

DESIGNING MOTIVATIONAL LEARNING SYSTEMS IN DISTANCE EDUCATION

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ABSTRACT

The designing of instruction, when considered as a process, is the determination of instructional requirements of the learner and development of functional learning systems in order to meet these requirements. In fact, as a consequence of studies on the development of effective learning systems some instructional design theories have emerged. Among these theories the motivational design theory points out that instructional processes are required to be configured with the strategies which increases the attention, relevance, confidence and satisfaction of the students for an instructional design which ensures the continuity of learning motivation.

The studies indicate that the systems which are developed on the basis of mentioned strategies raise the attention of the student during instruction, develop a relevance to the students' requirements, create a positive expectation for success and help having a satisfaction by reinforcing success. In this article, the empirical studies related with this subject and the suggestions for presenting more effective motivational instructional designs in distance learning are summarized.

Keywords: Motivational design theory, the ARCS model, Distance education.

INTRODUCTION

The learning environments have comparatively enlarged thanks to technology. As learning environments have enlarged, the educators have come face to face with two major phenomena. The first of them is novelty effect of the new technology and attractiveness of the new technology in providing with effective, efficient and interesting learning opportunities which exist in its potential capacity. The second of them is the fact that mankind has still been having the same motivational requirements since his/her existence.

The problems of motivation and/or instructional design can be experienced in distance education and in the other web-based learning environments.

In this article, first of all, major characteristics and problems about the motivation of distance education students are defined. Secondly, main categories of motivational design theory, motivational design process in distance education and finally samples of empirical studies attach importance to motivational design in distance education are summarized.

STUDENT PROFILE IN DISTANCE EDUCATION

Distance Education Students register a distance education program for various reasons such as for promotion in their careers, acquiring a second chance for university education, updating their knowledge, willing to overcome the geographical and physical obstacles (Willis, 1993). A great many of the distance education students are adults who have jobs and families.

Therefore they have to organize their time in their lives for their families, jobs, their free time and study hours for lessons.

The students generally feel lonely in distance education. The lack of communication and competition with the other students affect the students' motivations. The other problem as important as this problem is the student's obligation of researching into internet and other sources of knowledge for taking his/her own learning responsibility and internalizing these knowledge. This fact can cause a restriction for the students who can not take their own learning responsibilities.

Distance education students are enthusiastic for this learning environment because of the suitability that they expected and individual control degree. Besides, the existence of some problems can be clearly observed because of the high non-completion rate (Scalese, 2001). The students complain about the lack of instant support, guidance and incentives although it is known that their isolated state requires more support than the students in normal conditions (Keller, 1999).

The students in distance education do not have the same background as their teachers. These students have come from different social, cultural, economic and family characters. Therefore developing a close interaction between student-teacher can take long time. Besides, the students can feel uneasy during the learning period because of the lack of face-to-face communication (Scalese, 2001).

In literature, motivation is pointed out as one of the major reasons of these problems. This can be accepted true, but the quality of instructional design is also an important factor. When considered as a process, instructional design is the determination of educational requirements of the learner and the development of functional learning systems in order to meet these requirements. Thus, as a result of the studies on the development of effective learning systems, several instructional design theories have emerged.

Motivational Design Theory asserts that instructional material should be configured with the strategies which increase the attention, relevance, confidence and satisfaction of the students for a instructional design which ensures the continuity of learning motivation (Keller, 1983; Keller & Kopp, 1987).According to Keller, the goal of the many instructional design theories that have been developed is providing an effective and efficient instruction. However, in these theories the aspect of motivation has been generally ignored. Whereas motivation has to be essence of learning.

Motivation is individual's willing to perform required behaviours in order to attain his/her goals. According to motivational design theory, in order to create an effective, efficient and attractive instructional design, the elements of motivation which are handled in four categories have to be understood well. The following are these categories:

- Attention,
- Relevance,
- Confidence and
- Satisfaction.

The model which consists of the capital letters of these categories is known shortly as the ARCS Model.

The first step of motivation is acquiring the *attention* of the student during the instruction period and ensuring its continuity.

If the content that will be taught is not *relevant* with the requirements of the student or the state he/she is in, it will be difficult for the students, the curiosity of whom is stimulated, to preserve their interests and curiosities. *Confidence* is the student's developing positive expectation in order to perform a high degree of success. If the student loses his/her confidence, it will become quite difficult for him/her to attain success. The last element of the ARCS Model is *satisfaction*.

Motivation in high degrees is realized as a result of the satisfaction that the student get from instruction. If the student observes that his/her success is not reinforced according to the natural difficulty level that the instruction includes, he/she will feel unsatisfied.

The most important contribution of Keller's motivational design to the field of instruction is not only in this model motivational elements are determined and are classified, but also instructional strategies related to every category and sub-categories are given. In this way, it becomes rather easy to use the model in the field of instruction. Moreover, learner characteristics can be defined in every sub-category in order to be able to develop learners' motivational qualities (Keller & Suzuki, 1988). Based on the learner characteristics, motivational quality of instruction can be enhanced with the instructional methods suitable to learners' motivational qualities. Each factor of the ARCS Model has three elements, which Keller (1987) delineates. First, *Attention* includes

- perceptual arousal: use of strategies to gain initial interest;
- inquiry arousal-use of problem-solving, questioning, a sense of mystery and progressive disclosure to increase interest;
- Variability-use of variety (lecture with visuals, group activity, or game) for a change of pace.

Various studies have indicated that variability, unexpected events, curiosity and incompatible situations stimulate attention.

The strategies such as trying different methods in instruction, using different presentation styles, answering students' questions with a different (even misleading) opinion, choosing different examples and drills related with the subject can help the attention of students last all through the lesson by providing variability.

Naime-Diefenbach (1991) also states that the students who have completed a lesson that includes increased attention strategies have acquired higher success points than the control group.

Second, *Relevance*, which is the concept of linking the content to the learner's needs and wants, includes:

- **goal orientation**, which may mean outcome of learning such as obtaining a job, reward, etc. or may imply the means of learning;
- **motive matching** involves the learner's choices about strategies of learning, such as by group interaction, competition, or individual work;
- **familiarity or connect** to what one already believes and understands such as realistic graphics, people's names, personal learning experiences.

Newby (1991) has found out a significant positive correlation between relevance strategies and on-task behaviors in a study which he has applied on totally 30 first year elementary school teachers. Each teacher used several motivating strategies (concerning getting attention, emphasizing relevance, building confidence, and imposing rewards and punishments).

In another study, relevance strategies have been effective on increasing the students' motivational perceptions (Nwagbara, 1993).

The students perceive the subjects as more familiar to them by the usage of stories or pictures of the people and objects that they accept as familiar. Giving the examples are from daily life or close neighborhood help connecting them to real life. The usage of personalized language while communicating has also an importance for the student.

Keller ve Suzuki (1988) suggest using pronouns, student names and graphics for the new concepts to be understood.

Third, *Confidence*, which provides a sense of self worth and success ability in challenging tasks, involves strategies to:

- **provide learning requirements** in the form of clear objectives;
- **provide success opportunities** early and often enough to establish the learner's belief in his or her ability to achieve.
- **provide personal control** over the learning with choices of content, objectives and activities. This relates success to one's choices and effort.

The students have to believe that they will be successful. This doesn't mean making the success certain. However, it is required that the individual takes his/her chance and tests his/her capacity in learning new behaviors.

In such occasions, the individual gains knowledge about his/her own limits. The increase of expectations on success generally depends on the increase of experiences about success.

Fourth, *Satisfaction* includes strategies to:

- **increase the natural consequences** for use of the content, simulations, projects, real-life activity;
- **provide positive consequences**: both intrinsic and extrinsic rewards;
- **assure equity of rewards** so that they match achievements.

ARCS DESIGN PROCESS

The ARCS model contains design process with ten steps for the development motivational learning systems in the cases of work and learning settings (Figure: 1).

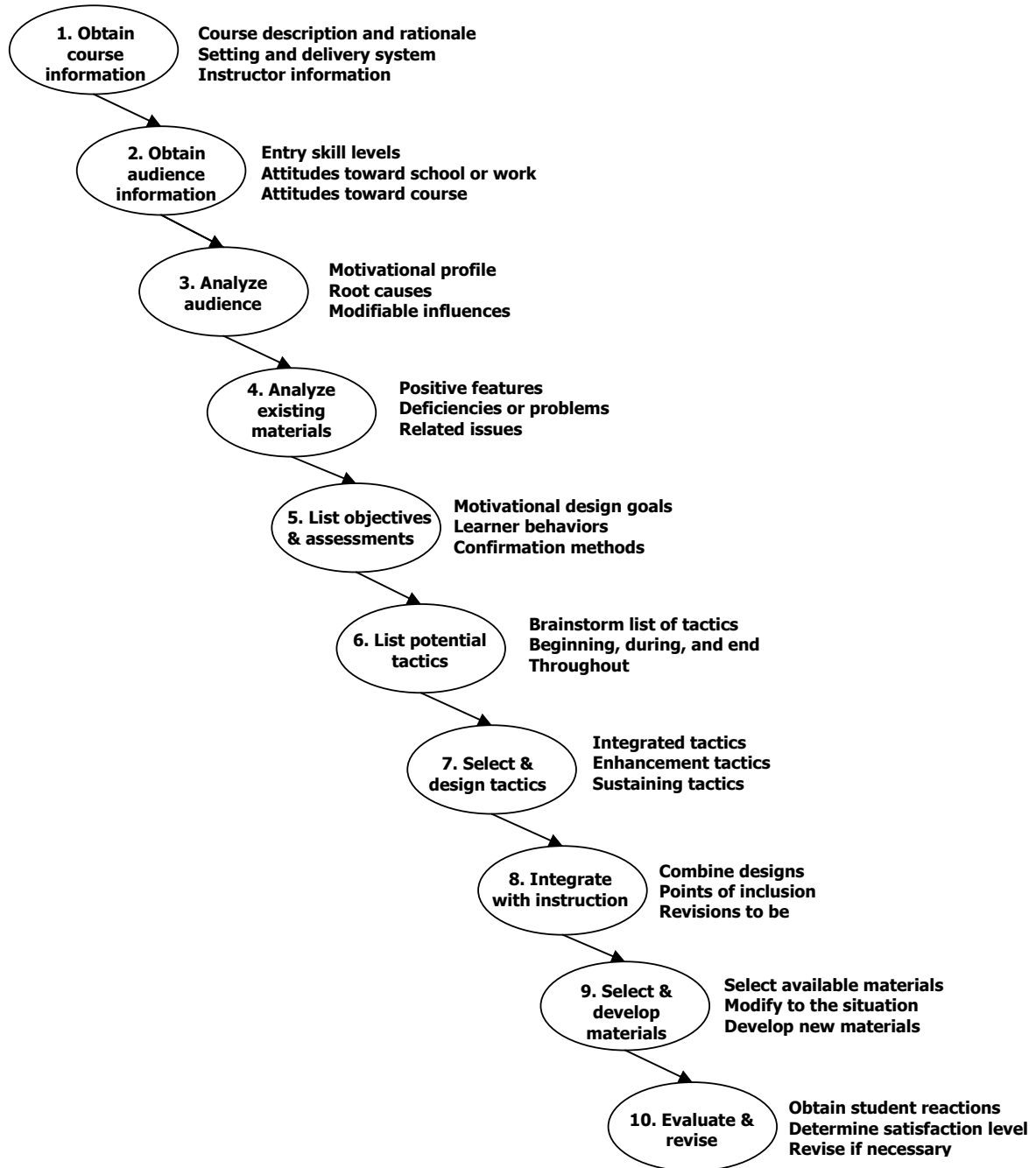


Figure: 1
Steps in Motivational Design (Keller, 1999)

The first two steps including all the elements of analysis of the process produce knowledge about the case; and the third and fourth steps provides a base for the analysis of gaps that is made and their effects. On the basis of these analysis, goals about the ways of evaluation of the performance development processes are prepared on the fifth step. After that, there are also two steps about the design. The sixth step includes brainstorming for creating possible solutions from every motivational category. The seventh step is a more analytic step which aims at choosing solutions which suit best to the time, resources and other factors according to the existing conditions. The final step involves both the development and evaluation.

As in any systematic design process, the development of motivational learning system also begins with collecting information (Figure 1, Step 1 and 2) and continues with analysis (Step 3 and 4).

These steps define motivational properties that direct the goals and also the gaps. Two difficulties that are encountered during this process are determining the degree and nature of a motivational problem. The first concerns the problems that result in the symptoms of the lack of motivation and they may not be caused by motivational reasons.

The reason of the lack of motivation in the individuals may actually be lack of capacity or problems of opportunity. For example, some individuals may develop low expectations for success by thinking that they will never reach a satisfying result. The source of the problem in this example is lack of skills.

The second difficulty in identifying a problem related with motivation arises from the nature of the motivation. There is a reverse U relation between motivation and performance (Keller, 1987; Keller, 1999). When motivation increases, performance also increases, but this increase continues until an optimal point is reached. Afterwards, while motivation increases by a certain degree, performance begins to decrease by the inducement of excessive stress. In short, certain level of anxiety and stress always accompany motivation.

When a problem of motivation is determined, first of all it is classified according to the four categories that are defined before and for every situation how much the students get motivated at each category is determined. For example, in the category of attention because the individuals do not pay attention since they get bored, lack of motivation can be seen or he/she may study more than normal level by thinking that it is a good opportunity of learning.

In the design of motivational learning systems (Steps 6-8), the best alternative is studying on the problems that are specifically defined. These requirements are specified. After a specific problem is chosen to be worked out, the first task to be done on the first step of the design (Step 6) is to put forth the probable solutions through brainstorming. At this point, all the probable ways of solution should be listed by not checking whether they are appropriate or not. The aim is to produce ideas as many as possible as in any process of brainstorming.

The second task is (Step 7), to define the appropriate solution by not paying attention to the restraints. The appropriate solution can be configured from the several specific suggestion that comes up during the process of brainstorming. The important thing at this step is not to worry about the cost, organizational politics or other restraining factors that prevents the appropriate solution.

Later at the eighth step, the most applicable strategies among the ones that are listed at the seventh step are chosen and placed in the motivational learning system. The aim of implementing this multi-level process is to encourage the designer about guessing what will happen in the future. All the possible solutions which seem very appropriate at first are put forth. In this way, instead of the first solution which is found at the beginning through a narrow perspective, applicable and better solutions can be produced.

The development and evaluation of the solutions that are formed at ninth and tenth step follow the same process as the course that can be used in any other field of the practice. At these steps, preparation of the task plans, development and revision of materials and making the preparations of practice are required. As in any effective system development activity, it is important to combine motivational strategies with other elements of system in a sound way. For example, if the strategies like case study which is given at the beginning of the lesson do not meet the requirements of the learner and do not help the preparation of the goals, they can be completely waste of time. The evaluation of the learner provides knowledge about the effectiveness of the strategies.

The development and application of motivational learning systems is also like in basic instructional design model. During the development step, it is required to choose the materials that will be used in instructional and to adapt (Step 9) these materials according to the motivational learning principles. Instead of the adaptation of materials according to the situation, the development of new materials can be considered as another alternative. During the development step, shortly the decisions which are taken during the design step are tried to be applied. The learning environment at the application step has great significance for the learner. Both the learning environment and the instructors are prepared for the motivational learning system.

Pedagogical activities are planned and applied in order to reach certain goals. At the evaluation step which is the final step, the four steps that have been developed are evaluated in terms of time and success. For ensuring benefits that are expected, meeting the requirements and materializing the goals in motivational learning systems, it is required that the students who have attended to the activities should be successful. By observing the reactions of the students towards instruction, the level of their satisfaction is examined. If there is any insufficiency, necessary corrections are made. Ultimately, the level of effectiveness, efficiency and attractiveness of the motivational learning system is tried to be determined.

Designing process is a comprehensive and an effective period, however it has two restraining factors. First, the individual who has designed the motivational learning system should have some knowledge about the four categories and various motivational factors that are represented by all the sub-categories of these four categories. Secondly, during the process of motivational learning system design, it takes so much time applying all the steps. In the situations when there is a serious testing of motivational capability or when a lesson has a very important motivational effectiveness, to follow the ten-step process that is mentioned will be the best alternative. However, in many cases the conditions that are mentioned are not formed. For the instructors or instructional designers who have very little or no knowledge about the motivational concepts and principles, a simplified approach can ensure a better outcome.

APPLICATIONS IN DISTANCE LEARNING

There are very significant motivational difficulties for the distance education students. The ratio of dropout the program can by itself be a sign of the problems originating from motivation. The interpretations of the students often indicate feeling of loneliness that they do not go forward purposefully; problems of time and that they have doubts about completing the program together with other responsibilities (Keller, 1999).

Visser (1998) used a simplified version of ARCS model design in the analysis of the learner, conditions, and potential solutions. The study is limited with the traditional distance education lesson which generally makes use of textual material but is also sometimes supported by audio or video cassettes. In this lesson in which various methods used together the effectiveness of teacher-student interaction as a motivational strategy has been taken into consideration. The teacher sent the student expressions of encouragement and empathy, reminder, suggestion and appropriate messages related with the content periodically. To focus on the students and to raise their motivation created positive results on the teacher's academic successes.

The simplified designing process shown in the Table: 1 used in designing these messages. The designing factors that are in the first two rows include the attitude of the students towards distance learning in general before the lessons and during the lessons. The answers that the designers will give to these questions are significant for the learner. The designing factor in the third row indicates the attitudes of the student towards the course content and the fourth row indicates the attitudes of the student towards the support that he/she has been given during the course. The fifth row presents a summary of the elements in the other four rows.

Table: 1
Mini design for the development of motivational messages
in distance education courses (Keller, 1999)

DESIGN FACTORS	ARCS CATEGORIES			
	Attention	Relevance	Confidence	Satisfaction
Precourse attitudes of students toward distance learning	New students: strong in the beginning (new materials/new topic), gradually diminishing as novelty washes off. Probably low level of attention for repeaters.	Decision to take the course is, most of the time, voluntary, not imposed. No big problems expected in relevance. May improve as learners apply what they have learned, or decrease if not what was expected.	A very sensitive area as the mode of instruction is new and unfamiliar. Generally satisfactory for experienced and successful distance education learners. Repeaters anxious about pitfalls; newcomers uncertain. Also, there is no peer support.	Successful completion of the course is an important step in the direction of a degree.
Midterm attitudes toward distance learning	Initially high attention and curiosity wear off as courses are often not really exciting and sometimes even boring.	Continues to provide an interesting possibility to make a career move or to show what has been learned. Time conflicts with other activities occur.	If they are confident in the beginning this wears off. Evaluation system is not very encouraging. No motivational support included in course. Very low level of confidence for beginners.	Reasonable, but dissatisfaction sometimes sets in. Both repeaters and new students soon disappointed about the limited interaction and about studying in isolation.

Student reactions to this course content	Initially high, but soon decreases due to lack of novelty and variation in content and learning strategies.	Course content is relevant, but too little interactivity to help students learn how to apply it. Some material is outdated.	Confidence that it can be done soon fades due to volume of work, lack of support, and lack of opportunity to see growth and application	Remains reasonable
Characteristics of student support during the course	Minimal, only contact is through feedback on assignments. Nothing unusual or unexpected happens.	Feedback is usually limited strictly to course content. No creative feedback to show connections to students.	Feedback is mostly worded in a positive way, but occasionally too general	Low because of lack of meaningful and personal contact.
Summary	Initial attention is soon slipping	Relevance usually continues through the course, although it becomes less important	Confidence depends heavily on results, but is generally low. This area needs extensive motivational treatment	Satisfaction is not a big problem, or would not be if the other issues were resolved.
Examples of motivational tactics to be used in motivational messages	Bring pacing into the course and offer tutor's assistance. Use student's name and include personal comments in feedback messages. Provide an unexpected communication to students from time to time.	Provide occasional extra material such as a publication. Provide creative feedback and link feedback to learner's work and daily circumstances.	Emphasize that they can do it if effort is put into the course. Reassure the learners by showing personal interest and concern. Make them feel part of a group who are all struggling to get it done. Show empathy. Provide encouragement and personal challenges at times that are known to be "low points" in the term.	Make turn-around time for assignments short. Ensure that tutors are accessible. Refer to positive feelings a learner will have when the course is completed successfully. Reward early completion through complimenting learners personally.

To assess the effectiveness of this intervention, she compared retention rates in the experimental section of the course to three other sections that did not receive motivational messages, and she did a qualitative review of student responses to various course evaluation and feedback instruments. She did not ask them directly about the effects of the motivational messages to avoid stimulating attitudes that may not have been present spontaneously in the students' minds. Improved retention rates of 70 to 80%, which are similar to conventional education, and student comments both offered clear support for the motivational messages.

Zumbach and Reimann (1999) discuss the relationship between problem-based learning (PBL) and computer supported collaborative argumentation (CSCA) in order to investigate how computer-based collaboration can be used to support PBL.

In addition, they provide an instructional model for combining PBL, CSCA and Keller's ARCS-model, which can serve as the conceptual basis for ongoing work on development and empirical testing.

Chyung (2001) presents a solution for the dropout problem in distance learning environment. The author suggests online interventions strategies based on the ARCS model. She implements the ARCS model as a guideline to conduct learner analysis and modify instruction to improve motivational appeal to individual learners in a distance learning environment.

Visser, Plomp, Arimault and Kuiper (2002) point that a great number of distance learning courses suffer from extremely low student completion rates compared to their traditional classroom. Authors regard motivational problems as a possible cause for the suffering. They describe the motivational problems that a representative group of international distance education students had as well as she suggests "a specific, low-cost motivational intervention" using the ARCS model that can enable instructors to effectively and efficiently support for students' motivation.

Based on the outcomes of the study it was found that: Motivational strategies improved the disposition of the learners to finish the course successfully; the number of learners successfully finishing the courses increased; collective messages were more cost efficient than personalized messages; there was no conclusive evidence that the use of personalized messages was more effective than the use of collective messages; the messages had a particularly strong impact on an improved level of self-confidence of the learners and the use of motivational strategies resulted in an enrichment of the student support system.

Schön, Hoffmann and Herczeg (2003) discuss the combination of instructional and narrative models for e-learning. This theoretical paper introduces issues and methods for combining instructional and narrative models for e-learning.

The authors incorporate the ARCS model as part of their study in pointing out that today's multimedia "is often reduced to the combining of different media elements. Analogous to a structure of a book the content is presented chapter by chapter. Various elements such as images, animations, and videos are embedded in text or each chapter, whereas dramaturgical structures or narrative concepts are not utilized." The goal of the project described here is "to convert the hierarchical learning structures of these courses into media-friendly and learner-friendly online learning modules....Digital storytelling concepts and corresponding, multimedia elements are combined to create an innovative narrative learning structure."

Keller and Suzuki (2004) discuss how a general model for motivational design, the ARCS model, can be applied in e-learning design. The authors state that, "Technology offers many innovative features that can be used to make instruction more appealing to learners. However, many of these features are interesting only because they are novel and may lose their appeal as learners become accustomed to them." They go on to point out that, "Overcoming these motivational challenges can be difficult because of the complexity of human motivation and the vast number of motivational concepts and theories that exist."

The results of these empirical studies have confirmed the validity of this model for the systematic design of motivationally enhanced instruction in e-learning settings with regard to lowering drop-out rates and other positive motivational outcomes.

Mills and Sorensen (2004) incorporate ARCS motivational design elements into the Kid's College™ 2004 educational software program. The paper specifically examines how the software program serves as an implementation of the Keller's ARCS motivational model of instruction. Kids College is a web-based learning program designed by Learning Through Sports, LLC. The program was developed to keep students engaged in the learning process by providing an interactive learning environment that utilizes sports-themed activities into the program.

The Kid's College program offers eight interactive sports activities that each contain hundreds of questions correlating to state standards in math, reading, and language at the grades K-8 level. The program serves as a resource focused on reinforcing skills taught in the classroom by providing a variety of practice opportunities for students.

Patronis (2005) conducts a case study that an online forum was used for interaction among learners in an online environment. In order to explore the interaction, the ARCS model was implemented. This study investigates the motivational forces and barriers to learners' motivation through the analyses of a series of data from questionnaires and students' feedback, which showed that online interaction can enhance learners' motivation and engagement in the learning process. Perrin (2005) argues that changes are necessary in pedagogy and ability to provide quality support for distance learning. From the statement "online experience is not necessarily better or worse than traditional classroom instruction, but it is different," this paper begins to focus on "the transition process for teacher, student, and the provider organization." It also discusses "best practices, standards, and creative approaches to teaching and learning." In addition, it suggests an instructional model that incorporates the ARCS model.

Kim and Keller (2008) investigate what kind of supportive information can be effective in improving the situation where there were severe motivational challenges. Motivational and volitional e-mail messages (MVEM) were constructed based on an integrated model of four theories and methods, which are Keller's ARCS model, Kuhl's action control theory, Gollwitzer's Rubicon model of motivation and volition, and Visser & Keller's strategy of motivational messages, and distributed with personal messages created based on learner analysis to a large undergraduate class. In order to examine the effects of the messages on motivation for the course, study habits (study time), and achievement (test grade), MVEM were sent to 30 students (Personal Message Group: PMG) with personal messages and to 71 students (Non-Personal Message Group: NonPMG) without personal messages. Results indicated that PMG showed a higher level of motivation, especially in regard to confidence, than NonPMG. Also, the mean test grade of PMG increased so that the initial difference of the test grade between the two groups significantly decreased. Although there was no difference between the two groups in study habits, the findings suggest that personal messages addressing specific individual problems raise the positive effects of MVEM constructed based on the integrated model.

CONCLUSION

Many studies have been made about the designing of motivational learning processes. One of the most important of them is the ARCS design.

Categories of attention, relevance, confidence and satisfaction of this design seek to find answers to the questions about the way motivational strategies are used in a teaching activity which aims at stimulating the learning motive of the students or continuing this motive. Distance education offers a very wide range of opportunities in the distribution and the usage of teaching. All these also include various motivational opportunities. Distance education programs in which both the elements of teaching and motivation are used together and whose design is made with care can improve the success of distance education student.

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