

12-2013

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Recommended Citation

Zhang, Weiyuan (2013) "Entering the 3rd Generation of e-Learning: Characteristics and Strategies," *Journal of Educational Technology Development and Exchange (JETDE)*: Vol. 6 : Iss. 1 , Article 2.

DOI: 10.18785/jetde.0601.01

Available at: <https://aquila.usm.edu/jetde/vol6/iss1/2>

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Entering the 3rd Generation of e-Learning: Characteristics and Strategies

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Abstract: *With the rapid development of e-Learning practices in education, the principles and methods of e-Learning have gradually evolved and matured. The purpose of this paper is to identify developmental stages of e-Learning and propose some strategies in establishing a new generation of e-Learning. First, the paper describes the three generations of e-Learning development. Second, the establishment of a 3rd generation e-Learning platform is analyzed. Third, course development in 3rd generation e-Learning is discussed. Using emerging new and user-friendly software, teachers and trainers could design and develop interactive e-Learning resources by themselves. Finally, the importance of staff development in e-Learning knowledge and skills is emphasized. The author points out that teachers and trainers would play a leading and predominant role, with support of instructional designers and technical staff, in implementing 3rd generation e-Learning.*

Keywords: e-Learning development, e-Learning platform, e-Learning courses, e-Learning training

1. Introduction

e-Learning has become an increasingly important learning and teaching mode, not only in open and distance learning institutes, but also in conventional universities, continuing education institutions, corporate training, and even in primary and secondary schools with its evident advantages of flexibility, richness, resource-sharing, and cost-effectiveness. Educational institutions provide e-Learning in various modes, including Web-facilitated learning, Web-enhanced learning, blended learning, hybrid learning, integrated learning, and purely online learning (Allen & Seaman, 2007;

Graham, 2006; The Sloan Consortium, 2008). Therefore, in this paper, e-Learning is defined as a general term, which is to use the Internet or intranet to enhance learning and teaching.

Since the use of new information and communication technology (ICT) emerged, e-Learning has been regarded as a new generation of distance education. Some scholars (Ding, 2001; Garrison, 1985; Nipper, 1989) classified distance education into three generations, which were correspondence education, multi-media instruction, and e-Learning (classified from technological perspectives). Taylor (2001, 2003) extended

distance education development to five generations, which were correspondence, multi-media, tele-Learning, flexible learning, and intelligent flexible learning, based on characteristics of the delivery technologies. The 4th and 5th generations were Web-based learning.

With the recognition of e-Learning as an educational field and that technology was only a delivery tool, Anderson and Dron (2011) defined three generations of distance education pedagogy based on general learning theories, which were cognitive-behaviorist, social-constructivist, and connectivist pedagogy. However, very limited research has been done on exploring e-Learning development from e-Learning principles and practice perspectives.

e-Learning has existed for and evolved over two decades. In practice, there have been successful experiences in implementing e-Learning, but also some failures. Through analyzing the actual e-Learning situations, some students enjoyed the flexible e-Learning mode and actively interacted with tutors and students to produce good study outcomes. However, many students were not motivated to study through e-Learning, and even stopped studying after a period. A study in China (Huang, Zhang, Chen, & Xu, 2007) found that, to a certain extent, distance learners did not participate in online learning that was provided for them because of limitations in (a) student learning habits, (b) e-Learning resources, (c) e-Tutoring, and (d) types of e-Courses.

The purpose of this paper is to explore the development of e-Learning, analyze the advantages of the new generation of e-Learning, and discuss strategies for establishing the new generation of e-Learning so as to achieve the targets of e-Learning quality and results, which should be “being the same but better” in comparison with face-to-face learning (Bates, 2004).

2.The Three Generations of e-Learning Development

By looking at the transformation of e-Learning principles and practices, e-Learning development can be divided into three generations. First generation e-Learning is a one-way technologically-driven transmission mode; second generation e-Learning is an interactive pedagogically-driven learning mode; and third generation e-Learning is a comprehensive mode of e-Learning. However, mingled stages of e-Learning development are involved. Some educational institutions might be in the 1st e-Learning generation while others might have entered the 2nd generation e-Learning practices. The most common examples of mingled stages are that some institutions provide 1st and some 2nd generation of e-Learning while some offer components of both 1st and 2nd generations of e-Learning.

2.1.The 1st Generation: A One-way Transmission Mode Driven by Technology

First generation e-Learning started in the early 1990s and developed in the late 1990s. During that period, e-Learning depended on professional technical staff with advanced technological knowledge and skills to develop e-Learning platforms and courses. Teachers and trainers mainly provided course content that had been used in the classroom to technical staff that uploaded course content to the course Website. It formed a one-way transmission e-Learning mode dominated by technology. It was hard to transfer the teachers and trainers’ knowledge, experience, and enthusiasm through e-Course design and development using this mode.

e-Learning forms part of the field of education; technology is only a tool for learning and teaching delivery. If face-to-face learning content is just transferred to the

Internet by technical staff and learners are subsequently allowed to learn by themselves to a large extent, the system will not raise students' passion for learning and maintain a perseverance to continue learning. As a result, learning will not continue or it stops after a period of time.

Because 1st generation e-Learning lacked various interactions and support in an e-Learning environment, it caused some educational institution initiatives, which regarded e-Learning as just delivery of classroom learning materials along with a discussion forum using ICT, to fail in e-Learning from 1999 to 2001. For example, Fathcom.com at Columbia University (lost US\$25 Million), Virtual Temple under Temple University (lost over US\$10 Million), NYUonline under New York University (lost over US\$10 Million), California Virtual University under University of California, California State University and California Community College (lost over US\$10 Million), and UKeU under Higher Education Funding Council (UK) (lost over £62 million (Cheng, 2005; Hafner, 2002; Liu, 2005) failed to deliver quality e-Learning programs and courses.

As the experiences and lessons from e-Learning were analyzed, these educational institutions gradually realized that implementing e-Learning had to follow pedagogical principles while technology was there just to provide a delivery tool. Hence, the principles and practices of e-Learning were transformed from being technology-driven to pedagogy-driven (Zhang, 2009).

2.2. The 2nd Generation of e-Learning: An Interactive Mode Driven by Learning Pedagogy

While some educational institutions failed in developing e-Learning, there were many successful cases such as the Open University, University of Phoenix, Athabasca University,

FernUniversität, University of Southern Queensland, China Open Universities, Online Education Colleges affiliated to 67 universities in China, Open University of Hong Kong, Indira Gandhi National Open University, Sukhothai Thammathirat Open University, University of South Africa, Open University of Malaysia, Open University of Israel, Pakistan Virtual University, Korea National Open University, Finnish Virtual University, and Anadolu University (Bacsich, 2004). In these universities, pedagogy and student support services were fundamental while technology was just regarded as a supporting tool.

A basic principle of pedagogy is interaction. In classroom learning with a face-to-face learning mode, learning occurs through interactions between teachers and students. In traditional open and distance learning, because teachers and students are in a quasi-separated relationship, interactions not only occur between teachers and students but also between students and the learning content. Therefore, traditional open and distance learning emphasizes three aspects of interactions: (a) between students and teachers, (b) among students, and (c) between students and the learning content (Moore, 1989).

In a distance learning mode, learning interactions can be more diversified in an e-Learning environment. Zhang (2009) proposed seven types of interactions: (a) between students and teachers, (b) among students, (c) between students and the learning content, (d) between students and interface, (e) between students and learning objectives, (f) between students and multimedia learning resources, and (g) between students and time management.

Zhang further suggested five fundamental pedagogical principles for implementing e-Learning interactions including (a) establishing an e-Learning platform that enables students to interact with the interface

and its features, (b) using instructional design that enables students to interact with the learning objectives based on outcome-based approaches, (c) developing multimedia and interactive learning resources that enable students to interact with learning content, (d) using e-Learning tutoring skills, which facilitate teacher-student and student-student interactions, and (e) using online automatic time management that enables students to interact with time arrangements.

From a pedagogical point of view, the focus of any type of learning mode is interaction. However, interaction can only reflect the learning and teaching aspect. As an educational area, e-Learning must also explore effective management, course design and development, student support services, assignment and assessment, evaluation and quality assurance, and staff development in a virtual learning environment. Hence, there is a need to develop a comprehensive mode of e-Learning predicated on e-Learning principles.

2.3. The 3rd Generation of e-Learning: A Comprehensive Mode of e-Learning

The characteristics of 3rd generation e-Learning are: (a) adherence to a set of e-Learning principles, (b) a one-stop service for e-Learning, (c) user-friendly and flexible functions and features of the e-Learning platform, (d) communication and collaboration within the learning environment, (e) interactive and interesting learning content, (f) sharable and co-developed learning resources, (g) cost-effectiveness through effective management, (h) quality assurance through a series of evaluation procedures, and (i) student support services of learning and teaching.

Second generation e-Learning focuses on pedagogical aspects, but 3rd generation e-Learning needs to consider all aspects from an educational perspective that include: (a)

e-Learning principles and methods, (b) staff management, (c) learning centre management and learning resources management, (d) design and development of the e-Learning platform, (e) design and development of e-Courses, (f) design and provision of the e-Learning environment, (g) instructional design of e-Learning, design and development of e-Learning activities, (h) online tutoring, (i) student support services, (j) use of open educational resources, and (k) evaluation and quality assurance, and staff development.

So, how does one create and establish 3rd generation e-Learning? An e-Learning platform and its functions are the basic tools for implementing 3rd generation e-Learning, while specifically-developed e-Courses are the learning resources for implementing it. Staff development is the quality assurance for implementing 3rd generation e-Learning.

As mentioned before, the new generation of e-Learning refers to many aspects. The following sections focus on strategies for developing 3rd generation e-Learning from three major aspects of e-Learning: (1) the design and development of e-Learning platforms, (2) the design and development of e-Learning courses, and (3) providing staff development or training in e-Learning.

3. Strategy One: Establishing a 3rd Generation e-Learning Platform

An e-Learning platform and its functions are the tools for delivering e-Learning. Zhang and Wang (2005), in examining 17 e-Learning platforms that have been widely used by open and conventional universities around the world, found that the functions of e-Learning platforms could be classified into four categories: (1) course content, (2) communication and collaboration, (3) course management, and (4) administrative functions. Details on these four areas are described in Table 1.

Table 1 Common Functions of e-Learning Platforms (Zhang & Wang, 2005)

Category	Specific functions
Course content functions	Instructional design tools; course layout template; search tool for course Website; student homepage.
Communication and collaboration functions	Discussion forums; internal email; text-based chat; audio/video conferencing; file sharing; workgroup; whiteboard.
Course management functions	Module management; quiz management; grade management; student tracking.
Administrative functions	Secure login; technical support.

However, those platforms mainly belong to the 1st or 2nd generation e-Learning tools, which have shortcomings. First, they lack flexibility because all the features of the platform act as a whole. Users cannot selectively use some of the features or add new features according to course characteristics and learners' needs. This limits the influence of teachers in e-Learning. Second, the interactive features of those e-Learning platforms are insufficient. Some emerging cooperative learning tools were not, or cannot be, integrated into the learning platform. Third, they lack a function for learning. This limits realization of the e-Learning principle of being "student-centered." Fourth, they lack an evaluation function. Because quality assurance of e-Learning is implemented

through a series of evaluation procedures, it is hard to implement e-Learning quality assurance mechanisms if the evaluative function is lacking. Fifth, an e-Learning platform is expensive. Currently, most e-Learning platforms have been developed by profit-making technological companies.

Third generation e-Learning platforms could overcome the shortcomings of the 1st and 2nd generation platforms. The functions of 3rd generation e-Learning platforms could be extended to six categories, which are (a) course content, (b) communication and collaboration, (c) assignment and assessment, (d) administration and management, (e) learning, and (f) evaluation functions. The details are shown in Table 2.

Table 2. Functions of the 3rd Generation e-Learning Platforms

Category	Specific functions
Course content functions	Course materials; audio and video lectures; streaming courseware; link to supplementary materials; interactive learning courseware; open education resources; course Website search engine.
Communication and collaboration functions	Discussion forum; virtual classroom; working groups; file Sharing; blog; facebook; online chat (MSN, QQ); RSS; student homepage.

Assignment and assessment functions	Timetable for assignments and exams; student's self-assessment; automatic grading; submitting assignments; receiving assignments; marking assignments; plagiarism checking (such as Turnitin); progress bar; outcome-based assessment grading.
Administration and Management functions	Online notifications for information management; learning resources management; management of self-assessed assignments online; management of online evaluation.
Learning Functions	Taking notes; reading points highlighting; tag; Wiki; glossary; mind map; e-Portfolio.
Evaluation Functions	Tracking of teaching activities; tracking of learning activities; advised reporting, observing learning, and teaching process; evaluation from teachers; evaluation from peers; feedback area from course Website; survey on student learning experience; survey on teaching experience.

Compared with the 1st and 2nd generations of e-Learning platforms, 3rd generation e-Learning platforms have five distinct advantages.

1. Flexibility. By creatively exploiting the potential of new technology, all functions of the platform can be object-oriented and dynamic. Features can be added, reduced, upgraded, and shared on the platform. Teachers and trainers can selectively adopt the features to use according to course characteristics, learners' needs, and personal teaching experience.
2. Interactivity. The interactive features such as blog, Facebook, RSS, and virtual classroom can be integrated into the one-stop service platform.
3. Learning functions. E-Learning is student-centered learning and teaching. Learning features such as e-note taking, tag, mind map, and learning portfolio are becoming important on the platform.
4. Evaluation functions. Quality is most important in all educational arenas,

and the e-Learning environment is no exception. Using advantages gained from ICT, an e-Learning platform could provide a series of evaluation features such as tracking teaching activities, tracking learning activities, observing and monitoring learning and teaching processes, and conducting surveys to assure quality of e-Learning provision.

5. Cost effectiveness. Because developing a new learning platform can use free or open software such as Moodle for configuring and customization, the flexible functions and features of the platform should allow for usage sharing and joint development, which could reduce costs in developing, upgrading, and enhancing the platform through resource sharing.

4.Strategy Two: Developing 3rd Generation e-Learning Courses

Along with the emergence of new software designed for developing e-Courses, teachers and trainers would be able to design and develop

interactive e-Learning objects and courseware with the support of technicians. Hence, in this mode, teachers' teaching experiences and understanding of students could be fully used in designing and developing their e-Learning courses, in addition to delivering their courses effectively. In addition, teachers and trainers could upgrade and edit e-Learning materials anytime, anywhere.

In order to reach cost-effectiveness of learning in an educational institution, three aspects of integration need to be made by internal management namely the integration of (a) learning modes, (b) human resources, and (c) learning resources.

The integration of learning modes involves integration of: (a) face-to-face and e-Learning, (b) e-Learning and tutoring, and (c) e-Learning and field work. The purpose of learning mode integration is to combine different modes of delivery in order to use the best of all and minimize the weaknesses of each.

Integration of human resources is needed when developing a new generation of e-Courses. e-Course design and development requires team work, rather than individual effort. Teachers in a subject team will play the most important role, but they will need support from instructional designers, multimedia producers, technicians, editors, and graphic designers.

Integrating learning resources includes combining open educational resources, existing resources, and newly developed resources. Developing new interactive learning resources involves a large amount of human and financial resources. Any open education resources and existing resources need to be fully adapted to fit each course.

Technicians played a dominant role in designing and developing e-Courses in the 1st and 2nd generations of e-Learning. For example, everyone depended on technicians to

upload learning materials. Even when teachers and trainers wanted to update online content, they also needed technicians to do much of the work for them. For video programs, a technical crew shot video lectures for teachers and trainers. The technician(s) acted as "Director" while teachers played an "actor/actress" role.

In 3rd generation e-Learning course development using emerging systems such as Blue Orange - Classroom Replay™ and ECHO360, lectures could be automatically recorded, created, and produced. The process could be easily managed by teachers and trainers themselves, and they could choose and edit video lectures and do their own uploading to Websites for students to review anytime, anywhere.

Similarly, when designing and developing interactive e-Learning objects, teachers and trainers can do the production themselves by using user-friendly e-Learning software tools. A few examples of which are:

- *Articulate* allows teachers and trainers to create engaging courses, presentations, quizzes, and surveys quickly and easily without professional IT knowledge and skills.
- *Captivate* allows teachers and trainers to create and upload interactive simulations, branching scenarios, and quizzes to courseware without programming knowledge.
- The *myUdutu*™ Online Course Authoring Tool allows teachers and trainers to build and deploy online courses without any prior technological expertise.
- *VoiceThread* allows group conversations to be collected and shared in one place from anywhere in the world. A *VoiceThread* is a collaborative, multimedia slide show that holds images, documents, and videos and allows students to navigate slides and

leave comments using voice, text, and audio or video files.

With these e-Learning software tools, teachers and trainers can develop their own e-Learning material quickly and easily without technological expertise.

The development of e-Learning resources, especially multimedia, is expensive. However, the open education resources (OER) movement provides favorable conditions for developing 3rd generation e-Learning courses. The term OER can be traced back to 2002 when it was used during a UNESCO Forum on the Impact of OpenCourseware for Higher Education (Prabhala, 2010). OER, in the forms of open courseware, open textbooks, learning objects, pictures and images, music and sounds, and open journal articles, among others, are online educational materials and resources offered freely and openly for anyone to use, and under a Creative Commons (CC) license to remix, improve, and redistribute. Generally speaking, OER is free of charge for teachers and trainers to use in their teaching.

From the initial MIT OpenCourseWare activity to the OpenLearning Project of the Open University UK, more and more educational institutions and organizations around the world are actively participating in this movement by making their educational resources openly available through the Internet. For example, MIT publishes lectures and materials from over 2000 undergraduate and graduate courses online, where they are freely available for self-study (MIT, 2011). More than 350,000 free lectures, videos, films, and other resources are available from all over the world. More than 800 universities have active iTunes U sites, about half of which — including Stanford, Yale, MIT, Oxford, and UC Berkeley — distribute their content publicly on iTunes Store (Apple Inc., 2011).

In 2011, the Department of Labor in the United States announced a solicitation for grant applications under the Trade Adjustment Assistance Community College and Career Training Grant Program (TAA CCCT), which will invest \$2 billion to provide community colleges and other eligible institutions of higher education with funds to expand and improve their ability to deliver education and career training programs. All of the materials created with program funds must be released under a CC-BY license. This \$2 billion dollars from the United States government is, in part, explicitly to fund the production of open educational resources (Kleinman, 2011).

China has launched over 20,000 open courses at national, provincial and institutional levels by June 2011 (National Excellent Learning Material Centre, 2011). Japan OpenCourseware Consortium (JOCW) has published over 1500 courses in either Japanese or English by January 2010 (Japan OpenCourseware Consortium, 2010).

With more quality OER being available on the Internet and with increasingly convenient Internet access, teachers and students could use abundant high-quality educational resources and easily integrate them into their e-Learning objects free of charge. Therefore, teachers and trainers do not need to develop all the courseware themselves. Through online resources sharing and joint-building, the cost of e-Learning course development could be reduced and the quality of e-Learning courses could be enhanced.

5.Strategy Three: Providing Staff Development for 3rd Generation e-Learning

In order to implement e-Learning in the best ways possible, teachers and trainers need to learn and master knowledge and skills of e-Learning, which include (a) e-Learning

principles, (b) e-Learning platform and its utilization, (c) instructional design, (d) online course material writing, (e) multimedia design and production, (f) use of online open education resources, (g) student support, (h) online tutoring, (i) evaluation; and (j) quality assurance.

Due to the advanced but user-friendly nature of new information exchange technology, teachers are increasingly playing a leading role in developing 3rd generation e-Learning. Nevertheless, e-Learning is an art and a science. In order to develop 3rd generation e-Learning effectively, teachers need to undergo systematic training. Just like in the education sector, primary and secondary school teachers need to undergo training in primary and secondary education; university teachers need to undergo training in university education; adult educators need to undergo training in adult education. Similarly, apart from general learning theories, teachers and trainers adopting e-Learning need to learn the knowledge and skills required for e-Learning.

As an educational area, the author would like to suggest the following contents of e-Learning development for teachers and trainers:

- *Fundamental principles of e-Learning*, which include the definition, development, and trends of e-Learning; the characteristics and advantages of e-Learning; and the fundamental principles and methods of e-Learning.
- *e-Learners and e-Learning*, which includes e-learner characteristics, learning motivation, learning styles, and learning processes.
- *e-Facilitators and e-Tutoring*, which includes teachers as facilitators; the methods and skills of e-Tutoring; and student support services.
- *Use of e-Learning platforms*, which

includes e-Learning systems; the functions of e-Learning learning platforms; the use of e-Learning features; and the use of virtual classrooms.

- *Design of e-Learning courses*, which includes theories and methods in e-Learning instructional design; design of e-Learning environments; and preparing blueprints for e-Courses.
- *Design of e-Learning course interfaces*, which includes the principles of interface design; color meaning and match in the interface; and the design of the interface layout.
- *Design and development of multimedia e-Courseware*, which includes the principles of multimedia courseware design, and the development of multimedia interactive courseware.
- *Development of e-Learning resources*, which includes e-Learning materials; e-Learning activities; and e-Learning assessment.
- *Use of open educational resources*, which includes the types of open educational resources; the search for open educational resources; the use of open educational resources; and copyrights of open educational resources.
- The eight steps of OER integration proposed by Gurell (2008) could be introduced, including: determine placement within the curriculum, check for license compatibility, eliminate extraneous content within the OER, identify areas of localization, remix with other educational materials, determine the logistics of using the OER within the lesson, devise a method of evaluation, or whether the currently planned evaluation needs adjustment.

- *Evaluation and quality assurance of e-Learning*, which includes planning evaluation, development evaluation, formative evaluation, and summative evaluation. The quality is assured by series of evaluations. Formative evaluation consists of platform utilization, Website utilization, instructional design, learning interaction, resources utilization, assignment and assessment, technical support, learning support, and flexibility. Summative consists of learning effectiveness, tutoring effectiveness, learners' satisfaction, and sustainability of programmes/ courses.

6. Conclusion

e-Learning is the fastest-growing learning mode in the educational sector, and it has a very bright future. This paper has summarized the development of three generations of e-Learning. In establishing 3rd generation e-Learning, we need to establish a powerful and comprehensive e-Learning platform, which can be shared and jointly developed and enhanced and be used as the fundamental tool for delivering e-Learning. We need to base the instructional design and development of 3rd generation e-Learning courses on the principles of e-Learning and to use user-friendly e-Learning software tools fully. Using these tools, teachers could lead in designing and developing interactive courseware while technical staff remains in support positions. This would allow teachers' knowledge and skills to be fully applied in e-Learning, so the teaching quality and learning outcomes could be assured. Only in this mode could students be invited and involved in course development. e-Learning is both a science and an art; if e-Learning needs to achieve the result of "being the same but better" than face-to-face learning, then teachers and trainers need to undergo systematic training with regard to professional knowledge and skills of e-Learning.

However, in order to establish 3rd generation e-Learning, there are some challenges, including the development of a comprehensive plan of e-Learning for educational institutions, using new technology or integrating different technologies for effective e-Learning development, developing teacher training programs on e-Learning, and resource availability for e-Learning development.

As stated earlier, 3rd generation e-Learning is a comprehensive mode, which considers all aspects of e-Learning. This paper discussed only three aspects, which were e-Learning platform development, e-Learning course development, and staff development in e-Learning. Further studies are needed in the aspects of e-Learning management, instructional design, course design and development, learner-centered pedagogy, learners' characteristics, learners' training on e-Learning, tutoring, evaluation and quality assurance, use of OER, and cost analysis, to name a few.

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Acknowledgement

This article is based on the keynote speech, presented and discussed at the 2011 International Conference on Hybrid Learning (ICHL) on 12 August 2011 in Hong Kong. Some of the revisions made in the production of this article are based on discussions at the conference, for which I am very grateful to the participants.