

# V Model of E-Learning Using Gagne Nine Steps of Education

Hasan Al-Shalabi<sup>1</sup>, Swidan Andraws<sup>2</sup>, Adnan I. Alrabea<sup>3</sup>, A. V. Senthil Kumar<sup>4</sup>

<sup>1</sup>Faculty of Engineering, Al-Hussein Bin Talal University, Ma'an, Jordan; <sup>2</sup>Faculty of Engineering and Technology, University of Jordan, Amman, Jordan; <sup>3</sup>Faculty of Information Technology, Al Balqa Applied University, Salt, Jordan; <sup>4</sup>Hindusthan College of Arts and Science, Bharathiar University, Coimbatore, India.

Email: hmfnam@yahoo.com, sweidan@ju.edu.jo, adnan\_alrabea@yahoo.com, avsenthilkumar@yahoo.com

Received August 31<sup>st</sup>, 2012; revised September 30<sup>th</sup>, 2012; accepted October 10<sup>th</sup>, 2012

## ABSTRACT

This paper presents a V model of E-learning using the well-known Gagne nine steps for quality education. Our suggested model is based on our experience at the computer engineering departments at Al-Hussein Bin Talal University, the University of Jordan and Albalqa Applied University. We applied the recommendations of the nine steps methodology to the E-learning environment. The V model suggested in this paper came up as a result of such application. Although this V model can be subject to some tuning and development in the future it proved to be highly efficient and easy to implement for the teacher and the student.

**Keywords:** E-Learning; Educational System; Nine Steps; E-Learning V Model; Quality Education

## 1. Introduction

The educational system is one of the main components of strategic management of governments. Expenditure on education may help foster economic growth, enhance productivity, contribute to people's personal and social development, and help reduce social inequalities. E-learning was introduced at these universities gradually starting from 2005. At the computer engineering department at the university of Jordan a E-learning project was launched in 2004. Based on experience it was found that there is a necessity of having a model for the E-learning so that other universities and departments can have a systematic and well defined methodology of adopting E-learning. Despite strained resources, the Ministry of Education developed highly advanced national curriculum and many other nations in the region have developed their education system using Jordan as a model. Jordan ranks number one in the Arab World in education. The Jordanian Ministry of Education is now making it mandatory for students to be computer literate and able to apply their studies in computers to their regular studies, most especially the scientific and mathematical courses. Its educational system is of international standards and its secondary education program is accepted in world-class universities.

These terms are used to mean different things in different contexts and locations. There are distinctions among these terms, but nowadays they share more in

common than is unique to each. E-learning would be any type of learning done over some digital device. Online learning is using computers and internet to perform the education. Distance learning is by definition far, and may use computers or other electronic methods.

Historically, distance learning involved mailing hard copy of materials to students, who read them, completed assignments, and mailed them back for evaluation. This is now the exception, with most distance learning involving the internet and little hard copy. Historically, E-learning was the next step, with the primary focus on self-study courses delivered via CD-ROM and other e-media. Online learning covers a broad spectrum of synchronous and asynchronous delivery modes over the internet.

## 2. Related Works

Public expenditure on education in Europe and the first world countries ranges from 5% to 7% of the GDP. Jordan is ranked 90 out of 177 in the Human Development Index [1]. Nevertheless according to [2] the total public spending on education including all levels of education was 4.63% in 2002 and 4.25% in 2007. The role of this system is not merely to bring the presentation of information and resources to the students. A major component is how to display this information and how to evaluate the absorption of the information [3]. New methods and tools to complement the traditional educational system

came into existence. These are E-learning, online learning and distance learning [4].

Most distance learning today looks much like online learning; however, “hybrid” or “blended” courses/training are also popular [5,6]. These combine aspects of all three, utilizing some on-site sessions, as well as self-study or interactive components (delivered online or via e-storage media) that do not require students to be on-site. Even at traditional colleges and universities, an increasing number are offering hybrid- or even online-courses to their local students.

Therefore these are three conceptually distinguishable models of learning, but from practical viewpoint pure distinctions among them have been fading rapidly and may soon disappear completely. In this paper we deal with the concept of E-learning and we will try to suggest a model of E-learning based on the nine steps model of traditional learning system.

A valid question arises: if anybody has access to virtually any piece of information in this world then is there a need for such an educational system and what is its role? The answer is definitely yes, but the new educational system will differ from classical one.

Another question that arises is: Is E-learning going to replace traditional education? The answer to this question is No. E-learning system is a complement or supplement to the traditional system. It is a support to the learning process and facilitates new ways of education which are place and time independent. It provides a learning environment that integrates a wide range of effective and efficient tools.

Hence the primitive importance of this paper which focuses on finding the steps proposed for the education system.

Several researchers investigated the different aspects of E-Learning. Investigations studied the impact and problems associated with E-Learning in the Middle East region [7-10] and globally. Different researchers discussed the issue studying the use of E-Learning in teaching different subjects.

### 3. Definition, Objectives and Advantages of E-Learning

E-learning is a form of distance education, and is defined as a way to teach using the mechanisms of modern communication like computers, networks, multimedia and Internet portals to deliver information to learners in a fast and cheap way, and to enable us to manage the educational process and setup and measurement and evaluate the performance of learners [11].

The objectives of E-learning can be stated as follows:

1) Using the information technology as a means to enhance the ability of the student to learn and maximize

the utilization of his potentials.

2) Reduce the cost of learning.

3) Develop the personality, the spirit, mind and body of the individual, and upgrade his abilities and skills.

4) Provide a flexible learning environment, and prepare qualified and skilled staff to use the strategies and methods of modern teaching.

When comparing to traditional learning we can identify the following advantages of E-learning:

- Overcome the constraints of space and time in the educational process.
- Provide an opportunity for learners to interact electronically with each other on the one hand and between them and the teacher on the other hand.
- Promote a culture of learning and self-training in the community, which improves and develops the capacity of learners and trainees at the lowest cost and minimum effort.
- Raise students’ sense of feeling and equality in the distribution of opportunities in the educational process and break the barrier of fear and anxiety.
- Reduce the administrative burden for courses through the use of electronic means and tools in the delivery of information and duties and assignments to learners and assess their performance.
- Use a variety of methods which are more accurate and fair in evaluating the performance of learners.

### 4. The V Model and Gagne Prototype

Quality learning was investigated by many educators and researchers and several models and systems were worked out. Among the most well-known systems are models and systems suggested by Gagne [12], McCarthy [13] and Keller [14]. We think that Gagne’s model is the most appropriate to be taken as a prototype for E-learning. According to Robert Mills Gagne skills are to be learned at the lowest level and mastered before proceeding. This reminds us of the waterfall development model. At the same time we recognize that learning process is an active interactive process and should be instantaneously adaptive depending upon the evaluated outcome. This leads to suggest a V model which is focused on the outcome and comparing it with the expected one set at the outset of the delivery. An instructor should use positive reinforcement and repetition, with each new skill building upon previously acquired skills. Gagne identifies the following nine steps of instruction. Gagne’s Nine Levels of Learning are also known as Gagne’s Nine Conditions of Learning, Gagne’s Taxonomy of Learning, and Gagne’s Nine Events of Instruction are:

1) Gain attention: Present stimulus to ensure reception of instruction.

2) Tell the learners the learning objective: What will

the pupil gain from the instruction?

- 3) Stimulate recall of prior learning: Ask for recall of existing relevant knowledge.
- 4) Present the stimulus: Display the content.
- 5) Provide learning guidance
- 6) Elicit performance: Learners respond to demonstrate knowledge.
- 7) Provide feedback: Give informative feedback on the learner’s performance.
- 8) Assess performance: More performance and more feedback, to reinforce information.
- 9) Enhance retention and transfer to other contexts.

### 5. Evaluation of Instruction

- 1) Have the objectives been met?
- 2) Is the new program better than the previous one?
- 3) What additional effects does the new program include?

Evaluation is concerned with the effectiveness of the course or program regarding the student’s performance. Based on the student’s performance, measures are taken of the kind of student capabilities the program is intended to establish.

When objectively analyzing the condition for learning Gagné says: “Since the purpose of instruction is learning, the central focus for rational derivation of instructional techniques is the human learner. Development of rationally sound instructional procedures must take into account learner characteristics such as initiate capacities, experimental maturity, and current knowledge states. Such factors become parameters of the design of any

particular program of instruction”.

Gagne’s Nine Levels of Learning model gives trainers and educators a checklist to use before they engage in teaching or training activities. Each step highlights a form of communication that aids the learning process. When each step is completed in turn, learners are much more likely to be engaged and to retain the information or skills that they’re being taught. If you use this approach before any type of training session or presentation, you’ll remember how to structure your session so that your people get the best possible learning experience.

Considerable research was done on models of e-Learning [8-10]. Generally speaking there are three categories of models in E-learning. These are: Academia, business and industry and government [15]. The academia model is the pioneer in the field and we are going to focus on it. Our model represents the activities used in e-learning distributed in two phases and having the shape of a V-letter. That’s why we are calling it the V model. The first phase is the delivery phase while the second phase is the testing phase.

Our model is based on projecting Gagne’s nine steps on the E-learning system.

We represent our model in V-shape and divide it into two main stages: the delivery stage and the testing stage. The model is not linear and involves some level of feedback.

Mapped to Gagne’s nine steps the suggested model can be represented in the following diagram **Figure 1**.

**Table 1** shows the correspondence between our suggested model and the steps in Gagne’s model.

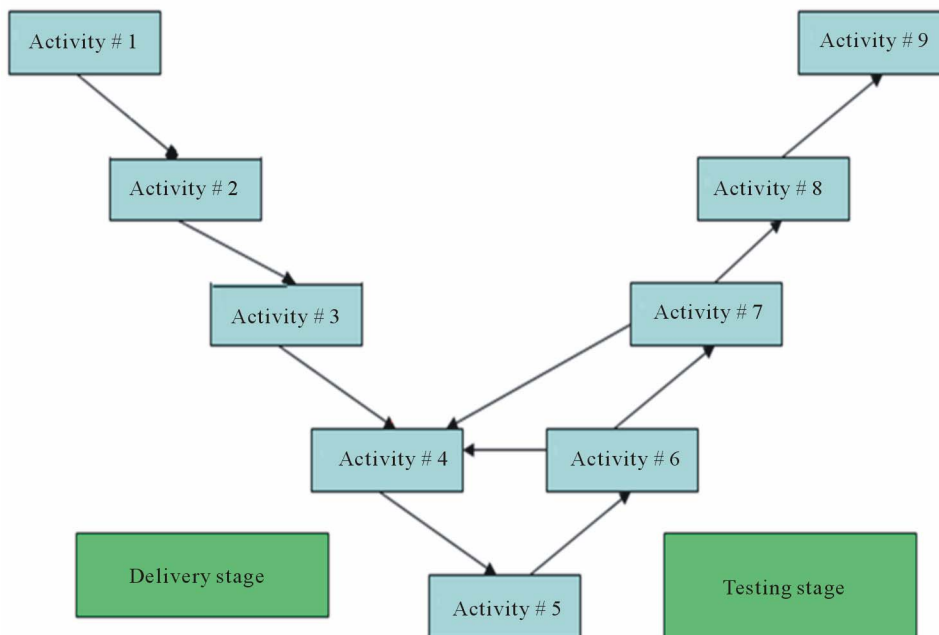


Figure 1. E-learning V model.

**Table 1. Correspondence between our suggested model and the steps in Gagne's model.**

V model activity	Step # in Gagne's system	Recommended actions in the E-learning model
Activity #1	Attract attention	Attract trainees acoustically and visually. Start with a screen animation Ask puzzling questions Mention a fact stimulating the curiosity of the trainee
Activity #2	Tell the goals to the trainees	Outline clearly educational goals Outline the importance of the session
Activity #3	Said the former information	Stimulate recall Ask questions about previous session. Discuss main concepts of the previous session Link new information with prior knowledge
Activity #4	View content	Display content in an organized way. Include text, images, sounds, graphics and video
Activity #5	Provide the guidelines "Guide to learn".	Use examples and case studies View graphics Do debates
Activity #6	Elicit performance (practice)	Practice new skill or new behavior Check the understanding of new concepts Practice new skills
Activity #7	Provide the comments (feedback)	Provide instant feedback on the performance of the students Provide exercises with full explanation Invite questions
Activity #8	Values of performance	Give the students their final evaluation Assessment should be graded Accepted grades are (80% to 90%)
Activity #9	Strengthen the process of conservation	Repeat concepts and main points Present graphically (block diagrams and charts) the main ideas

According to our model the E-learning process is divided into nine activities numbered from one to nine in match to the Gagne system. The first column of the table these activities are listed in order. The second column lists the Gagne instruction associated with the given activity while the third column describes the actions suggested in the E-learning system. E-learning systems are increasingly becoming very popular. Nevertheless different people in different institutions are using their personal experience and skills in designing and implementing their systems. Unfortunately there is no statistical data on the performance and effectiveness of the different E-learning systems. One of the aspects of further investigation is to do a comparative analysis of E-learning systems designed and implemented using different models among which our V model is one of the investigated models.

## 6. Conclusion

Based on our experience in E-learning a V model was proposed. Our model was based on Gagne's nine steps of quality education. Having this model E-learning in Jordan can be to certain extent formalized and standardized. Nevertheless a huge margin of freedom is given to the instructor so that his experience and creativity can be exploited to the maximum.

## REFERENCES

[1] [http://en.wikipedia.org/wiki/Education\\_in\\_Jordan](http://en.wikipedia.org/wiki/Education_in_Jordan)

- [2] T. H. Kanaan, M. N. Al-Salamat and M. D. Hania, "Higher Education in Jordan, Access and Equity in Its Financing," Jordan Center for Policy Research and Dialogue (JCPRD), March 2009.
- [3] F. Martin, J. D. Klein and H. Sullivan, "The Impact of Instructional Elements in Computer-Based Instruction," *British Journal of Educational Technology*, Vol. 38, No. 4, 2007, pp. 623-636.  
[doi:10.1111/j.1467-8535.2006.00670.x](https://doi.org/10.1111/j.1467-8535.2006.00670.x)
- [4] F. Martin, "Effects of Practice in a Linear and Non-Linear Web-Based Learning Environment," *Educational Technology & Society*, Vol. 11, No. 4, 2008, pp. 81-93.
- [5] M. Simonson, S. Smaldino, M. Albright and S. Zvacek, "Teaching and Learning at a Distance," 3rd Edition, Pearson Education Inc., Upper Saddle River, 2008.
- [6] J. Serwatka, "Improving Student Performance in Distance Learning Courses," *The Journal of Technological Horizons in Education*, Vol. 29, No. 9, 2002, pp. 46-52.
- [7] H. Al-Shalabi and S. Al-Jufout, "Instructor's Role through Embedded E-Learning at Al-Hussein Bin-Talal University. 1st International Conference & Exhibition on E-Learning," E-Learning Center, University of Bahrain, Bahrain, 2006.
- [8] H. Al-Shalabi and S. Al-Jufout, "The Electronic Classroom through Embedded E-Learning in Jordan," *Asian Journal of Distance Education*, Vol. 3, No. 2, 2006, pp. 1347-9008.
- [9] S. Al-Jufout, H. Al-Shalabi and R. A. Al-Muhaissen, "Embedded E-Learning Technique Evaluation in Jordan," *Asian Journal of Distance Education*, Vol. 5, No. 3, 2007, pp. 1347-9008.
- [10] H. Al-Yaseen, S. Al-Jaghoub and N. Al-Salhi, "Issues and Challenges in Implementing E-Learning Projects in

- Higher Education,” *The Case of Jordan Proceedings of the 10th European Conference on E-Learning*, England, 10-11 November 2011, pp. 16-22.
- [11] Olimpius, “Education Staff Working in E-Learning Environments: Skills and Competencies,” *7th International Scientific Conference E-Learning and Software for Education*, Bucharest, 28-29 April 2011.
- [12] [http://en.wikipedia.org/wiki/Robert\\_M.\\_Gagn%C3%A9#cite\\_note-4#cite\\_note-4](http://en.wikipedia.org/wiki/Robert_M._Gagn%C3%A9#cite_note-4#cite_note-4)
- [13] “Official Site of Bernice McCarthy’s 4MAT System,” [www.aboutlearning.com](http://www.aboutlearning.com)
- [14] “Official Site of John Kellers ARCS Model.” [www.arcsmodel.com](http://www.arcsmodel.com)
- [15] R. E. Scott, “E-Learning Models,” *Encyclopedia of Virtual Communities and Technologies*, IGI Global, 2006, pp. 166-173.