Presentation of Thesis: *The Usefulness of Instructional Systems Development and Instructional Design Models for Evaluating and Improving Existing Advanced Training Materials: A Case Study.*
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Goal 1: Show the professors that Life Innovations, Inc. current Advanced Workshop can be improved by applying the performance-based principles for instruction of Robert F. Mager and Jeroen, J. G. van Merriënboer. These performance-based principles are seen in the Modified Advanced Workshop.

In order to do this, I will need to, more correctly,

Goal 2: Show the professors that I successfully answered the research questions stated in chapter 1 of the thesis: *The Usefulness of Instructional Systems Development and Instructional Design Models for Evaluating and Improving Existing Advanced Training Materials: A Case Study.* Then, receive their agreement that the Modified Advanced Workshop is an "improved" version of the current Advanced Workshop.

> To achieve this goal, I will need to:
> Explain how I successfully answered the research questions…
> Show the difference between the two Advanced Workshops…
> Show how well the Modified Advanced Workshop fulfills both Mager's and van Merrienboer's methods: The burden for the effectiveness of the Modified Advanced Workshop is how well the design and development of the Modified Advanced Workshop enables workshop participants to perform the skills stated in the learning objectives. The measure is a simple criterion referenced standard. An Emphasis is placed on using the **Worksheets** as relevant practice.

> **Objective:**
> **Condition:** Given the thesis: *The Usefulness of Instructional Systems Development   and Instructional Design Models for Evaluating and Improving Existing Advanced Training Materials: A Case Study,* the materials for the Life Innovations, Inc. current Advanced Workshop, the materials for the Modified Advanced Workshop,
> **Performance:** the learners will be able to identify (check mark and label), within the materials for the Modified Advanced Workshop, the specific suggestions that are implemented for designing and developing instruction based on Robert F. Mager's and Jeroen J.G. van Merriënboer's 4C/ID-model for technical training,
> **Criteria:** the necessary suggestions include:

Mager's Method:
1. Big picture, (always included)
2. Objective(s), (always included)
3. A skill check description, (almost always included)
4. Description of relevance (to the student), (always included)
5. Demonstration or Modeling Example, Instruction, (as needed)
6. Relevant Practice / appropriate Feedback, (always included)
7. Directions (to the students), (almost always included)
8. Skill check, (almost always included)
9. Self-evaluation explanations, self-check (as needed)
(Mager 1997c, pp. 144-145; 163-164)

van Merriënboer's 4C/ID-model:
1. Task Class (whole-task practice)/Learning Task(s) (mental models, cognitive strategies)
2. Supportive Information (mental models, cognitive strategies)
3. Just-in-time (JIT) Information (information displays, corrective feedback)
4. Part-task practice (practice items, JIT, overtraining)
(van Merriënboer, 1997; van Merriënboer et al., 2002).

This presentation will not present a full discussion of the instructional methods/models. The purpose is not to present each of the instructional methods/models, but to show the application to current training materials.

However, I will present the key points within each of these two methods/models. Questions about these methods/models will be answered after the initial presentation.

Purpose of the Study
This thesis is a case study in implementing Robert F. Mager's (1997c) and Jeroen J.G. van Merriënboer's (1997) performance-based instructional methods and instructional techniques to the Life Innovation's, Inc. current Advanced Workshop materials, as of June 2002. These two instructional models are used to evaluate and improve the current advanced workshop into a performance-based training workshop that will enable the participants to perform with competence the knowledge and skills that are identified as the necessary learning/performance objectives.

(I suggest that the current Advanced Workshop can be improved because these materials use a traditional instructional method, which focuses on using lecture to teach knowledge to the Advanced Workshop participants. Even though the original advertisements for the Advanced Workshops stated that developing the Counselor's skill was a goal, developing the Counselor's skill by the use of relevant practice was not designed into the original Advanced Workshop. The Modified Advanced Workshop is a performance-based instructional model or method. The design of this Modified Advanced Workshop will require the workshop participants to participate actively with the content, primarily by using worksheets.)

Significance of Study (Relevance)

This study provides additional evidence to the value of performance-based instructional methods for training. Most especially, Robert F. Mager's method and Jeroen J. G. van Merrienboer's 4C/ID-model for instructional systematic design and instructional design, respectively, prove to be valuable methods for training complex cognitive skills, as well as valuable methods for evaluating and improving existing training materials.

Persons who design and develop training for adults may implement these specific performance-based models of instructional design in their own context with the assurance that adult students who complete these instructional modules will be able to perform the skills/tasks that are written from the results of the analysis phase of the instructional design.

Research Questions

1. Is the current Advanced Workshop suitable for a performance-based instructional design?
2. How will the Modified Advanced Workshop differ from the current Advanced Workshop?
3. Will implementing a performance-based instructional design to the Advanced Workshop provide the workshop participants with actual skills in how to perform the skills that are taught in the Advanced Workshop? In other words, will a performance-based instructional design provide the Counselor the opportunity to not only learn ideas, but also improve his/her performance in interrupting the assessment inventory for the couple and improve the Counselor's ability in providing feedback to the couple?

Testing the effectiveness of the Modified Advanced Workshop will need to be completed by another study. No data has been collected on the effectiveness on this Modified Advanced Workshop.

Definition of Terms

This section will define the basic terms used within this thesis.

Complex cognitive skill or task--An example is the cognitive task(s) required of a Counselor as s/he interprets the data from an assessment inventory, then decides what information from this assessment inventory to share with a couple, and then how best to share this information with a couple during a counseling session. This complex cognitive task, or series of tasks, takes place within the Counselor's mind, most likely in a matter of seconds. Van Merriënboer defines a complex cognitive skill as "Skills that are characterized by the fact that (1) they comprise a set of constituent skills, (2) at least some of those constituent skills involve conscious processing, and (3) the majority of constituent skills is in the cognitive domain" (van Merriënboer, 1997, p. 312).

Criterion-Referenced Standard -- A criterion-referenced standard is a standard used to measure the performance of a student. The results of the student's performance (on a test) are measured by the criteria stated in the objective. Student performance must meet or exceed the criteria (ion) as stated in the objective in order for performance to be considered acceptable (Mager, 1997c, p. 115).

4C/ID -- This sign is the shortened form for Jeroen J.G. van Merriënboer's model for training complex cognitive skills: Four-Component Instructional Design Model for Technical Training. The four components are learning tasks, supportive information, just-in-time (JIT) information, and part-task practice (van Merriënboer et al, 2002). I note that in van Merriënboer's text (1997) he introduces the four components as Compilation, Restricted Encoding, Induction, and Elaboration. These four components are the basic blueprints in developing training for complex cognitive skills. The ID is the shortened form for Instructional Design, thus a Four-Component Instructional Design Model …, or 4C/ID.

Instructional Design (ID)--Instructional design is one method used to develop instruction; it includes two parts in instructional design: analysis and design. According to van Merriënboer, Instructional Design is a more narrow method than Instructional Systems Development, yet more specific in the guidelines and directions for instructional design (van Merriënboer, 1997, p. 3).

Instructional Development --Instructional development is the process of instructional design where the "how to teach" decisions of the instruction is finalized, as opposed to the analysis phase of instructional design ("what to teach").

Instructional Systems Development (ISD)--Instructional Systems Development is a model for developing instruction; according to van Merriënboer, it includes five parts: analysis, design, production, implementation, and/or delivery, and summative evaluation (van Merriënboer, 1997, p 2).

Instructional Technology--According to Mager, instructional technology is concerned with teaching or training persons what they do not yet know. The method used is instruction. For example, a partial list of activities in Instructional Technology include task analysis, objectives, goal analysis, advance organizers, practice/feedback, skill checks, demonstration, presentation, mnemonics, self-pacing, modeling, and reinforcement (Mager, 1997c, pp. 6-7).

Mager's Method--The eighteen steps Mager describes in the book, *Making Instruction Work, or Skillbloomers: A Step-by Step Guide to Designing and Developing Instruction that Works* (1997c) is "Mager's-Method," as used by me in this thesis.

Performance-based Instructional Design--This method of instructional design concerns itself with what the student can *perform* or *do* because of participating in the training. The student's performance (what skill that can be performed) is purposely planned from the very beginning to the very end of the instruction: from analysis to the evaluation phase of instructional design.

Performance Technology--According to Mager, Performance Technology is a larger category than Instructional Technology. Performance Technology is concerned with improving the performance of what people *already* know how to do. Some examples of activities in performance technology include job analysis, performance analysis, information, workplace redesign, documentation, tools, instruction, performance management, job/performance aids, feedback, and policies (Mager, 1997c, pp. 7-9).

Traditional Instructional Method--this method of instructional design is most often implemented by lecturing content to students. The main goal is to tell students the knowledge they need to learn. This method of instructional design is distinguished from performance-based methods of instructional design, which concerns itself with what skills students can perform because of participating in the training.

Key Points to Robert F. Mager's Instructional method, and Jeroen J.G. van Merriënboer's 4C/ID-model for Technical Training.

Five Key Points to Robert F. Mager (Mager's Method)
As stated above, Mager's Method is a
1. **Performance-based Instructional Design**.
Mager is concerned that students be able to perform the knowledge/skill they are learning, whether it be cognitive or physical.
Students should have the opportunity to practice (**Relevant Practice**) this knowledge/skill with appropriate **Feedback** during instruction to the point of mastery, and then be able to transfer this knowledge/skill to their jobs within 72 hours of the instruction.
If this performance is not part of the instruction, Mager has suggested that the instructor is in violation of fraud.
"The focus has changed from instruction (a process) to performance (the desired outcomes of a process). Within the instructional process itself, the focus has changed from presentations by the instructor to practice by the students" (Mager, 1997c, p. 12).

2. An **Instructional Objective** according to Mager's Method includes three characteristics: the performance, the conditions, and the criteria of what you want a student to be able to do (Mager, 1997c, pp. 3-4).
An **Instructional Objective** tells students what you intend for them to achieve; **objectives** are about skills and tasks, about "what the learner will be DOING when demonstrating achievement of the objective" (Mager, 1997e, p.136).

"It is related to intended outcomes, rather than process…
It is specific and measurable, rather than broad and intangible.
It is concerned with students not teachers" (Mager, 1997e, p. 3).

Further, "If a statement does not include a visible performance, it isn't yet an objective" (Mager, 1997e, p. 52).

Objectives are used to write skill checks, <u>unifying the entire instructional process.</u>

3. **Criterion-referenced standard/evaluation**: As stated above,
A **criterion-referenced standard** is a standard used to measure the performance of a student. The results of the student's performance (on a test) are measured by the criteria stated in the objective. Student performance must meet or exceed the criteria (ion) as stated in the objective in order for performance to be considered acceptable (Mager, 1997c, p. 115).
A **Criterion-referenced evaluation** is making "a judgment based on a comparison of a measurement with an objective standard…" (Mager, 1997d, p. 10).

4. **Relevant Practice with Feedback**
Practicing the objective (skill) needs to be **relevant**; the actual skill is practiced.
Relevant Practice needs **Feedback** (information on the quality of the practice: adequate, diagnostic, and corrective feedback; Mager, 1997c, pp. 128-132).
"…practice with feedback is essential if the practice is to serve its purpose" (Mager, 1997e, p. 154).

5. the **Phases of the Instructional Process**:
Basically, there are four phases: **analysis, design/development, implementation, and evaluation/improvement.**

The **analysis** procedures will help ensure that the instruction is worthy of working (because it teaches the "right stuff"); The **development** procedures will make sure the instruction can work; The **implementation** procedures will ensure that the instruction does work; and the **Evaluation and improvement** procedures will ensure that the instruction continues to work as well as possible. (Mager, 1997c, p.24)

Five Key Points to Jeroen J.G. van Merriënboer's 4C/ID-model for Technical Training.

Rather than present the four components in the 4C/ID-model, I present five foundational key ideas:

1. **Cognitive Load Theory**
Cognitive load is "The amount of effort-demanding, controlled processing [schema-based and knowledge-based] that is imposed on a learner's cognitive system. Well-designed training systems prevent cognitive overload, decrease cognitive load that is not relevant for learning, and optimize cognitive load that *is* relevant for learning" (van Merriënboer, 1997, p. 312).

"Control over **cognitive load** that is mainly provided by *redirecting the learners' attention* …to processes that *are* relevant for learning, and in particular schema acquisition by induction from concrete cases" (Mager, 1997, p.76). As well as providing problem-solving support, [modeling examples and case studies], or scaffolding, and the [benefits of whole-task practice].

2. **Component Fluency Hypothesis**
Automation of skill (recurrent) can decrease the amount of thinking that is required to perform that skill(decrease cognitive load); thus freeing up the capacity of the brain to use the reasoning processes (schema-based processes) for solving problems, or even thinking about how to perform a new recurrent skill.

As Frederiksen (1984) put it: "…problem solving capacity can be greatly increased by learning to use automatic processing for the more routine elements of an activity, making available controlled-processing resources [reasoning/thinking] for the novel aspects of problem solving (p. 365). (van Merriënboer, 1997, pp. 72-73)
Thus, the more **fluent** a person is in performing the **components** of a skill, the more schema-based processes can be available for solving "unfamiliar aspects of a problem situation" (van Merriënboer, 1997, p. 77).

3. **Understanding Hypothesis**
The better we **understand a specific topic** (subject area domain), or the more knowledge we have in that topic (available cognitive schemata to solve a problem) the more likely we are able to reflect about our behavior/performance in that topic, and identify our errors and make appropriate changes (correct our errors; van Merriënboer, 1997, p. 73).

4. **Transfer and Reflective Expertise**
"The ability to perform an acquired skill in new, unfamiliar situations. A distinction can be made between near and far **transfer**, where the transfer tasks closely resemble the trained tasks, and far transfer, where the tasks are different from the trained tasks. The terms retention or self-transfer are used for situations in which the transfer tasks are identical to the trained tasks" (van Merriënboer, 1997, p. 322).

The goal of training is positive **transfer**. If the transfer goal is nearer or further from the original training goal, the instructional designer knows to emphasize procedural overlap, (rule automation) or schema--based transfer (schema acquisition) so that **reflective expertise** is enhanced and cognitive overload is avoided. The goal of instruction is to develop **Reflective Expertise**: the ability to solve new problems or perform a complex cognitive skill in a new situation because of the ability to (1) use a "domain-specific production to perform familiar aspects of a task," [perform a routine procedure), and (2) "the conscious use of cognitive schemata to solve unfamiliar aspects of the task" [the ability to think through an unfamiliar problem and find a solution]" (van Merriënboer, 1997, p.71).

The concept of **reflective expertise** leads to predictions regarding the transfer of particular training strategies. In particular, training strategies must pay more attention to schema acquisition and schema-based transfer if transfer tasks become more different from the original tasks" (van Merriënboer, 1997, pp. 74).

5. **Developing a learning environment**
Based on the type of transfer required by the learners, the strategies and tactics are appropriately chosen for a **learning environment**, so that the learners can manage or keep in balance their cognitive load: "…a training strategy is developed that mainly facilitates rule automation and transfer on the basis of procedural overlap for recurrent constituent skills, and schema acquisition and transfer on the basis of those schemata (e.g., by analogy) for non-recurrent constituent skills. In short, a **learning environment** is designed that promotes the development of reflective expertise" (van Merriënboer. 1997, p. 76).

Research Questions and Answers
1. Is the current Advanced Workshop suitable for a performance-based instructional design?

The *Advanced PREPARE/ENRICH Workshop Participant's Workbook* includes the "Outline of ADVANCED PREPARE/ENRICH Workshop," which state the goals: "Improve Your Counseling Skills with Couples & Build Strong Marriages in Your Setting.   Specific Goals of the Advanced Workshop:
•   To improve your counseling skills with couples.
•   To better use the Couple Types and the Couple & Family Map.
•   To better help Conflicted and Distressed Couples.
•   To learn about the new inventory, PREPARE-CC, and how to use it" (2002, Olson, introduction).

These goals are performance goals.
The goals state that after attending the Advanced Workshop, participants should be able to do these skills with improvement; they should be able to perform these skills better than they could before attending the Advanced Workshop. The current Advanced Workshop is intended to be performance-oriented.

Gagne's definition for learning is performance:

An observer knows that learning has taken place when the learner's performance can be seen to have changed. … By means of this set of observations, the change in the child's behavior and a persistence of this change is seen, and the inference can be made that learning has take place. (Gagne, 1988, p.21)

Gagne goes on to explain that learning is not just a change in behavior, but rather, learning is seen in a person's ability to demonstrate or to perform based on the learning. This common denominator in performance is the foundation for Gagne's "outcomes [performances] of learning" (pp. 38-62).

I conclude that any instruction, then, is suitable for performance-oriented instruction. As stated above, quite simply, from the goals of the current Advanced Workshop, it is already intended to enhance or improve the participants' performance with the Life Innovation's, Inc. resources and one's abilities in working with couples as a Counselor. The current Advanced Workshop is suitable for a performance oriented instructional design. The Modified Advanced Workshop should focus on developing the participants' ability to improve their performing these skills.

In relation to the 4C/ID-model:
The 4C/ID-model is designed to develop skill in using complex learning, or complex-cognitive skills. The skill of interpreting the *ENRICH Counselor Report*, and then, providing appropriate feedback to a Couple, based on the national studies presented in the Advanced Workshop, is no doubt a complex-cognitive skill. The Counselor is required to make numerous, simultaneous mental tasks as s/he interprets the *ENRICH Counselor Report* and decides on what information to present to the Couple, as well as how to present this information to the Couple in the process of feedback.

2. How will the Modified Advanced Workshop differ from the current Advanced Workshop?
The main difference is that the Modified Advanced Workshop is performance-oriented, and that the design is intended to build Reflective Expertise.

The objectives are written to involve the students doing something, as well as performing the actual skill(s) (relevant practice with feedback) that is being taught.

Notice the performance gap between the two Workshops.

The objectives are purposely tied together within the instruction, from the beginning through to the end.

The lessons are written to integrate and to build on each other, with the emphasis on skill with the *Worksheets*, the "How to Series" sheets, and developing problem-solving skills to interrupt the *ENRICH Counselor Report* for the Couple and improve the Counselor's ability in providing feedback to the Couple with the *Worksheets,* the "How to Series" sheets and the *ENRICH Counselor Report,* and the *Building A Strong Marriage Workbook*.

A brief presentation of the **current Advanced Workshop** is shown now.

Distinctions to the characteristics suggested by Mager and van Merriënboer are highlighted.

	Mager's Method:
	1. Big picture, (always included)
	2. Objective(s), (always included)
	3. A skill check description,
	4. Description of relevance (to the student), (always included)
	5. Demonstration or Modeling Example, Instruction, (as needed)
	6. Relevant Practice / appropriate Feedback, (always included)
	7. Directions (to the students), (no comment given)
	8. Skill check, (no comment given)
	9. Self-evaluation explanations, self-check (as needed)

(Mager 1997c, pp. 144-145; 163-164)

	van Merriënboer's 4C/ID-model:
	1. Task Class (whole-task practice)/Learning Task(s) (mental models, cognitive strategies)
	2. Supportive Information (mental models, cognitive strategies)
	3. Just-in-time (JIT) Information (information displays, corrective feedback)
	4. Part-task practice (practice items, JIT, overtraining)

(van Merriënboer, 1997; van Merriënboer et al., 2002).

A brief presentation of the **Modified Advanced Workshop** is shown now, including the PowerPoint presentation, the *Worksheets*, and the design and development "background" materials.

Distinctions to the characteristics suggested by Mager and van Merriënboer are highlighted.

	Mager's Method:
	1. Big picture, (always included)
	2. Objective(s), (always included)
	3. A skill check description,
	4. Description of relevance (to the student), (always included)
	5. Demonstration or Modeling Example, Instruction, (as needed)
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(van Merriënboer, 1997; van Merriënboer et al., 2002).

3. Will implementing a performance-based instructional design to the Advanced Workshop provide the workshop participants with actual skills in how to perform the skills that are taught in the Advanced Workshop? In other words, will a performance-based instructional design provide the Counselor the opportunity to not only learn ideas, but also improve his/her performance in interrupting the assessment inventory for the couple and improve the Counselor's ability in providing feedback to the couple?

The Modified Advanced Workshop is **performance-oriented**. The Modified Advanced Workshop intentionally provides **relevant practice with appropriate and timely feedback.** The objectives and the relevant practice with feedback in the Modified Advanced Workshop focuses on teaching the Counselor (student) **how to develop an initial treatment plan for the Couple, based on the information from the national studies presented as content in the Modified Advanced Workshop.**
The Counselor (student) should be more confident in why specific categories and items within the *ENRICH Counselor Report* are or are not selected to share with the Couple, based on the national studies presented as content in the Modified Advanced Workshop, or why these categories and items are used to emphasize a specific exercise from the *Building A Strong Marriage Workbook* for this specific   Couple.
The **4C/ID-model** is particularly strong with developing ideas, and how these ideas are applied (schema acquisition in the use of supportive knowledge and strategic knowledge/cognitive strategies). The Modified Advanced Workshop does not attempt to improve the Counselor's actual skills in providing feedback to the Couple, meaning communication and therapeutic skills, such as reframing, therapeutic use of triangles, when appropriately to use strong emotions. Yet, these skills are beyond the purpose of both the current and   the Modified Advanced Workshop.

Conclusion
Goal 1: Show the professors that Life Innovations, Inc. current Advanced Workshop can be improved by applying the performance-based principles for instruction of Robert F. Mager and Jeroen, J. G. van Merriënboer.   These performance-based principles are seen in the Modified Advanced Workshop.

In order to do this, I will need to, more correctly,

Goal 2: Show the professors that I successfully answered the research questions stated in chapter 1 of the thesis: *The Usefulness of Instructional Systems Development and Instructional Design Models for Evaluating and Improving Existing Advanced Training Materials: A Case Study.* Then, receive their agreement that the Modified Advanced Workshop is an "improved" version of the current Advanced Workshop.

To achieve this goal, I will need to have:
Explained how I successfully answered the research questions…
Shown the difference between the two Advanced Workshops…
Shown how well the Modified Advanced Workshop fulfills both Mager's and van Merrienboer's methods: The burden for the effectiveness of the Modified Advanced Workshop is how well the design and development of the Modified Advanced Workshop enables workshop participants to perform the skills stated in the learning objectives. The measure is a simple criterion referenced standard. An Emphasis is placed on using the *Worksheets* as relevant practice.

Objective:
Condition: Given the thesis: *The Usefulness of Instructional Systems Development and Instructional Design Models for Evaluating and Improving Existing Advanced Training Materials: A Case Study,* the materials for the Life Innovations, Inc. current Advanced Workshop, the materials for the Modified Advanced Workshop,
Performance: the learners will be able to identify (check mark), within the materials for the Modified Advanced Workshop, the specific suggestions that are implemented for designing and developing instruction based on Robert F. Mager's and Jeroen J.G. van Merriënboer's 4C/ID-model for technical training,
Criteria: the necessary suggestions include:
Mager's Method:

A brief presentation of the current Advanced Workshop was shown.
Distinctions to the characteristics suggested by Mager and van Merriënboer are highlighted.

	Mager's Method:
	1. Big picture, (always included)
	2. Objective(s), (always included)
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A brief presentation of the Modified Advanced Workshop was shown, including the PowerPoint presentation, the *Worksheets*, and the design and development "background" materials.

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(van Merriënboer, 1997; van Merriënboer et al., 2002).

I conclude that the Modified Advanced Workshop benefits from the application of Mager's Method and van Merriënboer's 4C/ID-model:

I have shown specifically how each instructional method/model is used to evaluate and improve the current Advanced Workshop.

The burden for the effectiveness of the Modified Advanced Workshop is how well the design and development of the Modified Advanced Workshop enables workshop participants to perform the skills stated in the learning objectives.

The measure is a simple criterion referenced standard.

This chapter details how these skills (objectives) are taught and practiced by the students in the Modified Advanced Workshop. The **objectives are linked** from the analysis phase to the evaluation phase of the instruction.

More correctly, however, van Merrienboer's model is not strictly focused on the performance of a learned skill, based on performance objectives; its design is meant to **develop expertise:** the ability to help the learner reason and solve new problems, as well as to teach a learner to perform correctly a stated objective (van Merrienboer, 2002, pp. 71-72).

This thesis has shown that
1. The current Advanced Workshop is suitable for a performance-based instructional design;
2. how the Modified Advanced Workshop differs from the current Advanced Workshop; and
3. that implementing a performance-based instructional design to the current Advanced Workshop should provide the workshop participants **with actual skills in how to perform the skills that are taught in the Advanced Workshop. A performance-based instructional design should provide the Counselor the opportunity to not only learn ideas, but also improve his/her performance in interrupting the assessment inventory for the couple and improve the Counselor's ability in providing feedback to the couple, based on the studies presented as part of the Advanced Workshop.**

END