them and allow them to deteriorate. As a result, Gardner does not ask, “How smart am I?” But rather, he asks, “How am I smart?” As far as he is concerned, there are no more or less intelligent students. There are simply differently able students. Absorbing course material can be different and unique for each student based on this model. Hence the reason MI and distance learning go hand-in-hand. For example, desktop and web-based publishing can be very effective learning tools for the verbal/linguistic learner. Furthermore, email can be another tool that verbal/linguistic learners can use to further develop their learning style. For the logical/mathematical learner, analyzing data, using search engines to run queries or use various online platforms to problem solve can be very effective as well. The visual/spatial learner can benefit from various technological tools, such as PowerPoint slide shows, charting and graphing, utilizing online platforms and editors, and even digital animation. Stimulating the bodily/kinesthetic learner through technology and web-based application is quite easy. Diagramming, videconferencing, sorting various materials by attributes, and participating in virtual group simulations can be some of the activities available to the bodily/kinesthetic intelligence.

Incorporating digital sounds into PowerPoint/multimedia presentations can easily accommodate the musical intelligence. The intrapersonal learner can work with answers to guided questions posted on the discussion section of the course (Blackboard, WebCT, Moodle), whereas the interpersonal intelligence can be stimulated by synchronous (chat-rooms) or asynchronous (email, discussion boards), group discussion, and various collaborative projects. The naturalist learner works well with organization. As a result, organizing and making sense of information, through the creation of databases or semantic mapping, benefits this intelligence. Finally, the existential intelligence can be stimulated through learning experiences that examine the “big picture” of learning. In this case, virtual communities can help the existential learner feel like he/she belongs to something larger than family, community or classroom. Virtual art exhibits and virtual field trips can also help in experiencing the beauty that surrounds the existential learner [6].

In other words, Designing instruction for learner populations who choose to learn at some distance from a traditional classroom presents an opportunity to effectively apply Howard Gardner’s Theory of Multiple Intelligences through the general design of course content, the use of specific instructional activities, general communication, and improved participant interaction. The appropriate use of these eight intelligences will also increase the likelihood that the learner will retain new knowledge and remain an active learner during the entire instructional process. Finally, incorporating multiple intelligence theory into the design of instruction can provide multiple avenues for learning based on an individual’s preferred style regardless of the discipline or the geographic dispersion of the intended learners [7].

Additionally, Dr. Sheryl Asen [8] has identified ten criteria for the use of technology in traditional as well as online instruction. A few of Dr. Asen’s criteria are as follows:
1. Students are involved in tasks that are broad in scope and challenging. Activities should span a range of related, intellectually demanding experiences that are not divided into fragmented talks (Existentialist).
2. Students, rather than the teacher, have control over the learning. The teacher serves as more of a guide, coach, and resource rather than a superior or administrator (Intrapersonal).
3. Students work collaboratively and cooperatively. Learning tasks should not be accomplished in social isolation (Interpersonal).
4. Students participate in varied learning tasks. This includes both variations in the format of the activities and their objectives (Musical, kinesthetic).
5. Students have opportunities to address learning tasks in different ways. Different approaches to a presented activity can be explored (Naturalistic).
6. Students are encouraged to offer varied solutions to a given problem. Reasoned answers and appropriate products are not limited to pre-set responses. All justifiable and fitting answers and products are accepted (Visual/spatial) [8].

The benefit of using these criteria in conjunction with the MI paradigm to create and organize instruction is clear. Undoubtedly, according to the MI paradigm, models of teaching are really models of learning [9]. Teaching and learning cannot be shaped through a fixed, rigid modus operandi. On the other hand, change and growth can be achieved only if education is not entirely the teacher’s responsibility, but rather it is an alliance between student and teacher. As a result, for both student and teacher, learning
cannot be a passive activity. In other words, students must actively participate in their learning, for even the greatest teacher cannot individually generate or promote student success [10], but collaboratively, “a good teacher can provide a rewarding educational experience” [11]. Interestingly, Gardner maintains that learning is both a social and a psychological process. As a result, when students understand the balance of their own intelligences, they begin to manage their own learning and value their individual strengths [12].

In the same sense, humor, coupled with Gardner’s MI theory and technology can enhance teaching and learning. In the recent years, in higher education, humor has been viewed as an important teaching tool in courses such as statistics [13], [14] & [15] law [16], and other courses that students find dull and difficult [17]. Humor has been said to facilitate the retention of innovative information [18], [19] & [15], to increase learning speed [20], improve problem solving skills [21], relieve stress [22], reduce test anxiety [23], [24] & [25], and increase perceptions of teacher credibility [26], and like it was mentioned above: humor can be incorporated into tests [23], [27] & [28]. “From an educator’s standpoint, using humor in the classroom cannot only increase the students’ attention spans, but also encourage the discussion of divergent ideas. It can improve morale and communication skills, increase retention of information, and make learning and teaching a more enjoyable experience” [2]. There are many resources that can be used to enhance classroom teaching through humor. Bringing jokes and cartoons to class or encouraging students to do the same makes for a lively, encouraging environment. Sharing with the class prior to the start of the lesson is always a good idea, so that there are minimal interruptions to the lesson plan of the day [2]. Jerry King further suggests bringing a different pointer for your board or PowerPoint presentations. Golf clubs, fishing rods, pool cues, kitchen utensils, makeup brushes, and the like make for an appealing and energetic environment [2]. Emoticons, avatars, cartoons, written jokes, and simulations (Second Life) can enhance, in the same way, online instruction. Including a trivial question or a joke half way into a quiz or a test, for example, can relieve stress and put students at ease. It is quite obvious that humor, technology and online platforms, including social media sites ought to be considered essential tools in the MI classroom and used to accommodate all students’ learning needs.

Moreover, incorporating humor into dry lecture material whether online or in the traditional classroom, aids in relaxing even the most reluctant of students, spruces up a course and positively motivates everyone involved. For instance, using movie and/or television show themes makes current events more palatable and further encourages students to make a positive change and take control of their learning. Clearly, when dealing with students who are able to unwind and willing to learn, the teacher’s job becomes much easier. Research shows that teachers who “use written language that includes humor and metaphor,” attain better learning outcomes in the traditional classroom and online [29]. However, it is very important to be as clear as possible when using humor, especially online. In fact, Gibbs and Fewell suggest, “If the instructor must interject humor and wants the students to know that the communication was an instance of humor, the use of an emoticon, such as a smiley or frowning face, would be in order” [29]. Humor, actually, creates a sense of community among online students. At the same time, Ian J. McCooq affirms, “Multiple Intelligence and technology blend in the modern, changing environment of education. To compete in the world marketplace, today’s students must acquire twenty-first century skills, such as global awareness and social responsibility. Technology allows these skills to be presented’ [30].

This research project was approved in 2003 by the Carnegie Academy for the Scholarship of Teaching and Learning (CASTL), a foundation that fosters scholarly teaching and learning [31]. I helped organize and facilitate a group at Briarwood College to pursue research in teaching and learning. After extensive research on various learning theories, and several meetings and discussions, our group decided to work with Howard Gardner’s MI theory. In other words, our chapter of the CASTL Teaching Scholars’ Group proposed that by utilizing Gardner’s MI paradigm, Briarwood College students’ involvement, understanding, and overall academic performance should improve. Our pilot study began in the Spring 2003. It included the following courses:

- ENG099: English Fundamentals,
- ENG103: English Composition,
- COMP101: Introductory Computers,
- OAD208: Legal Office Procedures,
- OAD209: Administrative Office Procedures,
- OTA104: Foundations for the Treatment of Physical Disabilities,
- OTA106: Clinical Rehabilitation Skills/Lab,
- OTA108: Psychosocial Pathology and Function,
- PSY205: Death and Dying,
- PSY206: Human Relations.

A total of 177 college freshmen enrolled in the aforementioned courses during the Spring 2003 Semester, participated. We compared their performance to a group of students who were also enrolled in the aforementioned courses taught through a traditional, lecture/seminar instruction, in 2001 and 2002. The configuration of our research concentrated on: (1) Determination of individual student learning styles, (2) Pre-assessment, (3) Faculty’s attempts to design learning activities incorporating learning styles, (4) Midterm assessment, (5) Post-assessment, and (6) Gathering and analyzing of data. Throughout the semester, we assessed our students by using several tools, including an MI Assessment, which we dispensed the first day of classes. We also administered personalized, supplementary assessments at midterm and during final examinations to ensure student success and give our students the opportunity to assess the courses they were taking. At the same time, we shared information regarding the students’ role in using MI assessments to maximize their learning experience. Checks for understanding, observation, writing (formal and informal), discussion, performance (presentations), quizzes, and tests were part of the instructional model. That is to say, we used several tools to assess students’ learning and retention of the
material, such as observation, writing (formal and informal), discussion, performance (presentations), quizzes, and tests, among others. More specifically, we used a variety of MI Assessment tools via the Internet for the students who had access and hard copies for those who had not. I have found that the assessment offered through the website, Literacy Works is one of the best. Computerized scoring is available at the conclusion of the 56-question assessment, and the students’ top three intelligences are listed with sufficient explanation and practical studying tips. Furthermore, the website offers ample resources regarding career choices and curriculum materials [32].

III. RESULTS

Our research yielded several interesting results: between Spring Semester 2001 and Spring Semester 2003 our success (passing the course) rate increased by nearly 17%. At the same time, the percentage of students who withdrew from our courses decreased by more than 12%. Additionally, 84% of students at midterm said that the courses were good, very good, and excellent, a number that increased to 96% at the end of the semester. The overall primary intelligence for a large number of our students was social or interpersonal (38.5%) with self or intrapersonal a close second (34%). As far as our success/failure rate, a 17% increase in our passing rate and a 12% decrease in withdrawals. When students were asked certain questions regarding their perception of this application in the classroom, 96.5% strongly agreed that the benefits in instructor use of MI were positive. Most students (98%) agreed and strongly agreed that the MI assessment assisted them in becoming more effective learners.

IV. DISCUSSION

The results were promising and were presented at several national and international conferences. Additionally, this research led to a number of publications [33], [34], [35], [36] & [37]. It seems the MI paradigm has been adapted by a number of colleges and universities across the United States of America. The application of MI in conjunction with humor and social media, which was in its infancy at Briarwood College, confirms our suspicions that most of our students do not learn through the two primary intelligences, Verbal/Linguistic and Logical/Mathematical. Beginning with the inclusion of technology for both online and traditional classes (colorful, multimedia PowerPoint presentations, Internet and database research, wikis, blogs, social networking, email, chat-rooms, video, and audio presentations), followed by extensive discussion both online, through social networking sites, such as FaceBook, LinkedIn, Second Life, and in the classroom, to hone critical thinking skills, seemed to unveil an enthusiastic student body. Additionally, ample use of clearly defined hand-outs, group work, writing workshops, and labs, including peer-editing, various student presentations on particularly difficult points, guided journal writing, production of multiple ungraded drafts, and electronic portfolio submissions enabled students to take charge of their learning and directly contribute to positive learning outcomes.

V. CONCLUSION

Exposing students to Gardner’s MI paradigm can only benefit the college classroom and higher education in general. The success of such shift of the teaching/learning paradigm can only be based on supportive teaching and administrative staff, students who are aware of our concerns and our willingness to change and adapt our teaching methods to assist them in their learning, a continuous process of implementing the MI approach in future classes, and an attempt to develop a means to quantify academic improvement. Furthermore, it is vital to build on past successes, but most importantly, to recognize the education evolution process and to be open and willing to continually analyze and modify teaching methods and course content, as necessary, to accommodate all students’ learning needs. In other words, being flexible and accommodating to students are key components in fostering student learning in a productive, culturally diverse, and all-inclusive classroom. It must be emphasized, however, that this is not about simply changing teaching methods; it is not an exercise in methods. It is about caring for our students as individuals and about our willingness to lend a helping hand; perhaps it is about becoming the guiding light in their journey. That is to say, encouraging students to take control of their learning by making them aware of their primary intelligences can make a great deal of difference in their educational experience. Perhaps then, those students who never anticipated to be college graduates because of their inability to conform to traditional logical/mathematical and linguistic models will achieve success and look forward to a bright future as college graduates.

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The Evaluation of an Online Virtual Game Environment (SimSafety) using HOU’s Software Quality Laboratory

Michalis Xenos, Spyridon Papaloukas, and Nektarios Kostaras

Abstract — This paper presents the formative evaluation of an early version of SimSafety (an online virtual game environment) based on ISO9126 that was conducted in a Hellenic Open University specialized Software Quality Laboratory. The participants of the evaluation were children and parents that were exposed to Internet dangers safely through playing games. The paper presents the results of the evaluation, the changes in the environment based on these results and the evaluation procedure per se (goals, setting, equipment, methods, participants, findings).

Index Terms — Online Game Environment, Software Quality Evaluation, ISO9126.

I. INTRODUCTION

This paper presents the evaluation of an online virtual game environment using a specialized laboratory for software quality evaluation. This online environment has been developed under the framework of the EU Lifelong Learning Programme and the project “SimSafety – Flight Simulator” for Internet Safety” from a consortium of seven partners from six countries: Greece, Cyprus, Portugal, Romania, Finland and United Kingdom. Further details for the project can be found at: http://www.simsafety.eu.

Although SimSafety is not just a videogame, in some parts of this paper the term videogame is used, complying to the international literature. SimSafety is an online virtual game environment which supports: i) role-playing game scenarios, offered in real-time to ii) dynamic groups of online users, iii) exposed to (penalized) safety traps, which should be recognized and overcome through (accredited) appropriate game actions. Therefore SimSafety allow socializing and playing videogames, but these games are specifically designed towards a purpose: to expose children to Internet risks, but safely.

The evaluation of the SimSafety has been conducted in the Software Quality Laboratory of the Hellenic Open University (http://quality.eap.gr) and the goal of the evaluation was to identify weaknesses of the SimSafety based on the project’s quality plan. The evaluation was formative, i.e. it was performed in an early version of the SimSafety allowing the identification and correction of all the recorded problems and involving a number of primary users of the environment (children and parents).

The rest of this paper is organized as follows: section II is a brief literature review on usability of videogames and videogames and learning. Section III presents the evaluation framework and goals, the software quality laboratory, the methods and tools used for the evaluation and the outcome of the evaluation. Section IV discusses results from the evaluation, as well as the changes in the final version of the environment that were stimulated by the evaluation, while section V summarizes the conclusions of this paper.

II. LITERATURE REVIEW

A. Usability of videogames

In this paper, game usability is addressed as the degree to which a player is able to learn, control, understand, be intrigued and enjoy a game. This definition is accepted on an early informal survey of usability problems cited in critical game reviews and on playability heuristics [1]-[3]. Some usability issues seen in games are similar to those seen in other application areas, such as the need to design visual consistency and readability. Game’s usability is highly related to how easily the player is able to start playing the game and to discover –and eventually use– all the features and functions available in the game. There is not a specific model that has been “adopted” by the scientific community for the measurement of games’ usability. In an effort to define usability in relation to a game the ISO standard of usability ISO 9241-11 is used, in which three basic usability metrics are described: effectiveness, efficiency and satisfaction [4]. Effectiveness is linked with accuracy and total achievement of the goal set by the user; efficiency relates to the resources spent for the attainment of the objectives, and satisfaction affiliates with the users’ mood.

Software Quality Research Group (http://quality.eap.gr) has developed a specialized laboratory as well as methods and tools used to measure software usability, some of which were used in this survey. However, games also have usability considerations that are not seen in other areas. For example, user errors are usually undesirable in other domains, but are expected in many games since they are designed to challenge users and to force them to develop new skills so that they can achieve in-game objectives [2].

The videogames like all other software types have an
The applied methodology of this research analyzes all factors in and evaluated during the development of the videogame. The areas are functional, must be satisfied and should be analyzed through so as to reach the game’s objective. All three different mechanism is the combination of animation and programming, through which the user interacts with the game; the mechanism and game play. The game’s interface is the device element of anatomy-structure of the game that they affect. The structure of the videogame consists of the game’s interface, mechanism and game play. The game’s interface is the device through which the user interacts with the game; the mechanism is the combination of animation and programming, whilst game play refers to the procedure that the user goes through so as to reach the game’s objective. All three different areas are functional, must be satisfied and should be analyzed and evaluated during the development of the videogame. The applied methodology of this research analyzes all factors in the context of usability.

B. Videogames and learning

The science of education apart from developing various theories has also attempted to isolate methods through which the learning procedure results can be improved. A number of these methods apply to videogames [7]. Although games had received an initial criticism focusing on their negative effects (addiction, unsocial behavior, violence), contemporary research has revealed far more positive aspects of games, such as their educational value [8], their aid in socializing [9], development of favorable attitudes to social issues such as the conservation of the environment and improvements in the classroom climate and interrelationships [10] or in enhancing logical thinking and decision making [11].

Regarding the group between the ages 9-13 which was the target group of the presented case, games can be influential in both the emotional and intellectual development of adolescents. Surprisingly, he goes so far as to assert that the game players usually have a higher intellectual level than non-players belonging to the same peer group. There are studies [12] which from the past decade foresee that games of social simulation (like the Sims and the Second Life are today) and of historical simulation and strategy will be accepted and used, at different academic levels. In addition to stimulating motivation, video games are considered very useful in developing skills in problem-solving, strategy assessment, media and tools organization and obtaining intelligent answers. Of all the games available, simulators stand out for their enormous educational potential. In addition, researchers advocate use of videogames in the classroom to expose the values they (videogames) disseminate; that is to say, to develop a critical attitude towards certain undesirable behaviors (e.g., violence) or values (e.g., sexism). Research has yet to prove that video games are intellectually harmful; on the contrary, many studies defend their great importance in the development of intellectual abilities.

The user often tests new ways of handling the obstacles that emerge and has to try new techniques or invent tricks to get past them. In a similar manner, the theory of self-efficacy (i.e. if you believe, you will manage to succeed; you will try much harder) is related to games, since all games have points, levels, items that the user has to collect and, therefore, is motivated to continue playing and trying constantly for a better result. The theory of learning through a specific target (i.e. you learn better if you work on a well set target) is related to a specified objective that all games have. Additionally, for the theory of cooperation based learning, studies in classrooms have proved that team work improves significantly the learning process results. There has been an improvement of 50% in comparison to individual learning process [7].

Furthermore, apart from the knowledge that can be acquired through playing, it is possible to outline a series of procedural objectives that videogames can help to fulfill. Among them, it is important to emphasize the following: Reading (some games promote book reading, such as the Lord of the Rings), logical thinking, observation, spatiality and geography (during games such as Civilization IV that involve spatial representations), problem-solving and decision-making, strategic planning.

The time we spend on the game is also a very important factor that enhances the learning process. It is evident that we are able to learn a subject much better if we spend more time studying it. Statistic analysis proves that an average American gamer spends an average of 6.8 hours per week on videogames (http://www.theesa.com). Respectively in the 2004 American Freshman: National Norms Survey by UCLA’s Higher Research Institute shows that pupils in secondary education spend five to eight hours per week to do their homework. If pupils had access on their daily homework through educational games then they would double the time on their homework [15].


A. ISO9126-based evaluation

Based on the project’s quality plan [16] the software quality evaluation was based on the ISO9126 standard [17]. The ISO9126 describes the abstract term ‘quality’ using six factors: functionality, reliability, usability, efficiency, maintainability and portability. The factors are associated to a
number of criteria in a hierarchical manner and finally to a set of metrics.

Since maintainability and portability were assured due to the use of the OpenSimulator platform emphasis was placed on the four ISO9126 factors that affect directly the users, i.e. functionality, reliability, usability and efficiency. The OpenSimulator is a 3D Application Server, able to host massive multiplayer on-line 3D environments. This platform bears many similarities to the popular Second Life environment, since it is a project inspired by Second Life (in an attempt to inverse-engineer and deploy its functionality under open-source terms). Despite being at an early stage of development (hasn’t reached Beta version yet), the platform proves to be quite stable and robust, even when serving many concurrent users [18], therefore maintainability and portability issues were resolved due to the opening to the open-source community.

B. The software quality laboratory and the evaluation methods

Experimental usability evaluation methods take place in laboratories or in users’ locations using mobile equipment and tools. Such a laboratory (Software Quality Laboratory) has been developed and used by the Software Quality Research Group of Hellenic Open University and used in this evaluation case. A schematic of the laboratory is shown in figure 1.

Fig. 1. The Software Quality Laboratory of Hellenic Open University.

The Software Quality Laboratory consists of one room designated as the testing room (on the right in figure 1) and a second room designated as an observation and control room (on the left in figure 1). The observation room is separated by the testing room by a one-way mirror so that the members of the quality evaluation team can watch the game players whilst the players cannot see them. The maximum number of individuals inside the testing room is two children (accompanied by their parents) and –in some cases– a member of the assessment team, depending on the case of the evaluation. All other members of the quality evaluation team are seated inside the observation room viewing the proceedings.

The equipment installed in this laboratory consists of one roof-mounted video camera that records the player’s behavior, such as hand movements, facial expression and general body language throughout the experiment. A microphone is also placed near where the players are positioned to record their utterances. Another microphone is installed in the observation room to record evaluators’ comments on the behavior of the player. Video from the camera as well as the real time image of the participant’s monitor are both directed to video monitors into the observation room where they are recorded for further evaluation. Since the members of the quality evaluation team are not in the same room with the players this eliminates almost entirely any possible biasing effects due to inadvertent non-verbal communications or mannerisms. The test room is structured in such a way that gives the player the feel of a normal office room and not a laboratory. Finally the camera (roof-mounted) and the microphone are placed in such a way that are not easily observable, despite the fact that the player is informed of their existence before the beginning of the experiment.

For the experiments conducted with the participation of children and parents, special recording tools, such as Usability Logger [19] developed by Software Quality Research Group, were used in order to record all players’ actions. These tools combine recordings from player’s camera and microphone (required in order to participate in the survey) as well as recordings of all users’ actions in the screen (screen captures, mouse movements, keystrokes, and idle time). The use of such tools was essential since some games within the SimSafety environment required the participation of 5 children, therefore some children played the game outside of the laboratory (but within Hellenic Open University premises, in a room nearby and under the supervision of one of the evaluators).

Regarding the methods used some limitation enforced by the fact that the users were children of ages among 9 to 13 years. Therefore evaluation methods applicable to adults, such as the Thinking Aloud Protocol, or Co-discovery could not be used. The methods used were: Actions Logging, Experts Observation and a final Interview including children and parents.

Actions Logging (or User Logging) is an evaluation method that includes recording of all user’s activities by the use of special equipment (which in this case was 2 cameras, 2 microphones and the aforementioned specialized logging software). Experts Observation added the evaluators’
comments to the data collected by various sources (in this case the experts data were recorded as verbal notes and combined to the roof camera recordings). All these data were digitally archived, synchronized and analyzed using Observer XT. Finally the analysis results were compared to the findings from the interviews.

Figure 2 shows the real-time recordings inside the observation room, while the evaluator is commenting. The screen on the left shows the video from the roof camera which is combined with the audio recordings of the evaluator’s comments. The screen on the right shows the video captured from the PC in which the child is playing the game, combined with the audio captured inside the test room (in this case the dialogue between the child and his mother, also shown in the left screen).

C. The participants and the data gathered

Six children and five parents (one parent was with two children) had participated in the evaluation experiment. In order to set up the environment in 6 PCs and offer technical support to the participants, three technicians (members of RACTI, the partner that developed the environment) were present during the evaluation. Finally four evaluators participated in the evaluation. Two evaluators were sited inside the observation room; another one was inside the room where the rest of the children played the game; another evaluator was available outside the test room to aid in case some advice regarding the evaluation was required. In the evaluation also participated one member of the HOU team responsible for capturing the evaluation process using a digital photo camera (producing the photos presented in this paper).

Figure 3, shows the final preparations before initiating the evaluation process. Both doors of the observation room and the test room were open just to capture the moment (the doors are closed during the evaluation). In the left side of figure 3 two evaluators are setting up the recording software and devices, while in the right side a parent and a child are waiting to start playing the videogame. It must be noted that six users (in this case children and parents) are considered sufficient in order to participate in such experiment, but in this case some videogames within the SimSafety environment require a minimum number of five participants, therefore it was essential to increase the number of participants above the numbers required for the aforementioned evaluation methods.

A number of particularities related to this evaluation procedure were recorded. Usually switching users from the other room into the test room is easy when it involves adults, but in some cases the children did not want to stop the game! On the other hand, adults sometimes feel peculiar inside the test room, once they are informed that they are monitored and all their actions are recorded. Children of course forgot all about the observation and the evaluation and focused directly on the game.

The evaluation procedure lasted just over 3½ hours of actual evaluation recordings (the overall process lasted quite more including the breaks, the initial orientation, the discussion and switching –sometimes unwilling users– in and out of the test room). The overall time to analyze the archived data was approximately 18 hours.

IV. THE EVALUATION RESULTS AND THE CHANGES IN THE GAME ENVIRONMENT

The analysis of the recorded data of the evaluation of this initial (alpha version) of SimSafety aided to identify a number of problems. Most problems were under the category usability but this was expected and it was in accordance to the literature review of section II. Table I summarizes the major problems that were detected; the symbols used are F for functionality, E for efficiency, R for reliability and U for usability.

<table>
<thead>
<tr>
<th>Category</th>
<th>Detection method</th>
<th>Short Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Observation</td>
<td>The goal of the game is not always clear to the children.</td>
</tr>
<tr>
<td>F</td>
<td>Observation and interviews</td>
<td>Some videogames perceived as quite ‘adult’ from the children.</td>
</tr>
<tr>
<td>E</td>
<td>Data logging</td>
<td>Delays in the avatar during walking through the SimSafety areas.</td>
</tr>
<tr>
<td>R</td>
<td>Observation and data logging</td>
<td>System crashed.</td>
</tr>
<tr>
<td>U</td>
<td>Data logging</td>
<td>Children had more fun exploring the environment, rather than playing the videogames.</td>
</tr>
<tr>
<td>U</td>
<td>Observation and interviews</td>
<td>After exploring the area and playing all the games there is nothing else to do.</td>
</tr>
<tr>
<td>U</td>
<td>Data logging</td>
<td>The lack of a visible scoring system reduces competition and fun.</td>
</tr>
<tr>
<td>U</td>
<td>Interviews</td>
<td>Children asked for more items to use in the SimSafety area.</td>
</tr>
<tr>
<td>U</td>
<td>Data logging and interviews</td>
<td>The stating requirements of some videogames are not clear to the children.</td>
</tr>
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</table>

Apart from these problems some minor problems were also reported that either are not significant and are immediately solved on the following version, or they are depended on the
limitations of the 3D environment used. The most typical problem of the second category was the lack of avatars that look like children, since it was not supported in this version.

Regarding the functionality related problems, the fact that the goal of the game was not always clear to the children it was addressed by adding detailed instructions in certain areas and by creating an introductory place, which was the starting place for all first-time visitors. It is also true that some games (especially role-playing games inside the environment) require detailed instructions and still cannot be played effectively by children. On the other hand, these games were kept, since they are very successful when one of the roles is being played by an adult making provocative questions and initiating interesting discussions, as it was proven in evaluations and pilot usage after this one.

Both problems related to efficiency and reliability were related totally to the alpha version of the platform used and solved entirely in the following versions (even from the beta version).

Regarding the usability issues, it is true that children when joining the environment had more fun exploring the environment, rather than playing the videogames. Data logging and observation showed that they prefer exploring, walking or flying around, teleporting and not playing the videogames immediately. It is also true (and shown in data logging and mentioned in the interviews) that after exploring the area and playing all the games there is nothing else to do. The solution to both these problems was to introduce items related to internet safety (such as a piece of paper with a login and a password on it) that children could use freely (i.e. not related to a specific videogame) while exploring the environment. The use of a ‘Report Centre’ where a game player can declare a lost and found object or report that he has been bullied aided towards learning while exploring and interacting. Furthermore, the use of bots (virtual people that interact with the children) added more fun to the game and reduced this problem. Clear evidence that the problem was solved is the fact that children that played the game once, they kept logging into the environment.

The problem of scoring was also solved, adding points into any ‘proper’ action related to Internet Safety and, as discussed previously, more items were added into the environment. Of course not all the items asked by the children (such as bikes, cars, etc.) but only the ones related to the goal of the game, still with some exceptions in order to increase the essential fun element of the game. Finally, regarding the ‘visibility of game status’ and the starting requirements of each game this was resolved by adding instructions and mechanisms to inform the children about the number of players registered in each game and the number of players that are required to start playing.

V. CONCLUSION AND FUTURE GOALS

Evaluation is a dynamic process. The one presented in this paper was the first, performed in a suitable setting and adding to identify and solve problems in the alpha version. Further evaluations and pilot runs in schools proved that all the reported problems were addressed and the results regarding children satisfaction were encouraging and promising in relation to game sustainability.

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Identifying and Ranking Internet Dangers

Aristodemou Elena, Yiannis Laouris and Tatjana Taraszow

Abstract—The paper reports a study on the identification and ranking of internet risks, using a root-cause analysis method. The results were used for the development of scenarios for the Simisafe Game™. The methodology used, known as structured dialogic design process, is unique in its capability to explore relationships between ideas and identify deep drivers. The risks that following collective consideration turned out as being more influential (i.e., deep drivers), and which have been considered during the development of the scenarios for the game included easy access to games or content that is inappropriate for certain ages, addiction and confusion of reality.

Index Terms—Structured Dialogic Design Process, Internet risks, Internet safety, video games.

I. INTRODUCTION

SINCE 1990 the use of the internet became increasingly popular especially in the developed countries [1]. As time passes by, the internet becomes a necessity and people are using it for personal, professional and/or educational purposes. Therefore, the impact of the internet upon people’s everyday life has become a primary area of interest among scholars [2], [3], [1]. One of the most prominent debates that exist in the current literature focuses on the social impact of the internet [4] as new means of communication with special emphasis on whether the internet has changed the social ties that existed until now. Opponents of this view, argue that electronic communication was part of people’s lives long before the introduction of the internet (such as telegraph, telephone), and as such the internet does not change social ties as it is still based on the communication between the existing face-to-face social networks [5], [6], [7]. Proponents of this view however, argue that the internet provides new means of communication and includes relationship formation among people that have never met in person, but are based only on mutual liking and common interests [8]. Zhao [1] presented a comprehensive assessment of the impact the internet has brought on the social construction of reality. His work revisited the work of Berger and Luckmann and highlights the changes in people’s lives since the introduction of the internet [1]. Specifically, he contents the creation of a “spatiotemporal zone” that eliminates time and offers new socialization ways through chatting in the online public space [1]. At a similar pace, Xie [3] provides a valuable account of offline relationship formation developing through online meetings. This assessment verifies the changes that accompany the advent of the internet in the construction of the social life of people.

Researchers examined also gender differences on the impact of the internet among adults [2]. Results showed that in adult males the internet has helped them in advancing or creating a career, in assessing the global impact of technology (positive aspects) and also in identifying the negative aspects of the Internet [2]. Women were found to be affected from the Internet in interpersonal relationships (such as making new friends or renewing old friendships) and also were found to be using the internet for shopping, studying and accessing information [2]. Therefore, the use of the internet and its impact to people’s lives has become an area of continuous interest to the scientific community. Nowadays, most countries are calculating statistics taking note of how many people use the internet annually and what services are they using from it.

According to Eurostat (2008), 60% of all Europeans have internet access, and 48% of those, access the internet via broadband connection. Not surprisingly, the highest percentage of people who access the internet ranges in ages 16-24 (96%). These figures indicate that the younger population is by far the lead in Internet use. The internet is becoming a necessity in people’s lives offering many conveniences and simplifications in the workplace, school and everyday life. However, as the internet occupies more and more time from our life, the population using it also lowers. In the last decade, researchers started assessing the impact of the internet on children [9], [10]. It has been found that in the US children as young as five years old are using the internet [11].

II. POSSIBLE RISKS

Despite internet’s countless benefits, access to useful information and ease of use, there are also always risks overlooking. Like any other new technology, the internet comes with potential hazards if one is not careful. Many dangers (we usually speak of risks) can potentially victimize everyone, but most often, the targets are underaged children. According to Staksrud & Livingstone [12], internet risks can be distinguished in three categories:
Content-related risks include exposure to pornographic material, child pornography material, racist/xenophobic or violent material and self-harm related material. Content risks appear to be more common among European adolescents and children with 4 out of 10 teenagers in Europe to have encountered such content on the Internet [13]. Exposure on this type of content can cause distress, discomfort or attract in young people and teenagers. 15-20% of EU teens reported that they had experienced distress, discomfort and felt threatened after exposure to pornographic, unwelcome sexual, violent and/or gruesome content [12]. Unfortunately, little research exists in the area of content-related risks and the impact it has upon children.

Child Pornography refers to visual material depicting sexually explicit activities that involve a child or children under the age of 18. Literature on child pornography is mainly focused on the profiles and typologies of the offenders [14], [15], [16], [17]. According to Elliott and Beech [14] there has been a significant increase in the incidents of child pornography online where the 80% of the children depicted in the images and videos are below the age of 10.

Racism refers to an ideology or practice or behavior towards a person or people, which classifies the worth of the person or people according to racial characteristics (such as color, ethnicity or nationality). Racist websites that are considered illegal are mainly those that urge people to act against other people of specific race, color, ethnicity or nationality. Xenophobia refers to an intense fear of people from different ethnic, national or social group than one’s own. Xenophobic websites that are considered illegal are also those that urge people to act against people of different ethnic, national or social group than one’s own. Even though child pornography, racist and xenophobic content appears widely on the Internet there is a big gap in the literature regarding the impact that viewing such material imposes on children. It is assumed however, that just like any other inappropriate content, racist and xenophobic websites increase incidents of hate among people, and can negatively influence children and teenagers that are in a crucial age span and can be easily affected and persuaded in wrong standards. The area of racism and xenophobia online merits serious in depth research, as such content can easily be accessed from children.

However, during the last years an increasing research interest has arose in the area of self-harm content. Self-harm websites aim at “helping” people harm themselves or sustain their unhealthy state of living. Self-harm and suicide websites demonstrate positive attitudes towards self-injury and suicide. Suicide websites are most commonly known as ‘pro-suicide’ websites. Researchers in the field report that pro-suicide and self-harm websites encourage these self-destructive behaviors and that can lead prone individuals to harm themselves by acting on the ideas that are offered to them [18], [19], [20]. Further to self-injury and suicide websites, websites that promote eating disorders (anorexia-bulimia) are also on the rise. Pro-ana and pro-mia (short for pro-anorexia and pro-bulimia) websites present those eating disorders as a lifestyle instead of an illness [21]. These websites are associated and offer advice on how to lose weight, on how to keep the disorder secret from the family and loved ones, and reinforce the disorder by the use of concepts such as “thinspiration” [22], [23], [24]. The concept of thinspiration refers to presentation of famous anorexic models in an attempt to idealize the disorder. Many of those also offer information on medication that can help achieving and maintaining weight-loss [25]. Only a few of those websites present show that anorexia and bulimia are serious eating disorders and present the consequences that they impose on health [26].

Contact risks are the second most common risk category that adolescents are faced with, and cyber-bullying is by far the most common form of those risks [12]. Except cyber-bullying contact risks also include online grooming even though less common as an incidence.

Cyber-bullying occurs when one minor harasses torments, threatens or humiliating another minor (child, pre-teen or teen). In cyber-bullying this kind of abuse is conducted through the internet, digital technologies or mobile phones. In many cases the bully discloses personal information of the victim on the web humiliates him/her and threatens them. Unfortunately, with the introduction of the internet and new digital technologies, cyber-bullying became increasingly popular among adolescents and children. Studies show that cyber-bullying increased in the past few years, with almost 50% of all teens to have been cyber-bullied at least once in the past year [27]. Cyber-bullying victimization has been associated with psychosocial problems such as emotional distress [28]. Further research identified that victims of cyber-bullying often show low self-esteem, suicidal ideation, cyber-bullying back, depression or anger [29]. Suniti Bhat [30] in her article on cyber-bullying describes detrimental cases of victims of cyber-bullying. Children as young as 12 years old, have come to end their lives as a consequence of being unable to deal with the cyber-bullying they suffered [30]. Moreover, Wang et al [31] studied the various forms of bullying including cyber-bullying in the US and showed that parental practices may be the key in protecting children and adolescents from being bullied and being bullies.

Online grooming refers to the incidents where pedophiles enter chat rooms that are used by children and approach them with the purpose of later engaging in sexual contact with them. According to the Diagnostic and Statistical Manual for Mental Disorder (DSM-IV) [32], pedophilia occurs when a person:

“over a period of at least 6 months, has recurrent, intense sexually arousing fantasies, sexual urges, or behaviors involving sexual activity with a prepubescent child or children (generally age 13 years or younger); the person has acted on these sexual urges, or the sexual urges or fantasies cause marked distress or interpersonal difficulty; the
To this end, we engaged ten experts in the field of internet map so as to discover the deep drivers, i.e., those risks which into relations between the various risks. In this study, we have studies lack, (a) ranking of importance and (b) an exploration and studied over the past few years. However, almost all aspired to identify as many internet related risks as possible.

In sum, many internet related risks have been indentified between aggressive behaviors and internet addiction [35].

Person is at least age 16 years and at least 5 years older than the child or children defined above” p. 1

Pedophilia existed long before the introduction of the Internet in people’s lives. With the internet however, pedophiles have found new and better grounds through which they can access and seduce children. Online predators are usually looking for vulnerable children that face several emotional problems (home or school oriented) and by pretending their friend they attempt to gain their trust and friendship. When they manage to do that, they then try to meet those children offline and abuse them. The pattern is pretty much known by all prevention messages and awareness campaigns organized for educating people in all countries. Wolak et al [33] however, argues that this is not enough and may not even be helpful. By especially addressing adolescents, the researchers stress the need for new prevention strategies that will take into consideration the teenagers’ normal interests for romance and sex [33]. As the authors continue, particular attention needs to be given to vulnerable teenagers referring mainly to those who have experienced sexual abuse, those who have conflicts with their sexual orientation and those who exhibit patterns of risky behavior [33].

Conduct risks refer to those that can potentially create the pathway for online groomers to act. Specifically, disclosure of personal information is one of the key behavior risk factors that children and adolescents exhibit on the net. Social Networking Sites are very popular in people who use the Internet from all over the world, with teenagers being the most common users. In these websites, each member is required to create a profile where he/she enters information about them such as contact information, interests/hobbies, profile picture etc. In a recent study on Social Networking Sites (SNSs) Taraszow et al [34] have found that young people are revealing crucial personal information (real name, gender, age, facial pictures and email addresses) on Facebook™ and accept friendship information from strangers that can potentially prove harmful for them.

Finally, a new threat has recently been added in the repertoire of internet related risks: some children and young people have started exhibiting patterns of what is now being called ‘internet addiction.” The term refers to the excessive use of internet to the extent that it affects the daily life of a person. Internet addiction is therefore associated with prolonged usage of internet, with a parallel loss of interest in other activities such as socializing or getting out of the house. Research in the area of internet addiction is still at primitive stages, but professionals have already identified associations between aggressive behaviors and internet addiction [35].

In sum, many internet related risks have been indentified and studied over the past few years. However, almost all studies lack, (a) ranking of importance and (b) an exploration into relations between the various risks. In this study, we have aspired to identify as many internet related risks as possible and subsequently structure them in the form of an influence map so as to discover the deep drivers, i.e., those risks which are “responsible” and which “drive” the more obvious risks. To this end, we engaged ten experts in the field of internet safety in a structured democratic dialogue for which over 100 person hours have been invested.

This paper presents the identification and ranking of internet risks using a root factor analysis methodology in order to examine the most prominent risks that could be used in the development of game scenarios in the context of the Simsafety project.

III. Method

A. Participants

Ten people (6 females, 4 males) participated in workshop, thereafter referred to as co-laboratory that was organized in order to identify and cross-evaluate internet risks for children. The participants were educators and internet safety experts.

B. Materials

The co-laboratory for identifying and ranking internet risks for children was conducted using a special methodology of structured dialogue known as Structured Dialogic Design (SDD) process. This methodology was developed by scientists such as Hasan Özbekhan, Erich Jantsch, John Warfield and Alexander Christakis (for reviews see [36] & [37]; For an introduction see reference [38]), who, in the context of the Club of Rome [39] opted for developing a democratic methodology for solving contemporary complex problems. It is based on seven laws and four axioms from cybernetics; has been grounded both scientifically and empirically in hundreds of settings on a global scale for the past 30 years.

C. Procedure

We applied the SDD methodology in order to record democratically the views of every participant in the dialogue. The procedure in any SDD co-laboratory begins with the formulation of a triggering question. Participants are encouraged to produce responses to this question. The triggering question was formulated from a core group team referred to as Knowledge Management Team (KMT), comprised of people who are considered and who feel as owners of the problem. Once set, the triggering question was emailed to the participants who were required to prepare prior the start of the co-laboratory by providing at least three contributions. For the current study the triggering question was:

“What dangers do children and youth face with the expansion of Cyberspace in their lives?”. During the face-to-face meeting, participants provided all their responses to the triggering question, which were recorded using specialized software called Cogniscope II™ (40). Responses were required to be one sentence-per-idea only. Ideas were collected from all participants one at a time in robin-round order. A list of all ideas was produced, printed and handed over to all participants at the end of this step.

After the ideas were recorded, participants were asked to cluster them based on similarities and common attributes that they share. The clustering table was subsequently printed and given to all participants, who were asked to choose five ideas that they believed were the most important. The ideas that
have been voted made it to the next phase, where participants were asked to decide \textit{whether solving one problem would make solving another problem easier}. If they answered yes with great majority an influence was established on the tree of ideas. The way to interpret such an influence is that an idea at the root of the tree is a deep driver, i.e., a root causes.

Stakeholders can develop an efficient strategy to address the problem at hand taking into consideration, to the degree possible, the root causes.

IV. RESULTS

A. Production and list of ideas

Participants produced 58 ideas regarding potential internet risks children and youth may encounter on the internet. The ideas included tangible dangers that can arise from incorrect behavior exhibited while using internet, easy access to games or content that is inappropriate for certain ages, addiction, confusion of reality etc. All ideas are listed and clarified in meaning in Appendix 1.

B. Clustering

After listing, ideas have then been clustered by the participants into fourteen categories based on similar characteristics and attributes that ideas shared. The fourteen categories that represent the 58 ideas are:

- Cluster 1: Seduction
- Cluster 2: Personal Data
- Cluster 3: Problematic Content
- Cluster 4: Addiction
- Cluster 5: Blurred Reality
- Cluster 6: Harassment/Intimidation
- Cluster 7: Exploitation
- Cluster 8: Desensitization
- Cluster 9: Inappropriate Entertainment
- Cluster 10: Social Pressure
- Cluster 11: Physical Problems
- Cluster 12: Educational Issues
- Cluster 13: Antisocial Networks
- Cluster 14: Social Consequences

All ideas that have been categorized in each cluster are shown in appendix 2. Considering the diversity of clusters, it becomes profound that internet risks appear in terms of: seduction where one stranger can manipulate and seduce a young child; revelation and stealing of personal data; problematic content that can appear on the net; addiction, which becomes more frequent nowadays in children; blurred reality in which children cannot distinguish between real and fake information on the internet; harassment/intimidation, such as cyberbullying, exploitation, desensitization, inappropriate entertainment especially through playing games not appropriate for certain ages; social pressure; health problems; educational problems; antisocial networks and social consequences that the internet can have upon the lives of children. All these clusters indicate a wide variety of problems that require specialists and relevant stakeholders to study further and identify the root causes of all these issues in order to tackle the problem at its heart.

C. Voting

After clustering all ideas, participants were asked to vote the five risks that they thought are the most important to be faced by children. The voting procedure yielded the following results:

- Idea #18: Child Pornography 5 votes
- Idea #04: Addiction 4 votes
- Idea #05: Conversing with strangers 4 votes
- Idea #03: Access to fictitious or false information that appears to be true 3 votes
- Idea #26: Submission of behaviours and opinions 3 votes
- Idea #45: Easy access to games inappropriate for certain ages 3 votes
- Idea #01: Grooming 2 votes
- Idea #09: Watching of inappropriate content 2 votes
- Idea #27: Publishing of personal data 2 votes
- Idea #54: Confusion between true and false Information 2 votes
- Idea #07: Confusion between real and imaginary world 1 vote
- Idea #10: Cyber bullying 1 vote
- Idea #13: Access to illegal content 1 vote
- Idea #16: Intimidation 1 vote
- Idea #17: Anonymity 1 vote
- Idea #19: Permanence of the Internet 1 vote
- Idea #32: Promotion of wrong idols 1 vote
- Idea #48: Exposure to racist content 1 vote
- Idea #49: Opportunities to create racists groups 1 vote
- Idea #51: Encouragement for hurtful acts (ex. suicide) 1 vote

Out of the 58 ideas, 20 received one or more votes. Described scientifically as \textit{spreadthink} or \textit{divergence} (ST or D respectively), the value, in this case of 28%, is a measure of disagreement.

According to numerous studies, the average degree of \textit{spreadthink} is 40%. Therefore, one can conclude that the participants of this study have demonstrated significantly less divergence than average in their ideas regarding the issue. This suggests that the participants exhibit a greater-than-usual degree of consensus; their understanding and interpretation of problems and their relations is more similar than the average. This was expected as the participants were chosen as experts in internet safety.

The results of the voting procedure were used to select ideas for the subsequent process of mapping. The participants were able to structure all 20 ideas, which had received one or more votes. The resulting “Tree of Influences” demonstrates the basic ideas, which could provide indications in answering the triggering question. The tree or map is characterized by 3 levels of influence.

D. Tree of influences

The tree of influences is made up of 6 different levels shown in figure 1.
Fig. 1: Tree of Influences on Internet risks for children

The ideas on the lower levels are those with the highest degree of influence. The participants agreed that these ideas were more influential and that any action related to the subject of Internet Risks should give them priority consideration:

1. Idea #19: Permanence of the Internet
2. Idea #45: Easy access to games that are inappropriate for certain ages
3. Idea #54: Confusion between true and false information
4. Idea #48: Exposure to racist content
5. Idea #09: Watching of inappropriate content

In particular, idea #19: Permanence of the Internet, which sits at level VI, is the one with the greatest influence. The repercussions derived from the permanence of the internet need to be considered seriously, because they practically feed all internet risks. Directly affected from the permanence of the internet is the easy access to games that are inappropriate for certain ages (idea #45: Easy access to games that are inappropriate for certain ages). As it was exemplified during the co-laboratory, children that easily access games inappropriate for their age, could be affected by factors present in the game (violent behaviour, bad language, etc) and could imitate what they experience in the game in real life. This could have significant negative consequences not only in their own lives, but also in the lives of others. Therefore, allowing children to access games only appropriate to their age can protect the youth from several hidden dangers that the Internet might entail.

In addition, idea #54: Confusion between true and false information, is also considered as highly influential since it was described as a threat when people believe everything they find on the Internet even though it might be false or fake, without using critical thinking. Idea #48: Exposure to racist content was also considered as highly influential as it could help enhance prejudice and violence against minority groups. Idea #9: Watching of inappropriate content, may result into traumatic experiences especially for younger children when they might come across photos or videos that are not appropriate for their age.

As a word of caution, we should state that although most of the descriptors did not receive any votes and are therefore missing from the Tree of influence, this should not mean that they are less important or that they should not be considered as risks. However, the focus in designing scenarios and/or curricula for educating children better start from factors that made it to the root of the Tree.

V. CONCLUSION

The goals of the co-laboratory were achieved in the following ways:
1. One list of factors was generated in response to the Triggering Question;
2. The factors were clarified in plenary, thus enabling participants to achieve a better understanding of the views of other members and greatly expand their own horizons regarding positives of internet use;
3. The factors were clustered in an interactive manner, thus providing opportunities for further and deeper clarifications of salient distinctions between separate ideas. The process is crucial for what we call “evolutionary learning” (i.e., during the process participants “lose” connection to their own personal ideas and stereotypes in favour of a collective and shared thinking);
4. Participants voted for the factors that they considered most important. They subsequently managed to “structure” all these ideas and produce an influence map. It must be noted that co-laboratories rarely manage to “structure” all ideas that receive votes;
5. An influence map has been produced for the Triggering Question, containing 20 ideas in the form of a trees of Influence;
6. The participants had time to discuss the influence map and in general agreed that the arrows in the map made sense to them;
7. More importantly, the structured dialogue process empowered the participants to identify and understand the risks of internet use.

APPENDIX

APPENDIX I:
Potential risks that children and youth could face with the expansion of cyberspace in their life generated by the participants:

1. **Grooming**
   Clarification: Adults find a way to through the Internet to approach underage children with the purpose of sexually abusing them.

2. **Identity theft**
   Clarification: Personal information that is published on the Internet can be exploited and abused by people.

3. **Access to fictitious or false information that appears to be true**
   Clarification: Because of the large amount of information that exists on the Internet some information that is wrong or fictitious can be appear as true and valid.

4. **Addiction**
   Clarification: They devote a lot of time on the Internet. They may play games for hours, or chat with people (strangers and familiar) or surf the net without any purpose.

5. **Conversing with strangers**
   Clarification: Through the use of various synchronous / asynchronous communication programs, children and young people may give personal information to complete strangers that want to harass them or exploit them.

6. **Phishing**
   Clarification: Stealing and use of a person’s personal data without that person’s approval.

7. **Confusion between real and imaginary world**
   Clarification: Some websites offer children the opportunity to move in an imaginary world with negative consequences.

8. **Double identity**
   Clarification: Through virtual games, children play roles that can possibly develop in real life also.

9. **Watching of inappropriate content**
   Clarification: Children can watch content (violent, sexual) on the Internet that is not appropriate for their age.

10. **Cyber bullying**
    Clarification: Especially young people how now another means for harassing people of their age.

11. **Alienation from natural environment**
    Clarification: The excessive use of the Internet can have negative consequences in the social development of a person.

12. **Easy approach from proselytizers**
    Clarification: Links to religious/racist websites are widely apparent on websites with educational material.

13. **Access to illegal content**
    Clarification: In their search for software, users end up in websites that are illegal and dangerous. Illegal downloading of software.

14. **Addiction to violent games**

15. **Addiction to online gaming**
    Clarification: Children play online games for hours every day and most of the times they receive wrong values and bad examples.

16. **Intimidation**
    Clarification: Through various social networking sites, children may become victims of intimidation by classmates/friends with whom they communicate.

17. **Anonymity**
    Clarification: Everyone can hide behind the anonymity of the Internet and maybe children know people that can put them in trouble (physical or spiritual).

18. **Child Pornography**
    Clarification: Easier access from criminals in their attempt to find children and produce child pornography.

19. **Permanence of the Internet**
    Clarification: Pictures, photos, videos stay on the net.

20. **Desensitization**
    Clarification: The excessive exposure to inappropriate content causes desensitization.

21. **Access to websites that promote bulimia/anorexia**
    Clarification: There are websites that promote anorexia/bulimia with advice on how to hide them from family and friends.

22. **Access to websites with black magic/Satanism**

23. **Access to websites with electronic gambling**
    Clarification: It can easily be done through the Internet.

24. **Social Isolation**
    Clarification: Children spend so much time on the Internet that they don’t have time to socialize with other children.

25. **Difficulty in managing information**
    Clarification: The vast amount of information that exists on the net, makes it many times very difficult for children to be able to manage it and evaluate it.

26. **Submission of behaviors and opinions**
Clarification: Children are driven through social networking sites to express certain behaviors and opinions from mimicking, without critically accepting them.

27. **Publishing of personal data**
   Clarification: Children often provide complete strangers with personal data without realizing it (i.e. through the use of Social Networking Sites).

28. **Immediate multiplication of personal data**
   Clarification: Personal information on the internet can immediately not only disperse around the internet but also multiply.

29. **Possible continuous monitoring through GPS on telephones**

30. **Possibility of use by terrorists**
   Clarification: They can use the Internet for i.e. kidnapping a child.

31. **Mimicry**
   Clarification: Access to bad examples and mimicking of bad values.

32. **Promotion of wrong idols**
   Clarification: Children visit websites of popular singers, models, soccer players and create wrong idols that they are trying to mimic.

33. **Loss of school work due to virus on the computers**
   Clarification: Viruses on the computers are most of the times the primary reason of consequences in the school life of children, since they can lose their school assignments from them.

34. **Creation of fake friends**
   Clarification: In Social Networking Sites, children add as friends many people known or unknown to them, and this way the true meaning of the word “friend” is lost.

35. **Financial fraud**
   Clarification: Scam emails that are sent with the purpose to extract money from people.

36. **Hacking of webcams and video recording**

37. **Putting pressure through chain messages**

38. **Easy promotion of irresponsible consumerism**
   Clarification: The Internet is another means for advertisements that can encourage children to ask for products.

39. **Sight problems**
   Clarification: Excessive use of the internet can cause sight problems.

40. **Distortion of the language**
   Clarification: In their online communication young people are using a special form of language that is also transferred to their everyday oral communication and in their written communication.

41. **No realization of the true dangers**

42. **[DELETE]**

43. **Alteration of the quality of communication due to the possibility for frequent interaction**

44. **Limitation of creativity and critical thinking**
   Clarification: When children are given a topic to work with at school, they prefer to go and find something ready on the internet instead of creating something on their own. This then poses a limit in their creativity and critical thinking.

45. **Easy access to games inappropriate for certain ages**
   Clarification: Many games are age limited but since there is no control, children can easily access and play games inappropriate for their age.

46. **Sexting**
   Clarification: Sending and/or receiving of messages of sexual content.

47. **Criminal activities like piracy become accepted**

48. **Exposure to racist content**

49. **Opportunities to create racist groups**

50. **Easy access to websites that teach you how to create explosives**

51. **Encouragement for hurtful acts (ex. suicide)**

52. **Increase of social inequality**
   Clarification: Since not all children can have the same access and same potentials in using the internet, it becomes a means of social inequalities to increase.

53. **Focused advertisement**

54. **Confusion between true and false information**

55. **Addiction to electronic gambling**

56. **Physical diseases in the wrist**
   Clarification: The excessive use of the computer can cause wrist problems.

57. **Back problems**
   Clarification: The excessive use of the computer can cause back/neck problems.

58. **Difficulty in critical evaluation of the validity of information**

APPENDIX 2:
Clusters of factors that appear as dangers on the Internet

**Cluster 1: Seduction**
- Grooming (1)
- Conversing with strangers (5)
- Phishing (6)
- Easy approach from proselytizers (12)
- Anonymity (17)

**Cluster 2: Personal data**
- Identity theft (2)
- Permanence of the Internet (19)
- Publishing of personal data (27)
- Immediate multiplication of personal data (28)
- Possible continuous through GPS on telephones (29)
- Hacking of webcams and video recording (36)

**Cluster 3: Problematic Content**
- Access to fictitious or false information that appear to be true (3)
- Watching of inappropriate content (9)
- Access to illegal content (13)
- Access to websites that promote bulimia/anorexia (21)
• Access to websites with black magic/Satanism (22)
• Easy access to games not appropriate for certain ages (45)
• Exposure to racist content (48)
• Easy access to websites that teach you how to create explosives (50)

Cluster 4: Addiction
• Addiction (4)
• Alienation from natural environment (11)
• Addiction to violent games (14)
• Addiction to online gaming (15)
• Addiction to electronic gambling (55)

Cluster 5: Blurred Reality
• Confusion between real and imaginary world (7)
• Double identity (8)
• Creation of fake friends (34)
• Confusion between true and false information (54)

Cluster 6: Harassment/Intimidation
• Cyberbullying (10)
• Intimidation (16)
• Putting pressure through chain messages (37)

Cluster 7: Exploitation
• Grooming (1)
• Child Pornography (18)

Cluster 8: Desensitization
• Desensitization (20)
• No realization of the true dangers (41)
• Criminal activities like piracy become accepted (47)

Cluster 9: Inappropriate Entertainment
• Access to websites with electronic gambling (23)
• Easy access to games inappropriate for certain ages (45)
• Addiction to electronic gambling (55)

Cluster 10: Social Pressure
• Submission of behaviors and opinions (26)
• Mimicry (31)
• Promotion of wrong olds (32)
• Putting pressure through chain messages (37)
• Easy promotion of irresponsible consumerism (38)
• Encouragement for hurtful acts (ex. suicide) (51)
• Focused advertisement (53)

Cluster 11: Physical Problems
• Sight problems (39)
• Physical diseases in the wrist (56)
• Back problems (57)

Cluster 12: Educational Issues
• Difficulty in managing information (25)
• Loss of school work due to virus on the computers (33)
• Distortion of the language (40)
• Limitation of creativity and critical thinking (44)
• Difficulty in critical evaluation of the validity of information (58)

Cluster 13: Antisocial Networks
• Possibility of use by terrorists (30)
• Opportunities to create racists groups (49)

Cluster 14: Social Consequences
• Social Isolation (24)
• Alteration of the quality of communication due to the possibility for frequent interaction (43)
• Increase of social inequality (52)

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Game designing and game playing: what we have learned from the SimSafety project! The case of Greece

M. Fountana, V. Delis, Th. Hadzilacos and D. Egarchou

I. INTRODUCTION

THIS DOCUMENT presents the SimSafety project and the idea behind it. It includes some theoretical considerations that constituted the background of its conceptual design and focuses on implementation issues drawing evaluation data and experience from the pilot implementation of SimSafety in Greece.

SimSafety is a 3D virtual online environment which pupils 9-11 years old are invited to visit along with the escort of an adult in order to be “safely” exposed to internet risks and investigate possible reactions and ways to avoid them through a game playing approach.

This game playing approach has been adopted by the project team and in collaboration with teachers participating in the project has been reflected in activities designed to be implemented in the classroom or at home with the support of an adult (teacher or parent). A list of educational activities as well as guidelines for their implementation in the classroom or at home with the support of an adult (teacher or parent) can be found in the following SimSafety project deliverable: D3.6: “Game Scenarios Manual”, Deliverable co-authored by all project partners of the SimSafety Project. (http://www.simsafety.eu). These activities are being referred as "educational activities" within the SimSafety project.

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II. THE SIMSAFETY IDEA

A. About the Project

The “SimSafety: Flight Simulator for Internet Safety” project (http://www.simsafety.eu), co-financed by the European Union (Lifelong Learning Programme / Transversal Programme / Key Activity 3: ICT - European Commission, EACEA), addressed parents, teachers and 9 to 11 years old pupils (although older students were not excluded) by approaching the issue of using the Internet safely and adopting a collaborative approach between adults and children aiming to create a common understanding of the risks entailed in Internet Use but also of the ways to deal with them.

For this reason, a gaming mechanism and scenarios have been developed in an Online Virtual Environment (http://opensimulator.org/wiki/Main_Page) to familiarise game players with the possible Internet dangers through their “controlled” exposure to them, since adults (parents and/or teachers) have been escorting their youngsters throughout the way adopting the role of the “Chaperone”. Young game players have been invited to use critical thinking to reveal – confront possible dangers by developing skills, acquiring knowledge, cultivating the culture of surfing the Internet safely.

It has not been the intention of the SimSafety project to suggest that possible risks do overwhelm the possible benefits that the use of the Internet may have in the lives of young pupils. On the contrary, the scope of the SimSafety project has been to support its participants understand the possible Internet risks in a realistic dimension. Through a Role-Playing Game (RPG) approach, children have been invited to promote skills such as critical thinking and imagination, questioning and speculation [1].

B. Some Theoretical considerations

1) Internet Safety Issues

The extended use of the Internet today and its importance to our lives is unquestionable. Search engines, communication and downloading services are an everyday reality. As a result of this shift to new technology, the scientific community became increasingly interested in studying the impact of the internet in people’s everyday life. Debates among scholars extend from the impact of the internet on the social

Abstract — SimSafety is a virtual online environment addressing internet safety issues through game playing, developed within the life of the SimSafety eu-funded project. It addresses pupils, parents and teachers and has been enriched with educational activities taking under consideration certain theoretical aspects. Pilot Implementation of SimSafety in Greece has indicated that the interesting idea has evolved into a challenging product with extended potential.

Index Terms—game playing, pilot implementation, internet risks, children and RPGs.
construction of reality to gender and age differences in Internet use and impact [2]. Internet use among children has also been in the centre of international studies lately indicating that more and more children are being exposed to the Internet from a very early age [3].

2) Possible Internet Risks

Despite the benefits of the Internet, there are potential hazards that could victimize its users, especially young children, if careful use is not maintained. Content risks (where the child is a recipient of unwelcome or inappropriate mass communication), contact risks (where the child participates in risky peer or personal communication), and conduct risks (where the child acts themselves to contribute to risky content or contact) seem to be the most common hazards among all internet users [4]. Actions taken so far include awareness campaigns for safer Internet, the establishment of awareness Nodes and Hotlines in all European counties as well as filtering and rating systems.

3) Learning and Game Playing

Learning through game playing is hardly a new concept. Its positive impact as a methodological approach in teaching and learning is well known to scholars [4]. Game learning promotes student motivation and interest in subject matter, enhancing thus the effectiveness of learning. Learning through games provides stimulation and interest to learners through the role of “fun” in learning. The simple presence of a game does not guarantee an effective learning experience. A great deal of success and failure factors underpin the use of games for educational purposes.

From the teachers’ angle, combining games and learning is a rather labored task. It demands not only the ability to properly moderate and debrief students’ experiences, but also the construction of an adequate pedagogical framework.

Role Playing Games aim at providing players with better understanding and knowledge of a given situation and thus constitute social learning support tools.

III. THE DESIGN OF SIMSAFETY

A. The Conceptual Design of the game

The purpose of the Game has been to create a simulated environment of today’s complex, dynamically changing and many-to-many virtual environments, in which internet risks are being presented, encountered and experienced by young players in a controlled way. The approach is scientifically grounded on the thesis that children do not learn optimally dangers they do not experience. Merely talking about them or advising them how to avoid a danger is not sufficient to make a young person comprehend the risk and avoid an associated danger. Moreover, the current generation faces one additional problem; they try to protect their children from dangers they themselves have never experienced, as these dangers appeared following the recent technological revolution. Even worse, many parents do not even have a clear idea of what constitutes a danger (The authors have implemented another project focused exactly on this issue; the project is funded by the Cyprus Research Promotion Foundation and can be found at http://inetrisks.cti.gr).

Within the controlled environment developed in the context of the “SimSafety”, a number of internet related dangers are simulated and presented in a controlled way, semi-randomly to young players in ways that challenge them make decisions and take actions. Their decisions and actions are directly evaluated using a scoring system that rewards for winning strategies, required knowledge and skills, selected behaviors and choices; at any time a player is considered a winner as there is a continuous “ranking” system analogous to most multi-player games in the market.

The Game is designed to be flexible. It can be played asynchronously by a single player, or it can be played dynamically in multi-player mode. It is possible that children from the same class or school play against each other, or they play together against children from other schools, for example, in the spirit of an organized school competition. It is designed so as to be dynamic and expandable.

The Game has provisions to “connect” its content and features to real world organizations and their respective educational and awareness materials. This allows Players to access and interact with digital information of various types, search for specific information, learn about the pan-European Safer Internet Program (Safer Internet Plus program), the Awareness Nodes and associates Hotlines and Helplines and their respective pan-European Associations (Insafe, Inhope).

Thus, the SimSafety Game creates a link between all safer Internet projects currently running in Europe and assumes a central position from which one can learn by doing, experience simulated dangers in controlled ways, contact relevant stakeholders, or simply have fun learning new things.

B. Different Game Settings

Participation in “SimSafety” may take place in different settings such as:

- **Fixed number of Players**: A minimum of 5 Players enter “SimSafety” at the same time and go from Game area to Game area competing on the same problems. While competing to maximize their score, they are also encouraged to collaborate in the search of information required to deal with the problems, answer the questions, support peers when they need help (e.g., when one is bullied), etc. The winner of this type of a Game is the Player who achieves the highest score when all Players complete all tasks. It is possible that in future version the Fame is expanded to include “Levels” for the various Games areas and Players select a Level when they entered or they simply play as a group in Level 1 and if they play again for a subsequent time they will be automatically sent to their respective next Level etc.

- **School competition**: Five players from each school enter “SimSafety” and remain together as a Group until the end of the game. The Game includes mechanisms and the possibilities for players of a particular school to interact with players from other schools. The winning Player is the one that not only
performs well in the Problems posed and in the collaboration with his peers, but also the one who is most sociable and succeeds in making new friends following internet safety rules.

- **Free competition but with participating schools:** Same as School competition with the difference that Players are let alone to move freely through the environment, meet people and make friends, create alliances, play asynchronously in different places from one another. They are not constrained to “collaborate” with children from their own school. They are encouraged to move through the environment comfortably, make new and good friends and acquire knowledge and skills.

- **Completely free and continuous Game:** This setting allows Players to enter at any time. A Gamer enters and plays randomly.

C. Various Game Scenarios available in the form of educational activities through the SimSafety project

Game scenarios have been developed within the project life time and have been available to the SimSafety users for different settings:

- **SimSafety Scenario for completely free and continuous Game** (either with the participation of schools or with the participation of independent players)

  These SimSafety scenario has the form of a “Game Tutorial” and has been available to all SimSafety players who visit SimSafety for the first time on their own either indirectly through the teachers participating in the pilot implementation along with their pupils or directly through the project portal. Instructions provided are in the form of “Hints” and are not exhaustive. The challenge is to intuitively participate in the suggested game “missions”.

- **SimSafety Scenarios played inside the classroom focusing on specific educational objectives**

  These SimSafety scenarios serve specific educational objectives and have been following specific educational templates for the teachers to use inside the classroom (or indeed for parents to use with their children). One example of a “thematic” educational scenario has been to “find the identity of someone”. For example, five players (who know each other) are challenged to adopt a new identity and play with the purpose of revealing the new identities of others. The mission here is the interaction that needs to take place in order for players to identify “who is who”.

IV. THE IMPLEMENTATION EXPERIENCE IN GREECE

A. Implementation Methodology

Implementation methodology in Greece, similarly to all participating countries in the pilot implementation phase, followed a specific procedure consisting of two phases.

The initial phase aimed at “testing” SimSafety in a closely supported setting in order to monitor technical issues that would need to be solved before the actual application in schools. The second phase included pilot implementation in two or three primary schools in each country, ideally implementing the Beta Version of the software for a series of three to four school sessions and then the Final Version of the software again for a similar amount of time. Methodology guidelines were shared among project partners offering indications on the time and duration of the SimSafety sessions at schools, the number of pupils involved in each session and the parameters influencing this decision, the process of monitoring the venture as well as the type of support that should be offered to the school teachers (both technical as far as setting up the school labs were concerned and pedagogical as far as actual classroom implementation was concerned). Finally, guidelines were offered with regard to evaluation issues and data collection techniques.

More precisely, in the case of Greece, the pilot testing of SimSafety took place in the premises of the Hellenic Open University in Patras with the participation of more than ten participants (parents escorted by their children aged between 7 and 14 years old). The specialised equipment of the Hellenic Open University facilitated the recording of the actual performance of each game player and offered interesting data from a usability testing perspective.

For the second phase of the implementation, it was a decision of the partners from Greece to take advantage of the schools and teachers who had shown their vivid interest to SimSafety from a very early stage of the project and the initial dissemination of its results through the project portal and the Newsletter distributed to its subscribed users. More than eight primary and secondary schools volunteered to participate in the pilot implementation phase of SimSafety from all over Greece. Supporting material addressing parents, teachers and pupils was distributed to the schools to inform about the project and its aims, to gain consent from the parents, offer pedagogical guidelines to teachers and provide indications about game playing to the young pupils.

It was not long before we realised, however, that primary schools in Greece were actually equipped with a limited amount of personal computers (five personal computers per school on average) with limited memory each (less than the minimum specifications of OpenSim, the Opensource platform hosting SimSafety) and slow internet connection. It was a challenge for the partners to be able to support the computer labs of the schools in order to have them up and running on time before summer vacation, in order to test the Beta Version of the Software and provide feedback which we could take advantage of towards the release of the Final Version of the Software.

Given the circumstances, it was decided to support three primary schools (two primary schools in Patras and one primary school in Athens which was actually hosted in the computer lab of the high school nearby) as a starting point. The number of pupils involved was determined by the number of computers available in each school lab. In many cases, sessions were repeated in order to cover for the extended demand of pupils to participate in the implementation phase and in others, each personal computer was occupied by a group of two or three pupils who were eager to get their hands
on the virtual environment, its gadgets, its avatars and the other features available in SimSafety.

Support of the whole venture included setting up the school labs (either through collaboration between the ICT teacher and the partners from a distance or through the presence of one person from the development team on the spot), instructing the teachers on how to use SimSafety and how to implement the SimSafety activities (the activities were instructed to the teachers by RACTI partners who also supported teachers and pupils during the sessions both technically and pedagogically either with actual or with virtual participation in the session).

B. Preliminary Evaluation Methodology

Initial sessions were monitored both on the spot and from a distance by the partners of the Research Academic Computer Technology Institute (RACTI) who was responsible for the organization of the pilot implementation in Greece. All sessions were, however, additionally monitored from a distance by logging into the game at the same time when the pupils were having a session in SimSafety. Recordings of these sessions have been stored by RACTI project partners as examples of best practice and have been reviewed for evaluation purposes.

Preliminary evaluation (the evaluation methodology of the whole venture is presented in detail in D5.5 Reaction Evaluation Report. Available at: http://www.simsafety.eu) of the venture was undertaken by a representative of the RACTI project team as well. Questionnaires were distributed to teachers and pupils whereas pictures, screenshots, videos and recordings have been part of the data collected for evaluation purposes.

C. Implementation Highlights

One of the highlights of the pilot implementation in Greece has been the great enthusiasm on behalf of the pupils. Many more pupils would have liked to be involved in the project. However, due to the limited number of personal computers available in the school labs as well as the limited time available in schools for such kind of events in between the regular school program and school vacations made this almost impossible.

Persistence and patience on behalf of the pupils is also worth mentioning since very often, pupils had to overcome internet connection failure at schools during game playing, due to the National Examinations taking place at schools throughout the country at the same days as the pilot implantation. Very commonly we would meet these pupils online, accessing SimSafety from their home regularly, hopefully with the support of their parents.

Finally, we received great support on behalf of the teachers who felt that SimSafety was worth fighting to overcome technical difficulties. They particularly enjoyed the educational activities known between the SimSafety partners as “mini-games” which included extensive exchange of opinions and view points between the game players. Discussion would move into the classroom around issues such as cyber-bullying, viruses, handling electronic resources as foreign property, stealing on the web, protecting personal data etc.

Pupils on the other hand particularly enjoyed the graphics (they thought there were many nice places to visit), their avatars, the different activities available, the possibility to socialise online both with their classmates but also with pupils from other countries who would happen to have a SimSafety session at the same time as the pupils from Greece and visiting certain places within SimSafety such as the “Report Centre”
where a game player can declare a lost and found object or report that he/she has been bullied.

Fig. 3. Print Screen from a session taking place inside the “Info Centre" in SimSafety during one of the sessions in one of the Primary Schools participating in the pilot implementation phase in Greece. Pupils have just answered a quiz which they thought was extremely easy to answer. However, they did not score as high as expected. The teacher of the session asks pupils to go through the quiz questions together and discuss them one by one. Pupils realise through discussion that correct answers to “easy” questions are not so self evident as initially thought.

D. Preliminary Results

Pilot Implementation has provided interesting and fruitful feedback in relation to different aspects of the project. Here are some initial thoughts (thorough analysis of the project evaluation results is part of the D5.6: Final Summative Evaluation Report. Available at: http://www.simsafety.eu) and conclusions:

- 6th grade primary school pupils tend to be more focused and perform better in SimSafety than 5th grade primary school pupils
- SimSafety is not an environment that pupils can take full advantage of without the support of a dedicated teacher
- Often visits to SimSafety minimise the technical problems and highlight the positive aspects
- Mini games are successful when one of the roles is being played by an adult making provocative questions and initiating interesting discussions
- Interesting discussions among teacher and pupils occurred during mini game playing and while answering the quizzes
- Some of the pupils have become great fans of SimSafety and import “gestures” to the system, help the development team debug it etc.

V. CONCLUSION

The idea of the SimSafety project has been a challenging one since it aimed at developing a challenging environment and educational activities to cover for an area which currently lacks extensive educational support. Internet risks, how they are perceived by the users, ways to confront them, ways to expose pupils to them in a “safe” way have all been issues of extensive discussion between project partners.

The environment developed is considered by project partners to have great potential for further future development and exploitation.

Pilot implementation so far has been embraced by teachers and pupils and provides strong indication that this idea may be at the right track towards offering a fresh and up-to-date approach to an equally new and up-to-date problem.

Future efforts of the project team will include further development of educational activities in SimSafety and emphasis on the involvement of the parents in supporting their children deal with Internet risks through SimSafety.

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Abstract—Universities and other Higher Education institutions in the European Union, of which Cyprus has rather recently become a member, have been facing major changes during the last decade. Among the various issues relating to education a major one is the learning of European languages. According to the declarations of the European Commission, Europeans need to learn two additional European languages in addition to their native tongue. Though language learning has been heavily promoted and supported through European funds, in Cyprus the number of students learning European languages other than English, has remained relatively marginal. Various assumptions can be made for the students’ reluctance to take up language classes. One of the major weaknesses of educational systems to address this problem is the little significance given to developing in language learners the skills of communicative competence and metalinguistic awareness. The use of ICT and Social Tools can have pedagogical benefits for language learning, such as enhancing communicative competence and developing metalinguistic awareness in Higher Education students, while being a powerful motivational tool for students of every age. However, the integration of any form of social software requires adequate planning and opportunities for in-service training in order to lead to successful language learning. This paper identifies the limitations of language learning in Higher Education in Cyprus and offers recommendations to enhance language learning, while highlighting the importance in enhancing communicative competence and developing metalinguistic awareness in adult learners through the use of ICT.

Index Terms—ICT, communicative competence, language learning, life-long learning, metalinguistic awareness.

I. INTRODUCTION

The European Union has been preoccupied with the educational systems in EU member states and has made huge efforts for improvements and standardization, such as the much debated Bologna Process. In the area of Higher Education the work of the Council of Europe focuses on issues of qualifications, public responsibility, governance and other relevant fields for the establishment of the European Higher Education Area by 2010. The much-debated Bologna Process is a European reform process that aims to establish a European Higher Education Area by the end of this decade by organizing higher education systems in European countries in such a way so that:

- citizens within the European Higher Education Area move easily from one country to another for the purpose of further study or employment;
- many people from non-European countries come also to study and work in Europe;
- Europe will be provided with a broad, high quality and advanced knowledge base which ensures the further development of Europe as a stable, peaceful and tolerant community [15].

To increase mobility for Higher Education studies would mean that the students would need to have a very good level of competence in EU languages in order to be more flexible in study or exchange options and enhance their intercultural competence. Reference [41] demonstrates that the EU objective of +2 foreign languages is far from the present situation: a mere 28% of the respondents is able to hold a conversation in two other foreign languages. The rationalisation behind this low percentage can rely on a plethora of reasons, ranging from historical factors to educational or financial. Besides, the decisions taken at the supranational level are subject to policy decisions at the nation/state or regional level. States may have global, abstract or symbolic aims with regard to language policy [37].

Europe has a kaleidoscopically changing pattern, created by the various member states; others have become bilingual or trilingual due to historical or political reasons – not necessarily by following the directives of the Council of Europe. In some regions near the borders, learning the neighbours’ language – as it is suggested by the EU – feels a natural process, while in other areas, learning the neighbouring language is an activity that is often frowned upon, like in the case of Cyprus. Hence before creating strategies to promote language learning, each member state needs to examine the language learning situation associated the particular member state from a variety of angles in order for language learning to be effective. Research carried out in other Member States, however, provides helpful insights and identifies significant weaknesses particularly relevant to the language teaching/learning methods used by language instructors.

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Victoria Kalogerou thanks RPF (Research Promotion Foundation, Cyprus) for providing funding for the project PENEK/ENISH0308/62, “European Language Policies: Implementation in Higher Education in Cyprus”.
II. CYPRUS AND THE EU

Cyprus is a relatively new member in the EU and has been struggling to harmonize its education system with the EU standards and guidelines. The linguistic dimension is a key element in creating a European Higher Education frame and at the same time the European dimension in education is supposedly one of the basic aims of the Cyprus education for decades. The local authorities in Cyprus have made some efforts to include the European dimension in education. This is often materialized through learning about the European Union, participating in European events and not through effectively introducing language learning in Higher Education curricula. Language learning has been mainly limited to the improvement of language skills in English, which is the language of instruction in private Higher Education institutions in Cyprus, while the options offered in learning other languages are limited to French, Italian and German. Often though the opinion of the practitioners - teachers, program developers, materials and textbook writers, administrators, consultants, or academics- who are involved in one way or another in the processes of Language Policy and Planning, has been often overlooked by local governments and decision-makers [37].

III. LANGUAGES IN HIGHER EDUCATION

It is interesting to note that in the UNESCO report the learning of foreign languages was identified having the same importance as the development of technology: “The effect of these changes on language education in institutions of higher education is almost as massive as that on information technology” [6:34]. However, while most students are required to take computer classes to upgrade their skills in using technology, the same it is not required in language learning, unless of course the students have to take additional English classes to comply with the policy of a particular institution where the language of instruction is English.

Very often the requirement to be competent in multiple languages is associated with Language students, i.e.: students who pursue studies in Language, Linguistics or Literature. Though language students are heavily exposed to the learning of other languages/cultures, students of other disciplines are not. Such inconsistencies not only inhibit language learning but also reduce opportunities for European integration and delimit insights into other cultures and the promotion of general learning skills. While there has been considerable effort – particularly in the countries that have recently joined the EU – to promote language learning [26] and demonstrate their support to European integration, the range of foreign languages spoken by Europeans is narrow, being limited mainly to English, French, German and Spanish.

Language learning is considered an important educational aim of citizens inside and outside the formal educational system. Practically everyone in Cyprus (98%) recognizes the benefits of knowing languages but the percentage of people who can actually hold a conversation in 2 languages besides the mother tongue is a mere 22% [41].

What is interesting in the field of Higher Education is that despite the conscientious efforts to promote at least the dominant European languages the number of students choosing to pursue studies in European countries other than the UK and Greece is negligible; according to Reference [4] the statistical data show that during the academic year 2006 – 2007, 37,454 Cypriot students studied at home and abroad. The number of students studying in Cyprus reached 16,266, whereas, Cypriot students studying abroad reached 21,188. These were mainly distributed to Greece (13,378), United Kingdom (5,641) and the USA (566).

IV. REASONS FOR LIMITED LANGUAGE SKILLS

What remains to be examined is whether the administration and the decision-makers in the field of Higher Education have made truly substantial efforts in promoting language learning. Reference [27] suggests that those who provide languages must also accept smaller groups with 5-10 learners and that teachers should regard this situation as an opportunity and a challenge to develop attractive programmes and promote multilingualism. In the private sector of Higher Education in Cyprus, programme coordinators would be extremely reluctant in permitting sections with few registered students to run, due to extensive costs. Even in cases where several languages are offered there is lack of coordination both in the sense that teachers know little about the languages the learners are concurrently learning and also in the limited communication between teachers teaching different languages. Reference [27] further suggests curricular plurilingualism, “a coordinated activity in which courses supplement and build upon each other” [45]; such views and practices are if not absent at an embryonic stage in the field of language learning in Higher Education in Cyprus.

V. LANGUAGE LEARNING CONTEXT

The context that languages are acquired and used has a bearing on the acquisition outcomes. The circumstances in the contexts of acquisition vary considerably from one country to another in terms of “teacher/students ratios, teacher preparation, intensity (hours per week), accommodation, technological back-up, availability of teaching materials, the relative importance of learning the foreign language and so on” [8:48]. Research carried out in other European countries showed that language learning depends on a significant degree in grammatical and syntactical rules, neglecting the development of communicative competence [22]. Exposure to a new language entails a change in the conceptual framework through which the learner views the world, which may prove to be a more challenging undertaking than grammatical and syntactic restructuring.

Very often in language learning the use of the mother tongue or other languages has been consciously prohibited in the classroom, in an effort to force students to use the target language as much as possible. This has restricted though the development of metalinguistic awareness in students. Metalinguistic awareness is the ability to transfer linguistic knowledge and skills across languages [12], [28]. Research has shown that this ability can facilitate and enhance reading and writing skills in the target language(s) [7], [24]. The knowledge of language learning awareness should be
achieved during foreign language instruction in school so it can be used later if learners want to further improve their foreign language competence after the completion of secondary education [30]. Language awareness can lead to the development of new skills which become part of the multilingual repertoire: language learning skills, language management skills and language maintenance skills [19]. Unfortunately, metalinguistic awareness has to some degree remained on the periphery of mainstream practices in language teaching and teacher education [9] though it would significantly assist the multilingual/multicultural practices sought by European developments. Similarly the development of other learning strategies, such as autonomous learning, self-direction and individual responsibility should be again promoted at the very early stages of language learning since they foster interest and motivation and make lifelong learning of languages possible [36]. The development of autonomous learning, self-direction and individual responsibility can be greatly enhanced with the use of ICT and social tools, as I specifically mention in section VIII.

An additional reason for limited language learning is the failure to join language learning with intercultural communication in the classroom. Intercultural communication is an integral part of language learning and should be receiving greater attention in language learning environments. It is suggested that, where a distinction is made between first, second and third language it is possible to speak of first, second and third cultures [39]. Interactional and pragmatic comparisons and contrasts can be made between languages to realize cross-cultural differences in the situations of requests and demands, to express agreement disagreement, in academic texts etc [39]. Situations that are dealt linguistically differently in the target language should be made explicit to learners, to enhance the sensitivity of the learners to cultural differences but also to promote conceptual and metaphorical competence. In addition, a great deal of intercultural training could be potentially a skill absent from many teachers studies or experience; this is another factor that makes intercultural communication but to satisfy instrumental motives.

Research has shown that adult language learners begin relying on their ability to analogize, systematize, and regularize the target language data to which they are exposed immediately upon beginning to learn a new language. Because of their lack of familiarity with the new linguistic system, however, they also rely extensively on their native languages for support. With increased proficiency in the target language, they rely proportionately less frequently on their native language grammar, and rely more frequently on their ever-increasing knowledge of the target language, coping directly with it and overgeneralizing its rules. Since student errors are inevitable, regardless of the mode of instruction or the teaching materials employed, a remedial approach involving review, contrast, and re-review seems necessary. It is with students who have already learned some of the target language that this approach can be most profitably undertaken in order to re-acquaint the students with the intricacies of the target language grammar and to help them learn to use the target language rules which they have already mastered in an appropriate way.

Adults can take advantage of their ability to learn and consciously implement learning strategies which “contribute to all parts of the learning-acquisition continuum” [33:4] and their understanding of language awareness and metalinguistic awareness to develop competence in a second or a third language [28]. This view is further supported by Reference [11], which suggests that teaching rules should be substituted by teaching strategies - “creative ways to negotiate the norms operating in different contexts” [26]. Adults evidently find themselves in such social circumstances that demand more complex language and expression of more complicated ideas whereas children generally lack pressure and maturity in second language learning. Furthermore, pragmatic objectives are more easily specified and implemented in the field of adult education than in the field of foreign language teaching in schools, “since in the latter interdisciplinary pedagogical objectives (personality development) play a major role along pragmatic considerations” [30:18]. Reference [18] notes that especially in the case of adult learners, it is natural to give priority to meaning and overlook certain linguistic features.

According to Reference [19] multilingual learning reaches its peak when students are in Lyceum (Upper-secondary school) and after the completion of their Higher Education studies, this knowledge begins to deteriorate. Hence, students in Higher Education have very good chances of developing their communicative competence in languages taking advantage of the learning strategies they have mastered while studying a second language at school. Adult learners can be successful in learning a second or a third language, since they show a higher degree of problem solving and metalinguistic abilities compared to younger learners [29].

The presence of metalinguistic awareness – the ability to treat language as an object – starts its development in the preschool years seems to increase in adults [28] and bilinguals learning a third language [13]. Often, the advantage of the metalinguistic awareness in adults balances out the age factor, equalizing young learners to adult language learners [28].
Finally, adults may become aware of their receptive multilingual skills and use them as a starting point for further language learning. Receptive multilingualism refers to the ability of an individual to get the general meaning when she listens to another language. This is mostly observed with languages that have a genetically close relationship such as Danish, Swedish and Norwegian [19], but it can also occur in instances when an individual is exposed to another language, because of work, migration or special interest.

Adults may also use online sources outside the classroom to enhance their language learning during their free time or while using social networking for work. The popularity of social software, such as LinkedIn, MySpace or Facebook, has led to a huge increase in the number of language-related social networking sites. It has never been easier to find a language-exchange partner and use another language in real time exchanges. An additional benefit of online social software is that language learners can register for free and can either find a partner for language practice on a one-to-one basis outside the classroom, or a teacher can set up a class exchange. However, as I mention later in section VIII, many language instructors feel reluctant in using such sites as part of or as an extension of their formal classroom practice.

VII. INTERCULTURAL LEARNING AND EUROPEAN INTEGRATION

Very often the countries of the 2004/2007 European Enlargement are accused of not being able to provide opportunities for extensive language learning to their citizens. Unlike “old” Member States whose principal language is used mainly or only within its own boundaries, like Finnish in Finland or Dutch in the Netherlands, have long fulfilled these language learning requirements. Finnish students learn-in addition to Swedish, their second official language-English and at least one further language. On the other hand, speakers of global languages, like English or Spanish, often learn at the most one foreign language [20].

European mobility and immigration increase the presence of students speaking another language apart from the national language and have pushed researchers to acknowledge necessity these new standards in education. Efforts to bridge cultural differences remotely such as with the use of technology have demonstrated weaknesses: online collaborations have implied that the cultural understandings promoted through such technology can be superficial and at times may lead to misunderstandings and disengagement [32]. Mobility, immigration and the weaknesses of using technology to overcome cultural differences have pushed for a more holistic approach.

As a result, Intercultural Education emerged to protect individuals’ rights and freedoms and enhance interaction and relationships within different linguistic and cultural groups. By definition, Intercultural Education respects, celebrates and recognizes the normality in diversity [2]. It sensitizes the learner to the idea that humans have naturally developed a range of different ways of life, customs and worldviews and that this breadth of human life enriches all of us though interaction [42], [31]. It is education that promotes equality and human rights, challenges unfair discrimination and promotes values upon which equality is built and should be integrated into postsecondary education [23].

The integration of cultural knowledge in language teaching is among the most persistent challenges for contemporary language learning and teaching. Interculturality is a dynamic concept and refers to evolving relations among cultural groups. It presupposes multiculturality and is the result of intercultural exchange and dialogue on the local, regional, national or international level [43:15]. To strengthen the democratic co-existence, education systems need to take into account the multicultural character of the wider society and be actively involved in promoting positive interaction among the different cultural groups. There are two approaches to do this, Multicultural education – which uses learning about other cultures to produce acceptance or at least tolerance between these cultures and Intercultural Education – which aims “at going beyond passive coexistence to achieve a developing and sustainable way of living together in multicultural societies through the creation of understanding of, respect for and dialogue between the different cultural groups” [43:18].

Education, “its practice, content and mode of embodied learning cannot be isolated from its social content” [6:2]. In other words, education is just a part of the wider society and one of the major cultural fields where different groups of people with particular political, economic and cultural backgrounds interact to establish what is socially acceptable. In the same light, intercultural education – which is gradually adopted in education - is not merely an addition of another element on the regular curriculum; it embraces the learning environment as whole and other dimensions relevant to education, such as school life, teacher education and training, decision making, teaching methods and learning materials. This holistic approach has led to the increased importance given by educators to intercultural competence [40].

As mentioned earlier, Intercultural communication is an integral part of language learning and should be receiving greater attention in language learning environments. It was feared some years ago that mobility and globalization would lead to the elimination of linguistic and cultural differences [27]. On the contrary, where a distinction is made between first, second and third language it is possible to speak of first, second and third cultures [39]. Interactional and pragmatic comparisons and contrasts can be made between languages to realize cross-cultural differences for situations that are dealt linguistically differently in the target language, as mentioned in section V.

Interestingly, the 2008 Annual report of the Ministry of Education in Cyprus states that “the European dimension in education is one of the basic aims of the Cyprus education [and it] is promoted interdisciplinary through the syllabi of various subjects and other school activities which aim at informing and assisting pupils so that they can acquire “European consciousness”. Therefore, schools participate in various activities, programmes and competitions such as Spring Day, The European Day of Languages, The European

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1 Intercultural Education has substituted the term Multicultural Education to a great extent. For more on this see Cushner, 1998 and Coulby, 2006.
Language learning comprises an important part of the student’s preparation for responsible citizenship in societies that are becoming increasingly multilingual and multicultural [25]. At the same time, a limitation of studies to enhance intercultural education is highlighted by Reference [3]: “With growing diversity in institutions of Higher Education and globally more studies are needed to determine how campus climates can support intercultural interaction and learning […]” [234]. This may be because great deal of intercultural training could be potentially a skill absent from many teachers’ studies or experience; this is another factor that makes intercultural education weak since as I mention in section V, both teachers and students bring their life experiences into the classroom.

In conclusion, intercultural education is a versatile notion, which implies that awareness and implementation of an intercultural educational model is not a straightforward endeavor. The European Member States have had a national history before their accession in EU and a clear account of historical process and social interactions through which their national cultures and identities have emerged. The European Union counts half a century of a political and economic history and only a decade in constructing a cultural history.

The intricacy of the relationships between language and culture were presented in the beginning of this chapter. If we accept that European citizenship is constructed through education then we need to investigate issues of identity as well. The combination of language and culture assigns people a sense of social and national identity which is a significant part of individual identity. While examining language identities, Block highlights that identity is a “complex and multi-layered construct” [8:27]. As a complicated construct, identity has been examined from specific angles by theorists and researchers [8], [38], [17]. Indeed Europe might have been better constructed had the politicians started from the idea of developing a common culture and a common approach to language rather than from the bureaucratic and economic end [1] but as things stand the notions of European identity and multilingual competence need to be simultaneously addressed with issues relating to language policy.

VIII. ICT-BASED TOOLS/SOCIAL TOOLS

The use of ICT-based tools can complement traditional face-to-face teaching and assist toward the direction of language learning and by extend toward handling issues of European integration in formal, non-formal, and informal language learning. The use of ICT may also assist in maintaining materials and resources up-to-date, particularly in certain areas of Tertiary Education such as Computer Science, Information Systems, Multimedia and the like. Internet technologies are easily accessible and students are quite motivated to use ICT tools to enhance their language learning. Research has often highlighted the benefits of using ICT in teaching and learning among which are the increase of motivation in students, the acquisition of paper-free environments, more accurate assessment methods and increased student autonomy [34], [35]. New technologies allow for increased learner control, which is necessary particularly in relation to life-long learning.

When interacting with ICT or Social software, language learners spend time thinking about their own language learning, in other words by exploiting their own egocentric curiosity. If language instructors begin by helping their students identify who they are as language learners, they might start thinking about language learning rather than just trying to learn the language. This can assist the development of communicative competence and language awareness, as I discuss in section VI.

However, there are some problems with further implementation of ICT and Social Tools in the language learning environment. The basic problem is that pedagogical applications do not keep up with and are not integrated into technological innovation and change [16]. There is a "lack of symbiosis" between commercial players in the fields of telecommunications and broadcast media who recognize the value and potential of ICT and educators [16:7-8].

Many projects relating to the use of ICT have been granted considerable logistical and financial resources because of the perception that, as Reference [14] it, “technology should be able to afford the learner more appropriately individualized instruction than what can be achieved through classroom learning” [78]. But, and this is crucial, "should be able to" does not necessarily entail "actually does" [10]. In other words, ICT has the potential to improve the language learning situation, but this needs careful thought in each case as there is no essential link with improved learning [10]. The need of strengthening awareness in relation to ICT tools and the need for professional in-service training has been recommended in many occasions to assist in the incorporation of ICT tools in language learning environments [16].

IX. CONCLUSION

Further language learning, as it has been so far promoted in Cyprus, offers limited opportunities to learn additional European languages and communicative competence in language learning seems impossible to meet. Many reasons may be accountable among which poor attitudes to language learning, limited learning environments and limited teacher training. Identifying weaknesses at the local level can shed more light on finding appropriate solutions that can make the +2 European language policy a reality, rather than a remote target. Further research needs to be carried out to identify solutions promoting further language learning in Higher Education in Cyprus. ICT and social software offer extensive possibilities in making language learning more effective. However, many language professionals are still reluctant to
use ICT due to lack of awareness for the usefulness of such tools and lack of knowledge in using ICT resources. Decision makers should inform themselves on the complementary relationships between the use of ICT in Tertiary Education, the development of communicative competence and linguistic awareness in students and further promote the implementation of ICT tools which can greatly assist in achieving the +2 languages goal in Higher Education in Cyprus.

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A smooth sea never made a good…avatar

Nikos Pomonis, Manolis Pomonis

Abstract—SimSafety project implementation at two schools of Patras, namely at a sixth and a fifth grade class, is being presented. The two teachers who were responsible for project implementation in these classes share their opinion on the experience they and their students had during the application.

Index Terms — Safe navigation, web application, learning by playing, e-learning.

I. INTRODUCTION

The SimSafety Project addresses Internet Safety issues through sessions either in the school or in the family environment and aims at teaching students how to safely navigate the web. The SimSafety project implementation presented in this paper took place in Patras, in two Primary schools with pupils aged 11 and 12 years and was completed in three phases from May 20 to June 10, 2010.

II. THE PROJECT – AIM AND OBJECTIVES

The overall aim of the project is to help students develop concepts, knowledge and skills that will help them use the Internet safely. This can be achieved by playing in a virtual environment and through participation in role-playing games that will not to be perceived as a regular, conventional, school taught subject but as entertainment.

A. Specific Objectives

Exposing students to “controlled” internet risks in a safe way virtual online environment.

Gaining experiences through staged educational scenarios to realize the internet dangers without running its risks.

Improving pupils knowledge and understanding of the Internet use by adopting rules, keeping scores and gaining awards, to ensure the stimulus of competition and the resumption of games with increasing difficulty.

Overcoming the digital divide generations (parent - child, teacher - student).

Supporting and facilitating communication and collaboration between students from different countries through their participation in the game [1].

III. THE EXAMPLE OF TWO PRIMARY SCHOOLS

A. 48th Primary School of Patras (Teacher: Nikos Pomonis)

SimSafety was implemented with the participation of 13 boys and 8 girls from the fifth grade, from 20 May to 10 June 2010. The whole venture was not a new experience for the teacher, since three months earlier he and his family had participated in another project similar to SimSafety, the InetRisks Project2. For the purposes of the InetRisks Second Life was used and all participants were involved in open activities with the aim of investigating pre-existing internet-related attitudes and how they may be effected or altered through participants’ exposure to specific Internet activities and tasks. This had been an impressive but also intimidating experience. Parents involved in the project who were also teachers at the same time, had to watch the reactions of their children during and after each session, but also reflect on their own responses in relation to the children. Therefore, the SimSafety project came as an add on to this experience, but what came as a positive surprise to the author was through the mature and responsible reaction of his pupils to SimSafety activities.

As a teacher of gymnastics, Nikos Pomonis is used to having his students running, moving, playing in the yard, and therefore asking students to remain in the computer lab this time to deal with something else was expected to come as a disappointment to them. However, this was not the case SimSafety, since it involved simulation and role playing, and pupils found themselves to be familiar with the concept of game rules and were keen on following them, unlike the regular classroom rules.

Collaboration is generally applicable in the course of physical education. A class of pupils is commonly divided into smaller groups, mainly to save time, but also competition purposes. Competition is a fundamental principle in sports acting as an extra incentive to achieve goals (win, perform better, etc.). In the case of SimSafety, a collaborative model was also adopted, since the computers in the computer labs were few compared to the number of students. One student was active each time taking turns, while others were helping where needed. The children were divided into three groups so that all pupils would have the chance to be involved in one of the educational scenarios implemented in the classroom.

The reaction of students was more than impressive. They immediately adjusted to the conditions, showed familiarity with the use of a computer, quickly learned how to handle the

2 http://www.inetrisks.net
avatar, but the fact that it was a few computers compared with children who participated had a negative effect, because they had not sufficient time to deal with the subject, particularly at school because at home they played with SimSafety almost every day. On the first day of the implementation, when the project developers came to provide guidelines, children had many questions and detailed views which impressed the teacher and gave him the opportunity to see other aspects of their personality.

The teacher would particularly like to focus on one of the students, who was visiting SimSafety every day from her home and had been playing all the scenarios over and over again. The fact that she had been asking about things that she had seen on-line, and most importantly, helped all of her classmates during the activity, promoting her to the role of the co-facilitator along with the teacher during the classroom implementation indicated that SimSafety is an environment that could initiate interesting discussions around internet safety issues, challenge a student into re-visiting and participating in educational activities ever and over again, promote certain skills and attitudes.

A memorable instance took place during the first day of the implementation, when children asked several questions to the developers, expressing their views about internet safety, while their approach revealed that they were keen to try something new and different in comparison to what they had been doing at school up to that day.

An awkward moment was each time the children were getting tired because they didn't all have a computer to play with. Another awkward moment was the participation of an autistic child, which plays computer games many hours a day (by the way, he is good too) and would do exceptionally well in SimSafety. Unfortunately he was not able to discipline to the key rules of proper Internet behavior when playing with his classmates and was finally advised to focus on another activity.

As stated above the class that participated in the program had more boys than girls, many hyperactive, deprived of the game and the fact that many waited until it was their turn to play has been a serious inhibitor. Technical problems in implementation - avatars appeared with great delay and sometimes not shown at all - availability of few computers, a small room, power failure during the second session were the main drawbacks of the implementation.

B. 60th Primary School of Patras (Teacher: Manolis Pomonis)

Even though sixth grade students are already familiar with several online applications, such as social networking sites or multiplayer games and the teacher is experienced in teaching with ICT, the activities of this project, especially the role playing part, was something new for him and his students.

The implementations of SimSafety took place in the computer labs of the school which also serves as the library and reading room of the school. The students were sitting in groups of three or four in front of a computer, as happens in the daily lesson, using a mix of teamwork and teacher-oriented instruction. However, for the purposes of the implementation, the project teams worked in a better manner, since all members had an active presence typing or reading the instructions or discussing the way forward.

The presence of the teacher who will give guidance regarding the activities carried out by the student in the game environment, is as useful as the presence of the teacher in the regular classroom. In the first case, the teacher presence is not necessary at all times, however in formal education the teacher is much more needed, as the initiative of the pupil is reduced.

Cognitive learning theories are directly applicable to the project, providing to the students opportunities to act in environments simulating real life situations making it possible to build knowledge based on existing cognitive structures [2]. Students usually have daily tasks related to what is taught in the classroom, to be completed every afternoon at home. This kind of homework is considered mandatory and is not completed with pleasure. On the other hand, when playing with SimSafety at home, they could act and implement certain applications with pleasure, without feeling that they were obliged to do so. The teacher could be at the same virtual environment and participate in an educational process with them.

In class, pupils act according to certain rules that are mostly imposed by the teacher without any prior discussion and agreement with students. When playing in SimSafety, students were pleased that they were able to create a character that was always representing their virtual self. So the students felt free of any rules or obligations even though the rules were still there, and were perceived very seriously by them for the success of the game.

As we mentioned earlier, the implementation took place with Sixth grade students of the teacher’s class and they were receptive to new technologies, since many of them were experienced computer users considering their age. It was a very interesting experience both for me and the students and they would gladly repeat it.

When students were asked about their participation in an ICT program and specifically a web application in a playful form, they had a very positive response and showed their enthusiasm. During the implementation of the project, all students were involved and any grievances expressed were related to the technological infrastructure of the school laboratory, namely the ratio users per computer seat and the slow Internet connection.

It is worth saying that some students had already installed the application and tried to create a user account before they were even informed about the existence of SimSafety. So when SimSafety was presented in class and the teacher wrote the SimSafety web address on board and let them know they could play from their houses, several students appeared the next day and had already installed the required software.

During the next session, the teacher realized that his presence was almost unnecessary. The classroom was quiet and when he checked the screens of the students, he was pleased and surprised to notice that all groups of students were comfortable in the game environment. In addition, the
chat box was filled with words drawn by the students, participating actively in all phases of activity.

The teacher clearly recalls of a student who, when informed about the pregnancy of another player-member of the project team- appearing as another avatar in SimSafety at the time, she was impressed, asked for more information about her and sent her wishes using the text chat not confusing virtual to real life. However, this has not always been the case.

In other cases, the two teams playing could not communicate with each other and proceed with the activities, but this was mainly due to serious network problems at the time.

IV. CONCLUSIONS - DISCUSSION
The preliminary results of the implementations of SimSafety are promising from the point of view of the classroom teacher.

The children responded and enjoyed the activities since they were designed in a playful manner.

Extensive discussions in the classroom indicated that the pupils realized that while surfing the internet, they may be faced with dangers beyond what they had experienced or known directly or indirectly, up to that day. By the end of the initial phase of the implementation of SimSafety, pupils of the 48th Primary school could recall and stated that they could now understand a certain phrase their teacher had said in the classroom when presenting SimSafety: “For young children, surfing the Internet without realizing the risks and taking precautions equals to walking in ‘Omonia’, the central and of ill repute square of Athens, alone at night”.

Students playing SimSafety not only have they learned to avoid the pitfalls that can occur when surfing the Internet, but also expressed opinions and thoughts and this is one of the challenges of this educational process.

The activity that impressed pupils the most and got them thinking was the one concerning the issue of publishing other people’s personal pictures without their permission. They now state being more cautious when uploading a picture on the internet (e.g. they try to hid their identity by posting photos which show half their faces or are taken from such an angle that does not make them identifiable).

Through the activity about individual property rights and about “stealing” online foreign property or exchanging foreign digital files illegally (e.g. movies, songs etc), pupils stated that they can now understand the meaning of the phrase: “Piracy kills music” that is being extensively advertised these days. They are now interested in finding out if and how they can download their favorite song or movie paying a lower fee, if possible, than actually buying the CD or the DVD.

So far, pupils do not seem to be eager to have their parents playing SimSafety with them at home or realizing that the ‘safety’ they feel at home, in their room, with their doors locked, has nothing to do with the ‘open window’ of the unsupervised internet use. Since the initial phase of the implementation has taken place at school, they consider this to be a school-related activity independent of what they normally would do with their parents at, whereas they stated that “they are now already aware of the internet dangers without the support of their parents” as well as that “when they are at home, they feel already safe”.

Furthermore, what the pupils say they want from their parents is ‘their trust’. They want their parents to stop underestimating the time they spend in front of the computer, watch them confront internet dangers successfully and be there if and when they need them in case of an emergency.

On the other hand, from a technical point of view and similarly to any other project that makes use of existing school infrastructure, both teachers and pupils state that it would be better to have a sufficient number of computers in the lab so that two or more children do not have to use the same computer simultaneously whereas decent internet speed is also mentioned as a key factor to the success of such projects.

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Using the TIPS platform to train Greek cultural mediators

Konstantina N. Polymeropoulou and Achilles D. Kameas

Abstract—In this paper, we shall discuss the role of Cultural Mediators and their qualifications and training needs, and then we shall present the a distant training course that we developed as part of the LdV TIPS project. The course employed the T-learning methodology and involved three technological platforms, namely Internet, mobile phones and IPTV, in order to ensure continuous availability and timely deployment of the course content. Finally, we shall present an assessment of the course based on the personal testimonies and the evaluation results of the TIPS Greek Class.

Index Terms — Cultural mediators, Internet, IPTV, Lifelong learning, T-learning methodology

I. INTRODUCTION

More and more European countries are becoming multicultural due to several socio-economic factors as their non homogeneous population is growing through the immigration phenomenon and the globalization. In the frame of the "European Year of Intercultural Dialogue" (year 2008), the cultural mediators are indicated as the most important players in the integration of the immigrants. ”Cultural mediators are involved in all welcoming services for immigrants, refugees and human traffic victims. Social workers require valuable, updated training especially applicable in everyday work-related activities [1].”

A professional cultural mediator acts as a facilitator aiming to enhance the communication and to establish a common understanding between the immigrants / refugees and the public bodies of the hosting country. Cultural mediators have a significant position and can be helpful in many important fields such as health, education, employment, legal rights etc [2]. They support foreign citizens and their families, providing them with information and professional consultancy in order to adapt better and even become integrated in the hosting country. The main skills and competences of cultural mediators are communication, empathy, active listening and knowledge either of the native country or the host country (culture, laws, traditions…) [3].

The need to develop a non-traditional approach to enhancing cultural mediators’ education has risen because of the requirement to constantly provide information and support to the immigrants, overcoming constrains of time and space. In this context, the TIPS project (T-learning to Improve Professional Skills for intercultural dialogue), co-financed by the EU Leonardo da Vinci Programme, developed a blended T-learning methodology by integrating a triple technology platform consisting of e-learning (Internet), M-learning (PDA & Smartphones) and TV-learning (IPTV) [4]. These three tools have been used in order to maximize the effectiveness and the efficiency of the cultural mediators’ education. Five countries participated in the project (Italy, Greece, France, Austria and Poland, which ran for twenty four months, between 01/11/2007 and 31/10/2009.

The main aim of the TIPS project was to develop and test an online training course using the T-learning methodology, addressing social workers and potential cultural mediators and aiming to advance their skills and capabilities required for cooperating with immigrants.

In spite the fact that the Greek social sciences have a strong knowledge base to practice the cultural mediation, the profession of cultural mediation appeared to be not so much developed and recognizable not only to a wide public but also to the public immigration institutions [2]. The terminology “cultural mediator” became more familiar in Greece through the participation of Greek organizations in several European projects (such as Community Initiative EQUAL) about cultural mediation [2, 5].

In this paper, we shall firstly present the TIPS project, the TIPS course content, and the T-learning methodology. Then, we shall focus on the progress of the Greek students and present the results of the evaluation study we conducted at the conclusion of the TIPS course.

II. THE T-LEARNING METHODOLOGY

The TIPS system combines three different educational platforms, in order to maximize the benefits of distance learning tools: the e-learning platform, the M-learning platform and the IPTV-learning platform (see Fig. 1).

Through the e-learning platform the participant is able to view multimedia training content and also to attend virtual classrooms, participate in a discussion forum and interact with other students and/or the tutors. Also, it is feasible to download the didactic material and exchange information and knowledge. The above educational procedure is realized by accessing the Internet via a personal computer.

The M-learning platform provides access to the training course contents anytime anywhere through a mobile phone or...
PDA. This platform supports a “learning-by-doing” approach integrated with “learning in the workplace”. The educational material that is being developed for the IPTV–learning platform is presented via television in high quality images, audio and movies that can be controlled using a simple remote control [6].

Fig. 1. T-learning methodology, a triple methodology which integrates e-Learning, M-Learning and IPTV Learning

III. TIPS Course

The TIPS online distant training Course titled “Practicing and Enhancing Cultural Mediation in a Pluralistic Europe” officially started on March 2009, with the delivery of the first module and ended on August 2009. Different course contents structured as “Learning Objects” were designed and developed for each platform based on their technical capabilities.

The TIPS training Course appealed not only to the people who were already working as professional cultural mediators and require up-to-date training, but also to those prospective cultural mediators, who needed to enhance their knowledge and skills. It was realized as a pilot course in the field of Cultural Mediation that made use of novel training methods supported through the three different platforms, E-learning platform, M-learning platform and IPTV-learning platform.

The TIPS e-learning platform is hosted in a restricted area in the TIPS website at www.forcom.it/tipsproject. It presents to the learner with a menu listing the services available, which include communication tools, the training agenda, announcements, documents, links and access to the e-course contents (see Fig. 2).

Fig. 2. E-Learning platform home page of the TIPS Course

The mobile learning platform offers different didactic material and communication tools, such as the TIPS phrasebook, which contains the most important phrases and expressions related to cultural mediation translated in fourteen languages, and the TIPS glossary, which provides specific professional terminology. In addition, there are mobile learning pills (short videos that can be viewed in a mobile phone or PDA) and multimedia objects composed of images, audio and text. There is a chat area and a telephone directory which contains a list with all course participants’ phone numbers (see Fig. 3). Moreover, the M–learning platform offers an e-book that provides information about several migrant countries, cultures and traditions. The M-learning platform is accessible at http://77.238.3.46/claroing/mobile/.

Fig. 3. The M-learning platform home page

The third platform is the TV–learning platform on IPTV. To access the IPTV–learning platform, a TV set has to be connected to the Internet via a set top box (see Fig. 4). By using the remote control, different course module videos can be selected, featuring case studies and interviews concerning cultural mediation. The e-book is also available on this platform.

Fig. 4. IPTV-learning platform using the AminET 125 Set Top Box, http://www.aminocom.com/products/ispth/aminte125.html

Five training modules were developed in the framework of the TIPS Course (see Fig. 5):

Module I:

Introduction to the TIPS course

The first module gives practical information on how to use the three platforms.

The Learning objects for module I include: three (3) mobile learning pills, three (3) audio lessons, three (3) lectures notes and documents and links.

Module II:

Cultural Mediation: A Professional Profile

The second module includes: three (3) mobile learning pills, one (1) IPTV video, four (4) audio lessons and four (4) quizzes, two (2) lecture notes and documents and links.

Module III:

The Psychology of Cultural Mediation
The third module, “The Psychology of Cultural Mediation”, provides an in-depth look into the psychology and theories behind interpersonal communication and intercultural mediation [7]. The Learning Objects for this module include: one (1) mobile learning pill, two (2) IPTV videos, eight (8) audio lessons and seven (7) quizzes, eight (8) lecture notes and documents and links.

Module IV: National and European Legislation

The fourth module, “National and European Legislation”, presents a general overview of European and national legislation in France, Italy, Poland, Greece and Austria, focusing on specific legal aspects and procedures essential to cultural mediation such as: registration procedures, work permits and social security [7]. The Learning Objects for this module include: one (1) mobile learning pill seven (7) audio lessons and six (6) quizzes and nine (9) lecture notes.

Module V: Cultural Mediation: Fields of Application

The fifth module, “Cultural Mediation: Fields of Application”, explores the world of legal and illegal migrants encompassing their human rights, welfare, access to social housing, education, healthcare and employment. The module demonstrates the role of cultural mediation in these different fields of application in order to facilitate the integration of migrants into their host country [7]. The Learning Objects for this module include: six (6) mobile learning pills, two (2) IPTV videos, two (2) audio lessons and two (2) quizzes, two (2) lecture notes and documents and links.

All partners collaborated in the development and evaluation of the Learning Objects, under the coordination of the Hellenic Open University group [8]. As an example, we are going to analyze the structure and the content of the second module. The aim of this particular module was describe the profile of cultural mediator, the main characteristics and six main principles of cultural mediation. Furthermore, the second module explained the meaning of intercultural dialogue and presented the way stereotypes and prejudices usually effect on modern societies. The contents of the module were developed by Dr. George Mavrommatis (see Fig. 6).

In addition, a video case study entitled as "Why Does a Cultural Mediator has to be neutral and impartial" was created. It was a seven minute interview with a cultural mediator who analyzes the profile of cultural mediator from her point of view. The trainee should answer to four questions based on the previous interview through the TV platform.

IV. TIPS Training

A specific selection process of the participants in the pilot phase of the TIPS course was realized in every participating
country. In the end, the training course was offered to one hundred participants from all the partner countries (see Fig. 7).

In Greece, more than fifty people were interested in participating in the TIPS course and submitted their CVs and pre-enrolment forms; finally twenty five of them were selected and enrolled. It is important to note that applications came from all over the country, as well as from countries other than Greece, including Germany, Italy and Finland.

Apart from the weighted criteria specified by the consortium, other selection criteria included: professional experience, background /degree, current occupation and working environment [9]. The selected course participants were given a training schedule describing the sequence of study of the five course modules. Within each module, they could design their own schedule of accessing its Learning Objects. At the end of each module, they had to attend from a distance one Virtual Classroom using the TIPS e-learning platform. During the VC, the trainees had the opportunity to virtually meet the national tutor, who was responsible for compiling and delivering the module, and discuss with him and the other students on topics related to the module contents.

Course students could log on the e-learning platform or IPTV-learning platform from their own premises, or from one of the TIPS Centres that each partner had set up. Each TIPS Centre was equipped with an IPTV, a mobile phone for the m-learning platform and PCs with ADSL Internet connection.

A. The Greek group

In Greece, we set up three TIPS Centres dispersed in three cities in the country, namely Patras, Athens and Rethimno, so as to facilitate access of all TIPS trainees. The Greek class included twenty one people from all around Greece, one from Albania, one from Romania and two from Lebanon (see Fig. 8) [9].

The concept of the TIPS course attracted people with different background and experience. More specifically, nineteen (19) working professionals were motivated to take part to this educational course, from which seventeen (17) were female and two (2) male (average age thirtyseven). Also, six (6) students who were studying social work, education, adult education, Greek and Arabic literature, theology, attended the course from which five (5) of them were female and one (1) male (average age twenty nine) (see Fig. 9).

It is a fact that more and more people nowadays become familiarized with the Internet due to its daily usage. But does this apply to the other two technologies that TIPS project supports? A question that emerged was whether the Greek trainees - who were not experts in the field of technology - would welcome the educational use of the other two tools (mobile phone and IPTV). In the end, the system recorded three (3) inactive participants and twenty two (22) active trainees out of twenty five. In other words, a percentage of 88% of the Greek Class (as of June 30, 2009) chose to access firstly the e-learning platform, then the mobile platform and last the IPTV platform (see Fig. 10). The Greek Class also attended five VCs using the e-learning platform.

B. Evaluation Results

The methodology that was used in order to accumulate all the valuable personal testimonies - the negative and positive aspects - of the course participants included evaluation questionnaires, interviews and roundtable discussions. As far as the roundtables are concerned, three meetings with the TIPS course trainees were organized during July and August 2009, in Patras, Athens and Rethimno, in order to discuss the students’ experience with the TIPS course. The following summarize the opinions, ideas and proposals about future
activities that Greek trainees shared with the Greek project team at the Hellenic Open University.

Generally, the content of the course was considered to be interesting and important enough for the trainees, who up to that point, were working as Cultural Mediators based mainly on their personal experience with immigration. The course, discussing in detail the characteristics and needs of the Cultural Mediator, gave them a different perspective on how the Cultural Mediator can deal with various cases that have a strong multicultural dimension. All trainees considered that their participation to the TIPS course gave them significant professional advantage, because Cultural Mediation is steadily emerging as a brand new field in Greece. The parallel usage of three technological platforms constituted a very useful and effective tool for Cultural Mediators. Trainees found the modules on communication and legislation to be both interesting and informative. In general, the TIPS course helped them acquire theoretical information on European legislation and immigration, enhance their communication skills and improve a positive collaboration with immigrants.

The trainees now believe that they can function as multipliers of this special knowledge in their work and social environment thanks to the TIPS course material. Trainees faced some difficulties in using the technology, especially the IPTV and mobile phone platforms. The cost of a 3G mobile connection was high and did not justify the benefits received from the content delivered by the M-platform. Moreover, some of them had problems in studying and understanding the educational content, because all the material and the virtual classes were in English. The time allocated for studying the modules was short, given the busy schedule of the trainees. The use of the triple platform was short, given the busy schedule of the trainees (almost all of them were professionals) and the large volume of the educational material especially that contained in module 3.

Concerning the IPTV videos, some of the trainees found the quality of the picture and the sound low. They also suggested that more videos should be included in each module, as they were considered to be helpful in memorizing and understanding the theory and the relevant content. Despite the technical problems, the trainees were active and enthusiastic about taking the course. During our meetings, they came up with various suggestions:

“The content of the fourth educational module should be continuously updated and complemented, so as to present the legislation more accurately and concisely.”

“Module 5 should be expanded to include culture (art, activities, sports, exploitation of free time, workshops of creative employment etc).”

“The TIPS web site should also be preserved and updated after the official end of the course, so as to function as a forum/point of contact of people who have an interest in Cultural Mediation.”

“The TIPS training approach could also be applied to other target groups, apart from cultural mediators, because cultural mediation is a process of resolution of conflict in the modern multicultural societies.”

“The IPTV platform should be enriched with more material and also be accessible from the Internet.” [10]

After the realization of the course, Hellenic Open University issued seventeen (17) certificates of attendance to the Greek class who completed at least a minimum of 30% of the Learning Objects. The 68% of the Greek Class managed to use the triple platform in a satisfactory level. Most of them have never used the mobile telephone and television for educational purposes. It was reported that the three dimensional educational activity was very interesting and worth trying.

V. CONCLUSION

Through a fruitful and constructive collaboration among the TIPS partnership, a significant project has been realized which has delivered interesting outcomes. The efforts of the trainees have greatly attributed to a successful experimentation and provided valuable results for the TIPS project. The T-learning methodology that was applied in the TIPS project has enhanced the combination of theory and practice, synchronous and asynchronous, autonomous and collaborative learning. It realized a pilot training Course at a European level, combining three novel and powerful technologies: Internet, mobile phones and IPTV. It is important to mention that the Greek class showed active participation and attendance.

Cultural Mediators will always need to improve their capabilities and competences. The TIPS project demonstrated the capabilities that technology can offer and is susceptible to future improvements not only for Cultural mediation but also for other social, scientific, or cultural domains.

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Design Guidelines for Location-based Mobile Games for Learning

Carmelo Ardito, Christos Sintoris, Dimitrios Raptis, Nikoleta Yiannoutsou, Nikolaos Avouris and Maria Francesca Costabile

Abstract—Today’s mobile devices, like smartphones and PDAs are often used as gaming instruments. A new genre that is rapidly proliferating is that of location based games, that use the positioning capabilities of the devices and other available locative media in the game. These new games expand in space and time and often involve large numbers of players, like in the case of location based role playing games, alternate reality games, treasure hunts, urban adventure games etc. So the social dimension of this kind of activities is particularly important. It is often that this kind of games are used for learning objectives, both in formal and informal settings. These activities may be proven important in life-long learning, as mobile devices are personal assistants of most adults today, so they may be easily engaged in informal games of this nature with learning potential. Design of such applications is a complex task. In this article we present an overview of the field and then discuss the process for developing design guidelines of future generation of location-based mobile games for learning. The guidelines are outlined in the final part of the paper.

Index Terms—About four key words or phrases in alphabetical order, separated by commas.

I. INTRODUCTION

Recent years have witnessed an explosion in the number of creative new games that are facilitated by mobile devices in such a way that the game activity evolves according to players’ location. The term used to describe such games is “mobile location-based games”, while alternative terms are pervasive games and locative games. Their proliferation is due to the widespread use of mobile devices, like smartphones and PDAs, with advanced location sensing capabilities, for example GPS satellite positioning. These games can be compelling for young players as well as adults [12]. A typical example of such games is “urban games” or ”street games” that are typically multi-player games played out on city streets and built up urban environments. Some of mobile games transcend place and time and can be played in many diverse places and extend to long periods of time (the term used in this case is pervasive games), while others are designed to be event based, i.e to be played in specific places at specific times, like during conferences, in museums and other non-traditional game venues. While most of these games have been designed for the amusement of the players, in many occasions learning may be an implicit outcome or an explicit objective of the designers. This is particularly evident in a particular genre of such games, which is alternative city guides. These are game-like activities for exploration of interesting areas of a city, often linked through a narrative. Examples of such activities are the whaithai city guides for Venice, Rome, Milan, Firenze in Italy3, the unlike city guides4 for the city of Wien, Berlin etc., the REXplorer [18] for the city of Regensburg, in Germany etc. These are mobile games designed for tourists that guide the users through the city, asking them to interact with historical buildings and other interesting monuments, whereby historical information is conveyed in a fun way to the visitors. The role of a narrative in such setting is of particular importance as it relates and supports construction of meaning and eventually learning, as discussed in [17].

The games discussed in this paper are particularly important for life long learning in informal settings, as mobile devices are personal assistants of most adults today, so they may be easily engaged in informal games of this nature with learning potential.

The design of such games is a complex process, so there is a need for guidelines and in general support to designers. This paper reports the work performed to identify guidelines that help designers in developing games able to provide an effective learning experience using mobile devices. Such guidelines complement other proposals available in the literature that, by focusing on very specific aspects of location-sensitive mobile games, do not address more general issues. The presented contribution is a first step of a wider work aimed at deepening the many features of location-based mobile games, in order to inform the designers of such challenging applications.

The increasing importance of location-based mobile games requires the definition of design strategies in order to support designers creating games that offer an engaging experience.

3 www.whaiwhai.com
4 unlike.net
This paper contributes to this goal by presenting a set of guidelines that will assist designers of such applications.

The next section motivates the value of design guidelines for mobile games for learning, by referring to related work. The methodology that was followed for identifying the proposed guidelines, starting from the analysis of many design issues and categorizing the guidelines along five dimensions, is then described. The paper ends with the proposed list of guidelines, as a contribution for discussion by the research community and practitioners in the field.

II. MOTIVATION

The first mobile devices used in recent times were PDAs without connections to other devices and had no context-aware capabilities. By exploiting the latest technological developments, i.e. the miniaturization of computer devices, their increased processing power and the network capabilities, latest generation systems have emerged, supporting and changing drastically everyday activities. If we take as an example a museum visit, using this kind of mobile devices for playful activities, the traditional task execution of the visit is modified, the electronic guide becomes visitors’ multimedia companion, which not only provides useful information, but aims at improving the overall visitors’ experience [3, 14]. In the same domain a playful character may be added in the museum visit, by designing a mobile location-based game. Such games break from the usual static paradigm of room play, going towards a more dynamic and social experience [12].

The mobile games become learning experience when embedded in places of high information, since they create an augmented reality setting which helps people to experience better the environment. Indeed, four main characteristics contribute both to the mobile game’s appeal and to the emotional attachment that players feel [8]: (i) physical experience; (ii) mental challenge; (iii) social experience; (iv) immersion. More specifically, the physical experience pertains to what it is felt when interacting with real and tangible objects as well as with virtual elements. Furthermore, players do enjoy additional mental stimuli by having to solve riddles or tasks. Regarding social experience, these games require people to meet, socialize and combine their efforts in order to be more effective while playing. Finally, the feeling of immersion in the game setting is the main entertainment factor.

III. RELATED WORK

Proposals of game design guidelines are available in the literature. We briefly report here some of them, which complement those identified in our work. The design guidelines proposed in [6] focus on how a game can be adapted to the social environment in which it is played, while those proposed in [7] are related to the challenges of using several devices at the same time in cross-media games. In [10], a user study was conducted aiming at producing guidelines from 700 comments made by six participants; the authors derived seven guidelines that primarily cover the design implications in relation to the asynchronous nature of the considered game. Wetzel et al. produced twelve guidelines by using an approach that is partially similar to ours, i.e. by analysing three different games with the goal to identify what is needed to create good mobile location-sensitive games and what causes them to fail [16]; the twelve guidelines focus on the inclusion of 3D features in such games and very marginally consider more general game design aspects. Thus, we felt the need of further guidelines that address a more holistic view of the mobile educational games and complement what is already available in the literature.

IV. METHODOLOGY FOR IDENTIFYING THE GUIDELINES

The guidelines proposed in this paper are derived by following a systematic methodology, defined as “case study methodology” in [11]. A team of three researchers, experienced in the design of educational pervasive games but with different backgrounds, started their work by investigating three specific mobile games by analyzing published papers. Their initial goal was to identify as many issues as possible related to the design of such games. The researchers’ knowledge of the design process allowed them to reflect on their own experience, recount important details, highlight different understandings of the design practice, participate in in-depth discussions, and elaborate on issues and concerns. The following subsections describe the activities carried out by the team.

A. Papers analysis

Each one of the three researchers involved in this phase of research, was assigned the same set of six papers to analyse independently. The papers reported the design and the evaluation of three mobile location-based games: Explore! A game for visitors of an archaeological site in southern Italy [2, 5], MuseumScrabble a game for a cultural historical museum in Greece [13, 15] and Frequency 1550 a mobile game that takes place in the city of Amsterdam [9, 1]. All three games have the goal of supporting informal learning and utilise a different range of multimedia features, technologies and interaction techniques, in three different settings. Each researcher identified and reported a long list of game issues and then worked independently to clarify them and to eliminate redundancies. A total of 317 issues were reported by the three researchers.

B. Defining game issues

The researchers met to analyze the initial list of 317 items from which a final list was produced, containing 94 issues related to the design of mobile location based games with learning objectives. The process included identifying similar issues, merging related or duplicate issues, and refining of the produced list. The overall goal was to identify issues in the final list, which could be addressed by a same guideline. For instance, some of the 94 final issues were: “Competition as a
means to increase motivation”, “Competition by hampering the other teams”, “Competition for limited resources”, “Competition for limited resources to induce collaboration (negotiate roles, discuss strategy)”, “Competition for other team’s points,” “Allow competition”, “Force Competition”. These seven issues are covered by guidelines 3.4 and 5.3 in the final list.

C. Defining dimensions

It is useful to organise a set of guidelines along dimensions, in order to support designers in quickly realising important aspects related to design. The process of defining these dimensions included a separate phase, during which the three researchers organised all 94 issues in subsets addressing a certain dimension, and a consolidation phase where the final set of dimensions was defined by combining the results of the individual work. The resulting five dimensions are:

1. Game General Design, which refers to issues related to the overall game design process;
2. Control/Flexibility, which is a basic dimension of system usability and, with respect to the games considered in this paper, also refers to how helping players to be aware of the effects of their choices during game execution;
3. Engagement, which informs on how to provide an experience that captivates the players, by providing hints on how to structure the game, which tools to adopt, etc.;
4. Educational Aspects, which concerns effective integration of learning objectives into the game context, so that the game can have learning potential on the players;
5. Social Aspects, which concerns the interaction among the players, role allocation etc. (the underlying assumption is that social activity, e.g. competition, can act as a motivational factor).

D. Defining guidelines

Each of the three researchers involved was provided with a table containing the 94 game issues, organised according to the five identified dimensions. The researchers first worked individually and defined design guidelines that emerged from the issues. The guiding principle for this activity was the need to identify “a set of guidelines that could guide designers who have the task to build a mobile game of this nature, which aims at improving the learning experience of people in a specific site”.

Prior to the joint refinement process, each researcher compared the set of guidelines he identified with those of the other researchers. Finally, in a discussion and negotiation phase, they consolidated their guidelines in a unique set. As a result, 40 guidelines organized in five dimensions were defined. A table reporting this first version of dimensions and guidelines was submitted to four external interactive technologies researchers with experience in the design of educational mobile games, who commented on them. Based on the feedback of these external researchers, the final list of 36 guidelines, presented in the next section, was produced.

V. MOBILE LOCATION-BASED GAMES DESIGN LIST OF GUIDELINES

In this section the final set of 36 design guidelines, organized in 5 dimensions, that was produced by the process described in the previous section are presented. The broad dimensions, as already discussed, are the following: Game General Design, Control / Flexibility, Engagement, Learning Aspects, and Social Aspects

1) Game General Design
1.1 Exploit metaphors from real-life games, activities, stories
1.2 Minimize the changes to the physical places (e.g. modifications to the physical structure, installation of special equipment like projectors, big displays, etc.)
1.3 Create a multidisciplinary design team (including e.g. HCI, domain experts, site experts, educational experts)
1.4 Perform formative evaluations and pilot studies to check if tasks’ difficulty is appropriate for the intended players
1.5 Consider the social conventions of the place (e.g. not loud speaking in a church)
1.6 Consider to extend the game experience beyond the game session (e.g. participating in a web community)
1.7 Consider to include activities/events that are not part of the game, but happen in the real world (e.g. the ceremony of change of the guard at noon)
1.8 Consider to include a game master (e.g. tutor, supervisor, coordinator) and her role: e.g. enforcing the rules, narrating the story

2) Control / Flexibility
2.1 Let players become familiar with the equipment and the game rules/structure (e.g. by including an introductory phase)
2.2 Facilitate game learnability (i.e. tasks, rules, constraints, etc. should be easy to understand and to learn)
2.3 Player should be free to switch between different tasks
2.4 Reflect on whether to allow players to correct their mistakes: it could be useful to force them to evaluate the consequences of their actions
2.5 Provide help or hint mechanisms to assist players
2.6 Consider to provide increasing difficulty levels (either automatic adaptation or human-generated adaptation)
2.7 Prevent rule breaking by either discouraging it (e.g. with penalties) or by incorporating cheating into the game
2.8 Make clear the game goal/s (e.g. earning points, completing tasks, being the winner, etc.)
2.9 Make clear the game ending condition/s (e.g. maximum time, target score, end of resources, etc.)
2.10 Consider to provide alternative ways for performing a task or completing the game
2.11 Make clear the goal of each task and its effects on the overall game
2.12 Provide immediate feedback about task execution showing its impact on the overall game
3) **Engagement**

3.1 Consider to integrate a back-story that is at the basis of game tasks

3.2 Consider to exploit role-playing (i.e. impersonating a character) to meaningfully link tasks to the back-story (if any)

3.3 Provide contextual cues linked to specific places or events to convey additional information (e.g. sounds reproducing noises of daily activities in an ancient city)

3.4 Consider to allow players to interfere to competitors, e.g. stealing/acquiring points

3.5 Let players practice different skills by including in the game a variety of tasks, such as: perform a quest, identify/visit certain locations, shoot a picture from a specific angle, videotape a route, search for a certain object, perform a certain action/gesture, search/identify a physical mark, answer a question, collect and classifying material

3.6 Minimize the interaction with the game tools. Players’ attention should be focused on the game and the environment

3.7 Tune the level of awareness of other players’ activities (hide/provide/delay information, e.g. showing the score and the progress of the competitors)

3.8 Consider to include rewards in order to improve players’ motivation/satisfaction (e.g. providing multimedia information as a prize for a successful task); integrate rewards tightly with the game tasks and back-story; consider when to provide the rewards to the players (during/after the game)

4) **Learning Aspects**

4.1 Consider to include a pre-game activity to prepare players (e.g. some lessons in classroom explaining the historical context in which the game is set)

4.2 Game should emphasize either vertical or horizontal exploration of a place/topic, i.e. deeply exploring a limited space (or few objects or a specific topic) vs. more superficially exploring a broad space (or many objects or several topics)

4.3 Tasks should require players to link areas, locations, physical objects to concepts, topics, etc.

4.4 Balance between competition and knowledge acquisition. Too much competition may have a negative impact on knowledge acquisition

4.5 Include a debriefing phase after the game to allow players to reflect on the game experience. Design it as an individual/collaborative game/activity that supports players to clarify and consolidate the game experience

5) **Social Aspects**

5.1 Team players (if any) should be selected based on players’ social relations (e.g. friends to maximize collaboration) or according to their skills. Involve in this process a person that knows them very well (e.g. a teacher)

5.2 Assign responsibilities and tools (e.g. mobile devices, maps, etc.) among team members to induce collaboration. Consider to force, forbid or allow responsibilities exchange among team members

5.3 Consider to permit, force or neglect the competition among players/teams

VI. **Conclusions**

The guidelines proposed in this paper offer insights on the issues that are relevant when designing location-based mobile games with the objective of learning. These usually take place in information rich environments, like museums and cultural sites, places of historic value, natural or artistic interest. These guidelines were produced by following a systematic methodology. They aimed at assisting a designer in carrying out the design process and formalizing key design decisions. The identified guidelines are quite general and may be used for mobile location-based educational games independently of any specific domain.

We have performed a preliminary validation study by providing small groups of HCI students with the guidelines and requesting them to design a new mobile game or to evaluate their game design work that they had in progress. They reported that, thanks to the guidelines support, they trusted to have addressed important game design issues. More importantly, some students said that the guidelines helped them to make decisions on key points on which they were in doubt about. These first results are encouraging, but we are aware that the produced set of guidelines has to be validated and further refined, through more systematic studies by a wider community of designers To this objective we hope that this publication will serve.

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**References**


Abstract—Being able to try new and innovative things in classroom is not always safe or easy. On the other hand, experimenting with new ways of teaching, gives us a unique opportunity to make progress and develop a better learning experience for our students.

Implementing the SimSafety game in the classroom was a rather unique and interesting experience. Through the game, the students realized that the Internet is not a safe place and by actively participating in it, they developed a proper attitude and a number of skills.

The paper is divided in two parts. The first part is about the experience my students and I had while using the SimSafety game and the second part refers to an educational activity based on the “Six Thinking Hats” technique.

Index Terms—SimSafety implementation experience, educational activity based on the “Six Thinking Hats”.

I. INTRODUCTION

The SimSafety game is an online virtual environment that supports role-playing game scenarios, offered in real-time, to dynamic groups of online users. The game participants are exposed to (penalised) safety traps, which should be recognized and overcome through (accredited) appropriate game actions. Critical evaluation of information, experience acquired through observation, exchange of resources and argumentation between game players will be the successful game methodology. [1]

The implementation of the SimSafety game took place during the first two weeks of June 2010, in the schools computer laboratory. The average age of the students was 11 years old and the sample was 20 students (11 boys and 9 girls). The majority of the students had basic computer skills and basic English knowledge. The mini game scenario that we played, is about the risk of uploading a photo on the web and is called “Explosive photos”

II. STUDENTS AND TEACHERS EXPERIENCE FROM THE SIMSAFETY GAME

A. The students experience

When I first informed my students about the SimSafety project and the possibility to take part in it, they were all very enthusiastic about it. The idea of participating in a virtual online game was intriguing to them. Most of the students were asking questions about the game and its potential. They wanted to play the game as soon as possible and some of them asked if they could also play the game at home. Even the ones that were not very familiar with virtual games had a very positive attitude.

Our first attempt to play the game blew the students with feelings of anxiety, excitement and curiosity. At first, they were very excited from the environment of the game, their avatars and the things they could do such as fly, talk to each other and change the look of their avatar.

A mini game scenario that we played is the “Explosive photos”. The basic aim of this scenario is to inform the students about the risk of uploading their photos on the web. According to the scenario, the teacher assigns a role to each student and he has to play the role as best as he can. For example, role 1: Your name is Barbara and you find out that private pictures of Annabelle have been published on the web. You go and see the pictures you spread rumor to some of your co-players.

At the end of the game, the students have to make up their minds and vote whether the action of each person(role) was right or wrong. The players get positive scoring for each correct answer and negative scoring for each wrong answer.

At the beginning of the game, most of the students were confused about their roles. When they did not like what the role suggested, they would instantly change the role and express their personal beliefs. After a short conversation, they finally understood that they had to act as their role suggested...
in order to be able to play the game correctly.

Finally, when they realized that they would judge the role and not the person who performs the role, they were able to enjoy the mini game scenario.

After the game ended, the students had a rather interesting conversation about what they would do in real life circumstances. Some of them admitted that the game changed their minds and that they would be more thoughtful when it comes to uploading a photo on the web.

The only drawback was the fact that our network connection was sometimes unstable, something that lead us to start over from the beginning. At that time, the students were rather annoyed and were looking forward to start the game immediately.

At the end of the game, the students declared that it was nice to talk to others through their avatars (they felt free to speak out their minds). They also mentioned that they really enjoyed the fact that they were able to do things that in real life is impossible, such as teleport or fly. The majority of the class said that it would be far more interesting if they could do their lessons through the game.

B. The teachers experience

The idea of the Simsafety project is rather promising. I think of the Simsafety game as a challenge, as a unique opportunity to create a better learning experience for our students. To be able to give motive to a child is a very important factor that can lead to success. In our case, the motive is the game itself and the success is the fact that your class is pleasantly participating in all this.

The main advantage of the game is the fact that the students are active learners and they are actually involved in the learning process. With the help of the mini-game scenarios, we are able to transform the students from audience to actors. Such a process, gives a deeper and more meaningful experience to the students.

As mentioned above, one of the mini game scenarios that we played was the “Explosive photos”. My role as a teacher was quite different this time. I was not the one giving the information to my students. I felt more like a coordinator, a person who has to organize the whole process and let the students build their own knowledge. In fact, my students were able to understand that they should think twice before they upload a photo on the web.

Moreover, through their avatars, the students were able to express themselves in a more liberating way. In fact my students worked as a real team and even the weaker students were trying hard enough, in order to prove themselves and the others that they are actually really good players.

Throughout the game, my students developed a number of skills, such as collaboration, time-management, decision-making and critical thinking. They had to work with each other in order to be able to come to a decision and furthermore they had to express their thoughts and feelings. They also had to criticize and decide if a person’s attitude was wrong or right.

For all the reasons mentioned above, I certainly will use the Simsafety game again.

III. IMPLEMENTING THE SIX THINKING HATS TECHNIQUE IN THE GAME- AN EDUCATIONAL ACTIVITY

A. The Six Thinking Hats technique

The de Bono Hats system (also known as “Six Hats” or “Six Thinking Hats”) is a thinking tool for group discussion and individual thinking. Combined with the idea of parallel thinking, which is associated with it, it provides a means for groups to think together more effectively, and a means to plan thinking processes in a detailed and cohesive way. The method is attributed to Dr. Edward de Bono.

The Six Thinking Hats technique can be used for exploring different perspectives towards a complex situation or challenge. Seeing things in various ways is often a good idea in strategy formation or complex decision-making processes.

Each of the hats is named for a color that is mnemonically descriptive of the perspective one adopts when wearing the particular hat. [2]

Six distinct states are identified and assigned a color:

- White (Questions) - information available, facts, what is needed
- Red (Emotions) - instinctive gut reaction or statements of emotional feeling (but not any justification), feelings, intuition
- Black (Bad points judgment) - logic applied to identifying flaws or barriers, seeking mismatch, critical
- Yellow (Good points judgment) - logic applied to identifying benefits, seeking harmony
- Green (Creativity) - statements of provocation and investigation, hypotheses, new ideas
- Blue (Thinking) – control of process, thinking about thinking

Coloured hats are used as metaphors for each state. Switching to a state is symbolized by the act of putting on a coloured hat, either literally or metaphorically. All of these thinking hats help for thinking deeper. The six thinking hats indicate problems and solutions about an idea or a product you might come up with. We can use some or all of the hats in any structured sequence, depending on the nature of the issue. For example: white(facts)→green(ideas)→yellow(benefits)→black(drawbacks)→red(emotions)→blue(summarize)[2], [3]

B. Applying the Six Thinking Hats technique in the game

In the classroom, the teacher gives the students the appropriate information in order to play the game. At first, he informs the students about the subject of the game, which is social networking and its dangers. He develops a short conversation with the students about what is social networking. He explains the six thinking hats technique and mentions that during the Simsafety game they will wear hats.

The teacher reminds the students that during the game they will change hats and that they should act according to the hat
they wear. He then explains the meaning of each hat.

In the game, the teacher creates six hats in his inventory (a green, a blue, a white, a red, a black and a yellow) and shares them with the children. As the game begins, the teacher wears the blue hat and acts like the coordinator. He will ask his students to wear their hats at specific times and they will have to answer questions or express their thoughts and opinions depending on the hat they wear. For example, if they wear their red hats they have to express their feelings.

Step 1: In the game, the teacher wears the blue hat and sends his students a message, which says that the game is about to begin and everyone should wear his white hat. He sends a few questions and asks his students to write any information, facts or evidence they might have come across to. A few suitable questions to begin with are “What do you know about social networking?”, “Can you name some of the most famous networking websites?” and “What do they offer to their members?” We have to make sure that all students have given at least one answer and in the case of someone not familiar with the subject, we advise him to look up at the Wikipedia site or search the internet.

Step 2: The teacher asks the students to wear their yellow hats and express their opinions about the benefits of social networking. We remind them that now they are wearing their yellow hats and should write only about the good points of the social networking. At this point, we expect answers such as making friends, communicating across the world, instant, no cost, etc.

Step 3: It is time for the students to think about the dangers of the social networking. At this point, the teacher asks them to put on their black hats and write down possible threats and dangers when using a social networking page. Because of the significance of this part of the game, the teacher can help the students unfold their thoughts by making the right questions.

The main advantages of this technique are: it is very easy to implement into the game, it helps the students put their thoughts in a right order and it makes them realize the difference between the facts, the experience and the emotions. Furthermore, knowing that it is the hat the others may judge, not them, allows a deeper and a more meaningful conversation.

REFERENCES

An Integration Platform of Social Networking Applications to Support Life Long Learning in Rural Territories: the “SoRuraLL Virtual Learning World” Environment

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Abstract—Social networking applications can form a valuable tool towards lifelong learning, especially in rural areas where they can be used to enhance computer literacy and deal with the digital divide. In this paper we present the “SoRuraLL Virtual Learning World”, a platform that was implemented in the framework of the SoRuraLL Lifelong Learning program. The platform, which is organized per user and per user site, combines social networking and e-learning tools and targets populations in rural areas.

Index Terms—Social networking, life long learning, rural digital divide, social e-learning

I. INTRODUCTION

Social Networking Applications are opening new doors for more effective learning and have the potential to support life-long competence development [1]. In this paper we present a life long learning environment, the “SoRuraLL Virtual World”, a platform that was implemented in the framework of the SoRuraLL Lifelong Learning program.

The paper is structured as follows: section II presents Social Networks and the notion of Social Web. Section III explains how Social Networking can be used in order to enhance computer literacy, especially in rural areas and presents the SoRuraLL project. In section IV, the SoRuraLL Virtual Learning World (the platform that was implemented) is presented in detail. A description of the system and its functionalities and an evaluation of the platform are included in this section. The paper is concluded in section V.

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II. SOCIAL NETWORKS AND THE SOCIAL WEB

A social network is a social structure made up of individuals (or organizations) called “nodes”, which are tied (connected) by one or more specific types of interdependency, such as friendship, kinship, common interest, financial exchange, dislike, sexual relationships, or relationships of beliefs, knowledge or prestige.

During the last years the notion of social networks has become more popular to a wide range of web users. The main reason for this change is the development of technologies that facilitate interactive information sharing, interoperability, user-centered design and collaboration on the World Wide Web. This shift is described by the term “Web 2.0” [2]. This term is often applied to a heterogeneous mix of relatively familiar and also very emergent technologies. The former may appear as very much “Web 1.0,” and the latter may be seen as too evanescent to be relied on for serious informatics work [3]. The main difference of Web 2.0 is that users are not only content “consumers” but also content “providers”. A Web 2.0 site gives its users the free choice to interact or collaborate with each other in a social media dialogue as creators of user-generated content in a virtual community, in contrast to typical websites where users are limited to the passive viewing of content that was created for them.

Social Web has emerged as a major component of the Web 2.0 movement. The Social Web can be described as people interlinked and interacting with engaging content in a conversational and participatory manner via the Internet. Social Web is enabled by the following applications:

- **Wikis**: a wiki is a website that allows the easy creation and editing of any number of interconnected web pages via a web browser. A wiki enables communities to write documents collaboratively. A single page in a wiki website is referred to as a “wiki page”, while the entire collection of pages, which are usually well interconnected by hyperlinks, is “the wiki”. A wiki is essentially a database for creating, browsing, and searching through information. A wiki allows for non-linear, evolving,
complex and networked text, argument and interaction [4].

- **Forum**: a Web forum, or message board, is an online discussion site where people can hold conversations in the form of posted messages. They differ from chat rooms in that messages are not shown in real-time, to see new messages the forum page must be reloaded.

- **Blogs**: a blog is a website that allows users to reflect, share opinions, and discuss various topics in the form of an online journal while readers may comment on posts. Entries typically appear in reverse chronological order. Most blogs are primarily textual, although some focus on art (Art blog), photographs (photoblog), videos (video blogging), music (MP3 blog), and audio (podcasting). Microblogging is another type of blogging, featuring very short posts (e.g., Twitter.com).

- **Media Sharing**: media sharing allows digital communities to aggregate, upload, compress, host and distribute images, text, applications, videos, audio, games and new media. Popular media sharing sites are YouTube.com (video sharing), Flickr.com (photo sharing) and RapidShare.com (file sharing).

- **Social networking**: a social network service is an online service, platform, or site that focuses on building and reflecting of social networks or social relations among people, e.g., who share interests and/or activities. A social network service essentially consists of a representation of each user (often a profile), his/her social links, and a variety of additional services. Most social network services are web-based and provide means for users to interact over the internet, such as e-mail and instant messaging.

- **Folksonomy**: a folksonomy is a system of classification derived from the practice and method of collaboratively creating and managing tags to annotate and categorize content. This practice is also known as collaborative tagging, social classification, social indexing, and social tagging.

- **Messaging applications**: messaging applications allow real-time direct communication between two or more people. The form of communication may be text, voice or video based.

- **Social Bookmarking**: social bookmarking is a method for Internet users to organize, store, manage and search for bookmarks of resources online. Descriptions may be added to these bookmarks in the form of metadata, so users may understand the content of the resource without first needing to download it for themselves. Such descriptions may be free text comments, votes in favour of or against its quality, or tags that collectively or collaboratively become a folksonomy. In a social bookmarking system, users save links to web pages that they want to remember and/or share. These bookmarks are usually public, and can be saved privately, shared only with specified people or groups, shared only inside certain networks, or another combination of public and private domains. The allowed people can usually view these bookmarks chronologically, by category or tags, or via a search engine.

- **Comments**: commenting allows Web users to publish their opinion for web resources through comments. Commenting is very popular in blog posts and media sharing applications.

- **RSS**: RSS is a family of web feed formats used to publish frequently updated content such as blog entries, news headlines, audio and video in a standardized format.

III. SOCIAL NETWORKING TO ENHANCE COMPUTER LITERACY FOR RURAL CITIZENS

Information and communication technologies are becoming increasingly integral to all aspects of society. They bring to many members of society benefits such as new ways of communicating, and more comprehensive sources of information and learning [5]. As more individuals are connected online, those who are not connected are increasingly in danger for becoming more marginalized within society. World widely there is a rising concern over this “digital divide” [6][7][8]. Most countries that have been concerned about this problem have instituted policies aimed at reducing aspects of it. In reality there are several possible concrete cases of the digital divide gap occurrence [9].

The Urban/Rural divide refers to those set of people without an enhanced data capability which will lead them to be unable accessing the expected benefits. This concern is seen to be greatest in relation to those living and working in rural and remote areas since the lower rates for data access for these consumers place them at a disadvantage in comparison to metropolitan consumers. For these citizens the problems of missing infrastructures, incentives and computer literacy (the factors leading to Digital divide) are bigger and more difficult to solve. The world widely experience shows that several specialized initiatives are needed for rural areas in order to anticipate expansion of current digital divide and at the same time to provide solutions to deal with the actual problem [10].

In general, the world wide experience shows that most of the effective solutions to ensure access to technology are involving also successful training, leading to enhanced computer literacy for local citizens [11][12][13].

Social Networking applications can form a valuable tool towards the above mentioned aims. They can form a powerful tool to:

- Teach students how to be effective collaborators in that world, how to interact with people around them, how to be engaged and informed twenty-first-century citizens [14].
- Build learning communities for primary and secondary education (involving teachers, students and parents).
- Assist specialized scientific education [15]
- Provide new opportunities for training professionals [16]
- Provide new opportunities for lifelong learning initiatives [17]
- Create a new learning style of “learning by doing” [18] by providing motivation for exchange of actual practical experiences.

However, for rural citizens, in order to let them gain the benefits from the above social networking applications, it is
important to understand their lower level of computer literacy and motivation, leads to a need for a different kind of customized solutions [19]. Under this perspective, in this paper we present an Information System (the so called “SoRuraLL Virtual Learning World” –VLW-) that has been developed within the SoRuraLL (www.sorurall.eu) Lifelong Learning Program. It delivers a specialized Social Networking platform customized to the needs and specific competences of rural citizens.

The methodology to achieve the most effective design of this customized environment was as follows:

- Initially all partners of the project collaborated to exchange experiences about:
  - current needs and problems in selected rural sites in partners’ regions
  - current status in relation with use of ICT Social Networks
  - best practices and success stories from experiences inside and outside the consortium
- Based on the findings of this extended collaborative work, an initial selection of functionalities to be included in the VLW have been decided and presented to the target groups in all countries through a series of workshops (customized to the specific situation of each targeted site). The outcomes of the workshops gave the consortium the opportunity to finally select the functionalities and interface to be implemented.

This list of these selected functionalities does not include only mature ones (chosen by the selected users as of high interest) but also several ones assessed as highly useful for the selected target groups based on their specific local needs identified. This leaded to several differences comparing with the functionalities of the general scope Social Networking platforms:

- Generic and simple applications such as blogs, wikis, and forums have been chosen to be delivered separately (and not only integrated through the Social networking platform). As a result the whole environment is easily customizable by the user to use only these generic and easy to use functionalities (instead of the whole sophisticated Social networking platform)

The whole environment is also easily customizable per country. As a result the multilinguality feature will not refer to the translation of user interface but mainly to the establishment of separate portions of it, per user site. For example the targeted user site in Ireland is customizable to use only blogs, video conference and external applications (which are the functionalities needed based on target groups specific needs). Of course a main transnational portion of the whole environment also exists and all separate local portions have a common database of users.

These two levels of customization (per user and per user site) are the main innovations which have been selected (based on the initial studies and the workshops outcomes) to make the so called “SoRuraLL Virtual Learning World Environment” an Information Environment adapted to the needs and competences of rural populations.

IV. THE SORURALL VIRTUAL LEARNING WORLD

A. System overview

The Sorurall Virtual Learning World is a web based platform that integrates several Web 2.0 services. The system is implemented with open source technologies (Apache, PHP, MySQL) and platforms (Drupal, Elgg, Dokeos). The different platforms were installed, configured and modified in order to operate as a unified service. Also, additional modules were implemented for the needs of the project. As a result the end-user interacts with the system through a common interface and the existence of the three different platforms is transparent to him/her.

As mentioned in the previous section the system is organized per user and per site. The Virtual Learning World is divided to seven portals (European, Bulgarian, German, Greek, Irish, Polish and Spanish) based on users’ nationality (Figure 1). All portals have the same interface, support the same functionalities and are used for the categorization of the content per country. For example the Greek user may select to use the Greek portal while he is also able to navigate to the Polish portal as well. This allows the interaction between people from different countries and the classification of the content based on language at the same time. The system supports Single Sign On (SSO) allowing all users to use any service from any portal with a unique account.

![Figure 1. The main page of VLW](https://example.com/fig1.png)

B. Users’ types

The SoRuraLL VLW supports four users’ types:

- Platform administrator: the administrator of the SoRuraLL VLW platform has full privileges over the platform functionalities and appearance. He is able to change or customize the appearance of the system. He is able to enable or disable specific modules and services of the application. Finally, the administrator is responsible for managing the accounts of the users (enabling or disabling access).
National administrators: national administrators are responsible for managing the provided services for each country portal. For example the Greek national admin may enable or disable the services that are provided to the users of the Greek portal. As a result, the enabled services may differ between different portals.

Simple users: simple users are subscribed in the SoRuraLL platform’s database. In order to become a user of the system one has to apply, filling in the corresponding form. The platform administrator checks the application and accepts it or not. Simple users are able to navigate through the different portals and use the enabled (by the national admin) services for each one. They may also change the appearance of their homepage.

Guest users: guest users are not subscribed in the SoRuraLL platform’s database. They are unable to log into the system and use the majority of the provided services. The only services that are accessible to guest users are blogs and wikis. However, guest users are only permitted to read blog and wiki posts and they do not have the right to create new posts or leave comments.

C. System functionalities

As mentioned in a previous section, the SoRuraLL VLW system integrates three different platforms that operate as a unified service. The supported functionalities are presented per platform below.

1) Integration platform

This is the main entry-point to the integration platform, the Virtual Learning World. This part of the system is based on the open source CMS Drupal. The main platform (Figure 2) incorporates most of the functionalities of the VLW which are presented below:

- Blogs: users are able to create blog posts and also post comments on them.
- Forum: the forum allows users to exchange opinions on a variety of topics.
- Video Sharing: users may upload and share their videos or post videos from popular video sharing services like YouTube.
- Wiki: the wiki tool permits the collaborative creation of web pages.
- External Applications: this tool allows national administrators to add external links to other services and simple users to visit them.
- Instant Messaging: instant messaging allows users to exchange messages in real-time.
- Tagging: the system allows the tagging of all content that is uploaded to the platform, creating thus a taxonomic scheme. A tag cloud is included in each page of the VLW.
- Video Chat: this functionality uses an external service called Vagipe and allows the users of the VLW to start a video conversation if their computers are equipped with a microphone and a camera.
- Web Chat: web chat, comparing to instant messaging, permits the exchange of messages but not in real time. As a result the users are able to start a conversation and continue it in the future, without the need that all parties are online.
- Mobile Version: a mobile version of the VLW is available for users that are equipped with a mobile device with access to the Internet. Almost all functionalities are supported in the mobile version.

As already mentioned these functionalities can be enabled or disabled by the national admin of each portal.

2) E-Learning environment

The e-learning application, which is based on the SCORM-compliant open source software Dokeos, is a tool for enhancing Lifelong Learning through an asynchronous e-learning platform. National administrators are able to create courses in their language. For each course they can enable a set of functionalities such as learning content upload, announcements, links, students groups, chat, forum, surveys, exercises, wiki, projects etc. Each user is able to subscribe to a course and follow it.

3) Social Networking application

The Social Networking application allows users to create their own online social network by creating relationships with each other. Each user maintains his/her profile by providing personal information which is visible to his/her friends. The application supports the following functionalities:

- Friends: users are establishing mutual relationships and become friends.
- File sharing: friends are able to share files, such as photos, documents etc.
- Blogs: each user is able to create his own blog and upload blog posts that his/her friends are able to read and comment.
- Groups: groups are entities that users can join, leave and post content to. In this way, users may create communities based on common interests.
- Pages: this functionality allows users to collaboratively create a set of documents in the form of web pages.
- Bookmarks: users are able to bookmark content uploaded to the system such as status updates, files, blog posts etc. Bookmarks are organized in a list for each user, while someone can visit the bookmarks of his/her friends.
• Messages: this service allows users to exchange private messages.
• Tagging: the social networking application supports tagging of content, thus making searching and organizing data much more convenient.

D. System evaluation

The evaluation of the platform is based on usage data that are collected during the pilot usage phase (November 2009 to June 2010) with two different approaches that are presented in the two following subsections.

1) System and content data

Those data are collected directly from the database of the platform and include information such as number of users, number of blog posts, number of forum posts etc.

Tables I, II and III present the collected data.

<table>
<thead>
<tr>
<th>Language</th>
<th>Number of users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgarian</td>
<td>12</td>
</tr>
<tr>
<td>English (European Portal)</td>
<td>8</td>
</tr>
<tr>
<td>German</td>
<td>85</td>
</tr>
<tr>
<td>Greek</td>
<td>17</td>
</tr>
<tr>
<td>Irish</td>
<td>23</td>
</tr>
<tr>
<td>Polish</td>
<td>58</td>
</tr>
<tr>
<td>Spanish</td>
<td>31</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language</th>
<th>Blog posts</th>
<th>Forum posts</th>
<th>Wiki pages</th>
<th>Uploaded videos</th>
<th>Tags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgarian</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>English</td>
<td>25</td>
<td>3</td>
<td>6</td>
<td>10</td>
<td>63</td>
</tr>
<tr>
<td>German</td>
<td>53</td>
<td>1</td>
<td>5</td>
<td>-</td>
<td>166</td>
</tr>
<tr>
<td>Greek</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Irish</td>
<td>14</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>41</td>
</tr>
<tr>
<td>Polish</td>
<td>7</td>
<td>-</td>
<td>3</td>
<td>11</td>
<td>59</td>
</tr>
<tr>
<td>Spanish</td>
<td>5</td>
<td>6</td>
<td>42</td>
<td>2</td>
<td>76</td>
</tr>
</tbody>
</table>

Concerning the null values at tables II and III, as already mentioned, some services of VLV were disabled by the national administrator of the respective portal.

2) Usage data

The Google Analytics script was installed in the platform in order to collect data about the usage of the system. Our system, during the pilot period had 2158 visits from 712 unique visitors. Table IV presents the number of visits based on the origin country of the visitor.

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>122</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>65</td>
</tr>
<tr>
<td>Cyprus</td>
<td>21</td>
</tr>
<tr>
<td>Germany</td>
<td>447</td>
</tr>
<tr>
<td>Greece</td>
<td>612</td>
</tr>
<tr>
<td>Ireland</td>
<td>82</td>
</tr>
<tr>
<td>Netherlands</td>
<td>10</td>
</tr>
<tr>
<td>Poland</td>
<td>285</td>
</tr>
<tr>
<td>Spain</td>
<td>452</td>
</tr>
</tbody>
</table>

A significant number of visits origins from countries that were not participating in the pilot phase. This is because some users despite their native language live all around Europe.

V. Conclusion and further work

In this paper, the SoRuralL Virtual Learning World was presented, a web-based integration platform that was implemented combining open source technologies in order to enhance lifelong learning in rural territories. The platform incorporates social networking tools and e-learning applications and aims to deal with the digital divide, a problem that prevents rural populations from taking advantage of the new information and communication technologies. The platform was described in detail and an evaluation based on the content that was exchanged through the platform and other usage statistics was presented. Concluding, the evaluation from the pilot functioning of the system provided us with satisfying results concerning the usage of the platform. It seems that the impact of this web-based tool was positive, which is very important since users from rural areas are usually less familiar with computers. In the future we intend to perform a more thorough evaluation of the SoRuralL Virtual World platform, taking into account the users’ opinions. Moreover based on the results of this evaluation we will proceed with changes to the interface or functionality of the platform, if necessary.

REFERENCES

Social Applications for Lifelong Learning, Patra, Greece, 4-5 November 2010


Abstract— the article aims to highlight the educational potential and impact of certain social networking tools, with reference to a Network of rural schools, telecenters and educational centers, where these tools have been systemically applied. To this end there will be presented certain examples of good practice, which map all the necessary steps, the difficulties and the effort demanded to accomplish such a project in rural areas, taking into consideration the numerous technical and human constrains, identifying how these difficulties were overcome and how all involved persons went the extra mile.

Additionally there will be demonstrated the approach adopted, so as to ensure the sustainability of social networking tools within school community, the emerging scenarios of use, and the gradual familiarization of users, with the view to facilitating them in becoming independent users and thus transforming them to change agents in the rural community they live.

Index Terms— rural communities, teacher training, social inclusion, social networking tools, learning culture, language distance courses.

I. INTRODUCTION

“Social Software dates back to the 1960s and JCR Licklider’s thoughts on using networked computing to connect people, in order to boost their ability to learn” [1]. In the last decades certain Web services and products became perceived as especially connective, characterized thus as social software: blogs, wikis, podcasting, forums, social networking platforms, folksonomy and video sharing tools, etc, have lately emerged to school community, the emerging scenarios of use, and the gradual familiarization of users, with the view to facilitating them in becoming independent users and thus transforming them to change agents in the rural community they live.

II. TEACHING FRENCH TO RURAL SCHOOLS

The pupils of two primary schools, namely the primary school of Sisses in Crete, and the telecenter in Geraki, Crete had the chance to attend distance courses of the French language via Skype; this initiative was taken by Ellinogermaniki Agogi in cooperation with the Greek Open University, responsible for the organization of courses and the respective training material, available at http://elearning.ea.gr/.

Picture 1: Print screen of educational material developed within the framework of distance learning French courses

This learning material was addressing the needs of beginners and covered certain thematic areas, whereas the format used was mainly power point presentations, exercises with colorful designs and various educational games. The main idea of the platform was the creation of a repository, where teachers could upload and download educational material, share and adapt it to their needs.
The pedagogical and methodological approach was the following: the three teachers of French, attending the Master’s degree Program at that time at the Open University of Patras with their supervisor structured the curriculum, planned to be followed, its duration, and the material to be taught. Ellinogermaniki Agogi was responsible for the technical infrastructure of both trainees and trainers. A physical meeting was organized among them, which took place at the rural schools, with the view to having a personal interaction, establishing a level of familiarity, and discussing the courses’ details. Such a meeting was regarded as necessary in order to promote the idea of co-belonging in the same community to both trainers and trainees, before the beginning of the distance courses, to set the basis for the creation of a virtual community, which cannot be functional without a previous face-to-face interaction. French courses covered almost the whole school year and took place via Skype; a web camera, a set of speakers, and a microphone were placed to the rural classroom and the teachers’ location, whereas the internet connection the project offered made the accomplishment of the courses feasible.
Picture 3 (i, ii, iii, iv) depict the workflow of the course and the methodological approach followed. French courses were scheduled once a week and each one lasted 45-60 minutes. During the learning sessions teachers and students had the chance to communicate with each other, send their queries, and were assigned to certain tasks planned to be accomplished from the one week to the other. According to rural teachers’ notes their students were very excited, as they rarely have the chance to attend courses of the French language and kept asking whether such courses would be organized the following year.

Apart from Skype teachers of French used Blogs as their main offline communication tool, a sort of diary, in which they wrote down the workflow of their courses, the difficulties they faced and how they managed to sort them out.

Additionally a certain group had been created to google groups, which functioned as a collaborative repository, where all participant teachers could upload the educational they had prepared, share it and further expand it.

The learning opportunities of such schools are quite limited, due to the fact that they are located to distant and often not easily accessible areas, whereas other than English language courses are rarely offered. The French language courses broadened their educational horizons both in terms of language learning and ICT proficiency, as their main communication medium was technology.

III. VIRTUAL TOUR OF THE PRIMARY SCHOOL OF KARPATHOS TO THE CRETE@QUARIUM

The primary school of Karpathos (6 pupils and their teacher) participated in a virtual guided tour to Crete@quarrioom Thalassokosmos; located in Heraklion, in an area of 60 acres it aims to inform, educate, and raise public awareness on the wide variety of Mediterranean marine species and habitats by organising educational programmes, seminars and events. To this end a certain educational scenario was structured, according to which the navigation in the aquarium followed. Namely pupils expressed their interest and the scenario delivered depicted their preferences for certain thematic categories. The magic sea world was transmitted through the mobile camera placed in the aquarium to classroom’s laptop in Karpathos via Skype;

The young pupils “wandered” around the aquarium and had the chance to get familiarized with the biodiversity of the Mediterranean coastal zone (i.e. seahorses, anemones, octopuses, Mediterranean morays, large ham mussels, lobsters, and dozens of species from the Eastern Mediterranean and Greek waters). In the pictures above there are presented two characteristic moments of the virtual visit and the technical infrastructure used.
IV. Teachers’ Training Sessions in the Thematic Area of Organic Agriculture

Organic agriculture is very popular thematic axes among the rural teacher community. The learning scheme that was applied was the following: a teacher from the Laboratory of Natural Sciences in Crete, working himself as a teacher at the local primary school, organized a series of seminars and communicated via Skype with the teacher of the primary school of Valtesiniko, in Arkadia; the objective purpose of such a collaboration was on the one hand to raise awareness about environmental issues and bio-agro ecology, and on the other to give certain guidelines for the creation of a school organic garden; frequent email communication, instant messaging and the preparation of a certain educational material (instructions, videos, photos, etc), uploaded to the web, which was available to all trainees, made such a collaboration successful. Skype was frequently used so as to discuss any queries (how to improve the soil, choose your plants, control weeds and insects naturally), to exchange opinions on certain phases of organic cultivation, to discuss on graphs and photos depicting certain techniques and practices. The pictures above present an example of the educational material delivered, concerning the “architecture” of an organic garden, techniques for soil improvement, composting, and mulching. The interaction between these two rural schools paved the way for the cooperation of teachers, the opening of a new dialogue potential, and the creation of a virtual community. The teacher of Valtesiniko primary school had access to a great variety of informative material related to environmental consciousness (climate change, energy shortages, waste disposal, water conservation, conservation of natural resources) and had been demonstrated how to integrate this material to everyday school life; technology became the medium through which the rural teacher undertook the role of the change agent; access to environmental education and organic agriculture actively contributed to changing people's behavior to reduce human impact on the environment.

V. Teachers’ Communication through Blog and Slideshare

Blogs have become the medium of an interpersonal communication, an undefined, virtually infinite public space [2]. The selection of blogs as a medium of communication encourages users’ involvement and interactivity. While, initially, a blog may be treated by its maintainer as little more than a ‘news space’, it is not uncommon, over a period of time, for a distinctive style to emerge, in the course of writing entries and responding to feedback, that reflects the personal character of the blog’s creator. Such interaction had been actively sought, that is why blogs played a significant role as a medium of communication among bloggers, i.e. rural citizens. This has been the case of a local agent in the pilot site of Organi, advisor of Physists’ in the prefecture of Thrace. There are about 300 science teachers working in 120 different schools, most of them located in isolated and remote areas, in some cases even 300 kilometres distance (from the capital of the prefecture); till then face to face seminars had been organised on a regular basis, however that solution did not turn out to be the optimal one due two basic reasons; teachers’ schedules frequently coincided, long distance among trainees created serious logistic problems, and repetition of training sessions was consuming both in terms of time and effort.
The importance of teachers’ seminars got even more crucial given that teachers serving in remote schools are the youngest ones, who tended to be replaced on an annual basis, so in service training was more than necessary. The abovementioned parameters paved the way for the exploitation of social networking tools and their usage as training media. Under this perspective a certain blog was created, namely http://sciences-thrace.blogspot.com/, where certain material has been uploaded, the online teachers’ community exchanged opinions, and a virtual collaboration has been established.

Apart from the creation of the abovementioned blog, a series of PowerPoint presentations have been uploaded to slideshare, were all trainees have access, can download and contribute to the continuous improvement and development of educational material.

VI. LIVE EVENT THROUGH BROADCASTING: CLASSICAL MUSIC CONCERT INVOLVING THREE RURAL SITES

The creation of virtual communities among rural pilot sites is highly prioritized aiming at teachers’ training and development of new learning opportunities for young students.

Such a learning activity was the live-audience music student concert including education tasks that took place in “Melina Mercouri” Cultural Center in Kato Achaia of Dymi’s Municipality the 28th of June 2010. Two other regions of Greece joined the concert via a teleconference session, both as distant viewers and participants as well. A specially constructed web-teleconference environment allowed music students from the Municipal Conservatory of Levadia (M.C.L.) in Viotia to continue the performance of a music piece that was started by students of the Contemporary Center of Music Education in Dymi, Achaia. Members of the Geraki cultural society from the island of Crete concluded the event with “mantinades”, (traditional greeting couplets in distich form). Apart from the three-part shared environment, users from France and Germany joined the broadcast as viewers.

A special arrangement of a five part controversial work by Fr. Chopin, “Introduction and Variations on a theme by Rossini” originally for flute and piano (Brown 9, circa 1824), was adopted for four flutes with a simplified theme melody on which young students with recorders and percussions were trained. Four flute students in Levadia were also trained on the rest of the piece. In order to deal with communication details over the link, a rehearsal schedule was outlined and carried out successfully. A brief power point presentation about the 200 years international-anniversary-celebrated Fr. Chopin and the nature of the work was presented in the concert allowing students, participants, online users and live audience to enhance their knowledge towards an educational topic. The final event took place under the auspices of R.A.C.T.I. For more information please visit http://ea.gr/ep/dma/
VII. PROBLEMS AND WEAKNESSES

Equipment and hardware malfunctions can be a great detriment to the effectiveness of distance learning. When a problem occurs in a class everything comes to a standstill and the learning environment is interrupted. If there are too many instances, the entire course can be affected. For instance, if an overhead projector goes out during an instructor’s presentation, an alternate way of delivering that information can easily be found. However, if a compressed video presentation has problems, the entire class must be stopped until the problem is resolved. If the instructor goes ahead with the lesson, one site will miss out on that information [3]. In our case certain technical problems were encountered both during the language learning courses and the series of activities organized within the framework of the project. Teachers frequently mentioned internet connectivity problems, which interrupted certain sessions; on the other hand electricity problems systematically occurred due to bad weather conditions, they were not sorted out on time, which caused cancellations or postponement of scheduled activities. Although such problems are very common for distance learning courses, they are quite frustrating for all involved agents, given that the preparation of such activities is demanding both in terms of effort and time; in case of such a failure pupils and teachers are disappointed and often reluctant to retry later; this way distance learning courses demand the technical efficiency of the participants, a detailed implementation plan with a series of back up solutions in case of technical problems.

VIII. CONCLUSIONS

It turns out that the integration and pedagogical exploitation of social networking tools can contribute to the bridging of digital divide in rural communities. The experience of SoruraLL pilot sites has proved that taking the initiative for projects that involve teacher training or virtual school visits might demand both time and effort but it’s worth it. Evaluation data have demonstrated the positive results of the so far implemented activities both in terms educational impact and motivation to function as a change agent in local community.

There are definitely quite many people eager to implement ambitious ICT projects, in our case many of them are teachers, which is very optimistic itself as parameter, given that teachers can and should work as change agents in a society, especially the rural ones. However, when designing such ambitious projects and generally speaking when initiating ideas that aim to bring innovation, and change in a community, and thus bridge digital divide, the long term investment in human capital is prerequisite for sustainable development. Chantal Peyer [4] placed great importance on public policies, underlining their role to integrate the development dimension in all national strategies addressing the information society, defining thus the role of ICT not only as a communication, but also as a development enabler, enhancing greater equality, social cohesion and participation. Under this perspective there is an urgent need to reach out to rural communities, educate them on how the new technologies can open new opportunities for them and their children, and why they should care. As we try to preach the benefits of information revolution to rural communities, we need to build upon the local infrastructure, namely to design and implement (human) networks that are robust and cost effective taking each community’s specific needs, environmental and socioeconomic conditions into consideration. This task requires skilled and well-trained human resources. Given that at the time being rural communities and developing countries in general are dependent on R&D undertaken in industrialized countries, the development of local capacities is highly prioritized; the main objective is to develop and establish a certain infrastructure to rural- and frequently- isolated community that would end up becoming a Learning Hub for the development of human capital for the whole area nearby. The two primary requirements for each Learning Hub are first, to create at least one new ‘out of the box’ pilot for innovative learning, and second, to form a global network of local ‘learning activists’ to help develop, guide, and research successful models for learning. Local Learning Hubs could help communities in numerous ways, serving as public access technology/learning centers, schools, centers for community development, incubators for small technology-based businesses, sites for professional development of educators, and centers for training, intellectual and political discussion. Under this perspective certain focus should be placed in the development of human resources and training facilities widely available for the acquisition of skills, which would guarantee sustainable development of local communities. Local agents and infrastructure turn out to be the main parameters that will maximize the impact of implemented projects on a long term basis and pave the way for even more ambitious and demanding projects on a realistic base, taking into consideration the specific socioeconomic and cultural conditions of an area and being there to support all future actions.

REFERENCES

Collaborative learning: Reasons that influence the participation of students in distance education fora

Kiriakos Patriarcheas and Michalis Xenos

Abstract—The asynchronous capabilities of electronic fora allows for more thought, reflection and processing of information and provides a high level of interactivity, which encourages collaboration and influences the learning process. This paper focuses on the student participation research in distance education fora, investigating the reasons that strengthen or discourage participation.

Index Terms—distance education, electronic fora, modeling, formal languages, asynchronous discussion.

I. INTRODUCTION

A key tool that supports communication in distance education is the electronic forum or e-forum. In recent years, the Hellenic Open University (HOU) has turned to the modeling of messages in order to classify the interventions of participants in its fora into large categories in order to detect where the subject of interest of the discussion is focused. For this study the previous practical and research experience was utilized within the framework of Hellenic Open University (HOU) related to the students attitude [1, 2], as well as fora modeling as a methodology for the interpretation of messages [3].

This paper focuses in the study of the reasons that influence the participation of students in a forum, by studying the causes that strengthen or discourage participation in the HOU fora.

The structure of this article is the following: section II, presenting the related literature review, section III presenting the study’s methodological framework, section IV analyzing the data, section V with the relevant discussion and presenting the related conclusions.

II. LITERATURE REVIEW

The fact that all communication elements are made explicit in the written contributions to the discussions makes the process of collaboration more transparent [5, 6]. Jeong [7] researched the effects of response time and message content on the growth patterns of discussion threads reaching the conclusion that the debate format and use of message labels may have produced sufficient argumentative exchanges to produce high response rates.

With regard to the participation degree in fora, some claimed that it depends on the number of messages sent [8], while Benbunan-Fich & Hiltz [9] also calculated the mean number of words in a message supporting that it is positively related to the quality of that message's content. Later, several methods have been added such as “thread-length” [10] and “social network analysis” [11]. However these statistical approaches provide at best a rough analysis of the communication [12]. Similarly, Marra et al. [13] consider that the relevant research has often been limited to frequency counts and other quantitative measures.

The recording, analyzing and interpreting learners’ interactions during a NSCL (Network Supported Collaborative Learning) process is an open research issue [14]. With regard to content analysis, an important issue that is raised is the unit of analysis to be used. Some researchers consider each individual sentence as a single unit of analysis [10], while Pena-Shaff & Nicholls, [16] use the paragraph as unit of analysis. Others choose to determine the thematic unit (otherwise one “subject” or “idea”) as the unit of analysis [17-19], while another approach [20-24] is to use as unit of analysis the entire message which a student posts in the discussion at a given moment. Jarvela and Hakkinen [25] select a complete discussion. Finally, in recent years there is a multiple perspective approach, both at a micro and macro level [26], although it has not yet advanced to the practical level. An overall and detailed overview of different content analysis instruments is made by De Wever et al. [5].

Given that the choice for a unit of analysis is dependent on the context and should be well-considered, because changes to the size of this unit will affect coding decisions and comparability of outcome between different models [27] as well as that Schrire [28] refers to a dynamic approach in which data is coded more than once and the grain size of the unit of analysis is set, depending on the purpose and the research question, it was decided in this study to use as unit of analysis, the message content category (see methodological framework) because when observing the discussion threads it was discovered that there are cases of messages that may include two (and/or more) content categories, e.g. a question...
about the upcoming advisory meeting and an answer to a question related to studying the educational material.

III. METHODOLOGICAL FRAMEWORK

A. Asynchronous discussion fora in Hellenic Open University

Hellenic Open University is the eminent educational institution offering distant education in Greece. Currently has 28129 students (16763 undergraduate, 11305 post-graduate, and 61 PhD students) and 1515 teachers (30 of which are permanent and the rest are external teachers-consultants).

The structural educational unit in HOU is the course module; at this time 184 course modules are offered by HOU. At this point we should also note that a course module is equivalent to 4 semester courses in conventional Greek universities. Furthermore the academic year practically begins on October 1st and ends on July 31st (formally September 1st to August 31st). Exams on course modules are carried out in June, and repeat exams are carried out in July for students that failed in June.

During a course module, students must submit 4 written assignments (long essays on a particular subject) in the middle of months: a) November, b) January, c) February and d) April. There are also 5 three-hour advisory meetings: a) in the middle of October, b) the end of November, c) the end of January d) the beginning of March and e) the end of April. The above applies with a divergence of (+/-) 10 days, given that an advisory meeting must always take place before the submittal of a written assignment, except for the last one which is mostly related to the exams.

An important instrument supporting the educational procedure is fora, which contribute both to the studies’ organization during the course module as well as the elaboration and development of what students have already studied.

The HOU’s fora provide important help during the educational procedure. They may also contribute to the following:

1) with regard to the organization of the studies during the course module:

- to the communication between tutors and students (regularity of contacts, subject, resolution of “technical” problems etc.).
- to the organization of homework (method of use of the teaching material and the preparation of the activities, use of the literature and the other sources, timetable, encountering problems related to it et. al.)
- to the supply of information about the advisory meetings (their number, their duration, the timetables, the goals, their content and methodology applied, dealing with problems related to the ability of attending them etc.).
- to the supply of clarifications about the procedure of preparation and evaluation of the written assignments (form, method of preparation, evaluation criteria, ways to be supported by the teacher etc.).
- to inform about the procedure of final exams (students’ preparation, support by the teacher, marking criteria, method and time of exams etc.).

2) with regard to the elaboration and development of what the students have already studied, the HOU’s fora may be utilized for:

- the presentation of consolidation exercises, short suggestions, presentation of examples, methodologies, literature etc.,
- answering questions and supplying clarifications about the teaching material.
- the interconnection between what has already been studied and the next chapters and the upcoming written assignment.

At the discussion threads of each course module the teacher and all the students of the course module have the chance to participate.

With regard to computer science students, in the 16 total course modules provided by HOU, at the time this study was being conducted 6,067 discussion threads with 26,246 messages had been created since 2003 when HOU’s forum was launched.

With regard to the evolution of the use of HOU’s forum, indicatively, in course module “Introduction to Informatics” (INF10), during the last three academic years a big increase in the number of messages is noted: 842 (2005-6), 1034 (2006-7) and 1666 (2007-8), due to the increase in the number of students taking this module. Therefore the great flow of information communicated through the HOU fora, as well as previous works that explored the behaviour of students [2-4, 29-35] was the stimulus for this study.

B. Data collection

The data comprised 423 discussion threads with 3542 messages and 6694 message content categories in the framework of course module INF10 in academic years 2005-8. It is worthy to note here that a respective system was used to automate this procedure by inserting threads from discussion fora and exporting the respective strings according to modeling by using formal language.

C. Method

The methodology used was modeling at the HOU fora which uses formal language and is determined by mathematic formulas representing the messages as unit of analysis the message content category. It should be noted here that the accuracy of the language was checked through the use of specific operation examples and an algorithm was designed for syntax checking [3] and furthermore, a relevant instrument was developed to make the process automatic by supplying a knowledge based system with data [2].

More specifically:

- There are two categories of communication carriers: a) Tutors, b) Students (symbolized by \( T \) and \( E \) respectively)
• With regard to the type of messages, they are distinguished into questions and answers (symbolized by $q$ and $a$ respectively).
• as to their content, the messages are distinguished into those relating to (the respective symbols are given in brackets): i) study of educational material ($M$), ii) questions/answers for exercises – assignments ($X$), iii) presentation of sample assignments by tutors ($P$), iv) instructions ($I$), v) assignment comments, corrections ($C$), vi) student comments on assignments ($D$), vii) sending – receiving assignments ($J$), viii) sending - receiving grade marks ($G$), ix) notification of advisory meeting ($V$) and x) pointless message ($L$).
• Finally, the order in which the above symbols appear is: a) the message carrier, b) the type of message and c) the content category to which the message belongs.

According to the above, when representing a message related to a student's message, addressing a question about the study of the educational material, followed by another student’s question about the following assignment and at the end of the thread there is the reply of the teacher both for the study of the material and for the following assignment, it shall be represented as follows: $EqMEqXTaMx$ ($E$ for the student’s capacity, $q$ for the question, $M$ for referring to the study of the educational material, $X$ for the fact that the next message concerned an assignment, $T$ for the teacher’s capacity, $a$ for the fact that it is an answer, $M$ for the fact that this reply concerns the study of educational material and $X$ for the fact that the second part of the message concerns an assignment.).

As seen in the example, while for each one of the first two messages content categories $M$ and $X$ correspond respectively for the 3rd message there are two content categories: $MX$.

IV. Data Analysis

Based on the above methodology, if for each discussion thread we take into account who starts it (Tutor or Student) then it is apparent that the threads started by a tutor have more messages: 10.97 messages/thread versus 5.06 in threads started by students. This means there are approximately twice as many messages per discussion thread (table I).

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Messages/Threads</th>
<th>Messages/Threads by Tutor (B)</th>
<th>B/A</th>
</tr>
</thead>
<tbody>
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<tr>
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</tr>
<tr>
<td>D</td>
<td>9.48</td>
<td>11.24</td>
<td>1.19</td>
</tr>
<tr>
<td>J</td>
<td>7.45</td>
<td>9.82</td>
<td>1.32</td>
</tr>
<tr>
<td>F</td>
<td>7.52</td>
<td>10.33</td>
<td>1.37</td>
</tr>
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<td>M</td>
<td>7.77</td>
<td>10.00</td>
<td>1.29</td>
</tr>
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<td>7.54</td>
<td>1.05</td>
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<td>2.10</td>
</tr>
<tr>
<td>S</td>
<td>3.11</td>
<td>5.67</td>
<td>1.82</td>
</tr>
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</table>

TABLE I
THE RATIO OF MESSAGES PER DISCUSSION THREAD IN INF 10 OF HOU DURING YEARS 2005-8

<table>
<thead>
<tr>
<th>Threads that begins from the students</th>
<th>Threads</th>
<th>Messages</th>
<th>Messages/Threads</th>
</tr>
</thead>
<tbody>
<tr>
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<td>941</td>
<td>5.06</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Threads that begins from the tutors</th>
<th>Threads</th>
<th>Messages</th>
<th>Messages/Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>237</td>
<td>2601</td>
<td>10.97</td>
<td></td>
</tr>
</tbody>
</table>

TABLE II
THE RATIO OF MESSAGES/DISCUSSION THREAD IN TOTAL (A) AND IN THREADS STARTED BY THE TUTOR (B) PER MONTH

However this advantage is not linear, but a relative differentiation is observed during the academic year. Specifically, if the ratios of Messages/Threads during the academic year are taken into account, given that educational activity at HOU practically starts in October, there is a greater number of messages in threads started by the tutor during this month (table II) compared to the total number (12.37 versus 9.69), which increases in November (when the 1st written assignment in submitted - 13.73 versus 9.28), and there is a small decline in December (11.24 versus 9.48) which continues into January (9.82 versus 7.45). However, there is an increase in February (10.33 versus 7.52) and stability in March (10.00 versus 7.77). In April and May there is a clear decline; however there are still more messages in threads started by the teacher (7.54 and 8.55 versus 7.17 and 7.23). In June we see the phenomenon of the sharp increase of messages, which is due however to threads started by students (8.53 versus 9.13). In summer months there is a natural decline because of vacations.

From the above, and even by taking into account absolute numbers (table III), the academic period may be distinguished into 4 sub-periods, as to the effect of the fact that the tutor starts the discussion thread: a) high participation in the first active months (October – December), especially in the discussion threads started by the tutor, b) decline (January – March) and c) even less participation (April – May), with the threads started by the tutor always having preponderance over the total number and d) low participation (June – September) with preponderance now of messages in threads started by students, with the exception of July, something which is due to the fact that this is the main month when the exam results are announced and explained by the tutor. Also, the relevant increase in June is exclusively due to students discussing the final exams with each other (see Section V).
With regard to the progress during the academic year of the ratio Messages/Threads started by the Tutor (B)/Total Messages/Threads (A), there is a relative stability that shows homogeneity regardless of intensity of participation, a fact that is an appreciable index for the reliability of the observations (the peak of the ratio in August – month of vacations – is not a reliable exception due to the small number of threads).

The determination of the thematic categories on which discussion focuses is interesting. This means not only the quantity of the discussion but also the subject of the discussion. As can be seen there is a greater number of appearances in categories questions/answers for exercises – assignments (X) with 1905 appearances and study of educational material (M) with 1633 followed by categories student comments on assignments (D) with 919, sending – receiving assignments (J) with 809 and assignment comments, corrections (C) with 710 appearances. Final categories are: pointless message (L) with 194 messages (mainly thank yous for answering messages and wishes for holidays and vacations), instructions (I) with 152, presentation of sample assignments by tutors (P) with 136, notification of advisory meeting (V) with 129 and sending - receiving grade marks (G) with 107 appearances (table IV).

If the above approach is analyzed at the monthly time level, then we have the following results per message content category (table V).

It is obvious that the category questions/answers for exercises – assignments (X) holds the leading position during all months, with greater intensity in the beginning of the academic period, and particularly the months of October, November and December (446, 479 and 302 appearances respectively). Second in appearances with great intensity in the same months is category study of educational material (M) where there are 381, 405 and 256 appearances respectively; in fact in August and September it comes first (with 21 and 36 appearance respectively). The next category in number of appearances is student comments on assignments (D), but not for all months, because it comes in 3rd in the months of July through December, while the category assignment comments, corrections (C) which is 5th for the year, is 3rd in the months from January through May, and in fact in June (month of exams) it comes in 2nd. So, category sending – receiving assignments (J) is 4th for the entire year, and 5th from January through July. This phenomenon occurs because on the one hand there is an exchange of assignments through the forum, especially during the first “adaptation” months (October – December), and after that students have a more active role in discussions with each other related to the substance of the assignments. This phenomenon becomes more distinct if we observe the relevant appearances of message content categories in threads started by the tutor compared to the total. The other categories present per month a similar picture of participation compared to the year’s total, where there are two distinct periods (October – May) with relatively low number of appearances (from 7 to 15 appearances per category) and almost inexistent presence in the other months (June –

| Month | Threads from Tutor | Threads Total | Messages from Tutor | Messages Total | Ratio
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
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<td>882</td>
<td>668</td>
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</tr>
<tr>
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<td>80</td>
<td>48</td>
<td>742</td>
<td>659</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>63</td>
<td>41</td>
<td>597</td>
<td>461</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>22</td>
<td>11</td>
<td>164</td>
<td>108</td>
<td></td>
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<tr>
<td>F</td>
<td>29</td>
<td>15</td>
<td>218</td>
<td>155</td>
<td></td>
</tr>
<tr>
<td>M</td>
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TABLE IV

<table>
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<tr>
<th>Content Category</th>
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<td>P</td>
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<td>J</td>
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<td>G</td>
<td>107</td>
</tr>
<tr>
<td>V</td>
<td>129</td>
</tr>
<tr>
<td>L</td>
<td>194</td>
</tr>
<tr>
<td>Total</td>
<td>6694</td>
</tr>
</tbody>
</table>

It is obvious that the category questions/answers for exercises – assignments (X) holds the leading position during all months, with greater intensity in the beginning of the academic period, and particularly the months of October, November and December (446, 479 and 302 appearances respectively). Second in appearances with great intensity in the same months is category study of educational material (M) where there are 381, 405 and 256 appearances respectively; in fact in August and September it comes first (with 21 and 36 appearance respectively). The next category in number of appearances is student comments on assignments (D), but not for all months, because it comes in 3rd in the months of July through December, while the category assignment comments, corrections (C) which is 5th for the year, is 3rd in the months from January through May, and in fact in June (month of exams) it comes in 2nd. So, category sending – receiving assignments (J) is 4th for the entire year, and 5th from January through July. This phenomenon occurs because on the one hand there is an exchange of assignments through the forum, especially during the first “adaptation” months (October – December), and after that students have a more active role in discussions with each other related to the substance of the assignments. This phenomenon becomes more distinct if we observe the relevant appearances of message content categories in threads started by the tutor compared to the total. The other categories present per month a similar picture of participation compared to the year’s total, where there are two distinct periods (October – May) with relatively low number of appearances (from 7 to 15 appearances per category) and almost inexistent presence in the other months (June –

<table>
<thead>
<tr>
<th>Month</th>
<th>Content Category</th>
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<tbody>
<tr>
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<tr>
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<td>A</td>
<td>Total</td>
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</table>

TABLE V

<table>
<thead>
<tr>
<th>Content Category</th>
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<tr>
<td>Total</td>
<td>6694</td>
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</table>
with the exception of categories presentation of sample assignments by tutors (P) and instructions (I) in June (11 appearances in both categories) because it is the month of exams.

There is great interest in the study of the data arising from the appearances of message content categories in threads started by the tutor each time (table VI). Here we distinguish 3 periods as regards intensity of appearances: a) October - December (with 1051, 1205 and 868 appearances respectively), b) January - June (with appearances ranging from 223 to 377) and July - September with appearances ranging from 15 in August (which refer to one thread in which two students participated who had not passed the course module in the last year) to 121 in July because it is the month when the repeat exams take place for students who did not pass the June exams.

In the case of threads started by the tutor there is a differentiation in the number of appearances per month where in the months of September through December the 1st category is questions/answers for exercises – assignments (X) with 2nd the category study of educational material (M) and in the remaining months (January through August) we see an alternation between the 1st and the 2nd place between remaining months (January through August) we see an alternation between the 1st and the 2nd place between assignments (J)

<table>
<thead>
<tr>
<th>Month</th>
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<th>Study of Educational Material (M)</th>
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<td>4</td>
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</table>

| Total | 2332                            | 1406                            | 136                              | 110                              | 635                              | 660                              | 577                              | 89                              | 118                              | 29                              | 4992                             |

In the case of threads started by students related to the subject categories on which the discussion’s interest focuses (table VII) but with different intensity. The category questions/answers for exercises – assignments (X) is again first with 499 appearances with 2nd the category study of educational material (M) with 401. Therefore here we do not have the phenomenon of the “strong” appearance of category assignment comments, corrections (C), meaning that this category mostly refers to threads started by the tutor.

Furthermore, the 3rd and 4th place are still held by categories student comments on assignments (D) and sending – receiving assignments (J) with 259 and 232 appearances respectively. The number of appearances of category pointless message (L) is also remarkable in threads started by students, which holds the next place with 165 appearances, while it is last (10th)

<table>
<thead>
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<th>Month</th>
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<th>Study of Educational Material (M)</th>
<th>Study of Educational Material (M)</th>
<th>Study of Educational Material (M)</th>
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<td>0</td>
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| Total | 2332                            | 1406                            | 136                              | 110                              | 635                              | 660                              | 577                              | 89                              | 118                              | 29                              | 4992                             |

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place) in threads started by tutors. Finally, as was expected, there are no threads started by students in category presentation of sample assignments by tutors (P).

Another issue is the comparison of the ratio (fraction) of the threads started by each tutor to the total number of threads, the appearances of content category compared to that of messages (table VIII).

But there seems to be a greater intensity in the number of appearances of message content categories compared to messages. This picture is confirmed even if we compare the ratios (fractions) of Appearances Number in threads that begin from the Tutor/ Appearances Number in threads that begin from the Students and Messages Number in threads that begin from the Tutor/ Messages Number in threads that begin from the Students (table IX).

V. DISCUSSION

As arises from the data analysis, the person that starts a discussion thread appears to play an important role in the participation in a forum on distance education. An overall finding is that participation is much greater in threads started by the tutor, but this does not happen always. There is both a greater number of messages per thread compared to threads started by students (approximately double, 10.97 versus 5.06) and in the level of appearances of message content categories (21.06 versus 13.98). It should be noted however that this phenomenon does not have the same intensity throughout the academic year, but there is a rising trend in the months October through December, a fact that means the gradually increasing participation of students in the forum in the first months of the academic year, followed (in January) by a decline of the effect of the phenomenon, a sharp rise in February and then an ongoing decline until the end of the academic year. Therefore in the middle of the academic year a phenomenon is observed where participation in threads started by the Tutor declines more than participation in threads started by students, both in quantity (in number of messages) and in quality (in appearances of content categories) a fact that means that fewer students stay in the forum, but that they are more active. Thus, the middle of the academic year functions as a “cross-road” where many students (most of them, because total participation falls) cease to participate, while others (fewer ones, because the B/C ratio declines both in Appearance Number level and in Messages Number level) participate more actively.

Another finding is that the period when a discussion thread is started plays a definite role, and we can distinguish 4 distinct periods: a) high participation in the first active months (October-December), peaking in November, b) followed by a period of decline (January-March), with a peak in February and c) lower participation period (April – May), with the threads started by the tutor always having preponderance over the total number and d) very low participation (June – September), with the exception of June, something which is mostly due to the fact that exam results are announced and explained by the tutor and the students have a relevant discussion. We should also take into account in the above that in the months November and February the 2 first written assignments are submitted, a fact that explains (proportionally) the two peaks of participation.

With regard to which subject categories are the focus of the discussion, based on this methodology, it arises that categories questions/answers for exercises – assignments (X) and study of educational material (M) are the most popular with 1905 and 1633 appearances respectively, even though there is a differentiation if we take into account the person that starts the discussion thread; here we see that threads started by the tutor, and particularly in the period January – June, the category assignment comments, corrections (C) seems to alternate between 1st and 2nd place with category questions/answers for exercises – assignments (X), while threads started by students hold the 5th place. This shows an effort on the tutor’s side to keep the discussion “alive” where (as aforementioned) increasingly fewer students participate. An important category also is student comments on assignments (D) which comes in 3rd totally with 919 appearances, a fact that shows that students like to comment on assignments of other students and make observations. Furthermore, the great difference in category instructions (I) in threads started by the tutor compared to those started by students (110 versus 42) shows that the basic “channel” in the provision of instructions passes through the tutor, and despite the tutor’s encouragement for the exchange of opinions between students, they continue to trust their tutor in the provision of instructions throughout the academic year.

The low appearance of the “functional” categories sending – receiving assignments (J), sending - receiving grade marks

<table>
<thead>
<tr>
<th>Month</th>
<th>Appearances Number (in threads that begin from the Tutor) (A)</th>
<th>Appearances Number (in threads that begin from the Students) (B)</th>
<th>B/C in Appearances Number level</th>
<th>Messages Number (in threads that begin from the Tutor) (C)</th>
<th>Messages Number (in threads that begin from the Students) (D)</th>
<th>B/C in Messages Number level</th>
<th>B/C in Messages Number level</th>
<th>B/C in Messages Number level</th>
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<td>17</td>
<td>11</td>
<td>1.55</td>
<td></td>
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</tr>
</tbody>
</table>
of advisory meeting (V), appears as expected, even though here we see the phenomenon of declining participation, a fact that means that from January and onwards students turn to more traditional forms for functional procedures (email, conventional mail, etc.). It is finally remarkable that the category pointless message (L) mostly related to messages with wishes for holidays, vacations, etc. is 5th in threads started by students and 10th in threads started by teachers, a fact that means that socialization in the student group is a strong parameter and is (proportionately) high in their ranking during their participation in the forum.

Based on the above, it is obvious that in order for discussion in the fora to succeed, a correct method would be to ensure that the tutor should frequently starts discussions in the beginning of the academic year, to not answer student questions immediately in the middle of the academic year, so that they are not interrupted, to motivate those that seem to be not participating focusing on issues mostly related to exercises – assignments and with study of educational material as well as to encourage students to comment on each other’s assignments.

In conclusion, the purpose of this paper was to add to the investigatory research in the field of electronic fora in distance education. Given that this subject is still in an early phase of research, despite the relevant progress made in other fields related to the use of internet services in education, its significance is obvious. It focused on the study of student participation in fora, trying to shed light on aspects not visible at first glance. The fact that HOU is addressed to adults with special educational needs was an important motive for this study.

It is finally worth noting that the above results which arise from all the data for years 2005-8, are verified at the annual level, meaning that they are recurrent phenomena.

REFERENCES


Abstract—“European Generation Link (EGL) – Promote European Citizenship through Intergenerational and Intercultural Learning” was a successful Grundtvig project carried out from October 2006 to September 2008. “TANDEM – How to establish intergenerational and intercultural communication and how to provide for transfer and transparency of competences in VET” started in December 2009 with a duration of two years. Based on the EGL project it adapts the approach of intergenerational learning successfully implemented and tested by EGL. TANDEM brings together two groups of society who are among the most affected by low participation in the labour market and social exclusion: young low-level educated individuals and older migrants. These groups are also hard to reach by educational measures and often show low motivation and poor course success. The idea draws on EGL where older people with a migration background passed on their stories and experiences from having lived in different European countries to young people who consequently documented these encounters within an interactive electronically library (www.europeangeneration-library.org). One of the main impacts envisaged was to increase tolerance and reduce prejudices and xenophobia among different cultures and generations. The TANDEM project adapts the original products, models and materials to make them suitable for the incorporation within vocational training in the selected target countries: Norway, the Netherlands, Greece and Bulgaria. An important difference between EGL and TANDEM is the focus of the latter on work related aspects, whereas EGL dealt more generally on day-to-day life situations of low-level educated youths and older migrant people. Both projects are based on the assumption that not only do the young have much to learn from the old but they also have much to teach them. This paper aims at elaborating on the didactical approach, the products and the practical values of these projects in detail.

I. INTRODUCTION

Europe is a continent of migration. However, current debates tend to forget, neglect or even deny the European history of migration, e.g. that “Europe has experienced several waves of internal migration and exile, including displaced persons before, during and after World War II, in the 1960s when ‘guest workers’ were invited from South Europe to the richer states, after the fall of the Iron Curtain and through conflict in the former Yugoslavia.” [1] One of the main objectives of European policy is to promote the “European Citizen”, but especially among those who have little or no knowledge about European migration, prejudices and narrow-minded attitudes towards migrants persist. This is why promoting tolerance and reducing xenophobia among different cultures and generations is an important step towards European inclusion. There are millions of older people who are true “European citizens” in the sense that they have lived in several European countries, cultures and societies and possess valuable knowledge in the context of a wider European perspective.

European Generation Link and TANDEM

The successful European Generation Link (EGL) project which was carried out from October 2006 to September 2008 aimed at “unearthing” the treasure of older people who had experienced a multilingual and multicultural life. Through innovative methods based on intergenerational and intercultural learning approaches this knowledge has been transferred to younger generations before it literally “died out”. The current transfer project TANDEM is based on the EGL project but focuses more on work related issues. The project stresses the importance of appropriate and consistent vocational education training materials and emphasizes that but competences and skills should become more transparent for transfer into other education and labour systems. TANDEM adapts the original EGL products in order to transfer them to the selected target countries, namely Norway, the Netherlands, Greece and Bulgaria. It is targeted at teachers, trainers and guidance counsellors dealing with several Vocational Education Training (VET) sector groups. They will receive new sensitisation and training materials, concrete tools and instruments to manage the communication between young and old European citizens. VET providers can use the sensitisation materials in order to promote intergenerational and intercultural vocational competences and skills.

The project coordinator of both the original and the transfer project is BEST – Institute of Continuous Vocational Qualification Training and Personnel Training Ltd. (Vienna, AT). The partnership of the TANDEM project consists of Austria, Germany and Belgium who were involved in the original EGL project and who are also involved in working with VET providers, consulting and research organisations and public bodies from Norway, the Netherlands, Greece and...
Bulgaria. Fig. 1 gives a first overview of some main facts about both projects.

<table>
<thead>
<tr>
<th>European Generation Link</th>
<th>TANDEM</th>
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<td><strong>EU program:</strong></td>
<td>LLP, Leonardo da Vinci, TOI</td>
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<tr>
<td><strong>Duration:</strong></td>
<td>December 2009 – November 2011</td>
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<tr>
<td><strong>Coordinator:</strong></td>
<td>BEST – Institute of Continuous Vocational Qualification and Personnel Training Ltd</td>
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<td><strong>Website:</strong></td>
<td><a href="http://www.europeangeneration-link.org">www.europeangeneration-link.org</a></td>
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<tr>
<td><strong>Objectives:</strong></td>
<td>Bringing together low-level educated young adults and people with migration background, both of whom, at times, struggle to demonstrate high educational course completion and can show a lack of enthusiasm in learning</td>
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<tr>
<td></td>
<td>Adapting innovative and concrete measures for Vocational Education Training demonstrates to VET teachers, trainers and counsellors how to bring these two groups of society together so they can benefit from each other</td>
</tr>
<tr>
<td></td>
<td>Demonstrating how to make non-formal and informal skills transparent and valid for the future professional development</td>
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Fig. 1. EGL and TANDEM by comparison [2]

This paper is structured as follows: After this short introduction, the pedagogical approach underlying both projects is explained (chapter 2). In chapter 3, product examples are given, whereas chapter 4 presents practical experiences and lessons learned. All information is drawn from the projects’ websites mentioned above. As the TANDEM project just started, many products are in preparation and not yet available online. In contrast to this, the project partnership of EGL has elaborated many useful products and tools which can be downloaded from the website. The interactive electronically library mentioned earlier can be accessed via the following link: www.europeangeneration-library.org. It is going to be available online until the end of 2010.

II. PEDAGOGICAL APPROACH

Both the European Generation Link and the TANDEM project aim at promoting intergenerational and intercultural learning. The idea behind EGL was to bring together people of different generations and cultural backgrounds: Older people told their stories (using the language of the new country they live in) of having settled down in various European countries (e.g. because they were refugees of the Second World War, belonged to the allied forces, migrated to another country or were refugees from Eastern Europe during the Cold War). Young people documented these stories in an interactive library and simultaneously taught their interview partners basic ICT skills. The objective was to promote understanding of historical backgrounds and to provide reflection in order to increase tolerance and to reduce prejudices and xenophobia. The pedagogical approach can be looked up in detail in the project’s guidelines (see chapter 3).

The concept of intergenerational learning assumes that different generations can learn from each other in an atmosphere of mutual trust and respect. Young people benefit from the life experience of their older tandem partners whereas the latter benefit from skills, especially in regard to new information and communication technology, that the students possess. Intergenerational means ‘being or occurring between two generations’; intergenerational learning refers to the sharing of information, thoughts, feelings and experiences between two generations that enrich both in a Lifelong Learning context. [3]

The EGL project was based on an individualized approach. The aim of this approach is to raise the learners’ awareness of their responsibility for their own learning contents (e.g. using a foreign language in oral or written form) and procedures on both sides of the EGL tandem. The younger students as well as the migrant seniors were actively involved in the design of their exchange of experiences, values and feelings and thereby experienced the fact that learning had something to do with them personally.

Intergenerational learning encourages innovative and alternative learning pathways of Lifelong Learning. Both tandem partners learned about things that interested them, which they decided to ask for and to be relevant to them. Intergenerational learning is a process, through which individuals of all ages could acquire skills and knowledge, but also attitudes and values. While the youths learned a lot about European history and culture as well as about autobiographical work and journalism, the seniors acquired basic ICT skills and learned how to handle a computer, surf the internet and write a letter with a word processor.

A. Methodology

The stories stored in the digital library are based on structured interviews which were carried out by young people (in the language “foreign” to the interviewees). The purpose of motivating young people as interviewers was to transfer knowledge between generations in a mutual way. Whereas the interviewees talked about their lives and their multicultural background, the young interviewers taught computer skills to their tandem partners. The objective was to bring about
greater intergenerational respect.

The EGL partnership elaborated the “Interview Guide” in order to provide young people without experience in journalism with structured information and help. The Guide, which can be downloaded from the project’s website, provides a set of information and advice for the younger generation and enables the learners to use their resources. The teachers are invited to clarify misunderstandings and give continuous feedback on the work of their students. The Interview Guide contains a variety of questions in order to help the students capture the multicultural background of the interviewees. The questions are divided into sections, e.g.:

- background
- migration
- school, work
- being a migrant – everyday life
- how important is it for you to…
- final words
- etc.

**INTERVIEW GUIDE**

Fig. 2. The Interview Guide [4]

In order to motivate and sensitise the younger generation, it is important to take personal interests as a starting point. Students want to learn about things that are important and relevant to them. Apart from the motivation to talk about one’s experiences and life (in the language of their new country), the chance to learn about new information and communication technology is also a motivating factor for the older generation. In order to strengthen the motivation of the interviewees it is necessary to show them that ICT learning is a process to reach individual goals like getting into contacts with grand children, relatives and friends, learning to safe old photos by scanning them, learning how to generate and store files and how to document the history of the family, etc.

The teacher has an important function in this context. Intergenerational learning should be accompanied by continuing tutoring in order to provide according information and support the well-directed development of knowledge, skills and competencies. The basic rule is: Teachers don’t have to be controlling, but in control.

**B. The EGL library**

The interviews are stored in a digital library which is arranged like a real library, with individual volumes containing the stories, complemented by photographs and, in some cases, audio files and video clips. The digital library is an interactive platform which is based on an internet based content management system (CMS). It offers templates for a structured input of the information and provides registered users with the possibility to add, edit and remove content from the library. Visitors can search the library using different parameters, such as countries, periods, cultures and languages. The stories consist of a short biography, background information, etc. and are structured around seven categories: family, politics, economic career, environmental issues, love stories, education and social life.

**C. TANDEM**

The TANDEM project is drawing on the pedagogical tools elaborated by EGL and adapts them to suite the slightly varying focus of the current project. As mentioned before, the main target group of the TANDEM project are teachers, trainers and guidance counsellors within VET who will be equipped with training materials which will aid them in motivating and teaching young and old Europeans. TANDEM borrows the interactive electronic library concept from EGL and extends it in the sense that the library is going to contain didactical teaching methods as well. Thereby the process of accessing training materials and information regarding VET is going to be fast and efficient. It will be possible for individuals to access information specific to one partner country and enter relevant search terms to select interesting work life related information. The library will include various experiences and “work life stories” documented as text and pictures, films and/or audio files from older migrants documented by young adults. The structure of this internet based library is going to be similar to that of the EUROPASS.

**III. PRODUCTS**

The EGL project partnership developed the following products:

**A. The platform “European Generation Library”**

As mentioned above, the library of the EGL platform is a web application in the form of a virtual Library. This electronic library lets the visitors search for stories of
migrants. Each story can consist of various textual and multimedia elements. The Library allows the visitors to look for these stories based on many criteria: language, country/ies, topic(s) and keyword(s). In other words, it allows its users to explore migrant stories that make the history of Europe. The interactive platform will be constantly available until 2010 (http://www.european-generation-library.eu).

B. The brochure “European Generation Link Guidelines”

The Guidelines contain a collection of methods on how to sensitize the younger generations, how to get in contact with seniors, how to conduct interviews with older people who can contribute to the library, how to take away their fears and anxieties and how to transfer basic ICT skills without “overloading” them with sophisticated and confusing contents. The Guidelines also contain the “Interview Guide” referred to earlier.

C. Additional products of EGL

On the project’s website there are also a “Concept for Demonstrations Events” and an evaluative study “Study on the Library Platform” available. The download of all products is free of charge.

The TANDEM project partnership is going to develop the following products:

D. TANDEM didactic guidelines

These guidelines are for VET teachers, trainers and counsellors in order to show them how to sensitize young adults and motivate them to form tandem teams with older migrants, carry out interviews, engage in knowledge transfer and make competences transparent.

E. TANDEM internet-based library

The TANDEM internet-based library will include “stories” of older migrants recorded by young adults that may be searched by diverse parameters (www.tandem-library.eu). It is currently under construction.

F. TANDEM library user handbook

The Handbook shall inform users about organisational aspects of how to use the library, produce, edit and upload recordings in various formats etc.

G. Additional products of TANDEM

Additionally, there are going to be TANDEM implementation concepts available for each target country in order to guarantee long term sustainability of the TANDEM results.

IV. VALUABLE EXPERIENCES AND LESSONS LEARNED

EGL materials are widely applied in VET courses, especially in Austria. The project partnership was able to evaluate the products and formulate major successes as well as difficulties. Three major success factors could be identified which affected the learning outcomes and satisfaction of the interviewer-interviewee tandem in the process of knowledge transfer, awareness of learning/teaching success, learning pace, reflection of intergenerational roles, etc:

- short and well-defined learning contents
- time for exercises and repetitions
- open and trustful atmosphere allowing to reflect and manage age related barriers

One main difficulty was that due to a general lack of motivation, some of the young participants were hardly interested at the beginning. It was necessary to motivate them by connecting the tasks to their personal interests and life realities. Another difficulty was that young people without experience in journalism had quite a problem with designing interviews and finding according interviewees. Support was necessary to help them in planning the first steps of their research. The EGL Guidelines help teachers with this task by providing an Interview Guide and a step-by-step instruction on how to plan, conduct and process the interviews.

During the multiplier seminar held in Baden, Austria, from 16th-17th September 2008, Judith Koppány from the Artemisszió Foundation Hungary shared her experiences from the pilot test conducted in Hungary with 8 young students and 10 migrants. As for the recruitment she said that the young people were selected by inner motivation, whereas the recruitment of the migrants was targeted on maximizing the diversity of migrants. Based on the personal preferences of the students, the tandem teams were formed. Those without previous knowledge and experience in interviewing were prepared with the help of the interview guidelines. However, it turned out that a lack of previous experience was not a burden. Koppány emphasized that it was important to pay attention to sensitive issues and questions and prepare the students in this respect. The students should receive help when it comes to compiling the story, correction work, etc.

The young participants reported that it was a strong experience for them and that they felt great emotions, such as empathy. One student said “It is great to talk to elder people who are intelligent, have opinion on diverse matters, and are active even in their late 60s. After three hours, I felt that the interview has changed my outlook on life, as well.” Another young participant stated “The life story was very interesting. Opening up for another person, a stranger is very brave. It is a challenging task to build trust, to create a connection…” The older participants liked to share their histories and appreciated that there was time for reflection. [6]

In her study on the Library Platform, Pamela Clayton reports the following “lessons learned”:

- “Some older people are already familiar with computers, though there is always something more to learn; others are willing to learn this new skill; while still others have no interest and cannot see the point for them.
- Even where computer skills were not taught, both could get a lot from the interview: knowledge and perspective on the part of the young interviewer and the opportunity for the interviewee to tell his or her story.
It was initially easier for both young and old if they already knew each other; but even where they did not it was possible to build a rapport that led to interesting and enjoyable conversations.” [7]

A clearly positive outcome of the pedagogical approach is that young people learned how to address people and run interviews; they improved their social skills and learned new working techniques. Above all, they acquired deep knowledge about Europe and different migration histories. The mutual approach provided the young generation with the chance to act as “teachers” and transfer ICT and language skills to older people. All members of the tandem team could improve their self-esteem.

REFERENCES
Workshop: Technological Aspects of Social Applications in Life Long Learning
Distance learning methodologies and tools for lowering the administrative burden of rural entrepreneurs. The case of Rural Inclusion

Fotis Kouris, Ma IBM

Abstract— It is a well documented fact that although ICT penetration in rural regions is at 87% and broadband access at 57% taking up of e-government applications in rural regions is very low, in fact is less than 35% across Europe. This gap is not attributed to any lack of e-government services addressing the needs of people in rural areas; on the contrary there have been significant efforts by the European Union and the national governments towards the realization of an inclusive information society, where entrepreneurs from rural areas will use the developed e-government services at the same rate as their counterparts in urban areas. The Rural Inclusion consortium has identified this disparity and attributes it to different behavioral characteristics of the citizens in rural areas. Therefore the consortium proposes tools and methodologies with the aim of assisting the entrepreneurs of rural areas to take advantage of the e-government services already at their disposal and most important training them using a blend of formal and informal training delivered by collaborative distance learning tools with the purpose of changing their conceptions beliefs and actions, improving their digital competences and effectively bridging the broadband and accessibility gap existing with their urban counterparts.

Index Terms— Administrative Burden, Distance Learning methodologies and tools, Rural Inclusion, Training of rural entrepreneurs

I. INTRODUCTION

IT IS WIDELY acknowledged that Small and Medium Enterprises (SMEs) constitute a critical aspect of the overall production process in liberal economies. Hence, it becomes evident that the optimization of their productive processes and the minimization of their operating costs are in the interest of the greater business ecosystem. However, although significant provision has been taken in terms of motivating the foundation and sustainability of SME’s there are yet criticalities pertaining to each enterprise’s distinct idiosyncrasies that need to be addressed. One of these issues is the low degree of penetration of innovative tools and technologies by SME’s residing in rural areas and the resistance of the entrepreneurs to adopt them. The side effects stemming from such a deficiency are more or less evident; however they become more dominant under the specific circumstances that characterize the operation or rural enterprises, i.e. the physical distance between their premises and central public authorities, which make the respective transactions cumbersome and costly significantly undermining their everyday operation and, in long term, their economic growth and prosperity.

The impact of the cost induced by transactions between SME’s and public authorities is further highlighted by EU’s determination to address this issue by setting a target of administrative burden reduction of about 25% by the year 2012 [1]. In the same scope, EU has elaborated a series of specific objectives to be addressed by relevant research initiatives [1]. The list of these objectives include among others:

- Encouraging the take-up and diffusion of ICT in the fields of e-business (particularly in relation to SMEs), e-skills and e-learning;
- Encouraging the take-up and diffusion of ICT. Take up and diffusion of ICT is essential in rural areas for diversification, as well as for local development
- Building local partnership capacity, animation and promoting skills acquisition can help mobilise local potential;
- Promoting private-public partnership in encouraging innovative approaches to rural development and bringing the private and public sectors together;
- Promoting cooperation and innovation can play an essential role in connecting people to new ideas and approaches, encouraging innovation and entrepreneurship and promote inclusiveness and the provision of local services. On-line communities can help in the dissemination of knowledge, the exchange of good practices and innovation in rural products and services;
- Improving local governance. To foster innovative approaches to linking agriculture, forestry and the local economy thereby helping to diversify the economic base and strengthen the socio-economic tissue of rural areas.

In such a context, a major European Project, Rural Inclusion, supported by the Information and Communication Technologies Policy Support Programme of the European Commission, aims at adopting a state-of-art infrastructure (i.e. modeling approach and software environment) that will facilitate the suggestion on improving these instructions, offering of innovative services by public administration in rural areas. More specifically, the objective is to address the challenge of reducing the administrative burden of enterprises in rural areas, by reducing the information elicitation process of businesses when they want to use a particular instance of
some public service, or making more effective use of the resources.
To achieve this, Rural Inclusion adopts, adapts, and deploys a Web infrastructure combining semantic services with a collaborative training and networking approach, in the rural setting of 5 European regions. It focuses on selected case studies of e-Government services that regional public authorities already offer, supports them by a rigorous and reusable service process analysis and modeling, and then deploys a semantic service that facilitates the disambiguation of the small businesses needs and requirements when trying to use the particular services. At the same time, the semantic service is complemented by a number of other Web-based services that support the creation of communities of learning and practice in rural settings, thus facilitating the communication between the rural businesses with the regional public authorities.

The envisaged potential users of the deployed regional portals will be Small & Medium Enterprises (SMEs) in 5 European rural regions in central Spain, the Greek islands, rural Latvia, rural France and overseas, in the region of Martinique. In cooperation with public authorities and/or professional associations of SMEs in each participating user country, a number of pilot demonstrators will be deployed and assessed. In addition, extended validation trials will follow with more user partners that will be invited to join the project and test its results.

II. CURRENT SITUATION AND CHALLENGES

A. Take-up of ICT and eGovernment applications in rural regions

Europe's rural areas are diverse in terms of population, demography, economic and social structures and labour markets. It is this diversity that is part of their richness. Nevertheless, many of Europe's rural areas face a common challenge – their capacity to support and allow the development of competitive SMEs is falling behind urban areas. In the EU-27 rural areas [2] (predominantly rural and intermediate regions) represented 90% of the territory and 56% of the population in 2006. The corresponding shares for predominantly rural areas were 54% of the territory and 19% of the population. Rural areas are therefore particularly important in terms of territory. Among the Member States, the importance of rural areas varies from the more "Urban"8 ones (BE, NL, MT) to the more "Rural"9 ones (IE, SI, FI) along a continuum where Intermediate Regions can play a major role (CY, LU, CZ, EE, SK, BG, LT). Even if economic activity tends to be concentrated in more urban areas, rural areas generate 43% of the Gross Value Added (GVA) in EU-27 and provide 55% of the employment, these shares being larger in the new Member States (70% and 79% respectively) [2].

Regarding infrastructures in rural regions, the rapid spread of faster and cheaper internet access has boosted internet use. In 2008, 56% of EU rural citizens were using the internet on a regular basis, up from 43% in 2005, and nowadays three quarters of them do so every day [3]. This goes in parallel with a rapid change in habits and in the adoption of new ways of communicating and sharing information. In 2008, 35% of Europeans declared using the Internet for advanced communication services [3], i.e. those services that go beyond the one-to-one communication systems and make possible the distribution and sharing of online information, content and applications. Although these services do not yet replace traditional forms of communication, they are getting increasingly widespread. Their adoption and use is very much linked to age: "Digital natives", i.e. people between 16 and 34 years old, and especially those aged 16 to 24, stand out as the most regular, intensive users. Digital natives are veritable users of an interactive borderless space in which content and services are made available for active users to download, exchange, create and recreate, distribute, share and re-use. This is confirmed by the rise in social networks and in user-created content in the past two years strongly point to the rising social and economic importance of the internet and ICT.

At the same time Europe has continued to make progress in the delivery of online public services towards meeting the objectives of the Lisbon Agenda and the i2010 eGovernment Action Plan [4]. The online delivery of basic services has continued to increase steadily in recent years: their full online availability went from 21 % in 2001 to 71 % in 2009 [5]. However, this increase masks substantial differences between services for businesses and services for citizens: the former have almost reached saturation with 83 % availability while the latter, with 63 % availability, show a significant shortfall. eGovernment for businesses has progressed fast. It has also reached a high level of sophistication (91 % in 2009) [6]. Some crucial services for enterprises like VAT, corporate tax, customs declarations and social contributions are fully available online in almost every EU country. However, services for the registration of new companies are still some way behind, although they are considered crucial to the European Growth and Jobs Strategy. In general, the use of online public services by businesses has kept up with the supply: on average, use was 71 % in 2009 for the EU-27 (up from 68 % in 2008). Levels of use are also quite even across countries. With the exception of Romania, eGovernment usage by businesses is above 60 % in all countries, with almost half having usage rates above 80 %. Take-up though is relatively low for advanced ways of interacting with the public administration (P.A.): 55 % of enterprises use the internet to return completed forms and 43 % had complete electronic transactions with the P.A. [6]. Continued increases in usage however have not yet compensated for certain take-up gaps. While broadband is available to more than 90% of EU population, effective take-up attains 50% of households [6]. The main reasons why households do not have an internet/broadband connection relate to a perceived lack of need, costs and skills. These barriers are greater for those on lower incomes. Most importantly, one third of European citizens have never used the internet. Large gaps in internet usage are observed both across countries and across socioeconomic groups. Digital inclusion is largely driven by age and education/income levels: In most countries, the largest disparities in internet use relate to groups aged 65-74, the economically inactive and the low educated [6]. Meanwhile, a
second digital divide, based on quality of use, is emerging. These results suggest the importance of demand-side policies which focus on stimulating the use of the internet, reducing psychological and skills barriers, increasing awareness on its possible benefits, facilitating access for the old and the disabled, reducing financial barriers and encouraging the acquisition of skills and life-long learning [7].

At the same time Inclusive eGovernment as addressed by both the Manchester and Malmö eGovernment declarations state that the groups at risk of exclusion, turn out to be very different from the traditional groups analysed for eInclusion policies. A disparity indicator for eGovernment use [2] shows that, once the different patterns of internet use have been factored in, there is no clearly discernable ‘digital divide’ in eGovernment use among internet users belonging to traditional groups at risk of exclusion.

Analyzing the data available on the socioeconomic characteristics of the European rural regions we observe the presence of a larger percentage of groups at risk of exclusion than in urban areas [2]. For example there is a higher concentration of people above 65 years of age. At EU-27 level, the income per inhabitant is 21% to 62% lower in rural areas and generally increases with a higher urban character. In the new Member States where the general level of income is less than half of the EU-27 average, the gap between predominantly rural areas and predominantly urban areas is accentuated. In 2008, 71% of adults of EU-27 have reached a medium or high education level. There are however large variations among Member States (from 27% to 91%), with notably a higher level of education in most new Member States than in EU-15. In most of the countries the level of education is lower in rural areas than in urban areas and these differences seem to be growing over the last years (2% and 2.5% average annual growth respectively in the period 2005-2008). At the same time the percentage of the population that engages in life long learning activities is around 9.5% a bit less than the average in urban areas.

A. Challenges preventing rural entrepreneurs in taking-up eGovernment applications assisting them in lowering administrative burden

The above presented data together with the fact that more than 95% of enterprises in rural areas are micro and medium size which lag in the use of sophisticated eGovernment services compared to large ones justify the gap between rural and urban areas in taking up ICT and eGovernment services [2]. Lack of training and skills are the primary sources of disadvantage among groups at risk of exclusion from the digital society and significantly affect their chances of using most online eGovernment services, but especially the advanced services. In extend this lack of training and ICT skills from entrepreneurs that operate in the rural regions form a barrier for the survival and development of the enterprises that operate within these regions.

In this operating environment the Rural Inclusion consortium has to provide services to rural entrepreneurs and create a critical mass of trained users that will employ the services provided in order to progress through the validation phase to that of commercial exploitation. Training of users poses also significant challenges, among them being:

- Availability of resources
- Geographic distribution of the entrepreneurs
- Cultural diversity
- Language issues
- Time challenges
- Diversity of skill sets
- Access to technology
- Variety of learning styles

Therefore a training methodology has to be developed where, assisted by the affordances of new digital instructional tools and resources, will meet these challenges.

III. TRAINING METHODOLOGY

In Rural Inclusion there are two main categories of users, the Public Authorities employees and the entrepreneurs and in extend the citizens of the rural areas. To train these two main categories to become professional in the use of the Rural Inclusion methodology, concepts, applications and services one has to develop a methodology that combines both formal and informal training. There are two main reasons for this:

- First is to create abundant training opportunities for a large number of people and
- Second is to develop the background for individual’s success in meeting the goals of training.

The latter can be augmented by including personalization in the training mix. Although it seems difficult to personalize training, technology can make a significant difference in the development and delivery of training and learning for many and for the individual. Technology offers opportunities for personalization when previously none existed. Even more interesting is the rate at which new technologies are emerging and becoming incorporated into the “training and learning fold”.

The combination of formal training, informal learning and personalization, with the use of technology to develop and deliver both, is the solution for the problem presented in training the users of Rural Inclusion.

The importance of formal training combined with informal learning is well documented [7]- [9] but as for applying the afore mentioned concept to the Rural Inclusion training methodology one has to take into consideration factors that do not apply in this case as they would apply if the consortium was to train the employees of an organization. First of all the entrepreneurs can not be forced to attend training as they are “customers” rather than employees, secondly it is unrealistic and cost prohibiting expecting the formal training of local entrepreneurs in each rural area.

Therefore a model has to be developed where formal training will be provided to the employees of the Public Administrations and to selected individuals (rural entrepreneurs, citizens) who will act as change agents and transfer the knowledge gained to the rest of the entrepreneurial community. The rest of the user population will be trained in using the services of Rural Inclusion through
informal but personalized training methods using the tools provided by the Rural Inclusion applications.

A. The role of Change Agents within the Rural Inclusion context

The project focuses its operations in a large and diverse geographical area with thousands of communities and entrepreneurs. Moreover, the consortium has limited resources in reaching to these communities and introduce the project services and methodologies to the key segments targeted. This is the reason that the consortium needs the assistance of local people who will act as evangelists of the Rural Inclusion concepts and methodologies and assist the rest of the users in adopting and utilizing the services offered by the project. These people are called Change Agents.

According to a definition by David W. Hutton “a Change Agent is an individual that will accelerate cultural, social change in business environment and will effectively evangelize the concepts of knowledge-based society, entrepreneurship and innovative-driven ICT in business”[10].

A Change Agent need not to be an entrepreneur but rather a “leader” within his community a person that the other people trust, listen and who is not afraid to go head to head with outdated practices and concepts and lead his community to progress. These persons in the community are of different professional and social backgrounds (a teacher, a doctor, a local entrepreneur or public employee) but share common characteristics that make them suitable for the task of leading their rural community in the road of progress and prosperity. Their characteristics are presented below:

- Regardless of what is going on today, a change agent has a vision of what could or should be and uses that as the governing sense of action. To a certain extent, a change agent is dissatisfied with what they see around them, in favor of a much better vision of the future. Without this future drive, the change agent can lose their way.
- A change agent is fueled by passion, and inspires passion in others leading them to a path of improvement and change.
- A change agent has a strong ability to self-motivate. There will be many days where everyone around does not understand and will not offer props. The change agent needs to be motivated in meeting the people in his community and risk being misunderstood and mis-appreciated, knowing that the real validation may be far in the future and may be claimed by someone else.
- A change agent must understand people, because change is about people. Change will be implemented when people embrace it. Therefore, change is part sales, part counseling and part encouragement.

B. Characteristics of training offered to the Rural Inclusion actors

The consortium decided at a blended learning program within a knowledge-centered easily accessible context based environment that will combine formal training, informal learning, instructor lead courses and distance learning tools.

The blended learning program of Rural Inclusion aims at Public Authorities personnel, Change Agents, rural entrepreneurs and citizens, will be used to support business and training initiatives and objectives such as:

- Reducing travel and expenses for the consortium personnel to go to the places where training will take place.
- Reducing time out of the job for the public authorities personnel and entrepreneurs and increasing resource productivity.
- Extending geographic reach — reaching wider, more diverse international audiences.
- Providing just-in-time information.
- Accelerating time to competency.
- Leveraging subject-matter expertise.
- Leveraging relationships through ongoing collaboration with the field, Rural Inclusion customers and channels of communication.

C. Training Delivery

Training will follow three main branches delivered using a blended learning approach which will be explained in detail in the next paragraphs:

- The first branch will focus in the personnel of the Public Authorities where training will focus on preparing the employees to model their services according to the methodology of Rural Inclusion. The consortium instructors will teach the P.A. employees the Public Service modeling methodology and assist them in modeling their P.A. services using the Public Service Modeling Template. (Fig. 1)

The consortium will utilize these talented persons acting as Change Agents. As already mentioned change agents are individuals of different skills and social backgrounds but who have the capacity to lead their communities to the road of change and progress. The consortium will utilize these talented persons and train them to change their communities through the use of the Rural Inclusion applications and concepts. For this purpose a set of training scenarios will be created depicting real life cases and problems and how can they be solved with the use of rural Inclusion applications and concepts. These scenarios will be made available to the change agents and through role playing in dedicated workshops where the change agents will learn to utilize the
Rural Inclusion services and methodologies to benefit their communities. Of course the change agents will also receive training in order to become professional in the use of Rural Inclusion applications. (Fig. 2)

![Training of Change Agents in sequential order](image)

- The third branch of training will focus to the remaining user types where the consortium will offer the methodology, concept, tools and assessment of training and the training will be offered through content provided by users and supported by the change agents and the employees of the Public Administrations in their respective communities. This form of training corresponds to the informal personalized learning concept that R.I. envisages for the rural entrepreneurs who through it, will be able to effectively use e-government services to reduce administrative burden (Fig. 3)

![Training of rural entrepreneurs in sequential order](image)

**D. Blending Methods**

There are several approaches the consortium will take to blending learning modalities in order to deliver training to Rural Inclusion users. The blends of Instructor Lead Training (ILT) and distance learning specifically aimed at Public Authorities personnel and Change Agents include:

- **Pre-workshop prep work.** The consortium will save both time and resources by having trainees review the prerequisites or the basics of a subject area ahead of time. This will make the limited time available in the workshops more productive and valuable.

- **Post-workshop follow-up** That can increase retention by following an Instructor Lead Training event with self-paced e-learning modules that review key concepts or ask application-level questions once the trainees are out of the workshop.

**Post-workshop topics** limiting time spent in the workshop by separating advanced topics, and providing the training on those via targeted self-paced e-learning modules immediately following the Instructor Lead Training event.

The introduction of Web 2.0 technologies to the Rural Inclusion blend of learning modalities allows for many more methods of integration which will be available to all types of actors:

- **Links from course outlines.** Letting a trainee know what related resources are available, Web 2.0 and otherwise, before they enter an e-learning module is a great way to raise their confidence before diving into challenging new material. Knowing that a trainee can get additional information from experts (blogs) or peers or have the opportunity to ask questions (forums), can improve the trainee’s perception about the training.

- **Link from within R.I. applications.** Linking to Web 2.0 supporting resources directly from the Rural Inclusion applications makes them available at the moment of need.

- **Pre-workshop use.** Social Networking provided by the Rural Inclusion applications can be a good tool for trainees to learn more about each other prior to arriving to the Instructor Lead Training or virtual classroom.

- **In-workshop use.** Forums in particular can be used in an Instructor Lead Training or virtual classroom setting to enable trainees to brainstorm in response to questions or challenges posed by the instructor. The instructor can also easily separate the students into groups to collaborate separately, and then compare their results.

- **Integration with extended formal learning events.** For Instructor Lead Training sessions that are longer than a single day, there will be instructor blogs, a Q&A discussion forum, to collaborate and brainstorm. The same holds for any virtual classroom sessions that span days or weeks.

- **Performance support and informal learning.** The most important use of Web 2.0 technologies within the Rural Inclusion context is not to complement formal learning at all, but rather to provide performance support in an ongoing way. The Web 2.0 technologies of Rural Inclusion provide blogs and video casts from the latest insights from experts and Change Agents, forums for direct answers to questions, social networking and allows one to discover great resources above and beyond what training provides.
E. Application of Blended Learning to Rural Inclusion

There are many ways to use all of these exciting technologies in the context of learning and training programs and scenarios that will be created for R.I. As always, identifying the learning or training need clearly and defining the goals upfront are the most important steps. This is particular true since R.I. aims to train a widely dispersed, multilingual, multinational and with a variety of skills and motivation rural audience. But by having the above technologies available within the R.I. tools there are many options to design the most appropriate training program depending on the local circumstances to provide the most value.

The table represents the possible learning and training needs of a typical rural region. Each row is a significant goal for which the learning function is expected to provide a solution. Each column is either a traditional learning modality or one of the new Web 2.0 technologies (in blue).

<table>
<thead>
<tr>
<th>Learning Program</th>
<th>Traditional Learning</th>
<th>Formal Learning</th>
<th>Performance Learning</th>
<th>Support, Informal</th>
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</table>

1) P.A. Employees Training

The consortium needs to train the P.A. employees in modeling the Public Administration services using the Public Service Modeling methodology, and the on-boarding learning program provides process and structures, BPMN symbols explanation, examples of services and other useful information. By using new technologies, the consortium sees higher levels of engagement and interest for new employees from Public Authorities who understand the benefits of R.I.

- A blended program of Instructor Lead Training and self-paced e-Learning, tracked with learning paths, provides the core concepts and processes. This approach maximizes the expensive in-classroom time by delivering introductory material as pre-class e-Learning modules and service modeling specific content as post-class e-Learning modules.
- Virtual classroom, synchronous e-Learning with topnotch trainers, which allows for the flexibility required by regularly updated services.
- The informal learning elements include a discussion forum where the employees of P.A. can ask questions and a blog where key leaders and trainers post information specifically intended for new trainees, to help provide context, and video casts from experts and other P.A. employees with advice and tips.

2) Change Agents

The consortium has the ambition to train local community leaders that will act as Change Agents within their rural communities and disseminate the benefits of using Rural Inclusion to the business community. This dispersed, and with little time available, poses challenges for traditional ILT programs. Although some form of ILT is necessary for the particular group, the consortium will offer:

- Self-paced e-Learning modules that provide the fundamentals of the R.I. applications.
- Virtual classroom, synchronous e-Learning with topnotch trainers, which allows for the flexibility required by regularly updated services.
- Social networking tools, blogs and video casts, where veteran entrepreneurs share their best practices in using R.I. In this way, much of each individual’s experiential knowledge becomes shared knowledge.

3) Rural Entrepreneurs

A good channel learning solution drives revenue throughout our channel and enables it to operate as a self-sustaining ecosystem—an organic extension of our business enterprise. Because a new service and methodology such as R.I. inevitably mean lots of questions from the organization’s extended channel, the consortium will have to use a combination of approaches that maximize information transfer, flexibility, interactivity, and enthusiasm. This combination provides key information, doesn’t involve travel to physical classrooms, allows for multiple opportunities to ask questions, and creates buzz through multiple modalities being leveraged over a short period of time.

- Social networking tools are available for questions, discussions, sharing of experiences between experts, change agents, consortium and entrepreneurs.
- To help with troubleshooting those hard-to-figure problems that inevitably arise, discussion forums are provided in a range of areas, allowing users to ask questions and share their expertise.
- And experts/change agents are given the opportunity to teach via blogs and video casts where they post their views on the latest developments in their areas of expertise.

4) IT Skills Development and Performance Support

It is evident by several researches that the entrepreneurs, Public Authorities employees and citizens of rural areas have less IT skills than their counterparts in urban areas, but have little time and facing more difficulties (e.g. distances to training centers) to devote to formal training. However, providing them with training on the latest technologies leads to familiarize themselves with the applications and services of R.I. and using them more.
5) Citizen Education on the Rural Inclusion Applications

Recognizing that not all of its critical learning programs are internal, the consortium has considered citizen education to be vital to attract new customers to the R.I. services and retaining them afterwards.

- **Social networking tools** are available for questions, discussions, sharing of experiences between experts, change agents, consortium and entrepreneurs.
- Key consortium experts author blogs that go beyond the information in the e-Learning modules. These blogs have the moderated comments feature enabled—an excellent way for the company to directly interact with their customers.
- **Discussion forums, pod casts, blogs, social networking tools** are available for questions, discussions, sharing of experiences between experts, change agents, consortium and entrepreneurs.

IV. RURAL INCLUSION TOOLS

To deliver training to such a community of users an innovative model is not enough unless it is supported by tools capable to meet the expectations of the model. The consortium is fortunate that two of the applications of R.I. more than have the capabilities to support technically the model and through the use of innovative web tools deliver the methodologies and content to the intended users efficiently, rapidly and cost effectively. These tools are eGovTube and Rural eGov Observatory 2.0. A brief description of both tools follows:

A. eGovTube

In order to support innovation adoption processes eGovTube provides a Web 2.0 online environment which supports knowledge exchange, learning and collaboration among the different users (target community, service providers, etc.). It is based on the latest Web 2.0 trends that make extensive use of video, profiling, game dynamics, agents and network visualizations so as to capture the attention and involvement of the learning community members by generating three different types of user value: connection value, actionable learning value, as well as entertainment and instant gratification value.

In fact, eGovTube allows connecting people together as well as to their ideas, experiences, interests and relevant knowledge assets by the means of:
- videos used for expressing concepts and for sharing experiences,
- rich profiling, for exposing people to their and to community members’ interests and competences,
- an advance network map (i.e. the Network Visualisation and Navigation Tool, NVNT) which allows to display and filter the kinds of relationships between eGovTube community elements, that is, people (i.e. SMEs, PA representatives and innovation providers), knowledge assets (i.e. ideas, experiences expressed as videos), tags (i.e. semantic descriptions related to people interests and to videos content) and related connections,
- a compelling Connection Game inspired on the word matching game designed by Louis van Ahn where Intelligent Connection Agents mine people’s profiles and behaviours in order to seek for the perfect match between game players and with the videos to tag.

It is also apparent that participants, thanks to the videos and the other communication spaces, synchronous, such as chat and video-chat, and asynchronous, via comments and discussion forums, “can get feedback, get and contribute to new ideas, exchange with others [and] collaborate with others” which well explains in what consists of eGovTube actionable learning value

Entertainment and instant gratification value are easily understood because of the implementation of most engaging WEB2.0 trends (e.g. rich media as videos, recommendations, rating, tagging, rich profiling, network map) as well as because of the Connection Game described above.

B. Rural eGov Observatory 2.0

Rural eGov Observatory 2.0 is an online observatory that has been developed in the context of the Rural-eGov (http://rural-eGov.eu) Leonardo da Vinci (LdV) initiative, and which monitors and assesses the e-Government services that are being deployed in a number of rural areas around Europe.

In the context of Rural-eGov, two types of information resources (or objects) are mainly stored, shared and accessed online: Digital Training Objects (DTOs) and e-Government Resource Objects (eGROs). The DTOs support a variety of training scenarios for the rural SMEs, and include different types of educational material (such as lectures, best practice guides, self-assessment forms, etc.). These are stored as electronic files in the form of Powerpoint presentations, Word documents, PDF documents, short demo videos, and others. They are developed to cover the needs of the five targeted rural areas, and therefore are made available in English, Greek, German, Polish and Slovenian. All the DTOs that are produced to support the SME training scenarios are uploaded in the repository of the Rural-eGov Observatory. To facilitate searching, locating and downloading appropriate resources, the characteristics of the DTOs have to be briefly reflected in their descriptions. In this way, users can simply go through the various descriptions, and select the most appropriate resources for their needs, instead of downloading each file and checking for their appropriateness. Apart from reflecting the most important characteristics, descriptions have to also be available in the language of the users (that is, multilingual descriptions will be necessary).
The Rural eGov Observatory 2.0 platform will be used in order to meet the formal training needs that may emerge when the PA representatives will discover on the eGovTube what rural SMEs requirements are. In fact, once needs for adopting the RI innovative services (Semantic eGov and Rural Observatory 2.0 itself) and / or for better modeling existing public services and / or for developing new services aiming at reducing the AB for rural SMEs will be detected on eGovTube channels, comments and discussion forums, domain experts (typically belonging to the PA) may produce suitable training content and store and deliver it via the Rural Observatory 2.0 tool.

V. CONCLUSION

It is evident that the Rural Inclusion Training Methodology presents several challenges but also creates opportunities that if addressed properly will be able to overcome the challenges and allow the successful exploitation of the Rural Inclusion project as a commercial entity. These conclusions are presented below.

- Training is paramount for the success of Rural Inclusion, its acceptance from the user community, and essential in educating the future customers of its services and applications. Therefore training will be provided throughout the lifecycle of the project/service.

- There is a diverse and difficult to reach audience for training consisting of several diverse groups of users who (the majority) are the customers of Rural Inclusion and therefore need special motivation and approach in accepting the training offered by the consortium.

- The extended use of technology is necessary to deliver personalized training to the diverse user groups in a multilingual rural environment across several European Countries.

- The consortium offers both formal and informal training with the formal training provided for a limited group of users (i.e. Public Authority employees and entrepreneurs acting as change agents within their communities)

- The applications of Rural Inclusion (EGovTube and Rural E-Gov Observatory) have the tools and the capability to support training and these applications are used by the consortium to deliver the on line training to the users of Rural Inclusion

- A set of training metrics are established and the analysis of the results will be used to improve the training methodology and content.

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