



Collection of Effective Instructional Design Principles

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DEVELOPMENT OF ONLINE COURSES

Before development of an online course can occur, school administrators, faculty and students must have confidence in the ability of an online course to meet the academic needs of students. Online courses have evolved from text-based online versions of traditional courses to multimedia and interactive modes of instruction. Through the use of Web 2.0 and its social networking components, the didactic model of instruction is being replaced by a collaborative model of student-student, student-content and student-teacher interactions. An effective online course needs to take advantage of the new modalities and models while still incorporating the types of supports and assistance that traditional courses offer such as, clear directions, clear expectations and a guide for seeking assistance.

To accomplish this evolution of online course development, institutions must support a collaborative effort of specialized individuals. The first member of the design team is the of a subject matter expert who ensures quality content that meets standards. Second, an instructional designer will assist in the evaluation of appropriate technology and strategies based on sound learning theories and best practices to accomplish the desired objectives. The third group of members are those who develop the technological implementation, such as web developers, media specialists and graphic designers. While a person may fill multiple roles, specialized knowledge of each of these areas is essential.

Ultimately, the success of an online course depends on the instructor offering the course. For an online course of study to be effective, the faculty must not only accept its inevitability, they must take an active role as a subject matter expert in developing the content, delivery and rigor of the course. Instruction should provide for active learning, scaffolding, critical thinking and formative assessment. Instructors will need training in developing these online lessons, in the use of technology, in managing online courses, as well as providing support to students in the new paradigm. Additionally, they should include important instructional materials, such as welcome letters, rules and procedures, a class syllabus, technology requirements, and other administrative documents (Caplan & Graham, 2008). Ultimately, it is critical that faculty receive ongoing encouragement, support, training, incentives, and rewards for their increased workload.

An intriguing way for faculty to become successful at online teaching is to experience online learning as students. By experiencing the same frustrations and successes as the students they will teach, faculty will obtain insights into implementing pedagogical processes, developing new administrative skills, and increasing their own technical proficiencies. Perhaps taking a course in online design would result in exponential dividends.

While e-learning is not the magic bullet in education, it is a growing trend, which should not be a threat to teachers. Online courses have undergone an evolution within the last decade, moving from text-based and teacher-centered to interactive, student-centered, and engaged

learning. Ultimately, online courses must be held to the same rigor, expectations, and standards as those in the traditional classroom setting. Through a strong team effort, online courses will meet the academic needs of students resulting in successful learners.

FOUNDATIONS OF EDUCATIONAL THEORY FOR ONLINE LEARNING

Distance learners have discovered the many benefits of learning online. Location, time, and distance are no longer obstacles to learning. Online learners are the beneficiary of the most up-to-date information and resources, and are privy to expert consultants and quality materials. Instructors also benefit from teaching online: materials can be changed quickly and easily, and individualized help can be offered to students via the most appropriate link to resources.

“Foundations for Educational Theory for Online Learning”, by Mohamed Ally, provides practical application of the four key theories of learning. Although research shows that a particular delivery system does not improve learning (Beyman, 2007; as cited in Anderson), W. Schramm (1997, as cited by Ally) in his book *Big media, Little Media*, suggests learning is more influenced by strategy than technology. Thus, online learning does not consist of simply placing information on the Internet or linking multiple sources to a site. Rather, it consists of using technology as the vehicle in which to provide meaningful content through sequential and interactive instruction, utilizing effective instructional strategies, to promote learner outcomes. To accomplish this, instructional designers of online courses must utilize both traditional and current research of learning theories if they are to develop courses which enable students to form meaningful knowledge. With knowledge of these learning theories, designers can focus on those strategies that are useful for a certain learning theory.

Authentic and engaging online learning needs careful and considerate planning. It must combine multiple learning theories to match learner outcomes. It must take into account several schools of learning - behaviorism, cognitivism, constructivism and connectivism - to engage the learner and provide ample opportunities for the learner to explore, discover, and find meaning. The learning goal determines the best learning theory to follow in any design, so designers must be well-versed in each of the four theories to be able to successfully match the learning goal to the learning theory.

The most traditional learning theory, behaviorism, focuses on observable behaviors. A behaviorist focus should be made when instruction relies heavily on facts. With this school of learning, the online instructor must detail explicit outcomes for the learners so they can determine their learning. Online courses should include regular testing to determine if the outcomes are achieved. The organization structure of the material is important and should move from simple to complex. Another important aspect of the implications of behaviorism on online learning is consistent regular feedback. Learners need regular input as they demonstrate their acquired knowledge.

The learning theory focused on how knowledge is acquired, cognitivism, requires information to be presented in an efficient manner. For the online course designer, the focus is on the learning process. Ally lists several key strategies for online designers. For example, through advanced organizers

or conceptual models, the designer must draw out long-term memory to aid in the acquisition of new material. Another strategy is to require the learner to create a generalized information map of the material being learned. Furthermore, the online designer should utilize the ARCS (Keller, 1983) motivational strategies as the course is developed. With the use of technology, the online designer has the opportunity to facilitate the transfer of knowledge to real life applications.

A more recent theory, constructivism, focuses on the learner as the center of learning while the teacher plays the role of the advisor. According to this theory, online courses should contain active learning opportunities. Learners should construct their own knowledge. Constructivist learning is collaborative and cooperative. Designers should provide opportunities for learners to reflect on theory learning as well as construct meaningful opportunities for the learner to apply their learning. A key element to the constructivist theory is interactive learning. Ally provides a useful chart to model the interactive relationships.

The most recent and controversial theory Ally addresses is connectivism. Learners are provided the opportunity to explore new and relevant information. It is important that learners identify the accurate information. Because we live a networked world, this theory addresses the need for learners to interact globally and unlearn irrelevant information. Learners must make connections of this new information to their prior knowledge, but they also must be willing to change their viewpoints and understanding as new information is presented.

These four learning theories are interconnected and build upon one another. The behaviorist theory focuses on what students are to learn, while the cognitivist theory focuses on how they learn. A constructivist viewpoint brings to light why learners learn, and the connectivist theory implies that learning is continual and relational.

KEY INSTRUCTIONAL DESIGN ELEMENTS FOR DISTANCE EDUCATION

SUMMARY

As distance education programs continue to grow rapidly in number and the demand for such courses continues to soar, a focus on the overall delivery of distance education will promote student success. Faculty of distance education courses need to play a key role in the design of the courses they teach. This new requirement adds the role of instructional designer to a faculty member's current job responsibilities. **When transferring instruction from the traditional classroom to an online environment, instructors must plan for the new challenges that will arise. By focusing on common key elements of different design models, faculty members can create courses that take into consideration the new challenges that arise from teaching in an online environment.**

Different instructional design models exist that can help designers create a complete and successful online course. Three prominent instructional design models exist; one model by Dick and Carey, another by Kemp, Morrison, and Ross, and a third by Smith and Ragan. While the design models do differ from each other, four key elements exist in each that faculty can focus on to create successful distance education courses. These four key elements are a focus on learner needs, content organization, instructional strategies, and evaluation. By paying close attention to these four elements, inexperienced online instructors can create successful distance education programs.

Since learners are the recipient of the course, the first key element that must be focused on when creating distance education programs is the individual needs of the learner. **Students'** attitudes, interests, prior skills, knowledge, experiences, and learning styles must be taken into consideration. This provides a particular challenge for the designer as the range of learners may **extend from the "newbie" to an experienced** online student. Courses need to have clear expectations, structure, and built in mechanisms for quality and prompt feedback, as well as opportunities for interaction between others students and the instructor. By carefully analyzing these needs during the development of the course, an instructor can alleviate many potential issues before the course officially begins.

In any online course, content organization is a key element for success. Instead of interacting with an instructor directly in a face-to-face manner, learners must be able to successfully obtain all necessary resources through the learning management system. Learners must have easy access to clear, concise directions for all learning activities, a method to contact the instructor, and access to necessary learning materials. To promote student success, instructors must thoughtfully consider the **learners' needs as they provide easy access to essential** interactions and resources.



A third common key element found in multiple instructional design models is a focus on instructional strategies. Distance education is a learner-centered approach, so instructors must focus on developing materials and instructional strategies that aid in this approach. The appropriate selection of materials not only helps learners gain content knowledge, but generate student satisfaction and provide students with motivation to complete the assignments. Because online learning can feel isolating, opportunities to connect with fellow learners, the subject matter, and the instructor can help create a successful learning experience.

Finally, evaluation is the fourth key element found in any successful distance education course. Instruction must be evaluated to determine if students are meeting goals, if the course has been a good return on investment, and if students feel satisfied with their learning. Evaluation should be ongoing throughout the course with both summative and formative assessments. Assessment tasks should be designed carefully with specific objectives in mind. By carefully planning out all assessment tasks, designers can receive accurate data that can then be used to improve the course in the future.

Good online instruction is built on careful planning. The four common elements of instructional design help instructors meet these planning requirements. By following these elements, online instructors can be confident in their new roles as instructional designers to help meet the demands of distance education courses.

WHAT WORKS: STUDENT PERCEPTIONS OF EFFECTIVE ELEMENTS IN ONLINE LEARNING

Online education continues to rise in popularity as an effective alternative to traditional education. With an increase in online offerings comes an increased focus on what works when delivering courses in an online environment. In “**What Works - Student Perceptions of Effective Elements in Online Learning**”, Reissetter and Boris (2009) analyzed what works in online education by surveying 59 graduate students in seven University of South Dakota graduate classes to gain the **students’ perspectives on online learning**. While this research only focused on adult graduate-level learners, it provides a glimpse into the overall effectiveness of online learning.

When considering the design of online courses, it is important to keep in mind the students participating in the learning environment. Online learners are typically female, self-motivated, and self-directed learners who value the flexibility and convenience an online course provides. Distance, family and work responsibilities can be a barrier to traditional learning. Thus, the ability to learn anytime, anywhere is an attractive characteristic of online learning. Although Reissetter and Boris (2009) found that most online learners are satisfied with their online course experiences, some barriers to success in online learning exist; such as the lack of face-to-face communication opportunities with professors and peers, time management issues, and technical issues.

A key component to the success of online learning is a coherent course design. Clear expectations and procedures, access to appropriate texts and resources, ease of navigation, as well as an organized course framework all contribute to a positive experience and help alleviate student concerns. Teachers can aid in student satisfaction by making themselves available with virtual office hours or similar communications. Frequent teacher feedback on assignments also helps break down barriers to learning. Individual assessment opportunities were viewed as beneficial in that students are able to monitor learning throughout the course.

Two unexpected findings did come from Reisetter's and Boris's (2009) study. First, many students would have preferred a traditional course setting, with 41% of the students preferring a traditional setting and nearly 25% neutral about the delivery style. Even with the many benefits of online learning and an overall positive view about online learning, only one-third of the surveyed graduate students preferred learning online. Second, the online community aspect was not beneficial to student learning. Student-to-teacher and student-to-student opportunities were made available in the online courses, but most students felt that true face-to-face interactions would be much more valuable to the learning experience. This is partly due to the difficulty of chatting with large groups synchronously and partly due to the disconnected nature of communicating asynchronously through discussion boards. Either changes must be made to improve face-to-face interactions in an online delivery, or the value of these types of interactions must be lessened.

As time passes and more schools utilize online courses, further study will be needed to determine if online learners need the same requirements as their counterparts within the classroom.

APPLYING THE MULTIMEDIA PRINCIPLE

In Chapter 4 of *E-Learning and the Science of Instruction*, Clark and Mayer focus on applying the multimedia principle to online instruction. The multimedia principle states to use words, either printed or spoken, and graphics when designing e-learning materials instead of words alone. The rationale for including both words and graphics is that learners remain engaged in the material and can make connections between the verbal and graphic representations of the content. However, the authors point out that not all graphics are the same, and simply adding any graphic to a lesson will not guarantee an increase in achievement.

The benefits of using graphics in e-learning differ depending on how the graphics are used. If an image is used for decorative purposes only, it does little to aid in understanding and should be minimized. Representational graphics (single, static images) should also be kept to a minimum since they only represent a single object. The types of graphics that should be emphasized are those that help the learner understand or organize the material. These types of graphics include relational graphics (e.g. pie charts), transformational graphics (e.g. animated demonstrations), organizational graphics (e.g. tree diagrams), and interpretive graphics (e.g. drawings of molecular structures).

When creating e-learning units, designers should focus on the type of content contained in the instructional unit to determine which graphics are most appropriate. For instance, when the content is mainly fact-based, representational or organizational graphics are appropriate to use, but when the content involves a process, then transformational, interpretive, and relational graphics are better choices. **The goal is to guide a learner's cognitive processing, so designers must carefully select graphics that help reach this goal.**

The multimedia principle does not apply equally to all learners, however. Designers need to consider their target audience when deciding on the amount and types of graphics to use. Novice learners benefit greatly with the addition of graphics, especially those that help the learners understand the material. Expert learners, or those learners that have more knowledge about the topic, do not need as many graphics to experience success. This may be due to the fact that with some prior knowledge on the subject, these expert learners are able to form mental images from written or spoken words. Designers can then limit the amount of graphics or even limit the amount of words and include graphics instead.

The authors cite research findings that support the use of the multimedia principle when designing online instruction. Eleven studies focused on lessons that taught scientific and mechanical processes such as how lighting works and how pumps work. In all eleven studies, students that received instruction that included both words and graphics did significantly better than those that only received written instruction. In a study focused on learning basic math calculations, students that received only drill-and-practice problems did poorly, compared to students in a group that completed problems in an interactive game environment.

The debate between static illustrations and animations was also explored in this chapter. At first glance, it might seem that an animation would greatly enhance a learner's perception of material. However, studies have found that students using illustrations-and-text performed better than those with animation-and-text. The reasoning indicates that illustration-and-text have to be mentally processed by students rather than passively received through animation. In hands-on situations, however, such as paper folding or tying knots, video instruction proved to be the most useful. Therefore, static imagery is recommended for process learning while animation or video is recommended for hands-on learning.

Although there is evidence that supports use of graphics in instructional materials, questions still remain about what types of visuals are the most effective for learners and instructional goals. Further research needs to be conducted to determine what the long-term effects of learning with graphics are and the cost benefits for incorporating them into online

DESIGN WITH ORGANIZATION IN MIND

“If you don't know where you are going, you might end up someplace else” is a quote often attributed to the late Yogi Berra, but its wisdom parallels the advice provided in Chapter 4: Design with Organization in Mind by Robin Smith in *Conquering the Content: A Step-by-Step Guide to Online Course Design*. Smith's (2008) book addresses college and university professors transitioning from face-to-face courses to online courses. Smith(2008) posits convincingly that organizing course content will not only contribute to student success but will also circumvent many of the irritations felt by instructors in the online classroom. This chapter of the book focuses on creating learning guides for each module of a course to serve as a blueprint for the instructor and as a checklist for the student.

The learning guide introduces students to each new module of a course. It essentially is a to-do list for students to follow from start to finish in a learning module. A learning guide should include the correct identification of the module and course, learning outcomes, learning resources, learning activities, self-assessment opportunities and manner of evaluation of the student. By focusing on each of these items before the course goes online, instructors can reduce the amount of misunderstanding and confusion that often arises when students begin a course.

Many students take multiple online courses concurrently. Thus, to minimize confusion, the learning guide should contain the *module and course identification*. Next, the *learning outcomes* should explicitly state what the student will learn. This helps both the students and instructor focus their attention on the module requirements. The *resources* section should clearly differentiate between required and supplemental resources and should provide the necessary tools for students to achieve success. Additionally, Smith (2008) suggests that when using pre-existing materials, such as websites or multimedia, instructors should provide students with a framework and guidance to enable the students to focus their attention. The next component of a learning guide, *learning activities*, takes the student through the lesson. These must be clear and complete in description. The cognitive component of the lesson can be designed to function independently in order to maximize

instructor interactive time with students. To ease student anxiety the learning guide should contain details such as due dates, expectations, how to complete an activity or assignment, how the activity or assignment will be graded, and where the students are to turn in assignments. Instructors are urged to set high expectations from the start and to provide excellent examples for students to analyze and follow.

The learning guide should also provide students with the opportunity to assess their personal understanding before completing the final evaluation at the end of the module. These ungraded activities could include a self graded quiz or exercise from a text or an explicit description of knowledge that the student was supposed to have gained. In contrast, the evaluation component should be complete with due dates, point values, directions for completion and instructions for submission.

As instructors build learning guides for each module, it is necessary to make choices and decisions about essential academic, affective and behavioural outcomes. Furthermore, the instructors must prioritize their time. A novice instructor may create an elaborate first module but run out of time, leaving the remainder of the course nondescript and the learners disappointed. To avoid this situation, Smith (2008) recommends instructors decide what *must* be included, what *should* be included and what would be *nice* to include within a course. By setting up these priorities, instructors can devote time to gathering pertinent resources and writing content.

Designing an effective online course takes time. Simply placing traditional lessons online will not necessarily result in a successful course. Instead, instructors must realize that design and development takes careful planning and prioritizing. **By following Smith's (2008) suggesting of creating learning guides for each module as a blueprint for the course, instructors and students will arrive at the intended destination: a successful semester of completing the desired learning outcomes.**

DESIGN WITH THE PROCESS IN MIND

Good design is deliberate, not accidental. A course design that focuses on consistency is key for student achievement and satisfaction in any class, but it is especially important when designing online courses. In this chapter of *Conquering the Content*, Smith shares several best practices that designers and instructors should consider when working with online courses.

As a designer, it's important to be consistent with the overall design of the course. Before students can take part in learning activities, they must be able to easily navigate to the activities. A learning management system that is easy to navigate and redundant in design is preferred since it allows learners to focus their attention and time on the lesson content. Time is not wasted searching for assignment submission areas, module expectations, or lesson resources. Instead, by being consistent in the overall design of the course, the confidence and satisfaction levels of learners can grow.

When changing roles from a designer to an instructor, consistency is just as important. Busy schedules are common to online learners, therefore setting up a consistent class schedule can help learners succeed. Online instructors can aid students by setting up due dates that are on the same day each week. In fact, many instructors determine all the course dates and identify any required synchronous sessions at the beginning of the course. Furthermore, they are careful to adhere to these dates throughout the course. Instructors should establish rules for communication, which includes setting contact hours, preferred methods of communication, and expected response times to student questions. Additionally, clear expectations for communications on discussion board assignments and in social interactions should also be established. Careful planning helps eliminate confusion and frustration that may appear later on in the course.

Finally, even with careful planning and design, it's always good practice to solicit peer review and feedback before launching a course. Something that seems clear to a designer can easily be misunderstood by others. Since online instructors are not available immediately to address misunderstandings, it's important to limit the possibility of their occurrence. Having a colleague or peer group look over materials will help ensure that directions and expectations are clear and that all resources and activities are easy to access.

BACKWARD DESIGN

Anyone who has ever read a map and planned a trip is familiar with backward design. Decide on a destination and then plan the roads and pathways to get to that fixed point. The same concept can be used in planning instruction. Instructional goals, or the destination for learning, should be considered first. The objectives, activities, and assessments (the roads or journey) can then be planned with the final goals (or destination) in mind. In chapter one of Understanding by Design, Grant Wiggins and Jay McTighe provide a definition of backward design and the three stages of the process.

The first stage of the process, *Identify Desired Results*, encourages designers to analyze standards, curriculum, and course outcomes to create learner outcomes and goals. A goal should be established that focuses on those concepts that are of the highest priority. To help designers focus their efforts, this stage is broken down into four criteria. First, a concept should contain some enduring value beyond the moment in time when it is presented. Second, the topic or process, should tie directly to the discipline to which it is connected. In other words, there should be authentic learning. Next, areas of misconception about the topic should be addressed. Lastly, the concept should engage the learner. Just like in a road trip, the destination in mind needs to be closely analyzed before selection.

Once the destination has been determined, the designer moves to the next phase. The second stage, *Determine Acceptable Evidence*, requires the designer to determine what evidence a learner must produce to demonstrate they have mastered the content. This can range from informal assessment, often referred to as formative assessment, to a performance task, which is a type of summative assessment. By offering different assessment opportunities throughout the unit, educators can

monitor understanding continually and can assess different levels of understanding. Keeping in mind the road trip analogy, several “checkpoints” are necessary to be sure the learner is headed in the right direction.

The third stage of backward design, *Plan Learning Experiences and Instruction*, is often where teachers begin, rather than end. By creating each activity or experience with the end in mind through backwards design, however, instructors and instructional designers can avoid the traps of simply “covering” material dictated by a textbook or tradition; educators are also less likely to choose their favorite (i.e. cooperative learning) or perhaps easiest (i.e. using the textbook) methods to teach a lesson. The learner and the learning goal become the priority rather than the by-product. Additionally, content can become focused and trimmed to the most relevant information instead of using misguided “good-to-know” detours that detract from the overall goal. Instead of multiple paths to the goal, the entire course will efficiently arrive at the appropriate target. It’s much easier to accomplish a road trip when the most direct route is employed with the best mode of transportation!

While backward design seems a commonsensical approach to instructional design, it is often overlooked. Instructors of the past have begun with activities, then matched them to a standard or two, before finally creating an assessment requiring students to regurgitate what was taught. This backward design method effectively brings the overall goals in sight and determines the best way to achieve those goals.

DESIGN FOR MOTIVATION

In the chapter “Design for Motivation” in *Design for How People Learn*, Dirksen (2011) addresses the need to design instruction for motivation and focuses on the behaviorist pedagogy of creating an environment to produce intended behavioral outcomes. Just as an elephant (the habitual decision maker) has been trained by experience and cannot be easily swayed to alter its course by its rider (the intelligent decision maker), many adults are similarly trained by their experiences. Knowledge does not always produce the appropriate actions because the consequences to particular behaviors may be too abstract or too far removed to affect behavior counter to knowledge. Dirksen (2011) states that because change is hard and relying on old habits and behaviors is much easier, unless a person can see a benefit of changing, they will most likely not change. Dirksen states that while learners may have “motivation to learn,” they also need the “motivation to do.”

When designing for a change in behavior, Dirksen (2011) suggests various models for the designer to consider. The Technology Acceptance Model (TAM) addresses the importance of perceived usefulness and perceived ease (Davis, 1989, as cited in Dirksen). When new technologies are introduced, learners will rely on these notions before investing time or money into the new technology. A learner’s motivation to work with new technology is increased if there is a clear benefit to using the technology and if it is easy to use. Thus, the advantage of a time-saving new piece of software could be negated if the software is difficult to learn. The immediate barrier (difficult software) prohibits the learner from the long-term benefit (saving time).

Another model recommended by Dirksen, from Diffusion of Innovation (Rogers, 2003), encourages the designer to address issues such as the relative advantage to learning the new procedure or technology, and provide opportunities for the learner to experiment with the technology. The designer needs to analyze the relative advantage, compatibility, complexity, observability, and trial-ability of an innovation. To increase motivation, the designer must ensure that learners see any proposed change as an improvement to their current situation. In addition, compatibility issues or complexity concerns must be minimized. It is also beneficial for learners to be able see any proposed changes put into practice. This is especially true if the learner can experiment with the innovation and see the changes firsthand. Several questions should be answered or addressed by the designer to aid the learner such as: What's in it for me? Is it something I can use or am familiar with? Is it easy or manageable to learn? Can I see it being used? Can I try it? A strong sense of self-efficacy can then be developed that helps motivate learners.

Designers must realize that people are creatures of habit and that it takes effort to try something different. Since motivation is often necessary, designers can help provide that motivation. Designers also must address the learner's self-efficacy (Can I learn this?), social proof (Do my peers buy into this?), and visceral matters (How do I feel about this?). In the end, however, the designer need to remember that "Change is a process, not an event." (Dirkson, 2011, p. 230).

DEVELOPMENT AND USE OF THE ARCS MODEL OF INSTRUCTIONAL DESIGN

Whether a student is sitting slumped at a desk with head phones in his or her ears, or sitting at a computer toggling between YouTube and e-courses, motivating students to learn is the key to educational success. John Keller's article "Development and Use of the ARCS Model of Instructional Design" (1987) provides a tested systematic approach for instructors and instructional designers to effectively motivate students. The ARCS Model has three features: four conceptual categories that characterize human motivation; strategies to improve the motivational appeal of a subject; and a design process called motivational design.

Based on psychological research, Keller (1987) defined four categories of human motivation: **A**ttention, **R**elevance, **C**onfidence, and **S**atisfaction, which form the acronym for the model. The first category, **A**ttention, challenges designers to gain and sustain the **learner's attention without overstimulation**. The second category, **R**elevance, refers to meeting the needs of the learner. Relevance not only includes the content, but can refer to the delivery of the content as well. For the social learner, collaborative material will be perceived as relevant because it meets the need for socialization. **C**onfidence, the third category, refers to the perceived expectancy for success. This **significantly contributes to a learner's motivation**. **External factors such as fear of failure, ability levels, and competitiveness challenge teachers to foster and sustain the impression that some measure of success is achievable**. The final category, **S**atisfaction, requires designers to achieve equity between intrinsic motivation and extrinsic motivation.

The second feature of Keller's model (1987) includes numerous prescriptive strategies subsumed within each category. For example, to gain attention, the module could begin with the **introduction of a fact that challenges a learner's past experience**, causing the learner to engage in the content out of curiosity. To maintain attention, the module might include a variety of instructional formats such as presentations, activities, readings, or discussions. To achieve relevance, designers can **match a learner's need for attention by creating trust and opportunities for sheltered interactions**. Research shows that confidence can be built by simply explaining the evaluation criteria for an assessment activity. Keller (1987) suggests that allowing students who demonstrate mastery to help **others will contribute to an individual's satisfaction**.

Given these categories and strategies, the last feature of the ARCS model includes the process of designing motivation into instruction. Keller (1987) divides the process into four phases: Define, Design, Develop and Evaluate. The ARCS model is grounded on the expectancy-value theory, which states that learners are motivated to participate in an activity if it will meet personal needs and there is a reasonable anticipation of success (Tolman, 1932; Lewin, 1938, as cited in Keller). Therefore the define phase requires instruction designers to analyze the learner. The first step is to define the motivation by classifying the problem, analyzing the audience motivation, and preparing motivational objectives. These objectives should include both a condition and behavior. The second phase, design, involves choosing motivational strategies to meet the objectives. Attention must be

given to time and money constraints as well as support the instructional objectives and delivery system as these strategies are selected. The chosen strategies are then incorporated into the instruction during the development phase. Last, as in any design model, the evaluation phase assesses the effectiveness of the instruction to meet the motivational objectives.

Two field tests were conducted on the ARCS model of motivational design. Both tests aimed **at measuring the instructors' attitude and ability to incorporate the model into their** teaching. Although results varied and further testing is necessary, the tests revealed that instructors found the model improved their awareness of motivating factors as well as their perception of the student motivation.

Although the cognitive theory of learning places a significant portion of responsibility of learning on the learner, instructional designers have a measure of control. Through applied research, Keller (1987) demonstrates that the theory of human motivation can be synthesized into a systematic approach to designing instruction.

LEARNING TOGETHER VIRTUALLY

In chapter 13, Learning Together Virtually, in E-Learning and the Science of Instruction, the authors discuss the work of Slavin and multiple research studies on collaborative learning. The chapter offers research and definitions of collaborative learning and computer supported collaborative learning (CSCL), as well as summaries of several CSCL studies.

Collaborative learning is a pedagogical approach stemming from constructivism, the theory that learning occurs when individuals create meaning from experiences and interactions. According to Slavin “Cooperative learning methods are extensively researched and under certain conditions they are known to substantially improve student achievement in most subjects and grade levels” (2011, as cited in Clark & Mayer, 2011, p. 281).

Clark and Mayer (2011) outline three criteria for success collaboration: social interdependence, outcome goals, and dialog quality. When designing CSCL tasks, these criteria are equally important. Research demonstrates that CSCL will be more successful if students know that their grades depend on the other members of the group. This is an example of social interdependence. It is also important to consider the outcome goals when designing CSCL. The choice of appropriate collaborative activities is dependent upon the learning goals desired by the instructor. Goals can range from individual performance to the quality of a group project. The choice of the learning goal also affects the size of the group. If the goal is individual learning, pairs are appropriate. When the goal is a solving an ill-defined problem, larger groups will provide more viewpoints and ideas. In both instances, care should be taken to avoid homogenous teams of low prior knowledge learners. The third criteria, quality of the dialog, is dependent on substantive contributions by all of the group members and an instructional design that promotes dialog. Quality dialog can be effectively mediated by opportunities to connect with the instructor and by utilizing virtual collaboration for reflection and for the sharing of ideas..

In addition to succinct strategies for successful implementation of collaborative learning, Clark and Mayer (2011) offer case studies which address common CSCL issues. For example, a study by Campbell and Stasser (2006) comparing virtual chat collaboration to face to face collaboration suggests that the parallel nature of virtual chats leads to better problem solving outcomes than a face-to-face environment. The two groups of trios were presented with the task of determining which of three suspects were guilty of a fictional homicide. Each member of the team was provided with different clues and the students worked teams to solve the problem. The synchronous chat lead to a more precise decision.

Another successful strategy for encouraging collaborative discourse is the use of structured controversy. When a problem or case is presented that has more than one viable solution, assigning pairs of students to argue each side of the case can result in constructive discourse. However, the art of structured controversy must be modeled and trained. Web 2.0 tools such videos, shared written

media or a combination in conjunction with synchronous and asynchronous discussions can be an effective means to implement this CSCL strategy.

Conceptually, Computer Supported Collaborative Learning (CSCL) enables instructors to create online learning tasks that promote authentic collaboration among learners. However, further study is needed to determine to what extent individual learning is affected by group assignments. Also, additional research is needed to offer insight into the best tools and approaches to CSCL. In addition, the relationship of group compositions and group member roles to meeting learning outcomes needs exploration.

INTERACTION ONLINE: A REEVALUATION

In chapter 24, *Interaction Online: A Reevaluation*, in *The Perfect Online Course*, John Battalio (2009), offers a new look at interactive learning in the virtual environment. At the time of the article, new research was being published that evaluated student perceptions of interaction in online learning. Because many educators believe that the traditional environment produces the greatest learning outcomes, as they move their face-to-face courses to an online format, they attempt to replicate the interactions that take place in the classroom. Battalio (2009) revisits the argument that online courses need to provide similar student-student interactions as traditional classrooms provide. Research results have been divided on the issue, with some studies showing the importance of student-student communications in online courses, while other studies have shown the opposite. After studying student interactions in online courses, Battalio (2009) asserts that online classes do not necessarily need a lot of student-student interaction.

Traditionally, there have been three types of interaction identified within a classroom: student-to-instructor, student-to-student, and student-to-content. Battalio (2009), in his own courses, identified two more: student-to-student-to-instructor and collaborative/team work. He discovered that as students become more comfortable with technology and as student technological skills and Internet accessibility have increased, students did not “need online experiences that replicated either the campus classroom experience or the interactive methodologies associated with live courses” (Battalio, 2009, p. 450). Battalio conducted a study of courses he taught. Two courses were conducted with limited peer to peer interaction. The other two courses relied on collaboration and high levels of student interaction. He conducted surveys to gather data, and the results showed that peer-to-peer interaction was more difficult online and that most students preferred to work on their own. He concluded that amount of interaction did not appear to play a role in students’ perceptions of success in the course. A post course survey revealed that two thirds of the students who responded to the survey preferred working independently and 90% of students indicated that they were satisfied with the learning experience. This small scale research provides the foundation for further research into the variety of interactions which lead to student satisfaction.

While the level of peer-to-peer interaction did not seem to affect student satisfaction, the research indicated that student-instructor interaction is vital. According to Stein et al (2005, as cited in Battalio), “Instructor-initiated interaction in the form of guidance and encouragement” leads to the greatest

satisfaction in learning. Students value instructor-student interaction. Arbaugh (2001, as cited in Battalio) suggests that the student-instructor interaction is the greatest predictor in student learning.

Today's online learner tends to be intrinsically motivated and self-disciplined. Additionally, a growing number of non-traditional students take online courses. Their needs are different than a traditional student, often juggling career, family, and classes. They do not necessarily have time or the need to participate in discussion groups or collaborate with peers on projects. They see themselves as consumers instead of students and want learning that fits within their needs and lives.

Social interactions in online classes require students to be in similar places within learning modules of a course. This takes away from a major benefit to online learning, which is to be able to learn at a pace and time that works best for the learner. To help students in online courses, it is suggested to require only student-instructor interactions while varying the amount of student-student interaction as needed for the course.

AUTHENTIC ACTIVITIES

To engage learners, especially online learners, it is important to incorporate authentic learning activities into the lessons. But what makes a learning activity authentic? According to Conrad and Donaldson (2011) in *Authentic Activities*, in *Engaging the Online Learner: Activities and Resources for Creative Instruction*, an authentic activity must simulate a real situation and should have a means of being implemented and evaluated. It should draw on the past experiences of the learners, even if those experiences involved failure. Authentic activities often require learners to work collaboratively, and they enable learners to build skills that can be applied beyond the classroom. Essentially, authentic activities are engaging and motivating activities that help learners develop transferable skills to real life situations.

For example, it is much more effective for a student to create a circuit using batteries, wire, and light bulbs than it is to view a simulation or read about it in a text. Additionally, learning to ride a bike can only be mastered by *doing*, rather than by reading or discussing. In other words, the assessment must fit the situation and the needs of the learner. So, how, then can authentic assessments be created in the online learning environment?

Conrad and Donaldson outline several activities that can be considered authentic activities and that can be incorporated into the online classroom. These activities include a case study, celebrity chat, cross-region discussion, team problem solving, a pyramid activity, and a social responsibility activity. While each activity is different, all possess characteristics that make it an authentic activity.

Case studies, for instance, mirror a real-life scenario that can be analyzed in any classroom setting. Students can learn from field experts with a celebrity chat by submitting questions in advance and participating in synchronous conversations. Cross region dialogues take advantage of distance by pairing different regions with one another to compare and contrast their similarities and differences. A team problem solving activity suggests breaking students into teams and providing three weeks to solve a problem. The students discuss the problem and possible solutions through a discussion forum. The instructor acts as continual tutor by providing short messages acknowledging contributions and offering guidance. A pyramid activity focuses on communication skills that are

necessary beyond the classroom, while a social responsibility activity challenges students to identify and propose possible solutions to problems within their own community.

No matter which authentic activity is selected, an instructor must remember that “The ultimate goal is to build lifelong learners who can take advantage of opportunities to apply knowledge and skills gained in their courses and identify new knowledge that they need to develop in the future” (Conrad & Donaldson, 2011, p. 93).

EVALUATING AUTHENTIC E-LEARNING

In any design model, the process of evaluation is essential. Chapter 8 of *Evaluating Authentic E-learning*, in *A Guide to Authentic Learning*, offers a detailed plan for effective evaluations. Following the provided thirteen element plan will ensure a quality course which accomplishes its learning goals. Furthermore, creating a plan enables all involved to establish relationships as well as **comprehend the scope of the evaluation. A thorough evaluation will determine a course’s effectiveness of transferring learning to the learner’s real world experiences.**

The first four elements are similar to writing an analysis portion of a design document. The first element is the *Introduction* which introduces the evaluation plan, not the course. The second element explains the *Background* of the course for all involved to understand the purpose and other important factors of the course. Next, the plan should include the *Purpose*. The purpose provides a mix of formative and summative goals and provides valuable information for decision making as well as focuses the collection of data. The fourth element of the plan lists the important *Stakeholders*: clients, consumers, teachers and learners.

The next three elements of the evaluation plan are critical elements for the success of the plan. Working with clients, the designer of the plan constructs the anticipated *Decisions* the plan will inform. For example, one decision might include the best delivery options for the course. The next portion of the plan, *Questions*, provides key questions the evaluation should answer. These **questions will be connected to the decisions. An example question might be, “What are expert reactions to this course?”** The seventh element, *Methods*, provides clear procedures for the evaluation such as interviews, learner questionnaire, or expert review.

The last six elements of the evaluation plan include important details for the evaluation plan. The *Participants* section lists all the participants in the evaluation. The *Instrument* section lists the items such as types of data collection, forms, record keeping, and software. The actual forms should be included in the Appendix. The next section, *Limitations*, identifies the potential limits in interpretations and generalizations based on reliability and validity of the methods. The last three elements, *Logistics*, *Timeline*, and *Budget*, include important details which will determine the overall success of the evaluation.

In addition to a detailed explanation of each of these sections, the authors illustrate the process of creating and implementing an evaluation plan by using the example of the Botanical Gardens

Management Simulations contained in ECOL 2000: Ecological Applications course at The University of Georgia. The working implementation of the plan is extremely valuable and provides details for the new designer. In addition to the detailed example of an evaluation plan, the authors offer important managing strategies. For example, keeping an evaluation journal with a copy of the plan, all correspondence records, periodic status reports, and financial records will contribute to successful management of the plan.

The report is the final and crucial element in a successful evaluation. It must communicate **clearly and effectively the “full story” of the evaluation** (p. 167). Essentially it will succinctly, yet thoroughly, present the results of the evaluation plan. It should include the background information from the plan, as well as summarize how the evaluation was conducted. A variety of media could be used for the communication of the evaluation report: print, web, or video. Regardless of the format an executive summary is an important element. Additionally, appendices are useful for providing more detailed finding and reports. However, when writing the evaluation report the most important element is clarity. The connections between data and decisions should be clearly and logically constructed and recommendations should be primary, relevant and realistic.

While most institutions and companies desire to implement high quality courses, investing money into evaluation might not be a priority. The creation and presentation of an evaluation plan requires keen insight into **e-learning, political perceptiveness, and “astute negotiation skills”** (p. 150). A course designer with these skills might elicit a more positive response to a thorough evaluation, as well as be able to produce an authentic e-learning course that provides learners with the knowledge and skills needed in the real-world.

References

- Battilio, J. (2009). Interaction Online: A Reevaluation. In A. Ornella, T. Hudgins, & M. Simonson (Eds.), *The perfect online course: Best practices for designing and teaching*. Charlotte, NC: Information Age Publishing.
- Caplan, D., & Graham, R. (2008). Development of online courses . In Anderson (Ed.), *The Theory and Practice of Online Learning, second edition - The Development of Online Courses*. Edmonton, AB: AU Press.
- Clark, R. & Mayer, R., (2011). Ch. 4 Applying the multimedia process., *e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning* (pp. 67-89). Retrieved from <http://www.ebilib.com>.
- Clark, R.C., & Mayer, R.E. (2011). *E-Learning and the science of instruction: Proven Guidelines for consumers and designers of multimedia learning* (3rd ed). San Francisco, CA: Jossey-Bass.

- Conrad, R. & Donaldson, J. (2011). Authentic Activities. *Engaging the Online Learner: Activities and Resources for Creative Instruction*. New York, NY: Wiley Publishing.
- Dirksen, J. (2011). Design for motivation, *Design for how people learn* (pp. 215 - 231). San Francisco, CA: New Riders.
- Herrington, J., Reeves, T. & Oliver, R. (2010). *A guide to Authentic e-Learning*. New York, NY: Taylor and Francis.
- Keller, J. (1987). Development and use of the ARCS model of instructional design. *Journal of Instructional Development*, 10(3), 2-10.
- Orellana, A., Hudgins, T. L., & Simonson, M. R. (Eds.). (2009). *The perfect online course: best practices for designing and teaching*. Charlotte, NC: Information Age Publishing.
- Rogers, E. M. (2003). *Diffusion of innovations*. New York, NY: Free Press.
- Smith, R. (2008). *Conquering the content: a step by step approach to online course design*. San Francisco, CA: Jossey-Bass.
- Wiggins, G., McTighe, J. (1998) What is backward design? *Understanding by Design*. Retrieved from http://www-tc.pbs.org/teacherline/courses/inst325/docs/nst325_wiggins_mctighe.pdf
- Zheng L. & Smaldino, S. (2009). Key instructional design elements for distance education. In M. R. Simonson, T.L. Hudgins, & A. Orellana,(Eds.), *The Perfect Online Course : Best Practices for Designing and Teaching*. Charlotte, NC: Information Age Publishing.