A content analysis of existing educational portals for teaching data warehouse and business intelligence

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Abstract — The purpose of this article is to analyze literature on educational portals. The main approach is content analysis. A lot of educational portals exist. From one side, the content of educational portals is organized in a unique way. On the other side, educational portals are web portals. That is why different instruments are used for building web portals. Two main problems are identified – the structure of the contents of an educational portal and the IT tools for its creation. This paper proposes a concept for a new educational portal on the basis of analysis of the functionality of existing educational portals and recent publications in scientific online journals about educational portals.

Key words — educational portal, e-learning, data warehouse, business intelligence

I. INTRODUCTION

Educational portals extend the knowledge people acquire at school. People can learn about new technologies. People can get new skills. Not so many people have enough money to afford paid courses. Educational portals are helpful for them because they can acquire specific skills. People will improve themselves. As a result the society will have more intelligent people. More intelligent people may have better life style.

Physical attendance at classrooms requires a personal attention from the teacher to the student. When there are too many students, students can get links to educational portals and play games, concerning improving skills and getting new knowledge. The most important part of an educational portal is the connectivity between people and data. It gives the opportunity to achieve knowledge in an individual approach.

Users may find courses by subject or educational level. Educational portals make education accessible. Some people use the term “digital classroom”.

Educational portals are used to share knowledge and information. Creating an educational portal is concerned with three types of knowledge – technology knowledge, content knowledge and pedagogy knowledge [1].

The content of some educational portals is built by cases. This paper is structured using the IMRAD research paper format.

The purpose is the design and development of an open source, dynamic and adaptive Web platform, using Web standards.

The new value added in this research is to provide information on the structure, features, contents, IT solution, tools, examples and trends on creating new educational portals.

II. LITERATURE REVIEW

Educational portals are used to provide online information for different users in Internet environment. Some of the educational portals are free; others provide paid access to online resources. Some authors [2] emphasize on the content of the portal. The content of educational portals is usually saved in educational repositories.

Some educational portals [3] are created using project funding. Different architecture solutions exist to create an educational portal. These portals deliver electronic content. A classification of the portal users has to be made before implementing the portal. Most of the existing educational portals are created as web portals. There are tools for creating web content such as Java, PHP/MySQL, Video tools, games, animations,
JQuery, e-books. There are other tools for administering the web portal.

Educational portals provide single access point to educational resources [4]. Some authors focus on the technology of building educational portals. Some use Moodle as a well-known open source software system for educational purposes. These authors use Moodle to provide courses in business intelligence. Educational portals are connected with two terms in e-learning – learning management systems (LMS) and content management systems (CMS).

Using the educational portals everybody is putting his educational resources. All participants get to “Learn to learn together skills” (L2L2) [5]. These skills include group learning and group creativity.

Educational portals are created for communication between people which are geographically separated [6]. Osman focuses on information exchange among different people. The decision making process has new dimensions.

The perceived usefulness of educational portals is different for different people [7]. It is connected with the behavioural control and attitude to computers.

Creating educational portals, web developers have to take in mind the portal structure [8]. The web portal has a unique structure. This structure is created by the designers of the web portal. It consists of an administrative part and a part for end-users. Elements concerning social integration, blogs and databases are obligatory in the model of the educational portal [21].

Based on the research done on this topic and the literature review above, there are so many opinions from various authors on the roles and significance of educational portals and the challenges faced by the academia particularly innovative solution in education. But, there is inadequate information concerning the methods of creating of educational portals particularly good case studies. Therefore, because of the scarcity of good solutions related to educational portals, especially in developing countries, many universities and educational institutions operate without ICT due to the fear of security issues and technical problems.

Due to the huge gap found in the research of this topic, especially in good examples, this paper concentrates on the methods of creating educational portals. Moreover, the authors of this paper recommend some methods. They could be applicable for universities in building good educational platforms. It is worth mentioning that the need of creating an educational portal appeared due to implementing of the DIMBI project by Jan Wyzykowski University [9], Economics University of Wroclaw, Economics University – Varna and Paragon Europe from Malta. The aim of the DIMBI project is the improvement of the quality of education through modernizing of curricula in the field of Business Informatics and creating new innovative solutions in the area of teaching, with the possibility to be implemented at universities inside the country and abroad. The project meets the needs of the universities and offers the access to the ready-made, innovative tools. It also contributes to the modernizing of high education in Europe and complies with the strategies and policies of EU. The aim of the Partnership, what’s over, is introducing the innovative practices leading to high quality of teaching and learning.

A summary of the literature review of the term “educational portal” is given in figure 1.

**Figure 1:** A summary of the literature review of the term “educational portal”

**III. RESEARCH METHODOLOGY**

In this paper information is analyzed from several representative universities, several ICTs and scientific papers concerning the current situation in developing of educational portals. Additionally, the IT specialists who create educational portals were interviewed.
Creating an educational portal has two main aspects – design and content. The design aspect concerns visual presentations of educational resources. The content is mainly created by authors (teachers). Some issues concerning copyright are also discussed in literature. In most cases the well-known Creative Common Licenses are used.

Teachers and students having Gmail accounts may use applications such as Classroom, Mind Meister and Pear Deck. These applications are used by many teachers and students and a lot of case studies are available. Our recommendation is the new educational portal to have integration with these Google applications.

Except Google Apps other instruments are integrated in educational portals [8]. These applications are used for creating presentations, collaborative writing a book, social bookmarking, sharing videos, interactive posters, quizzes, puzzles, web whiteboards and flipped lessons.

The method of developing of educational portals has been developed as a result of the research to answer the following questions:

a) Which structure should have a contemporary educational portal?

b) Which features should have a contemporary educational portal?

c) What should contain a contemporary educational portal?

d) Which IT solution should be implemented in a good portal?

e) Which tools should be used to build a good portal?

f) Which good examples (good practices?) should be taken into account to build new portals?

g) Which trends can be predicted in creating of educational portals?

The performance indicators on which we based our researching on creating a contemporary educational portal are the following: the structure of a new educational portal, features of contemporary education portal, contents of a new contemporary education portal, IT solution that could be implemented in the portal, tools to build a new educational portal, examples for contemporary education portals and trends that can be predicted during creation of educational portals.

IV. FINDINGS

The structure of a new educational portal

Creating a new educational portal is a difficult task. Having in mind the experience of other researchers and developers we may promote the following structure of a web portal (figure 2).

The proposed new structure of an educational portal extends the functionality of existing educational portals. It is designed to serve the DIMBI project purpose. Teaching data warehouse (DWH) and business intelligence (BI) in an innovative way requires the need of a new concept of an educational portal. This concept will be used by Paragon Europe (a partner in the DIMBI project) who will create the educational portal.

![Structure of a new educational portal](image)

**Figure 2:** Structure of a new educational portal for teaching DWH and BI

**Features of new education portal**

1. The digital resources should be available disregard the geographical location.

2. The portal should have two sections: public (access for all interested ones after the registration) and
non-public (only for the registered project participants).

3. The project participants should be automatically included in the process of testing the tools through the portal.

4. The portal should create the conditions so all the participants who will be testing the methodology of teaching will undergo the electronic surveying in closed and open surveys and they will also be engaged in dissemination activities.

5. Pass an exam to earn real college credit [10].

**Contents of a new educational portal**

1. The new educational portal will have its own repository with case studies in DWH and BI. Each tutor will have access to add new case studies with datasets and methodology for implementing them. After receiving the results from the used specialized software conclusions on the software output are made.

2. The portal will include the material base (documents, manuals, tutorials, scenarios of the classes, interactive books, presentations) and tools (open source software) necessary to implement and realize the methodology of BI and DWH.

3. The portal will include the basic information on the project participants such as name, location and contact details. Additionally, the data uploaded into portal will refer to the university (institution) authorities, lecturers, the history of the universities, institutions.

4. The portal will offer direct access to communication tools and will play information roles (collect the updates and information related to using the tools and will offer the access to discussion forums to the project participants) both for the project participants and the interested ones too. The range of the access will be formed accordingly by the educational portal administrator.

5. The authenticated users will have access to all available functions within the offered access rights.

6. Moreover the portal should contain:
   - Career Guidance
   - Educational snippets in article and video form
   - Free online courses
   - A resource for researching schools
   - Watch free video lessons
   - Take free quizzes

**IT solution that could be implemented in the portal**

**Mobile learning:**

Mobile learning provides unique learning experiences for learners in both formal and informal environments, supporting various pedagogies with the unique characteristics that are afforded by mobile technology. Mobile learning, as a growing topic of interest, brings challenges of design for teachers and course designers alike [20].

**Webinar**

Short for Web-based seminar, a webinar is a presentation, a lecture, a workshop or a seminar that is transmitted over the Web using video conferencing software. A key feature of a Webinar is its interactive elements: the ability to give, receive and discuss information in real-time.

Using Webinar software participants can share audio, documents and applications with webinar attendees. This is useful when the webinar host is conducting a lecture or information session. While the presenter is speaking they can share desktop applications and documents [19].

**Web-Cast**

A webcast is a media presentation distributed over the Internet using streaming media technology to distribute a single content source to many simultaneous listeners/viewers. A webcast may either be distributed live or on demand. Essentially, webcasting is “broadcasting” over the Internet [18].

**Tools to build a new educational portal**

The portal will be created with CMS technology in such a way that after the project has been completed, there will be still the possibility for its further development.

For the creation of the web portal different approaches are possible. A platform for creating the portal may be used – such as Joomla, Wordpress, Moodle. Another possible approach is specialized web application (created with PHP/MySQL or ASP.NET or other programming tool).

**Examples for new education portals:**

- https://www.buncee.com/education
- http://www.ellucian.com/higher-education-portal/
- http://study.com/pages/About_Us.html
- https://www.merlot.org/merlot/TeacherEducation.htm
- http://www.education.com/
- http://www.edubilla.com/

**Trends that can be predicted during creation of educational portals**

The analysis of web portals allows us to come up with a few comments.

Taking into consideration the content of the educational sites in most cases in serves to notice, that they offer a wealth of materials [21]. However, this
asset could be a disadvantage, too. The scope of the content requires sophisticated navigation tools. Untrained users can quickly become discouraged.

Not so long ago a common feature of educational portals was poor graphics and unintuitive content deployment. However, a noticeable trend is to change this approach. Currently, the creators of the best educational portals (specified in the paragraph above), put a significant emphasis on the visual aspects of their products. For this purpose, they use professional photos, videos or other media [22]. The interest of a user may result in his staying on a site and can guarantee regular visits.

An attractive graphics form the portal, the ease of navigation and current content tailored to the level of a recipient seem to be crucial for a large number of unique users. These issues are particularly important in the case of multi-thematic portals, where it is difficult to indicate the dominant area of knowledge / learning.

In connection with the global dynamically developing mobile technologies it is necessary to prepare a scalable and responsive portal. It is all about the ability to read the content and the use of the portal on a variety of desktop and mobile devices (smartphones, tablets, kiosks, etc.) [23].

In addition to the layout, which is no less important than the portal structure affects its popularity. One of the most significant trends in portals for education is the separation between content sections and navigation and current content tailored to the level of a user or even his stages of training. This means that the content should be presented in a form and level that is appropriate for the user's current capabilities.

It seems, that due to the increasing popularity of non-formal education on the internet, specialized bloggers or even academics vlogers are beginning to appear. Due to the fact, that as time goes by, they gain positions of opinion makers, they are supported financially by traditional universities. A thing worth consideration are the innovative activities linking bloggers and simultaneously maintaining an educational portal.

It is worth noting, that sharing content on the web is conducted by methods of open source. A growing number of publications and other content, having the nature of free access, favors the dissemination and popularization of scientific issues.

V. CONCLUSION

Teaching business informatics requires the application of new methods. Disciplines such as data warehouse (DWH) and business intelligence (BI) are complex ones. From one side, great datasets are used. From the other side, new and innovative methods have to be used because in BI many algorithms and methods may be applied for solving a case study.

To adapt novelty in teaching DWH and BI the purpose of the DIMBI project is to provide new curricula, new methodologies and new interactive books. For the dissemination of the DIMBI project several approaches are planned.

One of them is creating an educational portal. Since there are many educational portals in internet, two issues are discussed in this article. The first one: concerning the structure of the contents of an educational portal. The second one: the IT tools that may be used for its building it.

After analyzing existing educational portals a new proposition is made. The proposition concerns the content structure of an educational portal, its users, basic functionality and possible tools for its creation. Since the proposition is unique (created by the authors of this article), if it is used by other researchers or software companies, they must give the appropriate credit by providing a link to this article.

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VII. REFERENCES


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