Support, Structure, and Substance for Adult Learners

INTRODUCTION

Students in formal education programs, whether they are at the elementary or university level or somewhere in between, have a well-defined training network. This network is composed of resources like certified teachers, structured textbooks, peers, dedicated classrooms, equipment, etc. In contrast, many adult learning programs lack this network (Lowden, 1989).

The 3S approach creates a comprehensive educational framework for adult learners through adding layers of support and structure to the substance of a given content area. It is based on information age key markers (Reigeluth, 1999, fig. 1.2). The values inherent in the theory stress the social and cognitive aspects of adult learning. These values form the backbone to the 3S approach:

- Building social learning communities where collaboration, knowledge sharing, and feedback play significant roles.
- Applying active, meaningful instructional methods that sustain motivation and include a rich assortment of high-quality resources that support transfer.
- Encouraging students to set personal goals that are above and beyond the course goals and direct their own pace for achieving those goals.
- Adjusting scope and sequencing to allow time for reflection and integration, embracing multiple perspectives, and focusing on the process.

Application of the 3S theory is achieved through layering the support level, the structure level, and the substance level while managing instructional quality throughout all levels (see Figure 1). In the first level, Support, learning communities and feedback are addressed. In this level the social aspect of learning, as advanced by Bruner, is addressed (NCREL, 2000). In the second level, Structure, sequencing and resources are considered. In the third level, Substance, activities and practice promote learning, understanding, mastery, and transfer.
CONDITIONS FOR USING THE 3S APPROACH

To determine when to use the 3S approach, a number of different conditions in a variety of areas should be met. These areas include the characteristics of the learners, the course content and delivery methods, the class size, and the reusability of the course being developed.

The 3S approach is a theory to be used for instruction involving adult learners in a nontraditional learning environment, such as a corporate training course or a certification program. These adults should be personally interested in the course topic to the extent that they will be able to set personal and perhaps professional goals for the given content area. This interest helps to guarantee at least minimal intrinsic motivation. This entry-level motivation will be fostered and strengthened throughout their skill development.

The course content should be a mix of cognitive and psychomotor skills of medium to medium-high complexity. This content should contain heuristic tasks (Reigeluth, 1999, chap. 18) with the focus being on learning principles for guiding actions. The 3S approach would not be the most efficient theory to use for fixed procedural or rule-based tasks that rely mainly on memorization and/or muscle memory, since many of the methods support deeper understanding. In other words, use of this theory in such a setting would be overkill.

The course content should also drive the delivery mechanism. This theory supports both face-to-face and online delivery. If online delivery is used, however, it should contain an element of face-to-face teaming, at least initially, since teaming plays a major role in this theory. Additionally, if psychomotor skills are being taught, practice sessions should be conducted face to face rather than online unless sufficient technical resources are available for synchronous practice (e.g., high-speed, real-time, two-way video and audio).

This theory also stipulates a minimum and maximum class size of 6-25 learners. The minimum size of six is the number required to achieve diversity and effective teaming with at least two teams. The limit of 25 learners is specified to achieve an adequate learner-to-instructor ratio. This theory requires a significant amount of feedback and coaching, so exceeding this limit with a single instructor is not recommended due to the time-intensive feedback requirements. In fact, for this reason, an inexperienced instructor may want to limit the class size to approximately 15 learners.

The class size mandate does have some flexibility, however, if additional instructors are used. Only in such a case could more learners be added to the class. No more than 40 learners, however, should be in a course at any given time. Such a stipulation exists because the addition of more learners and thus more teaching assistants may have negative ramifications on communication (Misanchuk, in press).

Finally, the 3S theory is best used for longer courses (e.g., 15+ hours) and/or courses that are repeatable. While instructors have discretion over the selection of the method kinds (e.g., lecture or discussion), the methods outlined in Figure 1 should always be used. This requirement usually results in significant development and testing time and money during the course formation. In shorter and/or single-use courses, the return on investment could be compromised due to the time and effort required to establish the learning community and to conduct activities and meaningful practice.
THE 3S THEORY EXPLAINED

In the following section, the 3S theory is broken down by the various levels and methods within those levels and explained in detail. Method details contain a variety of kinds and associated conditions to aid in decision making regarding the implementation of this theory.

Level 1: Support

In Level 1, Support, the learning environment is created. This environment, composed of a learning community and feedback, should be pervasive—supporting and feeding into all of the other methods within all levels of this theory. It is presented here separately to aid understanding of the overall goals of each method.

Create, Organize, and Foster the Learning Community. In this method, the learning community is created, organized, and fostered throughout the lifecycle of the training. The formation and teaming of the class relationships, teams*, and individual to instructor are addressed in the three phases. The goal of this method is to increase and sustain motivation, collaboration, and transfer.

Table 1. Phases of the Learning Community

<table>
<thead>
<tr>
<th>Phase</th>
<th>Activities</th>
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| Creation | • Have learners develop personal and professional goals that may be above and beyond the class goals.  
• Conduct norming activities (e.g., values, working together guidelines, roles) using discussion and Q&A (see Level 3 for additional detail on discussion and Q&A). Norming aids organization, cooperation, and trust (Forsyth, 1999).  
• Define common processes and expectations (e.g., submitting work, peer review, adherence to deadlines, etc.).  
• For long classes or series of courses where learners will be working together for extended time periods (e.g., 3+ months), assess personality types of actual learners in the particular class. This activity will guide the norms, selection of some methods, and expectations during the application of certain methods. The gathered information can be used to initially structure teams as well as foster teams and provide guidance for selecting appropriate feedback delivery methods and some activities should changes need to be made to planned instructional activities (see Manage Instructional Quality). Tools to use include Myers-Briggs Type Indicator, Keirsey Temperament Sorter, DISC Personality Profile. |
| Organization | • Create teams of 3 to 5 people with common goals and working conditions/professions (Nelson, 1999).  
• Have each team refine the class norms into complementary team norms.  
• Encourage introductions and goal sharing. |

* Note: Teams are primarily used for activities and practice and to provide an additional resource for feedback. Some teamwork should always be used—how much depends on the content and the method kinds selected in Level 3, Substance.
Table 1. Phases of the Learning Community (Continued)

<table>
<thead>
<tr>
<th>Phase</th>
<th>Activities</th>
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</table>
| Fostering | • Conduct periodic reviews of team assignments (e.g., before new projects, when personality issues cannot be resolved, etc.).  
                  • Refine expectations as needed.  
                  • Coach teams by supplying solicited and unsolicited encouragement, performance analysis, additional challenges, help, and resource tips (Jonassen, 1999). Coaching also includes feedback (see below for additional details). |

Provide Feedback. The goal of feedback is to correct, reinforce, and shape behavior and attitudes and also to increase motivation and understanding. The 3S theory uses three types of feedback, which are detailed in Table 2.

Table 2. Types of Feedback

<table>
<thead>
<tr>
<th>Type</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor</td>
<td>The instructor is often in the best position to give feedback because s/he may be more objective than a peer, less invested than a subject-matter expert, and may be capable of more accurately identifying when a learner has made significant progress or overcome a learning barrier. It is important to note that the more respected the instructor, the more value the learners will attach to the feedback.</td>
</tr>
<tr>
<td>Subject-matter expert (SME)</td>
<td>SME feedback is the most powerful type to use to shape behavior if a learner's intrinsic motivation for the subject matter is high. It is also the most effective type for positive and/or corrective feedback in a specialized skill area.</td>
</tr>
<tr>
<td>Peer</td>
<td>Peer feedback is often most effective for shaping attitudes since there is pressure to belong and conform to a group (Forsyth, 1999).</td>
</tr>
</tbody>
</table>

While each type of feedback has different considerations, there are some general criteria that should be adhered to whenever possible:

- Feedback should be detailed, immediate, and individualized whenever possible.
- Feedback rates should be high. For example, when practicing psychomotor skills, feedback should occur on average at least once every 30 seconds.
- The instructor should determine the best types of reinforcement for each individual in the class (Gredler, 2001).
- Personality types should be considered when making feedback decisions (see formats for additional information).
- Periodic assessment of feedback needs to occur. This will be discussed in greater detail in Managing Instructional Quality.

* Instructors are encouraged to use positive reinforcement (Skinner, 1974) wherever possible.
In addition to the types and criteria for feedback, there are also a few different formats that should be taken into consideration. Feedback can be given in writing, as recorded audio or audio-video format, or verbally. Table 3 lists the considerations for each choice.

<table>
<thead>
<tr>
<th>Format</th>
<th>Considerations</th>
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</table>
| Written (or recorded) | • The most effective way of providing detailed feedback.  
• This is the best format for corrective feedback that requires substantial learner changes. |
| Verbal                | • The most effective and efficient way of providing immediate feedback.  
• It may be less organized/detailed than written feedback.  
• It requires synchronous environment.  
• Especially effective for giving feedback on motor skills and whenever else detailed feedback isn't required (e.g., drills). |

Additionally, feedback may be given either privately or publicly. There are considerations for this choice as well:

- Public: Consider using when many students are making similar mistakes. This choice is also beneficial in further refining instructor expectations.
- Private: Use the choice when feedback may affect the learner adversely (e.g., handling a problem within a team) or when the feedback is exceptionally negative (e.g., when communicating a low grade).

Despite the different types and formats, the most important aspect of feedback in the 3S theory is the frequency. At a minimum, feedback should be given at each major milestone, during every practice session, after each submittal of work, and at the end of the course.

**Level 2: Structure**

Within the previously established learning environment, structure is added to facilitate learning. This second level within the 3S theory provides assistance with sequencing instruction and promotes the use of diverse resources.

**Sequence Instruction.** The goal of this method is to structure learning for skill acquisition, process cognition, and, when applicable, skill mastery. There are five major sequencing considerations:

- Before sequencing can be addressed, it is first necessary to ascertain if the required prerequisite skills are in place. To gain information about prerequisite learning, a pretest could be given or the completion of another course within a specified timeframe could be required. Despite prerequisites, however, there could still be learning deficiencies for various reasons. It is recommended that a Q&A session* be conducted before all complex content that builds on assumed existing learning to verify this information is understood. If it isn't, a sequencing change may need to be made "on the fly." The benefit of this approach is that it encourages prerequisite facts to be firmly integrated with procedural knowledge (van Merrienboer, 1997).

* See Level 3 methods for additional information about conducting a Q&A session.
• Sequencing should be more spiral (Bruner, 1960 in Reigeluth, 1999) than topical whenever possible to support mental model progressions (van Merrienboer, 1997). One major exception to this guideline is when safety is an issue or prerequisite learning is faulty. In such cases, those objectives should be addressed at the beginning of the sequence.

• Repeat the terminal objectives throughout the course a minimum of two additional times. These repetitions should not reoccur within the same hour.

• Subskills should be taught in an order appropriate for a novice, such as a reverse order or counter-to-performance order, but practiced as an SME would perform the objective skill (van Merrienboer, 1997).

• When possible, allow the learner to make sequencing decisions with instructor concurrence when working with content containing metacognition, personal goals, and multiple perspectives (e.g., student projects in Level 3).

**Offer Diverse Resources.** The goal of this method is to guide and support the learning experience, aid transfer, provide ongoing educational opportunities, influence options, and foster a collaborative professional environment. The applicability of general resources is situational. For example, an inexperienced instructor should be provided a detailed instructor guide whereas an experienced instructor might not require the same detail or even the instructor guide resources. In general, however, it is better to err on the side of too many resources than too few.

Table 4 lists different kinds of resources. Examples and usage guidelines are also specified. It is especially important to note that there are valuable resources preexisting within the learning community in the form of other team members, subject-matter experts, and instructors (Bielaczyc & Collins, 1999).

**Table 4. Kinds of Resources**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Content/Examples</th>
<th>Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor Guide</td>
<td>A detailed IG should contain:</td>
<td>Required when instructor is less experienced and/or not a SME. The level of detail should correspond to instructor experience.</td>
</tr>
<tr>
<td></td>
<td>• Lecture notes</td>
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<td></td>
<td>• Activity guidelines</td>
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<td></td>
<td>• Time estimates for specific activities/sequences (broken into segments of no less than 5 minutes and no greater than 30 minutes)</td>
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<td></td>
<td>• Equipment lists</td>
<td></td>
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<td></td>
<td>• Lesson objectives</td>
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<td></td>
<td>• Copies of slides</td>
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</tr>
<tr>
<td>Student Guide</td>
<td>The student guide should contain items such as:</td>
<td>A student guide is an especially useful resource if one of the course goals is establishing a knowledge domain with concepts and procedures. Due to the development time and cost involved in producing a student guide, it is most useful for relatively static knowledge.</td>
</tr>
<tr>
<td></td>
<td>• Readings</td>
<td></td>
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<td></td>
<td>• Job aid masters</td>
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<tr>
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<td>• Copies of slides</td>
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<td></td>
<td>• Note-taking aids</td>
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<td></td>
<td>• Assignment details</td>
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Table 4. Kinds of Resources (Continued)

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<td></td>
<td>• Assignment details</td>
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<tr>
<td>Reference material</td>
<td>Examples of reference materials include:</td>
<td>Separate from the student guide, this kind of resource is for frequently changing information. This kind is designed to enable a learner to access the latest information and aids transfer and promotes ongoing learning and the motivation to do so.</td>
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<tr>
<td></td>
<td>• Periodicals</td>
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<td></td>
<td>• Books</td>
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<td>• Articles</td>
<td></td>
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<tr>
<td></td>
<td>• URLs</td>
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<tr>
<td>Job Aids</td>
<td>Job aids can take a variety of forms including:</td>
<td>These aids can be for critical, detailed processes that aren't memorized or often used; situations requiring standardized documentation, and to assist in heuristic-based decision making (van Merrienboer, 1997).</td>
</tr>
<tr>
<td></td>
<td>• Checklists</td>
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<td>• Decision trees</td>
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<td>• Worksheets</td>
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<td></td>
<td>• Process flowcharts</td>
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<tr>
<td>Emotional support</td>
<td>“Emotional support consists of those elements that support learner attitudes, motivation, feelings, and self-confidence” (Reigeluth, 1999, p. 64). Some additional sources for emotional support include:</td>
<td>Emotional support is helpful in all situations, but it is required for content that is exceedingly complex (i.e., taking 1+ year to master).</td>
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<td></td>
<td>• SMEs</td>
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<td></td>
<td>• Mentors</td>
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<tr>
<td></td>
<td>• Other learners/teams</td>
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</tr>
<tr>
<td>Cognitive support</td>
<td>“Cognitive support consists of those elements which serve to support the students in building their understanding of, and competence in, the subject matter” (Reigeluth, 1999, p. 64). Additional examples of cognitive support include:</td>
<td>Cognitive support is beneficial regardless of the situation; it is required, however, for material that requires years of practice to gain mastery in a specific, complex professional domain (e.g., physical therapist). This type of resource significantly aids the transfer of learning.</td>
</tr>
<tr>
<td></td>
<td>• SMEs</td>
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<tr>
<td></td>
<td>• Apprenticeship programs</td>
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<tr>
<td></td>
<td>• Other learners/teams</td>
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</table>
The selection of resources is dependant on the content area and the learner support required for that area given the length of study and the complexity of the content. It is not uncommon, however, for a course to include all of the resources listed above.

**Level 3: Substance**

In Level 3, Substance, the course content is presented to the learners. The following three methods are used in combination with one another in a cyclical process:

1. **Conduct Activities to Promote Learning**
2. **Guide Activities to Deepen Understanding**
3. **Promote Mastery and Transfer through Realistic Practice**

The general approach should be to first provide basic information through lecture, demonstrations, Q&A, and brainstorming. Next, learning should be translated to understanding through various activities like discussion, games, and reflection. Finally, understanding should be practiced using techniques such as simulations, scenarios, role play, and case studies. As additional levels of content detail are added, the cycle begins again, repeating as often as needed for any given content area until a specified depth of understanding and performance is reached.

The overall objectives and guiding principles of this level of the 3S theory are based on Sivasailam Thiagarajan’s Laws of Learning (Thiagarajan, 2003):

- Keep the training experience active to promote understanding.
- Provide significant amounts of practice, which is necessary to achieving mastery.
- Build on the learners’ existing knowledge and experience.
- People learn in a variety of ways.
- Emotional responses to events translate into longer-term retention of information.

**Step 1. Conduct Activities to Promote Learning.** The goals of this method are to gain the learners’ attention, increase their motivation, promote collaboration, aid learning and understanding, and elicit recall of existing knowledge. The various kinds of activities used to promote learning are described in detail below. These activities can be used in conjunction with one another or singly to achieve specific content goals. These learning activities can be done at the class or the individual level depending on the delivery medium selected (e.g., computer-based tutorial, web forum, classroom, etc.).

**Question and Answer.** Q&A has many different uses depending on the desired outcome (e.g., changing attitudes, memorizing information, recalling existing knowledge, etc.). It also has the additional benefit of enabling students to learn from one another. The following list provides suggested opportunities for using different types of Q&A:

- **Socratic:** Use to shape attitudes, as a precursor to reflection, to foster and check cognitive understanding of content, to create connections across domains, and to encourage metacognition.
- **"Jeopardy" style:** Use primarily to reinforce connections between information. “Jeopardy” Q&A can also be an effective, yet less efficient way to aid memorization.

* In some cases, especially when working with concrete, simple motor skills, the activities that promote understanding may be so informal that this step may be passed through very quickly. When teaching complex motor and cognitive skills, however, all three should be thoroughly employed to achieve maximum benefit.
• Drill: Use for memorization of facts that require immediate recall without conscious thought.
• Brainstorming: Use to elicit ideas and opinions for a specific topic, question, or problem. This is an effective way of encouraging creativity and collaboration. It should be limited to 5-minute increments to keep the brainstorming on topic. It is important to recognize that not all personality types are comfortable with brainstorming; some individuals may prefer to think for a while before vocalizing their ideas and opinions.

**Demonstrations.** Demonstrations can be used to aid goal development, detail expected outcomes, and to provide a big picture of upcoming learning, if used before learning subskills, or, if used after the subskills are learned, to explain the process of building learned subskills to mastery of the target skill. Demonstrations may also help to promote cognitive connections between subskills. Regardless of when they are used, demonstrations of critical tasks should always be first performed by an SME to ensure quality in terms of completeness and correctness.

A variety of delivery choices for demonstrations are available:
• Face to face: Best for smaller groups and/or demonstrations not requiring detailed or specific views.
• Video: Best for detailed demonstrations of intricate skills and to replicate the availability of the SME; also most effective for large groups (if appropriate supporting equipment is used) or to enable students to replay content on demand.
• Audio only: Audio has limited uses. It should only be selected when the demonstration requires no live visual support (e.g., differentiating between the different sounds of musical instruments).

**Lecture.** Lecture can be used to present basic, foundational, or prerequisite information. It should be limited to 15-minute stretches of time. It should also require learners to perform a physical activity like note taking, completing a form (e.g., learners are given a list of questions and during the lecture they write the answers to those questions based on the lecture content), interpreting a drawing, etc.

Lecture types include:
• Tutorials: Enables learners to progress at their own pace and repeat information. Tutorials are best for detailed content that may need to be reviewed periodically. This kind of lecture is also well-suited for distance learning.
• SME: Aids motivation within a specific content area and provides credibility to information. For replication and accessibility, SME lectures may need to be taped and delivered via VHS, CD, DVD, or some other format. When possible, both audio and video should be used to maximize the motivational aspect.
• Instructor: Use instructor lectures when other kinds are inappropriate, too costly, and when safety-related information needs to be emphasized.

Despite the differences inherent in these activities that promote learning, there are some additional general guidelines to help ensure success:
• A large number of correct and incorrect examples can aid learners in processing large amounts of information (van Merrienboer, 1997).
• Problems should be presented not only as situations in which an SME might confront, but also as worked-out examples so learners can begin to distinguish between different problem formats. It has been shown that large numbers of worked-out examples significantly aid transfer (van Merrienboer, 1997).
**Step 2. Guide Activities to Deepen Understanding.** These activities are done at the class, team, or individual level as specified in the text and/or the delivery medium. They are designed to expand on the knowledge presented in Step 1 and enable learners to internalize the content. There are many kinds of activities within this method from which to select:

*Discussion.* Discussion can occur in team or class environments and can either be conducted synchronously or asynchronously through face-to-face contact or electronic support. When deciding what type of discussion to use, let the content and outcome expectations guide the selection of team versus class, then select synchronous versus asynchronous based on the guidelines, and finally select the delivery strategy. See Table 5 for detailed application information.

Table 5. Process for Selecting and Using Discussion

<table>
<thead>
<tr>
<th>Step A: Select a Type</th>
<th>Step B: Select a Format</th>
<th>Step C: Select a Delivery Strategy</th>
</tr>
</thead>
</table>
| Teams: This type of discussion is most appropriate for exploring and creating personalized meanings within a specific context (e.g., the team members common goals and backgrounds). This discussion type also enables learners to customize the direction of the discussion to include subtopics of personal interest and to go to a depth deemed appropriate by the team members. Team discussions also have higher participation requirements and require more thoughtful responses. | Synchronous: Use when learners are confronting flow-time critical decision points (e.g., when learning cannot proceed until a path is chosen by a team). Note that extroverts tend to dominate the discussion (Misanchuk, in press). | • e-Mail  
• Bulletin boards  
• Tools enabling threaded discussions  
• Chat forums  
• Multifunctional web-based programs like Groove  
• Microsoft Word (using the comment feature)  
• Telephone  
• Face to face |
| Class: There are a couple of situations in which class discussions are especially beneficial:  
• For high-level discussions where in-depth answers are not required (e.g., verifying collective understanding and looking for problems with the instruction).  
• For cross-team learning and information sharing at a high level.** | Asynchronous: Use as the primary format for virtual teams. This is also the best format to encourage reflection. It also works well to foster communication among all personality types. | |

* Discussion can also be used in Step 1 to promote learning. It is most powerful, however, when used to deepen understanding, which is why it is listed within the Step 2 method.

** Note that student-instructor discussion is listed under Reflection.

*** If individual responses require more than a 1 to 3 minutes to articulate, then student lecture should be used instead (see below for details).
Games. Games are a powerful way to reinforce and build on existing skills/knowledge because they are usually highly motivating and engaging. They also encourage creative "out of the box" thinking by individuals, teams, and entire classes. Games may be as simple as a puzzle that can be solved in a few minutes or as complex as a computer game requiring significant interaction and thought.

The use of games in adult training situations has been well documented by one professional trainer, Sivasailam Thiagarajan, or Thaigi, as he is more commonly known. His extensive work provides comprehensive detail in the area of meaningful games and the principles for using them. Please review his work at [http://www.thiagi.com](http://www.thiagi.com) for information about using games in this method.

Learner projects. Projects are designed to provide an opportunity for learners to explore in greater depth any content areas that relate to their stated personal and professional goals. These projects are selected by the learners with guidance, if required, from the instructor. The learners control the sequencing and development of their personal projects. There are two recommended types of projects:

- Research-oriented projects: Enables learners to explore tangential content or go deeper into the course content as is suitable to their personal goals.
- Application-oriented projects: Enables learners to learn and apply course skills within a personalized context.

There are also two different approaches for the implementation of student projects:

- Team based: This approach emphasizes depth in a selected content area. It enables students to learn from one another, practice team skills, build collaboration expertise, and often to "specialize" and gain a deeper understanding in particular aspects of a project that conform to their personal and professional goals. The drawback to this implementation approach is that the expended effort of the participants may be unequal.
- Individual: This approach emphasizes breadth in a selected content area. It requires that the learner be involved in all aspects of the project, from start to finish. It is more of a "jack of all trades" approach that doesn't allow for skill specialization. Depending on the size and duration of the project, learners may require additional emotional and cognitive support to aid understanding and provide motivation.

Learner presentations and/or lectures. Presentations and lectures provide learners an opportunity to present introductory information and specific case examples for individualized content areas relating to, but not included in, the planned instruction. This kind of activity enables learners to elaborate information, an approach designed to increase their memory for new information (van Merrienboer, 2003).

Through researching, preparing, and then presenting and fielding questions, learners deepen their understanding of a specific content area. Because they may have to "defend" their presentation, this kind of activity encourages learners to examine content from multiple perspectives and gain awareness of personal processes and development, which promotes metacognition. An additional benefit is that presentations provide all learners in the class with both different perspectives and an introduction to a larger breadth of tangential content knowledge.
Reflection. The reflection technique is best used with content that addresses metacognition, personal goals, and multiple perspectives. There are a variety of informal and formal ways to promote and encourage reflection are specified in Table 6.

Table 6. Types of Reflection Activities

<table>
<thead>
<tr>
<th>Type</th>
<th>Usage</th>
<th>Criteria</th>
<th>Formal vs Informal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal</td>
<td>Personal reflection that occurs over an extended time period and usually builds on itself to promote process understanding and metacognition.</td>
<td>Entries should be scheduled on either a fixed timeframe (e.g., weekly) or after specific activities. If less than five entries are planned due to time and workload constraints, consider using the essay approach.</td>
<td>Informal</td>
</tr>
<tr>
<td>Team discussions</td>
<td>Best used for generating awareness and increasing understanding of multiple perspectives.</td>
<td>A specific content area/topic should be specified.</td>
<td>Informal</td>
</tr>
<tr>
<td>Learner-instructor meetings</td>
<td>Best used for addressing personal goals and providing one-on-one coaching.</td>
<td>To facilitate preparation and achieve the goals, meetings should be prescheduled and a basic agenda or topic specified.</td>
<td>Informal or formal (instructor choice)</td>
</tr>
<tr>
<td>Self-assessment</td>
<td>Designed to enhance metacognition.</td>
<td>The assessment criteria and guidelines should be outlined by the instructor before the activity begins.</td>
<td>Formal</td>
</tr>
<tr>
<td>Essays</td>
<td>A reflection activity for personal thoughts and goals. This type may be used as a summary activity for any of the other kinds of reflections or used instead of a journal if multiple journal entries are not possible.</td>
<td>Expectations should be outlined by the instructor. Also, learners may require assistance generating topics and/or themes.</td>
<td>Formal</td>
</tr>
</tbody>
</table>

Step 3. Promote Mastery and Transfer through Realistic Practice. The goals of this step are to build skills, aid transfer and retention, and promote mastery. The 3S theory specifies a number of different approaches to fulfilling these goals that may be used singly or in conjunction with other specified approaches.

Practice activities may be specified as either dynamic or static. If a practice is dynamic it means that it has the ability to adjust with the actions of the learner; the learner is in control. On the other hand, if a practice activity is static, that means that there are a limited number of choices a learner can make, which means that the learner doesn’t have the same level of control as is available in a dynamic practice. When creating and employing practice scenarios, it may be appropriate to first have learners practice in using static activities and
then move to dynamic ones. This should be considered a “best practice” when dealing with safety-related issues.

Four types of common practice activities are detailed in Table 7. The criteria that generally apply to all practice situations are listed below the table.

**Table 7. Types of Practice Activities**

<table>
<thead>
<tr>
<th>Type</th>
<th>Usage</th>
<th>Dynamic vs Static</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simulations</td>
<td>Very effective for overlearning skills for automatic recall. Simulations may be computerized for additional realism.</td>
<td>More dynamic than static</td>
</tr>
<tr>
<td>Scenarios</td>
<td>Especially effective for situations requiring a building cycle of practice-reflection-practice. Easier to implement than simulations.</td>
<td>More static and limited than simulations.</td>
</tr>
<tr>
<td>Role play</td>
<td>Less controllable than other kinds of activities but easy to implement. Role plays are especially useful for practicing actionable people skills (e.g., negotiation, etc.) and/or overlearning motor skills.</td>
<td>Dynamic</td>
</tr>
<tr>
<td>Case studies</td>
<td>Very effective for enabling a great variety of experiences in a short time. Good for practicing skills that require significant thought before action.</td>
<td>More static than other kinds, which may be limiting depending on the skill being taught</td>
</tr>
</tbody>
</table>

The following criteria should be applied to all practice activities. Practice activities should:

- Be as realistic as possible to real-world application. For example, if work is completed in teams on the job, the majority of the practice time should be spent in team activities; if the work is completed individually, then the practice time should be largely individual.
- Be variable in the task presentation, defining characteristics, context, task familiarity, etc. to promote transfer (van Merrienboer, 1997). In support of this criterion, it is suggested that the majority of activity types listed in Table 7 be used in any given course.
- “Offer divergent cases to work on in order to give compilative processes the opportunity to develop a broad set of domain-specific productions that may be used to perform new tasks” (van Merrienboer, 1997, p. 44).
- Elicit successive approximations that lead to the most realistic practice activity. This approach is more effective than simply practicing parts of the skill and then putting those parts together. “A learner who is able to perform all constituent skills [subskills] is not necessarily able to satisfactorily perform the whole complex skill. In short, a complex cognitive skill is considered to be more than the sum of its constituent skills” (van Merrienboer, 1997, p. 85).
- Occur often to strengthen the skills. “Productions accumulate strength each time they are successful applied. Only after further practice might the skill become fully automatic” (van Merrienboer, 1997, p. 41).

One possible guideline to use to assess whether or not sufficient practice has occurred is to watch a learner perform a set of skills correctly and then ask that learner to articulate the
knowledge used during the performance. If the knowledge has been deeply ingrained within the learner, to the point where it is considered tacit knowledge, it should be difficult for that learner to articulate the details (van Merrienboer, 1997). Another guideline is to structure training time so that at least 40% is spent performing practice activities.

**ISD PROCESS: MANAGING INSTRUCTIONAL QUALITY**

It can sometimes be difficult to separate instructional theory from instruction processes. In some cases, one influences the other. Such is the case with managing instructional quality in the classroom. Therefore, this additional section is presented to aid understanding of how a quality-oriented ISD process can affect the selection of instructional methods. Steps 1 through 3 are part of an ISD process, but are necessary to achieve Step 4, which does have a direct impact on instruction.

The process that is detailed below for managing instructional quality is designed to improve instructional quality. It is roughly based on the Deming cycle of “Plan, Do, Check, Act” (Arveson, 1998). The following steps outlined in Table 8 should be applied where applicable within the 3S theory methods.

**Table 8. Quality Steps**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Create and share contextual definitions (e.g., define quality) within the learning environment.</td>
<td>This is best done in the creation phase of the learning community. The purpose is to establish a common understanding of definitions that are key to the continual evaluation of the instruction (from the learner's point of view). It can also help set learner expectations.</td>
</tr>
<tr>
<td>2</td>
<td>Conduct periodic course evaluations.</td>
<td>Evaluations should address the course content, structure, selected delivery mechanisms, activities, feedback frequency and quality, etc.</td>
</tr>
<tr>
<td>3</td>
<td>Log problems.</td>
<td>The log should address errors in the content, delivery issues, activity failures, equipment problems, etc.</td>
</tr>
<tr>
<td>4</td>
<td>Select, analyze, and act on improvement opportunities.</td>
<td>This is an ongoing activity during teaching. It is basically the continual evaluation of the effectiveness and efficiency of the other methods. Based on the data collected (see above), selection of methods and kinds should be continually adjusted to improve the learners' experience. When possible, this adjustment should be made during the course in which the problem was logged (e.g., learners complain about ineffective team discussions so the instructor looks at changing the team composition, mentoring the team, etc., and makes the selected adjustments to affect the remaining course time).</td>
</tr>
</tbody>
</table>

The focus on quality within the 3S theory is to provide for the adjustment of instructional methods while the course is in progress. For example, in an eight-week course, methods
may be adjusted 2-3 times or as resources allow. An additional benefit to managing quality, however, is that significant changes can be made to existing courses before they are taught again to a different set of learners.

**SAMPLE APPLICATION OF THE 3S THEORY**

To aid understanding of the 3S theory, a sample application of the theory is provided. In this example, the 3S theory is being applied to a course on the topic of dog health. The adult learners taking this 6-week, 24-hour course are professionals with careers in dog training, therapy, and re-homing (e.g., humane society workers). The class size is limited to 16 learners due to the amount of hands-on practice requirements and associated safety issues. There will be one instructor and this individual’s level of training experience cannot be guaranteed.

In this face-to-face course, learners will be trained in psychomotor skills, such as taking a dog’s temperature and fashioning a muzzle, and in complex cognitive skills, such as assessing health and determining first aid approaches. This fictional example meets the additional requirements of the 3S theory because it is a course that will be replicated throughout the country. Additionally, this course is the first in a series of courses for dog professionals.

The first step in applying the theory is to create and organize the learning community. As individuals sign up for the course, they are asked to complete questions concerning their professional experiences, goals, and reasons for taking the course. Because these individuals may potentially be together for a series of courses, they are also asked to complete the Keirsey Temperament Sorter. The instructor and/or course administrators then assess the group dynamics and create four heterogeneous teams with four people per team.

The next steps in the theory are shown in Table 9. This table depicts sample class activities for the 6-week session. It is not meant to be comprehensive; rather it shows the general flow and application of the 3S methods. The course content would be much more substantial than is indicated in this example, which only focuses on safely handing a dog during an emergency situation.

**Table 9. Dog Care Course Example**

<table>
<thead>
<tr>
<th>Week</th>
<th>Sample Activities</th>
</tr>
</thead>
</table>
| 1    | • The instructor explicates processes and expectations such as course attendance, guidelines for working with demonstration dogs in class, general performance criteria, feedback mechanisms, and the role of quality in the course.  
     • The instructor leads a discussion about class values as a norming activity, proving feedback as necessary to emphasize good ideas and to motivate learners.  
     • The class is broken into preassigned teams, who then share their goals and experience while creating team values to aid working together. |
<table>
<thead>
<tr>
<th>Week</th>
<th>Sample Activities</th>
</tr>
</thead>
</table>
| 2    | • The instructor conducts a 15-minute Q&A session with verbal feedback to ascertain if the class has the prerequisite skills for identifying indicators of dog emotions. This prerequisite skill is required for the safe handling of a dog in a health care situation, such as when attempting to restrain a dog to fashion a muzzle.  
• Learners refer to a series of pictures of dog emotions in an article within their student guide.  
• The instructor demonstrates the process a novice would use to remain safe while caring for an injured dog. This demonstration includes a video of an expert muzzling various sizes of dogs with different head shapes. A variety of materials are also used (e.g., a muzzle, a shirt, and a towel).  
• The instructor leads a synchronous group discussion about the salient points in the process of muzzling. During this discussion, the instructor provides feedback concerning the participation. |
| 3    | • The instructor conducts a Q&A session to elicit details about the process of remaining safe while caring for an injured dog.  
• Within the specified teams, the learners work through scenarios that apply the skill of muzzling a dog using a stuffed dog. During this time, the instructor watches each team and provides verbal feedback and, if necessary, coaching to foster both individual learning and team development.  
• The instructor asks the class for feedback concerning the quality of the instruction. The results indicate that some learners were confused by what they interpreted as inaccuracies in the video of muzzling. |
| 4    | • To compensate for issues within the video, the instructor has arranged for an SME to perform a live demonstration of muzzling different dogs.  
• The students individually work through one of four case studies dealing with dog rescue situations.  
• Four students, each representing one of the case studies, presents the case and his or her resolution to the class. Class discussion and instructor feedback follow. |
| 5    | • In front of the class, one team at a time works through a simulation of handling a dog in an emergency situation. Well-trained dogs are used. The instructor and peers provide feedback. Each team uses a different simulation.  
• The instructor address teaming issues if any arise. Depending on the nature of the issue, this may be handled privately.  
• During a discussion conducted after the simulation activity, the instructor elicits from the learners details about the process of remaining safe while caring for an injured dog. |
| 6    | • In teams, learners conduct role plays of situations involving the handling of a dog in an emergency. Live dogs are used. The instructor provides written feedback using a performance evaluation form.  
• Learners reflect on their skill development by completing a self assessment.  
• Learners are given additional resources for future study in these techniques. |
CONCLUSION

The purpose of the 3S theory is to provide a comprehensive framework to support adult learners in content areas involving cognitive and psychomotor skill development. Based on values derived from information-age key markers, the 3S approach is a theory for development of interrelated levels of support, structure, and substance that can be woven together through the use of various kinds of methods. The end goal of the theory is to create motivated, life-long learners who have achieved significant success in a team-based classroom environment, developed a deep understanding of the content, created a network of support, and are well-equipped to transfer their skills to the real-world.
REFERENCES


