Finding e^3 (effective, efficient and engaging) Instruction

M. David Merrill [1]

Abstract

From a review of instructional design theories, research and practice Merrill derived the First Principles of Instruction. In this paper he suggests a rubric for using these principles to evaluate existing instruction. This paper presents a Course Evaluation Form and accompanying demonstration and application rubrics that enable the user to examine an existing course to determine the extent to which First Principles of Instruction have been implemented. For purposes of statistical analysis the paper also suggests a scoring procedure that assigns a value of from 0 – 10 indicating the degree of conformance to First Principles of Instruction. The remaining sections of this paper summarize First Principles and the instructional design concepts involved in these principles and the accompanying rubrics.

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The study of First Principles of Instruction over the past decade (Merrill, 2002a, 2006, 2007a, 2008, 2009) has shown that much of the available instruction falls far short of its potential effectiveness, efficiency and engagement (e^3). Too much instruction is information-only, sometimes characterized as spray-and-pray-remember-what-I-say instruction, meaning that the instructor or instructional system presents information, hoping that the learners will *acquire* some of it and then assesses this retention via remember tests. This tell-and-ask instruction is subject to significant forgetting, seldom prepares the learner to apply the information to real-world tasks, and often lacks any motivation for the learners to acquire and use the information accept to pass the test.

Learners are motivated when they can see the relevance of what they are learning. If they learn new information in the context of real world problems, if they are shown a demonstration of skills they are expected to acquire (show), if they have the opportunity to apply these skills in the solution of additional real-world problems or the performance of additional real-world tasks (do), then they are much more likely to acquire, retain and be able to use the required skills.

But how can we recognize e^3 instruction? Much instruction has very high production skills, contains beautiful graphics, animations, and video. But do these seemingly appealing multi-media courses really teach? What is necessary to promote effective, efficient, and engaging instruction? Is it possible review a course and estimate its e^3 level?

The material outlined in this article will help you review existing courses to determine their implementation of First Principles of Instruction and their potential e^3 level. Part One is the Course Evaluation Rubric consisting of four tables. **Table 1** is a form for summarizing the evaluation of a course. This form is the heart of the Course Evaluation Rubric. **Table 2** is an instructional event summary. **Tables 3** and **4** are e^3 quality rubrics for Demonstration and Application.

Part two of this paper summarizes the concepts involved in First Principles of Instruction and the Course Evaluation Rubric. This section includes a statement of the First Principles of Instruction (**Table 5**), a description of five types of component skill (**Table 6**), instructional strategies appropriate for each type of component skill (**Table 7**), component skills for a whole task (**Figure 1**), a problem- or task-centered instructional strategy (**Figure 2**), effective peer interactions (**Figure 3**), and finally principles for effective use of multimedia.

Part One: The Course e^3 Evaluation Rubric

The heart of the rubric is the First Principles Course Evaluation Rubric form (**Table 1**). Following is the procedure for using this form to evaluate a course.

1. In the header section of the form indicate the name of the course, the URL, the reviewer and the date.

2. In the left column of the form list each component skill taught in the course. It is often possible to determine the component skills in a course from the table of contents for the course.

3. Check the appropriate box to indicate the type of skill taught by this component … kind of, how to, or what happens (why) (See under Part two: Consistent Component Skills).

4. For each component skill use **Tables 4** and **5** to evaluate the quality of the demonstration and application for this component. The cells in these tables correspond to the checkboxes in column 5 of the Course Evaluation Rubric form. The first or demonstration row of checkboxes in column 5 of the Course Evaluation Rubric corresponds to the row for that type of skill in the e^3 Demonstration Quality Rubric (**Table 3**). The second row of checkboxes in column 5 of the Course Evaluation Rubric (**Table 1**) corresponds to the row for that type of skill in the e^3 Application Quality Rubric (**Table 4**). If the answer to the question is *yes* check the corresponding checkbox in column 5. If the answer to the question is *no* leave the box empty. If the instruction for a given component skill is complex or lengthy it is sometimes hard to remember all the details of the instruction. **Table 2** is an instructional event summary that can help you keep track of the details of the instruction for a given instructional component.

5. Complete the last section of the Course Evaluation Rubric if the course involves the learner in a whole problem. Use the last row of the e^3 Demonstration and Application rubrics to complete the form for a whole problem.

6. Make liberal use of the comment sections of the form. After a bit of time has passed it is often difficult to remember why a particular rating was made. The comments will help one to r*eca*ll reasoning. It is impossible for someone else to know why a particular *r*ating was used. The comments make the course evaluation more valuable to others. The comment section may also be used to make recommendations for course revisions to improve its e^3 quality and conformance to First Principles of Instruction.

7. For readers who may have an interest in correlating the rubric with student performance or other independent measures we suggest the following untested procedure for determining a score for individual component skills or for the course as a whole. The author would be interested in your attempts to use this scoring procedure. The proposed scoring procedure is as follows:

   a. Cunt 1 point for each checked box in the Course Evaluation Rubric for a given component skill or problem. The first checkbox, the tell and ask cells, in each row in column 5, score 0. This gives a score (C) of from 0 to 10 for each component skill and a score (P) of from 0 to 10 for the whole problem.

   b. The following formula gives you the total score for a module or course: Score = .75ΣC/N + .25P where: ΣC = sum of component skill scores; P = whole problem score; and N = number of component skills. This formula allows component skill instruction to account for ¾ of the total score and whole problem instruction to contribute ¼ of the total score.

Table 1 First Principles Course Evaluation Rubric[2]

Course Name: **URL:**
Reviewer: **Date:** **Page** **of**

Component Skills:	Kind?	How?	Why?		Comment:
	☐	☐	☐	☐☐☐☐☐☐ ☐☐☐☐☐☐	
	☐	☐	☐	☐☐☐☐☐☐ ☐☐☐☐☐☐	
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	☐	☐	☐	☐☐☐☐☐☐ ☐☐☐☐☐☐	

Whole Problem:

	☐☐☐☐☐☐ ☐☐☐☐☐☐	

N = **ΣC =** **P =** **Score = (.75 x ΣC)/n + .25P =**

Comment:

Key:	Tell	Show	Multimedia	Guide	>=3	Structure
	Ask	Do	Feedback	Coach	>=3	Peer

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Table 2 Instructional Event Summary[3]

Course name: Date: Reviewer:
Component name:

Instructional Events	Tell	Ask	Show	Do	Multimedia	Feedback	Guidance	Coaching	Structure	Peer	Type	Comments
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		

Comments:

Procedure:

Use this form when a given instructional component has a large number of individual instructional events. The purpose of this form is to help you keep track of these events.

1. Identify the instructional component.
2. List the instructional events one event per line. An instructional event is a single tell, ask, show or do.
3. Check if there is no violation of a multimedia principle. Comment on violations if they do occur.
4. Check if the event includes feedback, guidance, coaching, structure or peer collaboration/critique.
5. Make liberal use of comments to help you remember details of events.
6. Indicate the type of learning involved: what is it – kinds (K), how to do it (H), what happens (W), or whole problem (P).

Table 3 Demonstration e[3] Quality Rubric[4]

	Tell	Show	Multimedia	Guide	>3	Structure
Kinds	Does the demonstration tell learners the name and **definition** of each category?	Does the demonstration show learners **examples** of each category?	Does the demonstration use effective multimedia principles?	Does the demonstration provide guidance by highlighting **discriminating properties** or by showing **matched examples** among categories?	Does the demonstration include at least **3 examples** from each category?	Does **guidance** during demonstrations show learners how the defining properties and portrayals relate to an organizing structure?
How to	Does the demonstration tell learners the **steps and sequence** in the procedure?	Does the demonstration show a specific instance of the task and **demonstrate each of the steps** required to complete the task?	Does the demonstration use effective multimedia principles?	Does the demonstration provide **guidance** by calling attention to the execution of each step?	Is the procedure demonstrated in a **progression** of at least 3 increasingly difficult situations?	Does **guidance** during demonstrations show learners how the steps in the procedure relate to an organizing structure?
What happens	Does the demonstration tell learners the **conditions and consequence** of the process?	Does the demonstration show the **process** in a specific real or simulated situation?	Does the demonstration use effective multimedia principles?	Does the demonstration provide **guidance** by helping learners relate the events in the process to the conditions and consequence?	Is the demonstration of the process repeated for a **progression** of at least 3 increasingly complex scenarios?	Does **guidance** during demonstrations show learners how the conditions and consequence relate to an organizing structure?
Whole Task	Does the demonstration describe a **whole problem** or task indicating some of the major steps involved?	Is the **whole task** or problem demonstrated to the learners?	Does the demonstration use effective multimedia principles?	Are the **component skills** of the whole task demonstrated to learners in the context of the whole task using a problem- or task-centered instructional strategy?	Is there a **progression** of at least 3 increasingly difficult whole tasks or problems demonstrated to the learners?	Does **guidance** during demonstrations show learners how the steps in the whole task relate to an organizing structure?

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Table 4 Application e[3] Quality Rubric[5]

	Ask	Do	Feedback	Coach	>3	Peer Interaction
Kinds	Are learners asked to remember the definition?	Does the application require learners to classify new examples?	Does the application provide corrective feedback that focuses learners' attention on discriminating properties?	Does the application provide coaching early in the sequence and gradually withdraw this coaching as the application continues?	Does the application require learners to classify a series of 3 or more divergent examples?	Does the application allow for peer-collaboration and peer-critique?
How to	Are learners required to remember the steps in the sequence?	Does the application require learners to do the task by executing each step in a real or simulated situation?	Does the application provide intrinsic feedback and extrinsic feedback?	Are tasks early in the progression coached and is this coaching gradually withdrawn as for successive tasks in the progression?	Does the application require learners to do a simple to complex progression of at least 3 tasks?	Does the application allow for peer-collaboration and peer-critique?
What Happens	Are learners required to remember the conditions and consequence of the process?	Are learners required to predict the consequence? OR are learners required to troubleshoot an unexpected consequence in a specific situation?	Are learners able to receive intrinsic feedback by being able to test their predictions or test their trouble shooting?	Is coaching provided for problems early in the progression and gradually withdrawn as the progression continues?	Are learners required to make predictions or trouble shoot a series of at least 3 increasingly complex problems?	Does the application allow for peer-collaboration and peer-critique?
Whole Task	Are learners asked to remember information about the whole problem or task?	Do learners have to apply the component skills to the completion of a new whole task or problem?	Are learners able to receive intrinsic feedback on their performance by seeing the consequences of their activities?	Is coaching provided for problems early in the progression and gradually withdrawn as the progression continues?	Are learners required to solve a progression of at least 3 increasingly complex whole problems or tasks?	Does the application allow for peer-collaboration and peer-critique?

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Part Two: Concepts and principles

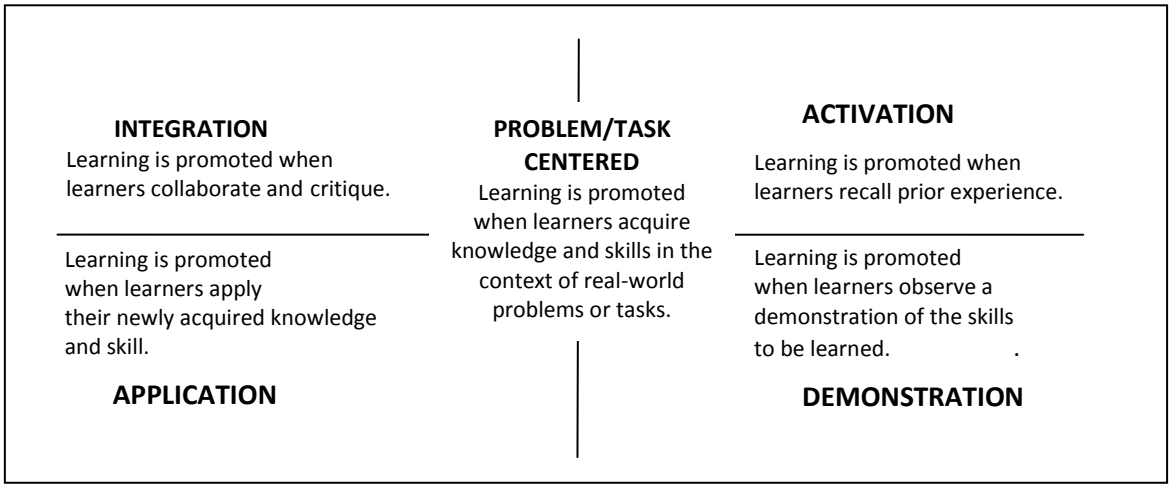
Some of the concepts and principles involved in the Course Evaluation Rubric may not be familiar to the reader. This section provides a summary of these concepts and principles with references to published articles that provide further elaboration. This section will cross reference these concepts to the relevant parts of the Course Evaluation Rubric.

The rubric is an attempt to provide a way to determine the extent to which existing instructional products incorporate First Principles of Instruction. Over the past several years these principles have been modified slightly with each subsequent publication. They are restated here somewhat modified from previous published versions to be as consistent as possible with the Course Evaluation Rubric. Table 5 summarizes these First Principles of Instruction and the following paragraphs elaborate each of these statements in a way that is consistent with the Course Evaluation Rubric.

First Principles of Instruction

To provide a close correspondence with the evaluation rubrics, the following statement of First Principles has been modified from previous statements (Merrill, 2009).

Table 5 First Principles of Instruction



Activation principle

- Learning is promoted when learners recall relevant prior experience as a **structure** for organizing new knowledge, and when this structure is the basis for guidance during demonstration and the basis for coaching during application. See the *Structure* column of the Demonstration e^3 Quality Rubric.

Demonstration principle

- Learning is promoted when learners observe a **demonstration** of the skills to be learned that is **consistent** with the type of content being taught. See the *tell, show* and *>3* columns of the Demonstration e^3 Quality Rubric.
- Demonstrations are enhanced when learners are **guided** to relate general information or an organizing structure to specific instances. See the *guide* column of the Demonstration Rubric.
- Demonstrations are enhanced when effective **multimedia** principles are implemented. See the *multimedia* column of the Demonstration Rubric.

Application principle

- Learning is promoted when learners engage in **application** of their newly acquired knowledge or skill that is **consistent** with the type of content being taught. See the *ask, do* and *>3* columns of the Application e^3 Quality Rubric.
- Application is effective only when learners receive intrinsic or corrective **feedback**. See the *feedback* column of the Application rubric.
- Application is enhanced when learners are coached and when this **coaching** is gradually withdrawn for each subsequent task. See the *coach* column of the Application rubric.

Integration principle

- Integration is enhanced when learners share their new skill for **peer-collaboration** and **peer-critique**. See the *peer interaction* column of the Application rubric.

Problem- or task-centered principle

- Learning is promoted when learners are engaged in a **problem- or task-centered** instructional strategy involving a **progression** of whole real-world tasks. (See the *whole task* rows of the Demonstration and Application rubrics.)

Consistent Component Skills

First principles of instruction includes the categorization of learning outcomes as originally proposed by Gagne (1985) and later elaborated by Component Display Theory (Merrill, 1994). The premise is that different outcomes require different kinds of presentation, demonstration and application. The Course Evaluation Rubric assumes five primary types of instructional outcome as summarized in **Table 6**[6] and elaborated in the following paragraphs. The type of outcome for a given component skill is indicated in the *kind*, *how*, and *why* column of the Course Evaluation Rubric form. Completing the matrix in the rubric is done by finding the row in the demonstration and application rubrics that correspond to the type of outcome promoted by the component skill being evaluated.

Information-about

All content involves information. Remembering information is part of every instructional strategy. Therefore an information-about instructional strategy could be used (and too often is the only strategy used) for any type of subject matter content. However, an information-about strategy is most appropriate when the content to be learned has the following property:

- The information is associated with a specific single entity, activity, or process and cannot be generalized.

What is it? -- Parts-of

Most entities, activities or processes can be divided into parts. Therefore a parts-of-strategy can be applied to almost any entity, activity or process. However, a parts-of strategy is most appropriate when the content to be learned has the following property:

- The name, location and description of the parts to be remembered are associated with a single specific entity, activity, or process and cannot be generalized**.Note**: a parts-of strategy may be the first phase of a kinds-of strategy in which learners first learn the parts of a specific single entity,

[6] This material has been adapted from Merrill (2001). This material is an update of the author's earlier work in Component Display Theory (Clark, 2008; Merrill, 1994).

activity or pro**ce**s**s a**nd then generalize by successively applying this part-naming skill to additional instances of the content from the same class. In this approach a parts-of strategy evolves into a kinds-of strategy.

Table 6 Information and portrayal elements for 5 types of component skill

	INFORMATION	PORTRAYAL
Information-about	**Facts, associations, qualifications**	**NA**
What is it - parts-of	**Name, description**	**Location of part with regard to specific whole**
What is it – kind-of?	**Definition – list of defining properties**	**Instances – specific examples and non-examples that illustrate properties**
How-to to do it?	**Steps and sequence**	**Portrayal of execution of a specific instance of the procedure**
What-happens?	**Conditions and consequence**	**Portrayal (demonstration or simulation) of a specific instance of the process**

What is it? --Kinds-of

Almost all words in any language, except proper nouns, are category words. These words reference a class of entities, activities, or processes that share common properties. A kind-of strategy is most appropriate when the content to be learned has the following properties:

- Instances of the class of entities, activities, or processes to be identified are characterized by a set of common properties.
- Instances within the class are distinguishable from one another while still sharing these common properties.

How-to do it?

Remembering information, identifying parts and classifying instances into classes are all ways to describe our environment. How-to content provides ways for learners to act on their environment. A how-to strategy is most appropriate when the content to be learned has the following property:

- The content specifies a sequence of activities for the learner to do to accomplish some goal or bring about some consequence.

What-happens -- Why?

Information-about, parts-of, and kind-of all describe the environment. How-to provides ways for learners to act on their environment. What-happens enables learners to comprehend their environment. A what-happens strategy is most appropriate when the content to be learned has the following properties:

- A set of conditions leads to some consequence. When the conditions change the consequence changes.
- A change in a condition can be a naturally occurring event or an event caused by some action on the part of the learner.

Consistent Strategies[7]

The underlying premise of consistency is that there are different strategies appropriate for different instructional outcomes. **Table 7** summarizes the main elements of the *Tell*, *Ask*, *Show*, and *Do* strategies for each of the types of instructional outcome that has been identified. These strategies correspond to the *tell* and *show* columns of the Demonstration Rubric (Table 3) and the *ask* and *do* columns of the application rubric (Table 4). The following paragraphs elaborate these strategies.

Table 7 Instructional Strategies for Component Skills

	Tell Information PRESENTATION	Ask (remember) Information RECALL	Show Portrayal DEMONSTRATION	Do (apply) info to portrayal APPLICATION
Information about	**name - information**	**name - information**	**----------**	**----------**
Parts of	**name - location**	**name - location**	**----------**	**----------**
Kinds of	**definition**	**definition**	**examples non-examples**	**classify examples**
How to	**steps – sequence**	**steps and sequence**	**demonstrate task**	**perform task**
What happens	**statement of conditions – consequence if… then**	**statement of conditions – consequence If … then**	**demonstrate process**	**predict consequences or find conditions**

Information and Portrayals

Subject matter content can be represented in two ways: as **information** or as **portrayals**. Information is general, inclusive and refers to many cases or situations. A portrayal represents a specific instance of the information. Portrayals are limited and refer to one case or a single, specific situation. Learners can remember information but to use this information learners need to see this information applied to real-world examples (demonstration) and they need the opportunity to try to use this information with additional real-world examples (application). To be useful in instruction content analysis requires the specification of both information and portrayals.

Demonstration and Application

Instructional strategies typically involve at least two phases: a **presentation/demonstration** phase and an **application/practice** phase. It is generally recognized that there are at least two levels of

[7] The following has been adapted from Merrill (1999; Merrill, 2001).

content: general (**information**) and specific (**portrayal**). General information consists of information about an entity, definitions identifying categories of objects, a list of steps in a procedure, or a list of events in a process. Specific information consists of examples and non-examples of a concept, a demonstration of how to perform a specific procedure, or a visualization illustrating the execution of a specific process. Two presentation/demonstration components are identified -- **TELL** and **SHOW**. TELL is used to present general information to the student -- tell information about, tell a definition, tell the steps in a procedure, or tell the events in a process. SHOW is used to demonstrate specific portrayals -- to show the instance of a concept, to show a demonstration of a procedure, or to show a visualization of a process.

Two practice/application components are identified -- **ASK** and **DO**. *ASK* is appropriate when we want the student to recall the general information that was presented -- remember information about, remember a definition, remember the steps in a procedure, or remember the events in a process. *DO* is appropriate when we want the student to be able to use their knowledge or demonstrate a skill in a specific situation (portrayal). *DO* requires the student to analyze an instance to find the properties that determine its class membership (classification), to perform a procedure, to interpret a process by predicting a consequence or by finding faulted, missing, or inadequate conditions.

Effective instruction almost always involves all four of these primary strategy components.

Component Skills for a whole problem or task

Merrill (2002b; Merrill, 2007b) describes the component skills required for a whole task. **Figure 1** illustrates these component skills and their relationship to the problem as a whole. The following paragraphs elaborate the steps in performing a component skill analysis.

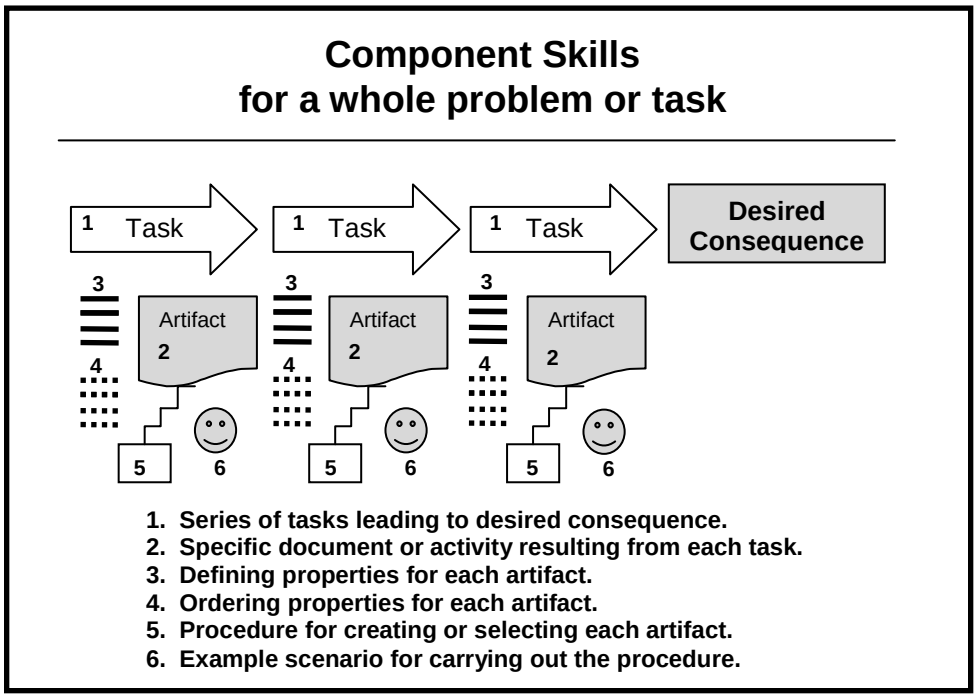


Figure 1 Component Skills for a whole problem or task

1. Identify the common steps required to solve each problem in the progression, not steps that are specific to a given problem (how-to).

2. For each problem specify the specific artifact (specific document or activity) associated with each step in the solution (kind-of).
3. Identify the defining properties of each type of artifact. Be sure these are general properties that apply to the artifact for the same step in each of the problems (definition).
4. Identify the ordering properties for each type of artifact (definition).
5. Specify the sub-steps required to produce the artifact.
6. Demonstrate someone doing the sub-steps to resulting in the artifact
7. Identify where in the resources students can find information about the properties of each artifact.

Problem or Task-Centered Instructional Strategy

Instruction is more effective and engaging when learners learn component skills in the context of a whole task (Problem- or task-centered principle). **Figure 2** illustrates one approach to a problem- or task-centered instructional strategy. The following paragraph elaborates this strategy.

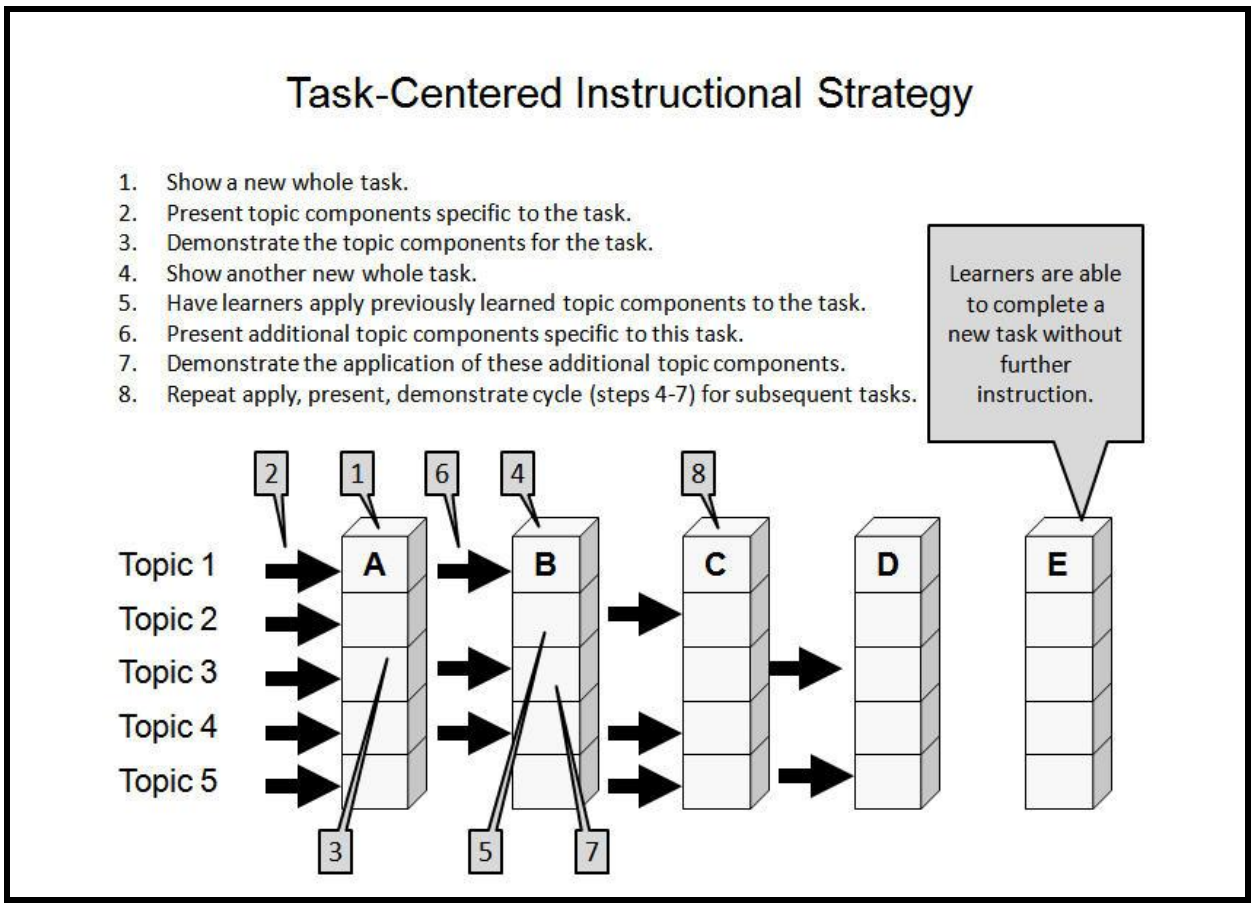


Figure 2 Problem- or Task-centered Instructional Strategy

Problem- or task-centered instruction combines problem solving with direct instruction for the required knowledge and skill (*tell*), demonstrates the problem solving process (*show*), and then engages

learners in the problem solving process (*do*). In a *problem-* or *task-centered* strategy learners are engaged in doing real tasks early in the instructional sequence (Mendenhall et al., 2006; Merrill, 2007b). Component skills (topics) are introduced as they are needed to enable learners to do each task in the progression. Notice the *tell* (2), *show* (3), *do* (5) sequence in the instructional strategy as illustrated in the figure.

In contrast with a topic-centered approach a problem-centered approach involves learners in applying skills to the application of whole problems early in the sequence, demonstrates the application of individual component skills in the context of a whole problem, and engages learners in a progression of problems giving them multiple opportunities to apply their new knowledge and skill.

The last row in the Course Evaluation Rubric provides a way to identify whether a give course involves a problem- or task-centered instructional strategy. A problem- or task-centered strategy is a major contribution to effective, efficient and engaging learning. Consequently the proposed scoring formula weights whole problem involvement to account for ¼ of the total score for a course.

Peer Interaction

There has been a recent emphasis on communities of learners. The integration principle indicates that learning is more effective when learners have an opportunity to reflect on, defend, and expand the skills they have acquired. One way to promote this integrative activity is for learners to collaborate with one another in problem solving and then to critique one another's solutions to the problem or products resulting from a whole task. **Figure 3** illustrates a suggested procedure for effective peer collaboration and critique that involves three steps (Merrill & Gilbert, 2008). The following paragraph elaborates this procedure.

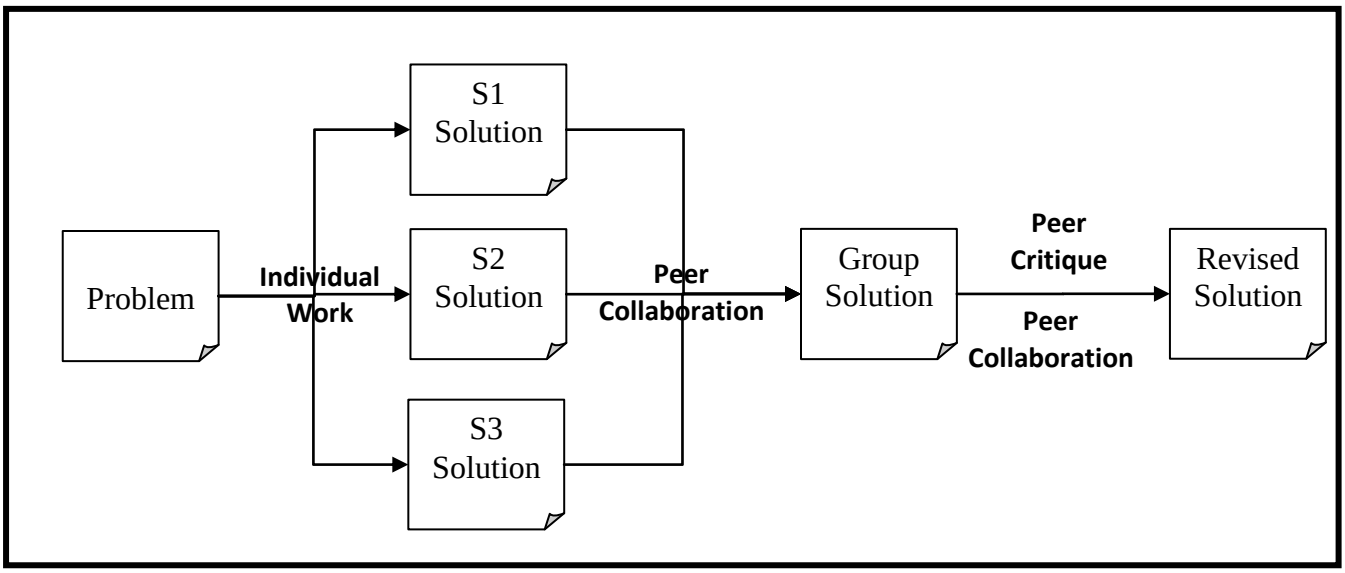


Figure 3 Effective Peer Interactions

After appropriate problem-solving demonstrations and instruction in component skills, learners are given a new problem to solve or task to complete. (1) Each learner first submits an individual solution to the problem. (2) A small group of 3 to 5 learners then collaborate with each other to synthesize their individual solutions into a collaborative group solution. (3) Using an appropriate rubric, each group then

critiques the solution submitted by two or three other groups. In this peer interaction sequence learners interact with a given problem at least three times greatly increasing their opportunity to form, adapt, and modify their mental model concerning the content to be learned. This effective peer interaction significantly increases the amount of learning for each individual learner. Different content areas and different courses within a content area may implement the peer-interactive principle in a variety of ways.

Principles for e^3 Multimedia[8]

Clark and Mayer (2003; Mayer, 2001) identify principles for the effective use of multimedia. These principles have been incorporated into the demonstration principle and the multimedia column of the Demonstration Rubric (.

1. Use words and graphics rather than words alone. Look for:
    a. Graphics and text are used to present instructional content.
    b. Graphics are relevant rather than decorative.
    c. Representative graphics are used to illustrate concrete facts, concepts, and their parts.
    d. Animation is used to illustrate processes, procedures, and principles.
    e. Organizational graphics are used to show relationships among ideas or lesson topics.
    f. Interpretative illustrations such as graphs are used to show relationships among ideas or lesson topics.Graphics are used as a lesson interface for case studies.
2. Place corresponding words and graphics near each other. Look for:
    a. Screens that place explanatory text adjacent to the graphic they describe.
    b. Feedback that appears on the same screen as the question
    c. Procedural directions that appear on the same screen in which the steps are to be applied in an exercise.
    d. Linked information that does not cover related information on the primary screen.
    e. Use of techniques such as pop-up text and reduced graphics that support integration of text and graphics.
3. Present words as audio narration rather than on screen text. Look for:
    a. Use of audio narration to explain onscreen graphics or animations.
    b. Use of text for information that learners will need as reference, such as directions to practice exercises.
4. Presenting words in both text and audio narration can hurt learning. Look for:
    a. Graphics are described by words presented in the form of audio narration, not by narration and redundant text.
    b. Onscreen text can be narrated when the screens do not include graphics.

[8] (The following principles and guidelines are quoted fromClark & Mayer, 2003).

   c. When language is challenging, onscreen text is narrated.

5. Adding interesting material can hurt learning. Look for:

   a. Lessons that DO NOT include extraneous sounds in the form of background music or unrelated environmental sounds.

   b. Lessons that DO NOT use graphics and video clips that are related but not essential to the knowledge and skills to be learned.

   c. Lessons that present content in lean text or narration that presents the main points.

Conclusion

When instruction incorporates First Principles of Instruction the resulting learning is more effective, efficient and engaging (e^3) than for instructional products that fail to implement these principles. This paper describes a tool, the e^3 Course Evaluation Rubric that can be used to judge the degree to which a given instructional product incorporates First Principles of Instruction. This tool enables you to carefully determine the e^3 quality of the presentation and demonstration and the application for whole problems and a variety of different types of component skills. This evaluation will also provide prescriptions for how a given instructional product could be revised to increase its e^3 quality.

If a learner fails to attain the learning goals then the instruction is a waste of time. The Course Evaluation Rubric will help you identify instructional products that are more likely to really teach and help you revise your own instruction to be more effective, efficient and engaging.

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