11."VIRTUAL LABORATORIES" A TOOL FOR PRACTICAL VOCATIONAL TRAINING IN HIGH SCHOOL

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Abstract: The article describes a didactic tool for learning the logistics profession, used in many Polish schools. The authors presented the situation in Polish education and discussed the broad functionality of the described tool which is called Virtual Laboratories, created to help understand students how a comapany works. The product was created from EFS funds from 2007-2013 bugdet.

Keywords: EU projects, ERP system, e-learning

1. SITUATION IN POLISH SCHOOLS

Many teachers ask themselves how to conduct classes so that students engage and participate in a lesson. This is a huge problem because it is increasingly difficult to encourage a student to actively participate in classes. This applies to schools around the world, especially in developed and developing countries. The development of technology and access to the network makes that young people spend their time much more willingly in the virtual world than in the real world. Social networks, online games or computer games are everyday for them. On the other hand, the virtual world deprived young people of the natural need to be with another human being. Of course, they have company, but they are often avatars of colleagues, and chatting becomes a channel of communication instead of conversation. The differences between adults and youth are becoming more and more visible. Older people do not understand how much time can be wasted on telephones, games, etc., and the younger ones do not understand why their parents are forcefully pulling them away from these games and phones, saying they need company. These differences will unfortunately deepen, while the development of technologies will accelerate them. It can be said that children are much more advanced in use of technologies used than their parents or teachers. Unfortunately, this is true with which adults have to be reconciled. More specifically, they must start using technology to stop this gap between the world of adults and children. One of the ways is to use these technologies in education. In the remainder of this work, authors will focus on Polish schools.

Polish education has been undergoing constant reforms for years. Not every one of them is good. In general, however, the aim is to improve the quality of education. The biggest problem is money, which unfortunately does not go hand in hand with introduced changes. As a result, when talking about a Polish school, its foundation is the nineteenth century ideas for teaching. In most schools, the student is assessed only from the acquired knowledge, passed in accordance with the program arranged by the Ministry of Education of the given government introducing a new reform in education. Very often the student cannot have his own opinion, and if he does it for many teachers he is simply insolent and arrogant. To this should be added the fact that the Polish school is very poorly equipped with teaching aids. It should be clearly stated that from the moment of Poland's accession to the European Union, the situation has started to improve significantly as schools use various forms of financial support offered by the development programs offered to the Member of EU.

Schools have equipped themselves with modern multimedia devices, computers, etc. It is regrettable that such activities do not apply to all schools... In order to visualize the scale of the problem, it is worth noting that modern computer equipment often worked in the local network, and access to the Internet was provided via an Internet connection with the lowest (cheapest) parameters. Despite the fact that the state did its best to have internet in every Polish village,

unfortunately in many of them it is of the lowest quality. Access to the network itself is not a total problem (if there is only such a signal quality in a given place, then nobody will complain when there is no comparison with a larger city). The scale of the problem is much larger, because budget constraints of schools force them to reduce expenditures and not to develop their infrastructure and equipment. Few will believe that photocopier is often a luxury article, but many Polish teachers will confirm it.

Polish education has been underfunded for years. No government implements systemic solutions to change this situation.

Many teachers do not see the potential which was mentioned at the beginning of this text, related to the vast knowledge of young people about modern technologies. Students with their own smartphones do not use them in school activities. It is amazing that using phones is forbidden in most schools. These phones are technologically often much more modern than the school's computer equipment. In addition, the development of the economy is accompanied by the development of technology and more and more access to information (e.g. via the Internet). We hear many times that we educate online illiterates who cannot even search for simple information on the web. This does not mean, of course, that students do not know how to use the Internet. Of course, they can, but only to the extent of their own needs. The authors' experience shows that many young people are not able to find valuable information on the desired topic using the search engine. Very often the result of the task is to indicate the first few websites indicated by the search engine - there is no question of advanced search. Many teachers are afraid to let students abduct students in their world and skills, and yet knowledge gained in this way could be perfectly used to teach the same students through the tools they use on a daily basis. The technical schools are much worse than general education. Here the problems are stratified. In 2012, a very large reform was introduced that completely changed the approach to learning different professions. His assumption was practical learning. Fact, companies report a need to focus on the development of many students' skills. Each of these skills will be subjected to training in a future workplace anyway. It was assumed that half of the classes should be practical. There are many professions in which the change of technology and general development of the economy have a very big impact on the issues that are taught. It is a shame to say that in many schools didactic aids come from the 80s or are even older ... it is much worse that the idea of practical teaching has limited itself to changes in the content of the programs, leaving the schools responsible for its implementation. In the reform, neither the penny has been devoted to improving the qualifications of teachers who have so far focused on theoretical issues. The assumption of the reform was that companies would have to strengthen their cooperation with vocational schools, giving them their know-how. Nothing more wrong. In Poland, companies are not interested (in the vast majority) for cooperation with education (not only in technical education, but also

high schools and universities). Polish law imposes that the employees of those companies who look after students have appropriate pedagogical qualifications, not (again) providing system solutions so that their acquisition is profitable for companies. As a result, we have reformed programs focused on practical learning, which students gain through watching videos on YouTube or from photos ...

Realizing that this text can be read by a reader from outside Poland, we want to make it clear that this does not mean that a Polish vocational school graduate cannot do anything. In spite of so many problems and limitations, many schools seek access to companies through their channels and have contacts with several friends. As a result, the Polish vocational school graduate is doing quite well on the job market. The authors point out that despite the lack of state support, the school is doing well (at the expense of its teachers, who have to jump over the difficulties encountered and partially described above) in educating a graduate ready to work in an ever-changing labour market.

2. SITUATION IN EDUCATION OF LOGISTICS

To show an example of good practices, the authors will focus on the logistics profession, describing the difficulties in its learning. Logistics is an area of the economy that is growing rapidly. This development is most visible on the example of using new technologies, which are largely based on IT and telecommunications solutions. A decade ago, there was talk of the boom of information systems in business, and today their place was taken by the Internet and the use of applications in a smartphone. The business responds flexibly to these changes, adapting to the needs of the client and the market. Many teachers who teach logisticians provide their students with information about changes taking place in logistics. In 2010, the High School of Logistics, based on the conducted research among teachers, identified IT needs related to adapting IT solutions to the curriculum. The curriculum imposed by the state provided for the use of an IT system in education. For many companies, the purchase and implementation of such a system was quite a challenge, let alone a school that did not have the money for basic needs. Conducting their own research, it turned out that many schools

declared having such a system. They were asked to indicate the name of their system and it turned out that the speech was about ... the Windows system[1]...

3. DESCRIBTION OF A SOLUTION

As part of improving the quality of education in the logistics profession, the High School of Logistics undertook to create an IT system adapted to the curriculum. Establishing the project was simple: create tasks to be implemented in the ERP system, thanks to which the students will learn the processes taking place in the industry and at the same time learn about the IT system used in business. The main motto in the development of the tool was: no simplifications. Thanks to this, the created system looks and works just like in business.

The solution used is widely used in the business world, while in the sphere of education is an innovation. The main assumption is to provide access to the IT system via the Internet, which gives the opportunity to calculate the costs associated with the purchase of a ready-made solution. It is not unusual for the purchase and implementation of an IT system to be very expensive and the benefits of the implemented system are visible in a medium-term or long-term enterprise. All entities that run a business can bring measurable benefits. This is mainly due to the organization of the processes of the enterprise and, consequently, the costs associated with their implementation. In the didactics, no IT system is able to address itself in relation to the costs incurred with its purchase, adaptation to the didactic path associated with it, as well as its implementation. Virtually no school is able to bear such costs (what is different in the sphere of enterprises that run business activity generating profits). The application of solutions that consists in the fact that the IT system is installed on external servers and making the database accessible to the school is the only solution that allows easy access to modern IT solutions. nobody implements IT systems from funds obtained from

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[1] Own research at the beginning of project (2010) [1, 3, 4].

the European Union. Taking into account the scale of the needs of Polish schools, those using EU funds are unitary. This phenomenon is obvious and results from many facts:

1. The availability of programs enabling the purchase and implementation of teaching tools is limited by budget and very often regionally. Additionally, it should be remembered that each application is considered individually by the evaluator. It may therefore occur that the exact same conclusion could be assessed quite differently by different evaluators.

2. Not every school joins competitions and uses funding. Of course, taking into account the competitiveness of the education market, the phenomenon of such passivity is practically impossible, however, in many places in Poland, the initiative of writing applications is imposed by the leading authority (subject and value of co-financing).

3. Small interest from enterprises providing IT solutions. You can divide this into two reasons:

a. the first one results from the pre-purchase phase, i.e. the identification of the needs (how the system's functionality should be, on what level of supervision and reporting detail). In business, the development of the list of functions and the detail of the system's work is carried out by a staff of people, often managers, familiar with the processes implemented in that enterprise. In didactics, it is difficult to precisely specify the school's needs in terms of the database being developed and the complexity of reporting and forms of process supervision. An additional burden is the fact that it is often done by one person (teacher, lecturer), not by a team of people - as in business. Often, the school is offered a model base, showing a simple process to which the school must get used (despite the desire to show certain processes / phenomena in a completely different form or the level of detail). This is often one of the main factors discouraging both parties to cooperation (discrepancy of effects to expectations).

b. the second reason is finance. Apart from the costs of purchasing and implementing the system, service supervision is an important aspect. The large number of schools (those related to logistics science in Poland is over 250) means that such service becomes a problem for IT companies. School service differs from business primarily because the fault must be removed immediately (arises during the course of classes). In business, a time buffer is often established to react when a failure or system fault is reported. The number of system users, the response time and the scattering of schools is very often a disincentive to IT companies to cooperate with schools.

4. VIRTUAL LABORATORIES

A very important element related to the imposition of the IT system in the company is the training of users. All in all, despite the difficulties associated with a large amount of information to be forwarded to such training, they are so simple that users know the processes in question. More precisely, they see them the same way. In the case of the described tool, it was first necessary to teach the teachers the same view of the processes on the basis of which the ERP system was created. The second impediment was that the teachers they passed the knowledge to their students. The number of hours associated with the preparation of teachers was much less than the time that the teacher has at his students' level. Thus, several forms of training were developed:

- direct - enabling the teacher to contact the trainer conducting the training;
- Internet - in the form of film tutorials showing step by step how to implement a given action in the ERP system. This training allows you to play in any amount of activities discussed in the film at a time convenient for the teacher;
- a paper form, manual (an e-book version is also available), describing both the action to be performed in the ERP system and the implementation of the entire task (sequence of activities).

Also manuals were developed for the ERP system and the instructional package. For students: divided into the theoretical part and the practical part, containing the content of tasks and instructions for use.

For teachers: in a similar division, enriched with authors' comments on tasks.

To facilitate the work and understanding of many issues, the system is accompanied by a series of tasks in Excel and PowerPoint presentations discussing issues that are implemented in the ERP system. There are also didactic films among them, discussing the importance of IT systems in various areas of logistics.

During the project period (2010-2012) almost 10,000 students benefited from the product, nearly 300 teachers from over 200 Polish schools were trained. The product has been awarded many times and awarded by various educational or business institutions. The greatest distinctions include the first place in the competition organized by the Ministry of National Education for ESF projects in 2011-07-2013, addressed to professional majors and the indication of the project in the good practice report. The second is the distinction awarded by PTL in the competition for the best TSL companies held during the international logistics 2014 conference.

Currently, about 100 Polish schools educating logistics services use the product, which means that every year around 2000 students perform basic activities related to the ERP system service (we talk about, for example, accepting customer orders, placing orders with suppliers, issuing warehouse documents related to accepting

or issuing indices) , invoicing, production planning, production settlement, rebates, etc.). The creators of the product constantly care about its development by creating new tasks or expanding the product with new IT systems and solutions used in logistics. The product also enjoys recognition among companies, hence joint projects are being implemented, which result in new teaching packages. An example may be the creation of a special package of tasks related to courier services in cooperation with DHL.

5. WHAT IS THE UNIVERSALITY OF THE SOLUTION?

1. Variety of processes. Students have the opportunity to learn about different processes taking place in the company, such as sales support, granting discounts, printing invoices, ordering deliveries, production planning, production accounting, calculating production costs, handling warehouses, etc. Getting to know them makes it possible to broaden knowledge about the company's operations and Understanding the relationship between processes, eg as a result of an order from a customer, inventory is analyzed, production order is created and placed in the production plan, missing materials ordered etc. Such process observation of the company is today a valued skill sought by employed employees.

2. Multithreading. Each process can end differently. The same can be simulated in this product. An example is the production of a product. The first step is to teach the student how this process works properly. Then, you can start the analysis of different process variants, eg the order has not been completed in its entirety and it must be completed later. The produced part should be sent to the customer. Comparing the two variants, it can be seen that the second edition of the product will be double. The same will apply to invoices for providing the missing part of the party. The task can be further developed with new threads, e.g. if the order was produced incomplete, what was the reason? How this delay affected the expected production costs. How has the product price changed relative to the price in the standard process? This task can be developed also for other skills not directly related to the trowel in the ERP system. An example can be communication with a client. If there is a delay and the customer does not receive it in full, a contact will be required in which he will be notified. Here again, you can enter multithreading, i.e. a telephone conversation and e-mail will look different. Customer can react with understanding or not. The ability to add more threads depends on the teacher and his experience. The assumption was to teach individual activities occurring in the processes and classes combines these skills by creating various cause and effect scenarios.

3. The product used can be used in many languages, as the ERP system has been developed in many languages (the system manufacturer sells it in the whole world). Practical learning of a foreign language is possible.

4. Adjusting the content of tasks to each program basis (not only Polish).
5. The ability to combine the taught processes with different IT solutions. An example of this is the combination of customer service related to the implementation of the transport service using the transport exchange, which aims to eliminate the costs associated with empty runs. The students prepare the order in the ERP system and then using the transport exchange look for orders that can be made on the way back from the client.
6. The ERP system is only a tool that supports the work of the company. Many exercises were prepared so that the student first made calculations or calculations or simulations, and then (after choosing the best variant) finalized the process in the IT system.
7. The product created is not just an ERP system. In agreement with DHL, a series of tasks related to the approximation of courier services was developed. A scenario for a didactic film about non-standard loads is currently under preparation. The interest of logistic companies in the willingness to present the profile of their business and the specificity of a given industry is observed. Such knowledge for a student learning logistics is not only interesting and attractive, but also allows to broaden knowledge about this interesting profession.
8. This product can be used to learn any profession in which processes occur that can be handled by the ERP system.
9. Possibility to adapt the difficulties and complexity of tasks to work with students of high school and university.

6. CONCLUSION

Virtual Laboratories have been very popular for years, especially for financial reasons (eg service and service costs are spread over all users). For 6 years, after the completion of the project, the product is constantly being enlarged with new elements: exercises, theoretical materials, other IT tools, and case studies. Schools using the product train well-prepared employees who know the basics in using the ERP system.

About 10,000 pupils were prepared to perform simple tasks in IT systems.

Teachers who train them have a tool that is adapted to the current needs of business. The product is constantly evolving, and its creators are eagerly looking for new forms to reach both students (to make the product attractive to them), teachers (to simplify preparation for the lesson) and above all business, because its strength and support for this initiative gives young people a sense of that they learn what they will use in their professional life.

Virtual Laboratories, for 6 years, still enjoy interest - about 100 schools in Poland, that is more than 2,000 students use it every year. It would be good for logistics companies to perceive this potential and to support such a well-established brand in the education market.

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