CHAPTER 3

CONCEPTUAL FRAMEWORK FOR EFFECTIVE E-LEARNING

3.1 Introduction

In this chapter, a perspective of online teaching and learning that looks beyond the traditional paradigm of instruction is presented. Once such a perspective is adopted, instructional designers can incorporate the key elements that are needed for effective e-learning environments. The criteria the framework must satisfy according to the impact of instructional methods and information technology on student learning styles based on the theory of multiple intelligences are discussed. A conceptual framework that can guide the development of effective e-learning is illustrated and specific examples of instructional strategies that fit the instructional principles are listed.

3.2 Criteria for the Framework

In order to begin to identify an effective e-learning environment that emphasises good learning theories and supports different kinds of learners based on MI Theory, there is a need to consider three areas of research direction. Firstly, learning theories and instructional design need to be looked into. Secondly, the aspect of e-learning that employs the type of technology approach as Internet-based online learning systems need to be studied. Thirdly, the research focuses on creation of course content in various presentation styles to accommodate student preferences. The required criteria for the development of the proposed framework are derived from these three research directions. Through an analysis
of existing literature on multiple intelligences theory, learning theories and e-learning technology, the researcher sought to answer the following questions:

1. What instructional principles for e-learning environments can be derived from a synthesis of compound theories of learning?

2. Based on those principles, what specific instructional strategies can be applied in an e-learning environment?

3. Based on those specified instructional strategies, what are the identified key elements for an effective e-learning environment to support varied learning styles?

4. What are the technological requirements to consider all six elements in the e-learning environment?

Instructional designers need to look for innovative ways to support effective teaching and learning without following tightly to traditional forms of instruction. The challenge for instructional designers is to devise ways to create pedagogically sound content for delivery over the Internet. The term pedagogy is used to refer to teaching and learning strategies. The choice of strategy is driven by attention to the learning theories that apply to the situation and to the facilities in the environment. It appears that e-learning technology may facilitate or enable a host of new pedagogies as well as the current ones.

E-learning courses need to address variability in student learning styles and provide external forms of motivation such as positive feedback and interaction with others for the isolated students. The challenge is also to facilitate active learning in an e-learning environment while avoiding the tendency to provide too much of information. The other challenges may be to devise ways to promote high levels of interactivity among students and instructors. Such interactivity can result in community building, collaboration among learners, and enhanced communication.
3.3 **Grounded Theoretical Approach**

In line with Hannafin *et al.* (1997; 1999), the researcher argues that design and use of e-learning must be grounded in a theoretical approach. First, Hannafin *et al.* (1997) state that the specific solution of practice is not congruent with advocated underlying theoretical principles. Second, besides the problems concerning a potential mismatch between practice and theoretical roots, the author further argues that a theoretical grounding is necessary in order to develop strictly on the basis of an existing practice, the implementation of new technologies will result in a remediation of the existing learning activities, i.e. a transfer of the existing learning activities from physical locations to an e-learning environment. A remediation maintains but does not improve the quality of the educational practice. In order to develop the use of e-learning from a pedagogical point of view, it is therefore not enough to study the existing practice. Instead, it is necessary to have an understanding of theoretical principles of the learning process and of the ideal learning environment. It means that the use and design of e-learning should be grounded in a learning theoretical approach and cannot be based on an existing practice.

The concept in Hannafin *et al.* (1997) of grounded design is defined as the systematic implementation of processes and procedures that are rooted in established theory and research in human learning. The framework presented in this chapter attempts to provide a learning theoretical grounding for design and use of e-learning. It is therefore necessary to create a link between theory and practice to ensure that the solutions of practice are congruent with the learning theory. The approach to a theoretically grounded design and use of e-learning is based on the following relations:
Together, the concepts of Figure 3.1 can be termed as a pedagogical approach; it is characterised by sound learning theories, learning principles, and by the use of technology (and other materials) in different activities in the learning environment. E-learning consists in different *technologies* such as discussion forums, e-mail, file sharing, shared whiteboard, video conferencing and chat. In an e-learning environment, these technologies are used in support of different *activities*. The structure of the activities of a course or a course unit is determined by *learning principles* which provide a model of the e-learning environment. Finally, the learning principles are founded in a *learning theory* which describes the human learning process.

Effective course design can begin with asking and answering the key question: what are the major learning goals and objectives for this course? Once these goals and objectives have been identified and clearly articulated, the question of which learning strategies, activities, and experiences to employ can be addressed.

E-learning can employ any of the wide variety of strategies discussed here, from e-mail to online database and archive searching. Much of the power of learning via the
Internet lies in its capacity to support multiple modes of communication including any combination of student-to-student, student-to-faculty, faculty-to-student, student-to-others, others-to-students and so forth (Berge and Collins, 1995). Taking into account the varied learning styles of learners and providing opportunities for self-directed and collaborative learning, educators can facilitate powerful, effective courses geared to achieve specific learning goals and outcomes using the vast resources and capacities of e-learning.

The e-learning environment is, after all, just another learning environment, in some way similar to and in some ways different from more traditional environments such as conventional classrooms, seminar rooms or labs. The various instructional strategies used to meet the goals and objectives of a course are likely to be similar in each environment. However, the ways in which the strategies are utilised differ as students and instructors make the best use of the characteristics and capacities of each environment.

### 3.4 Instructional Principles for E-learning Environments

In order to confront these challenges, instructional designers must examine their traditional perspectives and adopt a new philosophy of teaching and learning that is appropriate for electronic instruction. Instructional designers need to match their desired learning goals and instructional approaches to the relevant learning theories. The researcher argues that this new philosophy should build on a combination of learning theories rather than being confined to one preferred perspective. Behaviourist, cognitivist, and constructivist theories have contributed in different ways to the design of online materials, and they will continue to be used to develop learning materials for e-learning. Behaviourist strategies can be used to teach the facts (what); cognitivist strategies to teach the principles and processes (how);
and constructivist strategies to teach the real-life and personal applications and contextual learning.

Adopting a synthesised theory of learning can have a synergistic result by integrating the most positive and powerful aspects of each individual learning theory into an e-learning environment. Table 3.1 lists these three theories and their implications for instructional design.

Table 3.1
Summary of Learning Theories and Instructional Design Use

<table>
<thead>
<tr>
<th>Learning Theory</th>
<th>Implications for Instructional Design</th>
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| Behavioural theory (learning as response acquisition) | ➢ individual progress  
  ➢ content sequencing  
  ➢ analysis of learning task  
  ➢ assessment keyed to behaviour |
| Cognitive theory (learning as knowledge acquisition) | ➢ structure activity  
  ➢ support expert development  
  ➢ learning strategies  
  ➢ organizers  
  ➢ assessment keyed to performance on activity |
| Constructivist theory (learning as knowledge construction) | ➢ share control with students  
  ➢ emergent understandings  
  ➢ authentic activity  
  ➢ peers and adults assist learner  
  ➢ assessments include self reflection and learner responsibility |

Online instruction occurs when learners use the Web to go through the sequence of lessons to complete the learning activities and to achieve learning outcomes and objectives (Johnson, 1997) (Ritchie & Hoffman, 1997). A variety of learning activities are used to accommodate the different learning styles. Learners choose the appropriate strategies to meet their learning needs. Effective e-learning environment was designed with the
following aspects in mind: effective learning; effective instruction; effective presentation of
the content; and effective use of technology in the service of the above three.

From extensive study of literature, particularly learning theories and their
implications for instructional design; and from the review of existing frameworks and
models the researcher contends that effective e-learning environments need to contain a
combination of instructional principles. The instructional principles listed in Table 3.2
consolidate the events of instruction proposed by (Gagne, Biggs & Wager 1992); strategies
of instructional design by (Merrill, 1997) and (Resnick, Greeno & Collins, 1996); the
design guidelines of (Hannafin & Peck, 1988); and Web-design concepts offered by
(Johnson, 1997) and (Schank, 1998). Principles that support quality design of e-learning
environment instruction were identified from each of the behaviorist, cognitivist and
constructivist learning theories. The list of principles and the relevant learning theories are
shown in Table 3.2. The check mark indicates the learning theory(s) that each instruction
principle belongs to. The different schools of thought (Ally, 2003) on learning suggest how
they can be used to develop effective e-learning materials.

Table 3.2
"Instructional Principles for E-learning and the relevant Learning Theories"

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<thead>
<tr>
<th>Instructional Principles for E-learning</th>
<th>Behaviourist theory</th>
<th>Cognitivist theory</th>
<th>Constructivist theory</th>
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<tr>
<td>Cater for individual differences</td>
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<td>Encourage student reflection</td>
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<td>Motivate students</td>
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<td>Encourage interaction</td>
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<td>Provide contextual learning</td>
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<td>Promote meaningful learning</td>
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<td>Facilitate deep processing</td>
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<td>Consistent layout</td>
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<td>Track progress</td>
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Of the many instructional strategies available for use in the e-learning environment, most have not been developed specifically for e-learning instruction, but are currently employed in traditional classrooms, and can be successfully adapted for facilitating e-learning. According to Knowles (1991), instructors must be able to choose a learning technique that is “most effective for accomplishing a particular educational objective”. From this perspective, instructional strategies are tools available to instructors for designing and facilitating learning. Pitt and Clark (1997) have identified ten instructional strategies which have been effectively used in the traditional classroom and can likewise be used in the e-learning environment. These strategies are: learning contracts, lecture, discussions, self-directed learning, mentorship, small group work, the project method, collaborative learning, case study, and forum.

The following section provides specific examples of instructional strategies that can be incorporated in an e-learning environment. Each of these strategies highlights the importance and practical application of the nine principles of effective e-learning environments.

### 3.5 Instructional Strategies of Effective E-learning Environments

Following are the descriptions on each instructional strategy based on the instructional principles:

**Individual differences**

Within a learning context, differences can be found in the areas of general skills, aptitudes, information processing, and application of information to new situation. In addition, all learners differ in their ability to perform various education-based and real-world learning tasks. Consequently, the general abilities or preferences of the learner will affect his or her
ability to accomplish different learning outcomes. Individual differences specific to learning and instruction can be found with learning styles based on multiple intelligences theory (Gardner, 1993). Each of the intelligence helps to describe one’s preferences.

Recognition of individual differences has, for the most part, been taken into account and promoted through the instructional design template for student centric e-learning environment (SCEnE). The following techniques and strategies have been used in SCEnE to address individual differences:

- **Assessment on learning styles.** The static MI profile of each student is determined by getting the student to first complete, before starting the lesson, the Multiple Intelligences Inventory (MII) (McKenzie, 2005). Intelligences refer to abilities in what one can do such as execute skills or strategies.

- **Array of interactive materials and activities.** With the use of various communication technologies, content can be provided in multiple formats. Lectures are presented using PowerPoint or detailed text. Other formats of content presentation include spreadsheet, flash, audio, video, as well as still and animated images. Content is also presented through WebBoard discussion groups where students are required to share and discuss information with each other. Moreover, each course has links to outside web sites that provide supplemental material on the current topic.

- **Allow learners to control the pace.** All courses provide various means of navigation within the e-learning course. Content can be assessed through links or a graphical organiser. A student can be as systematic or random in his or her access of course material as he/she desires. Although the course is built and presented in a hierarchical sequence, it does not have to be accessed in the same way. While it is not necessarily encouraged, students are also not discouraged from moving through the course in a random order.
- **Encourage active and collaborative interaction.** Recognizing that “the whole is greater than the sum of the parts,” each course is designed with activities that are both individual and group based. Working within “virtual team,” students work together to solve problems, analyse cases, and develop group deliverables. These assignments or projects allow individual ideas, perspectives, and experiences to be heard and collectively considered.

**Reflective learning**

Mezirow, 1990 defines learning as “the process of making a new or revised interpretation of the meaning of an experience, which guides subsequent understanding, appreciation, and action.” The process of reflection enables the ideas, understandings, an experience of individuals and groups to be reviewed (Preskill and Torres, 1999). Values, beliefs and assumptions of team members are explored through reflection. Watkins and Marsick (1993) see reflection as a key to continuous learning. The following three strategies can be used to promote reflective learning.

- **Provide extensive and timely feedback.** Helping students feel that they are a part of a learning community is critical to persistence, learning and satisfaction. Effective e-learning design will include provision for feedback that amplifies the learning from the experience, and enables students to increase their level of skill and knowledge. The range of available feedback strategies is vast, including reflective responses to prescribed questions, semi-automated responses by the system to student actions and work, shared comments in online forums and blogs, and personal responses via e-mail. Cyboran (1995) reports that feedback should be more than “your answer is correct” or “your answer is incorrect” and states that feedback should let learners know why their answer was wrong, use complete sentences and present feedback in the same location on every screen.
Incorporating “one minute papers” and “muddiest point” into learning process. “One Minute Papers” are short writing exercises in which students are asked to reflect on a particular topic as a form of knowledge assessment activity. Students are asked to post a quick list of the new knowledge they gained through a particular session. On the other hand, the “Muddiest Point” activity allows students to identify the areas of confusion or uncertainty and/or to raise additional questions around the content of the session. Both of these activities benefit the students and instructors by providing feedback on what is clear and what may need further attention through the use of reflection. These activities can be accomplished in an e-learning environment using communicative tools like forum, whiteboard and email.

Online diaries and reflective journals. Diaries and journals promote continuous reflection throughout the course. Entries can be self-directed or promoted by an issue, question, or experience posed by the instructor. Journals allow students to reflectively interact with various course topic and experiences and, as noted earlier, critically examine how their values, beliefs and attitudes fit with the material. This is a way that promotes growth beyond what regular instructor and student interactions provide.

Motivation

E-learning approach is commonly assumed to motivate the learner, simply through the use and integration of various activities and media involved. This degree of intrinsic motivation can now be teased out and related to the intelligences, that is, the degree of intrinsic motivation will rely to a large extent on engagement of the intelligences.

At its most basic level, human motivation is controlled by the drive to satisfy a range of human needs (Maslow, 1970). The ARCS (Attention, Relevance, Confidence and Satisfaction) Model of Motivation is a practical way for instructors to address the issue of student motivation (Kellar & Suzuki, 1988). Instructors must be able to gain and maintain
students’ attention by providing an environment that is interactive and participative. While keeping the students’ attention is critical, it cannot be maintained unless the students feel that the course material is relevant. In other words, the course content, activities, and assignments must be related to their personal and professional goals. Students must also feel confident that they can achieve the expected outcomes of the course; therefore instruction should be flexible to compensate for individual student needs. The final component of the ARCS model is satisfaction, which corresponds to whether or not students derive satisfaction from the instruction. For example, students will not perform as well if they feel dissatisfied with the instruction because it does not present enough of a challenge. Strategies for enhancing student motivation in an e-learning environment can be best characterised as either novel and entertaining approaches or attempts to personalise the instruction. The techniques that can be used to enhance the motivation of students are:

- **Incorporating games into the e-learning environment.** Various games can be incorporated into the course to get students attention. An example of a successful game for an e-learning course is “word game”, puzzle and “tic-tac show”. Another example could be the popular television show called “Who Wants to Be a Millionaire.” However, some games require synchronous sessionS.

- **Simulation programmes.** Real-life experiments represented in flash format or animated images can enhance students’ motivation on the relevant topic.

- **Use of multimedia when appropriate.** E-learning courses tend to be primarily textual-based forms of instruction. Graphic images, photographs, audios and videos can be incorporated into the course to enhance student motivation.

**Social learning**

Social learning combines elements from both behaviourist and cognitive theories and put forward that we learn best by interacting with others in social setting (Merriam &
Caffarella, 1999). Behavioural learning theory contributes social learning because people do not learn from observation alone but through imitation and reinforcement of what they observed. Cognitive theory focuses on the cognitive processes involved in the observation over the resulting behaviour with the idea that individuals can regulate their own behaviour by recognising consequences. The strategies to promote this perspective include:

- **Creating a personal connection with students.** The goal is for instructors to be perceived as a real person in mediated communication. Actions such as personalizing examples, addressing students by name, questioning, praising, initiating discussion and encouraging feedback all help make this connection. Personal connection can also be made through the use of “relational icons” or “emoticons” made by combination of punctuation marks.

- **Peer review and feedback.** Feedback from fellow students is as important as instructor feedback. The purpose of the activity is to help their peers by providing comments that help the person to understand the areas that are clear and well done and the parts that need further development. This activity also models appropriate format for the particular assignment/project being developed. Other than the content of the assignment, students can include the group members’ comment/feedback in the assignment for future enhancement or as a compliment.

- **Require and facilitate interaction.** This may not seem like a new approach, however, in the e-learning environment, it is much easier for students to be passive both in assignment submission either individual or group and during synchronous or asynchronous chat session. In addition to basing a percentage of the course grade on participation, other initiatives can be taken as well. One is to post an agenda of the upcoming week’s synchronous/asynchronous session. Another technique is to post discussion question prior to a chat session so students can think about the topic and be
ready for a discussion. While the quantity of interaction is important (measured by the hits on the WebBoard), the quality of interaction is what should be stressed. If not, it becomes too easy for students to fall into the trap of providing comments that add little or no value to the discussion. It is also important that the instructor models the expected type of interaction by providing quality comments to the discussion as well.

**Contextual Learning**

Context is an essential central element in learning because knowledge is a product of the activity, context, and culture in which it is developed and used (Brown *et al.*, 1989). Wilson (1993) identifies three major premises of context and how these affect knowing and learning. The first is the idea that learning and thinking are social activities that are structured by constant interpersonal interaction. Second, the available tools within a particular situation significantly structure an individual’s ability to think and learn. Finally, human thinking is profoundly structured by interaction with the setting. We offer the following recommendations to e-learning instructors to promote contextual learning in an e-learning environment.

- *Create virtual learning teams.* At the start of each new course, students are placed in a virtual learning team consisting of three to four members. Students work together on weekly assignments and projects via e-mail, forum, chat and Instant Messenger. This initiative provides a group context that is similar to what would be experienced in the face-to-face classroom.

- *Simulate reality using appropriate case studies.* Regardless of the delivery format, the more “real-life” examples that can be utilized, the better students grasp the lesson. Case studies are an excellent way to provide the context through which new learning can be developed. As with any situation where a case study is used, it is critical to choose cases that relate to the content of the course.
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- **Require collaborative projects with schools, faculties or other organisations.** Students are encouraged, where possible and appropriate, to develop course projects within the context of their work environment. This provides a real-life context in which to embed application of the material.

**Active Learning**

There seems to be assumed separation between knowing and doing in education (Brown et al., 1989) where knowing is valued over doing and mental activity is valued over physical activity. However, cognitive theorists have challenged this perspective because the activities through which learning occurs are inseparable from cognition. In order for e-learning to be successful, some form of learner activity must be included.

Active learning can occur in many forms in an e-learning environment. Discovery learning, project-based learning, and cooperative learning are common techniques for engaging students in activities that involve considerable amounts of creativity, decision-making and problem solving. Each of these instructional approaches emphasizes the importance of learning from experience that is goal driven and activity-based. Since these activities usually take more time to complete, they provide for sustained thinking about specific problems over long periods of time. The following are specific examples of how active learning can be applied in an e-learning environment.

- **Organise e-learning courses around projects.** Application-rich courses can be designed around major projects and specific activities to be completed in order to create a final product. For example; guided student discovery through hands-on activities, experimentation and investigation results, independent studies and research projects, student designed projects, and manipulatives created to show resolutions. By adopting a project-based approach, the e-learning instructor can easily incorporate the concept of
active learning into a virtual environment instead of providing the typical “read and write” e-learning course.

- **Think-Pair-Share in an e-learning environment.** Think-pair-share is an active learning technique used in many face-to-face classes but is rarely used in an e-learning environment. The goal is to help students organize prior knowledge, brainstorm questions, or summarise, integrate, and apply new information. Having students work in groups of two or three within an e-learning environment is a great way to keep students active and focused on their learning. This strategy can be used in both synchronous and asynchronous situations.

- **Handle small group discussions during synchronous/asynchronous sessions.** The instructor describes a discussion activity to the class and then asks them to enter their “virtual team” chat space to discuss and complete the assignment. A specific time is given where the students are expected to return to the class chat space and share the major points of their discussion with the rest of the class. This technique is commonly used in many face-to-face classes; it is a unique, yet under-utilized strategy in an e-learning environment, as usually, there is no specific time frame or availability of students.

**Facilitate Deep Processing**

Providing too much of information in a short period of time contributes to memory overload, which makes learning difficult and leads to confusion and poor retention. Instructional designers need to follow the Rule of Seven, which suggests that the amount of information presented at one time should be limited to no more than seven pieces of content (Clement, 1985). The Rule of Seven suggests that instructional designers “chunk” instructional content in small groups and give students the opportunity to learn each “chunk” thoroughly before being presented with new information. Using this strategy will
result in better understanding. The following are some suggestions for an e-learning environment.

- **Limit instructional content.** By following the Rule of Seven, we help avoid memory overload by purposely limiting the amount of information instructors provide in a course. For example, each main topic of a module is divided in subtopics. Limited content presented in a subtopic makes it easier for students to complete in one sitting and it forces the instructor to concentrate on a few main concepts in a topic. This approach also fits ideally with the concept of a learning cycle.

- **Present learning objectives and prerequisites.** Learning objectives help students to understand the overall purpose of the course. One viewpoint from the cognitive learning theorist is that new knowledge is learned by the merging of previous knowledge with new information (Hannafin & Peck, 1988). An e-learning system should prompt the instructor for a list of the previous knowledge the learner should have acquired prior to beginning a lesson.

- **Organise and sequence lessons.** Each course should have a hierarchical structure containing sections, modules, and learning cycles. This approach allows for easy updating of courses over time and the development of custom courses for different modules. Each learning cycle comprises of four components. The first component provides the student with access to new content through a variety of formats. This is followed by evaluating the learning outcomes through activities involving self-assessment, peer-assessment, or formal instructor assessment and feedback. Once the learning cycle is completed, a new cycle begins with the presentation of a new “chunk” of content, followed by new application (examples and exercises) and assessment activities.
Provide a graphic organizer for the course. It is very easy for students to get lost in any hypertext environment as they navigate through the e-learning courses that contain extensive layers of content distributed over multiple locations. To avoid frustration and memory overload that can occur in a web-based environment, visual representation of the course structure should be provided. The graphic organizer serves as a map for students as they navigate through various portions of the course. The graphic is also hyperlinked so that students can quickly move to a desired location in the course by clicking directly on the image.

Consistent Layout

Graham et al., (2000) looked at the human computer interface (HCI) designs, including the organization and presentation of e-learning materials. Graham et al., (2000) emphasises that consistency in the interface allows people to easily learn and recognize the graphic language of the interface. The following guidelines can be used to improve the web page layout and design.

- Use consistent styles on pages. This includes consistent and complimentary backgrounds, font type, font size and icons.
- Consistent and easy to use web site navigation. Users should have more control using the site navigation; a web needs to have standard navigational bars, icons, and links to information that should be consistent.
- Aesthetically pleasing design. The design and graphics should be well-organised, simple and consistent with principles of visual design. Icons and images used in the site should all be professional in nature and appropriate to the content of the course.

Track Progress

Bugbee (1996) showed that computers can be used for effective testing. A good e-learning system should be able to monitor students’ progress. An e-learning system should provide
the developer the capability to incorporate various testing formats (true-false, short answer and multiple choices), thus record and track any score on an assessment by an individual learner. Despite that, the e-learning system should also keep a profile of individual learning preferences.

- **Record and track score on assessment.** Keeping track of students score will enable the instructor to monitor the progress of a student. Furthermore, the record will be guidance for the instructor to improve on the course presentation if progress is not good.

- **Track students’ learning preferences.** Other than storing students score on an assessment for the course, an e-learning system should also store relevant information pertaining to the usage of the system. This includes navigational history, the time spent on each learning unit, feedback given by students on navigation choices and their preferred approach or mode of learning.
## Conceptual Framework for Effective E-learning

### Instructional principles and strategies

<table>
<thead>
<tr>
<th>Key elements of effective E-learning</th>
<th>Instructional principles and strategies</th>
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<tbody>
<tr>
<td><strong>Activity</strong></td>
<td><strong>Individual differences</strong></td>
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<td>- assessment on learning styles</td>
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<td>- array of interactive materials and activities</td>
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<td>- allow students to control the pace</td>
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<td>- encourage active and collaborative interaction</td>
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<td><strong>Scenario</strong></td>
<td><strong>Reflective learning</strong></td>
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<td>- extensive and timely feedback</td>
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<td>- “one minute papers” and “muddiest point”</td>
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<td>- online diaries</td>
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<td><strong>Feedback</strong></td>
<td><strong>Motivation</strong></td>
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<td>- incorporate games into the e-learning environment</td>
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<td>- simulation programmes</td>
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<td>- use of multimedia</td>
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<td><strong>Delivery</strong></td>
<td><strong>Social learning</strong></td>
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<td>- create personal connection with students</td>
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<td>- peer review and feedback</td>
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<td>- require and facilitate interaction</td>
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<td><strong>Context</strong></td>
<td><strong>Contextual learning</strong></td>
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<td>- create virtual learning teams</td>
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<td>- simulate reality using appropriate case studies</td>
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<td>- collaborative projects with schools, faculties or other organizations.</td>
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<td><strong>Impact</strong></td>
<td><strong>Active learning</strong></td>
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<td>- organize online courses around projects</td>
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<td>- Think-Pair-Share in a virtual environment</td>
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<td><strong>Facilitate deep processing</strong></td>
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<td>- limit the amount of content and activities</td>
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<td>- organize and sequence lessons</td>
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<td>- graphic organizer for the course</td>
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<td><strong>Consistent layout</strong></td>
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<td>- use consistent style on web pages</td>
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<td>- record and track score on assessment</td>
</tr>
<tr>
<td></td>
<td>- track students’ learning preferences</td>
</tr>
</tbody>
</table>

*Figure 3.2: Proposed framework for effective e-learning environment*
3.6 Key Elements of Effective E-learning Design

In this section, six elements at the heart of effective e-learning design are presented, in an attempt to draw attention to the important consideration within a complex system based on the grounded theoretical approach described in the previous sections (Section 3.3 to 3.5). The design of e-learning resources requires understanding in education, multimedia content, resource publication, and electronic technologies. The sophistication of the task is highlighted by the fact that teams, rather than individuals, are often employed to take it. The six elements which are, activity, scenario, feedback, delivery, context and impact cover issues across all disciplines involved in e-learning design, but particularly focus on learning as the driving force.

**Activity**

A rich activity is one that opens up opportunities for action rather than directs students down a prescribed pathway. Such an activity “implies the active involvement of the learner in making choice about what experience to undertake” (Murihead and Haughey, 2003), and is complex enough both to engage and to challenge students for the duration of the study, if not longer.

**Scenario**

Situation or scenarios are usually provided by a story, a role play, or simulation, within which the activity plays a pivotal role in helping students to contextualize content (Brodsky, 2003). The situation will most likely be fictional; however, there is an assumption that the learning or skill gained through the activity will be transferred to future real-world situations.
Feedback

Effective e-learning design includes provision for feedback that strengthens the learning from the experience, and enables students to increase their level of skill and knowledge. The range of available feedback strategies is vast, including reflective responses to prescribed questions, semi-automated responses by the system to student actions and work, shared comments in online forums and blogs, and personal responses via e-mail.

Delivery

Good e-learning design relies on appropriate delivery to reach its full potential. Conditions for defining appropriate delivery are not easily specified because of contextual variations on learning environments. The appropriate delivery of e-learning should aim to maximise the engagement of the student with the activity, enable the communication of stimulating contexts, and maximize opportunities for feedback and reflection.

Context

The condition within which the e-learning resources are to be used has a significant influence on the design, but may only be partially predictable. Elements of activity, scenario, and feedback need to take into account the users’ profile and the delivery element needs to consider the technical infrastructure. Additional contextual considerations include the institutional objectives of the e-learning program, the role and skills of any instructor, longevity of the resources, and cultural sensitivities. Another aspect of context is how the activity fits into a sequence of learning. Taking context into considerations requires that the designer considers the demands and scaffolding inherent in the students’ environment.

Influence

The influence of the e-learning design can be assessed from a number of perspectives, including the way that it will affect the student, the ramifications that it will have for the
learning community into which it is implemented, and the environmental influence of its
development and use.

The elements of effective design highlighted in the proposed framework stem from
a focus on student experience based on multiple intelligences, while taking into account the
broader networks that contribute to and are influenced by that experience. This study
proposes a participatory design and implementation approach, where the e-learning system
is a two-way direction allowing early and ongoing communications between designer and
users, rather than a channel directed at the instructor or student.

In compiling the six elements of effective design, the researcher is aware that
technology affords opportunities to e-learning designers to amplify the strengths and
weaknesses in both the activities and the delivery systems. Although the framework is
based on well-recognised theories of learning and represents a synthesis of ideas from
multiple perspectives, it is not fully developed, nor is it all-inclusive. Additional principles
may be added as the e-learning program continues to develop and evolve.

3.7 Summary

This chapter highlights the development of the proposed framework which helps us to
describe and categorise the wide ranging factors associated with effective e-learning
accommodating multiple intelligences. In the next chapter, the proposed framework will be
used as a basis for designing a questionnaire to correlate the intelligence type and e-
learning preferences.