

Let's Be PALS

An Evidence-Based Approach to Professional Development

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An evidence-based approach to professional development is described on the basis of the findings from a series of research syntheses and meta-analyses of adult learning methods and strategies. The approach, called PALS (Participatory Adult Learning Strategy), places major emphasis on both active learner involvement in all aspects of training opportunities and instructor/trainer-guided learner experiences. The use of PALS practices has been found to be associated with improved learner knowledge, use, and mastery of different types of intervention practices. Implications for in-service training are described. **Key words:** *adult learning, evidence-based, in-service training, instructor-guided learning, participatory learning*

NO INTERVENTION PRACTICE, no matter what its evidence base, is likely to be learned and adopted if the methods and strategies used to teach or train students, practitioners, parents, or others are not themselves effective. It is therefore useful to make a distinction between intervention practices informed by research (Dunst & Trivette, 2009; Kazdin, 2008) and the methods used to teach or train others to use the practices (Donovan, Bransford, & Pellegrino, 1999; Fixsen, Naom, Blase, Friedman, & Wallace, 2005). As Fixsen et al. (2005) noted, it is important to be aware of the difference between the intervention practices that are

used to affect behavior change and the training methods used to promote adoption and use of the intervention practices.

This article includes a description of an adult learning strategy called PALS (Participatory Adult Learning Strategy) informed by findings from several recently completed meta-analyses of adult learning methods (Trivette, 2007; Trivette & Dunst, 2009a, 2009b; Trivette, Dunst, Hamby, & O'Herin, 2009a, 2009b). The syntheses were completed, in part, to discern whether different opinions about adult learning are supported by research evidence and to identify the conditions under which adult learning methods are optimally effective. Even a cursory review of the adult learning literature finds varied assertions about what are and what are not the most important characteristics of adult learning (eg, Kirschner, Sweller, & Clark, 2006; Merriam, 2001a).

The article includes 4 sections. The first section includes a brief overview of both adult learning theory and the 4 adult learning methods that were the focus of analysis in our research syntheses. The second section includes a summary of the major findings from one of our meta-analyses of studies of adult learning (Trivette et al., 2009a, 2009b). The third section includes a description of the key elements of PALS based on the results of all our

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meta-analyses. The fourth section includes a description of the implications of PALS for professional development, with particular focus on in-service training opportunities.

ADULT LEARNING THEORY

Adult learning refers to a collection of theories, methods, and approaches for describing the characteristics of and conditions under which the process of learning is optimized (Merriam, 2001b; Trotter, 2006; Yang, 2003). Knowles, Holton, and Swanson (1998) used the term “andragogy” to describe the assumptions and foundations of adult learning: readiness-to-learn, self-directedness, active learner participation, and solution-content. Knowles’ (1996) adult learning principles have been used widely to propose teaching methods and strategies for instructors, teachers, trainers, and others to enhance learner knowledge acquisition and use (eg, Imel, 1998; Merriam, 2001a).

Adult learning methods

The 4 adult learning methods that have been the focus of our meta-analyses are *accelerated learning* (Meier, 2000), *coaching* (Hargreaves & Dawe, 1990), *guided design* (Hancock, Coscarelli, & White, 1983), and *just-in-time training* (Beckett, 2000). Each of the methods, to varying degrees, includes elements that Knowles et al. (1998) and others (eg, Trotter, 2006) consider the essential features of adult learning. Accelerated learning includes methods for creating a relaxed emotional state, an orchestrated and multisensory learning experience, and active learner participation in the learning process (Russell & Morrow, 1999). “Coaching is a . . . method of transferring skills and expertise from more experienced and knowledgeable practitioners . . . to less experienced ones” (Hargreaves & Dawe, 1990, p. 230). Guided design is characterized by a decision-making and problem-solving process that includes procedures for using real-world problems for mastering learning content in the context of group learning

and facilitator guidance and feedback (Wales & Stager, 1982). Just-in-time training includes access to and provision of information, advice, guidance, and so forth in response to learner requests that are intended to improve learner performance (Brandenburg & Ellinger, 2003).

Research reviews on the effectiveness of these different adult learning methods (eg, Felix, 1989; Showers, Joyce, & Bennett, 1987; Stephenson, 2003), as well as research reviews of adult learning approaches in general (eg, Bishop, 1996; Brookfield, 2006; Merriam, 2001a; Smith & DeFrates-Densch, 2008), can be found scattered throughout the literature. Most of these reviews have analyzed adult learning methods at a macrolevel and have not focused on the features of the methods and strategies that affect learning. Available research reviews are informative but have not identified the specific characteristics of adult learning methods and strategies that best explain what matters most in terms of explaining learner outcomes.

META-ANALYSIS OF ADULT LEARNING METHODS

Trivette et al. (2009a, 2009b) recently completed a meta-analysis and research synthesis of studies of accelerated learning, coaching, guided design, and just-in-time training that focused on those practices that make adult learning effective. (The complete report can be obtained free of charge at www.wbpress.com, www.practicalevaluation.org or <http://tnt.asu.edu>) The meta-analysis is part of a series of research syntheses on adult learning focusing on the characteristics of the practices that are associated with learner outcomes (Trivette, 2007; Trivette & Dunst, 2009a, 2009b). The conduct of the syntheses was guided by a characteristics-consequences framework that focuses on unpacking, disentangling, and identifying the practice characteristics that are most strongly associated with study outcomes (Dunst & Trivette, 2009).

Method

Four searches were conducted, one for each adult learning method, using the search procedures described by Lucas and Cutspec (2007). ERIC (Educational Resources Information Center), Psychological Abstracts (PsycINFO), Academic Search Elite, Business Source Elite, WorldCAT, Social Sciences Citation Index, InfoTRAC Expanded Academic ASAP, MEDLINE, OCLC PapersFirst, and Dissertation Abstracts were searched to identify studies. These were supplemented by searches of Ingenta, Google Scholar, ABI/INFORM Global, the Cochrane databases, and an EndNote library maintained by the Puckett Institute. We also conducted manual searches of seminal papers and all retrieved articles, chapters, books, and journals devoted to the different adult learning methods. We also conducted Social Sciences Citation Index author searches of leaders in the development of each of the adult learning methods.

Studies were included if (1) the participants were *adult learners* (defined as post-high school age), (2) sufficient information was included to code the use of different adult learning method characteristics (see the following

text), (3) the adult learning methods were compared with some control or contrasting condition, and (4) either a randomized controlled trial or comparison group design was used to evaluate the effectiveness of the adult learning methods. Studies were excluded if the participants were elementary or secondary school students, insufficient information was included about specific elements of the adult learning procedures, and preexperimental or single-participant research designs were used (see Trivette & Dunst, 2009b, for a synthesis of an adult learning method that includes single-participant design studies).

Findings reported in *How People Learn: Brain, Mind, Experience, and School* (Bransford et al., 2000; Donovan et al., 1999), a research review on the *science of learning*, were used to identify 6 adult learning method characteristics and to code the studies in the research synthesis using these characteristics to determine the extent to which the presence of the characteristics was related to variations in study outcomes. Table 1 shows the characteristics that were the focus of analysis. The 3 main features were planning, application, and deep understanding. Each

Table 1. Characteristics of the adult learning methods that were the focus of analysis

Features/characteristics	Definition
Planning	
Introduce	Engage the learner in a preview of the material, knowledge, or practice that is the focus of instruction or training
Illustrate	Demonstrate or illustrate the use or applicability of the material, knowledge, or practice for the learner
Application	
Practice	Engage the learner in the use of the material, knowledge, or practice
Evaluate	Engage the learner in a process of evaluating the consequence or outcome of the application of the material, knowledge, or practice
Deep understanding	
Reflection	Engage the learner in self-assessment of his or her acquisition of knowledge and skills as a basis for identifying "next steps" in the learning process
Mastery	Engage the learner in a process of assessing his or her experience in the context of some conceptual or practical model or framework or some external set of standards or criteria

of the main features included 2 practice characteristics. Planning included methods and procedures for both: (1) introducing new knowledge, material, or practices to learners (eg, class/workshop presentations, preclass assignments) and (2) illustrating and demonstrating the use of the knowledge, material, or practices (eg, demonstrations, role-playing). Application included methods and procedures for both: (1) learner applied use of the knowledge, material, or practices (eg, learner use of a practice, problem-solving activities) and (2) learner evaluation of the outcome or consequence of application (eg, instructor/learner review, instructor feedback). Deep understanding included methods and procedures for (1) engaging the learner in reflection on his or her learning experience (eg, performance improvement reviews, group reflection) and (2) self-assessment of the knowledge and mastery as a foundation for identifying new learning opportunities (eg, learner self-assessment, standards-based assessment). The 6 characteristics are nearly identical to those described by Graham and Wedman (1989) as the key features of effective adult learning practices.

Search results

Seventy-nine studies were located in 66 research reports for the meta-analysis. The studies used either randomized control designs ($n = 58$) or nonequivalent comparison group designs ($n = 21$). The studies included 3152 experimental group participants and 2988 control or comparison group participants. The learners included classroom teachers, student teachers, undergraduate students, graduate students, medical personnel, counselors, English as second language learners, and business personnel (eg, sales and customer service personnel). The settings in which the adult learning methods were implemented included college classrooms; elementary, junior, and high schools; special education classrooms; hospitals and private physician practices; and various business and work settings. The learner outcomes in the studies included teaching practices, foreign language learning,

nursing and medical practices, science and engineering, mathematics and statistics, economics, and rare vocabulary.

Seventy-six studies included the introduction of some type of knowledge, material, or practices, and 37 studies included the demonstration or illustration of some type of knowledge, material, or practices. Fifty-eight studies included some type of learner application, and 31 studies included some type of learner evaluation of their use of the knowledge, material, or practices. Thirty-three studies included some type of learner reflection, and 29 studies included some type of learner self-assessment of mastery. One-third of the studies evaluated training provided between 1 and 10 hours, one-third of the studies evaluated training between 11 and 40 hours, and one-third of the studies evaluated training of more than 40 hours.

Method of analysis

Cohen's d effect sizes for the mean difference in the posttest study outcomes between the experimental groups and the control or comparison groups were used for assessing the effectiveness of the adult learning methods. The average Cohen's d effect size was computed for each of the 6 adult learning method characteristics as well as type of practice for each characteristic to ascertain which characteristics and practices accounted for the largest between group differences. The average size of effects and their 95% confidence intervals (CIs) were used for substantive interpretation. A CI not including zero indicates that the average effect size is significantly greater than zero at the .05 level (Hedges, 1994).

SYNTHESIS FINDINGS

The average effect size (95% CI) for all studies and outcomes combined was 0.58 (95% CI = 0.45-0.70), indicating that the adult learning methods were associated with positive posttest outcome differences between the experimental and control or comparison

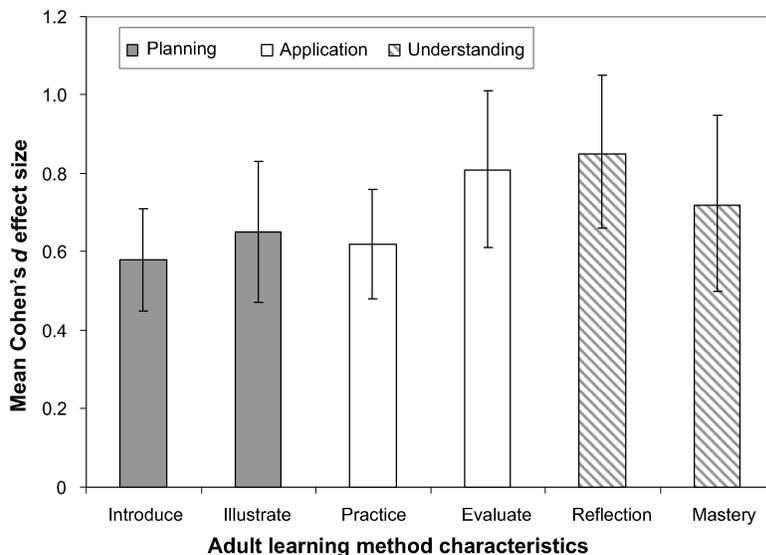


Figure 1. Average effect size and 95% confidence intervals for the relationship between the 6 adult learning method characteristics and the study outcomes.

groups. The average effect sizes and 95% CIs for the individual adult learning methods were 0.86 (95% CI = 0.41–1.31) for just-in-time training, 0.68 (95% CI = 0.47–0.90) for coaching, 0.67 (95% CI = 0.39–0.95) for guided design, and 0.35 (95% CI = 0.20–0.51) for accelerated learning.

Adult learning method characteristics

Figure 1 shows the average effect sizes and 95% CIs for each of the 6 adult learning method characteristics for all outcomes measures combined. All of the characteristics were associated with positive learner outcomes as evidenced by the average sizes of effects and the fact that none of the CIs included zero. The pattern of results shows that the more actively involved the learners were in judging the consequences of their learning experiences (evaluate, reflection, and mastery), the stronger the relationship between the adult learning method characteristics and the study outcomes. This finding highlights the relative importance of active learner participation in learning new knowledge or practice and learner engagement in judging his or her experience with new material.

In addition to the main results, there were several other findings that helped elucidate the conditions under which the adult learning methods were most effective. Large doses of learning opportunities distributed over time increased the effectiveness of the adult learning methods ($d = 0.70$, 95% CI = 0.50–0.88). Instructor- or trainer-guided learning opportunities positively affected learner outcomes ($d = 0.83$, 95% CI = 0.52–1.14).

Adult learning method practices

Table 2 shows the results for the different practices used for each of the adult learning method practices. All of the practices, except a combination of imagery and dramatic readings for introducing new information, were significantly related to the study outcomes.

Introduction of the learning topic

Two methods proved to be the most effective in terms of introducing new knowledge, material, or practices to the learners: (1) out-of-class activities and self-instruction and (2) warm-up exercises and preclass quizzes. Both practices actively involved learners in some type of exercise or task prior to instructor

Table 2. Effect sizes for the different adult learning method characteristics and practices

Characteristics/practices	Number		Cohen's <i>d</i> mean effect size	95% Confidence interval
	Studies	Effect sizes		
Introducing information				
Preclass exercises	9	9	1.02	0.63-1.41
Out-of-class activities/self-instruction	12	20	0.76	0.44-1.09
Classroom/workshop lectures	26	108	0.68	0.47-0.89
Dramatic readings	18	40	0.35	0.13-0.57
Imagery	7	18	0.34	0.08-0.59
Dramatic readings/imagery	4	11	0.15	-0.33-0.62
Illustrate/demonstrate				
Learner input	6	6	0.89	0.28-1.51
Role-playing/simulation	20	64	0.87	0.58-1.17
Real-life example/real life + role-playing	6	10	0.67	0.27-1.07
Instructional video	5	49	0.33	0.09-0.59
Practicing				
Real-life application + role-playing	5	20	1.10	0.48-1.72
Problem-solving tasks	16	29	0.67	0.39-0.95
Real-life application	17	83	0.58	0.35-0.81
Learning games/writing exercises	9	11	0.55	0.11-0.99
Role-playing (skits, plays)	11	35	0.41	0.21-0.62
Evaluation				
Assess strengths/weaknesses	14	48	0.96	0.67-1.26
Review experience/make changes	19	35	0.60	0.36-0.83
Reflection				
Performance improvement	9	34	1.07	0.69-1.45
Journaling/behavior suggestion	8	17	0.75	0.49-1.00
Group discussion about feedback	16	29	0.67	0.39-0.95
Mastery				
Standards-based assessment	13	44	0.76	0.42-1.10
Self-assessment	16	29	0.67	0.39-0.95

presentation or explanation of the learning topic as a means of introducing new information or practice. Classroom lectures were also significantly related to the study outcomes but not as strongly as active learner participation in having them introduced to the learning topic.

Illustrating the learning topic

Two methods for illustrating the use of new knowledge, material, or practices were most strongly related to the study outcomes: (1) instructor use of role-playing or simulations and (2) incorporating learner input into demonstrating the applicability of the new knowledge, material, or practices. A combination of real-life demonstrations and role-plays also

proved to be an effective strategy for illustrating the learning topic.

Practicing the use of the learning topic

A combination of real-life application and role-plays proved to be the most effective method for engaging learners in the use of the newly learned knowledge, material, or practice. Problem-solving tasks, real-life application, and some type of learning game or writing exercises also proved to be highly effective for engaging learners in application.

Evaluating the consequences of application

The 2 methods for engaging learners in the evaluation of the consequences of their use

of the new knowledge, material, or practices proved equally effective: (1) assessing learner strengths and weaknesses related to the application experience and (2) reviewing learner solutions to problems or answers to quizzes about their experiences.

Reflection on learner acquisition

Engaging the learner in a process of determining the next steps in learning targeted knowledge or practice was most effective (performance improvement). Engaging learners in journaling about their newly acquired knowledge and skills and positive learner feedback were also effective strategies for learner reflection. Group reflection on instructor feedback or peer feedback was an effective method of reflection as well.

Learner assessment of mastery

Actively involving learners in some type of self-assessment of their mastery of the learning topic and having learners use a set of a priori identified standards or external criteria for assessing their learning were both strongly related to the study outcomes for assessing their performance.

Combined influences of the adult learning method characteristics

The extent to which the simultaneous presence or use of the different adult learning method characteristics and practices was related to the study outcomes was determined by summing the number of characteristics used per study and relating variations in this measure to learner outcomes. The presence of a characteristic was limited to only those practices that were associated with positive learner consequences (see Trivette et al., 2009a, 2009b). The average number of characteristics per study was 2.18 (SD = 1.63, range = 0-5) with this metric.

Figure 2 shows the results for the relationship between the number of practice characteristics and the learner outcomes. The more adult learning method characteristics that were used, the larger the sizes of effects between the practices and the study outcomes. Studies in which none or only one characteristic was used had little or no effect on learner outcomes. Studies that included 2, 3, or 4 characteristics were associated with an average effect size of about 0.75. In those cases in which 5 adult learning

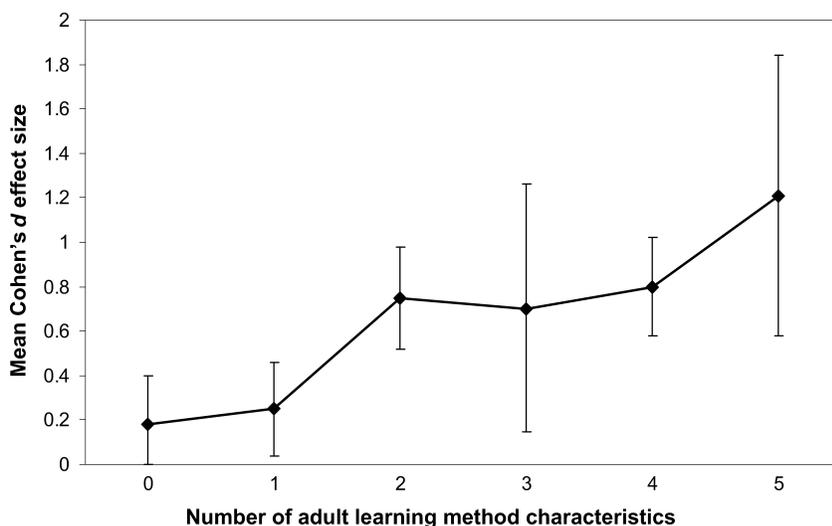


Figure 2. Average effect sizes and 95% confidence interval for the relationship between the number of the different adult learning method characteristics included in a study and the learner outcomes.

method characteristics were used, the average effect size was about 1.25, indicating that there were value-added benefits of adult learning methods that included multiple characteristics.

Discussion

The results briefly described here, and reported in detail in Trivette et al. (2009a, 2009b), showed that all 6 adult learning method characteristics were associated with more positive learner outcomes and that adult learning methods that more actively involved learners in using, processing, and evaluating their mastery of newly acquired knowledge and skills were most effective. In addition, the more characteristics that were incorporated into training opportunities, the more the adult learning methods had optimal positive consequences. Results from our research synthesis extend findings by other investigators by isolating *what matters most* in terms of adult learning methods being effective and the *conditions under which* the methods are likely to have optimal positive learner consequences.

PARTICIPATORY ADULT LEARNING STRATEGY

PALS model

The findings from the meta-analysis of adult learning studies by Trivette et al. (2009a, 2009b), our other research syntheses on adult learning (Trivette, 2007; Trivette & Dunst, 2009a, 2009b), and experiences developing, implementing, and evaluating the effectiveness of in-service training projects (eg, Wilson & Raab, 1997) have resulted in the development of a procedure we call PALS. The PALS model is shown in Figure 3. The 4-phase process includes instructor or trainer introduction and illustration of targeted knowledge or practice, trainee or practitioner application of the knowledge or practice and their evaluation of their experience, trainee or practitioner reflection on and assessment of mastery of the knowledge or practice to promote informed understanding, and learner use of informed understanding to decide next steps in the learning process to further develop learner understanding, use, and mastery. A key ingredient of PALS is

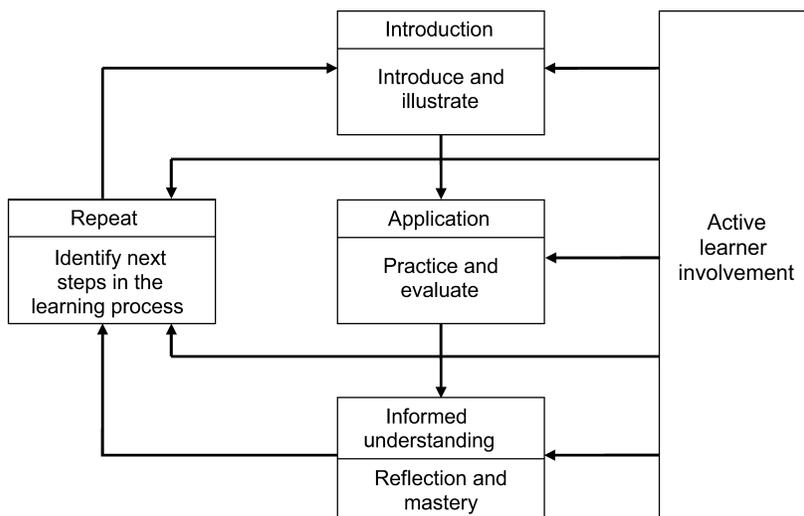


Figure 3. Major components of PALS (Participatory Adult Learning Strategy) for active learner involvement in a learning opportunity.

Table 3. Trainer and trainee roles in the different phases of PALS

PALS phases	Trainer roles	Trainee roles
Introduction	Preview learning topic Describe key elements Provide examples Include trainee input Illustrate application Demonstrate application	Complete pretraining preview Preclass/workshop exercises Provide input on the learning topic In-class/workshop warm-up exercises
Application	Facilitate application Observe trainee application Provide in vivo feedback/ guidance Facilitate learner assessment of options	Provide examples of application Trainee role-playing, games, etc Implement/practice use of the subject matter Evaluate use of the knowledge or practice
Informed understanding	Establish learning standards Engage learners in self-assessment Provide guidance to learners Provide behavioral suggestions	Standards-based evaluation Conduct self-assessment Trainer-guided learner reflection Journaling Group discussions of understanding
Repeat Learning Process	Joint planning Trainer guidance Trainer/trainee mentoring	Joint planning Identify needed information/ experiences Trainer/trainee mentoring

active learner involvement in all phases of the learning process that is explicitly intended to have capacity-building consequences (Jarvis, 1995; Kolb, 1984).

PALS practices

Table 3 shows the instructor/trainer and learner/trainee practices at each phase of PALS that were identified from our research syntheses of the characteristics of adult learning that contributed to optimal benefits. The different practices, although listed separately for trainers and trainees, are best thought of as bidirectional where instructor and learner interactions are the contexts for learning and mastering new knowledge and skills (Dickover, 2002; Galbraith, 1991; Garrison & Archer, 2000).

The PALS framework includes the roles both trainers and trainees play in the learning

process. Trainers elicit input from trainees before, during, and after training sessions and incorporate learner input into describing and illustrating the targeted knowledge or practice. Trainers promote trainee use of the knowledge or practice and provide in vivo suggestions, feedback, guidance, etc. to elicit trainee feedback and evaluation of their experiences. Trainers engage trainees in a self-assessment of their mastery with standards-based tools (eg, performance checklists), a priori mastery criteria, or other methods (eg, journaling), and together with the trainees reflect on the totality of the learner's experiences. The outcome from performance assessment and reflection is the identification of the next steps in the learning process. The learner process is repeated in as many times and ways as possible to further develop learner knowledge and skills.

Key PALS features

Three features of PALS “stand out” as different from other approaches to instruction and training. The first has to do with the fact that learners do not need to fully understand everything about a knowledge base or practice to be able to use and evaluate the knowledge or practice to develop a better understanding of either (Kolb, 1984). PALS introduces information in an incremental fashion so that new learning builds on or adds to existing knowledge and skills (Jarvis, 1995).

The second feature of PALS that makes the learning process different in that as many learning opportunities as possible are afforded to learners during any one learning session in which this happens repeatedly over time. The multiple learning opportunities afforded within a session either or both build on the same subject matter or illustrate how one set of knowledge or practice is related to another knowledge base or practice. The repeated learning opportunities afforded learners over time provide a foundation for continuous learning and deeper and more informed understanding of the knowledge or practice that is the focus of PALS.

The third feature of PALS that makes it different from other adult learning methods is the role instructors and trainers play in facilitating learner involvement in the learning process. Instructors or trainers neither direct learning nor encourage only self-directed or discovery learning but rather guide learning based on observations of learners’ experiences and evaluation of the use of the knowledge or practice and learner self-assessment of understanding against some standards or a priori established criteria. According to Bransford et al. (2000), for example,

A common misconception [of] “constructionist” theories of knowing (that existing knowledge is used to build new knowledge) is that teachers should never tell [learners] anything directly, but, instead, should always allow them to construct knowledge for themselves. This perspective confuses a theory of pedagogy (teaching) with a theory of knowing There are times when [instructor guided learning] can work extremely well. (p. 11)

IMPLICATIONS FOR IN-SERVICE TRAINING

PALS has evolved from more than 20 years of research and practice and, more recently, from our meta-analyses of different adult learning methods. Versions of PALS have been used to teach practitioners’ family systems intervention practices (Dunst, Trivette, & Deal, 1988), capacity-building, help-giving practices (Trivette & Dunst, 2007), preschool classroom practices (Wilson & Raab, 1997), early childhood intervention practices (Raab, Dunst, Wilson, & Parkey, in press), and natural environment practices (Dunst et al., 2001). The adult learning method is now at a point where we know both the characteristics of and conditions under which PALS is likely to be most effective. As part of the use of PALS to promote practitioner adoption and use of family systems intervention practices, for example, we found that the practices were still being used more than 10 years after the training was completed (Trivette & Dunst, 2000).

PALS can be easily used for planning, implementing, and evaluating *in-service training* (as well as other types of instruction) to the extent that training is provided on multiple occasions and multiple learning opportunities are afforded within any one training session. The PALS model (Fig 3) and associated practices (Table 3) can help facilitate in-service training opportunities by ensuring that all adult learning phases are covered and practices informed by research are used to provide or conduct training.

The version of PALS described in this article is currently being used as part of the Center for Early Literacy Learning (www.earlyliteracylearning.org) and the Center for Everyday Child Language Learning (www.cecll.org) to promote practitioner and parent adoption of evidence-based child literacy, communication, and language learning practices. In both applications, the kinds of practices listed in Table 2 are used to introduce the center models and associated practices to learners, engage them in the

use and evaluation of the targeted practices, have the learners assess their knowledge and practice against performance standards, and together with the trainers, plan next steps for engaging in new learning opportunities to further improve knowledge and practice.

CONCLUSION

The manner in which training opportunities should be afforded to students, practitioners, and other learners has been the focus of theory and practice for hundreds of years (eg, Hiemstra, 1995; Hudson, 1851). Professional in-service training as currently practiced falls along a continuum from 1-time didactic workshops to informal discovery or experiential

learning. Findings reported in this article point to a middle ground where professional development personnel structure learning opportunities for learners in which learners are actively involved and take responsibility for learning and mastering targeted knowledge and practice. PALS was specifically developed to include key elements of such an approach to in-service training informed by research evidence on different adult learning methods. The PALS model and associated practices should therefore prove useful for in-service training, as well as other types of instruction in which the focus is on the use of evidence-based practices for promoting learner understanding and use of the targeted knowledge or practice.

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