

Kragujevac J. Math. 30 (2007) 89–97.

THE MATH PORTALS

Ljubica Diković¹, Dušan Stefanović²

¹ *Business Technical College, 31000 Užice, Serbia*

² *Faculty of Science and Mathematics, 34000 Kragujevac, Serbia*
(e-mail: dikoviclj@ptt.yu, dusans@kg.ac.yu)

(Received October 30, 2006)

Abstract. Learning portals allow users to learn just what they need to learn, when they need to learn it, and from wherever they can learn it, and how they can choose objects in the order they desire, or perhaps choose between different ways to learn the same information? Math portals represent a new dimensions of mathematics education for teachers and students, which offers a large collection of math lesson plans, resources, and links to other web sites. Also, the math portals are designed to help local schools to understand the issues and challenges available for dramatically improving mathematics instruction so that all students can learn. The Internet contains wonderful resources but without guidance, can be hard to find. The aim of the work is to systematically point out to existing mathematical resources on Net and some good mathematics sites, and show that learning maths can be efficient and effective as traditional approach. Finally, new trends in technology and learning are shown. This work considers several of these trends, which are especially important for the future development of e-learning.

1. INTRODUCTION

E-Learning portal represents a virtual environment set by one or more organizations with the aim of helping the users to access to different kinds of learning. E-Learning portal is an intelligent learning portal because it recognizes what the users know, which certificates they have, what kind of experiences they possess with

recommendation for the choice of the most adequate learning style. They transmit information in an accurate, consistent way, using a simple interface in work, which is flexibly integrated, if needed, into the systems of estates. E-Learning portals have evolved from the information economy to the learning economy, i.e., the economy based on learning (knowledge). Portals represent places for exchange of collective learning together with centralized control of learning on one side, and user's centered flexible learning, on the other side. It could also be said that learning portals are WEB sites that combine educational content prepared in the form of courses, all modalities for achievements of mutual cooperation and communication technology. New technologies and communicating infrastructure of Internet created E-Learning technology, content and services for development of critical learning resources. Learning portals can combine several complementary E-Learning solutions together with a new effective learning form. [1], [2].

2. LEARNING PORTALS

Learning portals, as specialized portals, represent a specific learning gateways, including all available learning resources and putting them into use to different focus groups. Learning portals represent an important form of E-Learning which enables the users to learn the things they want to learn, when they want to learn and from where they want to learn, and at the same time to choose different learning styles of the same information or the order of access to the learning objects in a nonlinear manner, by links. Thus, the term learning portals is used to describe different forms of portal applications intended for learning, which serve different user's groups.

The basic functions of learning portals are to allow efficient access to documents and distribution of information in documents, which could be located at several different places (Web sites on the network, data bases on servers, etc.) That function is realized by searching of interface, which represents an active mechanism for accessibility and achievement of learning. Access function to information and their distribution, broaden the role of portals from the passive, virtual information system

to the function of active acquisition and distribution of learning. Success of portals is measured by the quantity of information flow through portal. [3]

Scientific portals represent a kind of portals which are focused on the creation of learning, integration of learning and information validity, which influence everyday increase of productivity level of scientific workers all over the world. Scientific portal possesses the following functions: [4]

- It is target-oriented to the learning products, integration and learning control;
- Provides, produces and control the information on information validity;
- Provides information on business and meta information as well as the degree in which it is possible to rely on such information;
- Makes the difference between learning and information;
- Provides capacities for production of learning from information;
- Allows production and integration of learning.

One of the tools for creation, flexible designing for different users and portal updating, is WebLogic.[5]

3. MATH PORTALS, NEW DIMENSIONS OF MATH EDUCATION

*”Do not worry too much about your difficulties in mathematics,
I can assure you that mine are still greater.”*

Albert Einstein

Math portals have been designed and outlined as network educational solution for presentation and learning of mathematics. Many of them are intended for schools and teachers with aim to help them to understand present needs and changes, in the trend of dramatic increase of math instructions which pupils and students are to learn.

The internet already contains numerous math resources starting from curriculum, interactive lessons and exercises, tables, graphs, animation, math puzzles and games , and so on. Math portals, as new dimensions of math education , offer the following contents:

- Professional advance training of teachers: teachers' education, new trends in teaching of mathematics (mathematical reforms), exchange of learning (knowledge) and experience;
- Sullabys, lessons and materials;
- Resources for pupils, students and parents (help in work with children)
- Various tests and exercises.

Such a mathematical education is aimed for popularization of mathematics, i.e., math learning for all!

Math learning should include the following mutually connected components: [6]

- Conceptual understanding: Understanding of math concepts, operations and relations, i.e., to realize what math symbols and procedures mean
- Procedural easiness: Adopt and make math procedures flexible, efficient and usable (applicable).
- Strategic competence: To be trained to formulate problems mathematically, develop strategies for problem solving using formerly adopted concepts and procedures.
- Adaptive reasoning: Develop the capacity for logical thinking, observation, explanation and checking of problem solving, or apply known solution and results in other, unknown situations.
- Productive dimension: Taking math as sensitive, useful, applicable and significant science, with faith and self-confidence into its own efficiency.

Out of numerous Internet resources intended for math portals, we distinguish:

- On address [18] http://en.wikipedia.org/wiki/List_of_mathematics_lists, there is an extremely long list of all mathematical articles, sorted in alphabetical order. Classification of subjects on the list has been left to the American Mathematical Society.
- On address [8] <http://www.teach-nology.com>, there is a portal outlined as on-line teaching resource intended primarily for teachers who are willing to exchange experiences and advance their presentation to present-day generations of pupils and students. Free access is allowed to 27000 curriculums, 6.500 printable tables, a lot of advice and instructions, games, 256000 links to other sites, etc. On the link "Math Worksheets Area", there are a great number of very useful links, such as: "Basic Arithmetic", "Even and Odd Numbers", "Geometry", "Graphing", "Magic Numbers", "Math Funs", "Math Puzzles", "Measurement", "Rounding", etc.
- On address [15] <http://www.psamathe.net> there is a math portal divided by links in news, dictionary (terms), math encyclopedia. Directory which contains subfolders: algebra, analysis, theory of numbers, combination, logic, etc., as well as top Web pages with mathematical contents.
- On address [17] <http://mathforum.org>, there is a well-organized math portal according to subjects, broadened by archived forum containing mutually given questions and answers of users. The portal is intended for teachers and students, including activities, ideas for teaching practice, curriculums and lessons, presentation, exchange of solutions of numerous practical problems. The portal also contains a list of useful Internet math links.
- On address [6] <http://portal.connect.znanost.org>, there is a place for communication and exchange of information among the members of Connect net, which connects Croatian students, educators and scientists abroad and in Croatia. The community members can add texts they want and which they consider

interesting for others. On the site there is a link to electronic math magazine math.e started by the Croatian math society, on address www.math.hr./mathe. Although it is primarily intended for high school pupils and students of mathematics and similar faculties, all those who visit Web-pages of the magazine will find something interesting.

- On address [12] <http://hrcak.srce.hr>, there is a portal of scientific magazines published in the Republic of Croatia, starting from Mathematical Herald which publishes original scientific works in the field of pure and applied mathematics, via scientific-expert magazine KoG for constructive geometry and computer graphics in the field of geometry, applied geometry and computing graphics and other magazines.
- On address [13] <http://web.math.hr/hmd/nastsek.htm>, there is a teaching section on the portal of the Croatian Mathematical Society, responsible for improvement of teaching mathematics at all levels containing distribution of lectures for advance training , councils, annual exams, etc.

4. FUTURE DEVELOPMENT OF PORTALS

Technology of portals supports open standards, which can be easily integrated into existing infrastructures of organizations. Portal solutions must be acceptable for different kinds of platforms and units. With their platform, application and architecture independent of hardware, E-Learning portals provide optimal flexibility. The aim is to provide a mobile, distributed and organized access to applications, learning and information necessary for making some decisions, thus becoming the places of vital importance for business, productivity and profitability. Attractiveness of Web based solutions combined with necessity for efficient access to information and learning, contributed to a great popularity and acceptance of E-Learning portals. Contribution of fundamental technical trends of development will have a decisive role in development

of E-Learning in future.

Some of the trends are: [19]

- To be always online.

Soon, due to lower costs of network equipment and telephone impulses, online version of work is expected to be accessible to all users. It may also be expected that students require the answers from the teachers at any time during the day, which means that the institutions should provide "24/7" learning support.

- All information online.

Even today, the user need not go to the library, because libraries come to him. A huge human learning potential is present on Internet. Digital libraries and online data base offer trillions of pages with online information, which must influence the reform of primary education.

- Digitalization of all media.

With increase of network speeds and introduction of technology "voice-over IP" (VoIP)", audio technologies become more present in the form of E-Learning while overcoming a number of previous restrictions. High quality of audio media, including "surround sound", influence the greater learning inspiration and motivation, creating impressive audio similarities as new working techniques. Video technologies and video conferences will be increasingly used for presentation and collaboration, returning into communication three-dimensional objects and the fluid of real world. Audio and video technologies can simulate dynamic virtual world reality, which can be in the function of complex training in certain professions.

- System protection

In communication conditions of business information systems via Internet, there is an increasing threats directing toward secrecy, accessibility and integrity of business data, while the safety becomes an important question of functioning of the business systems and people. Thus, information safety is not a phrase any more but a concept which is obligatory for business-information systems.

- Learning trends in the sense of whole-life learning are continuing, and E-Learning represents an ideal form for that. According to this, E-Learning must develop modules of adaptability to different levels of interest, knowledge (learning), and technical equipment. Trends of learning globalization are continuing, because Internet and Web technologies ignore time zone and restrictions. It is predicted that further development of E-Learning portals will go in the direction of creation the portable portals with trends towards mobility of learning.

5. CONCLUSION

Further development of communication technologies will progressively influence on the development and quality of math portals. Mathematics and its style of thinking are to become easily accessible, being made available to modern man during his whole life. With development of the next generation of algorithms for data compression and communication network equipment, advanced collaborative properties of math portals are expected, which would include: immediate textual adding in writing, voice mail, virtual white boards and audio and video conferences in real time. Advanced collaborative tools are to add the element of dynamism into static environments of math portals, as they appear today.

References

- [1] <http://www.amanet.org/books/catalog/0814407218.htm>
- [2] <http://www.expertmagazine.com/artman/publish/article-351.shtml>
- [3] <http://learning.ncsa.uiuc.edu/elearntr/portable.html>
- [4] G. Drakulić, M. Banjanin, D. Miladinović, *Razvoj portalnog sistema za telekomunikacionu agenciju MDK*, XIII Telekomunikacioni forum TELFOR, Beograd (2005).

- [5] <http://www.bea.com>
- [6] <http://portal.connect.znanost.org>
- [7] <http://www.croeos.net>
- [8] <http://www.teach-nology.com>
- [9] <http://www.learn.com>
- [10] <http://www.learn2.com>
- [11] <http://www.dolina.hr>
- [12] <http://hrcak.srce.hr>
- [13] <http://web.math.hr/hmd/nastsek.htm>
- [14] <http://www.xplora.org/ww/en/pub/xplora/>
- [15] <http://www.grupa.org.yu/>
- [16] <http://www.mililanihs.k12.hi.us>
- [17] <http://mathforum.org>
- [18] http://en.wikipedia.org/wiki/List_of_mathematics_lists
- [19] George M. Piskurich, *The AMA Handbook of E-Learning: Effective Design, Implementation und Technology Solution*, AMACOM, New York (2003).