A Critical Review on E-Learning Prospective: With Special Reference to Migration from Web 2.0 to Web 3.0

Namrata Dhanda, Dr. Manuj Darbari, Dr. Neelu.J.Ahuja, Dr. I.A Siddiqui

Abstract— E-Learning has gained importance as people have realized that the use of technology can improve the learning process. Consequently new learning environments have been developed. The paper focuses on various aspects of e-Learning: Activity Theory, Multi-Agent Systems and Web 3.0. A survey of literature has been done to provide an insight into the work that has been done by various researchers in the past.

Index Terms— e-Learning, Web 2.0, Multi Agent System, Web 3.0, Activity Theory

———————————— ◆ ————————————

1 INTRODUCTION

E-LEARING spans a wide area of research ranging from virtual classrooms to remote courses or distance education. With the emergence of new technologies and Semantic Web, e-Learning systems are gaining more importance day by day. Application of e-Learning systems in higher education is becoming more prevalent in developing countries like India. In traditional learning the methods cannot be molded according to the individual's choice whereas in e-Learning, the content can be made available as per learner's previous knowledge. Various definitions for distance learning and distance education have been proposed in [1] & [2]. [3] And [4] associate Web-based learning with Web browser technology, often delivered via the Internet or intranets. There is much literature associating e-learning with Web-based learning over the Internet. In [5] we refer to learning activities involving computer networks as e-learning, and stresses that e-learning is not merely distance learning. The concept of online learning predates the appearance of the Web, but most recent publications about online learning refer to materials delivered over the Internet or intranets. The paper reviews the works carried out by different researchers in this area till now.

2 BASICS OF E-LEARING: A COMPREHENSIVE REVIEW

With the vast advancement in technology, the traditional lecture-driven classroom is giving way to a new and more active environment, where students have access to a variety of mul-

timedia and interactive course materials. The twofold contribution of [6] is a novel use of existing technology to improve learning and a longitudinal quasi-experimental evaluation of its use in context. As a first contribution, authors introduce an integrated environment that is designed to meet the active learning preferences of computer engineering learners, in addition to a support for collaborative learning. For the second contribution, several classroom experiments were carried out.

In [7], traditional learning is compared with e-Learning System. Based on a survey consisting of interviews and questionnaire it has been proved that e-Learning is more advantageous in contrast to the conventional learning methods because of its portability, ease of use and ubiquitous access facility. With the popularity of distance education, there is an increasing interaction between the students and the instructors and between the students themselves. However, it is still difficult to customize the material and teaching methodology according to the students background/profile as stated in [8]. Artificial Intelligence techniques have been employed to make e-Learning more effective and qualitative by considering students previous knowledge. The authors in [9] believed that prior experience with ICT and virtual competence was two influential factors that affected e-learning and had a positive influence on its outcomes. Using social cognitive theory, they opened up the black box of psychological processes in which e-learners engage. The study resulted in a more comprehensive account of the effects of ICT experience. Their findings revealed that experience with information seeking and communication via ICT helped individuals developed virtual competence, which in turn allowed them to learn effectively and feel satisfied with their experience. There is no doubt that e-Learning idea will promote most straining person to acquire some special knowledge and integrate utilize these knowledge of the major of the communication. A systematic design and the implementation scheme for teaching the communicational courses while meeting the training requirements of the students of the communication engineering major in the e-learning environment has been proposed in [10]. It is important to apply the e-Learning idea and its advanced tech-

————————————————

- *Nmarata Dhanda is currently Ph.D in Computer Science from University of Petroleum and Energy Studies, Dehradun, India. E-mail:ndhanda510@gmail.com*
- *Dr. Manuj Darbari is working as a Professor in Department of Information Technology in BBD University, Lucknow, India. E-Mail: manujuma@gmail.com*
- *Dr. Neelu. J. Ahuja is working as an Assistant Professor in Department of Computer Science in University of Petroleum and Energy Studies, Dehradun, India. E-Mail: neelu@ddn.upes.ac.in*
- *Dr. I.A. Siddiqui is working as a Project Manager in Celerity Networks Pvt Ltd, Noida, India. E-mail:imranas@gmail.com*

nology to teach the major of communication. In [11] the authors analyze that the e-learning interface based on PET method is quite soaring and the erudition curve is relatively high for the I (first) XHTML and XML e-learning Interactive tool software solution, as well as for the II (second) software solution (e-learning mathematical tool). It is obvious that the student learners are faced with a lot of decisions and they need previous knowledge in order to use the software. The analysis showed that for the III (third) software solution the Information Retrieval Courseware system the learning curve is quite flat and users are already familiar with all of the concepts because the software itself was build and targeted the knowledge level of the users. The research is proposed a new way of tackling the process of creation of e-learning solutions as interactive environments by integrating and undertaking the software engineering approach based on e-learning indicators. In [12], the authors have presented a modeling approach of a pervasive e-learning application based on high-level Petri Nets. The authors have underlined the importance of this new attractive mode in the education basing on new communication technologies and web services. The second stage of the study concerns the implementation of the proposed application. With existing powerful technologies such as Java technologies, XML language and Oracle data base, authors have implemented the application. Learner as the subject of e-learning also has a certain impact on e-learning [13]. But as time goes by, it was discovered that there are many factors that also have the reaction on e-learning, so many experts and scholars began to study different factors' impact on e-learning. Firstly, it describes the factors that influence e-learning quality, then it it analyzes learner's role and their contribution to e-learning, compare with the different learners' behaviours on e-learning, and extract the differences and similarities impact on their e-learning, Finally, it shows many problems in the e-learning and give some suggestions for improvement. At present the utilization of computers and new technologies has become an important aspect of education. An attempt to examine how the traditional role of a teacher in the e-courses changes and what preconditions are pivotal for the tutoring of such courses has been done in [14]. In addition to that, it describes a creation of e-learning courses from the pedagogical point of view. Finally, a few problems of practical e-tutoring run at a university level in the Czech Republic are depicted. The growth of an e-Learning system poses added challenges for software developers, given that there are other facets, such as contents and client tracking, not usually considered in software advancement methodologies [15]. The authors approach enriches the improvement of e-Learning systems process anticipated in ADDIE with the model-based development of client interfaces and software quality contemplation. By doing so, they aim at the development of, what writers have named, a Model-Based Instructional Development Environment (MB-ISDE), to include e-Learning development in the current trends of model-based software development. The development of the e-learning systems should be done using safety methods and internationally recognized standards. Information security can be obtained using methods such as cryptography and network protocols. In [16], the authors have

highlighted several key security issues with the intention of must be taken into consideration in developing and using an e-learning platform. A secure learning platform should incorporate all the aspects of security without affecting too much the system performance.

The above correlations between three classifications are applied in Web 3.0 rule for e-learning using Deontic Logic Verification.

3 E-LEARNING WITH WEB 2.0 FOCUSING ON SERVICE ORIENTED ARCHITECTURE

It is well-known that training and networking are keys to progression and personal skills development; therefore the lecturers need to learn to innovate in line with the technology advancement and how technology can assist in teaching and learning process differently than before. As such teaching and learning must be co-created between the instructors and learners and be viewed from the participative and service oriented approach [17]. The participative approach emphasizes on the learners participation in real life exercise while the service oriented approach promotes values that are co-created between the learners and instructors to create win-win perspectives for both parties. The overall feedback is positive both from the participating lecturers and learners. In [18] a theory-based Integrated Design Process (IDP) has been developed in order to improve the design process and usability of the WD2L environment as a learning support tool. Results indicated that the proposed IDP was effective in that the study showed (1) the WD2L environment's equivalence to traditional supplemental learning, especially as a Web-based supplemental learning program and (2) users' positive perceptions of WD2L environment resources. The study also confirmed that for an e-learning environment to be successful, various aspects of the learning environment should be considered such as application domain knowledge, conceptual learning theory, instructional design, user interface design, and evaluation about the overall quality of the learning environment. The theories and principles of the interaction design on the E-Learning courses has been discussed in [19]. Thereby, an analysis of the interaction design of the "College English Intensive Reading" as well as their technology implementation is done. "College English Intensive Reading" E-Learning courses also should provide some methods of interpersonal interaction to make up for the students and teachers in non-learning content interaction. Interaction between students and students in collaborative learning plays an important role, Web2. 0 technologies can compensate for this shortage. In [20] the framework aims to provide a complete adaptive, integrated and robust environment for learning. The highlight of the system is the feature to judge the student capability and adaptive management of the learning process. This is complemented by the intelligent assessment engine which generates quizzes and assessments according to the capability of student. This framework aims to provide a complete environment of online learning. The conceptual architecture of the framework presented in this paper is centered around the following core features: (1) Domain Specific Learning Services (2) Student Capability

Analysis (3) Adaptive Lecture Authoring Tool and Notification Manager (4) Intelligent Assessment Engine (5) User Friendly E-Learning Portal. A detailed analysis of well known architectures for service based E -learning system is done in [21]. The architectures surveyed here give users the ability to collect, analyze, distribute and use learning knowledge from multiple knowledge sources. This paper provided a survey on service based architecture for E-Learning system which includes features like interoperable, distributed, adaptive dynamic, extensible, collaborative and intelligence, if the architecture includes semantic web technology and appropriate levels of security, the system will be more efficient. Service-oriented architecture for E-Learning provides adaptable, interactive, extensible, distributed, collaborative and intelligent E-Learning system to effectively realize the learning anytime and anywhere to instructors and learners. Software deployment and code changes as well as maintenance could not be made through critical times. The more years are software used and alive the more time and costs are required. Linear dependency between realized changes and costs is changing into exponential dependency as the years go [22]. It is nothing common that maintenance of poorly or wrong designed software products (for example LMS) can achieve point when cost of new development is lover than actual cost of maintenance. The contribution is an explanation and introduction into most critical parts of software maintenance. Again in [23], Model Driven Architecture has been analyzed, designed, implemented and integrated with Service Oriented Architecture to design a system that is flexible and which will adapt itself to the changing requirements. It also makes use of the emerging technologies such as .NET and Web 3.0 to provide proper functionality; reusability and interoperability are the main aspects of designing such systems. In [24], the basic components of an e-Learning system have been built using J2EE and then they have been integrated with the Web Services. Basically two models have been defined-the functional model containing various components of an e-Learning system and a service model as a means of communication between the various Content Authoring Tools and Learning Management System. The paper in [25] puts more emphasis on the use of the learning content rather than the creation of the content. The use of Knowledge Management and Learning Management is used together to learn and share knowledge in order to improve the performance of the learner. Web 2.0 is used for providing various functionalities to the learner. A personalized e-Learning system for the institutions that are using Adobe Flash has been developed in [26] keeping in view the user's needs, his previous knowledge and expertise in the concerned area. On the basis of these facts, the learning material is extracted and provided to the user. Appropriate services are provided to the users till their learning goals are achieved.

4 E-LEARNING USING ACTIVITY THEORY

The advancement of e-learning systems has initiated an insurgency for instructional substance delivering, learning deeds, and societal communiqué. After factor study, learners' attitudes can be grouped into four dissimilar factors - e-

learning as a novice autonomy upbringing, e-learning as an indicative environment, e-learning as a multimedia learning environment, and teachers as assisted tutors in e-learning. In accumulation, the research in [27] approves that activity theory is an apt theory for considerate e-learning systems. From the activity theory stance, individuals actively raise their acquaintance within social realms.

The excessive use of technology isn't a guarantee for the construction of successful e-Learning systems [28]. Many pedagogical and technical problems must be addressed depending on the dynamic context of learning. The proposal in [28] uses the models to deal with problems like modeling, implementation and retrospection. It retrieves the modeling concepts needed in the semantic of activity theory. The authors have also demonstrated the suitability of adaptive workflows as metaphor to address educational scenarios. Considering the traces as first rank entities can help to build flexible and reusable scenarios. Analysing online learning environments as activity systems evade the conception of knowledge as independent from actors, as an objective resource like any other; nor are knowledge conceived independently from action, a product of discourse and interpersonal statement alone. Activity theory offers a way of synthesizing and developing relevant notions [29]. Activity theory examines the nature of practical activities, their social origins, and the nature of the 'activity systems' within which people collaborate. The theory reframes e-learning by modelling the recurrent and embedded nature of human activities, by revealing the tentative nature of knowledge and its action orientation, and by highlighting the opportunities for individual and collective development. The paper concludes by reviewing implications for knowledge work and e-learning. Based on the activity theory, authors of [30] proposed a framework to examine factors influencing e-learning effectiveness. Two hundred and forty-two learners joined the on-line education project in Chai-Yi County. The results show that learning motivation, e-learning platform experience, attitude toward Internet, computer self-efficacy, and prior experience were found to significantly influence the e-learning effectiveness. In [31] an outline of the methods and techniques used to abstract pedagogically and contextually adept design requirements for an e-learning environment for supporting teaching and learning in European high schools has been made. It illustrates how theoretical and pedagogical perspectives can be incorporated into the systems development process of abstracting design requirements for an e-learning environment. The method outlined in this paper emphasizes that focus should not be put on interface design alone, instead, we should aim to address the whole context of use and forms of interaction which are embedded both in tasks and in the users' accepting their actions. The conceptual and visual complexity of the expanded activity triangle and operational mapping tool used to represent and communicate findings can potentially confuse and overwhelm those with no background in the theory. Fortunately, the operational mapping tool offers a format and structure for summarizing results for stakeholders; however, this tool by itself is insufficient. In [32] it is discussed how these methods can inform instructional design and development within distance educa-

tion programs. Overall, AODM holds promise as a tool for assisting the design of e-learning practices.

5 E-LEARNING USING MULTI AGENT SYSTEMS

A software agent is a data-processing entity which carries out in an autonomous way tasks delegated by a user, but also a part of software which can operate on behalf of another entity [33,34]. Software agents function in a particular environment (i.e., an agent platform) which is often populated by other agents and processes. Ideally, they learn from their experiments, communicate and cooperate with other agents, and, if required, move around in networks and on the Internet. In addition, an intelligent software agent has characteristics like mobility, ability to interact (exhibiting social and adaptative behavior), ability to cooperate, learn and even reason, based on certain knowledge representations [34]. We review here some of the works done by the researchers in the field of e-Learning using Multi Agent Systems. In [35] the authors presented some conceptual view on advanced future educational environments and the preliminary results in multi-agent prototype creation. This project is work in progress aimed at providing flexible and customized educational services. The main directions of eLearning systems evolution and stages of each direction are defined. The roles of ontologies and intelligent agents in such systems are recognized. An approach to constructing of personalized learning program based on the Semantic Web technologies is proposed. In [36] the proposed system is presented in three perspectives to provide the domain specific content to the learner based on the effort prediction according to their background details. The structure of system, work process, the design of intelligent agent and the realization of intelligent agent were introduced. After the test use of the system by certain network school, it was found that the system could improve the learners' initiative participation, which can provide learners with personalized knowledge service. A generic approach for the development of service-oriented and agent-based eLearning intelligent system architectures is presented in [37]. It describes a generic service-oriented and agent-based approach for the development of eLearning intelligent system architectures providing mobile access to electronic services (eServices) and electronic content (e-Content) for users equipped with wireless devices, via a set of Info-Stations deployed in key points around a University Campus. The approach adopts the ideas suggested by the MDA specification of OMG. By following this approach two prototype eLearning applications, have been successfully implemented. In [38] an intelligent tutoring module of the system has been proposed. Also, a functional prototype of an intelligent learning platform (called INES), which includes capabilities related to LMSs, LCMSs, and ITSs, such as: management of contents and users, and recommendation of specific and suitable learning tasks to the students has been discussed. Hence, a general purpose system design and development, capable to adapt itself to specific needs of students and teachers, using intelligent support to provide reasoned decisions at every moment has been developed. The main future work related to the tutoring module is to improve its intelligence.

The domain ontology is not only useful as a learning instrument but it can also be employed to assess students' skills [39]. The analysis of students' mistakes allows to propose them personalized recommendations and to improve the course materials in general. In future work, we plan to develop more powerful algorithms for ontology analyses that consider ontology integration and their distributed upgrade based on Multi- Agent technologies. In line with the development of new algorithms, it is desirable to add more powerful semantic similarity calculations for allowing flexible quantitative grading mechanisms. Finally, further work will include studies on more complex interactions among the agents that constitute the architecture.

6 WEB 3.0: A NEW DIMENSION OF E-LEARNING

With the emergence of various web technologies and innovative concepts of using the web to its fullest potential, the web is evolving fast towards intelligent web systems. To plan a better future the web science need to be studied and understood as a whole. The web page designers and application developers have a lot of challenges to support a high performance infrastructure which connects multiple servers and services all geographically distributed across the globe. In [40], an analysis has been made to report which web technologies and protocols succeeded in realizing the current web and what is going to be the possible future web architecture and its social impact. In [41] the author describes the status of information construction of regional comprehensive universities and analyzes the theory of the web3.0 technologies. It then discusses the process of information construction of comprehensive universities from the view of web3.0 which includes the three parts: information management, learning environment, and teaching resources. The end users also follow the same standard during uploading their resource to the library. Finally all the resources in the library are stored an orderly manner with a uniform standard and keep a close link between different type resources. In [42], author presents three types of semantic web applications for education, namely learning objects, learning object repositories and pedagogical agents, and critically appraises their contribution to learners and instructors alike. In addition, terms defined within the ontology need to describe concrete data, using one of the existing ontology languages and, in order to ensure its effectiveness, one needs to extensively test it examining the extracted information. In this article author is describing a learning object explicitly, using multidimensional and consistent metadata is of particular importance for the successful implementation of the semantic web in education. The application of Web3.0 becomes crucial for the current development of social groups; this technology will help us to gain more applications in near future. For the design of recommendation mechanism, Bayesian Theorem and Fuzzy Theorem were used to accomplish the recommendation mechanisms of site friends, hobby friends and articles [43]. The main concept is to use the characteristic of Giant Global Graph and the API of social network to integrate friends from various social platforms and to further create high efficient interactive mechanisms such as efficiency

by making recommendation of hobby friends and top collections, blogs of interests, external membership collections, real-time chat rooms, cooperative redactions and personal recommendations. As a preliminary move, eLearning model for interview preparation is implemented in [44] wherein the learning objects are assembled in RDF data model in accordance to the defined ontology and enabling user a flexible search. As a first step in a ladder of enriched environment for knowledge up-gradation this paper implements a tool enhancing a refined search retrieving only the most relevant links eliminating the other links using the semantic web technologies. A well refined search mechanism is built in and what the user needs is all given back in a unified manner to them filtering all the irrelevant links.

A model for an e-learning system which uses e-learning agents and is based on semantic web is proposed in [45]. The study reveals how to extract the useful information on the web and also gives the superficial knowledge about semantic web and categories. e-Learning agents such as Instruction Agent, Lesson Planning Agent, Resource Location Agent, Personalization Agent, Learner Centered Agent, and Collaboration Agent are used to describe an e-learning system. The main purpose of the model is to make an e-learning system which can be personalized as per individual's need so that everyone is able to make the full use of it. In [46] a Semantic grid-based E-Learning Framework has been proposed. SELF aims to identify the key-enablers in a practical grid-based E-learning environment and minimizes technological reworking by proposing a well-defined interaction plan among currently available tools and technologies. An effective, end-to-end and practical E-learning environment cannot be realized from a loose integration of available technologies or by starting the development from scratch. An attempt to evolve an end-to-end E-learning infrastructure from the integration of available technologies, specifically the semantic web, the grid, collaborative and personalization tools, and knowledge management techniques has been made. In [47] the presented concept is an attempt to introduce an educational system which combines Web 3.0 technologies in order to achieve better personalization and usability. Moreover, technologies such as, Artificial Intelligence and the WWW have rapidly evolved over the last few years. Despite of this situation, educational concepts have not been developed. The last few years a lot of interesting on-line services have been introduced to the public. On-line video conferencing, synchronous/asynchronous conversations, wikis and social networking are just a few of those technologies which changed the way people see and use the Internet. Using the combination of the features mentioned above, the system will be able to achieve a personalized interactivity with each user. Furthermore, the social networking characteristics will contribute in gaining wide acceptance and satisfaction. The discussion in [48] presents the concept of Semantic Web and Web 3.0 technologies, which could be a distinctive success factor in the current competitive e-business market for companies currently positioned with the world of Web 3.0 technology. It describes the evolution of Web 3.0 for the creation of value and new emergent business models, its various properties, and its major differences with Web 2.0 technology. Fur-

thermore, the paper proposes eight direct or indirect revenue based business models that have different levels of openness that a company can follow to adapt a successful Web 3.0 based business strategy. In [49], a Web Service Oriented ensuring the privacy of e-Learning content has been proposed for developing an E-Learning system. It aims at integrating all the components of e-Learning system such that it facilitates both the service provider and learner by making use of Web Services as an interface. Emphasis has been made to make the system reusable and interoperable. In [50], a modular Semantic Web based interoperability framework has been proposed for the integration of the various educational content and functionalities of an e-Learning System. Also, emphasis has been made on the preparation of e-Learning content by making use of ontology driven authoring tools

7 CONCLUSION

With the development of new technology and Government initiative e-Learning is rapidly penetrating in the regions where education was a distant dream. Internet and Ubiquitous environment has provided wings to it. This paper summarizes e-learning in various prospective like: Adaptive learning using Multi-agent, Service oriented Architecture (SoA), migration from Web 2.0 to Web 3.0 making learning more intelligent.

REFERENCES

[1] Keegan, D. (1986). The Foundations of Distance Education. Routledge Kegan & Paul.

[2] Garrison, D.R., & Shale, D. (1987). Mapping the boundaries of distance education: Problems in defining the field. The American Journal of Distance Education, 1(1), 7-13.

[3] Khan, B. H. (2001). Web-based Training. Educational Technology Publications.

[4] Hall, B. (1997). Web-Based Training Cookbook. John Wiley & Sons.

[5] Schank, R.C. (2001). Designing World-Class E-Learning. McGraw-Hill Professional Publishing.

[6] Hamada, Mohamed. "An integrated virtual environment for active and collaborative e-learning in theory of computation." Learning Technologies, IEEE Transactions on 1.2 (2008): 117-130.

[7] Kamsin, Amirrudin, and E. Is. "Is e-learning the solution and substitute for conventional learning." International journal of the computer, the internet and management 13.3 (2005): 79-89.

[8] Gamalel-Din, Shehab A. "Smart e-Learning: A greater perspective; from the fourth to the fifth generation e-learning." Egyptian Informatics Journal 11.1 (2010): 39-48.

[9] Wan, Zeying, Yinglei Wang, and Nicole Haggerty. "Why people benefit from e-learning differently: The effects of psychological processes on e-learning outcomes." Information & Management 45.8 (2008): 513-521.

[10] Chen, Lina. "About e-Learning Application in Communication Teaching."Web-based Learning, 2008.ICWL 2008.Seventh International Conference on. IEEE, 2008.

[11] Fetaji, Bekim, and Majlinda Fetaji. "E-learning Indicators Approach to Developing E-learning Software Solutions." EUROCON, 2007. The International Conference on" Computer as a Tool". IEEE, 2007.

[12] Nait-Sidi-Moh, A., Jaafar Gaber, and M. Wack. "Modeling and implementation of a pervasive e-learning application." Multimedia Computing and Sys-

tems (ICMCS), 2011 International Conference on. IEEE, 2011.

[13] Na, Shu, and Liu Jing. "The Impact of Learner Factor on E-Learning Quality."E-Learning, E-Business, Enterprise Information Systems, and E-Government, 2009.EEEE'09.International Conference on.IEEE, 2009.

[14] Klimova, BlankaFrydrychova, and Petra Poulova. "Tutor as an important e-learning support." Procedia Computer Science 3 (2011): 1485-1489.

[15] Fardoun, Habib, Francisco Montero, and Víctor López Jaquero. "eLearniXML: Towards a model-based approach for the development of e-Learning systems considering quality." Advances in Engineering Software 40.12 (2009): 1297-1305.

[16] Luminita, DeftaCostinela. "Information security in E-learning Platforms."Procedia-Social and Behavioral Sciences 15 (2011): 2689-2693.

[17] Yahya, Yazrina, Doreen Ng Nielsen, and Muriati Mukhtar. "Innovation in teaching and learning using service oriented approach." Electrical Engineering and Informatics (ICEEI), 2011 International Conference on.IEEE, 2011.

[18] Nam, Chang S., and Tonya L. Smith-Jackson. "Web-based learning environment: A theory-based design process for development and evaluation." Journal of Information Technology Education 6 (2007): 23.

[19] Jin Hu, Qian, Min Wu, and Jia hui Qi. "Web-Based "College English Intensive Reading" ELearning Courses Design and Implementation of Interaction."Education Technology and Computer Science (ETCS), 2010 Second International Workshop on. Vol. 1. IEEE, 2010.

[20] Khalid, Sh Umar, et al. "An adaptive e-learning framework to supporting new ways of teaching and learning." Information and Communication Technologies, 2009.ICICT'09, International Conference on.IEEE, 2009.

[21] Jamuna, R. S., and M. S. Ashok. "A survey on service-oriented architecture for E-learning system."Intelligent Agent & Multi-Agent Systems, 2009.IAMA 2009.International Conference on.IEEE, 2009.

[22] Poklemba, Tomas, I. Sivy, and Zdeněk Havlice. "Maintenance software processes for web 2.0 based learning management systems." Emerging eLearning Technologies and Applications (ICETA), 2011 9th International Conference on. IEEE, 2011.

[23] Liu, Xiaofei, Abdulmotaleb El Saddik, and Nicolas D. Georganas. "An Implementable Architecture of an e-Learning System."Electrical and Computer Engineering, 2003. IEEE CCECE 2003. Canadian Conference on.Vol. 2.IEEE, 2003.

[24] Chatti, Mohamed Amine, Matthias Jarke, and Dirk Frosch-Wilke. "The future of e-learning: a shift to knowledge networking and social software." International journal of knowledge and learning 3.4 (2007): 404-420.

[25] Cheng, Zhifen, Tinglei Huang, and JiaNong. "An extensible development platform for SOA-based e-learning system."Computer Science and Software Engineering, 2008 International Conference on. Vol. 5.IEEE, 2008.

[26] Liaw, Shu-Sheng, Hsiu-Mei Huang, and Gwo-Dong Chen. "An activity-theoretical approach to investigate learners' factors toward e-learning systems."Computers in Human Behavior 23.4 (2007): 1906-1920.

[27] Mohammed Khalidi Idrissi, Farid Merrouch, Samir Bennani, "E-Learning Models Based on Activity Theory", IADIS International Conference e-Learning 2009.

[28] Ayse Kok, " An Activity System Perspective of E-Learning and the Reframing of Knowledge", International Journal of The Computer, the Internet and Management Vol. 18.No.2 (May - August, 2010) pp 17 – 25.

[29] Hung, Shin-Yuan, et al. "Exploring E-learning Effectiveness Based on Activity Theory: An Example of Asynchronous Distance Learning." MIS REVIEW: An International Journal 15.1 (2009): 63-87.

[30] Mwanza, Daisy, and Yrjo Engestrom. "Pedagogical adeptness in the design of e-learning environments: experiences from the Lab@ Future Project." World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education. Vol. 2003. No. 1. 2003.

[31] Greenhow, Christine, and Brad Belbas. "Using activity-oriented design methods to study collaborative knowledge-building in e-learning courses within higher education." International Journal of Computer-Supported Collaborative Learning2.4 (2007): 363-391.

[32] Bradshaw J., "Software Agents", MIT, AAAI Press, Cambridge, USA, 1997.

[33] Carolan T., Collins B. et. al., "Intelligent Agents", University of Dublin, Ireland, 1997, http://ntrg.cs.tcd.ie/cs4/agents/main3.html.

[34] Panteleyev, Michael G., et al. "Intelligent educational environments based on the semantic Web technologies." Artificial Intelligence Systems, 2002.(ICAIS 2002). 2002 IEEE International Conference on. IEEE, 2002.

[35] Duo, Sun, and Zhou Cai Ying. "Personalized E-learning System Based on Intelligent Agent."Physics Procedia 24 (2012): 1899-1902.

[36] Stoyanov, Stanimir, et al. "Service-oriented and agent-based approach for the development of InfoStation eLearning intelligent system architectures."Intelligent Systems, 2008. IS'08. 4th International IEEE Conference. Vol. 1. IEEE, 2008.

[37] Mikic Fonte, Fernando A., Juan C. Burguillo, and Martín Llamas Nistal. "An intelligent tutoring module controlled by BDI agents for an e-learning platform."Expert Systems with Applications 39.8 (2012): 7546-7554.

[38] Gladun, Anatoly, et al. "An application of intelligent techniques and semantic web technologies in e-learning environments." Expert Systems with Applications36.2 (2009): 1922-1931.

[39] Guha, Radha. "Toward the intelligent web systems." Computational Intelligence, Communication Systems and Networks, 2009. CICSYN'09. First International Conference on. IEEE, 2009.

[40] Hui, Wang. "The status and development prospect of information construction of regional comprehensive universities from the view of Web3.0." Uncertainty Reasoning and Knowledge Engineering (URKE), 2011 International Conference on. Vol. 2. IEEE, 2011.

[41] Kasimati, Anna, and EfpraxiaZamani. "Education and learning in the Semantic Web." Informatics (PCI), 2011 15th Panhellenic Conference on.IEEE, 2011.

[42] Chang, Yi-Hsing, and Kai-Xiang Chang. "An efficiently interactive social website based on web 3.0." Machine Learning and Cybernetics (ICMLC), 2011 International Conference on.Vol. 2.IEEE, 2011.

[43] Alice, P. Sheba, A. M. Abirami, and A. Askarunisa. "A semantic based approach to organize eLearning through efficient information retrieval for interview preparation." Recent Trends In Information Technology (ICRTIT), 2012 International Conference on. IEEE, 2012.

[44] Shrivastava, Gulshan, Kavita Sharma, and AparnaBawankan. "A new framework semantic web technology based e-learning."Environment and Electrical Engineering (EEEIC), 2012 11th International Conference on.IEEE, 2012.

[45] Abbas, Zaheer, et al. "A semantic grid-based e-learning framework (SELF)." Cluster Computing and the Grid, 2005.CCGrid 2005.IEEE International Symposium on.Vol. 1.IEEE, 2005.

[46] Giannakos, Michail N., and VasileiosLapatas. "Towards Web 3.0 Concept for Collaborative E-Learning."Proceedings of the Multi-Conference on Innovative Developments in ICT.ICTEL.Vol. 10. 2010.

[47] Almeida, Fernando LF, and Justino MR Lourenço. "eCreation of value with Web 3.0 Technologies." Information Systems and Technologies (CISTI), 2011 6th Iberian Conference on.IEEE, 2011.

[48] Xu, Zhengfang, Zheng Yin, and Abdulmotaleb El Saddik. "A web services oriented framework for dynamic e-learning systems." Electrical and Computer Engineering, 2003. IEEE CCECE 2003. Canadian Conference on.Vol. 2. IEEE, 2003.

[49] Aroyo, Lora, and DarinaDicheva. "The new challenges for e-learning: The educational semantic web." Educational Technology & Society 7.4 (2004): 59-69.

[50] Thyagharajan, K. K., and RatnamanjariNayak. "Adaptive content creation for personalized e-learning using web services."Journal of Applied Sciences Research 3.9 (2007): 828-836.

IJSER