DOCUMENT RESUME

ED 383 291 IR 017 146

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TITLE An Instructional Theory for Learner Control: Revisited.
PUB DATE 95
NOTE 16p.; In: Proceedings of the 1995 Annual National Convention of the Association for Educational Communications and Technology (AECT), (17th, Anaheim, CA, 1995); see IR 017 139.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Decision Making; Educational Environment; Instructional Improvement; *Learner Controlled Instruction; Learning Processes; Learning Strategies; *Learning Theories; Student Characteristics; Student Motivation; *Teacher Role

ABSTRACT

This study develops a prescriptive theory of learner control for educators to support the learner's decision making in the learning process and to manage more efficiently their instructional processes. The theoretical framework of learner control in conjunction with the self-regulation of learning, learner characteristics, and learner motivation may make educators and instructional designers understand why it may be effective to allow learners to have some control over the learning process. It is assumed that the development of an instructional theory for learner control would answer some needs of the information society. This theory would facilitate educations' new roles by providing practical guidelines for more effective instructional management. The major questions of the study considered important factors for empowering learners and the functional relationship among these factors; learners' decision making roles and the educator's role in supporting the learning process; and when learner-controlled strategies are recommended. The results are composed of two descriptive conceptual models and a prescriptive instructional theory for learner control which includes four instructional models. The following conclusions are derived from the results: (1) the three major variables affecting learning process and learning control decisions are condition variables, method variables, and outcome variables; (2) the critical variables which influence learner control decision are experience and importance of task; (3) a learner's role is to be an active participator with self-regulation skills; (4) the role of an educator is to be a facilitator and mediator of learning ; (5) there are four instructional conditions of learner control theory and four instructional models for matching each instructional situation; and (6) there are several critical success factors (CSFs) which are vital to the success of the instructional theory. (Contains 45 references.) (AEF)

Title:

An Instructional Theory for Learner Control: Revisited

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I. Research Background

Learners should be able to feel free to optimize their potential and to hold their own in any setting. *Becoming empowered* means learning how to influence and interact with the challenges of one's life in such a way as to maximize performance. We live in an age of empowerment. The term *empowerment* has come into use in public education and the business worlds. Just as the individual school is viewed by most people as the basic primary source of change and improvement, so too is the training and development center in the corporate environment.

Educators concerned about the empowerment of learners have seen that a restructuring of schools may be necessary if empowerment of learners is to be realized. So it is that the notion of "school restructuring" has been discussed in the same context as empowerment(Banathy, 1987, 1991; Bateman, 1990; Elmore, 1989; Harvey & Crandall, 1988; Murphy, 1991). In other words, learners should be at the heart of educational processes. Meanwhile, educators should facilitate and empower learners to take control of their own learning(Chung, 1991).

Empowerment would necessarily involve a consideration of learner control or self-instructional management. Learner control has been one of the most important issues in the field of instructional technology and especially it is the major instructional management strategy (Heinich, 1973; Hoban, 1965; Reigeluth,1989). Each learner's control of instruction is inherently appealing to learners, since it is assumed that learners will be more motivated if they are allowed some control over their own learning.

Research findings regarding the effects of learner control have been *inconclusive* (Carrier, Davidson, & Kalweit, 1986; Ross & Morrison, 1989; Steinberg, 1977; Tennyson, 1980). Whatever the causes for the inconclusiveness of the research into the effects, it is time for us to count on the prescriptive knowledge base of learner control as a means to empower learners. Educators must require more systematic guidelines for implementing effective learner control in their instructional situations in order to maximize the learners' performance.

The purpose of this study is to develop a prescriptive theory of learner control for educators to support the learner's decision making in the learning process and to manage more efficiently their instructional process. The theoretical framework of learner control in conjunction with the self-regulation of learning, learner characteristics, and learner motivation may make educators and instructional designers understand why it may be effective to allow learners to have some control over the learning process. In this study, the author assume that development of an instructional theory for learner control would answer some needs of our information society. This theory would facilitate educators' new roles by providing practical guidelines for more effective instructional management. Thus, educators can help their students to take control of their own learning process with confidence and responsibility. In a nutshell, the author expects this prescriptive theory to be a meaningful mechanism to empower learners in our society.

II. Research Questions

The major questions of this study were:

(1) What are the important factors required to empower learners in managing their learning? What is the functional relationship among those factors?

(2) What types of learner control or learners' decision-making roles are available in learning situations? What would be the educator's role to enhance and support the learner's own learning process before, during, and after instruction?

(3) Under what conditions (condition and outcome variables) can a specific learner-control strategy be considered as an associated solution or a combination of solutions (method variable)? In other words, when is and isn't a certain learner-control strategy (or a combination of strategies) recommended? What are the associated critical success factors?

Research questions 1 and 2 will be mainly answered by review of relevant literature. Question 3 and part of question 2 will be clarified and answered through the instructional theory construction process

using inductive and deductive approaches based on empirical research, theoretical research, and intuition. As a matter of fact, the work of theory construction is iterative and recycling. After all, the questions (1,2, and 3) described above can be answered altogether and interrelated in the systemic viewpoint.

III. Research Procedure

We need to know the reason why the author exploit the methodology (theory construction, especially using both deduction and induction methods) and how to progress this work.

A. Rationale

In the current study, I exploit both the inductive and the deductive approaches. The inductive method is *primarily* adopted in analyzing the empirical research, building a knowledge base of learner control and learner decision-making skills, and constructing the current *prescriptive* theory for teachers which will support learners' appropriate control decisions during the instruction and learning processes. According to Snelbecker (1985), in the inductive mode of theory construction, statements are summarized or generalizations are derived from empirical facts. Such theories work "from the bottom up," developing into higher-level systems which generalize across small theories, and eventually culminating in a theory which can account for all the statements lower in the schema. The strength of this approach is that the statements produced are *not* too far from the "truth" which has been verified. The weakness of this inductive thinking is that it can often lead to a proliferation of very low-level theories, many of which are not unique and contain considerable overlap in function(Hoover, 1984; Noble, 1976; Snelbecker, 1985; Turner, 1968).

Meanwhile, the deductive method is used intuitively both in synthesizing theoretical research and connecting a knowledge base to the development of taxonomies which form the core of a *conceptual model* for learner control. The conceptual model for learner control will be the beginning stage of the current theory construction. In the deductive approach, theorists work "from the top down," building a theory that seems logical on an "a priori" basis and then testing the correctness of this theory (Babbie, 1989; Noble, 1976; Snelbecker, 1985; Turner, 1968). This type of approach is good in terms of comprehensiveness, breadth, and a consistency among rules. However, the problem in deductive thinking is the lack of empirical foundation and a good deal of needless research if the majority of the original postulates prove to be incorrect. In this study, the author exploited both the inductive and the deductive approaches. Figure 1 explains how the approaches were applied.

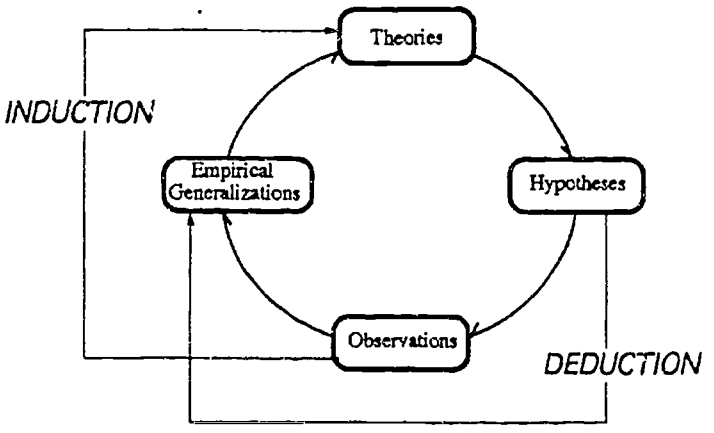

Figure 1. The Wheel of Science

B. Procedure

This procedure became the general guidelines for the author to build the theory. First of all, a literature review was conducted. Next, a conceptual model of learner control will be developed. Then empirical and theoretical research findings will be integrated on the basis of the conceptual model. Lastly, a prescriptive instructional theory will be constructed. However, in fact the theory development process was very reiterative and recycling in all directions.

1. Reviewing Literature

Literature is the source for a sketch of conceptual models and an instructional theory. Reviewing literature is the very first step in the current theory construction. This study reviews a variety of literature (both empirical and theoretical) relevant to decision making, human performance and motivation, learner control, and theory construction. The literature was obtained from discussion and consultation with professors and colleagues, from books, journal articles, conference papers, Psychlit, and ERIC microfiches across the areas of education, psychology, and business.

2. Developing Descriptive Conceptual Models

Through the literature review process, the conceptual models were developed. The conceptual models in this study has two shapes: one is a diagram of variables (Figure 2); the other is a diagram of the process (Figure 3). Figure 2 identifies and organizes the relevant variables affecting a learner's decision making and describes relationships among the variables. Figure 3 shows the roles (interaction or relation) of learners and teachers in a given learning environment. The models were products of the synthesis of intuition, and the related research and knowledge base about learner control. They facilitated a theory development. In other words, the conceptual models were the basis of development of formative hypotheses and the taxonomy of variables of instructional theory.

3. Integrating Research Findings

When a quantity of relevant research data is gathered and analyzed, the research findings were integrated on the basis of the conceptual models so that logical conclusions can be drawn. As result of this activity, a set of principles were produced. Each principle consists of condition(s) and method(s). The credibility of a theory is dependent upon the component constructs, as well as the substance of the principles of the theory.

4. Constructing the Prescriptive Instructional Theory

Inductively integrated knowledge which is based on research findings concerning learner control was changed into a prescriptive form in order to provide teachers and instructional designers with a guide to empowering learners. After identification of four major sets of conditions, the current study produced the theory by prescribing four instructional models of learner control to cope with individual learning and instructional situations. The deductive approach was also used to improve the framework of the theory.

On the basis of Conceptual Model 1(Figure 2) with integrated research findings, critical condition variables (such as learner ability, prior knowledge, types of learning, task importance), critical method variables(such as content control, sequence control, pace control, and display control), and critical outcome variables (or dependent variables such as achievement and attitude) were identified. The interrelationships between the critical variables were identified. At this point, prescriptive principles were matched with situations.

Based on method variables, four instructional models (A, B, C, D) were constructed to match the four conditions. First, I decided that each model should consist of three instructional tactics: (1) providing learners with an *introduction*, delivered by an instructor or a program, about how to use learner control effectively in the given program, (2) allowing learners to use some degree and type of control *options*, and (3) providing *instructional (or control) advice* during the program. Then, the second kind of instructional tactics (allowing learners to use instructional options available in the progress of learning) were mainly inductively identified from Conceptual Model 1. However, the first and the third tactics were identified

primarily deductively on the basis of Conceptual Model 2. As a result of induction, deduction, and integration of conceptual models, Figure 4 (the overall picture of the theory) was created. All the key principles under the critical success factors (CSF) in each model were listed.

IV. Results

The results of this study are composed of two descriptive conceptual models and a prescriptive instructional theory for learner control in which includes four instructional models .

A. Descriptive Conceptual Models

1. Conceptual Model 1(Variable Relationship)

There are three groups of variables: condition, method, and outcome variables. Condition variables include learner variables (such as age, ability, prior knowledge, cognitive style, and motivational level), content variables (such as learning type and task importance), and environment variables (such as climate and medium). Method variables (i.e. learner control strategies in present study) include content control, sequence control, pace control (time management), and display control. Each method variables will be defined later in the prescriptive instructional theory learner control. Outcome variables include learner performance (or achievement), learner attitude, continuing motivation to learn, number of selection, anxiety, and learning time.

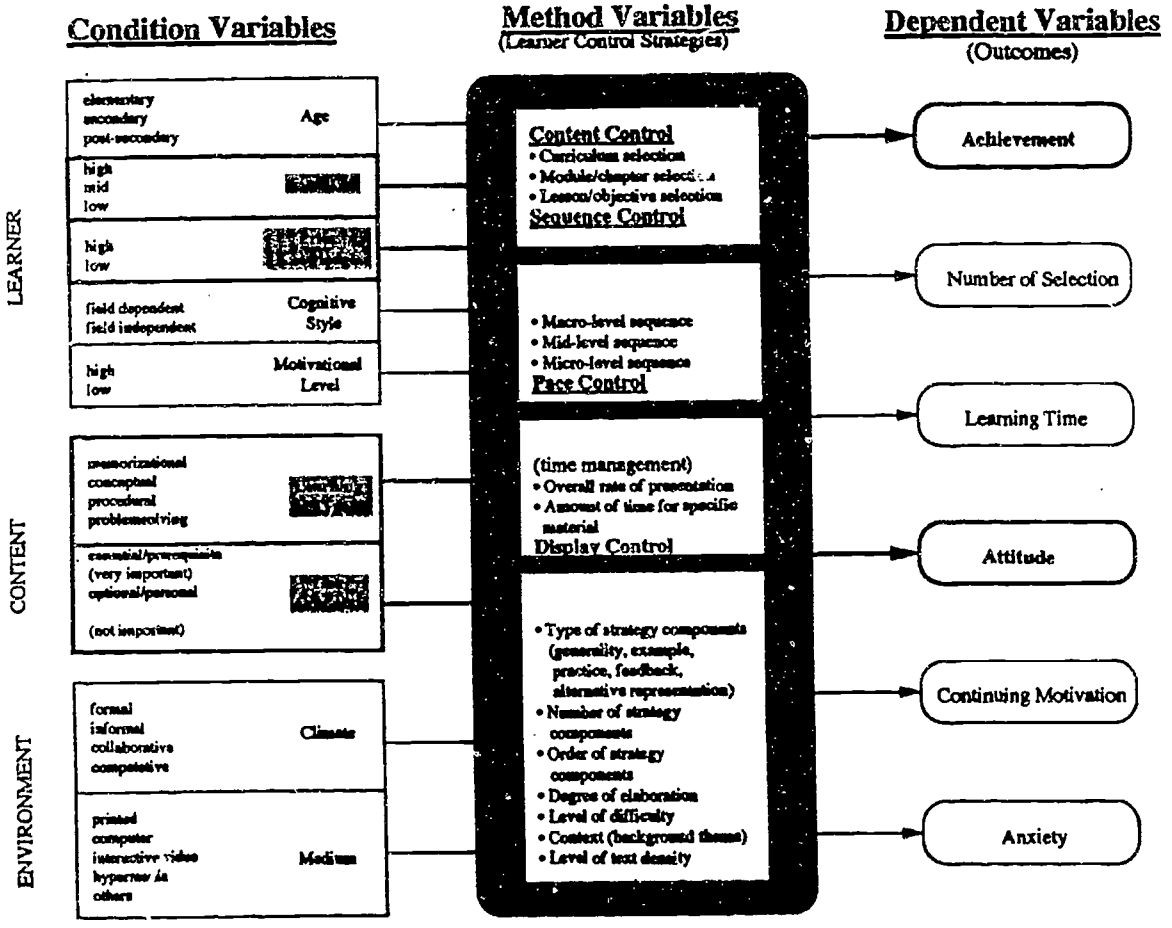

Figure 2. Conceptual Model 1 (Variable Relationships)

As a result of the integration of empirical and theoretical findings on the conceptual model 1, the author could identify the relationships among the variables as Figure 2. These relationships are the basis of the prescriptive instructional theory of learner control. Figure 2 indicates, on the basis of the number of variable relationship involved, that achievement and attitude to a large extent, and anxiety and learning to a less extent, are decisive dependent variables. Especially, the degree of learner experience (ability and prior knowledge), the degree of task importance, and types of learning are the critical factors of condition variables in the present theory.

2. Conceptual Model 2(Self-Managed Learning Process)

Figure 3 describes the self-managed learning process. A learner (1.0) becomes an *empowered* learner (3.0) through the learning process (2.0). The learning process consists of a session of training about decision making (learning strategies), self-managed learning experience, and self-assessment by the learner. In conceptual model 2 (Figure 3), we can identify the roles of a learner and an educator. The learner will be the center of the learning process and he/she will be an active participant in the whole learning process with self-regulation skills. The educator can provide knowledge and skills in the pre-training session. The educator can also advise, counsel, facilitate, and influence learners during the learners' self-managed learning experiences. The educator can provide learners with informative feedback during or after learning session. During this process, a learner's schemata (cognitive structure) changes one time, either by a process of accretion, or a process of tuning, or a process of restructuring. Often a meta-process is involved which consists of a mixture of all three processes, with the mixture varying one time.

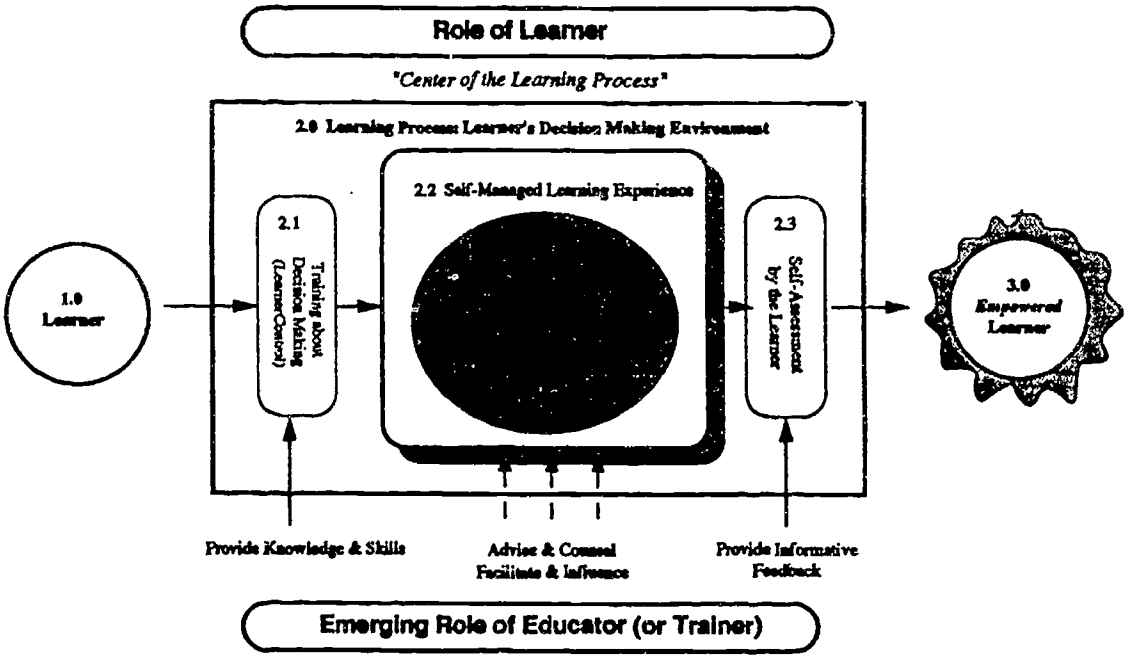

Figure 3. Conceptual Model 2. (Self-Managed Learning)

B. A Prescriptive Instructional Theory

This theory prescribes what models based on different conditions are likely to optimize the desired instructional outcomes. Four distinct models operationalize this instructional theory for learner control. As in Figure 4, Model A is most learner-control oriented and Model D is least learner-control oriented (a continuum).

1. Taxonomy of Variables for the Instructional Theory

Instructional Goal (Outcome): For all four models in this theory, the desired learning outcome (that is, instructional goal) is to meet different individual learner needs. Instruction is judged by its effectiveness, efficiency, and appeal in the context of instructional management (Davies, 1984; Reigeluth & Merrill, 1979).

Instructional Conditions: The selection of instructional methods in this theory is mostly determined by two sets of condition variables: 1) learner experience and 2) task importance (Korotkin, 1992; Davies, 1993; Grau, 1986; McMillan & Spratt, 1983; Weiner & Brown, 1984).

Condition 1:	If the learner has a high experience and if the task is less crucial;
Condition 2:	If the learner has a low experience and if the task is less crucial;
Condition 3:	If the learner has a high experience and if the task is more crucial;
Condition 4:	If the learner has a low experience and if the task is more crucial.

Instructional Methods: In this section, instructional methods are divided into the types of learner control exploited in the field, the role of educators, and the degree of learner control.

a) Types of Learner Control: Roles of active learners
These learning activities can be arranged into four broad classes of control: learner control of content, learner control of sequence, learner control of pace, and learner control of instructional display (strategy).
- *Learner control of content.*(Merrill, 1983).
- *Learner control of sequence.*(Merrill, 1979; Milheim & Martin, 1991; Reigeluth & Curtis, 1987).
- *Learner control of pace (time management).*(Milheim & Martin, 1991).
- *Learner control of instructional display (strategy).*(Merrill, 1984; Ross, Morrison, & O'Dell, 1989; Ross & Morrison, 1989).

b) Role of Educators
- *Developing metacognition and cognitive strategies of learners.* (Merrill, 1984; Flavell, 1976; Resnick, 1972; Corno & Mandinach, 1983; Gagné & Glaser, 1987).
- *Instructional advisement.* (Milheim & Azbell, 1988; Tennyson & Rothen, 1979).

c) Degree of Control: The degree of control is a continuum from maximum program control (that is, minimum learner control) to maximum learner control.

2. Four Instructional Models of Learner Control.

Four prescriptive instructional models (Model A, B, C, and D) will be elaborated here. Each will be described in terms of the tactics involved and each will identify a precept or rule as a critical success factor (CSF) to the model.

Model A

If the learner has a high experience (ability and prior knowledge) and the given task is not crucial ("Condition 1") in the learning, then the optimal prescription for instructors or instructional designers in this instructional theory for learner control is Model A.

(Goal: To meet individual learner needs)

Conditions	Models
If a learner has a low experience and if a given task is less crucial	**Model B** * Introduction * Control • Content Selection: Learner control • Sequence (Path): Learner control • Time Management: Learner control • Display (Strategy): Program control * Instructional Advice
If a learner has a high experience and if a given task is more crucial	**Model C** * Introduction * Control • Content Selection: Program control • Sequence (Path): Program control • Time Management: Learner control • Display (Strategy): Learner control * Instructional Advice
If a learner has a low experience and if a given task is more crucial	**Model D** * Introduction * Control • Content Selection: Maximum program control • Sequence (Path): Maximum program control • Time Management: Learner control • Display (Strategy): Program control * Instructional Advice

Figure 4
Models of Instructional Theory for Learner Control

The three instructional tactics in this model are: a) providing the introduction or training on learner control; b) allowing learners to use instructional options available in the progress of learning; and c) providing instructional advisement for effective learning. Usually c) is embedded in b). In condition 1, tactic a) is less important than in other conditions.

a) Critical success factors for learning strategies training:

CSF: *Provide learners with directions in how to use learner control strategies in order to promote a learner's performance.*

CSF: *Provide learners with directions for conscious cognitive processing of the information in order to improve their performance* (Callahan & Merrill, 1978; Merrill, 1984; Reigeluth,1979; Strickland, Fletcher, & Merrill, 1978; Wilcox, Richards, Hindmarsh, & Merrill, 1978).

b) Critical success factors for experiencing control options:

CSF: *A high degree of learner control over content selection (what to learn) is advisable when it is beneficial for learners to set their own learning goals*(Ross & Rakow, 1981; Steinberg, 1991).

CSF: *High degree of learner control over sequence of content is advisable.*(Leshin, Pollock, & Reigeluth, 1992; Reigeluth, 1979)

CSF: *A high degree of learner control over instructional pacing should be allowed.*(Keller & Kopp, 1987; Leshin, Pollock, & Reigeluth, 1992; Milheim & Martin, 1991).

CSF: *A high degree of learner control over strategy should be allowed*(Beard, Lorton, Searle, & Atkinson, 1973; Leshin, Pollock, & Reigeluth, 1992; Milheim & Martin, 1991). Merrill, 1983; Merrill, 1984; Reigeluth & Merrill, 1977; Reigeluth & Schwarts, 1989; Slough, Ellis, & Lahey, 1972).

c) Critical success factor for instructional advisement

CSF: *Provide learners with instructional advisement only when necessary in order to facilitate and improve learner's decision making and performance* (Hannafin,1984; Kinzie, 1990; Laurillard,1984; Merrill, Li, & Jones, 1990; Tennyson & Park, 1987).

Model B

If the learner is less experienced and the given task is less crucial ("Condition 2") in the learning, then the optimal prescription for instructors or instructional designers in this instructional theory for learner control is Model B. Like Model A, there are also three instructional tactics in this model:

a) Critical success factors for learning strategies training:

CSF: *Absolutly provide learners with directions in how to use learner control strategies in order to promote a learner's performance.*

CSF: *Absolutely provide learners with directions for conscious cognitive processing of the information n order to improve their performance.*

b) Critical success factors for experiencing control options:

CSF: *Learner control over content selection (what to learn) is advisable.*

CSF: *Learner control over sequence of content is advisable.*

CSF: *High degree of learner control over instructional pacing should be allowed.*

CSF: *Learner control over strategy should be restricted.*

c) Critical success factor for instructional advisement

CSF: *Provide learners with instructional advisement only when necessary in order to facilitate and improve learner's decision making and performance.*

Model C

If the learner has a high experience and the given task is more crucial ("Condition 3") in the learning, then the optimal prescription for instructors or instructional designers in this instructional theory for learner control is Model C. There are also three instructional tactics in this model:

a) Critical success factors for learning strategies training:

CSF: *Absolutely provide learners with directions in how to use learnercontrol strategies in order to promote a learner's performance.*

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CSF: *Absolutely provide learners with directions for conscious cognitive processing of the information in order to improve their performance.*

b) Critical success factors for experiencing control options:
CSF: *Learner control over content selection (what to learn) is restricted.*
CSF: *Learner control over sequence of content is restricted.*
CSF: *High degree of learner control over instructional pacing should be allowed.*
CSF: *High degree of earner control over strategy should be allowed.*

c) Critical success factor for instructional advisement
CSF: *Provide learners with instructional advisement only when necessary in order to facilitate and improve learner's decision making and performance.*

Model D

If the learner has a low experience and the given task is very crucial ("Condition 4") in the learning, then the optimal prescription for instructors or instructional designers in this instructional theory for learner control is Model D. There are three instructional tactics in this model:

a) Critical success factors for learning strategies training:
CSF: *Provide learners with directions in how to use learner control strategies if necessary.*
CSF: *Provide learners with directions for conscious cognitive processing of the information if necessary.*

b) Critical success factors for experiencing control options:
CSF: *Learner control over content selection is restricted.*
CSF: *Learner control over sequence of content is restricted.*
CSF: *High degree of learner control over instructional pacing should be allowed.*
CSF: *Learner control over strategy should be restricted.*

c) Critical success factor for instructional advisement
CSF: *Provide learners with instructional advisement only when necessary in order to facilitate and improve learner's decision making and performance.*

Figure 5 is a summary table of learner control strategies of each model. All learner control strategies are allowed in Model A. Meanwhile, most learner control strategies are restricted in Model D.

		← more LC oriented		less LC oriented →	
Strategies \ Models		Model A	Model B	Model C	Model D
Introduction (Pre-training)		less important for some	important	important	important
Control Options	Content Control	maximum learner control	learner control	restricted LC (PC)	minimum LC (max.PC)
	Sequence Control	maximum learner control	learner control	restricted LC (PC)	minimum LC (max.PC)
	Pace Control	learner control	learner control	learner control	learner control
	Display Control	learner control	restricted LC (PC)	learner control	restricted LC (PC)
Instructional Advice		important	important	important	important

- LC: learner control
- PC: program control

Figure 5. Summary Table of Learner Control Strategies of Each Model

V. Conclusions and Educational Implications

The results of this study permit several conclusions about the instructional theory construction for learner control. The following conclusions seem noteworthy.

1. There are three major variables affecting learning process and learning control decisions. Those are condition variables, method variables, and outcome variables.

2. The most important critical variables which influence the learner control decision (method variables) are (a) the experience of a learner and (b) the importance of task. The combination of these two variables creates four instructional conditions of my learner control theory.

3. A learner's role in the self-management learning environment is to be an active participator with self-regulation skills (metacognition).

4. The role of an educator or instructional agent in the self-management learning environment is to be a facilitator and mediator of learning with instructional and organizational roles.

5. There are four instructional conditions of learner control theory and four instructional models for matching each instructional situation. Each instructional model has three instructional tactics:
   (a) Developing self-regulation skills of a learner.
   (b) Allowing a learner to use the degree and the type of control.
   (c) Providing instructional advice during learning.

6. There are several CSFs which are critical to the success of the instructional theory prescriptions for learner control.

This theory expands previous conceptualizations of the roles of learners and teachers by exploring the decision-making process and the interrelationships of learner factors, content factors, environment factors, and delivery factors. This theory links previous research findings and practitioners' prescriptions within a logically consistent framework. Theoretical research, because it deals with abstraction and relationships, is often more demanding than other forms of inquiry. However, theory construction is essential to support or question the foundations of practice.

This study takes a first documented step toward theory construction for empowering learners to manage the learning process. It is a exploratory attempt to improve the common practice of education and training. The recommendations resulting from this study fall into two main categories: one is for evaluation of the theory developed in this study; the other is for expansion of the theory.

For evaluation of the theory:

1. In the future, this theory must be examined within the limits of experimental research design. The investigation results can serve as further tests of the components of the theory.

2. The theory can also be evaluated by a large sample of experts and practitioners (teachers and trainers). It is expected that further research and testing efforts will lead to refinements. The use of experts' opinions for assessing the worth of a product is probably the oldest evaluation strategy used in education. Experts' and practitioners' opinions can be an important evaluation tool because it is quick and enhance the credibility of the theory.

   The instructional prescriptions developed in this study were validated with empirical and theoretical research by the author. But the instructional theory need also to be validated in terms of optimality and utility by both experts in the field of instructional theory and learner-control research and practitioners in the education and training..

For expansion of the theory:

1. Additional work can be done to find the relationship between motivational design and learner performance in the self-managed learning environment. The motivational effects is expected to make the instructional theory for learner control more dynamic.

2. Additional work should be done to develop more flexible instructional theory for learner control in order to cope with advanced information technologies including intelligent tutorial systems, expert systems, and computer-based simulations and games.

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