Integrating Instructional and Motivational Design

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ABSTRACT

Theories are used in instructional design to produce instruction that is effective and efficient. Learners, however, may not be drawn into instruction because it lacks relevance and appeal. Motivational design theory is used in concert with instructional theory to produce instruction that is both appealing and effective.

This paper describes how Keller’s motivational design theory can be integrated with Gagné’s instructional design theory and used by instructional developers and designers to carry out their work. Following a brief description of the two theories, the ties between motivation strategies and specific instructional events are demonstrated. An example is used to show how motivation strategies can be integrated with instructional events to produce instruction that appeals to learners.

Relating Instruction and Motivation

The design of instruction is concerned with setting forth the critical events that take place during instruction. Gagné’s (1985) events of instruction (e.g., such activities as gaining attention, providing learning guidance, and assessing performance) are the key elements in a widely used theory that prescribes what needs to be planned for instruction to be effective. Gagné’s theory and others like it (e.g., Merrill, 1983) specify the events of instruction needed for learning different kinds of outcomes and the sequence in which the events should occur.

Instruction, however, varies in effectiveness despite how carefully it may be planned. Keller (Keller & Kopp, 1987) presents a model for designing instruction that has motivational appeal. The model includes four categories of motivation variables that influence how events that take place during instruction can be tailored so that the instruction attracts and sustains the interest of learners. Keller calls his motivational design model the ARCS model to depict the four motivation categories—attention, relevance, confidence, and satisfaction.

Instructional design and motivational design are complementary, not conflicting ideas. Keller and Kopp (1987) say that motivational design “is meant to be used in conjunction with instructional design models (p. 291).” Instructional design theory guides the designer in what instructional events should be planned and
in what order they should be carried out. Motivational design theory guides the designer in how the events of instruction should be implemented. Motivational design addresses the characteristics of the instructional events that influence how attentive learners are during instruction, the relevance seen in the learning tasks, the confidence with which instructional tasks are carried out, and the satisfaction derived from learning.

**Importance of Motivational Design**

No matter how skillfully instruction is planned, it can only be effective if learners persistently engage in it. To be effective, instruction must be appealing. The problem of instructional appeal grows more severe as instructional tasks become more complex. Without question, learners need to learn more now than in years gone by in order to be fully functional adults in society. As society becomes more complex, the level of skill and ability needed to function successfully in it increases as well, and this increases the difficulty of instruction. Attending the complexity and difficulty of instruction is an increased need for making it appealing.

Increasingly too, instruction is not just an enterprise engaged in by the young. Throughout their lives, adults need to learn new skills and information to carry out their jobs or to learn to perform new ones. For these more mature learners who are often learning outside a formal school environment, instructional appeal may be more important than in a classroom in which a teacher may supplement whatever intrinsic appeal the instructional materials have.

**Keller’s Motivational Design of Instruction**

Keller (Keller & Kopp, 1987) describes four categories of motivation variables that are critical to producing instruction in which learners persist. The four categories of variables include strategies for producing instructional materials that promote attention, relevance, confidence, and satisfaction on the part of learners.

A list of the strategies taken from Keller’s work (Keller & Kopp, 1987), is shown in Figure 1. Collectively, the strategies describe characteristics or features to build into instructional events that gain and sustain the attention of learners, impart the importance of topics under study, provide realistic expectations of success, and assure that outcomes are consistent with expectations of success.

**Gagné’s Instructional Design Theory**

Gagné (1985) describes five categories of learning outcomes (intellectual skills, verbal information, cognitive strategies, motor skills, and attitudes) to which instruction might be addressed. For each of the five categories, different conditions of learning are required.

Gagné further describes nine events of instruction (see Figure 2) that are essential for learning to take place. The events describe the teacher (or program) and learner activities that occur throughout the learning process. The events of instruction are differentiated according to the kind of learning being attempted. Thus, the events are exemplified differently, depending on whether the learning outcome is an intellectual skill, a motor skill, or any of the other kinds
Attention — curiosity arousal, gaining and sustaining the learner's attention.

Strategy A1. Perceptual arousal. Gain and maintain student attention by the use of novel, surprising, incongruous, or uncertain events in instruction.

Strategy A2. Inquiry arousal. Stimulate information-seeking behavior by posing, or having the learner generate, questions or a problem to solve.

Strategy A3. Variability. Maintain student interest by varying the elements of instruction.

Relevance — importance of the instruction to learners.

Strategy R1. Familiarity. Use concrete language, and use examples and concepts that are related to the learner's experience and values.

Strategy R2. 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.

Strategy R3. Motive matching. Use teaching strategies that match the motive profiles of the students.

Confidence — positive expectation of success within reasonable risk limits.


Strategy C2. Challenge setting. Provide multiple achievement levels that allow learners to set personal standards of accomplishment, and performance opportunities that allow them to experience success.

Strategy C3. Attribution molding. Provide feedback that supports student ability and effort as the determinants of success.

Satisfaction — consistency of outcomes with expectations.

Strategy S1. Natural consequences. Provide opportunities to use newly acquired knowledge or skill in a real or simulated setting.

Strategy S2. Positive consequences. Provide feedback and reinforcements that will sustain the desired behavior.

Strategy S3. Equity. Maintain consistent standards and consequences for task accomplishment.

Figure 1. Four categories of motivation variables in the ARCS model of motivational design (from Keller & Kopp, 1987).
of learning outcomes. To design instruction is to specify how these nine events of instruction will be carried out in an instructional setting for any specific learning outcome.

The procedures (or steps) in using Gagné’s instructional design theory are to (a) identify the type of learning outcome, and (b) specify how each instructional event will be exemplified for that kind of outcome. The key to integrating motivational and instructional design is to plan the instructional events in a manner that leads to effective and appealing instruction.

**Integrating Instructional and Motivational Design**

The task of the instructional designer who wishes to produce instruction that is both effective and appealing is to link the ideas of motivational design to an instructional design theory. In this case, it will be shown how Keller’s motivational design could be used with Gagné’s instructional design theory. There is nothing special about this particular link; any of a number of instructional design theories (e.g., those reviewed in Reigeluth, 1983) could be used as a basis for designing instruction with
motivational design procedures being adapted to them.

In Gagné's theory of instructional design, the nine events of instruction are always used. The events are either supplied by the teacher or program (e.g., informing the learner of the objective) or engaged in by the learner (e.g., responding to practice items). The events, of course, are tailored to the type of outcome being pursued. To use motivational design in this context is not to alter the events of instruction, but to modify how they are used so that there is an impact on the attentiveness of the learner, the perception of the relevance of the learning activities, the confidence that learning will be successfully accomplished, and the satisfaction derived from accomplishing instructional ends. Thus, the events of instruction are still present when motivational design is used but their content and character are molded in such a way as to enhance the motivational appeal of the instruction.

Figure 2 shows Gagné's events of instruction side by side with the motivational strategies recommended by Keller (Keller and Kopp, 1987). In each case the motivational strategy is placed beside the instructional event that is most likely affected by its use. For example, perceptual arousal and inquiry arousal (two of the twelve motivation strategies) are placed beside gain attention because their use influences the gaining of attention, and they are most likely to be employed in instruction when the teacher or program attempts to gain the attention of the learner. The remaining motivation strategies (motive matching, familiarity, etc.) are similarly linked with the other instructional events—in each case associated with the event on which they would most likely have an impact.

Integrating Keller's motivational design with Gagné's instructional design, therefore, is a matter of matching motivational strategies with appropriate instructional events. Figure 3 provides an example of how this would be accomplished for a particular outcome. The objective for this instruction is—

Given problems in a spreadsheet requiring description, accumulation, or selection of data, write functions to accomplish the tasks.

The learners for the instruction are adults in a business environment who are learning to use computer spreadsheets to keep track of sales. For the objective just stated, Figure 3 shows the events of instruction, a brief design showing how the events will be exemplified for this objective, and the related motivation strategies for this objective and for these learners. The events of instruction from Gagné's theory are listed in the first column. In the second column the design (quite brief, in this case) is given that shows how the instructional events will be exemplified for this objective. The third column lists the motivational strategies from Keller's theory that seem to apply for this particular objective and these learners. The fourth column shows how the events in the second column would be influenced by the motivation strategies in a way that is likely to increase the appeal of the instruction. Columns 2 and 4 in Figure 3, therefore, provide an example of how motivational design is used in conjunction with instructional design. The focus of the instructional design is on setting forth the events appropri-
<table>
<thead>
<tr>
<th>Events of Instruction</th>
<th>Instructional Activities to Implement the Events of Instruction</th>
<th>Motivational Design Features to Enhance the Appeal of the Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaining attention</td>
<td>Show a spreadsheet with column or row headings labeled &quot;total&quot;,&quot; maximum sales&quot;, etc., and ask how these values can be determined.</td>
<td>Inquiry arousal</td>
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<td>Questions should relate to situations know to learners through their work.</td>
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<td>Informing the learner of the objective</td>
<td>Use direct statements to inform learners that they will learn to write expressions using functions to determine cell values.</td>
<td>Goal orientation</td>
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<td></td>
<td>State that sales people who produce these have an advantage in their work.</td>
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<td>Stimulating recall of prerequisite learning</td>
<td>Learners need to recall how to specify the location of a cell or a range of cells.</td>
<td>Familiarity</td>
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<td></td>
<td></td>
<td>Describe how achieving these skills can lead to acquiring new, valuable abilities.</td>
</tr>
<tr>
<td>Presenting the stimulus material</td>
<td>Describe the procedure used to calculate sums, averages, minimums, or maximums for a range of cells.</td>
<td>Motive matching</td>
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<td>Use examples taken from the lives of learners (e.g., sales across months, average sales, high and low accounts, top sales for the month, etc.)</td>
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<tr>
<td>Providing learning guidance</td>
<td>Give examples of expressions using functions to determine sums, averages, minimums, and maximums.</td>
<td>Expectancy for success</td>
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<td>Describe how success with examples will translate into success on the overall task.</td>
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<td>Eliciting the performance</td>
<td>Have learners develop functions for each of the four operations (sum, average, minimum, maximum) from described situations in a given spreadsheet.</td>
<td>Challenge setting</td>
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<td>Provide practice problems and performance levels to indicate high, moderate, and low level performance.</td>
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<td>Providing feedback</td>
<td>Provide the correct form of the expression for each practice exercise. Also, have learners check the accuracy of their results.</td>
<td>Positive consequences</td>
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<td>Feedback should comment on relating success to diligence in study.</td>
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<tr>
<td>Assessing the performance</td>
<td>Provide four more tasks taken from an available spreadsheet that require writing expressions using functions.</td>
<td>Equitable standards</td>
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<td>Remind learners that these tasks are just like the ones previously completed and their performance should be similar.</td>
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<tr>
<td>Enhancing retention and transfer</td>
<td>Provide additional tasks and correct answers so learners practice and check their work. Give similar problems in a new spreadsheet to promote transfer.</td>
<td>Natural consequences</td>
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<tr>
<td></td>
<td></td>
<td>Provide questions relating to performance of individual sales people that are answered by writing appropriate expressions.</td>
</tr>
</tbody>
</table>

Figure 3. Specific motivational design features used to enhance the appeal of instruction aimed at a particular objective.
ate for effectively achieving this particular instructional outcome. The motivational design is focused on making these instructional events appealing for the particular learners.

Incorporating motivational design in the instructional design process tends to personalize the instruction. Because the learners in the example are persons involved in sales, the means of getting attention, making the materials relevant, bolstering the confidence of learners, and increasing satisfaction in the learning are achieved through job-related examples and references. The instructional materials when developed would probably not have any special appeal, for example, to high school students who were learning to use spreadsheets, because the job references would not be pertinent.

An obvious aspect of attending to motivational design is to make instruction appropriate to a particular group of learners. A consequence of this is that instruction may not be highly generalizable. To make instruction that is effective with one group become appropriate for another may require using different attention getting techniques, different relevance considerations, and different methods for promoting satisfaction and confidence in learning. To maximize appeal, instruction may have to be tailored to individuals in terms of their backgrounds and goals. Heterogeneous learning populations, therefore, may pose the biggest problems for designers who are concerned about the motivational appeal of instruction.

**Using Motivational Design During Instructional Development**

Up to this point, only the design phase in instructional development has been considered (during which specific instructional events are planned to accomplish objectives). Nothing has been said about specifying objectives, conducting a task analysis, formatively evaluating, or performing other tasks involved in the development of instruction. The steps in motivational design, however, need to be integrated into the instructional development process. The four steps recommended by Keller (Keller & Kopp, 1987) are (a) to analyze the audience from a motivation standpoint, (b) to set motivation objectives, (c) to select motivation strategies, and (d) to evaluate accomplishment of motivation objectives.

Audience analysis (step a) in motivational terms means to analyze learners in terms of the four categories of motivation variables. What kinds of activities or events are likely to attract the attention of the learners? What kind of activities or situations related to the topic are relevant to the learners? How confident are learners about the topic, and what can the instruction provide that will sustain and build their confidence, so that they can learn successfully? What can be done to enhance the satisfaction of learners through relating expectations to outcomes? Answering these questions constitutes conducting an audience analysis. It is done at the same time in the development cycle when learner entry behaviors and characteristics are being analyzed. Figure 4 shows how motivational design activities (including audience analysis) are integrated into instructional development activities.

Entry behaviors and characteristics are identified because they relate
Figure 4. Integrating Keller's motivational design activities into Dick and Carey's instructional development model (from W. Dick and L. Carey, The systematic design of instruction, Copyright 1985. Reprinted by permission of Scott, Foresman and Company.)
to what and how learners learn. Thus, entry characteristics such as the age, gender, occupation, spatial reasoning, or mathematical ability of learners may influence how instruction is developed. Similarly, determining the motivations of learners may aid in structuring effective learning materials. Using interviews, questionnaires, or observations of selected learners from a target audience can lead to knowledge about learner motivations. Interviews may determine that learners are particularly interested in social interactions. Questionnaires may show that learners have little confidence in their knowledge of how to apply theory to practice. Observations from training or on-the-job settings may reveal that learners are not satisfied with their ability to solve customer relations problems. Pieces of information such as these are then available to instructional designers to use in structuring course materials attentive to factors that may influence their effectiveness.

Specifying motivation objectives (step b) means to specify motivational outcomes to be achieved during instruction. The motivation outcomes or objectives are set forth along with the instructional objectives for a lesson. Motivation objectives deal with such matters as the interest shown in the instruction, the persistence of the learners, or the perception of the relevance of the instructional materials. For example, a motivation objective might be that learners will rate the learning materials as applying directly to their jobs.

Motivation objectives describe behaviors of learners that are thought to relate directly to success with instructional materials. Therefore, they describe intermediate behaviors which lead to achievement of instructional outcomes. If the motivation objectives are achieved, the likelihood of success in instructional outcomes is enhanced. Motivation objectives for an instructional program may be persisting with practice exercises until competence is demonstrated, demonstrating attentive behaviors during information presentations, and rating learning scenarios as highly related to job activities. If each of these objectives is achieved by all or most learners, the expectation is that learning will be enhanced.

Selecting motivation strategies (step c) is the task of deciding how instructional events can be carried out so that motivation objectives are achieved. This process has already been described in this paper and is illustrated in Figure 3. Motivation variables corresponding to each event in the instructional plan are designated (see the third column of Figure 3). Thus, for example, the motivational design variable inquiry arousal is invoked during the gaining attention event by ensuring that the examples relate to situations known to learners. The situations may be known by the instructional developer because of general knowledge of the learners or they may be specifically determined through techniques, such as interviews and questionnaires, during audience analysis.

Continuing the process of selecting motivation strategies leads to matching additional motivation variables with instructional events (e.g., goal orientation with informing the learner of the objective, familiarity with recalling prerequisites, etc.) and then deciding how instantiating each variable can sustain the motivational appeal of the instruction.
Step d in the process of motivational design is to evaluate achievement of motivation outcomes. Just as the regular outcomes of instruction are assessed, motivation objectives are evaluated as well. The evaluation strategies for assessing motivation objectives that deal with persistence, satisfaction, or appeal are through techniques such as observation, rating forms, and attitude/perception scales.

Using the motivation objectives just cited as an example, a developer could determine how persistent learners are in practice tasks by keeping track of how long they study and by recording their level of competence at the time practice is terminated. Obviously these measures are done more readily in some learning environments than others. In computer-based instruction, for example, data can easily be recorded on learning time and performance levels.

Continuing with the assessment of motivation objectives, attentive behaviors could be determined by observing time on task—a measure done through observation. Rating of learning scenarios as job related would be done by having learners do exactly that—identify which scenarios were judged to relate specifically to their jobs.

Figure 4 shows where the four steps in motivational design of instruction are integrated into an instructional development model. In this case, the instructional development model of Dick and Carey (1990) is used but any of a number of models would be suitable. Using motivational design in conjunction with instructional design means that motivation-related activities are attended to at certain points in the instructional development process. When learner characteristics are analyzed, the developer using motivational design also analyzes the learner from a motivation perspective. When the objectives for the instructional materials are specified, the motivational objectives are also designated. When the instructional strategies are chosen (i.e., the instructional design is done), the appropriate and accompanying motivation strategies are simultaneously chosen and used. And, finally, when formative evaluation is carried out, the impact of the motivation strategies and accomplishment of motivation objectives are evaluated at the same time as the evaluation of the instructional program or materials.

Summary

The purpose of this paper is to show how the motivational design of instruction is conducted in concert with instructional design. Motivational strategies are employed when implementing the events of instruction in ways designed to increase the attractiveness and appeal of instruction. Motivational design was shown to fit readily into instructional development wherein certain instructional development activities are carried out in ways that contribute to both the effectiveness and the appeal of instruction.

References


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