Comprehensive Approach to Program Evaluation in Open and Distributed Learning (CAPEODL Model)

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With the continual emergence of new web technologies, institutions around the world are investing more and more in the development and deployment of *open* (i.e., learning in your own time, pace and place, Calder & McCollum, 1998) and *distributed* (i.e., learning materials located in different locations, Khan, 2001) e-learning programs (see Figure 1). A recent study of 2,500 US colleges and universities reports that the number of online students has more than doubled in the five years and the growth from 1.6 million students taking at least one online course in fall 2002 to the 3.94 million for fall 2007 represents a compound annual growth rate of 19.7 percent (Allen & Seaman, 2008)

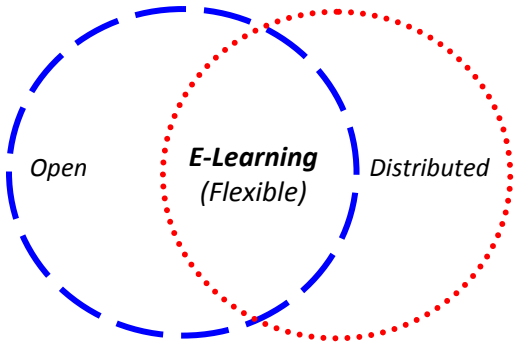

Figure 1: Open and Distributed Learning

As is the case with any new learning initiative, stakeholders of online learning will be faced with many challenges. By exploring what works and what does not, we are able to help them overcome these challenges and continually meet their expectations. We must evaluate these online programs in order to assess whether they are indeed useful to their stakeholders and ultimately helps them achieve their institutional mission. To this end, Frydenberg (2002) noted:

> The literature on e-Learning program evaluation is naturally skimpy, since few fully developed programs have arrived at a stage where summative evaluation is possible. However, we should soon be seeing articles describing solid attempts and preliminary findings based on in-progress or formative evaluation processes that go beyond the anecdotal. The research body of knowledge of formal program evaluation should be brought to bear on these endeavors.

In this paper, I would like to discuss a program evaluation model for e-learning entitled "Comprehensive Approach to Program Evaluation in Open and Distributed Learning (CAPEODL)." The CAPEODL model critically reviews the products and services of e-learning by carefully collecting information about all aspects of online programs from start to finish.

The following is an outline of the paper:

- The CAPEODL model
  - People–Process–Product Continuum in E-Learning
  - E-Learning Framework
- Performance Measurement Criteria and Assessment Rating
  - Review of Various Stages of E-Learning
- Overall and Executive Status of the Review
- CAPEODL in Practice
- Conclusion

The CAPEODL model

The CAPEODL model (which can be pronounced as "KA-POO-DUL", Khan 2004a) is developed with the integration of the *People-Process-Product (P3) Continuum in E-Learning* and the *E-Learning Framework* (see Figure 2).

The CAPEODL model examines e-learning products with a competent and proven tool that focuses on the critical issues. In the first part of the CAPEODL model, the P3 continuum procedurally lists various products for the *seven* stages of e-learning. The second part of CAPEODL model, the *E-Learning Framework,* serves as a diagnostic tool to judge the quality and utility of all seven stages of e-learning and blended learning products with its *eight* evaluation criteria methods. These methods include: pedagogical, technological, interface design, management, resource support, evaluation, ethical and institutional (Khan, 2001, 2005, 2005a, 2007).

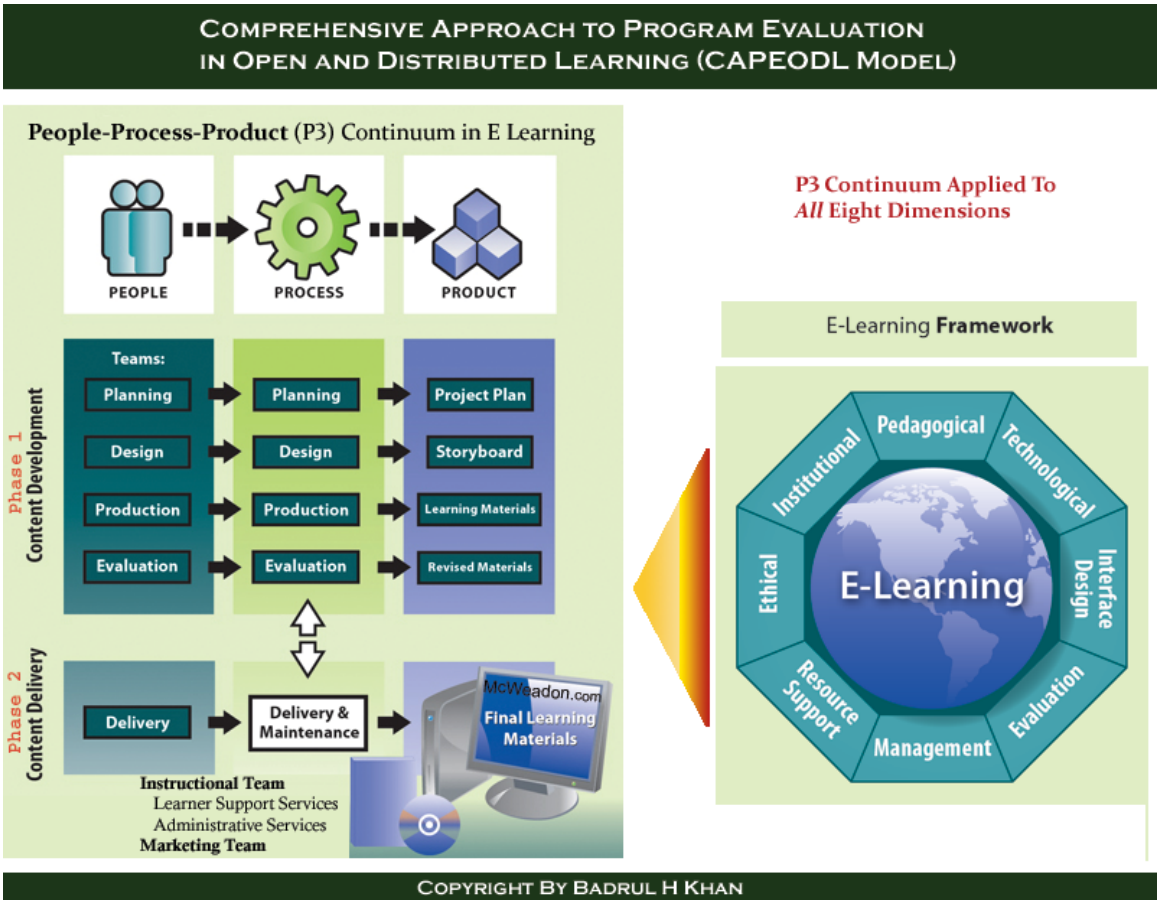

Figure 2 The CAPEODL Model

Why review only the products? What about the other two components of the P3 (i.e., people and process)? A product is the result of people being involved in a process. (Please note that Figure 2 only gives an example of 4 of the 7 stages of e-learning products. See *Review of Various Stages of E-Learning* section of this paper for more details). By examining the quality of the product, we are comprehensively evaluating the performance of the people involved in producing that product.

In order to gain a comprehensive, accurate assessment of any e-learning environment, we must examine all final products through seven e-learning stages based on *eight* evaluation criteria methods (see Figure 3). *(See below for more details on these critical stages and criteria methods.)*

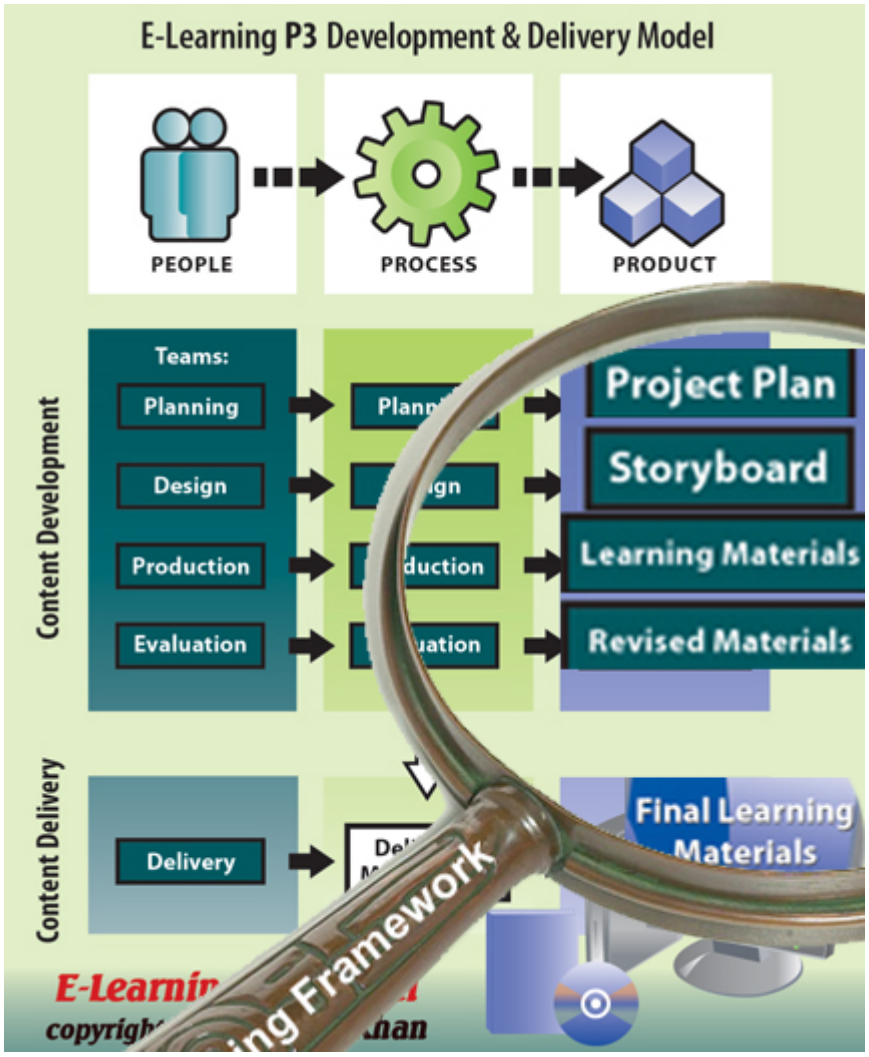

Figure 3 Assessing E-Learning Products

People–Process–Product Continuum in E-Learning

In e-learning, people are involved in the process of creating e-learning products and making them available to a specific audience. The P3 continuum can be used to map a comprehensive picture of e-learning (Khan, 2004).

The e-learning process can be divided into two major phases: (1) Content Development and (2) Content Delivery. The two phases combined comprise seven different stages of e-learning. The Content and Development phase consists of: (1) planning, (2) design, (3) production, and (4) evaluation. The Content and Delivery phase includes: (5) marketing, (6) instruction, and (7) maintenance. The e-learning process is iterative in nature. Although evaluation is a separate stage of the content development process, shown in Figure 2, ongoing formative evaluation for improvement (i.e., revision) should always be embedded within each stage of the e-learning process. Individuals involved in the e-learning process should be in contact with each other on a regular basis and revise

materials whenever necessary. *Please note that individuals may refer to the various stages of the e-learning cycle by using different terms than I use in this paper but they have to go through each and every one of them.*

Based on the size and scope of the project, the number of individuals involved in various stages of an e-learning project may vary. Some roles and responsibilities may overlap as many e-learning tasks are interrelated and interdependent. A large-sized e-learning project requires the involvement of various individuals. With a small or medium-sized e-learning project, some individuals will be able to perform multiple roles. When an e-learning course is completely designed, developed, taught, and managed by a single individual, it is clear that the same individual has performed the role of content expert, instructional designer, programmer, graphic artist, project manager, etc. This is an example of a small size e-learning project. Many individuals have had experiences in developing their online courses by themselves, with intermittent staff support from their institutions. Details on all seven stages of e-learning process, people, and products are described in the *Review of Various Stages of E-Learning* section next.

E-Learning Framework

The E-Learning Framework puts the instructional systems design and pedagogical issues in the context of a much wider and complex set of factors integrating the analysis of an organization's e-learning environment (Khan, 2001, 2004, 2005, 2005a, 2007, Smith & Khan, 2005, Bedard-Voorhees, 2008). The Framework can be used to capture an organization's inventory of e-learning by addressing issues encompassing the following eight dimensions of open and distributed learning environments (McWeadon, 2008):

1. Pedagogical: Refers to teaching and learning. This dimension addresses issues concerning content, audiences, goal and media analysis, design approach, organization, and methods and strategies of e-learning environments.
2. Technological: Examines issues of technology infrastructure in e-learning environments. This includes infrastructure planning, hardware and software.
3. Interface Design: Refers to the overall look and feel of e-learning programs. The interface design dimension encompasses page and site design, content design, navigation, and usability testing.
4. Evaluation: Includes both assessment of learners, and evaluation of the instruction and learning environment.
5. Management: Refers to the maintenance of the learning environment and distribution of information.
6. Resource Support: Examines the online support and resources required to foster meaningful learning environments.
7. Ethical: Relates to social and political influence, cultural diversity, bias, geographical diversity, learner diversity, information accessibility, etiquette, and the legal issues.
8. Institutional: Refers to issues of administrative affairs, academic affairs and student services related to e-learning.

The eight dimensions of the framework provide us with ideas about specific issues in e-learning. These issues generate many questions which serve as critical factors or performance measurement criteria to review e-learning products and services.

Performance Measurement Criteria and Assessment Rating

Performance Measurement Criteria (PMC) contains specific questions assessing the quality and utility of e-learning products. PMC items represent the key issues within each dimension of the e-learning environment (i.e., pedagogical, technological, etc.). It may be challenging to come up with questions for some dimensions of the Framework for some specific stages of the e-learning phases given the interrelationship among the characteristics of the eight dimensions. In such situations, I recommend not worrying about those particular dimensions and continue with other dimensions. Some questions may appear to be a good fit for more than one dimension. You may come up with or find some PMC questions not fitting into any of the eight dimensions of the framework—that's ok—we can use them as long they are critical and relevant for evaluating e-learning.

In addition to structured questions (i.e., quantitative or hard data) in the PMC, for a comprehensive program evaluation of e-learning, it is necessary to gather qualitative or "soft data" such as constructive comments/feedback from stakeholders, reviews of documents and site visits.

The CAPEODL model uses PMC items to review the products of the e-learning process (such as *E-Learning Plan*, *Storyboard*, *E-Learning Materials, etc.)*. Once again, you must gather both quantitative and qualitative data in order to properly evaluate the process. (see Figure 4).

E-Learning STAGE (Product Type)	E-Learning Framework Dimension	Performance Measurement Criteria (PMC)	Assessment Rating (Score Card)		
			Excellent	*Sufficient*	*Deficient*
Feedback and Comments from Stakeholders: Notes from Site Visit(s) and Document Reviews:					

Figure 4 E Learning Products' Performance Measurement Criteria and Assessment Rating

Assessment Rating is used as Score Card for the evaluation of e-learning products. The PMC questions support the assessment of a program's progress in completing the

critical e-learning activities and an *Excellent-Sufficient-Deficient* rating is used as Assessment Rating (Score Card).

- **Excellent** – Yes, the issue(s) discussed in the question are well-addressed.
- **Sufficient** – Yes, the issue(s) discussed in the question are partially-addressed.
- **Deficient** - No, the issue(s) discussed in the question are not-addressed.

How do you go about selecting a rating of Excellent, Sufficient or Deficient? Is there a benchmark to use? In some instances, there is. If there is an existing benchmark I contend that you should use it. The ultimate intention is to judge the status of a product using the best possible information available. For example, the selection criteria for a Learning Management System (LMS) is available on the Website of several reliable sources (such as http://www.webcite.com.au/webcontent15.htm). These criteria allow you to make judgments about whether the LMS selection is excellent, sufficient or deficient. Some benchmark criteria may not always be fully applicable to some institutional contexts. The judgment will always be subjective. The CAPEODL model encourages the most transparent, unbiased and reasonable judgment in the review of a product.

Review of Various Stages of E-Learning

To conduct a comprehensive evaluation of e-learning, we have to review the quality of products from all seven stages of the e-learning process. Within the scope of this paper, I will discuss review criteria for products of two major phases of e-learning which include all seven stages:

Phase I: Content Development

1. *E-Learning Plan* (i.e., product of the Planning stage)
2. *E-Learning Storyboard* (i.e., product of the Design stage)
3. *E-Learning Materials* (i.e., product of the Evaluation stage)
4. *Revised E-Learning Materials* (i.e., product of the Evaluation stage)

Phase II: Content Delivery

5. *Marketed Course* (i.e., product of the Marketing stage)
6. *Course Taught* (i.e., product of the Instruction stage)
7. *Final and Updated E-Learning Materials* (i.e., product of the Delivery & Maintenance stage)

1. Review of E-Learning *Planning* Stage

During the planning stage, based on the scope of an e-learning project, there may be key individuals such as project manager, business developer and instructional designer who develop a *project plan* (i.e., *an* ***e-learning plan*****)** that serves as a road map for the project. The scope of the plan can range from the broadest to the most narrow in scope:

- *national level* (e.g., US National K-12 E-Learning Plan),

- *institutional level* (e.g., McWeadon Institute's E-Learning Plan, see Figure 5),
- *program level* (e.g., Instructional Design Certificate Program's E-Learning Plan), and
- *Course level* (e.g., ET505 Instructional Design course's E-Learning Plan).

Many e-learning projects have been developed without having any formal plan. Individuals involved in these projects might have jotted down ideas on paper, napkins, and notebooks without necessarily referring to them as an e-learning plan. That's fine. As long as they had some concept of what a plan would entail—that's what really matters. Table 1 in Appendix A provides sample review criteria for the product of the planning stage.

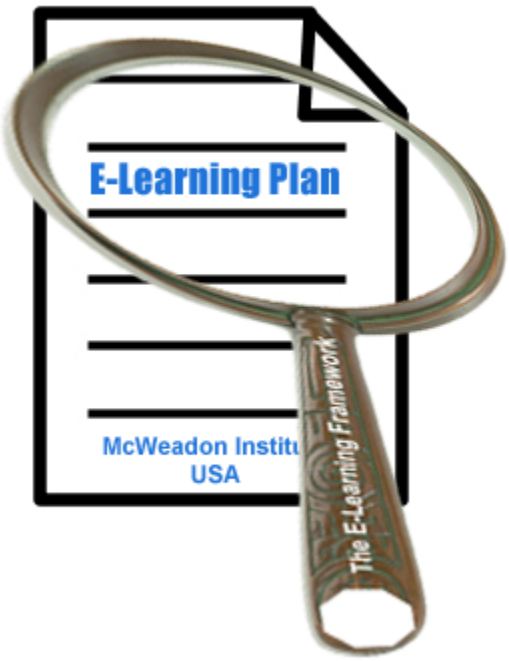

Figure 5 Review of the E-Learning Plan

2. Review of E-Learning *Design* Stage

With a comprehensive understanding of learners' needs, institutional capabilities, and experience in e-learning design and research, the design team (led by an instructional designer) is responsible for reviewing course content for pedagogical soundness and the selection of the appropriate delivery medium. In this stage, instructional designers work with subject matter experts, interface designers, copyright coordinators, and evaluation specialists.

The major product of an e-learning course design process is the *storyboard*. Brandon (2004) states, "A storyboard is to e-Learning design what a blueprint is to architecture." The *storyboard* provides details from the designers that are needed by the developers

(production team) to produce e-Learning materials on time and within budget. Table 2 in Appendix A provides sample review criteria for the design stage.

3. Review of E-Learning *Production* Stage

During the production stage, the production team creates the learning materials for a course from the storyboard which was created during the design stage. The production coordinator leads the e-learning production process. Team members include, but are not limited to: course integrator, programmer, graphic artist, multimedia developer, photographer/videographer, editor, learning objects specialist, and a quality assurance person. The production team makes sure that the timeline is maintained for all deliverables. The e-learning production process is time consuming, collaborative process in which each member does his or her own specific tasks. Table 3 in Appendix A provides sample review criteria for the production stage.

4. Review of E-Learning *Evaluation* Stage

Several cycles of evaluation should be conducted during the overall e-learning process to improve the effectiveness of e-learning materials. There are two types of evaluation: (1). Formative - conducted to improve the learning product as it is being developed (for example, during the content development phase) and (2). Summative - conducted as the final assessment of learning products (for example, during the content delivery phase). By conducting ongoing formative evaluation, we can improve the e-learning product as it is being developed. Formative evaluation is inherent in the e-learning development process. Instructional designers and interface designers review learners' feedback from the pilot and communicate with the production teams to make course revisions. Table 4 in Appendix A provides sample review criteria for the evaluation stage.

5. Review of E-Learning *Marketing* Stage

Institutions offering e-learning courses/programs are increasingly facing competition as learners have more options from which to choose making he e-learning market very competitive. With non-academic institutions often competing with academic institutions, ongoing market research with e-learners (i.e., clients) can provide institutions with advantage over others in their e-learning offerings. Market researchers and recruiters are among the people who should be part of the overall e-learning marketing initiative. Effective marketing will help institutions attract and recruit students for their courses and programs. An important marketing strategy for any offerer is to make accurate information about their e-learning offerings known to as many potential learners as possible. Table 5 in Appendix A provides sample review criteria for the marketing stage.

6. Review of E-Learning *Instruction* Stage

At the instruction stage, instructional and support services (ISS) staff may include course coordinator; instructor; tutor; course facilitator; discussion moderator; technical support; librarian; counselor; customer service; registration and administrative staff.

When a course is offered, the ISS is at the front line working directly with students. The online course coordinator should make sure that registered students receive orientation for the course and that the ISS support is available as promised. The course coordinator should always be in touch with the maintenance team to resolve any technical problems that the ISS team may encounter during the course. Table 6 in Appendix A provides review criteria for the instruction stage.

7. Review of E-Learning *Maintenance* Stage

The maintenance team consists of individuals such as systems administrator; server/database programmer; webmaster, etc., who are responsible for delivering/maintaining an effective and efficient e-learning environment. All online course materials should be accessible by the learners at anytime from anywhere in the world. All supplemental course materials (e.g., CD, DVD, audio and video cassette, book, course pack, etc.) should be delivered to learners. Table 7 in Appendix A provides sample review criteria for the maintenance stage.

Overall and Executive Status of the Review

The CAPEODL model can provide an executive summary of how well *e-learning products* of different *e-learning stages* address all eight categories. By combining assessment rating scores from Table 1 to Table 7, we can develop an executive summary status table for each stage. For seven stages of the process, we can generate seven executive summary status tables. For example, Table 8 in Appendix A provides an executive summary for the product of the planning stage (i.e., McWeadon Education's *E-Learning Plan*). Based on how well it addresses various issues in the eight categories, it can provide us with three color coded status – green, yellow and red. With its scores, Table 8 in Appendix A suggests that McWeadon Education's E-Learning Plan is pedagogically sound, but is weak in technology and ethical dimensions.

By combining the scores from all seven tables, we can develop an overall executive summary status table for the products of all stages combined. The overall executive summary table can reflect the comprehensive program evaluation status of an e-learning program. Table 9 in Appendix A suggests that McWeadon Education's overall E-Learning Program is pedagogically sound, but is weak in technology, interface design and ethical dimensions. It seems that McWeadon should consider improving its technology infrastructure plus improve management of e-learning materials and ethical issues related to copyright permission.

CAPEODL in Practice

The CAPEODL was first used by The George Washington University graduate students (mostly professionals from government agencies, corporations and educational settings) taking the Program Evaluation course with me. Students used CAPEODL to review six higher education institutions in the USA and Canada, including; Regis University,

Tallahassee Community College, University of Illinois-Springfield, University of Alaska, Illinois Online Network, British Columbia Open University (Khan, 2004a).

The results of the program evaluation were shared with the contact persons in each institution. Participating institutions received reviews of pedagogical, technological, interface design, evaluation, management, resource support, ethical and institutional aspects of their online programs. Institutions shared their views on using CAPEODL noting that they were able to identify areas where they had strengths and weaknesses—helping them to better appropriate resources and develop future budgets. For example, one participating institution's online program did very well in the pedagogical issues, but poorly in ethical issues. By using the CAPEODL model my students advised, "Since the pedagogical design of e-learning is satisfactory, there is no need to either replace the existing instructional designer or hire new one. Since the plagiarism and intellectual property rights issues were not adequately addressed, assistance from individuals with expertise in legal and copyright issues should be considered in future online learning projects."

I have established McWeadon Education (www.McWeadon.com) where my colleagues and I provide e-learning design, development and evaluation services. In addition, we have been conducting workshops on CAPEODL model in the USA and abroad. Based on the CAPEODL model, we offer a 4 week short course and two-day workshops on *E-Learning Evaluation* (http://McWeadon.com/courses/). In this McWeadon course and workshops, participants use the CAPEODL model to review online programs and courses.

Conclusion

As I indicated earlier, the CAPEODL model uses the E-Learning Framework as a diagnostic tool for a holist evaluation of an e-learning environment. A comprehensive review of the quality of products and services during the *content development* phase (e.g., planning, design, development, evaluation stages) and *content delivery* phase (e.g., marketing, instruction and maintenance stages) of e-learning process which, in turn, helps us judge the performance of people involved in the process. We become increasingly more knowledgeable about e-learning as more and more institutions review their programs. This, in turn, guides us to further inquiry in the field.

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