

OPPORTUNITIES AND CHALLENGES OF ELECTRONIC LEARNING

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Abstract. *Rapid development of computer networks and information technologies, especially the Internet and World Wide Web causes expansion of electronic learning (e-learning) and distance education. Education programs delivery via virtual learning environments is a convenient form of education for learners who want to learn from home whenever. In today business and economic environment, e-learning must be a part of strategy in many institutions trying to make success in basic education, higher education, continuing education, and training. The paper is dedicated to opportunities that the new form of education makes. Moreover, challenges and shortcomings of e-learning should be considered by education institutions, business organizations and learners.*

Key Words: *E-learning, web-based training, education, interactivity.*

1. INTRODUCTION

The term e-learning refers to set of applications and processes and includes many other similar terms such as, web-based learning, on-line learning, virtual classrooms, distance learning. E-learning could be defined as the delivery of education content via all electronic media, including the Internet, intranets, extranets, satellite broadcast, interactive TV, and CD or DVD. [1]

On-line learning is used synonymously with web-based learning although terms like e-learning, distance learning, on-line learning and web-based learning are defined and used differently by different organizations and user groups. On-line learning makes just one aspect of e-learning and means learning via Internet, intranet, and extranet. There are basic on-line learning and sophisticated on-line learning. A basic on-line learning program includes textual and graphic content of the course, exercises and testing. A sophisticated on-line learning program includes audio and video records, discussion groups, on-line mentoring, animations, simulations, links to course material on a web site.

Finally, some authors use term e-training as a synonym for corporate e-learning. Really, e-training describes corporate training conducted via e-learning methods and technologies. [2]

E-learning can be conducted by synchronous and asynchronous methods and technologies. Synchronous learning takes place in on-line real-time virtual learning environment and lectures are led by an instructor. In the environment all participants are present at the same time and communicate directly with each other. There are many examples of environments for synchronous course delivery: virtual classrooms, teleconferences and videoconferences, Internet telephony, and live satellite broadcasts of lectures to students in a classroom.

In asynchronous learning environment, participants are not present at same time and thus they communicate with time delay. Examples for asynchronous course delivery are: distribution of courses via Internet or DVD, recorded classes, recorded audio/video web presentations, question&answer mentoring, on-line chats and discussion groups, and e-mail.

The aim of the paper is to explain trends and market segments of e-learning, challenges and opportunities, as well as shortcomings of e-learning. The following part of the paper is dedicated to trends and market segments of e-learning, which are very complex. The transformation of economy and education makes broad context for emerging and expansion of e-learning and that is topic of the third part of the paper. Challenges of e-learning are explained in the fourth part and opportunities are analysed in the fifth part. E-learning has some shortcomings which are the theme of the sixth part. Finally, concluding remarks on challenges, opportunities and shortcomings of e-learning are presented in the seventh part of the paper.

2. TRENDS AND MARKET SEGMENTS OF E-LEARNING

Today, there are three major trends in e-learning area: integration of many information technologies in education, learner-friendly environments and service-oriented institutions.

Integration. Many information and communication technologies in education are going to be integrated. Distinctions between different forms of educational telecommunications have been reduced. New wireless services in e-learning challenge further integration of technologies. Education and training organizations must help learners to be familiar with multiple technologies, to be skilful in information gathering from remote sources and to be trained in collaboration with remote team members. These skills are central to the future workplace.

Learner-friendly environments. Advances in educational technologies (e.g. natural language processing, reusable learning objects, and agent technology) make learning environments more friendly. Learners simply describe the desired learning goal and send intelligent agents to collect suitable learning objects from web. Thus, learners using the technologies are engaged in collaborative global learning and teachers have the role of facilitators. Learners take responsibility for their own learning, defining their own learning goals and using educational resources and technologies. [3]

Service-Oriented Institutions. The quality of services of e-learning institutions is a key factor influencing the competitive advantage of the institutions. The services include:

pedagogical services, learning services, and infrastructure. Most of today's learning environments are focused mainly on infrastructure and neglect the personalized pedagogical and learning services.

Some of the challenges in e-learning include inadequate quality of service, inadequate materials and lack of interactivity. In most existing web-based learning environments, course materials are organized by the course authors in order to cover one or more topics. The course materials in form of linked HTML pages are then placed on-line on a web site. The students can use them only by following the established path. In the environments, instructors and tutors are not always available on-line and there is need for assistance and interactions between students. As the number of on-line learners increases, there are more problems in balancing cost, quality, and efficiency in course development and maintenance.

Interactivity is another main factor influencing on-line education effectiveness. Web-based educational applications available on the market provide different educational environments with specific features. However, the environments have the same aim: to deliver learning content through Internet. Interest of students in the learning process is radically reduced when the level of interactivity is low. [4]

Content, technology, and services are the three major market segments in e-learning, particularly in corporate e-training, which is becoming more popular. E-learning market in developed countries is very complex with many market segments but the three segments are main and they capture the general trends of e-learning.

Content providers create and publish educational and learning material and software as intellectual property. The material is delivered by variety of training delivery methods and media. This segment includes courseware, synchronous and asynchronous course delivery, linear and branched content, and complex multimedia simulations. Certain e-learning vendors license content from academic institutions or professional associations and develop libraries of on-line classes. Some publishers of content have started to offer the following services: custom curriculum design, skills evaluation and testing, program implementation and integration support, coaching and mentoring, training effectiveness analysis.

Technology vendors provide tools and learning-specific hardware enabling the creation, delivery, and management of virtual learning environment. Education technology market includes organizations offering one or more of the following products: authoring and web publishing tools, training management and administration systems, knowledge management systems, collaborative software, virtual classroom technology, interaction hardware, conferencing technology, testing and assessment tools, simulation tools, etc.

Service providers offer learning-related services, which can be categorized in three groups: portals, learning service providers, and other professional services. **Portals** provide single point of access to learning and training resources collected from multiple sources and obtain aggregation, hosting, and distribution of content. Many portals create environment for on-line communities, often in combination with course delivery. Some content providers and technology vendors have developed portals in addition to their major business. **Learning service providers** offer learning and content management services, training delivery software, and other enabling technologies and services on a rental basis. The providers also offer assessment and testing services, certification and degree granting, on-line tutoring and mentoring, web-based collaboration services, and media

production and delivery services. *The third group of providers* offer other professional services such as: content development and distribution, consulting, web integration and hosting, and network and IT services.

3. ECONOMIC CONTEXT OF E-LEARNING

Transformation of economy as a whole and particularly education sector have made it necessary for radical changes in methods of learning and delivering educational and training content. The transformation makes broad context for emerging and expansion of e-learning. [5]

Economies of developed countries have been becoming knowledge-based economies. In the past, the economies were production-based, but now they are service-based. The new economies make emphasis on intellectual capital and knowledge. However, in time of globalization and technological revolution, four-year educations do not give enough knowledge and skills in long-range perspective. Education and training throughout the career and life-long learning are becoming an imperative.

In new economy, organizations view learning and knowledge increasingly as a competitive weapon rather than cost factor. Business success depends more and more on highly trained and skilful employees. Enhancing employees' skills is key to creating a sustainable competitive advantage. Therefore, organizations are exploiting advances in technology to train employees rapidly, effectively, and at less expense.

The new global economy requires from workers higher levels of education, computer literacy, critical thinking, information analysis, and synthesizing skills. However, many developing countries are lagging behind educational levels of industrial nations in some indicators. For example, literacy proficiency of a substantial proportion of labor force in developing countries is limited. Many workers lack the skills needed to interpret, integrate, and compare information using written materials common to the home or workplace.

There is a big gap between the higher demands of knowledge economy and the educational status of the workforce. Developing countries like Serbia must reduce the gap in order to be competitive internationally. A fundamental reexamination of curriculum and teaching methods is needed. Academic and business organizations must be redesigned to adequately prepare people to function in an information society.

In many developed countries, education is a very important sector. For example, education industry is the second largest sector of the USA economy. The education and training industry in USA is divided into five segments: childcare, primary and secondary education, postsecondary education, corporate training, and continuing education. Huge market size makes the education and training industry the second largest economic sector in the USA, after healthcare. [6]

4. CHALLENGES OF E-LEARNING

Economic, technological and business context sets many challenges to education and training sector. The challenges could be solved by implementation of e-learning concept. These challenges are: complexity of work environment, lack of skilled labor, need for

reduction of training cost, globalization of business, social and demographic changes, requirement for greater flexibility in the workplace, learning as a continual process, and rapid growth of the Internet. [6]

Complexity of work environment. Technological changes increase complexity of work environment and workforce has to process more information in a shorter amount of time. Production cycles and life cycles of products are shortened and information and training quickly become obsolete. Delivering of knowledge and skills more rapidly and efficiently whenever and wherever needed is a necessity. Just-in-time training becomes a critical element to business success.

Lack of skilled labor. The challenge drives the need for learning and reducing the gap between skills of the workforce and business demand. This is why corporations compete aggressively for skilled workers. Corporations that offer ongoing education and training have a higher rate of employee retention and the benefits resulting from skilled workforce. An increasing number of USA corporations, Chief Knowledge Officers (CKOs) or Chief Learning Officers (CLOs) has hired to plan and coordinate training programs.

Need for reduction of training cost. Strong competition in most industries leads to pressures for cost reduction. With traditional training methods, companies generally spend more money on transporting and housing trainees than on on-line training programs. Approximately 65% of training costs are travel expenses and it is a huge burden for training budgets in today's competitive environment. Taking into account opportunity cost, the actual costs of training are even higher. Time spent in traveling or sitting in a classroom reduces employee productivity and the revenue of the company.

Globalization of business. Advances in information technology and falling trade barriers intensify global competition. International expansion has led to larger and more complex corporations which have locations in different time zones and employ large numbers of workers with diverse cultural backgrounds and educational levels. Corporations are now seeking more innovative and efficient ways to deliver training to their spatially dispersed workforce.

Social and demographic changes. The changes direct education toward older population. In USA, the fastest growing group attending higher education institutions are working, part-time students older than 25. These students need education principally to advance their careers and increase their salaries. These individuals are excellent candidates for e-learning and delivering of education content to their homes. Declining birth rates, aging population, and lack of skilled labor are factors influencing the assessment of the training needs of older population. In the new economy, even senior workers need to be trained and they need to accept new on-line training delivery options.

Requirement for greater flexibility in the workplace. Globalization, competition, and labor shortages force employees to work longer and harder. On the other hand, these workers require more independence and responsibility in their jobs and want to do the jobs from home. These knowledge workers do not have traditional workplace and believe it is not important where or when a job was done. Also, they want to take education services and learn new knowledge and skills wherever and whenever. Modern training methods are designed to meet the specific requirements.

Learning as a continual process. Learning is a continual process rather than a distinct event. Many traditional training practices are unable to make workforce skilful and

competent. Traditional training is often unrelated to new business initiatives or key technology trends. Traditional training courses have not improved the performance of workers because learning is treated as one-time activity and distinct event. Organizations have to accept training techniques and knowledge delivery methods that enhance motivation, performance, collaboration, innovation and a commitment to lifelong learning.

Rapid growth of the Internet. The emergence of on-line education is caused by economic, social and technological changes. Advances in Internet technology are the most important technological change that provides efficient delivery of education and training services. The number of Internet users worldwide grows rapidly. Developed countries like the USA have the largest share and highest penetration of the Internet. The USA is also the leading country in e-commerce. Users of Internet are target population for most educational institutions and business organizations. Increasing reach and simplicity of Internet use makes global market for many training products where language and geographic barriers almost do not exist.

5. OPPORTUNITIES OF E-LEARNING

Beside the challenges, e-learning makes many opportunities for education institutions, business organizations and learners. These opportunities are: effective use of information and communication technologies; delivery of educational services anywhere, anytime and to anyone; substantial cost savings; just-in-time access to timely information; personalized learning; improved collaboration and interactivity; convenience of on-line training. [7]

Effective use of information and communication technologies. Information technology has made substantial changes in learning. In the today business environment, employees have to learn more than ever before. Live classroom-based training is too costly and inconvenient for many organizations which need more modern, efficient, and flexible alternative: e-learning. The aim of corporate e-learning is to obtain an up-to-date and cost-effective program to employees. Effects of the learning are highly motivated, skilled, and loyal knowledge workers.

Delivery of educational services anywhere, anytime and to anyone. The Internet is a good technical solution for education, learning and training. In developed countries like USA, estimations are that approximately 80% of the professional workforce already uses computers on the job. Many technical obstacles for wide use of Internet (access, standards, infrastructure, and bandwidth) are removed. The growth of the World Wide Web, high-capacity corporate networks, and high-speed desktop computers have improved learning process. Learning is available to people 24 hours a day, seven days a week around the globe. This enables organizations to distribute training and learning materials to multiple locations easily and conveniently. Also, employees can access the materials when it is convenient for them, at home or in the office.

Substantial cost savings. Huge reduction of cost is due to the elimination of travel expenses. When conducted electronically, training is less expensive per user due to efficient distribution and the elimination of high salaries for trainers and consultants. The biggest benefit of e-learning is elimination of the expense and inconvenience of getting the instructor and students in the same place. Organizations could save between 50–70% when replacing classical training with electronic training and learning. In e-training,

courses can be organized into shorter sessions and in several days or weeks so that the organizations do not lose an employee for entire days. On the other hand, employees do not need to travel and they improve productivity and use their time efficiently.

Just-in-time access to timely information. Web-based training services allow instructors to easily and instantly update lessons and learning materials. This keeps educational content fresh and consistent. Learners have immediate access to the most current information that can be retrieved just before it is required. Electronic training has proven to have a 50–60% better consistency of information than traditional learning.

Personalized learning. Personalized learning impact on higher retention of learning content. There are individual differences in learning styles and e-learning supports all the styles. E-learning also provides a high level of simulation suitable to the learner's level of proficiency. People can learn at their own pace and review course material as often as needed. They can customize the learning material to their own needs, control their learning process and better understand the material. The delivery of learning content in smaller units contributes further to a more lasting learning effect. The more intensive e-learning course enhances the retention rate by 25-60% when it compares to traditional learning.

Improved collaboration and interactivity. Electronic learning offers more collaboration and interaction with experts and peers than traditional learning. Teaching methods and information communication technologies which create an interactive on-line environment are: case studies, demonstrations, simulations, streamed videos, on-line references, coaching and mentoring, discussion groups, project teams, chat rooms, e-mail, bulletin boards, tutorials, FAQs, and wizards. Distance education encourages more critical reasoning than traditional learning because interaction takes place better in small group of students. Students in on-line courses better understand topic of lecture than in a traditional course because of the discussions about the topic. A study shows that on-line learners had more peer contact with others in the class, enjoyed it more, spent more time on class work, understood the material better, and performed better than students in the traditional classroom.

Convenience of on-line training. On-line training is less intimidating than classical courses. Learners can try new ideas and make mistakes without exposing themselves. It is particularly important when they try to learn soft skills, such as leadership and decision making. A good training program presents the results of students' actions and after a failure, they can go back and try again. This type of learning experience eliminates the embarrassment of failure in front of a group.

6. SHORTCOMINGS OF E-LEARNING

In addition to advantages and opportunities of e-learning, there are some shortcomings. Educational institutions and business organizations planning to implement e-learning and e-training programs must take into account these facts. Main shortcomings of e-learning refer to lack of human interaction. [8]

The interaction is a critical component of every successful teaching and learning. Traditional classroom training will not be replaced because certain content is not suitable for on-line delivery. Nature, relative value, or importance of some education content imply classical training (e.g. soft skills training). On the other hand, some kinds of training (e.g.

acquisition of IT skills) are well suited for on-line training. Another example is training in strategy formulation where face-to-face communication is very important. Other learning content that is not appropriate to virtual environment is material requiring practical application with peer review and collaboration. Examples are courses directed to improve writing, communication, or presentation skills. In the courses, body language, facial expressions, direct dialogue and sharing of experiences are necessary for the success of learning.

Electronic instruction is not suited to everyone. Certain groups of learners want live experience and total interactivity with a human trainer and others are uncomfortable with computers. Many individuals have auditory or kinetic learning style instead of visual style. Electronic training is not the most efficient method for these individuals. The classroom has guidance and structure that are important for individuals who lack the motivation for self-study and learning in virtual environment. For these learners, better solution is traditional education, but the education can be supplemented by e-learning projects.

Classical training will continue to play a role in delivering educational content. IT will not replace traditional learning completely but it will leverage and expand the reach of the learning. This applies especially to primary, secondary and post-secondary education. In high education, efficient acquisition of knowledge is only one aspect of learning. Educational experience is better with face-to-face interaction with professors and socialization with a diverse group of people.

Organizations should decide when and how to implement e-learning. On-line education has a complementary role supplementing classroom learning. Educational institutions and business organizations need to plan context-specific training and education for a given set of learners. E-learning is an effective solution in situations where the primary objective is the rapid, efficient acquisition of specific knowledge. Corporations should accept technology-based approach to training in following circumstances: a large or widely dispersed number of employees, high costs of classroom training, high employee turnover, and the need for uniformity of content.

Learners should balance shortcomings and advantages of e-learning. E-learning may require more dedication and discipline than traditional learning. It also does not provide adequate degree of interactivity and collaboration. However, this is not a big problem for many business professionals who need a reputable continuing education. They tolerate insufficiencies of on-line learning because convenience is a good feature of the learning. Everyone must agree that e-learning is not perfect, but it is practical. In e-learning, it is important to measure participation of learners and results of learning. Future models of e-learning will be so structured that they obtain measurement of participation and results. E-learning is unlikely to completely replace classical education and training, but offers opportunities for corporate training and continuing education.

7. CONCLUSIONS

E-learning makes many opportunities for education institutions, business organizations and learners. These opportunities are: effective use of information and communication technologies; delivery of educational services anywhere, anytime and to anyone; substantial cost savings; just-in-time access to timely information; personalized learning; con-

venience of on-line training. Successful e-training solutions must offer high level of interactivity. Virtual collaboration between participants is the most important factor of successful implementation of on-line learning. Web creates collaborative learning communities that improve real-time human interaction. Transformation of education from a mechanical process into an exciting, interactive learning experience is the primary aim of web-based training implementation. There are many tools supporting a dynamic on-line classroom with powerful interactive features. Interactivity includes the use of streaming media, personalized skills assessment, application exercises, case studies, simulations, video clips, knowledge base access, peer and expert communities, virtual classrooms, on-line mentoring, discussion groups, and on-line chats. Interactive learning provides higher user retention, motivation, and completion rates and addresses most of the problems with on-line training discussed in the paper.

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MOGUĆNOSTI I IZAZOVI ELEKTRONSKOG UČENJA

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Brz razvoj računarskih mreža i informacionih tehnologija, naročito Interneta i World Wide Web-a utiče na ekspanziju elektronskog učenja (e-učenje) i obrazovanja na daljinu. Isporuka obrazovnih programa putem virtuelnih okruženja za učenje je pogodna forma obrazovanja za učenike koji žele da samostalno uče kod kuće u bilo koje vreme. U današnjem poslovnom i ekonomskom okruženju, e-učenje mora biti deo strategije u mnogim institucijama koje se trude da budu uspešne u osnovnom obrazovanju, visokom obrazovanju, kontinuiranom obrazovanju i obuci. Ovaj rad je posvećen šansama koje ova nova forma obrazovanja pruža. Takođe, obrazovne institucije, poslovne organizacije i učenici treba da analiziraju izazove i nedostatke e-učenja.

Ključne reči: *e-učenje, obuka bazirana na webu, obrazovanje na daljinu, interaktivnost*