EUROPEAN ACADEMIC RESEARCH
Vol. II, Issue 7/ October 2014

Impact Factor: 3.1 (UIF)
DRJI Value: 5.9 (B+)

ISSN 2286-4822
www.euacademic.org

Analyzing the Components of Online Learning and Their Inter-relatedness

Dr. NAKHAT NASREEN
Associate Professor
GAMAL AHMED AHMED ABDULLAH ALAWI
Research Scholar
SHAGUFTA N. ANSARI
Research Scholar
Department of Education
Aligarh Muslim University (AMU)
Aligarh, India

Abstract:

This study analyzes the interrelationships of different components of distance education, such as online learning, multimedia techniques of digital libraries' and internet applications. Different software's like QuickTime, iTunes, and YTube, have been used as tools of internet while using Berkeley Digital Library Website as the source of education and learning. The aim of this study is to analyze the impact of distance education on online learning. At higher education level, to find out the impact of online learning on feedback, to assess the impact of activities on online learning and to understand the impact of usability on experience. The effect of online teaching on usability and impact of learnability on online teaching will also be analyzed. Two models have been developed to study the variables using AMOS 5 program, they explained 18% of variance for learnability and 95% of variance for distance education.

The subjects had been using BDL were engaged in multi tasks such as searching, browsing, downloading, copying, listening, reading, watching, writing, extracting, and abstracting information. They also used chat rooms for more discussions during online collaborative and finally reported their information in different styles through assignments, projects on WWW with the help of their teachers.

Key words: Distance Education, Online Learning, Digital Libraries, Internet applications

1. Introduction

Informally, Web-based education (WBE) encompasses all aspects and processes of education that use World Wide Web as a communication medium and supporting technology. Paulsen [32] said that there were many other terms for WBE; some of them being online education, virtual education, Internet-based education, and education via computer-mediated communication. Atkinson & Castro [4] viewed:

> "Online education has become popular for a variety of reasons. First, distance learning powerfully expands educational opportunities for people who may be physically unable to attend an educational institution because they are busy with work or children, are disabled or incarcerated, or live in a rural area where the courses they want to take are unavailable. "

There are a number of important concepts related to Web-based education or online education, such as *e-learning, distance education, and adaptive learning*. Distance education is the most important concept. Moore and Kearsley [25] defined distance education as, "Planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, as well as special organizational and administrative arrangements."

In some cases, institutions offer online courses because online courses—especially those that can be scaled to serve many more students than could be served in a traditional classroom—are more efficient than traditional courses and can therefore cut costs. Online courses save classroom space, and the number of students in a class becomes less important when

lectures are recorded as Web videos or podcasts. Robert and Daniel opined:

> "If an institution of higher learning can teach courses that are more basic introductory and efficiently, professors can as a result spend more time teaching the upper level courses that require more interactive class time. In addition, online learning is not limited to the content available in formal classes."

The Internet puts an unprecedented amount of information at one's fingertips. With an Internet connection and a healthy dose of self-motivation, anyone can learn about a range of topics. These include topics related to activities of daily living—for example, it takes only a few clicks to find a Web video demonstrating how one can reset a Palm Treo smart phone (of particular use to visual learners who might have trouble with owner's manuals). In addition, they include more academic learning opportunities such as "iTunes-U," Apple's clearinghouse for free lecture podcasts from leading universities.

Two important concepts that have a direct bearing on the study are constructivism and cognitivism. Solomon [40, 41] focused that Jean Piaget, a key figure in educational psychology, originated what is sometimes called *cognitive constructivism* (although all constructivist theories are essentially cognitive) and what he called *genetic epistemology*. Piaget focused his attention on what happens in our minds in the course of learning in an era dominated by behaviorism, which held that we could know nothing about what happens in our minds. Piaget is called a cognitive constructivist both because his main concern was the internal development of mental structures and because he thus opened the door for the development of cognitive psychology. Indeed, many cognitive psychologists accept a weak form of cognitive constructivism in that they focus on the internal construction of mental structures while nonetheless maintaining a belief in a biologist

by training. Piaget in his early career observed how organisms reacted to their environment. He applied that approach to studying how children learn, and not surprisingly, he believed that children learn by interacting with the environments in which they find themselves. Learning occurs, he maintained, through the cognitive processing of environmental interactions and the corresponding construction of mental structures to make sense of them. He called these mental structures *schema* and posited two kinds of cognitive processing involved in schema construction. The importance of cognitive constructivism is in the fact that it clearly locates learning in the mind of the individual and defines it as an active process of mental construction linked to interaction with the environment (Norman & Rumlhart [38]).

Another important concept is constructionism, which is important because it suggests ways in which computer-based construction activities can be used to support corresponding mental constructions. Andy diSessa [7], for example, writes:

> "Computers can be the technical foundation of a new and dramatically enhanced literacy . . . which will have penetration and depth of influence comparable to what we have already experienced in coming to achieve a mass, text-based literacy."

Learning theories are called *social constructivist* when their main concern is with knowledge construction through social interactions. Social constructivist theories derive primarily from the work of Lev Vygotsky [46, 47], a Russian contemporary of Piaget whose work was suppressed by the Stalinists and rediscovered in the 1960s. Vygotsky maintained that all learning results from social interaction even when it takes place in individual minds and that meaning is socially constructed through communication and interactions with others. He believed that cognitive skills and patterns of thinking are not primarily determined by innate factors but rather are the products of the activities practiced in the social

institutions of the culture in which the individual lives. So that constructivism suggests that such remediation requires accommodation—that is, that teachers must help students to make their thinking visible, to test it against experience, and to reconstruct understandings that are more viable. Online learning poses many challenges to the development of learner-centered environments, the majority of which stem from the facts that all interactions are necessarily mediated through the online environment and that most online courses must be created before students join them. Indeed, when Carol Twigg [45] gathered a group of innovative virtual educators to discuss paradigm changes in online learning, their overall conclusion was that individualization, which they termed *personalization*, was the key to innovation in distance education. Twigg thus argues that quality online learning should include initial assessments of students' knowledge and skills, individual study plans involving an array of interactive learning materials, and built-in, continuous assessment with instantaneous feedback.

The constructivist approach is concerned with support for the construction of internal knowledge structures through active learning. Constructivism likens knowledge-centered learning to learning a landscape by living in it and exploring it from a variety of perspectives and so argues for the design of learning environments that encourage analogous cognitive activity. For example, some research, which suggests online learning in general, is more supportive of conceptual learning and less supportive of procedural learning than learning in traditional classrooms [49]. Such findings deserve further investigation in diverse subject domains. Similarly, it might be useful to explore how knowledge is constructed through various online activities (for example, discussion, collaboration, written assignments, simulations) or combinations of activities, again within specific subject areas and among particular populations of learners. Constructivism suggests that self-assessment is integral to learning and implies that opportunities for self-

assessment should occur continuously and be embedded within learning activities.

Dong and Agogino [3] claimed that:

> "Learning technologies could be characterized as technology focused, that is, focused on the enabling technologies rather than tailoring their design to local educational practices. The bulk of the current set of learning technologies deliver tools needed to create, deliver, and manage on-line courses. More emphasis and effort is placed on full-featured learning management systems and ever more complex instructional technology systems incorporating more content and more capabilities. Anecdotal evidence suggests that teachers and students are often frustrated by these systems. The need exists for systems that place instruction at the core of design and technical functionality, to distinguish them from systems that merely contain educational content but whose design and technical functionality is indistinguishable from a wide-array of others. We advocate a contextual design approach focused particularly on applying current learning research to instructional technology."

The digital library offers direct access to and delivery of instructional resources through the establishment of a federation of representative SMETE digital libraries. The digital library promotes learning through personal ownership and management of the learning process while connecting the learner with the content and communities of learners and educators. Dong and Agogino [3] referred that:

> "Content and services provided through the digital library will generally include multimedia courseware, digital problem sets and exercises, educational software applications, related articles and journals, and instructional technology services for educators and students, both commercial and non-commercial – all organized and labeled for the purpose of education and instruction… The tasks of the digital library are to find the learning resources, supply useful tips on applying them to current learning goals, and surface information that would aid in the decision to incorporate the learning elements"

According to McClintock [24] moreover, the Internet itself offers unprecedented access to information and authentic contexts that can be easily incorporated into course materials and activities. At the same time, Spiro and Jheng [42] emphasizes that the nature of the online medium makes it possible for students to visit and revisit diverse course materials and activities in ways and at times of their own choosing. For example, Stanford University has created a set of digital learning objects (DLOs) named *courselets* that are self-contained, integrated tutorials covering a small set of concepts to be used across science and engineering courses [44].

Licklider [9] holds that the proper concept of a digital library seems hard to be completely understood and evades definitional consensus. For example, a Delphi study conducted by Kochatanek and Hein [43] of digital libraries coalesced to a broad definition: organized collection of resources, mechanisms for browsing and searching, distribution networked environments, and sets of services objectified to meet users' needs.

Berkeley Digital Library consists of multiple materials that are improving the quality of teaching and the number of available multimedia (text, audio and video) in different subjects by providing virtual expert help on developing the pedagogy and content of curriculum. It is a social activity and learning environment support the social construction of knowledge and the development of a learning community and the degree to which it connects to students' larger community and culture. It includes subjects that make use of the multimedia in full time and multi-tasks such as searching, browsing, downloading different multimedia, copying text, reading, listening, and watching those multimedia, extracting and abstracting information. The students can use chat room for more discussions in the category of online collaborative and report their information in different styles through

assignments, projects on WWW or face-to-face in the classroom meeting with the help of their teachers.

Explorations of the relationship of cognitive theory to instructional technology have in fact co-existed with behaviorist ideas in the instructional technology community for years, and the field has a long history of drawing on both traditions to explore the relationship of media and learning. For example: Kozma [14] offered his conclusions and insights as argument of reframing instructional technology's longstanding debate on the contributions of media to learning:

> "Perhaps we should ask, what are the actual and potential relationship between media and learning? Can we describe and understand this relationship? Moreover, can we create a strong and compelling influence of media on learning through improves theories, through improves research, and through improves instructional designs?" [14]

MacDonald et al., Paulsen., Perzylo et al., Piaget [21, 32, 33, 34] and Wittgenstein., Parker et al., [48, 49], all suggest important capabilities that students must acquire to use text-based electronic information resources successfully; (Gopinath., Shridhar and Small et al.),[19,20,39] perform the same function for multimedia materials.

Since open and distance education (ODL) relies on technology as the vehicle for learning content, one of the main challenges in reaching people in rural, remote and resource-poor communities where needs are often greatest and ODL is, arguably, most relevant – is the lack of infrastructure [26]. Munro and Pringle [26] claimed that:

> "Beyond computers and Internet connectivity, educational access barriers start at a more fundamental level with electricity and roads. Since so many education and training programs, even in non-formal settings, depend on written text, literacy is likewise a major obstacle. The use of appropriate technologies, ones that overcome these barriers and build on cultural elements, is essential."

Various media may be used to teach learners, including printed texts, radio or other audio formats, television or other video formats, the Internet, mobile devices or Web 2.0 technologies. Distance education materials help students to complete their tasks and reach their goals. These materials open new channels for students in educational procedures so that Munro and Pringle [26] indicated that:

> "Distance education materials tend to have been text-based where print materials are exchanged between learner and instructor/tutor by post, courier or through local distance learning centers. Much use is also made of email, chat rooms and other computer-based tools to support learners. Both synchronous and asynchronous exchanges and discussions may take place to support learning, the latter often within set limits of time (a week or two), allowing learners to contribute when it suits them given their other commitments. Discussions among learners and between learner and tutor are easily managed through email as are links to libraries and databases. Using text-based materials still presents a barrier for learners with limited experience with formal education and with limited literacy skills, however, and audio and visual media can help to overcome this."

Ajadi [2] also discussed the management of open and distance education and showed that it is different from the management of conventional face-to-face universities. He concluded that for now the National Open University of Nigeria (NOUN) cannot compete favorably with the counterparts in the developed world. NOUN uses only print and facilitation to teach the students as against other open and distance learning universities where the use of print and facilitation has been substituted by the use of multi-media. The former which is what NOUN used basically is already outdated in other open universities especially those in the West. To be able to take care of the excess demand for university education, the NOUN is the answer, but the government must provide enabling environment for smooth operation of the NOUN.

Park and Hannafin [31] have compiled a set of empirically based guidelines for designing interactive multimedia that might provide some insights into how components of the digital library might be designed to enhance learning.

Gopinath [19] discussed the attempt to provide a modular structure for the learning of a computer based information system is essence of IT. Gopinath indicated to the curriculum design that the organization of learning experiences for library and information professionals involves vertical and horizontal relationships. The vertical relationship among learning experiences is worth reference to time – the first semester, second semester etc. The horizontal relationship is in terms of one area to another, for instance, the first semester talks of information and its usage; the second semester on system technology and the third semester combines both in terms of human computer interface for information access and assimilation. Shridhar [20] discussed the impact of electronic of libraries/media on education that aid all types of education – formal, informal, adult, vocational, distance and higher education. Digital libraries are potentially highly interactive environments encouraging electronic learning between its users. Acc. to Logue [18] the role of libraries in providing instructional supports has changed to one of a more dynamic nature in recent years – developing new digital resources and services for the purpose of distance learning, teaching aids, or support for the academic faculties in students' research and coursework. Large et al., Liebscher et al., [16, 17] with the proliferation of digital libraries in education, institutions and schools are realizing the benefits of digital libraries to provide new opportunities for learning activities. Cognitive psychologists, instructional designers, and others coming from an educational research background often highlight the role that digital libraries can play as cognitive tools to support the learning and sense- making activities of individual users. This view focuses on how people can make use of multimedia

resources in digital libraries to construct their own knowledge representation, and typically draws on cognitive theories such as constructivist learning or those taking a human-interaction processing perspective. MacDonald and Mason [21] denoted to that in distance learning literature, this is often referred to as 'resource-based learning' which strives to offer learners choices in their learning materials and to accommodate individual differences through the provision of a wide selection of typically related, multimedia learning resources. As such, resource-based learning requires learners to grapple with both the topic of study and information seeking and information handling skills. Renninger and Shumar [37] discussed how specific Math Forum services, and participation in the broader Math Forum Community, helped teachers to reconceptualize themselves as linking mathematics rather than being math phobic, and thus increasing their own personal skills in mathematics and changing the way they taught math in their classrooms.

2. Objectives

1. To analyze the impact of distance education on online learning of learners at higher education level.
2. To analyze the impact of online learning on feedback.
3. To analyze the impact of activities on online learning.
4. To analyze the impact of usability on experience.
5. To analyze the impact of online teaching on usability.
6. To analyze the impact of learnability on online teaching.

3. Methodology

The present research has covered both quantitative as well as qualitative methods of data collection. By applying suitable techniques, the proposed structure models for distance education, online learning, online teaching were analyzed and interpretations done accordingly.

3.1 Sampling

Twenty-three fields of studies were chosen for this study. Fifty undergraduates in English Language Teaching Department in Taiz University were found interested in the learning and using of Internet and digital library web sites. All of them had enough knowledge of Internet, and had used and searched Internet before this study. However, they had no idea of using digital libraries web sites, so they were trained for about two months to use BDL web sites correctly for browsing, searching, navigating and using different multimedia software.

3.2 Data Collection

Two questionnaires were used for the purpose of data collection. First questionnaire was used for testing experience and usability and consisted of eleven questions. The second questionnaire concentrated on activities and post test such as ease of learning, ease of use etc. and consisted of twelve questions.

BDL that provides different contents and software was selected as learning environment that provides a rich source of material for the learners in Open and Distance learning. There are two basic reasons behind selecting this digital library for achieving the objectives of the study. First, BDL offers different software such as iTunes, QuickTime, and You-Tube for multimedia operations and increases the opportunity of selection of most suitable ones as desired and liked by the learners. It presents comprehensive materials related to education, online teaching and research needs and connects to different Journals and Magazines. Secondly, the subjects recruited for this study are the targeted users of the selected digital library. Figure1 illustrates the design of the BDL.

Figure.1. Berkeley Digital Library Web Site

3.3 Learners' Participation:

At the end of their allotted training timeframe, the students were asked to complete the questionnaires and give the comments after each answer. Usability was measured via three attributes namely, effectiveness, efficiency, and satisfaction (Kozma, [14]., Large et al, [15]., Piaget, [35]). Whereas, the satisfaction was measured according to some attributes such as ease of use, recovery from the mistakes etc (Kozma, [14], Large et al, [15]).

Some snapshots of online teaching with the connection to Brekeley Digital Library web site are shown in the figure: 2 below:

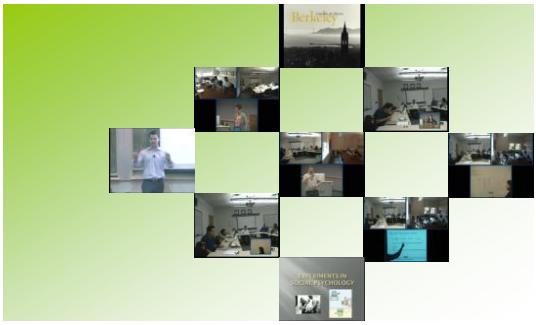

Figure.2. Snapshots of Online Teaching by using BDL

3.4 Selection of task

Different tasks were assigned to participants such as searching (e.g. find some educational audios, videos, e-books, and PDF papers), copying PDF papers or e-book pages or some texts, downloading some educational audios or videos according to their interest, watching set of academic videos and writing abbreviation of them in five lines for each, and listening some academic audios and reporting the important notes in short sentences for each. They were free to listen to audios, watch videos, or read text at times in the Internet laboratories in Al-Saeed Library of the Taiz University.

3.5 Hypotheses:

H01: Distance Education has positive effect on online Learning
H02: Online learning has positive effect on feedback
H03: Activities have positive effect on Distance Learning
H04: Usability has positive effect on Experience
H05: Online Teaching has positive effect on Usability
H06: Learnability has positive effect on online Teaching

4. Data Analysis and Results

The results showed that 36% of participants previously did not use Internet, 24% used the Internet only one time per week, 18% used it two times per week, 6% used it three times per week, and 16% used it over than three times per week. The results also indicated that the participants attracted to the Internet in the order a) specific web site (M=1.82 & SD=0.38809), b) specific magazines (M=1.30 & SD=0.24291), c) specific digital libraries (M=1.24 & SD=0.43142), and d) specific Journals (M=1.18 & SD=0.38809). The availability of information needs ordered as the needs to information in short time (M=1.70 & SD=0.46291), the needs for information under one site (M=1.62 & SD=0.49031), the needs for searching and

browsing (M=1.54 & SD=0.50346), and finally the needs for getting educational multimedia (M=1.34 & SD=0.47852).

The results also showed that the participants were satisfied by looking for information in the category of text (papers, e-books, etc.) first (M=3.08 SD=0.98644), video category (M=2.98 & SD=0.68482), and finally in audio category (M=2.74 & SD=0.63278).

The means related to the Online Learning using Berkeley digital library (BDL) Web site participants ranged from 1.62 to 29.79, whereas, the standard deviation related to the usability varied from 0.40406 to 18.43967, as shown in the figure-3.

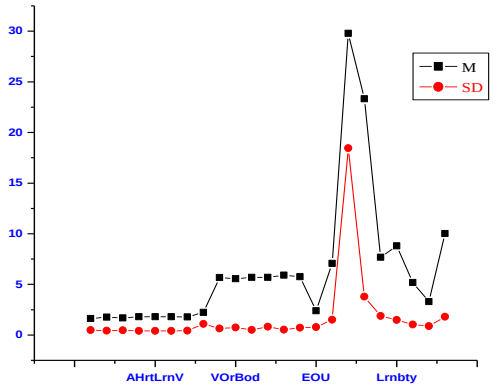

Figure.3. Means and SD of Online Learning

One model was designed for measuring web site for Online Learning (see tables below). Therefore, the multiple regression technique was used to test this model to describe the important components of the result such as R, R2, ANOVA, Coefficient (B, t, and Sig.t), as seen in table1 below. The correlation coefficient was R=0.904 for the model, and accounting 81.6% of variance of using the BDL web site.

Table1. R, R^2, Adj.R^2, F and α of Online Learning

R	R^2	Adj. R^2	F	Sig.	α
0.904	0.816	0.791	31.868	0.000	0.788

The internal consistency reliability for the construct, as measured by Cronbach's alpha, was α=0.788>0.70 the minimum level of acceptable [8].

Table2. Online Learning Standardized Coefficients

Model		β	t	Sig.
	(Constant)		-4.172	.000
	AHrtLrnV	.212	3.054	.004
	VSo	-.208	-2.508	.016
	VAms	.371	4.414	.000
	EffiT	.260	3.859	.000
	Satis	.604	6.402	.000
	ACnsm	.288	3.158	.003

In the table2 above, the results showed that according to the values of β, t and its Sig. level all the observed variables were significant in the level P=0.05.

5. Analysis of the Structural Models

A structural equation modeling was used to test two models. They are usability in relation to learnability & online teaching and distance education. AMOS 5 program was employed for

this purpose. The models tested results as shown in the figures below.

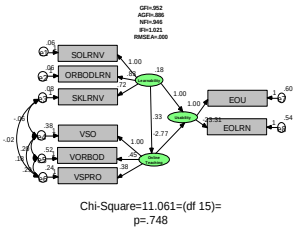

Figure.4. Usability in relation to Learnability & Online Teaching

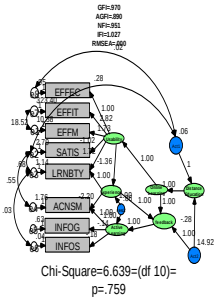

Figure.5. Distance Education Model

It is found that:

1 Distance education has positive effect on the online learning (β=2.04, t=2.96, P=0.003)
2 Online learning has positive effect on the feedback (β=0.764, t=2.774, P=0.006)
3 Activities has positive effect on distance learning (β=0.281, t=1.408, P=0.015)
4 Usability has positive effect on experience (β=1.362, t=0.538, P=0.005)
5 Online teaching has positive effect on usability (β=2.770, t=1.344, P=0.001)

6 Learnability has positive effect on the online teaching (β=0.332, t=1.475, P=0.004)

The fit indices, which are commonly used in the literature, were employed to test these models' fit. The best fit was acquired for each model see figures above. The commonly used measured of models' fit, based on the results from analysis of the structural model, are summarized on the top of each figure for these models. All goodness-of-fit statistics are in the acceptance range.

The proposed structural models explained 18% of variance for learnability (figures 4) and 95% of variance for distance education itself (figures 5).

6. Conclusion

This study tend to follow the framework of Judy Jeng [10,11], Neilsen [30] in the category of usability, Faisal Ahmed [1] in the category of enabling digital libraries, Tanyss Munro and Ian Pringle [21], and Timothy Ajadi [2] in the category of open and distance education.

Internet and digital libraries diffusion in higher education support by English Language students. Multiple dimensions of Internet and digital libraries attributes are taken into consideration: usability and learnability to interact with distance education functions.

The findings of the study showed the use of digital libraries could support online teaching, which supports the distance education system in higher education. Moreover, a conceptual modeling of digital libraries system is an initialized step toward successful implement of a distance education system on the Internet. Since, there is a wide gap between university education demand and supply and there is no way the country can afford to use the conventional face-to-face mode of university education to bridge the gap as a result. Therefore,

there is a need to embrace the online teaching for the distance university mode to enable university education accessible to millions of students who have been deprived at one time or the other university education.

It is found that the use of Internet and digital libraries showed that the design of the digital libraries affects on how users interact with them. In particular, the availability or unavailability of the actual design of features suggest or guide users how to use a digital library.

The study has investigated the underlying relationships between usability and learnability of digital libraries, which support learning in higher education. Completely the hypotheses postulated by the structural models are supported.

As a result, the distance education with associated activities has a strong positive effect on the learning in higher education. These stronger impacts of them emphasize that it is required to use the digital libraries' web sites in universities particularly for getting information through multimedia and research using Internet connection of many Journals and Magazines purposes and encourage faculty members of higher education and researchers to interact with these means. Therefore, it is significant that usability and multimedia as techniques or tools within the digital libraries should be supported both technically and educationally and the process should be institutionalized via the policies and strategies of universities.

The results of the study suggest that more user-friendly techniques should be evolved that the learners find the attributes of Internet and digital libraries more easy and accessible in order to fulfill their educational needs.

REFERENCES

Ahmed Faisal. Digital Libraries as Learning Environments: A case for Enabling Digital Libraries. Online: scholarship.rice.edu/bitstream/handle[1]

Ajadi T. (2009). Organisation and Management of Open and Distance Education in Nigeria: A Case of National Open University of Nigeria (Noun). European Journal of Scientific Research, Vol.38 (4), pp 577-582. [2]

Andy Dong and Alice M. Agogino (2001). Design principles for the information architecture of a SMET Education Digital Library *In IEEE/ACM Joint Conference on Digital Libraries.* Roanoke, VA, USA. Available at URL: www.engineeringpathway.com/smete/public/about_smete/publications/JCDL-0601/dongagoginojcdl01-01.pdf. [3]

Atkinson, R. D. & Castro, D. D. (2008). Digital Quality of Life. *Understanding Personal & Social Benefits of the Information Technology Revolution.* [4]

Cathie Norris, Professor (2007). University of North Texas, Denton, Texas, personal communication. [5]

Cory Marchionini and Hermann Maurer (1995). The role of digital libraries in teaching and learning. *Communication of the ACM, April 1995/vol. 38,* No.4. [6]

DiSessa, A. A. (2000). *Changing Minds: Computers, Learning, and Literacy*. Cambridge, MA: MIT Press. [7]

Hair JF, Anderson RE, Tatham RL, Black WC (1992). Multivariate Data Analysis with Readings. New York: MacMillan. [8]

J. C. R. Licklider (1965). *Libraries of the Future*. MIT Press, Cambridge, Mass. [9]

Jeng, J. (2005a). Usability assessment of academic digital libraries: Effectiveness, Efficiency, Satisfaction, and Learnability. *LIBRI, 55(2-3)*, 96-121. [10]

Jeng, J. (2005b). What is usability in the context of digital library and how can it be measured? *Information Technology and Libraries 24(2)*, 47-56. [11]

Jose, J. M., Braddick, H. Martin, I., Robertson, B., Walker, C., & Macpherson, G. (2002). Virtual tutor: A system for deploying digital libraries. In E. P. Lim, S. Foo, C. Khoo, H. Chen, E. Fox, S. Urs & T. Costantino (Eds.), *Proceedings of 5th International Conference on Asian Digital Libraries* (pp. 275-286). Germany, Springer. [12]

Kearsley, G. (2000). Learning and teaching in cyberspace. Canada: Wadsworth. [13]

Kozma, R. B. (1994). The influence of media on learning: The debate continues. School Library Media Quarterly, 22 (4), 233-240. [14]

Large, A.; Beheshti, J.; Breuleux, A.; & Renaud, A. (1994a). A comparison of information retrieval from print and CD-ROM versions of an encyclopedia by elementary school students. Information Processing & Management, 30 (4), 499-513. [15]

Large, A.; Beheshti, J.; Breuleux, A.; & Renaud, A. (1994b). Multimedia and comprehension: A cognitive study. Journal of the American Society for Information Science, 45 (7), 515-528. [16]

Liebscher, P., & Marcionini, G. (1988). Browse and analytical search strategies in a fulltext CD-ROM encyclopedia. *School Library Media Quarterly*, 16 (4), 223-233. [17]

Logue, S. (2003). The changing role of libraries in instructional upport. Information Technology and libraries, 22 (2), 52. [18]

M. A. Gopinath (1996). Development of a curriculum for digital information systems: A learning package for library and information professionals. *SIS-96*, 18-20, '96, Bangalore. [19]

M. S. Sridhar (1996). Beware of electronic libraries/media. *SIS-96*, 18-20, '96, Bangalore[20]

MacDonald, J. and Mason, R. (1999). Information handling skills and resource-based learning. Institute of Education Technology, The Open University (UK). [21]

Marlion, M., Summer, T. R., Fulker, D., Manduce, C. and Mogk, D. The digital library for Earth system education: building community, building the library. Communication of the ACM, Special Issue on Digital Libraries (May). 80-81. [22]

Mayer, RE, and Moreno, R. (2002) Aids to combuter-based multimedia learning. Learn. Instr., 12. 107-119. [23]

McClintock, R. O. (1999). The Educators Manifesto: Renewing the Progressive Bond with Posterity through the Social Construction of Digital Learning Communities. New York: Institute for Learning Technologies, Teachers College, Columbia University. [24]

Moore, M. G., and Kearsley, G. (1996). *Distance Education: A System View,* Wadsworth Publishing Company, Belmont, CA. [25]

Munro T. and Pringle I. (2009). Using Open and Distance Learning for Community Development. (In: Baksh R. and Munro T. (2009). Learning to Live Together Using Distance Education for Community Peace building, Commonwealth of Learning, Vancouver) [26]

Neuman, D. (1993). Designing databases as tools for higher-level learning: Insights from instructional systems design. Educational Technology Research and Development, 41 (4), 25-46. [27]

Neuman, D. (1995a). High school students' use of databases: Competing conceptual structures. Unpublished paper presented at the Annual Meeting of the American Society for International Science, October 1995, Chicago. [28]

Neuman, D. (1995b). High school students' use of databases: Results of a national Delphi study. Journal of the

American Society for International Science, 46 (4), 284-298. [29]

Nielsen, J. (1993). Usability Engineering. San Diego, CA: Academic Press. [30]

Park, I. & Hannafin, M. J. (1993). Empirically based guidelines for the design of interactive multimedia. Educational Technology Research and Development, 41 (3), 63-85. [31]

Paulsen, M. F. (2003). *Online Education and Learning Management System – Global Elearning in a Scandinavian Perspective*, NKI Floraget, Oslo. [32]

Perzylo, L., & Oliver, R. (1992). An investigation of children's use of a multimedia CD-ROM product for information retrieval. Microcomputers for Information Management, 9 (4), 225-239. [33]

Piaget, J. (1952). *The Origins of Intelligence in Children*. New York: International Universities Press. [34]

Piaget, J. (1957). *Construction of Reality in the Child*. London: Routledge. [35]

Rapp, D. N., Taylor, H. A. and Grane, G. R. The impact of digital libraries on cognitive processes: psychological issue of hypermedia. Computers in Human Behavior, 19, 609-628. [36]

Renninger, K. A. and Shumar, W. (2002). Community building with and for teachers at the Math Forum. In Renninger, K. A. and Shumar, W. eds. Building virtual communities: Learning and change in cyberspace, Cambridge University Press, New York, 60-95. [37]

Rumelhart, D. E. and D. A. Norman (1981). *Analogical processes in learning. In Cognitive Skills and Their Acquisition*, ed. J.R. Anderson. Hillsdale, NJ: Erlbaum. [38]

Small, R. V., & Ferreira, S. M. (1994). Multimedia technology and the changing nature of research in the school library. Reference Librarian, 44, 95-106. [39]

Soloman, P. (1993). Children's information retrieval behavior: A case analysis of an OPAC. Journal of the American Society for Information Science, 44 (5), 245-263. [40]

Soloman, P. (1994). Children, technology, and instruction: A case study of elementary school children using an online public access catalog (OPAC). School Library Media Quarterly, 23 (1), 43-53. [41]

Spiro, R. J. and J. C. Jheng (1990). Cognitive flexibility and hypertext: Theory and technology for the nonlinear and multidimensional traversal of complex subject matter. In *Cognition, Education, and Multimedia: Explorations in High Technology*, ed. D. Nix and R.J. Spiro, 163–205. Hillsdale, NJ: Erlbaum. [42]

T. Kochatanek and K. Hein (1999). Delphi study of digital libraries. *Inf. Proc. Manag.*, 35(3): 245-254. [43]

The Sloan Consortium (2002). *Effective Practices: Learning Effectiveness*. [44]

Twigg, C. (2000). *Innovations in Online Learning: Moving Beyond No Significant Difference.* The Pew Learning and Technology Program. Online: http://www.center.rpi.edu/PewSym/mono4.html. [45]

Vygotsky, L. S. (1962). *Thought and Language*. Cambridge, MA: MIT Press. [46]

Vygotsky, L. S. (1978). *Mind in Society*. Cambridge, MA: Harvard University Press. [47]

Wittgenstein, L. (1963). *Philosophical Investigations*. Oxford: Basil Blackwell. [48]

Parker, D. and A. Gemino (2001). Inside online learning: Comparing conceptual and technique learning performance in place-based and ALN formats. *Journal of Asynchronous Learning Networks* 5(2):64–74[49]