DESIGNING SUCCESSFUL E-LEARNING: THINKING OUTSIDE THE BOX

Toh Seong Chong
Centre for Instructional Technology and Multimedia
Universiti Sains Malaysia
tohsc@usm.my

ABSTRACT

Instructional designers very often confine their work to the definition of objectives, organizing content, selecting media, defining learning events and developing performance tests. Designing inside the “boxes” of an e-learning application, is a traditional but narrow view of the design responsibility where often little attention is given to the practicality of learners actually performing on the job, the level of practice that is necessary to sustain proficiency. As a result, popular techniques often focus on design details while missing the big picture and not targeting the most significant issues. External factors preceding, current with, and following instruction affect learning and subsequent performance. This paper discusses the broader perspectives of instructional design for successful e-learning. It addresses factors outside “the box” instructional design issues. The paper discusses three contexts of concern, namely: the Pre-instruction phase, the Instruction phase, and the Performance phase. It also discusses the Prochaska Stages of Change model which identifies a well-validated process of change, and how this model can be aligned with the phases of learning. Examples of work done at the Center for Instructional Technology and Media, USM based on this “Out of the Box” Design model are explained in this paper.

INTRODUCTION

One of the main concerns of most observers in the field of instructional technology is the dissatisfaction of the effectiveness of most e-learning applications; it seems that they have not yielded the desired impact that they are needed to have (Allen, 2003; Toh, 2005). As we surveyed most of the books on instructional systems design (ISD), they seem pretty much describing of the same thing with some variations here and there; most of these models are derived from the generic model of ADDIE, which is the acronym of analysis, design, development, implementation and evaluation. Thus, if we keep doing the same thing, and keep saying the same thing, we are likely to get the same results. Is there any way to think “out-of-the-box”, and take a new and broader view of instructional design on e-learning? Is it possible to view instructional design from a wider perspective?

Taking cognizant of this situation, this paper seeks to address threefold need. Firstly, it is to review, analyze, and synthesize theoretically psychology of behavioral change and its application in instructional design. Secondly, it is to further articulate on a “out-of-the-box” model of instructional design of e-learning recently “discovered” by Dr. Michael Allen (Allen, 2007), and discuss specific instructional design techniques and related conditions under which this model can be applied. Thirdly, it is to map out the intricate relationships among these techniques; thereby, developing a guide for courseware developers.

SUCCESS-BASED e-LEARNING DESIGN

Success-based e-Learning design is a systematic integration of approaches, theories, research, and experience. It is also pragmatic, settling for what works best for the learner, regardless of theoretical bias. It uses the designer’s time and resources wisely and it focuses on those things that matter most in application – that is enabling the learner to do the right things at the right times, under a myriad of pressures, expectations and distractions faced by the learner. Success-based e-learning design is based on the integrative application of four major theoretical approaches, behaviorism, cognitivism, constructivism and connectivism. Although the advocates of one are sometimes critical of the other theories, from our experiences as instructional designers, we could incorporate the perspectives and techniques of two or all four in our designs.

Ertmer and Newby (1993) proposed an interesting means of selecting theoretical approaches based on two factors: a) the learner’s level of task knowledge; b) the level of cognitive
processing required by the task. They argued that, with respect to the learner’s knowledge, “… a behavioral approach can effectively facilitate mastery of content… (knowing what); cognitive strategies are useful in teaching problem-solving tactics where defined facts and rules are applied in unfamiliar situations (knowing how); and constructivist strategies are especially suited to dealing with ill-defined problems through reflection-in-action.” The connectivism strategies enable the learner to use a network with nodes and connections as a central metaphor for learning. In this metaphor, a node is anything that can be connected to another node: information, data, feelings, images. Learning is the process of creating connections and developing a network (Toh, 2005). Knowing-how and knowing what need to be supplemented with knowing “where” (the understanding of where to find knowledge needed). This strategy is particularly useful in modern day learning where knowledge is rapidly growing exponentially. See Figure 1. Therefore, success-based e-learning design is not particularly concerned with theoretical purity although these theoretical perspectives continue to arise in support of what success-based designers are doing in practice. Sometimes theory leads to practice, and sometimes the reverse.

**Figure 1: Comparison of Associated Strategies**

**Levels of Cognitive Processing Required by the Task**

Comparison of the associated instructional strategies of the behavioral, cognitive, constructivist, and connectivist viewpoints based on the learner’s level of task knowledge and the level of cognitive processing required by the task.

*Adapted from Ertmer and Newby: Behaviorism, Cognitivism, Constructivism: Comparing Critical Features from an Instructional Design Perspective*

**BURIED IN A BOX**

As instructional designers, we often have a tendency to think too narrowly of our role to confine our work to the definition of objectives, organizing content, selecting media, defining learning events and developing performance tests. Under this paradigm, instruction that is most carefully and systematically designed instruction can fail to achieve desired learner outcomes. Or, if these outcomes are achieved initially, they are not sustained. In such situations, learners are frequently identified as the culprit, usually for their lack of motivation, effort, or willingness to change. With this perspective, instructional designers are stymied. Adhering to an instructional systems design (ISD) approach or the “Waterfall” ADDIE design model may not be sufficient to develop instruction that fosters learning and lasting behavior change, particularly in situations where learners are resistant to change or where new behaviors must be integrated into their day to day life. See Figure 2.

In this “in-the-box” view, we hope to achieve the expected performance by designing a series of learning events or modules for learners. We hope that this is going to change their behavior through this effort. We are actually lucky if we change their knowledge. We do this when they have lots of responsibilities in their lives – things that are going on at home, or in their office. If we lose people’s attention for just a little bit, their minds begin to wonder, and the effectiveness of instruction is diminished. This is especially so if our instruction is boring.
The truth is, our role as instructional designers isn’t simply to apply design principles and hope for the best; it is to enable people to perform at higher levels of competency. Designing inside the “boxes” of an e-learning application is a traditional but narrow view of design responsibility. Inside these boxes, designers often give little attention to the practicality of learners actually performing on the job what they are teaching and the level of practice that is necessary to sustain proficiency.

“Inside the box”, instructional designers just create a string of learning modules, each dependent on the preceding one, each presenting more difficult concepts and tasks to perform, each designed to raise performance to a higher level. There is an assumption that the learner is totally inside each box with the designer – committed to and focused on each module, approaching it with energy and enthusiasm. See Figure 3.
NEED TO CONSIDER BROADER PERSPECTIVES
As instructional designers, we need to get out more – out of our boxes, and consider broader perspectives. There are many variables not typically seen as within the purview of instructional design that can sabotage instructional efforts or enrich them. Success requires designers to think expansively about the real lives and influences on learners – what they care about, what they are trying to do, how they might perceive they learning intervention – and design both inside and outside the confines of the typical learning product. Failure to do so may result in great ideas being buried quite prematurely inside the very large box of quickly retired learning programs.

Allen (2003) suggested that there are three sequential or overleaping contexts surrounding the path to desired learner’s performance. These contextual phases are the Pre-instruction phase, the Instruction Phase, and the Performance phase.

The Pre-instruction phase include things that influence how they are going to learn and also how they are going to perform later. These comprises of the learners’ attitudes, prior learning skills, prior failures, and motivations before formalized training begins on the current lesson. The period preceding instruction is an important time for setting expectations, energizing learners, and preparing them to learn.

The Instruction phase is where the organized interventions of teaching takes place with the intent of moving the learner from the current levels of competence to more effective and higher levels. During this phase, it is important for the designer to recognize and give attention to the surrounding learning environment, harnessing the support and energy concurrent learners can provide to each other.

The Performance phase is the improved performance expected after the training has concluded. It is the “proof pudding”. It is the ability to do the right things at the right time. During this phase, it is important for designers to recognize that the “embryonic skills” or “nascent abilities” acquired by learners easily could evaporate or die when support terminates at the end of formalized instructions. Designers need to recognize and mitigate adverse factors where possible and devise safeguards and support mechanisms so that nascent abilities can be fully nurtured.

THE DESIGN CHALLENGE
As we look at the myriads of factors that influence performance, we start to ask the question whether is there any way to go about to ensure really effectiveness in training? If we just concentrate on activities “inside-the-box” design activities like how to get peoples’ attention, how to structure the content, how to make it interactive so that they practice sufficiently, and hope that these activities are going to change behavior – in many instances, it is still ineffective. Therefore designing successful instruction is really a challenging task. Is there a way to approach instructional design differently from what we have been traditionally doing? Is there a approach to build on “outside” the boxes that might make might a difference?

THE PSYCHOLOGY OF BEHAVIORAL CHANGE
A relevant model appropriate to serve as the underpinnings of this “Out-of-the-box” instructional design paradigm is the Transtheoretical Model of Change by James Prochaska. The application of this model in successful instructional design was “discovered” by Michael Allen (2007). James Prochaska and his colleagues, John Norcross and Carlo DiClemente (1994) identified stages of behavioral change in a model that deserves consideration by instructional designers. Although this work has focused primarily on drug addiction, anger management, smoking cessation, its effectiveness for behavioral change has been verified by considerable research. This research strongly suggests that for people to change their behavior they must transverse well-defined stages in a specific sequence. Another exciting finding of this model is that nobody can skip these prescribed steps, otherwise only temporary change will occur. In other words, if they do not satisfy the requirements of each stage, any observable changes will be short-lived. The clarity of its structure yields relatively clear implications for an instructional designer.
BACKGROUND OF THE DEVELOPMENT OF THE PROCHASKA TRANSTHEORETICAL MODEL OF CHANGE
When psychologist Dr. James Prochaska was a junior in college, he lost his father to the twin demons of alcoholism and depression. Throughout his illness, Dr. Prochaska's father had expressed mistrust in psychotherapy and refused to consider it — with tragic results. Dr. Prochaska's frustration with this missed opportunity led him to an intensive study of psychology in an effort to understand more about people like his father and how the field could be more helpful to them. But instead of answers, Dr. Prochaska's studies led only to more questions. One puzzler was that although therapy seemed to be beneficial to many people struggling with different types of problems, no one really seemed to understand why. No over-arching theory explained how people manage to change their behaviors. In fact, as Dr. Prochaska observed, there were at least 300 different approaches and explanations fragmenting the field of behavior change. This early observation led Dr. Prochaska and his colleague, Carlo DiClemente, to explore the ways that people succeed in changing their behavior. Their goal was to see whether they could detect any patterns that might apply across all the different cognitive and behavioral approaches used in modern psychology. Their discovery of common stages and processes, originally gleaned from extensive interviews with people who had overcome addictions to nicotine, became known as the Transtheoretical Model — so named because it spanned so many different theories.

STAGES OF CHANGE FRAMEWORK
The underlying thesis of this model is that there is a six-stage program for change which matches change strategies to the individual's stage of change. In other words, if you understand where you are in the change process, you can "create a climate where positive change can occur, maintain motivation, turn setbacks into progress, and make new beneficial habits a permanent part of your life."

The Stages of Change model postulates that there is a course of successful change comprising of six well-defined stages, namely:-

1. Pre-contemplation
2. Contemplation
3. Preparation
4. Action
5. Maintenance
6. Termination

Each stage has specific tasks, which must be completed before moving on to the next stage. Most interestingly, the model claims that changes cannot be skipped for successful, sustained changed. Each stage requires different kinds of activities, and achievement before one can successfully lead to the next stage. The stages are described below.

1. **Pre-contemplation** – People in the pre-contemplation stage usually have no intention of changing their behavior, and typically deny they have a problem (hence the term “denial” which is frequently applied to this stage). The main task of the pre-contemplation stage is for the individual to become aware of their behavior (or lack thereof). The most effective strategy is to increase the individual’s perception of the risks and problems with the current behavioral state.

2. **Contemplation** – In this stage, people acknowledge they have a problem and are seriously thinking about solving it. They have not yet made a commitment to take action to change their behavior. Contemplators struggle to understand their problem, to see its causes, and to evaluate possible solutions. The main task of this stage is for the individual to gain information and understanding of their behavior, and to weigh the pros and cons of the problem and its solution. The most effective strategy is to "tip the decisional balance" (the pros and cons) in favor of change.

3. **Preparation** – People in the preparation stage are planning to take action. The individual may be committed to action, but still feel ambivalent about making a change. This ambivalence must be resolved. The main task of this stage is to develop a plan for change. The most effective strategy is to help the individual develop a plan that is acceptable, appropriate, and effective.

4. **Action** – The action stage is where people actually change their behavior. They engage in activities or change their environment in order to alter their problem behavior. Many people, erroneously, equate action with change. It is only stage, and change will not occur (or last) unless the other stages are completed as well. The main task of the action stage is demonstrating behavior. The most effective strategy
for individuals in this stage of the change process is to provide encouragement and support to enhance the individual’s sense of self-efficacy.

5. Maintenance – During the maintenance stage, the gains attained during the action and other previous stages are consolidated. The individual typically struggles to prevent lapses and relapses. Although maintenance is sometimes viewed as a static stage, it is a critical continuation, not an absence, of change. The main task is to stabilize the behavior and avoid relapse. The most effective strategy is to help the individual maintain the change in behavior.

6. Termination - Termination of undesired behavior and substitution of desirable behaviors is the ultimate goal of change. In the Termination stage, the temptation to revert to previous behaviors no longer represents any treat. Even without exerting the effort required for vigilance in the Maintenance stage, those who have terminated undesirable habits have no likelihood of falling back to undesirable behavior patterns.

HOW DOES THE STAGES OF CHANGE MODEL LINE-UP WITH ALLEN’S VIEW OF INSTRUCTIONAL DESIGN?

The Prochaska’s stages of change framework described above have applications for instructional design. A prescriptive e-Learning Design Model was developed by Dr. Michael Allen incorporating the elements of stages of change into the pre-instruction, instruction and performance phase. See Figure 4.

Preparatory Events to support behavior change during the Pre-contemplation stage
In pre-contemplation, people see problems arising from their own behavior; they do not see a need to change, and they do not want to change. Whatever problem arising they will reckon that it is outside their personal control. At this stage, if they are pressured to
change, they will revert back to their own behavior easily. In this stage, there are three most important things to do, that is:-

1. Raise learner consciousness – give them some information and help them see it; invite persons to give testimonies of their success.
2. Facilitate social liberation – letting them know that the organization is aware that they are going to make changes, and are ready to provide support systems if they make mistakes.
3. Support informal learning – encourage people to exchanges thoughts and ideas informally.

Preparatory Events to support behavior change during the Contemplation stage
In contemplation, people begin to focus on personal behavior & problems. They begin to dwell in causes, but also ponder solutions but not “really sure” about them.

In contemplation, some of the preparatory events that we can structure includes:-

1. Providing information – at this point, when people are contemplating, they will soak up information – to see how they will go about changing; how painful is it; how long is it going to take; what are the rewards that it is going to be?
2. Encourage self-evaluation – we encourage people to evaluate themselves: whether change will be useful? Why am I not changing? What good reason for not changing?
3. Engage emotions – we can get them emotionally excited by dividing them into teams and see who can achieve the goals soonest. Even a person who is not totally committed to change can get swept up by the emotional excitement of it and eventually effect change.

Preparatory Events to support behavior change during the Preparatory stage
In the preparation stage, people continues to gather information gathering continues and becomes more specific. They need help making concrete plans for change. So at this stage, we can provide realistic appraisal to identify strategies for moving forward and for handling setbacks. Events at this stage includes:-

1. Provide planning help
2. Encourage commitment
3. Provide information
4. Engage emotions

Instructional Events during Action Phase
In this stage, the learner is really excited and committed to take action. They begin to learn skills necessary to enable them to perform better. At this juncture, it is critical to align emotions and self-image with new behaviors and successful performance. Also, it is very important to note that much practice is usually essential to substituting good habits for bad.

According to Allen (2007), several critical activities should be provided during this stage:-

1. Designing motivating instruction based on the framework of context, challenge, activity and feedback. He suggested Seven Magic Keys to motivating e-learners, listed within the framework of these four components, namely:-

   **Context**
   (i) Build anticipation of outcomes  
   (ii) Make the context appealing – using novelty, suspense, humour, graphics, sound, animation.

   **Challenge**
   (iii) Put the learner at risk.  
   (iv) Select the right content for each learner – adjust the challenge to match the learner's readiness level. Also provide spaced learning events and instructions.

   **Activity**
   (v) Have the learners perform multi-step task.
**Feedback**

(vi) Provide intrinsic feedback.

(vii) Delay judgment

2. Provide spaced, authentic learning events – We need to provide spaced learning to enable them to transfer to actual or authentic performance. Also the performance activities need to be spaced apart to help learners to consolidate what they have learned.

3. Arrange for personal, meaningful, intrinsic feedback – This is absolutely critical at the performance phase. Intrinsic feedback focuses on the linkage between actions and results.

4. Train supervisors for mentoring responsibilities – We really need to train supervisors to mentor or helping people to take the new behavior.

**Transfer Aids and Reinforcement Techniques during the Maintenance stage**

The maintenance stage is the “moving to independence” stages. This requires learner being able to identify situations where old behaviors are no longer appropriate and very sensitized to these behaviors. It is important to have quick response contingency plans when old behaviors creep back. At the maintenance phase, organizations need to design and develop aids to help learners transfer their learning to performance. The techniques include:-

- Training supervisors to mentor
- Basing evaluation on observed performance
- Encouraging self-testing
- Teaching safety nets
- Providing refresher events and space practice
- Applying behavioral change techniques of reward, countering, controlling the environment and helping relationships.

**APPLICATION OF THE MODEL AT CENTRE FOR INSTRUCTIONAL TECHNOLOGY AND MULTIMEDIA, UNIVERSITI SAINS MALAYSIA**

At the Centre for Instructional Technology and Multimedia, Universiti Sains Malaysia, many interesting innovations were carried to address e-learning problems. These researches encompass development of e-learning solutions based on this broader “out-of-the-box” instructional design model of Dr. Michael Allen. Several of this e-learning were developed intuitively before this model was developed and crystallized. However, looking back in retrospect, it fits very nicely into this model. Some of these e-learning solutions include:-

1. **AMD C4 Technology Design e-Learning solution:**

   The project was designed for a multinational company in Penang for their field-engineers to enable them to have a thorough knowledge of the AMD C4 chip and skills to answer questions regarding quality standards of the product when meeting their clients. Before the e-learning solutions were designed and developed, a lot of time was spent discussing with the AMD engineers to ascertain the learning problems. Several brain-storming sessions were carried to find out what actually the performance problems are and ways of address them. When all these problems are clearly identified, prototypes are developed using the successive-approximation method. The result is the successful development of an e-learning solution meeting all the requirements of the company.

2. **Virtual Reality Learning for Novice Drivers:**

   This project was developed to address the mismatch between the traditional instruction given by Malaysian driving school instructors which is very much “post-test”- based and actual performance of drivers which requires novice drivers to visualize in the 3D environment. Elements of pre-instruction, instruction and performance were incorporated in this e-learning solution. Much time were spent to ascertain the actual learning needs through several brain-storm sessions. Prototypes were developed to address the learning needs using the successive-approximation method with emphasis on learner’s
CONCLUSION
The integrated instructional design model described in this paper involves cognitive, social, and behavioral aspects of learning. Although its application is broad in scope, it may be particularly useful in instructional situations where behavior change must be integrated into the learner’s lifestyle or where resistance to change may be encountered. When lasting behavior change is the goal, instructional designers need to consider the learner’s stage of readiness for change as well as the creation of a supportive environment that promotes the likelihood of the behavior change, and design instruction accordingly.

The “Out-of-the-box” model of e-learning design by Dr. Michael Allen which incorporates the Prochaska’s Stages of Change research techniques, represents a promising prescriptive model for instructional designers to design e-learning that are memorable, motivation and meaningful. It takes in account the complexities of human behavior that makes change difficult – an aspect which was largely ignored by traditional “in-the-box” designers. This model takes cognizance the things influencing learners before (Pre-instruction phase), during (Instruction phase), and after instruction (Performance phase). Designing instructions with this broader perspective can strongly increase the prospects of achieving performance success.

REFERENCES
Thinking outside the box starts well before we're "boxed in" – that is, well before we confront a unique situation and start forcing it into a familiar "box" that we already know how to deal with. Or at least think we know how to deal with. Advertising. Learning about how such relations are structured can teach you a lot about how people relate to each other and the world around them. Starting to see the reason in another religion can also help you develop mental flexibility when you really look at all the different ways people comprehend the same mysteries, and the fact that they generally manage to survive regardless of what they believe, you start to see the limitations of whatever dogma or doxy you follow, a revelation that will transfer quite a lot. Learn To Think Outside The Box. Every one of us has a different world view. These individual perspectives are influenced by a variety of factors. On the other hand, if the most successful people in the world have one thing in common, it is their willingness to think outside the box without concern for what others think. The Benefits of Thinking Outside The Box. Here are just a few of the benefits of thinking outside of the box. These can have a positive effect on your education, career, and even your interpersonal relationships. When a problem seems to have no good solutions, your ability to take a completely different approach could be the key to finding the solution that nobody else can see. In many ways, designing successful e-learning is a nearly impossible task. The complexity can be overwhelming, with challenges coming from voluminous content that somehow manages to be incomplete, unsympathetic technology, anxious and inattentive learners, inadequate budgets, subject matter experts who are asked to be... In many ways, designing successful e-learning is a nearly impossible task. The complexity can be overwhelming, with challenges coming from voluminous content that somehow manages to be incomplete, unsympathetic technology, anxious and inattentive learners, inadequate budgets, subject matter experts who are asked to be designers, and restrictive deadlines. Thinking outside the box, does not mean that you have your head in the clouds, rather it implies that you have a practical approach to doing things and will always keep a clear head when dealing with an issue. When you want to learn to think outside of the box, you must ensure that you are keeping up with the changing times, lest your ideas will be impractical and even unattainable. A person who thinks outside of the box will be very up to date with global trends and pressing problems in the world. 3. Watch some inspirational videos Thinking outside the box requires a box: Michael Bahr at TEDxSUU. Think out of the Box Expand your Comfort Zone. How to do Creative Thinking. Einstein's Lesson on How to Think Outside the Box. Articles from Forbes and Inc. What do you do to think outside the box? Please share your ideas and suggestions in the comments below so that we all can learn and receive inspiration from each other! Over and out! I have to go do some creative thinking.