



3D Performance Learning Platform for Motorcycle Mechanics

Progress Report

Public Part

Project information

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Executive Summary

The project 3D-PLP-M aims to develop an innovative educational methodology in vocational training. The core of the innovative technology is to develop a special learning platform that builds on the visual ability of the students. There has to be an additional benefit to be as attractive as possible to draw the students' attention regardless of the age group being trained. These aims are achieved through the excessive use of Virtual Reality technology to create a HOLOGRAPHIC-like 3D learning environment.

The idea comes directly from science fiction movies where special devices are used to project drawings into the space of a room to enable viewers to fully see the objects being studied.

3D-PLP-M addresses the problem that in theoretical education it is sometimes impossible to show students a particular part of an engine, a vehicle or a working cycle or even the structure of DNA may be difficult to explain at a conventional black board.

Up to now this problem has been handled by using dummy parts, projected drawings, etc.



Students visualize, imagine how things look like, work or how a process is completed or carried out. With this kind of education students need additional time for understanding.

As all the consortium partners are involved in Motorcycle Mechanics vocational education in their national environments it was obvious to start the development with the training materials of that subject.

At the starting phase of the project partners divided the motorcycle into subsystems and collected the main components found in these. The focus was to create a HOLOGRAPHIC-like 3D parts library made up of parts that are hard to reach or their dismantling takes excessive time from training. A library of HOLOGRAPHIC-like 3D animations is also created. In that, special processes like gas flow through an internal combustion engine or electromagnetic phenomena such as electricity generation are shown in Virtual Reality to help students visualize the specific theme thereby saving time for explanations and deeper understanding. These results can be used in the future not only in the motorcycle sector.

At the current stage the consortium already approved the basic design and didactical elements of the learning platform. During the a train-the-trainer course held at the 3rd transnational project meeting in Szeged/HU additional parts and themes were also specified to be included in the HOLOGRAPHIC-like 3D parts and animation libraries. This meeting not only served as a test venue for the work done so far but directions for further development were set, too.

The 3D Performance Learning Platform will be tested in pilot courses held at partner institutions during the forthcoming months to get feedback from future users. As this information is with outmost importance at the same project meeting a questionnaire has also been compiled. This common document will serve as a base platform on which consortium partners will build and fine tune their own information gathering forms. These actions taken so far greatly help reaching the goals to develop a performance oriented 21st century teaching and learning aid and make educational efforts more effective

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1. Project Objectives

Students enter to formal vocational schools at about 16 years old. Just leaving the primary school they are concerned to have no knowledge at all on anything like engines, mechanics, etc. From experience of the consortium partners it is clear that to have complete engines in classrooms at the very beginning of theoretical education would be helpful. Even if it was possible there is no way to show students the way a working cycle is completed in a running engine. Up to now this problem is handled using dummy parts, projected drawings, etc. with which students visualize and imagine how the real part looks like, works or how a process is completed within an engine. It takes sufficient time to explain these using the old fashioned tools of the training and by the time trainees start practicing in the school workshop the knowledge collected in theoretical training fades. This means their knowledge needs to be refreshed that is done in the time frame allocated for hands-on practice. This way real practical work begins later and less time is available for it.

Motorcycle technology develops rapidly so more sophisticated designs are sold each year. An increased level of preparedness is required from future workshop workers to repair them. This goal will be reached with a higher percentage of theoretical training in education at the expense of practical training (60%-->50%). This will worsen the current situation and with the tools usually used to teach it will stay unchanged.

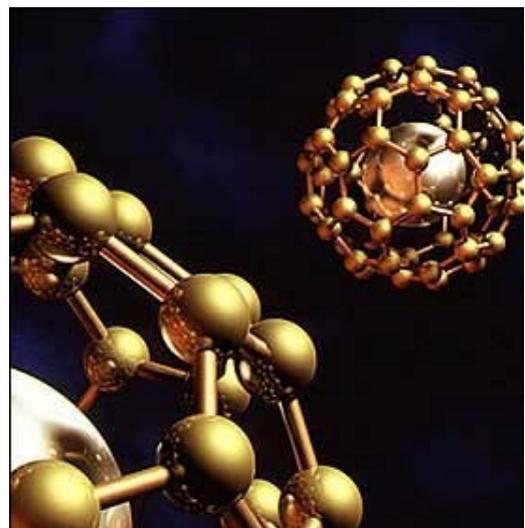
In adult education evening or weekend classes are held with reduced time frame to learn the same amount of information like in normal daily classes. To make things worse participants arrive to classes after work or after a working week. They are tired and their concentration may decrease listening to explanations and forcing their mind to visualize the information.

Usually this age group has less experience in ICT and is more in danger of exclusion because of their lack of skill in using computers which is a prerequisite for most of the jobs.

Changing trade is also difficult for students of older age and to re-enter education to keep their knowledge up to date is crucial. Self initiated Life Long Learning process is with outmost importance in their case as it helps preventing them from falling out of the labour market.

Main objectives of 3D-PLP-M project are:

- Develop an attracting way of learning
- Improve the efficiency of theoretical and practical training
- Teach more in less time
- Make E-learning more attractive and efficient
- Help keeping adult workforce knowledge updated
- Increase the chance of changing trade and carrier
- Make Lifelong Learning more attractive
- Create a base platform for other educational sectors to build their own 3D databases (arts, medicine, chemistry, etc)
- Develop a new way of presentations



2. Project Approach

During the life cycle of the project for the common understanding of procedures and objectives personal contact in the trans-national meetings are required. During these meetings lectures of individual partners about results, teamwork, brain-storming are used.

To ensure the best possible performance of the partnership portions of work to be completed will be defined with realistic and measurable agreement on objectives. The results are evaluated at each trans-national project meeting thus the project team is going to be oriented to a successful termination of the project. These documents are presented in a form of minutes of meetings and used as guidelines in the work between the meetings.

Outside meetings the daily exchange of results, problems, and project information are done mostly on electronic base. For this the partners use generally available internet mailing systems, fax or telephone as required. To ease the communication a mailing list has been created (3d-plp@lev-lista.hu) so each partner receives all the information necessary to complete the undertaken tasks by the agreed deadlines.

By using this information and document management system results are worked out together in the most time effective way. Since the partnership is well established by working together in the Leonardo project ESTM and co-operations afterwards (since nearly 6 years by now) we had no conflict so far and plan no to have one in the future.

Performance parameters of time, project cost and rate of realization of each work-package are supervised.

In the phase plan the main check activity dates are defined which correspond with the dates of meetings. The meeting minutes and agendas also serve as phase reviews and contain the outcome of the meeting, the achieved partial results, the definition of the correction processes, the content of the next work-package and the information about responsibilities for the different correction processes or parts of the work-package and the date by the results have to be submitted to project partners.

Realization of the project targets are done by the project teams of each partner institution and by subcontractors. During actual work self control is assumed from the contributors with the given criteria outlined in the actual phase review. The evaluation of phase results will be made by comparing the received results with the defined project aims/phase results in the previous minute of trans-national meeting, the planned and realized expenditures and with the scheduled time.

The pilot courses involve the end users of the product in the development and the minute of the pilot course will also be used in the correction processes.

3. Project Outcomes & Results

The main product of the 3D-PLP-M project is a special methodology that uses HOLOGRAPHIC-like 3D Virtual Reality technology. With this method a 3D picture or movie is generated of a part or a process that can be moved without limits. The digital information then presented on either a DVD or in the project web platform.

To employ the methodology a comprehensive database is being created that contains all the relevant information that subjects of motorcycle mechanics require. It means 3D scanned images of parts, assemblies and special 3D animations to show certain engine cycles, chemical or metallurgical processes from a viewpoint that could never be showed otherwise and with great detail focused on efficient knowledge acquisition.



At the 1st trans-national project meeting held in Budapest/HU a presentation was held by a possible subcontractor to show the capabilities of the HOLOGRAPHIC-like 3D technology. Also at this meeting the list of major subsystems were defined by which the partners began creating the necessary lists and screenplays which will last through about to three quarter of the project's life time.

During the 2nd trans-national project meeting held in Frankfurt am Main/D a sample 3D animation was presented. It helped the members of the consortium to understand the possible directions of development and requirements regarding the presentation of information to create the HOLOGRAPHIC-like 3D parts and animation libraries.

At the 3rd trans-national meeting in Szeged/HU trainers have been trained to use Learning Platform in order to perform the testing of 3D-PLP-M platform under development. To facilitate their training a curriculum for the Train-the-Trainer course and a teacher manual have been developed.

Also at the 3rd trans-national meeting consortium partners agreed to have a demo version of 3D-PLP-M published through the common project webpage. It greatly helps the dissemination activities of the partners and gets wider recognition of the project results.

Along with the development work dissemination materials are and will be produced to raise attention towards the results of the project. These include:

- special publication targeted to formal vocational schools
- flyers
- posters
- demo DVDs
- DM letters
- press releases and
- normal advertisements in magazines, radio, etc.

To get TV coverage to introduce results of the project is treated as a priority as news magazines are always the best platform to get to wider audience and to the possible end users. It also serves to raise attention of the editors of other TV productions that specialize in education or in science.

At the 3rd trans-national meeting held at Szeged/HU the Szeged TV broadcasted a 2 minute report in its evening news.

Beside of the above mentioned methods the dissemination activities include organizing press conferences, seminars on 3D-PLP-M and also participation in trade shows, fairs where the capabilities of HOLOGRAPHIC education can be demonstrated and an effective valorisation of project products will be founded.

4. Partnerships

Three vocational schools; one chamber and a limited form the consortium. This diversity ensures that all aspects of the project is paid attention. Every partner takes part in development and testing work.

M-Force is a privately owned institution and has significant experience in organizing courses, fairs, commercialising project products (ie. ESTM), making advertisements, etc. It also has a really strong base in adult education.

ISSA is formal vocational school. They experience in motor vehicles education dates back to the 1950's and with modern equipment and skilled teachers are the best conditions for cooperation on this project. ISSA can have a major impact on the pedagogical and didactical parts of the project.

Rhein-Main Chamber of Crafts will have a great impact on the development methods used in the project especially in compiling training material for students and for trainers as well. HWK has vast experience in further vocational education. Also most of the Japanese manufacturers have their headquarters established in Germany and HWK has really good connections to the importers. These links will help the project in gathering all relevant data directly from the manufacturers and will also serve as dissemination channels to the manufacturers to help raising attention for the project.

Siegfried Marcus Berufsschule also has decades of experience in training craftsmen in motor vehicles trades.

Szeged Pannonia Motorcycle Mechanics Vocational School with its teachers possesses substantial experience and knowledge in didactical methods used. Beside other project activities they will help to define the type and extent of content used in pilot courses.

The above detailed partnership has the potential to resolve technical and pedagogical problems and thus is able to develop new and valuable educational contents. All of the partners are experienced in education, participated in different local and international projects with success and every one of them has the attitude to form a very effective project team together.

As for the structure, M-Force, the applicant organisation coordinates project activities and communication among the partners and supervises the general advancement of the project. Also M-Force controls the financial background. The partners ISSA, BTZ, SMBS, SzePM organise the background of the project meetings whereas M-Force organises the content of these. The train-the-trainer course and quality control are the roles of the applicant, too. Every partner is involved in the creation of databases for selected subjects of motorcycle mechanics education and will conduct pilot courses to test and evaluate the project products, and assess the results of these courses. As the pilot courses form part of the quality control process the necessary information is fed back to the product development and to the trainer education. Every partner regardless whether it is applicant or partner adapts the project results.

5. Plans for the Future

Between the 3rd and 4th trans-national project meetings pilot courses will be conducted at each partner institution. The aim is to get valuable feedback from the participating students. To facilitate this; questionnaires will be produced. The main points are:

- Quality of the database (both design and technical content)
- Trainer performance
- Ease of use
- Asking advice to define directions of further development



From the evaluation of these questionnaires a common minute of pilot courses will be created that will be used to improve the quality of project products.

After the necessary changes the content of 3D-PLP-M will be finalized and a user manual will be created that will be available in printed form, too.

The content of 3D-PLP-M will be placed on DVD and on to the project webpage in the national language versions and in English. Other languages will be adapted later on according to actual needs.

In the future other types of dissemination materials and activities will be performed according to actual needs in relation to partner activities at different trade programs, fairs, etc. Examples are: special publication targeted to formal vocational schools, flyers, posters, demo DVDs, DM letters, press releases and normal advertisements in magazines, radio, organizing press conferences seminars, fairs to show the capabilities of HOLOGRAPHIC-like 3D education

Taking the actual future needs into consideration further development includes integration of audio information so trainees will be able to hear the noise of malfunctioning parts. Also special ways of assessments will be developed using the possibilities of 3D-PLP-M.

6. Contribution to EU policies

Developing the learning environment:

With 3D-PLP-M a special HOLOGRAPHIC-like 3D environment is created. Trainees can manipulate the objects or follow specific processes that could not be seen. Its advantage is that students are able to practice work sequences without the need of having parts or test equipment in the classroom. 3D-PLP-M also increases the efficiency of theoretical education by creating the possibility to see instantly the described subjects which otherwise would require the use of a complete workshop. It also creates good base for distance or e-learning along with the assessment of trainees.

Participation rates in education by age and by level of education:

3D-PLP-M's creates the perception of being able to touch parts, assemblies which are not present in their physical entity and does it with stunning impact on the viewers. With this education environment schools can increase the number of students enrolled to the institution helping the development of knowledge based society.

With older age groups the presentation of information helps to integrate them into the ICT based modern world. It also contributes in making the Life Long Learning process an enjoyable occupation. Because 3D-PLP-M can be installed onto any PC the number of individuals with any kind of educational background can participate in self directed education.

7. Extra Heading/Section

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