eラーニング・ファンダメンタル
eLearning Fundamental

Chapter 8 Designing e-Learning courses

Learning Objective:

Be able to analyze the structure of an e-Learning course based on structuring and sequencing technique.
Be able to analyze examples of learner control in e-Learning in consideration of its advantages and disadvantages.

Summary of this Chapter

- Designing e-Learning courses is work that ranges from analysis to curriculum design, and its output is a map indicating multiple blocks existing as the smallest units of instruction and interrelationships among them.

- Structuring technique is to graphically show the relationships between the identified items to teach. Gagné proposes structuring techniques depending on the nature of the learning tasks. Instructional Curriculum Map (ICM) is proposed as a framework to integrate them and has been widely adopted.

- Sequencing technique is to indicate the order of learning. The order of learning related units is sometimes clear, and sometimes not clear, depending on the nature of the learning task. The degree of the necessity of sequencing is different depending on the methods of learning, such as between classroom instructions led by a teacher, and individual learning using materials with hyperlink structures.

- Issues of learner control are to determine to what degree does the material control the learning process (i.e., system control) and from where to leave it to the learners (i.e., learner control). Appropriate learner control depends on the previous characteristics of learners, the degree of importance of the content, and whether or not advice is added.

- There is a negative view toward "bottom-up sequence" in material development projects based on Constructivism. Sub-skills are claimed to have their meanings only by putting them within the contexts, which can not be possible with the bottom-up sequence. Design principals of e-Learning courses would differ depending on the point of view toward the value of failure experience and the roles of teachers.

Section 1 e-Learning courses development process

Broadbent (2002) proposed an eight-step model of e-Learning development cycle that is appropriate for each development phase (Figure 8-1). It is included in this chapter just for reference; although no details of the development process are further discussed.

Figure 8-1: Eight-step model of e-Learning development cycle (Broadbent, 2002)

Step	Description
1. Scope the Project	It consists of general data collection to assess the feasibility of introducing e-learning in an orgaruzation.
2. Analyze	The context, technology, users, work, training suitability, content, and cost/ benefit are examined.
3. Design	After laying out the curriculum, selecting training methodologies, and setting objectives for the training modules, designing learning support based on factors such as Gagné's nine events of instruction, and developing prototypes.
4. Develop	The training developers implement what was planned in the design phase with what they gained agreement on during prototyping. Internal reviews should be completed.
5. Pilot Test	Once some materials are developed, they are reviewed with users and stakeholders in pilot instructional sessions. Evaluation phase shifts to β testing from internal α testing.
6. Deliver	It consists of using the material in a learning situation. Feedback and observation can provide data for improving the materials.
7. Evaluate	It helps developers to draw accurate conclusions about the impact of e-Iearning, and tells them whether the original needs assessment was accurate and whether the program design is appropriate.
8. Maintain	Ongoing maintenance of e-Iearning ensures that materials instructional strategies, and exercises are updated and that users' comments are addressed.

Note: From the body text written by Broadbent (2002), pp. 67-69, summarized into a table by Suzuki

Development work of e-Learning course is divided into two major components. One of which is to identify items to teach, and the other of which is to consider how to teach the identified items. For the former work, the technique to analyze the contents of the job, to identify the needs of trainings, and to analyze which items should be included to cover a certain field. In the Figure 8-1, Step 1 “The scope of the project,” Step 2 “Analysis,” and “designing curriculum” in Step 3 “Designing” can be categorized into this former process. The latter work, “how to teach,” is “designing learning support” in Step 3 “Designing” in Figure 8-1; it will be explained in detail in the next chapter in this text (Chapter 9 “Designing learning support in e-Learning”).

The output from the tasks from analysis to curriculum designing, which are covered in this chapter, is a map that indicates a number of the smallest blocks of instruction (or contents to learn within an hour) that exist in it and the relationships between these units. It is also referred to as “macro design,” and designing learning support in the next chapter will be done while using the map as input, which is called “micro design.” First, structuring technique and sequencing technique are discussed as the techniques to look at the whole contents of an e-Learning course.

Section 2 Structuring technique and sequencing technique

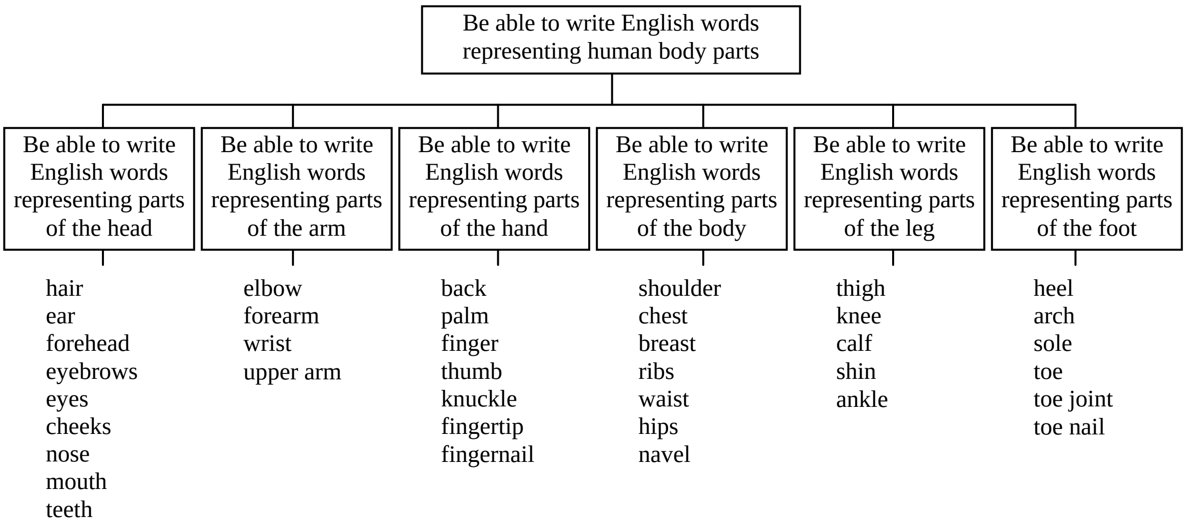
8-2-2: Types of learning tasks and appropriate task analysis

The structuring technique refers to a technique to graphically indicate the relationships among the identified items of learning. Gagné's ID theory, assuming that the structures of learning tasks differ depending on their types, proposes to employ the appropriate method to each of them (see Figure 8-2; refer to Chapter 5 of Suzuki, 2002, for details. The examples of analysis are shown following Figure 8-2 from Suzuki, 2002).

Figure 8-2: Types of learning tasks and task analysis

Verbal information Cluster analysis	Gathering related or confusing items; not limited to hierarchical relationships. Identifying relationships/differences between items or between an item and a known item to find a hint to memorize them. <cluster type> <network type>
Intellectual skills Hierarchical analysis	Starting at the highest learning objective, from top down, searching for more basic objectives by asking "What are needed as foundation to learn that objective?" Search more fundamental objectives for each of the found lower-level objectives in the same way and indicating how they are built up from basic skills.<pyramid type>
Motor Skills Procedural analysis	Find "skill elements" included in the learning objective by questioning "What should be done first, then what should do be done next, when performing the target skill?" to define the procedure to execute the target skill, so as to resolve them into divided steps that can be practiced separately. Sometimes lower-level objectives may be necessary for some steps.<step-by-step type>
Attitudes Hierarchical / procedural analysis/ Cluster analysis	By questioning "What does a person have to be able to do when expressing this attitude?", find intellectual/motor skills that are required to express the target attitude, and by questioning "What is the reason for selecting this attitude?", find information that is required to form the attitudes.<compound type>

Source: Suzuki, K. (2002). "Instructional Design Manual" Kitaooji-shobo, p. 71 (Figure 5-1)



.Figure 8-2-1: Example of cluster analysis "human body parts"

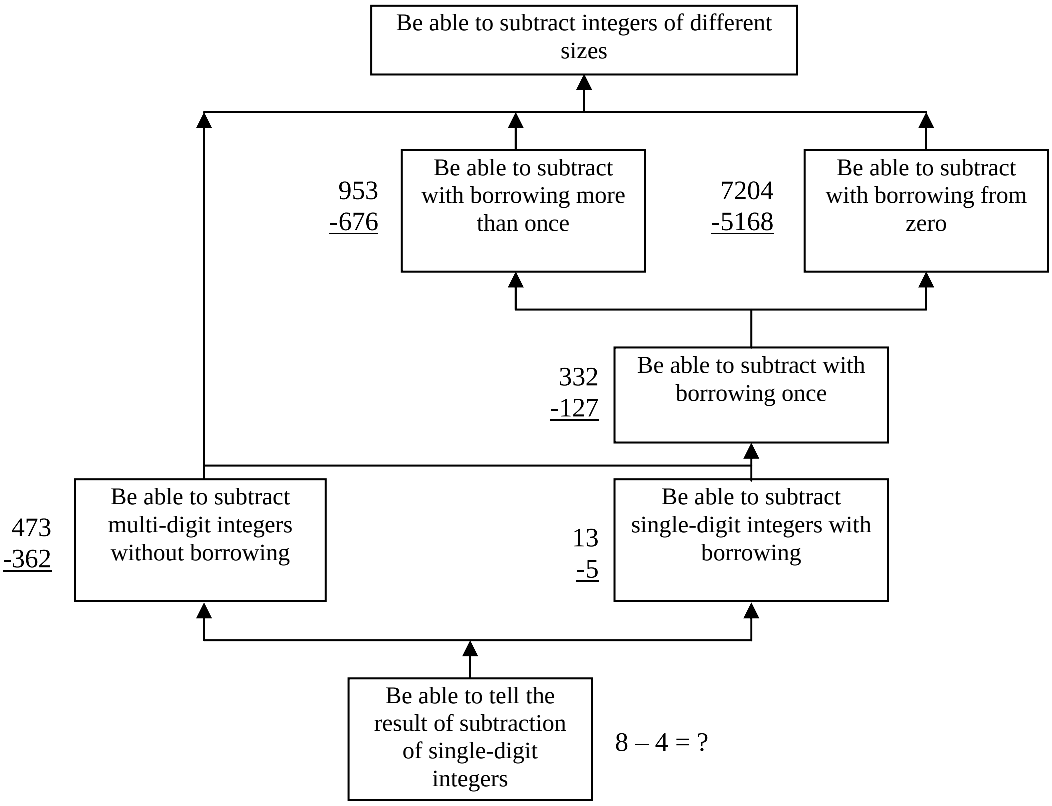


Figure 8-2-2: Example of hierarchical analysis “subtraction”

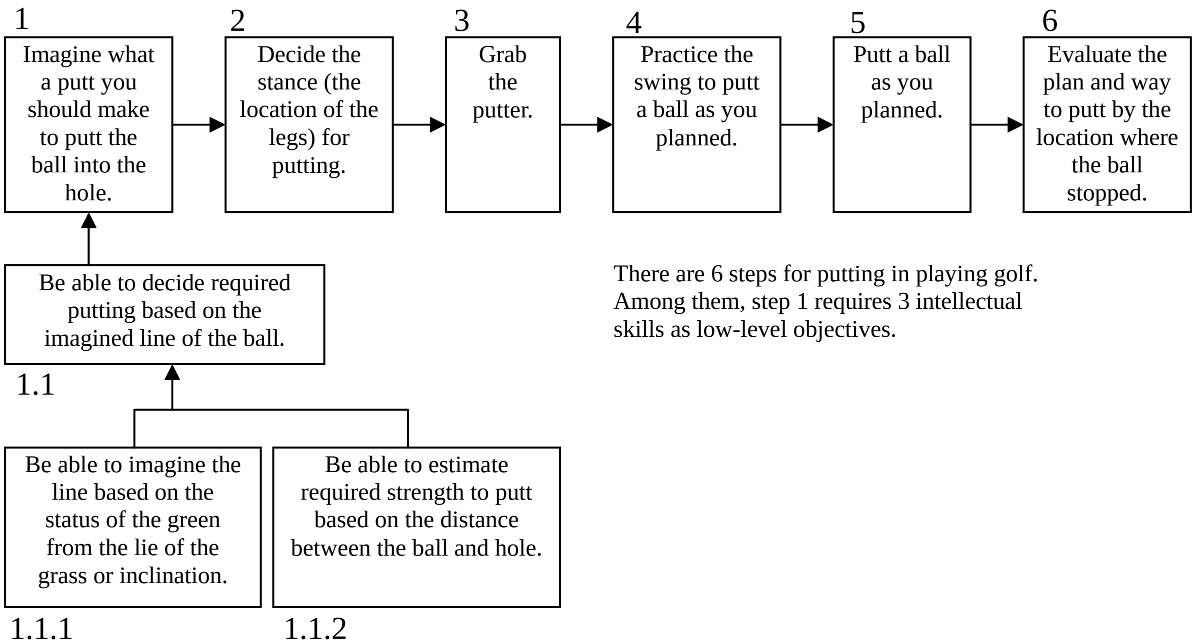


Figure 8-2-3: Example of procedural analysis “putting in playing golf”

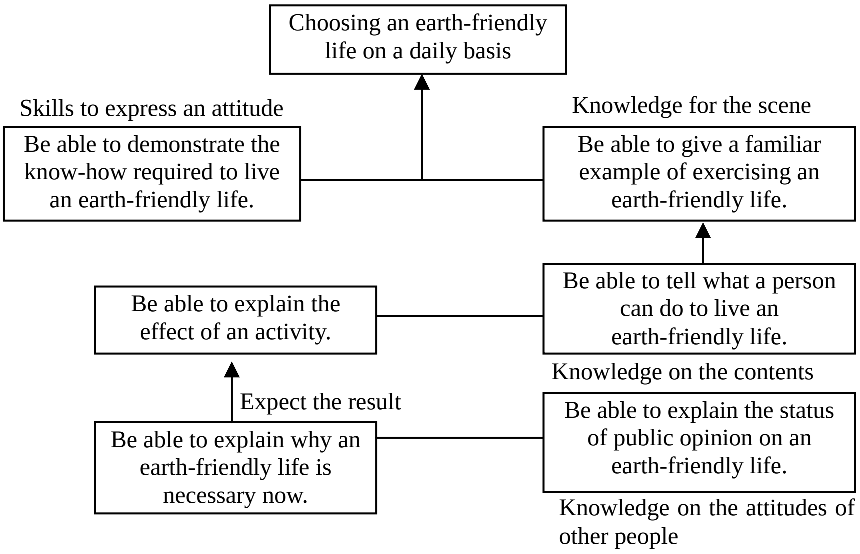


Figure 8-2-4: Example of analysis for learning attitude “choosing environment-friendly life.”

Sequencing technique refers to a technique to indicate the order of learning. It shows which of the elements depicted in structuring is the most effective starting point for learning. As final output of this technique, various types of mechanisms are proposed, such as showing the order to learn statically or dynamically, depending on the status of on-going learning.

If it has a hierarchical structure, then the order is consequently clear. Basic approach is the learning sequence of “checking from the top and going downward up to the level that is appropriate, then begin learning from there upward to increase the level.” If the procedure is clear as in motor skills, the basic approach is to learn each sub-element one by one at first, then to learn the whole sequence to improve precision and fluency (Note: there is controversy over whether to begin with the first of the sub-elements, or to begin with the last of the sub-elements and work backward toward the first element). On the other hand, there is the structure that does not have any clear order such as cluster analysis of learning languages. The mechanism that selects technique to choose the next learning unit must dynamically monitor the learning status of learners, and must employ techniques that make the relationship between the units that have already learned and the units that are yet to be learned.

In the Elaboration Theory proposed by Reigeluth (Reigeluth & Stein, 1983), the principles of macro design are explained in terms of the “zoom lens analogy.” It explains that, like looking into a painting through a zoom lens, a learner first looks at the whole painting to grasp the relationships between the parts in the painting, then “zoom in” onto a part of the painting to learn the details of it. After going through that part, the learner “zooms out” to widen the perspective, looking at the whole painting again, review the part from the whole painting context to grasp the relationship between the learned part and the next part, then again “zoom in” onto the next part. By repeating this procedure, the learner acquires each part and reviews it within the whole. In order to utilize the zoom lens analogy, Reigeluth points out that a design technique is needed, which is different from a micro design strategy for a single learning objective (Figure 8-3). Macro design can be considered an advanced form of the sequencing technique.

Figure 8-3: Technique of macro design in Elaboration Theory (Reigeluth)

1. Technique related to elaboration and exemplification with the "zoom lens analogy" of materials to highlight the framework of a painting, and to enable learners to learn the details of the painting, while gradually increasing complexity.
2. Technique related to the timing and methods to summarize or review the items that have already been learned.
3. Integration technique to deepen understanding by making connections between items that have already been learned.
4. Technique related to utilizing metaphors or parables to make a connection between items that had already been learned and items that have been newly learned.
5. Technique to remind a learner of the strategy of learning (learning skills) at a necessary point.
6. Technique to decide the degree of learner control to let the learners select the parts or the order to learn.

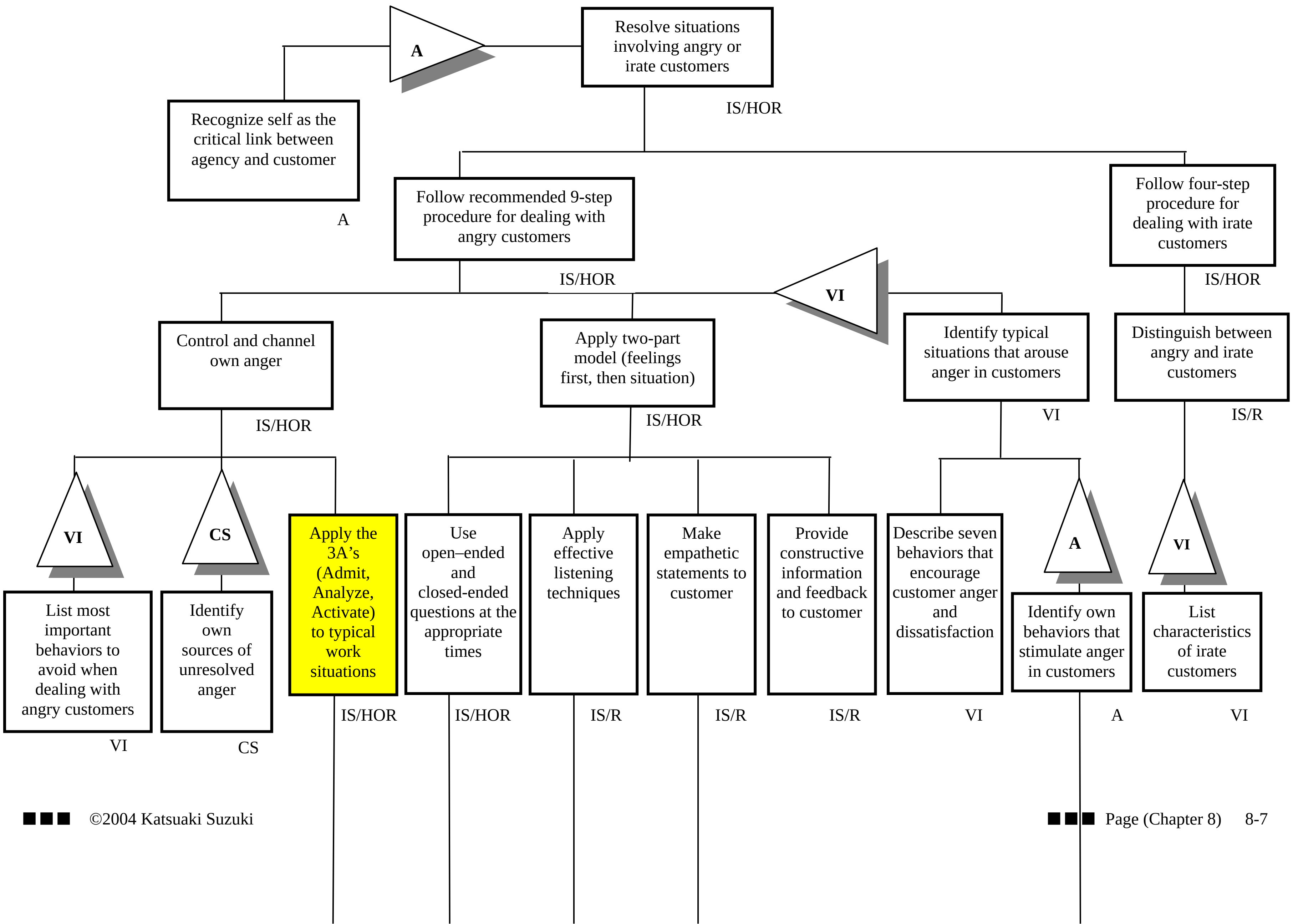
Note: Reprint of the body text by Suzuki (1994) in table form

8-2-2: Instructional Curriculum Map

Briggs and Wager (1981) propose "Instructional Curriculum Map (ICM)" as a framework to integrate the contents to learn, including learning tasks from various domains. ICM graphically illustrates the relationships among objectives from other related domains, by expanding the learning hierarchy, which is the structuring technique of intellectual skills proposed by Gagné. This has become widely used as a map of the curriculum that is designed focusing on learning "intellectual skills," while expanding to such objectives from cognitive strategy and verbal information domain, as well as those from affective domains such as raising motivation to learn or affirmative attitude. Figure 8-4 illustrates an example of ICM for a training curriculum of salespersons, "dealing with angry customers" (Gagné & Medsker, 1996).

When hierarchical analysis is conducted, the lower-level objectives are identified by asking, "What are one-level lower fundamental elements, in order to become ready to learn this intellectual skill?" After a learning hierarchy is depicted, an ICM is created in similar fashion, by questioning, "What is (are) the related objective(s) to promote learning and application of this intellectual skill? What is related information? What is associative cognitive strategy? How about related attitudes?" By following this scheme, a person can propose a structure of instruction at a course level based on the relationships among the objectives from different domains.

Figure 8-4 is depicted for the top objective of "Applying three A's (accept, analyze, and act) to typical job situations." This learning objective is marked IS/HOR because it is categorized as intellectual skill at higher-order rule level. Related objectives (indicated with same color) are assumed to form a unit of the course. By graphically illustrating related objectives in the form of a map, you can construct a unit of instruction that deals with related objectives together, rather than dealing with them separately. ICM shows the whole course (or the whole unit) and the relationships among its constituent units (or lessons within a unit).


Resolve situations involving angry or irate customers
IS/HOR
A
Recognize self as the critical link between agency and customer
A
Follow recommended 9-step procedure for dealing with angry customers
IS/HOR
Follow four-step procedure for dealing with irate customers
IS/HOR
VI
Control and channel own anger
IS/HOR
Apply two-part model (feelings first, then situation)
IS/HOR
Identify typical situations that arouse anger in customers
VI
Distinguish between angry and irate customers
IS/R
VI
CS
List most important behaviors to avoid when dealing with angry customers
VI
Identify own sources of unresolved anger
CS
Apply the 3A's (Admit, Analyze, Activate) to typical work situations
IS/HOR
Use open–ended and closed-ended questions at the appropriate times
IS/HOR
Apply effective listening techniques
IS/R
Make empathetic statements to customer
IS/R
Provide constructive information and feedback to customer
IS/R
Describe seven behaviors that encourage customer anger and dissatisfaction
VI
A
Identify own behaviors that stimulate anger in customers
A
VI
List characteristics of irate customers
VI

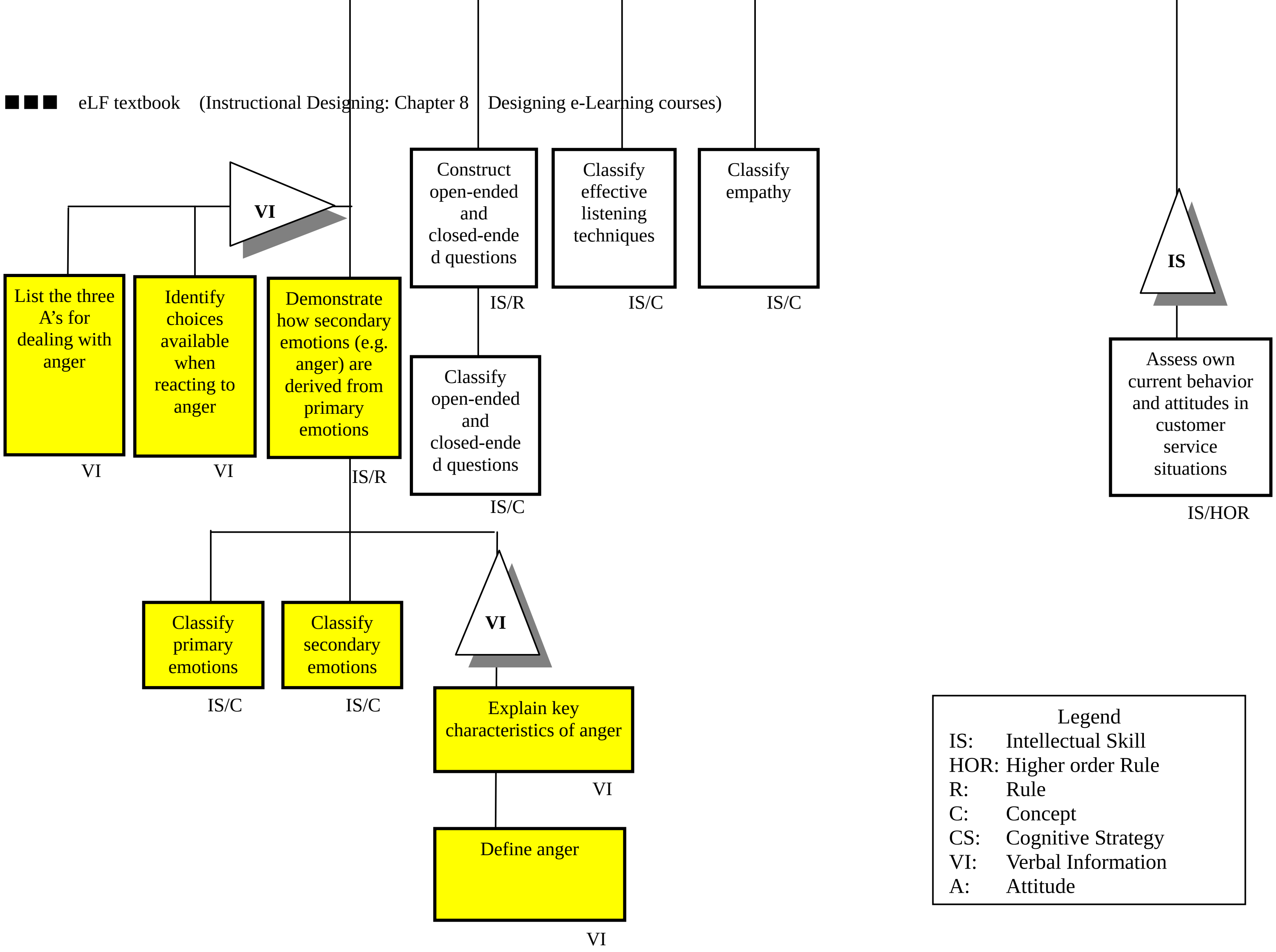


Figure 8-4: ICM for “Dealing with angry customers” course (Gagné & Medsker, 1996, Figure 15-1, p.198)

Section 3 Structuring/sequencing and learner control

One issue to be considered after structuring the contents to learn and sequencing the order to learn is "to what degree we should require the learners to do as the result of the analysis." This is referred to as the issue of "learner control" (Note: it is a technical term that means that the learners control their own learning, it does not mean to control learners without giving them freedom. The stronger the elements of learner control, the greater the degree of freedom of the learner; an example of learner control is the learner arranging the order of learning). In traditional classroom instruction, the instructor had to decide the sequence of lessons, and all of the learners had to follow the order specified by the instructor. Therefore, "What is the most appropriate sequencing?" is an important question, and it is natural for everybody in the class to follow the determined sequences.

On the other hand, in the network environment with a hyperlink structure, the concept of sequencing of learning objectives can be less important. The best sequence for everybody does not have to be decided definitely in advance. In fact, a map can be provided to the learner, which shows relationships among the components, indicating whether ordering is critical or not. Allowing the learners to control the ordering of learning and to select the contents of learning is expected to have good influence on the learners' motivation. Clark & Mayer (2003) propose three principles of learner control: (1) learner control should be used when the learners have sufficient previous knowledge and good metacognition, (2) important events should be set as default options in navigation, (3) advice should be added to learner control. How to use learner control and advice is identified in Figure 8-5.

Figure 8-5: How to use learner control and advice (Clark & Mayer, 2003)

WHAT TO LOOK FOR IN e-LEARNING

CONSIDER A COURSE HIGH IN LEARNER CONTROL WHEN:

1) Your goal is primarily to provide information rather than to build skills.
2) Your content is relatively low in complexity and topics are not logically interdependent.
3) Your audience is likely to have high metacognitive or learning self-regulation skills.
4) Your audience is likely to have prior knowledge of the content.
5) The lessons or courses are later in a series so that learners have built a knowledge base.

CONSIDER e-LEARNING THAT USES ADVISEMENT WHEN:

1) Your audience has a mix of background knowledge and skills related to the content.
2) Saving learning time is a high priority.
3) Reaching high levels of skill and knowledge proficiency is a high priority.
4) Resources are available to create the questions and decision logic necessary for advisement.
5) Training is a regularly scheduled event, or is primarily for compliance purposes, or demonstrated competence would save considerable learner time.

CONSIDER e-LEARNING THAT USES PROGRAM CONTROL WHEN:

1) Your audience is primarily novice and a high level of proficiency is a priority.

Note: from the summary of Chapter 12 (pp. 243-244) by Clark & Mayer (2003)

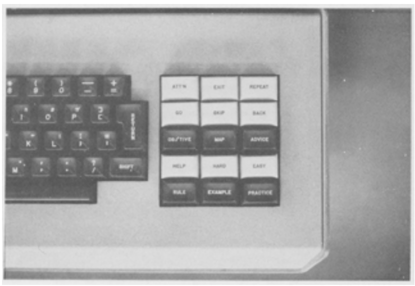
Column: Component Display Theory (CDT) and Learner Control

Component Display Theory (CDT) is an ID theory that divides the instructional materials into small pieces of frames (i.e., component displays) that can be selected by learners (Merrill, 1983). It enabled the learning materials to be controlled by learners, yet provided materials based on structural analysis or hierarchical analysis. TICCIT (Time-shared, Interactive, Computer-Controlled Information Television), which was designed with the concept of CDT, was a large-scale CAI system created from 1971 to 1979 at Brigham Young University in Utah, funded by the US National Science Foundation (NFS). At that time, this system, which was considered one of the two major system of its kind, (the other being the PLATO system developed in Illinois), was introduced in Japan (Itaya, 1979). However, the ID theory (CDT), which was the basis of TICCIT, did not attract attention in Japan.

The hardware created for TICCIT was equipped with a dedicated keyboard with 15 learner-control keys, in order to allow the learners to move between the frames freely. First, the learner selects the “Map” key to choose the content to learn from the map illustrating the structural relationships among learning contents. There three kinds of frames, “RULE,” “EXAMPLE,” and “PRACTICE,” which are displayed on the screen when the learner presses the corresponding keys. Pressing “EASY” or “HARD” key will change the display according to the level of difficulty (low, middle, and high). The “ADVICE” key is to be pressed when the learner wants advice on learning. In the “MAP,” the learner’s status (not selected, not passed, passed) is indicated by using different colors. The learner can choose a higher-level item without even passing basic items, while the system-driven advice was provided, such as “Basic items are not passed. You are advised to study them first, although you may continue to see your choice.”

TICCIT and CDT are pioneers among ID theories. TICCIT had an extreme mechanism of learner control and advice generation. CDT was developed by Professor M. David Merrill, who is still active and is seeking the way to automatize ID as he develops another ID theory, called Instructional Transaction Theory (ITT) based on the idea of learning objects (LO).

Appreciating the author’s regret that CDT remained to be not well-known, an undergraduate student, who wrote a thesis under my supervision in 2003, designed a shell script of web-based authoring tool using Perl, which produce e-Learning modules based on CDT (Namikawa, 2003).



Learner Control Keys (TICCIT)

Reference:
Takeshi Namikawa (2003) “Developing a shell script of web-based instructional material based on Component Display Theory” graduation thesis, Faculty of Software and Information Science, Iwate Prefectural University [Available online] http://www.et.soft.iwate-pu.ac.jp/study/soturon/1999/0311999128.pdf (summary in Japanese)

Section 4 Constructivism and denial of bottom-up sequence

The ID model has been developed as a technique to make training more effective. It was born with program learning and teaching machine, and developed with CAI materials. The technique of ID has always focused on clarifying learning objectives and promoting the levels of learning. Thus, it has been investigating the connection among the three elements: (1) what should be acquired by the material/training (learning objective), (2) how to evaluate whether or not it has been achieved (evaluation), and (3) what is the most appropriate procedure to learn in view of the nature of the contents to learn (instructional strategy). I would like to call this technique to minimize the gap between evaluation method and instructional strategy "objective-driven approach" (Note: It is known as ensuring "congruence" in technical terms.)

The objective-driven approach is powerful. By going back to the item that learners could not do and identify the cause and re-start with it, the learners can approach the objective gradually. Structuring and sequencing techniques are also powerful tool. Having the overview of the whole course in mind, one can proceed to a major goal step by step. By breaking down into small pieces, clarify the immediate objective so that one can achieve it. They are a perfect methodology for a diligent person.

On the other hand, approach that assumes one can achieve a major goal "some day" by achieving a small forward step is not always successful. Breaking down the learning into small pieces, find out what is necessary for a learner so that one can fix it in the manner of medical treatment. This powerful approach may not work always. What shall a person do for a thing whose structure itself is not clearly defined (ill-structured domain), in contrast to a thing whose structure is clearly defined (well-structured domain)? How about a task that is extremely complicated, which makes a person feel "Do I have to clear all of them?" by just looking at the analysis result? Can it also be applied to a highly specialized field that is more practical and advanced, with complicated relationships among its constituent factors? Can it be applicable only for "textbook-like" contents dealt with in elementary or secondary education, or in introductory training for engineers?

There is a point of view that has been emphasized in recent years, that assumes that meaningful learning is letting learners "suddenly" confront a more chaotic scene where one is required to solve a problem and learn basic skills as a measure to conquer difficulties, denying step-by-step learning with a map such as ICM. This point of view is called Constructivism.

A research group at Vanderbilt University, lead by Prof. Bransford, developed a multimedia material called the Jasper Series (for more details, refer to Suzuki, 1995, or http://peabody.vanderbilt.edu/projects/funded/jasper/). They designed a material of detective collaborative learning mainly using videos to teach mathematics to elementary school students. It was highly recognized as it realized main features of Constructivism (Note: there was an initiative to create a Japanese edition, but it has not been realized).

Jasper is the name of the main character in the story. The tales of adventure consist of 12 episodes of daily life including scenes to raise questions related to mathematics, each lasting 14 to 18 minutes. The story ends with a scene where one of the characters confronts a challenge and poses it to children who are watching it, and they try to solve the question. It consists of 4 types of episodes: (1) a travel plan using time and distance, (2) project plan using statistical data, (3) finding a route by applying geometry, and (4) a task related to algebra. There are 3 episodes of each type.

In the first episode of Jasper's adventure, "Journey to Cedar Creek," Mr. Jasper Woodbury, the main character of this story, visits Cedar Creek, going up a river to look at a used boat that he saw in a newspaper advertisement. At the end of the episode, the viewers are given a challenge to judge whether Jasper can return home by the boat he bought without running out of fuel and by sunset. Children have to make a judgment for Jasper, from the information that is embedded in the video they watched (such as estimating distance from the map and learning the time of sunset; they need to combine 17 pieces of meaningful information from 44 pieces of given information in total), sorting out complicated conditions. Children, who become absorbed in the video as the story goes on, consider what information is required to solve the challenge, recall the contents of the video, and watch parts of the episode again as necessary, gradually building the factors to make a judgment (For details of the story, refer to CTGV, 1991, p. 37 or http://peabody.vanderbilt.edu/projects/funded/jasper/preview/jtcc.html, which is good for getting the idea, as it provides several images along with the story).

To find the answer to Jasper's challenge, who bought the boat with a broken light; i.e., "whether or not he can go back home by sunset," learners need to derive the subtask of obtaining the time and remaining amount of the fuel, find embedded information necessary for the subtask, create a formula, and calculate. Through the calculation, children find that the boat does not have enough gas to go back home, and then, as the next subtask, they have to calculate whether or not he can get to the midway point to refill the gas and whether or not he has enough money to buy the fuel. By solving 4 subtasks and calculating a total of 16 formulas to achieve the subtasks, children can obtain the answer that "Jasper can return home before sunset."

The Jasper material places emphasis on the process to collaboratively solve a task for which a person cannot find out its solution immediately. It aims to let children feel the pleasure of finding the task (creating a formula) and solving it and to realize the pleasure of trial and error, the difference in perspective that becomes evident by working collaboratively, multiple ways to the correct answer and better solution, and effectiveness to think mathematically. It is a material designed with the intention that each child "constructs" a solution mathematically in the context of the actual (authentic) situation through experience, rather than by teaching it to them.

However, once this material was brought to classrooms, it often was not utilized in the way it had been intended. Assuming that in the United States, just like any other countries, it was widely believed that the class should be led by the teacher building up step by step, the Jasper material could be taken as being "too chaotic." The teacher felt "this material is too difficult to children, so I need to give them enough help," and they provided much help (unnecessary interference?).

From this experience, the research group of Jasper points out 3 factors as a basic standpoint that has significant influence on the style of classroom teaching as shown in Figure 8-6. Although Jasper material is intended to realize a Constructivist learning environment, there could be completely different classes taught from it, depending on the style of class the teacher adopts. As shown in Figure 8-7, three types of classes using the Jasper material can be expected.

This is a material for children which has been developed under the assumption of being used in elementary schools; however, it has enough complexity that it can be used for mental training for adults. When I introduced it in English without translation, it was rejected; "Its Tennessee accent is too heavy for learners to catch the meaning." Be that as it may, I believe that it provides hints to major matters of overall e-Learning in designing courses, such as how to deal with hierarchies, how to evaluate the value of failure, or determining the role of instructors. In designing an e-Learning course, it is important to check the following basic premises. Recently, the "parachute learning method" (http://www.noguchi.co.jp/supra/study.html) was proposed by Yukio Noguchi as a method to realize the shortest way to achieve the objective, rather than building up from the basics. Meanwhile, some insist on an outgrowth "from training 'just in case' to training 'just in time'." It would be better to review while comparing with sequencing which requires "acquiring boring basic skill" as a premise and the Jasper material, which "suddenly puts a person in a certain context and lets one learn the basic skill when it becomes necessary."

Figure 8-6: Three factors that have influence on the style of class

(1) Defining the order of the contents to teach: whether to regard completing acquisition of sub-skills as a premise or to regard that sub-skills have meaning only within a certain context

(2) Value of failure: whether to regard that the ideal is no failure or to regard conquering failure, limitation, or misunderstanding as important

(3) Role of teachers: whether to regard them as authorized information providers or as those who can be advisors or cooperative learners as necessary

Note: reprint of table 6, Suzuki (1995)

Figure 8-7: Three types of classes expected for Jasper material

Type	How to proceed classes
Type 1: Basic first, immediate feedback, direct instruction	Conducting the class from the standpoint that although the Jasper material is very good instructional material, basic skills or concepts that are required to solve the tasks in the Jasper material should be taught before using it; therefore, it is better to teach them on that condition. It regards the role of teachers as an information source; teachers directly explain the basic skills, which are taken away from the context, and let the children practice the skills one by one. When the Jasper material is used from this standpoint, it is expected that the class is led by the teacher in the style that the teacher explains the correct process to solve the task to the children (occasionally asking questions to the children about the required information). Disadvantages of this style are taking away the pleasure of mathematics, not suitable for teaching why basic skills are important and when they can be utilized, and even if the basic skills are achieved it is difficult to raise it to the ability to combine basic skills to solve a more complex task.
Type 2: Structured problem solving	Conducting the class from the standpoint that although the Jasper material is to be used concurrently with learning basic skills, in order to avoid the children's failure and prevent confusion, it is better to prepare a worksheet and let them solve the tasks along with it. Several versions of the worksheet are prepared to cover the various possible methods (various types of methods including methods that do not succeed as well as the best method) to solve the task, and it has columns to fill with information necessary for each method from the video or spaces for doing necessary calculations. The more detailed explanation given on the worksheet, the fewer the number of failures by children. The class is conducted in a style, for example, of assigning different worksheets to different groups, letting children fill in the blanks, to present them to each other, and to review and compare them. Failures that can be avoided by this method are in the process to create the method to solve the task (low-order objective) and to evaluate its appropriateness; therefore, it results in taking away from the children the task that is assumed to be the most important in the problem solving process. In an experimental class using this style, it is reported that exchange of opinions among the groups is limited and the focus is placed on collecting the facts from the video and calculation.
Type 3: Guided Generation Model	Conducting the class from the standpoint that aiming to make the most of the fertilities of the Jasper material in which multiple solutions are possible, give children the Jasper material at the first stage and let them create solutions through trial and error in group activity. In order to raise consciousness of "detective community" as the whole class including the teacher, minimal instructions are given by the teacher. Although the teacher gives advice as necessary, the children are given only hints to reach the right answer by themselves, rather than the right answer, aiming to create the "base" for their research. The amount of the help is reduced progressively so that the children can become independent at the end. This is the method that is recommended by the research group of the Jasper project; however, it highly relies on the teachers. Significant time and efforts were spent on a challenge to change the culture in the class, requiring the teachers to go beyond the "common sense" of the daily classroom activity.

Note: from the body text written by Suzuki (1995), summarized into a table

In the Jasper project, they also pay attention how to raise abilities of teachers and how to establish a system to support teachers. The following 6 points were raised that require attention:

(1) It changes the role of the teacher from an information provider to a coach/a person who learns together, making a change in the human relations within the classroom

(2) Since it is impossible to prepare a detailed instruction plan, it requires flexibility that can deal with various situations

(3) Since it is impossible to become an "expert" on each task, because tasks occur inconsistently, it requires the attitude to learn together and to suggest the way to investigate, rather than try to provide the correct answers

(4) It requires learning the appropriate timing and method to give advice that is not overly instructive

(5) It requires the skills to access databases related to the task for further research to deepen one's understanding

(6) It requires the ability to place it in the existing curriculum, balancing it with mandatory learning items

In designing an e-Learning course, it is desired to clarify "originally what is to be learned in the course" as much as possible. Without clarifying the end goal and establishing a firm method to evaluate whether or not it is reached (evaluation method), it is impossible to clearly determine the effectiveness of the designed course and achievement of the training. Even if only the end goal is defined clearly, without creating the path to reach there and placing a guide, learners who are told "you should reach the end goal on your own" may feel embarrassed. Therefore, in the author's opinion, structuring and sequencing should be applied as much as possible and its result should be shared with the learners.

On the other hand, it is irritating to start with basic items and take time to reach the end goal. In addition, the author does not prefer to force a person to build up from the base whenever and in any situation, because it seems to be a matter of ego on the teaching side, as if saying "Because I had a hard time doing it like you, you should have the same experience." Once having finished drawing the plan, it would be better to exhibit creativity in seeking what strategy is to be used and where to start in accordance with the time, place, and occasion, in order to achieve the training result while enjoying the process. It would be better to do what should be done first, then, taking it as the base, create an e-Learning course that realizes the individuality and ideas of the instructional designer. It would be better to write down in the design of the course that assures some space for learners' individualities and ideas in the course of training.

Column: Garbage in, garbage out

There was Center for Educational Technology at Florida State University, where the author was working while studying in the United States. They were working on the design and development of a CAI system called JSEP [Job Skill Education Program] project for newcomers of the United States Army to increase their basic knowledge and skills. It was a huge project, designing and developing computer-based instructional materials that cover approximately 300 topics, including reading ability, calculating ability, and ability to read maps, which are required of newcomers based on job analysis in the Army. I was designing the materials as an instructional designer at an early stage of the project, then worked as a programmer to computerize the designed materials when the design of most of the materials was completed. During the daytime I attended lectures and at night I managed the shift schedule.

In those days, the phrase “garbage in, garbage out” often came up in conversation among programmers. Literally translated, it means, “if you put garbage in it, garbage comes out from it.” It means that if the design of the material is bad, now matter how skilled the programmers, the material would never be good; thus, poor-quality material will be created as it is ordered as such. This was a form of grief with irony. From my experience as a programmer in programming material designed by others, I often agreed with it, saying “indeed, garbage in, garbage out,” hoping that it did not apply ironically to the material I had designed!

For good or for bad, work performed through machines is of the nature that the commands are executed precisely. The design of an e-Learning course (and the design of learning support following it: to be discussed in the next chapter) is definitely the most significant factor that determines whether the material is become a good one or a bad one. How much money you would put for the provision of the e-Learning system (such as LMS); it is impossible to prepare a good e-Learning environment with bad material design. If carefully prepared, it can be an effective instructional material; however, if there is a mistake, it will be executed as is. Even when its appearance is good, a course not covering what should be covered would be indeed “garbage in, garbage out.” This explains why ID is important. Don’t you agree?

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End of chapter report assignment (Chapter 8)

Write a report on one or more of the following three assignments:

1) After reading this chapter (Chapter 8), write a report including questions, comments, opinions, or thoughts you have. If you have past experience or additional information, or have conducted research (attach the name of the source of information), include them to deepen your understanding.

2) Raise an example of an e-Leaning course, then extract its course structure and analyze it by consulting an ICM, or other diagrams. Without being limited to e-Learning, you can analyze your experiences as a student in school, or educational activity you are involved in.

3) Consider the rights and wrongs of learner control from the standpoints of agreement and disagreement (or agreement on condition). In considering, reflect on your e-Learning (or other than e-Learning) experience. In addition, it would be deepen your understanding to include “denial of bottom-up sequence” related to the Jasper material described in this Chapter.