Motivation and its Relationship to the Design of Educational Games

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Introduction

This paper is divided into the following sections.

- A working definition of motivation for this paper is established.
- The importance of motivation in educational games is investigated.
- The relationship of adult learners to motivation and learning is discussed.
- Instructional design models that have a motivational component are examined.
- These models with an overt motivational component are compared and contrasted.
- Motivational opportunities (based on design models and learning theories) and motivational barriers (as identified by the literature) are then examined.
- Conclusions based on this information end the paper.

What is Motivation?

Most instructors would readily agree that learner motivation is an important variable to consider when developing, monitoring, and assessing instructional effectiveness in educational games. Defining motivation is an elusive process, as difficult to do as grasping a slippery fish in a dark cave. Motivation is a hypothetical construct. It cannot be directly and scientifically measured. Psychologists concerned with learning and instruction use the term motivation to describe those processes that can energize and give direction or purpose to behavior (Wlodkowski, 1989). It is highly unpredictable and changeable, subject to many influences beyond the control of teachers and designers (Keller, 1987). Perhaps Heckhausen (1991) says it best:

> "The term motivation in psychology is a global concept for a variety of processes and effects whose common core is the realization that an organism selects a particular behavior because of expected consequences, and then implements it with some measure of energy, along a particular path." (Heckhausen, 1991, p. 9).

Unsurprisingly, there are many, many definitions of motivation. Most of these definitions fall into two categories, physiological definitions and psychological definitions. Under each of these two categories are hundreds of definitions, representing a breadth of knowledge too vast to cover in this paper. Entire books could be (and have been) written on these definitions and their applications to learning and other environments. While it is not the purpose of this article to replicate these works, it is necessary to briefly discuss physiological and psychological aspects of motivation in an

attempt to lay the groundwork for the subsequent parts of this paper. Also, this paper will undoubtedly reflect a Western attitude towards motivation. Cultural context can affect a person's achievement motivation (Travers, 1962). As Fukász (1985) states, motivation must always be studied in the context of historical traditions and the economic, social, and cultural conditions of the country in question. Motivation and culture are inseparable (Wlodkowski, 1999). As the bulk of the research cited in this paper comes from Western authors, this paper will be biased towards constructs of motivation appropriate for Western cultures. As a final focussing mechanism for this paper, cognitive aspects of motivation, as opposed to physiological aspects, will predominate this paper.

At this time, there is not a clearly established research base on online education that one can draw upon to separate motivational issues from more "traditional" environments. Therefore, the majority of this paper will examine motivation in a more general educational light, trusting that the unique aspects of educational games in relationship to motivation will not differ to a great extent from traditional settings. Any unique aspects that do emerge through research analysis will be examined.

Definitions of Motivation

Physiological

Physiological definitions of motivation deal only with observable facts concerning measurable bodily functions. In general, the term "energized" is used to describe motivation. The animal must be active to be motivated. (Travers, 1982). Behavior is energized through a strong external stimulus, called a drive stimulus. (Hull, 1943; Travers, 1982). Drive states have to do with basic bodily needs, such as thirst, hunger, and the need to reproduce. H. A. Murry called these viscerogenic needs, needs related to bodily needs. (Travers, 1962).

While some aspects of motivation can be explained in purely physiological terms, (such as heightened heart rate), there are many aspects of the origin of motivation that defy this objective scrutiny. Thus, many years ago scientists turned towards possible cognitive explanations of motivation.

Psychological

Are humans endowed with cognitive sources of motivation? Scientists have long debated this issue (Travers, 1982). Scientists cannot provide satisfactory empirical reasons for how motivation without external stimuli arise (Travers, 1982). It is possible that many aspects of motivation are learned. H. A. Murry called these psychogenic needs, needs that are learned (Travers, 1982).

This paper will focus on the cognitive aspects of motivation, for the bodies of research on motivation and learning use mostly cognitive approaches.

Why is Motivation Important?

It is almost universally accepted that there is a positive correlation between motivation and learning. Dewey himself (1938) said that most important attitude that can be formed is a desire to learn. The more motivated a person is about a given subject, the more likely s/he will learn about that subject. Malone (1981) claims that intrinsically-motivated students may spend more time and effort learning, feel better about that learning, and use that learning more in the future. Schank (1999), in defining the eight most important things one must consider when building the Virtual University, places motivation at the top of the list! Thus, we need to understand enough about motivation to know how to effectively employ it in instructional design processes. An understanding of the particular conditions that energize human behavior is needed if we are to successfully control motivational constructs in instruction (Travers, 1982). Unfortunately, our understanding of motivation is a "weak link" as applied to learning and design processes (Duchastel, 1997). Instructional designers must pay more attention to motivational constructs when designing instruction and games.

Relationship Of Adults To Motivation And Learning

Adults, young and old, have some unique needs and up-front desires when it comes to learning. Most are very goal oriented, and want instruction that they can immediately apply to their job or life (Knowles, 1980). Adults are highly pragmatic learners. They want instruction that gives them the ability to do something (Wlodkowski, 1989). Adults will actively seek out learning situations they consider optimal. They purposefully engage in learning situations to meet a goal, to achieve competence. Motivation is high and intrinsic in these individuals (Wlodkowski, 1989). Adults also have a need to take charge of their learning (Penland, 1979; Keller, 1987). While they may want and need guidance in choosing amongst alternatives, they want to make the final decision. When adults see they are responsible for their learning they are likely to be motivated (Wlodkowski, 1989). Finally, it is possible that adults are motivated to learn because of their need to grow, to become more than they are (Knowles, 1980).

The type of adult and his/her environment has impact on instruction delivery. One typically hears that adults in distance education courses tend to be highly mature, capable of working and learning with relatively little guidance (Wlodkowski, 1989). These people can be classified as motivated, for they seek out education. This is certainly true for some percentage of adults in distance education settings. However, there are other adults who lack these autonomous capabilities, have the education thrust upon them, and they bring little motivation to the learning environment. They may have a limited educational background, or one that is rife with failures and problems. These two groups obviously represent the extremes of what one may find in a given adult learner population, but they are both valid, significant groups. How does an instructional designer accommodate these separate groups?

In a motivational study of adult learners by Hancock (1994), he concluded that low conceptual learners (LCL) and high conceptual learners (HCL) will learn better and with

higher motivation in situations that meet their learning needs. LCL people have relatively few cognitive structures and want to minimize ambiguity in their learning. They prefer structured, hand-fed instruction. HCL people are more complex cognitively and can deal with (and perhaps prefer) less structured learning environments. Hancock's findings supported these statements, suggesting that this is at least one way instructional designers can classify adult learners and thus develop appropriate instructional strategies for both groups.

For HCL people, motivational constructs embedded within the overall delivery of instruction are minimally needed, at best. For LCL people, motivational constructs probably should be included at key points, as this group lacks these constructs themselves.

Related to Hancock's work is the concept of field dependency (Witkin, 1977). Field dependent learners are those that rely on external cues for learning. Field independent learners, on the other hand, are intrinsically motivated and can rely on environmental cues to positively manipulate the learning environment.

Achievement goals are another area where learner differences come into play. According to Elliot and Harackiewicz (1994), there are two types of achievement goals that affect both motivation and performance - performance achievement oriented or mastery achievement oriented. Performance achievement oriented individuals are interested in developing competency in relation to others, doing what is asked of them, often only shallowly processing information. Mastery achievement oriented individuals are interested in mastering the task for their own sake, and are not as interested in reaching a comparative norm. Obviously educators would like to see all individuals approach a learning situation with a mastery achievement framework.

Can studies of motivation help us understand and design instruction and games that accommodates these different types of learners? If adult learners do need (or can at least benefit from) motivational constructs within educational games, what should instructional designers do during design to accommodate this need? Fortunately, there are several models and taxonomies about motivation instructional designers can examine to assist them in their efforts.

Instructional Design Models/Frameworks That Have An Implied Motivational Component

According to Reigeluth (1999), the field of instructional design is undergoing a paradigm shift. This shift is towards a more student-centered, customized, active learning approach, and some indirect consideration to motivation is now given in many current instructional design theories. In many theories, little is given beyond mention of motivation's importance to guide the instructional designer in incorporating motivational strategies within an instructional lesson, module, course, or system.

Some authors provide general guidelines. For example, Cropley (1985) lists five general areas one should consider when designing motivating instruction for adults:

- Organization: Activities should take place in an environment that makes sense to the learners, where connections between the subject matter and their real lives is obvious.
- Content: The content of a course must be closely linked with the real-life needs and interests on the learner.
- Teaching and Learning Activities: Allow the learners to regulate their own learning, including self-pacing and self-evaluation.
- Educational Technology: Use educational technology to provide concrete activities that are self-directed, self-paced, and can be used in various locations, such as the home.
- Staff and Staff Training: Staff members must be aware of adult learning needs, know how to function as facilitators, and be able to guide learners in the self-evaluation and self-pacing process.

Some authors admit motivation is important and may even overtly list it as an instructional event. For example, Dick & Carey (1996) state that motivating learners should be done throughout an instructional activity. Some theories have motivational constructs covertly assimilated into the theory. Topic relevance is discussed by Hannifin, Land, and Oliver (1999) in their discussion of Open Learning Environments, as well as Jonassen's (1999) Constructivist Learning Environments. The link between relevance and motivation is obvious. In addition, these theories discuss scaffolding, or matching the task to the student's abilities. In a properly scaffolded learning environment, expectancy for success must be high. Vroom's (1964) expectancy-value theory, that contends that two essential motivational elements are value of the task and expectancy of success, provide theoretical support for such scaffolding. Bandura's (1977) description of self-efficacy - the belief that one can or cannot execute some action - also provides theoretical support for scaffolding.

While many instructional design theories have covert motivational constructs embedded, instructional designers would benefit from more overt models to follow, if they are to successfully integrate motivational constructs within developed instructional sequences. Fortunately, several robust instructional design models that revolve around motivational constructs do exist.

Instructional Design Models/Frameworks That Have An Overt Motivational Component

The ARCS Model by John Keller, the Time Continuum Model of Motivation by Raymond J. Wlodkowski, the Motivational Framework for Culturally Responsive Teaching, also by Wlodkowski, and the Taxonomy of Intrinsic Motivations for Learning by Thomas W. Malone and Mark R. Lepper all include components for developing and assisting learner motivation. Each is discussed below.

The ARCS Model

The ARCS model was developed by John Keller over a period of approximately 10 years. ARCS stands for:

- Attention
- Relevance
- Confidence
- Satisfaction

ARCS is based on Vroom's (1964) expectancy-value theory, in turn derived from the writings of E. C. Tolman and K. Lewin. Tolman believed that an expectancy was the anticipation held by an organism that under a given set of circumstances, a particular behavior would lead to a particular outcome (Beck, 1983). Each component of the ARCS model is briefly described below.

Attention – Gaining attention is a learning prerequisite. Getting and sustaining it is critical. One must arouse a student's knowledge-seeking curiosity without over-stimulating it. The goal is to find the proper location between boredom and hyperactivity. The Yerks-Dodson Law directly supports this notion. The Yerks-Dodson Law states that as tasks are increased in difficulty, the optimum level of motivation declines (Travers, 1982). One technique to gain and keep attention is through the use of novelty. Novel objects or situations make the individual attend to the object or situation in an attempt to discover the nature of the object or situation (Travers, 1982). The use of color, animation, and sound can also be used as external stimuli to motivate learners. It attracts and retains users (Ritchie & Hoffman, 1997).

There are three basic ways to gain attention:

- Perceptual Arousal
  Gain and maintain student attention by the use of novel, surprising, incongruous, or uncertain events in instruction.
- Inquiry Arousal
  Stimulate information-seeking behavior by posing, or having the learner generate, questions or a problem to solve.
- Variability
  Maintain student interest by varying the elements of instruction.

Relevance – How does the instruction seem to meet the present and anticipated needs of the learners? Perhaps the most interesting aspect of this part of the ARCS model is Keller's claim that relevance can not only come from *what* is taught, but also from *how* it is taught. For example, people with a high need for affiliation will perceive relevance in group projects. Others support this claim. Curiosity, creativity, and higher-order thinking are stimulated by relevant, authentic tasks of optimal difficulty and novelty for each student, according to Wagner (1998).

There are three basic methods for providing relevance:

- Familiarity
  Adapt instruction, use concrete language, use examples and concepts that are related to the learner's experience and values to help them integrate new knowledge.
- Goal Orientation
  Provide statements or examples that present the objectives and utility of the instruction, and either present goals for accomplishment or have the learner define them.
- Motive Matching
  Adapt by using teaching strategies that match the motive profiles of the students.

Confidence – Expectancy for success. Locus of control plays an important part here. Does the learner believe s/he is responsible for learning success (internal locus), or is s/he a helpless pawn in the learning environment (external locus)? People with an internal locus of control tend to attribute success to effort. People with an external locus look to luck or the difficulty of the task for determination of success. In his discussion of fear of failure people, Travers (1982) provides further validation for Keller's argument that confidence is a motivational factor in instruction. Fear of failure people will accept the risk if the odds of success are either very good or very poor. Very poor chance failures can be blamed on outside factors. Success-oriented people will accept middle-of-the-road risks and avoid the high and low-risk situations. Low risks offer too little challenge, whereas high risks are too chancy.

There are three ways of building confidence in the learner:

- Expectancy for Success
  Make learners aware of performance requirements and evaluative criteria.
- Challenge Setting
  Provide multiple achievement levels that allow learners to set personal goals or standards of accomplishment, and performance opportunities that allow them to experience success.
- Attribution Molding
  Provide feedback that supports student ability and effort as the determinants of success.

Satisfaction – How good do people feel about their accomplishments? Keller claims this category involves the normal reinforcements for work well done, but also contends with issues of learner control. If a student must accomplish a goal to get a teacher-derived reward as opposed to an already-existing intrinsically satisfying reward, control of the learning situation is lost to the student. In these cases, learning satisfaction actually decreases. Malone (1981) certainly concurs with this statement, as do other researchers (see Zimbardo, 1969, and Lepper & Greene, 1979).

There are thee ways of enhancing satisfaction:

- Natural Consequences
  Provide opportunities to use newly acquired knowledge or skill in a real or simulated setting.
- Positive Consequences
  Provide feedback and reinforcements that will sustain the desired behavior.
- Equity
  Maintain consistent standards and consequences for task accomplishment.

The Keller ARCS Model also includes a design process that concerns itself with analyzing audience motivation, preparing motivational objectives and instructional elements, and assessment of motivational outcomes.

How applicable is the ARCS model to online learning environments? Arnone, and Small (1999), implicitly support the ARCS model in their description of motivational factors in educational web sites. Web sites must be:

- Engaging and stimulating - captures and maintains interest
- Useful and Credible - elements that add value and promote relevance
- Organized and Easy to Use - navigation, user control, help mechanisms
- Satisfying and Effective - opportunities for interaction, exploration, fun, and building competence

Time Continuum Model of Motivation

Raymond J. Wlodkowski has devoted a great deal of thought to motivation and the adult learner. In general, he believes one should look for four aspects in any instruction (Wlodkowski, 1989):

- Value – Is the learning important?
- Appeal – How stimulating is the learning?
- Perseverance – How well do students maintain their involvement? Are other environmental factors clamoring for attention? Perseverance is greater when these distractions can be blocked out (Heckhausen, 1991). Lewin's Theory of Systems Under Tension (Wlodkowski, 1989) supports this idea, as do certain interpretations of the Yerks-Dodson law. Atkinson and Birch's Dynamic Action Theory (1970) claims that in a given point in time, there are many incomplete actions the individual needs to complete. All are scrambling for priority. This can cause a breakdown in perseverance.
- Continuing motivation – Using what was learned outside the learning experience. This can be tied to enhancing retention and transfer – showing students how to do this, at least initially.

While motivation is one of these four aspects, it is not as clearly defined as it is in his Time Continuum Model of Motivation:

Time Continuum Model of Motivation (Wlodkowski, 1985)

- Before Instruction
  - Attitude
  - Need
- During Instruction
  - Stimulation
  - Affect
- After Instruction
  - Competence
  - Reinforcement

Positive attitudes are established by clearly stating the goals of the course, using clear examples, and stating the criteria for evaluation. Adult learner needs are addressed by reducing or removing environmental components that lead to failure. Chances are provided to practice using a newly acquired skill or piece of knowledge before it is assessed. Assistance should always be available.

Most adult learners at the beginning of a learning sequence will ask "Do I need it?" and "What do I think of it?" These internal needs and attitudes interact with the stimulation and affective processes that occur during instruction.

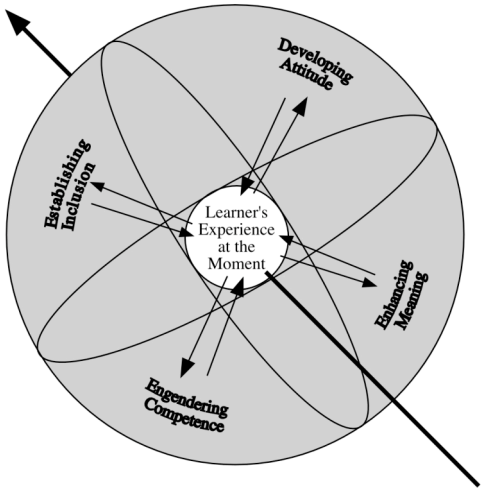
To maintain learner attention, provide a variety of activities and different presentation techniques that stimulate the learner. Make sure the learner is an active participant in the learning process. To maintain positive attitudes, utilize cooperative goal and learning structures to maximize cohesiveness in the learning group. By maintaining learner attention and a positive attitude, the learner's effort to continue learning is maintained.

Increase learner competence by making the learner aware of progress towards goals via positive feedback. Include the progress towards mastery and demonstrate how the learner is responsible for his/her own learning. This reinforcement provides a strong motivational influence for continued/future learning.

The Motivational Framework for Culturally Responsive Teaching

Wlodkowski (1999) has developed another framework for examining and fostering motivation (see Figure 1). The Motivational Framework for Culturally Responsive Teaching is the blending of his earlier work and his attempt to integrate cultural sensitivity into the teaching process.

Figure 1 - The Motivational Framework for Culturally Responsive Teaching



This framework has four essential components:

1. *Establish inclusion* by creating a feeling of respect and connectivity between teachers and students.

2. *Develop attitude* by ensuring personal relevance and choice.

3. *Enhance meaning* by creating challenging experiences that include learner's values and perspectives.

4. *Engender competence* by creating an understanding that learners will learn about something that they want to learn about.

Wlodkowski describes 60 motivational strategies under these four categories that one can use to ensure motivation in virtually any learning situation. Some of these strategies are referenced in the next section, where models are compared and contrasted.

Taxonomy of Intrinsic Motivations for Learning

The Taxonomy of Intrinsic Motivations for Learning was developed by Thomas W. Malone and Mark R. Lepper (1988). It is based on theoretical discussions on motivation both authors previously developed. The taxonomy is divided into two sections.

I. Individual Motivations
- A. Challenge
  - A.1. Goals
  - A.2. Uncertain Outcomes
  - A.3. Performance Feedback
  - A.4. Self-esteem

B. Curiosity
    B.1. Sensory Curiosity
    B.2. Cognitive Curiosity
C. Control
    C.1. Contingency
    C.2. Choice
    C.3. Power
D. Fantasy
    D.1. Emotional Aspects
    D.2. Cognitive Aspects
    D.3. Endogenity

II. Interpersonal Motivations
A. Cooperation
B. Competition
C. Recognition

Malone and Lepper's Taxonomy is loosely based on several cognitive theories of motivation. Each aspect of their taxonomy is described below.

Challenge – Activities that provide an optimal level of challenge – neither too difficult or too easy. This is supported by the Yerks-Dodson Law, Lewin's Theory of Systems Under Tension (Wlodkowski, 1989), and Atkinson and Birch's Dynamic Action Theory (1970). Vgotsky's (1978) Zone of Proximal Development suggests that there is a learning threshold in any individual that cannot be passed without external intervention. It could be argued that the external intervention necessary to pass this threshold should be constructed to provide an optimal level of challenge to the learner. Reiber (1992) argues this approach for the design of educational microworlds, but the same should hold true for any learning environment.

Stating an explicit goal is important in a traditional environment. Ausubel's (1968) theory of advanced organizers supports this concept. For environments that may not have explicit goals, such as open-ended learning environments or open-ended case studies, emergent goals can be generated by the learners themselves (Malone & Lepper, 1988).

An uncertain outcome is desirable to make the learning environment challenging. Malone & Lepper (1988) suggest this can be accomplished by varying the difficulty levels of the instruction, establishing multiple levels of goals (i.e., varying time constraints), providing incomplete information and making the learner seek out the missing elements, and applying randomness where possible (i.e., varying the room size when calculating the amount of paint needed to paint the room).

Performance feedback that is frequent, clear, constructive, and encouraging (building self-esteem) is required to make instruction intrinsically motivating. Numerous studies on feedback support these assumptions.

Curiosity – Sensory curiosity occurs when changes in light, sound, smell, etc. occur and one attends to that change. Special effects, such as zooming in, etc. all fall under this category. One use of sensory curiosity is for gaining attention. Cognitive curiosity can be stimulated by an incompleteness in the learning environment, an inconsistency, or an unparsimonious event.

Control – Control plays an important part in motivation, according to Malone and Lepper (1988). Learners will seek control of their learning environment. Knowles (1980) concurs with this statement, explaining that as a person matures, s/he moves from dependency to increasing self-directedness. When a learner makes a choice or takes an action, the result must be contingent upon that choice or action. Also, the learner must be able to make a reasonable amount of choices and not be straitjacketed into one learning path. Finally, the learner must perceive that s/he has power over the learning environment, which is demonstrated both through overt contingent responses to actions and the ability to make choices.

Fantasy – Fantasy is a category unique to the Malone and Lepper Taxonomy. In a fantasy environment, mental images of physical or social situations not actually present are evoked. A role-playing game might fall under the fantasy category, as might a case study. From an emotional standpoint, fantasies can help one to experience power, success, fame, and fortune. For a fantasy to fulfill an emotional need, the learner probably needs to identify with the character(s) in the fantasy. Thus, a case study that contains a person or persons similar to the learner will probably evoke a string emotional response and be more interesting (and motivating) to the learner.

Fantasies may also help a learner to relate new learning to past experience. For example, using a dartboard simulation (or fantasy), something the learner is familiar with, the rules of physics can be explored in a way that makes sense to the learner.

Finally, fantasies where the skills to be learned and the fantasy itself are tied together in an endogenous relationship are believed to be more motivational. Such fantasies may provide for a state of flow. Such a state of flow must qualify as an optimally motivating experience. Flow is discussed in more detail in the following section.

The second part of Malone and Lepper's Taxonomy deals with interpersonal motivations. They believe that cooperation and competition are equally important and should be used appropriately. Also, a learner's achievement should be made available to other people, so the need for recognition in the individual is satisfied.

Comparison of Motivational Models/Frameworks

To illustrate some broad generalizations one can make about integrating motivational constructs into the instructional design process, the four models/frameworks discussed previously will provide the foundation for comparison and contrast of different motivational aspects (see Table 1). Although there are many more motivational theories that could be considered here, only the four models/frameworks described above will be

used, for they represent a serious attempt to bring theory into practice; an important process for instructional designers. This comparison is done at a surface level; providing a point-for-point, in-depth comparison is beyond the scope of this article.

Table 1 - Comparison of Four Models Concerning Motivation

ARCS (Keller)	Time Continuum (Wlodkowski)	Culturally Responsive Teaching (Wlodkowski)	Taxonomy of Intrinsic Motivation (Malone & Lepper)
• Attention – Obtaining and sustaining	• Appeal – How stimulating is the learning? • Provide a variety of activities and different presentation techniques.		• Provide optimally-challenging activities. • Change sensory conditions to arouse curiosity.
• Relevance – Meet the needs of the learners. • State goals.	• Value – Is the learning important? • State goals. • Continuing motivation – Use what the was learned outside the learning experience.	• Establish the relationship of instruction to learner's lives. • State goals. • Create an understanding that learners will learn about something that they want to learn about. • Develop attitude by ensuring personal relevance and choice.	• State goals or allow goals to emerge.
• Confidence – Develop an expectancy for success.	• Use clear examples. • State criteria for evaluation. • Provide performance feedback. • Reduce or remove failure-causing components.	• Establish inclusion of learner with teachers and other students. • Indicate and demonstrate your commitment to helping students learn. • Clearly state the rules and procedures of the class/course.	• Provide an optimal level of challenge. • Provide performance feedback.
• Satisfaction – How good do people feel about their accomplishments? • Give learners control over reaching goals that are intrinsically motivating.		• Enhance meaning by creating challenging experiences that include learner's values and perspectives.	• Provide control over the learning environment
			• Use fantasy to help the student experience power, success, fame, and fortune. Also helps learners relate new learning to a past experience.

As presented in this table, the four models/frameworks have a great deal of overlap. While semantics may differ and the degree of detail change, all models concur that getting and sustaining attention, relevance, competence, and satisfaction are important motivational constructs (as per the ARCS model). This is not to say the other models/frameworks are not unique and should be discarded. Each model presents unique insights that may not be apparent in the brief overview provided. Malone and Lepper's Taxonomy, for example, discuss fantasy in great detail. This is an unknown component in all other models.

The Importance of Flow

In addition to several strong models/taxonomies concerning motivation and learning, the concept of flow must be examined. Flow is a term coined by M. Csikszentmihalyi (1990). It is a merging of the learners total attention with the task at hand such that all other sensory and cognitive distractions are invisible to the learner. In these cases, the learner's attention is totally on the learning environment and it is very difficult to distract him/her. The learner is unaware of time passing, and may later remark on this. Flow may be described as an optimal motivating experience, where the learner is so immersed in his/her learning that everything except the learning environment conceptually disappears for a time.

Is flow possible to create in an online distance learning environment? Jones (1998) contends that it is possible to do so in educational games. He outlines eight criteria a learner must experience to achieve flow (see Table 2). As these criteria are broadly based, these are easily adopted to online distance learning environments:

Table 2 - Elements of Flow

Criteria	Method
1. Task can be completed.	Scaffolded tasks that rest within the Zone of Proximal Development.
2. Learners can concentrate on task.	Reduce cognitive load on environmental operations and low-level cognitive tasks.
3. Task has clear goals.	Provide problems that are relevant to the learner and the content.
4. Task provides immediate feedback.	Environment is responsive to user interactions and reacts accordingly. Actions that are deemed positive by the designer are positively reinforced. Actions that are deemed negative by the designer are negatively reinforced.
5. Deep (losing awareness of real environment & loss of real-world concerns) but effortless involvement in task.	Relevance of task, smooth integration of tools and manipulation mechanisms into the environment, perception of moving towards a desired goal state.
6. Learners exercise a sense of control over	Learner control of the environment. Ability

their actions.	to navigate to a desired location. Ability to change the environment and see the results.
7. Concern for self disappears during flow, but sense of self is stronger after flow activity.	Achievable goals. Tasks within the Zone of Proximal Development. Eliminate personal "danger."
8. Sense of time is altered.	Tasks and information must flow smoothly from one to the other. There can be no disjointed experiences, such as stopping to figure out what a particular button does in the middle of a task.

Thus, instructional designers do have several sound models/taxonomies and theories they can use as frameworks to develop online distance learning instruction that is inherently motivating. In addition to these proactive frameworks, designers also need to look at motivational barriers in online learning environments and reduce and/or eliminate these barriers.

Barriers to Motivation in an Online Learning Environment

Three current motivational barriers in an online learning environment are isolation, frustration, and academic persistence. Instructional designers need to eliminate these barriers as much as possible.

Students in online learning environments often feel isolated from their peers and instructors (Hara & Kling, 1999, Cookson, 1990). Every effort must be made in the design of these environments to enhance student-student and student-instructor communication. Students need to know exactly what is required of them. They also need timely feedback on assignments and clarification requests.

Students can easily become frustrated in online environments (Hara & Kling, 1999). Some conditions that lead to frustration, such as lack of access and technological frailty, are beyond the direct control of the designer. Other issues, such as low technological literacy and/or self-management skills, must be addressed in the identification of prerequisite skills for the instruction. Under direct control of the designer is the amount of information and assignments that must be generated by the online learner. Hara & Kling (1999) contend that, at least in initial parts of courses, students in online learning environments should have reduced content loads, so they can adjust and adapt to the (to them) new environment. Simple tasks should lead to complex tasks to accommodate this (Mory, Gambill, & Browning, 1998). As an example of a prerequisite skill, Jegede, Taplin, Fan, Chan, & Yum (1999) contend that online learners must have excellent time management skills to succeed. Other skills, such as cooperative learning and active reading, also seem quite important to online learning success, and should be carefully considered by the designer as possible prerequisites. Finally, some students may not like the public exposure online environments can bring to any product or thought they post online. This is an issue that must be resolved between the designer and the instructor.

Another area of concern in distance education for adults is academic persistence, or motivation to continue a course. A great deal of study has investigated why people do not finish a distance education course (Gibson, 1996). Moore & Kearsley (1996) report that traditionally a dropout rate of 30 to 50 percent in distance education courses was common, but this figure is now nearer the lower edge of that range. Learner persistence is often affected by the learning and personal environment of the learner. Job and domestic pressure, and courses perceived as too difficult also contribute to dropout rates (Cookson, 1990). While a designer cannot predict or account for job and domestic pressures, as mentioned previously it may be possible to scaffold tasks in such a way that courses are not perceived as too difficult to complete.

Conclusion

This paper investigated motivation and its relationship to learning environments, with the purpose of supplying instructional designers some guidelines in this area. Authors and models that have specifically considered online environments in relationship to motivation were also examined. Models, frameworks, and taxonomies for proactively integrating motivational constructs into instruction do exist, and should be used when designing instruction for online learning. While these models, frameworks, and taxonomies rest on a fairly sound related educational theory research base, in truth very little direct empirical evidence exists to support most of them. In addition to these proactive models, barriers to motivation are exist as well. It is possible for the instruction designer to address some, but not all of these barriers.

Several themes emerged from the review of the literature for this article:

- Capturing and sustaining the learner's attention is a key motivational need. The materials must be appealing and be presented in a variety of ways. This will arouse sensory curiosity. Activities should be challenging but not too difficult to accomplish.

- The learners must perceive the relevance and importance of the instruction to their needs. Clearly stated goals will help accomplish relevance, for they allow the student to understand what is expected of them. Integrate the learner's prior learning and life experiences into instruction wherever possible.

- Learner confidence can be developed by using clear rules and procedures, clear learning examples, clear feedback, and ensuring a "safe" learning environment, where challenge is optimal for each learner, and failures are anticipated in advance and accounted for in the instruction. The teacher should attempt to develop a bond with the learners so they know the teacher will be there for them in difficult times.

- Make the learning experience a satisfying one. In addition to providing challenging experiences that include learner's values and perspectives, give

learners some control over their own learning. Control is important to the student. While some (Clark, 1982; Steinberg, 1977, 1989) argue that learner control is not desirable because learners usually don't think about what they don't know and are thus poor judges what they need, this must be balanced with the adult learner's need to maintain control of his or her learning situation.

- Use fantasies to enhance a student's satisfaction with the instruction, to boost self-esteem, and to provide ties to past experiences.

- As much as possible, enhance the conditions for flow to occur. Attempt to develop an environment that engages the learner to the point where outside stimulation is ignored, an environment that is perceived as "real" to the learner.

The models and barriers described above, and the resulting discussion demonstrates the clear need for more research on motivational constructs. What works, with what audience, under what conditions? Even though these models/frameworks (largely) rest upon accepted motivational theories, there is precious little quantitative or qualitative data to support any of the assumptions they make. Thus, instructional designers following these models/frameworks should proceed with caution, when incorporating motivational constructs within developed instruction.

It is apparent that a great many areas and theories concerning motivation exist. While individually these theories may account for a portion of the true picture of motivation, in reality it is difficult to separate these items out, examine them individually, and draw valid conclusions about them. In reality, it is possible that these various theories of motivation interact with one another, perhaps supporting each other in an individual, perhaps canceling each other out. What can be stated with some certainty is that motivation may be unique to each individual. This logically leads to the concept of a learning environment that adapts to the learner's motivations. The concept of instructional adaptability is not new, but perhaps motivation should also be considered in the still-developing models that do exist. Online learning environments and games hold the potential to become this type of environment.

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