Training the Multigenerational Workforce: A Reaffirmation of Systematic Instructional Design

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Abstract

This paper critically examines the current state of research on the use of instructional design and development (IDD) procedures to develop work-related training that is inclusive of all age groups. The approach included a Best Evidence Synthesis of books, academic journals, and conference proceedings in the fields of instructional design and technology, training development, and human resource management published since 2000. The review reveals a focus on age-related generalizations about cognition and learning capacity as the basis for design decisions. However, the role of training context and content is unclear, limiting generalizations about design and training effectiveness. Implications for professionals charged with developing and implementing effective training strategies for an increasingly multigenerational workforce are discussed, along with review limitations and opportunities for further research.

Introduction

Despite challenging economic times, organizations continue to invest in employee training and development. Studies of industries in the U.S. and in other countries have shown that investment in training is linked to increased employee productivity and to organizational profitability (Huselid, 1995; Lyau & Pucel, 2008; Sepulveda, 2009). From an employee perspective, the increasing pressures of technological change and the need for continuous training to remain competitive in the 21st Century job market have become key drivers for a workforce that is increasingly becoming multigenerational (Rothwell, Sterns, Spokus, & Reaser, 2008). However, opportunities for and participation in work-related training is not yet multigenerational, posing challenges for professionals charged with developing and implementing effective training strategies.

In exploring the training gap between younger and older workers, three themes are prominent in the training literature: Age-related stereotypes, older workers’ training self-efficacy, and training motivation. Further, the literature appears to indicate an interrelationship among these three themes. Posthuma and Campion’s (2009) review of 117 research articles and books that deal with age stereotypes in the workplace identifies resistance to change, lower ability to learn, and lower return on training investment due to short tenure as being among the many stereotypes. In a review of 93 articles in adult education journals from 1980-2006, Chen, Sim, Moon, and Merriam (2008) found that older adults have been portrayed as a homogeneous group in terms of age, gender, race, class, ethnicity, and able-bodiedness, contributing to the growth of age-related stereotypes. The impact of age-related stereotypes on training and development opportunities has been explored at the individual country level, as well as in cross-country comparisons (Chiu, Chan, Snape, & Redman, 2001; Armstrong-Stassen & Templer, 2005; Harper, Khan, Saxena, & Leeson, 2006; Kluge & Kring, 2008; Fouarge & Schils, 2009). Studies that explore cognitive and physical declines as part of the normal aging process (Avolio & Waldman, 1994; Verhaeghen & Salthouse, 1997; Masunaga & Horn, 2001; Thornton & Dumke, 2005) appear to affirm some of these beliefs about which age groups are more or less “trainable” than others.

In terms of older workers’ self-perceptions, there is some consensus in the literature that training self-efficacy is closely related to organizational experience and the presence/absence of age-related stereotypes in the workplace. For example, the results of a survey of 715 managerial and supervisory employees of a state employer located in the Midwestern U.S. indicate that late career stage employees (50 years of age or older) possess lower levels of self-efficacy beliefs with respect to success in training, and lower perceived training utility than those in early career stages (Guthrie & Schwoerer, 1996). Enhancing older worker training self-efficacy requires re-tooling work-related training to enhance feelings of control, minimize dependence on memory, emphasize the application and usefulness of the training, and provide an encouraging, non-threatening environment with constructive feedback and support (Guthrie & Schwoerer, 1996; Yeats, Folts, & Knapp, 2000; Charness, Czaja, & Sharit, 2007; Ng & Feldman, 2008). Age-related stereotypes are also influences on older worker motivation to participate in training. In a meta-analysis of 106 peer-reviewed journal articles published between 1989 and 1999, Colquitt, LePine, and Noe
(2000) found that age was a key factor in the motivation to learn, with older learners demonstrating lower motivation, lower learning, and lower post-training self-efficacy. Hardré (2003) notes a lack of focus on motivation in examining training for all age groups, not just older workers. From a legal perspective, age-related effects on training and development opportunities could become increasingly actionable, particularly in the U.S., where litigation often complicates labor relations (Maurer & Rafuse, 2001). Aside from the potential for legal challenges, the removal of age-related barriers to work-related training opportunities is deemed essential to employee motivation and retention (Hirsch, 2007), and to a reduction in costs to the organization for absenteeism and work injuries (Brooke, 2003).

Despite worldwide recognition of the changing demographics of the workplace, and the need to keep all workers current in the skills/competencies and technologies required to continue contributing to the changing nature of work, the extent to which training is designed to be multigenerational and thus, inclusive of older workers, is unclear. This paper critically examines the main ideas, models, and studies of the use of systematic instructional design and supporting technologies to develop work-related multigenerational training.

Method

To analyze the current state of training design inclusive of older workers, the search strategy used for this paper is an adaptation of the Best Evidence Synthesis (BES) approach (Slavin, 1986). This search strategy enables the researcher to work with whatever evidence is available, taking account of study design and quality, and use a range of approaches to synthesize the heterogeneous evidence. The best evidence strategy involves several iterations, because the initial, inclusive search generally produces a very large number of citations that cannot easily be excluded automatically by means of search filters. Beginning with wide inclusion criteria may still result in locating few evaluative studies of any design, so that the final number of studies to be reviewed in depth is in the tens, or fewer, depending on the extent to which the topic area has been a focus of research (Petticrew & Roberts, 2006).

Using keyword combinations such as “older workers”, “older employees”, “training”, “multigenerational workforce”, and “designing instruction”, a search was conducted of the PsychInfo, ISI Web of Science, JSTOR, Psychological and Behavioral Sciences and ProQuest electronic databases for peer-reviewed English-language journal articles published from January 2000 to April 2010, yielding 609 citations. A search of the “gray” literature (e.g., dissertation abstracts, conference proceedings, trade magazines, unpublished reports) (Petticrew & Roberts, 2006) yielded another 143 citations, for a total of 752 citations.

After a merge-purge of duplicates, book reviews, and editorials, abstracts of 537 studies were retrieved and read for relevance. A reading of the abstracts revealed 456 studies that did not address age, training, or focused on geriatric care training. Another 64 were excluded because the results presented did not relate to designing training inclusive of or targeted to older workers. In total, 17 studies qualified for inclusion in the analysis. The 17 studies (see Table 1) that were reviewed and analyzed address two broad issues: (a) models for designing instruction inclusive of older workers (7 studies) and, (b) training performance outcomes with instructional design models specifically targeting older workers (10 studies).

Table 1. Multigenerational, age-inclusive training

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| Training performance outcomes with design models targeting older workers | Callahan, Kiker and Cross (2003)  
Chilarege, Nordstron, and Williams (2003)  
Stolze-Loike, Morrell, and Loike (2005)  
Wallen and Mulloy (2006)  
Themistocleous, Koumaditis, Mantazana, Morabito (2010)  
Jamieson and Rogers (2000)  
Sanders, Gonzalez, Murphy, Pesta, and Bucur (2002)  
Nair, Czaja, and Sharit (2007)  
Ownby, Czaja, Loewenstein, and Rubert (2008) |

### Findings

Models for Designing Age-inclusive Training

Critical to the design process is a solid understanding of the characteristics of the learner, particularly the learner’s ability to process and apply information to effect a change toward improved performance. To that end, one stream of thought advocates targeting the specific needs and limitations of older workers as a means of multigenerational training design. Drawing on the fields of cognitive psychology and instructional design, Pate, Du, and Havard (2004) state that instructional designers must become more aware of ageing and the cognitive learning needs of older adults because of demographic changes in the workforce. Beyond current skills, abilities, and technical competence of older workers, designers need to understand barriers to learning such as health factors, cognitive changes affecting memory and concentration, and opportunities for successful knowledge transfer that fit older worker learning preferences and attitudes toward learning.

Ford and Orel (2005) affirm the importance of biological changes, changes in sensory systems, and cognitive changes as elements that inform design decisions when establishing training for older workers. Moreover, older workers are less focused on learning for career advancement than for empowerment and self-actualization. Training considerations for older workers should include (a) environmental factors, such as proper and balanced lighting, modifications to computers (e.g., trackball mice, large-screen monitors) to facilitate operations, and bathrooms in convenient locations, (b) task factors, such as avoidance of timed tests, strategies that include audio and visual aids, and frequent summarization, and (c) personal factors, such as including older workers in the planning and implementation of their learning experiences, and a nurturing learning environment that makes older workers feel valued and reduces anxiety about new learning situations. Opportunities should include training to update critical skills to help older workers perform in their current positions, and skill development training to prepare older employees for new jobs or functions. This enables older workers to be redeployed and/or retained in the event of redundancies due to restructuring or other organizational changes (Koc-Mendard, 2009).

Newell, Arnott, Carmichael, and Morgan (2007) offer some specific strategies for involving older adults in the design process based on a theater model of software usability testing. In lieu of traditional usability testing methods such as laboratories with two-way mirrors to observe human-software system interactions, the authors utilized theater professionals (actors, script writers, directors) to produce a series of short dramatized scenarios to create a shared context for discussions between potential users of a software package and the designers during the requirements-gathering phase. This enables the designers to develop an awareness of the issues and challenges of older adults working with new software, while enabling older adults to “see themselves” in the scenarios, so that they could then better articulate their needs.

An alternative stream of thought holds that adherence to instructional design processes is by definition inclusive. Regardless of which instructional design model is used, the needs/characteristics of learners, as well as the context (organizational, individual) in which the learning takes place, will be taken into account. Consequently, instructional designers will automatically become aware of older worker needs, motivation, and self-efficacy and will use instructional strategies that move learners from simple to complex tasks with continuous positive feedback and emphasis on relevance of the content to work (Rothwell, Sterns, Spokus, & Reaser, 2008). Fisk, Rogers, Charness, Czaja, and Sharit (2009) contend that all products — including software applications — should be developed using the principles of user-centered design (UCD) that includes: Task analysis; empirical measurement; iterative design and testing, and; integrated design with all aspects of the usability design process working in parallel and under the coordination of a single person. When developing computerized instruction, the principles of general
instructional and multimedia design inform the choice of strategies that can compensate for the cognitive and physical effects of normal aging (Van Gerven, Paas, and Tabbers, 2006). For example, to compensate for older workers’ reduced mental processing capacity, content presentation should be bimodal (audio-visual), with worked examples in lieu of practice problems, and redundant information omitted.

Training Performance Outcomes

The second broad issue area in the literature focuses on how older workers perform in training situations. In a meta-analysis of 41 empirical studies published from 1950 to 2000, Callahan, Kiker, and Cross (2003) sought to compare the effectiveness (as measured by post-training skills tests) of three instructional methods – lecture, behavior modeling/demonstration, and activity-based learning – with four instructional support mechanisms, namely supplementary materials, training pace, learner feedback, and small group size. Focusing only on studies that examined these relationships empirically and that contained a pretest-postest study design with reported effect sizes, the authors found that training in small groups or training that enabled older learners to progress at their own pace was associated with higher levels of observed training performance relative to large-group or paced training.

Empirical studies of work-related training performance outcomes conducted since Callahan, Kiker and Cross’ (2003) review have been limited in number but varied in scope, design and sample characteristics. In recognition of the importance of technology to the workplace, some studies have focused on which instructional strategies and methods that incorporate technology best enable older workers to advance their skills. In a study of 67 adults 40-80 years of age, Chillarege, Nordstrom, and Williams (2003) sought to compare the effectiveness of two different training goals – learning goal vs. job performance goal – and two training strategies – error management vs. error avoidance – on older workers’ performance in a Microsoft Word software training course. Study results show higher scores on the word processing knowledge post-tests by participants in the learning goals and error management cells than those in the performance goals/error avoidance cells. The authors conclude that these results are consistent with other studies that show older workers learn best in situations where mistakes are encouraged rather discouraged or penalized.

As part of a research program that focuses on older adults and computer-based work, Sharit, Czaja, Hernandez, et al. (2004) evaluated the ability of 52 adults 50 and older to perform an e-mail-based information search and retrieval customer service task for a fictitious Internet-based company. Study findings showed significant differences by age on only two variables (total e-mails sent, search time) out of seven, with participants over 65 and older similar to their 50-64 year old counterparts in demonstrating progressive improvement on each of the task performance measures. Task performance results, in combination with qualitative exit interview data, affirmed the ability of older participants to learn tasks reflective of the technically oriented work environment. The authors also conclude that the results affirm the importance of providing older participants with the skills and confidence in using computer-interactive tools, so that cognitive resources can immediately be directed to developing a mental model of the task rather than to concerns related to technology use.

Using the National Institute on Aging (NIA) and the National Library of Medicine (NLM) guidelines for designing information technology for older adults, Stolz-Loike, Morrell, and Loike (2005) conducted usability testing of a computer-based e-learning software package designed to teach technology skills and business information to adults 50-69 who are still in the workforce. The NIA/NLM design guidelines are intended to address the cognitive and perceptual aspects of the aging process and cover text features, color, graphics, site design, navigation and content delivery. Test results from the 20 participants affirmed the overall usability of the software package. However, participants experienced some difficulty in completing tasks that required multiple steps. The authors conclude that although the study supports the ability of mature adults to use technology-based materials when they are custom-designed for their needs, the study does not address either engagement with or adoption of the those materials.

Wallen and Mulloy (2006) sought to test the impact of age-related cognitive declines by comparing the training outcomes of 50 factory workers ranging in age from 26 to 64 on computer-based safety training modules. Following a test of prior knowledge in the subject area, participants were randomly assigned to one of three versions of the module: Text only, text with pictures, and text with pictures and audio. Upon completing the training module, participants were given a multiple choice test to assess their recall of the module content, and then a problem-solving test to measure knowledge transfer. Study results indicated no significant differences between workers over 45 and those under 45 in module content recall. However, there were significant differences by age on the knowledge transfer test, with younger workers outperforming their older colleagues. The gap between younger and older workers was not as pronounced among participants assigned to the multimedia training module. The authors conclude that multimedia computer-based training is more effective for training a multigenerational workforce,
because older workers are at less of a disadvantage versus younger workers when trained with multiple modes of presentation.

The effectiveness of specific technology-based instructional strategies has also been examined in cross-national contexts. For example, in developing a framework for training workers 40 years of age and older that are employed in the Information and Communications Technologies (ICT) sectors in the European Union, Themistocleous, Koumaditis, Mantzana, and Morabito (2010) compare participant performance in an online course with a fixed schedule and voluntary use of discussion forums, to the same course offered with a flexible, self-paced schedule and discussion forum use embedded in group work requirements. Based on higher course completion rates and forum participation in the self-paced design, the authors conclude that older ICT workers can learn in a flexible, interactive online setting that combines collaboration with learning-by-doing.

Other empirical studies on the training performance of older workers start from the assumption that good training design for older workers applies to both work and nonwork settings. These studies are grounded in the stream of gerontology that focuses on the cognitive capacities of adults across the lifecycle. For example, Jamieson and Rogers (2000) sought to compare the effectiveness of blocked practice schedules, where the learner practices a sequence of tasks repeatedly and in a fixed order, versus random practice schedules, where the learner practices a sequence of tasks non-consecutively. Using a simulated automatic teller machine (ATM) as the technology to be learned, 80 adults age 18-80 were randomly assigned to the blocked and random practice groups respectively and given a series of tasks to perform (e.g., cash withdrawal, transfers from checking to savings). A key finding was that older adults' performance in the random condition was not significantly different from younger adults' performance in the blocked condition. The authors infer that random practice is better for all age groups in the transfer of learning to novel tasks on a novel ATM. The authors conclude that with specific types of practice, older adults may be able to overcome limited computer experience and perform as well as younger adults on a computer-based task. The authors caution, however, that even after instruction and 50 trials of practice with an ATM, the older individuals remained slower, less accurate in their menu selections, and more likely to forget to take their receipt or their cash. Consequently, new technologies will require extensive training and exposure before older adults will be capable of using them to their full functionality.

Sanders, Gonzalez, Murphy, et al. (2002) state that lifelong learning is a means of coping with the changing demands of daily living in both work and nonwork situations. Drawing on Schmidt and Bjork’s (1992) findings that some training conditions hinder learning by reducing subsequent retention and generalization, Sanders et al. (2002) sought to assess whether training content difficulty affects the degree of retention and generalization of a newly acquired cognitive skill. The authors compared retention and performance outcomes among 116 adults age 18-80 on an algorithm for mentally squaring two-digit numbers under high vs. low content variability conditions, such as number of problems used and manipulation of the Constant values. Study results reveal significant age differences in the effect of high variability training on generalization rather than on retention. The authors attribute these differences to the known age differences in working memory capacity and learning efficiency between younger and older adults. They conclude that regardless of context – work-related or nonwork related – training should be adjusted to the capabilities of the older learner to accommodate reduced working memory and processing speed.

Using data from a previously conducted simulation of a customer support task (Sharit, et al., 2004), Nair, Czaja, and Sharit (2007) examined the role of age, cognitive abilities, prior experience, and knowledge in skill acquisition on task performance among 52 older adults over four consecutive days of training. Study results indicated that age is the strongest predictor of task performance, with increased age associated with lower initial performance. However, results also indicated that the rates of change in performance over time is higher for older adults than for younger adults, affirming a previous conclusion that older workers need to be provided with both practice and memory aids.

Ownby, Czaja, Loewenstein, and Rubert (2008) sought to identify the specific cognitive abilities that are related to older adults successfully completing training for computer-related tasks. A total of 417 participants age 20-75 were divided into three groups, with each group assigned different data entry, database inquiry, and account balancing tasks designed to simulate real-world customer service tasks. Day 1 of the 5-day training included a series of cognitive and computer skill assessments, with task training starting on Day 2 and practice tasks on Days 3 to 5. Study results indicated that age, computer experience, and measures of short-term memory and psychomotor speed predicted older participants successful completion of training. However, the lack of a significant interaction between age as a stand-alone variable and training success led the authors to infer that age-related differences in variables such as psychomotor speed are more important to understanding older workers’ training success than just age alone. The authors conclude that age-related changes in cognitive abilities should be taken into account when designing training on job-related tasks.
Discussion

The results of the review, graphically illustrated in Figure 1, raise some challenges for professionals seeking to guide their training staff in designing interventions inclusive of both younger and older workers. One challenge concerns the lack of a clear, consistent definition of “older”. The U.S. Age Discrimination in Employment Act (ADEA) of 1967 defines an older worker as 40 years of age and older (U.S. Employment Equal Opportunity Commission, n.d.). Chillarege, Nordstron, and Williams (2003), and Themistocleous, Koumaditis, Mantzana, and Morabito (2010) adhere to this definition. However, the other 15 studies in this review each use different definitions, ranging from 50+ to 65+.

These definition inconsistencies reflect a definition dilemma that pervades the training literature as a whole, with as many definitions of “older” as there are topics linked to older worker training. For example, definitions in the workforce training literature begin as low as 35 (Jacobson, Lalonde & Sullivan, 2005) and 39 (Delgoulet & Marquie, 2002), while other studies deem age 50 to be the cutoff point (Simpson, Greller & Stroh, 2002; Greller, 2006; Armstrong-Stassen & Schlosser, 2007). In a review of 70 studies published after 1990 that address older adults’ computer learning and usage, Kim (2008) found that studies dealing with age-related differences define “older” as 65+.

Another challenge posed by the studies in this review concerns the treatment of older workers as a monolithic group, with age-related generalizations about cognition and learning capacity as the basis for training design decisions. The studies in this review focus on mapping the cognitive and physical declines associated with the normal aging process to instructional strategies such as self-paced learning, learning in small groups with generational peers, and with feedback for reinforcement. However, there is some disagreement in the literature as to the impact of cognitive and physiological aging on the ability to learn. Charness, Czaja, and Sharit (2007) note that people age differently, making group averages unreliable. Further, researchers from a variety of disciplines have stated that older adults consist of multiple segments, with a variety of needs, preferences, capabilities, and life experiences (Bouvier & De Vita, 1991; Reisenwitz & Iyer, 2007; Lipschultz, Hilt, & Reilly, 2007; Moseley & Dessing, 2007). Level of education and the position of the older worker in his/her organization are also critical differentiators (Schaie, 2005; Schmidt, 2007).

A third challenge is the role of context and content. Context refers to the interaction of situational factors in which training takes place, and which need to be identified and accommodated to inspire learning and knowledge transfer (Tessmer & Richey, 1997). Content refers to what is to be learned. As noted by Choi and Hannafin (1995), context provides the framework for learning, but content determines its authenticity and veracity. The ability to select and use a variety of techniques for determining training context and content are core competencies of the design professional (International Board of Standards for Training, Performance, and Instruction, 2000).

Only one of the empirical studies in this review addressed training in a real-world organization with job-specific training content and desired training outcomes (Wallen & Mulloy, 2006). The other empirical studies utilize quasi-experimental designs in laboratory-like settings—some providing financial incentives to study participants - testing tasks unrelated to skills/competencies required on the job or to solving real-world performance problems. As such, it is difficult to extrapolate those results to real-world training settings, where workers have a real stake and where the risks/rewards of training participation and success may directly impact their work situation.
The importance of connecting training activities and events with the real world of work is grounded in the situated learning theory of knowledge acquisition (Lave & Wenger, 1990). Situated learning posits that learning needs to be presented in an authentic context, with settings and applications that would normally involve that knowledge. Situated learning serves as the model for skills and competencies training in a number of industries, including healthcare (Woolley & Jarvis, 2007), information technology (Sharma & Yetton, 2007), and engineering (Sense, 2007).

Moving Towards Multigenerational Training Design

Although this review presents a number of challenges associated with the literature on multigenerational workforce training design, the review does have limitations. The conceptual and empirical studies included in this review employ a variety of audience definitions, methodologies, and focus on different aspects of training design for older workers, all examined through the lens of systematic instructional design. As such, a different exploratory lens may lead to a different selection of studies for review. Nevertheless, this review enables researchers and training and development practitioners alternative insights into the challenges of multigenerational workforce training design. It also suggests some opportunity avenues for addressing those challenges. One avenue is sharing real-world case studies of organizations engaging in age-inclusive training design. Case studies, such as the one describing the application of instructional design processes at the U.S. National Aeronautics and Space Administration (NASA), have helped HR practitioners make the connection between best practices and methods and models identified in the research literature (Brock, 2009).

Another avenue lies in the evolving literature on training and productivity. In the U.S. manufacturing sector, for example, cost-benefit analyses have shown the relationship between training and employee productivity (Sepulveda, 2009). Analysis by employee age segments would help to address the basic question of whether or not older workers are “worth” the training investment. In short, there is a need for more research grounded in real work-related training situations identifying the extent to which training context and content affects design decisions, and training and job performance outcomes. The extent to which organizations have actually adapted their instructional design procedures and technologies to be inclusive of older workers also deserves further investigation.

At the moment, multigenerational training design is not quite “there” yet in terms of either research or practice. However, pockets of practice are evolving and are being shared. Moreover, there is a growing recognition that inclusive training design is part of a larger context focusing on how organizations manage their talent (Lawler, 2008; Collings & Mellahi, 2009). Continued progress in these areas will offer some concrete direction to those professionals charged with developing and implementing effective training strategies for an increasingly multigenerational workforce.

References


