executive summary

INTERACTIVE EFFECTS OF INSTRUCTIONAL STRATEGY AND LEARNER CHARACTERISTICS ON LEARNING EFFECTIVENESS AND APPEAL

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Abstract

This research verified the interactive effect between the instructional organization strategy by using elaboration model and the students' characteristics on the learning effectiveness and appeal. Students' characteristics which were predicted to interact with the elaboration model were cognitive style, achievement motivation, and learning strategies.

Experimental factorials design was used to test the hypothesis. The independence variable of this study was strategy for organizing instructional content, which was classified into elaboration model and linear model. The moderator variables were students' cognitive style, achievement motivation, and students' learning strategy. The cognitive style was classified into field dependence and field independence. Achievement motivation was classified into high and low. The students' learning strategy was classified into two deferent strategies, those were described the activities that the students do while reading the instructional material. The dependence variable was learning effectiveness and appeal.

The total subjects were 16 groups of students. The analysis of data leads to the following conclusions:

• Elaboration model was more effective and more appeal than linear model as a strategy of organizing instructional content.
• Field independence student revealed significantly higher achievement than field dependence student.
• There was no difference on learning effectiveness between student with high and low achievement motivation.
• Student with note taking while studying the instructional material revealed significantly higher achievement than student not note taking.
• There was an interaction between strategy of organizing instructional materials and students' cognitive style on learning effectiveness.
• There was an interaction between strategy of organizing instructional materials and student activities while reading instructional materials on learning effectiveness.
• There was an interaction between students' cognitive style and student activities while reading instructional materials on learning effectiveness.
• There was an interaction between strategy of organizing instructional materials, students' cognitive style, and student activities while reading instructional materials on learning effectiveness.
• There was an interaction between strategy of organizing instructional materials, students' cognitive style, and achievement motivation on learning effectiveness.

These findings was very useful for the foundation of developing instructional theories and principles, especially those instructional theories and principles related to the identification of the best instructional strategies for achieving the predetermined instructional objectives. All efforts directed toward these goals should be incorporated into the discipline: Instructional Science and Technology.

This study has also its practical values, especially for developing instructional materials,
Background

The Instructional designers in higher education tend to ignore the interactive effect between the instructional strategies and learners' (students') characteristics. Although there is some recognition that there is an interactive effect between instructional strategies and instructional conditions, especially the condition rooted from student learning characteristics, researchers, especially graduate students, tend to test the effectiveness of these strategies in a sporadic way without relating them to students' special characteristics. This study intents to test the interactive effect between instructional strategies and students' learning characteristics on the learning effectiveness and appeal.

Theoretically, the verification of the instructional strategy without investigating its interaction with the instructional condition variables, is not useful because it is not based on any established assumptions in developing instructional theories. The assumption reads that an instructional strategy is only useful if it is used in a particular condition or particular subjects characteristic.

Instructional strategy in this research was limited to the organizational strategy of instructional content. Reigeluth, Merrill, Wilson, and Spiller (1978) name them structural strategy. They also develop a model, known as the elaboration model. The effectiveness of this model was tested by comparing it to the one that was prevalent in the tertiary education in Indonesia.

In a special sense, the strategy of organizing instructional content is an important component in instructional design. This strategy emphasize the role of synthesizing and sequencing of subject contents. Synthesizing will make topics in a subject more meaningful for student (Reigeluth, et al, 1978). This meaningfulness is made possible by relating a topic to a context (Ausubel, 1963; 1968), or by showing how these topics are related to the overall content of a subject (Degeng, 1990). This meaningfulness makes students to be more interested in learning, and thus will improve the achievement, or efficient learning is realized. Sequencing is important because effective synthesizing obviously requires a certain strategy for sequencing subject contents. This sequencing is important because most subject contents imply learning prerequisites (Gagne, 1968; 1977; 1985; Gagne, Briggs, and Wager, 1988).

Instructional organization strategy is ignored in the instructional design. Lectures today tend to organize their instruction by following the sequence and the content of textbooks at hand (Degeng, 1988; 1990). Each topic is orderly discussed, one after another according to the textbooks. This kind of instructional sequencing is considered traditional.
However, instructional strategies play an important role in determining learning quality. In instructional design there are some variables which determine the instructional quality have to be accepted as givens by instructors, and used those variables as a framework for their instructional practices (Degeng, 1988; 1990). For examples, the instructional goals/objectives can not be manipulated by an instructor, as they have been predetermined by the curriculum, so are the characteristics of the content of the subjects and the limitedness of the learning resources. One of the most important variables among these is the students' characteristics. Theoretically, these characteristics cannot be manipulated. Thus, they must be accepted as they are.

The most influential characteristics that determine instructional quality originated from student variables, but the least investigated, are cognitive styles, learning strategies, and achievement motivation (Entwistle, 1981; Smith, 1978, Vander Zanden, 1980). Cognitive styles still play an important role in determining the effectiveness of instructional strategies, especially the strategies related to the organization and the sequencing of the instructional content (Entwistle, 1981). Other influential characteristics, learning strategies, and achievement motivation, theoretically have an interactive effect with strategy of organizing instructional content on learning outcome.

Elaboration model was, at first, introduced by Reigeluth, et al. (1978). Other articles which review this model are Merrill (1980), Merrill, Keley, and Wilson (1981), Reigeluth (1979; 1984), Reigeluth & Darwazeh (1982), Reigeluth and Rogers (1980), Reigeluth and Stein (1983), and Degeng (1988; 1990). The elaboration model starts with an epitome of the subject to teach. Then, the content of subject is divided into topics, and each topic is divided into sub-topic. Elaboration is made at the topic and at the sub-topic. This division and elaboration are continuously developed to reach the expected details. In this way each student will always be able to relate each sub-topic to the topic and each topic to its more extended context.

The elaboration model is a prescriptive model that was developed to integrate existing knowledge about how to organize instruction, especially at the macro level (i.e., for many related ideas or topics). It is a major attempt to use both an analyzing of the structure of subject content and an understanding of cognitive processes and learning theories to design strategies for selecting, sequencing, synthesizing, and summarizing the subject content. It is hypothesized that if the instruction is designed according to the appropriate model, then that instruction will result in improved levels of learning, synthesis, retention, transfer, and motivation (Reigeluth, 1979; Degeng, 1988). The results can be employed as an accurate indicator for the degrees of learning effectiveness. In his recent investigation Reigeluth (1983) expanded the theoretical and conceptual based of
this model in the areas of learning efficiency and appeal. It is hypothesized that the elaboration model will both make instruction more effective, efficient, and appealing. The limitedness of this model is that the narrower the content of a subject, the smaller the differences they will produce (Reigeluth, 1979). It means that the narrower a topic is, less the influence will be, regardless which method the lecturer uses in sequencing those topics.

It is very important to test the elaboration model of organizing instruction by investigating its interaction with subjects' characteristics. This is due to the fact that only few findings have been done so far and the existing findings indicate inconsistency. Through literature there are only four similar researches to be found (Hanclosky, 1986; Degeng, 1988; Wedman & Smith, 1989; and Lusy, 1990).

The inconsistency of these findings is probably due to the existence of the interaction of the elaboration model with the subjects' learning characteristics. Among the four studies above, there is only one that tried to relate it with learner characteristics. Theoretically, this is unadvantageous because it is not based on the established assumptions for developing instructional theories. This assumption shows that an instructional strategy is proved to be effective, efficient, and has a good appeal if it is used in a particular condition (Degeng, 1989).

Hanclosky (1986) discovered the ineffectiveness of the elaboration model, while Degeng (1988) discovered that the elaboration model was very effective for increasing learning outcomes. Next, Wedman and Smith (1989) discovered that elaboration model did not significantly effect learning outcome. Lusy (1990), in her thesis, however, discovered again its effectiveness for medical students. Thus, these four findings indicate inconsistency. Maybe this is because they did not consider the interactive effect of other variables, especially the subjects' characteristics.

Degeng's study (1988) was specially done for his dissertation. It was intended to investigate the effectiveness of the elaboration model on concept learning, particularly the concepts in biology. The elaboration model/theory has not been tested for its effectiveness in any other types of contents, such as in learning principles and/or procedures.

The limitedness of empirical investigation concerning the elaboration model is also obvious in the identification of their dependent variables. In the existing research findings, including the theoretical and conceptual argumentation, the observed variables have only been limited to the level of learning effectiveness. Even, this learning effectiveness only limited to the learning achievement, especially at the low level of cognitive aspects. So far, the effectiveness of the elaboration model/theory at the a higher level of cognition is still not confirmed yet. Also, for the learning efficiency and learning appeal. It is true that by using the elaboration model, as a strategy for organizing instructional content, the
instruction will be more efficient? Further more, is it true that learning will be more interesting for students? An integrated investigation is crucial for examining the effect of an instructional strategy on learning effectiveness, efficiency, and appeal. In fact, it is urgent to find out whether verified effective strategies are also efficient and can stimulate the students to study harder although the scheduled learning period has ended.

Today, the Instructional designers in higher education ignore the interactive effect between the strategies for organizing content and learners' (students') characteristics. They also ignore the characteristics of subject content. In case they succeed to organize the content, but it has not been based on the structure of the subject content to teach.

This research verified the interactive effect between the instructional organization strategy by using elaboration model and the students' characteristics on the learning effectiveness, efficiency and appeal. Students' characteristics which were predicted to interact with the elaboration model were cognitive style, achievement motivation, and learning strategies. The interrelatedness of these variables, used as the working theory, shown follows:

**RESEARCH PROBLEMS**

Following the background of the problem the research problems were as follows:

1. Do different organizational strategies of instructional content cause different learning effectiveness? Do they also cause different learning appeal?
2. Do different cognitive style cause different degrees of learning effectiveness?
3. Do student with different achievement motivation will show different degrees of learning effectiveness?
4. Do student with different learning strategies show different learning effectiveness?
5. Is there any interaction between those fore mentioned variables, i.e. cognitive styles, achievement motivation, and learning strategies on the level of learning effectiveness?
Contribution to the existing body of knowledge

This study was very urgent for providing empirical findings for increasing the learning quality at the higher education. These findings was very useful for the foundation of developing instructional theories and principles, especially those instructional theories and principles related to the identification of the best instructional strategies for achieving the predetermined instructional objectives. All efforts directed toward these goals should be incorporated into the discipline: Instructional Science and Technology. Therefore, this study was provided findings or empirical evidences to strengthen the foundation of Instructional Science and Technology.

This study has also its practical values, especially for developing instructional materials, like textbooks, modules, and other printed materials for instructional purposes. The most obvious contribution will be on the organization of textbooks, modules, and other instructional contents. The elaboration model tested in the experiment gave a prescription of how to organize the instructional content for teaching. That’s why, it was recommended that the designer should accommodate elaboration model in organizing an instructional, especially printed instructional materials.

References


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