LEARNING SOLUTIONS - IGUAL

Mierlus Mazilu Ion

(associate professor PhD) Technical University of Civil Engineering, Bucharest, Romania

Abstract:
The low quality of primary and secondary education in most Latin America countries is a well-known problem. As a response to this reality, the private educational market has been steadily growing in those countries. These private schools, in general, offer a higher quality and personalized education for the students that can afford it. The main selling point of these institutions is access to better resources: better teachers, technologies, materials and pedagogical methods. This difference in education quality creates a problem once students from public schools reach university.
This IGUAL project will generate learning solutions (combination of e-learning software, pedagogical methodologies and learning materials) to facilitate the assimilation of new knowledge and the development of new skills even when the student has deficient background knowledge and/or under-developed required skills. The solutions that this project will provide have the potential to be used by all students in the Latin American

Key Words: Education, learning software, pedagogical methodologies, learning materials

Introduction:

The low quality of primary and secondary education in most Latin America countries is a well-known problem. As a response to this reality, the private educational market has been steadily growing in those countries.

The IGUAL Project proposes the use of innovative learning technologies to help university students from public schools to bridge the knowledge and skill gap with their private schooled counterparts. This project is being developed by the following partners from Europe Union:

- Tampere University of Applied Sciences (TAMK), Tampere, Finland;
- Universitatea Tehnica de Constructii Bucuresti (UTCB), Bucharest, Romania

and also from Latin America:

- Universidad Autónoma de Aguascalientes (UAA), Aguascalientes, México;
- Universidad de los Andes (UNIANDES), Bogotá, Colombia;
- Escuela Superior Politécnica del Litoral (ESPOL), Guayaquil, Ecuador;
- Universidade Federal do Pampa (UNIPAMPA), Bagé, Brazil;
- Universidad Austral de Chile (UACh), Valdivia, Chile.

Basic idea:

These private schools, in general, offer a higher quality and personalized education for the students that can afford it. The main selling point of these institutions is access to better resources: better teachers, technologies, materials and pedagogical methods. This difference in education quality creates a problem once students from public schools reach university. The public schooled students have a strong handicap in their performance in a demanding and fast pace environment where professors are more concerned with the delivery of knowledge to large audiences than with catering to the specific needs of each student. This problem is aggravated by the fact that the great majority of public schooled students belong to low-income families. All the problems that arise from this social status in Latin America (need to work at an early age, economical difficulties, etc) also conspire to reduce the probabilities of success of these students. In this light, it is not just understandable, but to be expected, that the private schooled students out-performed their public schooled peers and gain better opportunities at the labour market.

The unequal primary and secondary education system in Latin America contribute to the inflexibility of the social mobility. Students that could afford private primary and secondary education have much better opportunities to have access to high quality universities and to complete successfully their studies. On the other hand, students that due to their socio-economical status only had access to public education have, statistically, a lower chance to enter universities and to obtain a professional degree. This has a negative impact on the competitiveness of Latin American countries, as only the middle- and high-income segments are fully contributing to the pool of specialized workforce while the talent and potential is uniformly distributed among the whole population. While scholarships and subsidized or free higher education could help to overcome the economic problems of low-income students, the lack of an adequate primary and secondary education has not been directly addressed in the region. While improving public basic education is the ideal solution to the problem, changing current educational structures have proved to be a long-term and difficult project for any country.

The main problem to be addressed during this project is the increased level of difficulty that public schooled students confront during their university studies, compared with their private schooled counterparts. This difficulty results in lower performance and a higher level of dropout. The only way to deal with such great individual differences in the students will be to personalise the learning process for each student according to their current status and capabilities. A feasible and scalable alternative to personalise the learning experience of the students is to use learning technologies to create automated solutions to follow the students during their learning process, identify areas or skills that they require but are lacking, recommend them appropriate content from learning material repositories and guide them trough learning paths adapted to their individual needs. This project will generate learning solutions (combination of e-learning software, pedagogical methodologies and learning materials) to facilitate the assimilation of new knowledge and the development of new skills even when the student has deficient background knowledge and/or under-developed required skills. These learning technologies, initially developed in Europe, could be adapted to provide several "helpers" or "automated tutors" for each learner. Even if not perfect when compared with human tutors, these technologies could help disadvantaged students to receive the extra support needed to overcome the gap with their peers.

The solutions that this project will provide have the potential to be used by all students in the Latin American Universities to support their learning process. However, it is expected that the public schooled students will be the main beneficiaries from these innovations, as they will enable those students to overcome the disparity in knowledge and skills with privately schooled students. In the context of the validation studies, at least 2000 students will be directly or indirectly involved in the different Latin American Universities that partner in this project by participating the pilot courses. If the project proves to generate positive results, this experience will be repeated each academic year and expanded to other knowledge areas apart from the pilot. The local companies are also final beneficiaries of this project. They can increase their competitiveness with new well-educated graduated professionals as their employees. Another final beneficiary group is the Latin American countries, as the know-how increases in the companies the competitiveness of the countries also increases.

In order to assure the dissemination and exploitation of the solutions proposed in the project, the Latin American Community of Learning Objects (LACLO) will be used as a way to reach other Latin American higher educational institutions beyond the project participants during and especially after the project. Also, this project is the first collaboration approach between two existing regional networks, Codewitz in Europe and LACLO in Latin America. All the project partners come from these networks. There are several activities such as a joint conference and virtual seminars during the project to create links between the members of both networks. All the project results are made technically compatible to be shared in both networks.

The objective of this project aligns itself with one of the specific objectives of the ALFA III program, namely, to improve the quality, relevance and accessibility of Higher Education in LA, particularly for the most vulnerable groups. If more low-income students successfully finish their studies despite the deficiencies in their basic education, the project will have a direct, positive impact

in the accessibility of higher education for a segment of the population (public schooled students) that is usually in a disadvantaged position compared with students that could afford private schools.

This project also supports two of the three ALFA III priorities. First, the adoption of innovative learning technologies to solve current pressing issues will help in the modernization of Latin American HEIs. Moreover, these technologies are aimed to the most disadvantaged group of students and will be implemented in two of the poorest countries in the region. Second, the creation of the solutions will require an intense exchange of ideas, learning materials, tools, methodologies and results in a level not seen before in the region in the area of learning technologies. This collaboration will strengthen existing regional networks, such as LACLO, and will create lasting bonds with European networks, such as Codewitz.

Research directions:
▪ Analysis of State-of-the-Art Solutions for Personalised Learning Support

LA partners, with the help of European partners, explore the state-of-the-art solutions for Personalized Learning Support developed and/or used in Europe. The partners collect and report the technologies used, promising results and good practice. This report will serve as base to select the technologies to be adapted to the Latin American needs and context. Each LA partner will assign at least one researcher to contribute to the report. This activity is conducted in parallel with the Need Analysis. Output will be one state-of-the-art report about European technologies for Personalized Learning Support

▪ Data collection for Needs Analysis

In order to determine the specific need of personalization that public schooled students have at the University, all LA partners will apply common questionnaires to their students and professors. Both LA and European partners discuss and approve the questions and the form of the final questionnaires. The overall activity is coordinated by the project coordinator. All LA partner will make necessary translations of the questionnaires and will apply them to their own students and professors. Each LA partner writes a report about their findings from the results of the conducted Need Analysis. Output will be a Questionnaire, results and also a Draft Need Analysis Reports

▪ Need Analysis and Needs Analysis Meeting

To unify the view of all the partners about the need analysis, ESPOL will coordinate the on-line discussion and the writing for the final report. To conclude the Need Analysis report, all partners will send a delegate to a meeting and visit to UNIANDES, Colombia. During this meeting the final discussion about the need analysis will take place and an agreement is reached over its content. During this meeting also, the Needs Analysis is contrasted against the State-of-the-Art report to establish the best European learning technologies to be adapted to address the knowledge and skill gap between public and private schooled students through the adequate used of automated personalization. Output will be Recommended Technologies Report

Proposed solution:
T The overall objective of this project is to improve the accessibility of higher education in Latin America for students from public schools. There is a measurable gap between the quality of education between private and public schools in most Latin American countries. This gap has an immediate impact on the level of accessibility to higher education for each one of those groups. Students that come from the public schools have a lower probability to enter higher education institutions and also an even lower probability to finish successfully their studies. While there are several factors that are responsible for these results (need to work while studying, lower expectations), the knowledge and skill gap between private- and public-educated students is a key problem that aggravates the others. This project will propose innovative, contextualised solutions, based on proved learning technologies, to help students with a public school background to rapidly close the gap and compensate for handicaps in their basic education.

The specific objective of this project is to create and validate innovative and contextualised solutions to reduce the knowledge and skill gap between private- and public-educated students. These solutions will help the student to acquire new knowledge and skills, providing individually directed

support based on the particular background and profile of the student. The personalised learning solutions will early detect problems with the students' knowledge and skill background, suggest students to review topics that were not being well covered in their basic studies and to recommend the student with activities to improve the level of their under-developed skills. Students with the public school background can use these tools to cope with deficiencies in their previous studies and to be up to par with their peers from private schools. The effectiveness, efficiency of the different solutions, as well as their positive impact in the students from public schools, will be evaluated and validated through their concurrent application and evaluation in all Latin American institutions that partner for this project. The application area will be introductory computer programming, where the gap between public and private basic education is the widest due to the limited access to technological resources in public schools.

The Latin American partners tackle the common problem of accessibility of the university studies concretely by delivering 6 learning solutions. The solutions put all their emphasis on enabling easier learning process for those students who have weaker background to catch up with the basic level of knowledge required in the university studies. These solutions would help to reduce the knowledge and skill gap between public and private schooled students. The solutions to be developed during the project are:

- Adaptive Learning Materials, which provides a methodology and tools for the easy creation of content that adapts to the student's specific needs. For example language, learning style, way to access the material, etc. This solution will be coordinated by UNIPAMPA, with the support of UAA, UNIANDES and TUCEB.
- Problem Solving Protocols which provides a way to adapt not only the content, but the process needed to solve a problem, depending of the mental models of each student. This solution will be coordinated by UAA, with the support of UNIPAMPA, ESPOL and TUCEB
- Adaptive Learning Design is a solution providing a methodology and tools for the creation of learning paths and designs in a way that enable the automatic adaptation to the students background knowledge and skills. This solution will be coordinated by UACH, with the support of UNIANDES, UNIPAMPA and TAMK.
- Social Sharing and Recommendation of Learning Materials is a solution for integrating familiar social media features into the process of sharing and recommending learning materials. This solution serves also as the main valorisation channel as all produced solutions and learning materials are distributed freely as open source through the platform. This solution will be coordinated by ESPOL, with the support of UACH, UAA and TAMK.
- Evolving Adaptive Framework this solution will provide the students an integrated and personalized way to access and use the other solutions created in this project. This solution will be coordinated by UNIANDES, with the support of UACH, ESPOL and TUCEB.

Conclusion:
- Design and Implementation of Innovative Learning Solutions

Given that several groups will work in parallel to develop different solutions, a set of technical standards will be set to ensure the interoperability of the different solutions. The topics to be agreed during those discussions are for example learning material metadata standards (Dublin core or LOM etc.), packaging standards (SCORM or IMS or LAMS etc.) and communication standards (SQI or OAI-PMH etc.). All partners participate in the discussion and the task coordinators will publish a final document. The use of appropriate standards ensures the maximum exploitability of the solutions. All partners will follow the agreed standards that will be included in the quality plan document.

- Designs and Implementation Plan for the Learning Solutions

Different solutions based on learning technologies will be proposed as ways to reduce the gap between private and public-schooled students in Latin American Universities. These solutions will exploit the research conducted in several areas of learning technologies in Europe and Worldwide. Each solution will be designed and implemented by development teams. The first partner in the

development team coordinates the work. The tentative solutions, pending confirmation by the need analysis, are the following:

- Adaptive Learning Materials

Adaptive Learning Materials, which provides a methodology and tools for the easy creation of content that adapts to the student's specific needs. The development team enables and produces adaptation to 100 learning materials.

- Problem Solving Protocols

Problem Solving Protocols, which provides a way to adapt not only the content, but the process, needed solve a problem, depending of the mental models of each student. For the pilot courses the development team will produce 40 problem protocols.

- Adaptive Learning Design

Adaptive Learning Design is a solution providing a methodology and tools for the creation of learning paths and designs in a way that enable the automatic adaptation to the students background knowledge and skills. The development team produces accordingly 60 learning designs for the use in the pilot courses.

- Social Sharing and Recommendation of Learning Materials

Social Sharing and Recommendation of Learning Materials is a solution for integrating familiar social media features into the process of sharing and recommend learning materials. This solution serves also as the main valorization channel as all produced solutions and learning materials are distributed freely as open source through the platform.

- Evolving Adaptive Framework

Evolving Adaptive Framework this solution will provide the students an integrated and personalized way to access and use the other solutions created in this project.

Acknowledgments:

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