# An Interactive Multimedia Program to Train Professional Caregivers

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*Journal of Applied Gerontology* 2003; 22; 269
DOI: 10.1177/0733464803022002006

# An Interactive Multimedia Program to Train Professional Caregivers

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*An interactive multimedia computer training program on CD-ROM was compared with a videotaped lecture-based training program for professional caregivers of patients with dementia. Both programs promoted use of appropriate communication skills including speaking skills, reacting skills, redirection skills, and use of communication cards for redirection. Professional and paraprofessional caregivers (*N = *88) were recruited as participants and randomly assigned to view one of the training programs. In a pretest-posttest design, participants rated caregiver responses in video vignettes of specific caregiving situations. At posttest, those who viewed the interactive program were significantly more likely to: (a) identify the correct responses, (b) intend to use correct strategies, and (c) have increased self-efficacy to use correct strategies, compared to participants who saw the videotaped lecture.*

***Keywords:*** *computer training; staff training; in-service; dementia communication skills; interactive multimedia; CD-ROM; mastery learning*

The Omnibus Budget Reconciliation Act (OBRA)(P.L. 100-203) of 1987 requires nursing home administrators to implement effective training

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AUTHORS' NOTE: We are indebted to a large cast of people who helped with different stages of the project. The interactive multimedia technology (IMM) development team included Steve Andress; Natasha Beauchamp; Gretchen Boutin; Ellen Hickey; Jessica Jackson; Brian Johnson; Kimberly Johnson; Denise Sevigny; Donna Selig, R.N.; Marilyn Welch, R.N.; and Will Doolittle of Moving Images Productions. Thanks to Gretchen Boutin for video editing and to Diana Robson and Turliv Vilbrant for programming. The evaluation team included Lindsay Arnold, Jessica Jackson, Brian Johnson, Laura Philips, and Heather Remo. Tom McGough conducted the in-service for the videotape condition. Jeff Gau and John Seeley conducted the data analysis, and Sara Wyant provided helpful editorial comments on the manuscript. This research was supported by a grant from the National Institute on Aging (No. AG14940-01). Special thanks to Dr. Marcia Ory.

The Journal of Applied Gerontology, Vol. 22 No. 2, June 2003 269-288
DOI: 10.1177/0733464803251845

programs for their staff. In spite of the growth of the training industry in the past decade, surveys of nursing aides reveal increasing job dissatisfaction and turnover rates (Caudill & Patrick, 1991). Nursing aides pointed to the need for more and better training programs, particularly for providing effective care to residents with cognitive impairments (Grant, Kane, Potthoff, & Ryden, 1996). Effective interventions exist for the range of challenging behaviors exhibited by patients with dementia, including auditory distraction techniques for disruptive vocalization (Burgio, Scilley, Hardin, Hsu, & Yancy, 1996), restraint reduction (Bradley, Siddique, & Dufton, 1995), resident aggression (Hagan & Sayers, 1995), feeding problems (Van Ort & Phillips, 1995), and bathing problems (Miller, 1994). When caregivers receive training in the use of these interventions, they improve their caregiving skills, perceptions and knowledge of dementia, and motivation to work with the population (Feldt & Ryden, 1992). Following training, reduced staff turnover and positive patient behavior changes also may be observed (McCallion, Toseland, Lacey, & Banks, 1999).

Despite these encouraging findings, standard in-service training programs (that typically involve group training) may not produce such positive results for a variety of reasons. One barrier to effective training may be the limitations of the training programs used in nonresearch settings, that is, a program may be shown to be effective in a research context, but it may be difficult to replicate in a real-world setting. Factors such as format, duration, content, trainer expertise, staff education level, and staff attitudes toward older adults influence program effectiveness (Hepler, 1987). The common in-service training approach was shown to be effective when combined with on-the-floor consultation between the trainer and the staff (e.g., McCallion et al., 1999). Monahan (1993), however, noted that staff participation in group training sessions is often difficult and attendance sporadic, given the realities of staff scheduling in facilities already burdened by absenteeism and vacant positions.

Other common training approaches may include use of reading materials and videotapes. Although there has been a recent proliferation of print training materials (e.g., Andresen, 1995; Cohn, Smyer, & Horgas, 1994), the efficacy of this approach may be marginal because nursing aides tend to have low literacy levels (Crawford, Waxman, & Carner, 1983). Alternatively, videotape materials for staff training (e.g., Lewis, Scott, Bielfeld, & Slabe, 1995; Teri, 1990) can be viewed by an individual at convenient times, can present real-life training information, and can model recommended employee behaviors. This medium, however, also brings with it certain inefficiencies. For instance, the videotape approach cannot tailor information to a viewer's experience or training needs, and consequently it may present material that is

already known or of little interest. Besides potentially boring the viewer and encouraging inattention, an unnecessary review of already-known material is costly in terms of staff time and personnel costs. In addition, videotape programs require staff support to document time spent on instruction and administering and correcting competency tests (if available).

The shortcomings of other modes for caregiver training potentially can be addressed effectively using interactive multimedia technology (IMM), which uses a computer to control video and graphic presentations (Keckan, 1997). This approach retains the advantages of video (e.g., modeling) and was shown to be educationally effective for various topics in nursing and health education (Brug, Campbell, & van Assema, 1999). An advantage of IMM programs is that messages tailored to the needs or interests of the individual may be more personally relevant and therefore more motivating (Noell & Glasgow, 1999). Moreover, IMM programs can evaluate the trainee's comprehension via criterion-referenced assessments of topic mastery. If the material is not fully understood, the program can automatically branch back to review material specific to the viewer's error(s). This approach greatly increases the chances that the viewer will be trained to an acceptable level for quality assurance. Although such a criterion-referenced approach has been recommended, it is not a part of many caregiver training programs (Burgio & Burgio, 1990).

The purpose of this study was to develop and evaluate a staff training program using the IMM format. The content of the program included specific communication and behavior management skills (e.g., speaking, reacting, redirection, and use of communication cards) that were shown to be effective with residents exhibiting symptoms of dementia when used by nursing aides in residential settings (Bourgeois, 1998). We hypothesized that caregivers who received IMM training would demonstrate increased knowledge of the trained skills, increased intention to use the trained skills, and increased perception of self-efficacy when compared with a group of caregivers who received similar training content via another form of individualized training: a videotape of an in-service training lecture.

## Method

### *Participants*

A total of 88 caregivers in two sites (Tallahassee, FL, $n = 41$; Eugene, OR, $n = 47$) participated. Professional caregivers (e.g., nurse aides, home health workers) and paraprofessional caregivers (e.g., adult daycare volunteers,

participants in the federally subsidized Senior Helper program) were recruited to the study by posted notices, by announcements at residential care staff meetings and in-service classes, and by word of mouth. Each volunteer was paid $20 to participate.

As shown in Table 1, participants were mostly women (85%) and averaged 44 years of age (*SD* = 15.11). By race, the participant pool included Caucasians (59%), African Americans (30%), Native Americans (5%), and other races/cultures (6%). A total of 67% were employed full-time, 19% part-time, and 14% were paraprofessionals. Household income was less than $20,000 for 52%, $20,000 to $30,000 for 31%, and greater than $40,000 for 17% of the participants. Thirty-eight percent of the participants had no more than a high school education, 49% had completed some college, 11% were college graduates, and 2% had graduate degrees.

## *Research Design*

The goal of the research was to test the effectiveness of an interactive multimedia training program on CD-ROM compared to a standard type of in-service training program received by nurse aides working in long-term care facilities. Participants were randomly assigned to one of two training conditions ($n = 44$ per group). Their responses to pretest and posttest measures of knowledge, intent, and self-efficacy were compared. No significant differences between training condition were found for any of the demographic variables at pretest.

*Interactive multimedia program*. This program consisted of four instructional modules (Speaking Skills, Reacting Skills, Redirection, and Communication Cards) and an interactive Information Center comprised of topics related to dementia and caregiving. Participants were free to move through the program at their own pace. They could access modules according to their preferences for sequence and time spent on each section, and they could return to any module repeatedly.

The program began with a video narrator introducing the program and recommending that the user first select the Speaking Skills module from the main menu of program modules. Each module consisted of a didactic segment with the video narrator introducing the skills, a modeling video vignette of an interaction between a disoriented patient and a nurse aide, an interactive summary question set to reinforce the trained content, and a quiz to test knowledge acquisition. To illustrate: The Speaking Skills module covered the elements of a positive greeting (e.g., when entering a resident's room). The content was modeled with a video vignette, then the recommended

**Table 1. Demographic Information for Participants**

| | *All Cases (N = 88)* | | | *CD-ROM (n = 44)* | | | *Video (n = 44)* | | |
|---|---|---|---|---|---|---|---|---|---|
| *Variable* | M | SD | % | M | SD | % | M | SD | % |
| Age | 44.0 | 15.1 | | 42.6 | 15.1 | | 45.4 | 15.1 | |
| Gender | | | | | | | | | |
| Female | | | 85.2 | | | 81.8 | | | 88.6 |
| Male | | | 14.8 | | | 18.2 | | | 11.4 |
| Race | | | | | | | | | |
| Caucasian | | | 59.1 | | | 63.6 | | | 54.5 |
| African American | | | 29.5 | | | 29.5 | | | 29.5 |
| Hispanic/Latino | | | 2.3 | | | 0 | | | 4.5 |
| Native American | | | 4.5 | | | 4.5 | | | 4.5 |
| Asian/Pacific Islander | | | 2.3 | | | 0 | | | 4.5 |
| Other | | | 2.3 | | | 2.3 | | | 2.3 |
| Income (in dollars) | | | | | | | | | |
| Less than 20,000 | | | 51.1 | | | 47.7 | | | 54.5 |
| 20,000 to 40,000 | | | 30.7 | | | 31.8 | | | 29.5 |
| 40,000 to 60,000 | | | 10.2 | | | 9.1 | | | 11.4 |
| 60,000 to 80,000 | | | 5.7 | | | 9.1 | | | 2.3 |
| More than 80,000 | | | 1.1 | | | 2.3 | | | 2.3 |
| Education | | | | | | | | | |
| 0 to 8 years | | | 3.4 | | | 0 | | | 6.8 |
| Some high school | | | 5.7 | | | 9.1 | | | 2.3 |
| High school graduate | | | 28.4 | | | 29.5 | | | 27.3 |
| Some college | | | 48.9 | | | 45.5 | | | 52.3 |
| College graduate | | | 11.4 | | | 13.6 | | | 9.1 |
| Graduate/professional | | | 2.3 | | | 2.3 | | | 2.3 |
| Employment status | | | | | | | | | |
| Full-time | | | 67.0 | | | 68.2 | | | 65.9 |
| Part-time | | | 19.3 | | | 20.5 | | | 18.2 |
| Volunteer | | | 13.6 | | | 11.4 | | | 15.9 |

behavioral elements of the vignette (e.g., introduce yourself and say the patient's name) were broken out and explained individually. The participant then viewed the modeling vignette again and was asked to respond to on-screen questions (question set) by clicking on-screen buttons to indicate whether the model had performed the recommended behaviors, all of which were correct (e.g., "Did she say her name?" "Did she say the resident's name?"). The user advanced in the program if all responses were correct. If some responses were not correct, the program branched back to the didactic portion of the module where only the content relevant to the incorrect answer

was reviewed. Next, in a "You Be the Judge" segment, a new vignette was shown that was composed of correct (e.g., the nurse aide introduced herself to the resident) and incorrect (e.g., the nurse aide did not call the resident by name) behaviors. The user again responded to on-screen questions (quiz). As before, the program automatically reviewed content associated with missed questions before continuing, or it moved on immediately if all answers were correct. After completion of a module, the participant was returned to the main menu that noted progress on each module (e.g., not seen, started, and finished).

*Videotaped in-service lecture*. This presentation consisted of a 55-minute VHS videotape of a typical in-service training presentation. Because no commercial videotape products were available that presented material comparable to the content of the IMM program, an in-service trainer was hired to develop materials (e.g., notes, overheads) for the same content. Thus, the videotape presentation covered the same four instructional areas as the CD-ROM program but did so within an in-service lecture format. The presenter was instructed to talk on each of the four topics for an equivalent amount of time.

The in-service instructor was an experienced presenter, respected for his knowledge of professional caregiving issues. He was also in demand as a speaker because he was an animated and effective trainer who combined humor and personal insights to help motivate caregiving staff to accept and apply in-service materials to their jobs. The in-service videotape was made with a tripod-based VHS camera as the trainer presented a standard in-service presentation to 30 caregiving staff of a long-term care facility. The camera was focused primarily on the trainer during the presentation, and when questions from the audience were answered, but as appropriate, the camera was focused on the screen when drawings from the overhead projector were displayed. The trainer used a hand-held microphone to enhance sound quality on the resulting videotape.

## *Setting and Procedures*

In Tallahassee, the evaluation took place in the in-service conference room of a local nursing home. In Eugene, participants reported to a conference room at the Oregon Center for Applied Science. There were no statistical differences by site in any of the analyses reported here.

At each site, four training stations were set up consisting of a personal computer (PC) with CD-ROM drive, monitor, keyboard, mouse, and earphone headset. Two of the stations also had a 13-inch VCR-TV adjacent to

the monitor. When participants reported for training, a research assistant (RA) reviewed and obtained their signature on an informed consent form. Each participant was then randomly assigned to either a PC-only station (IMM group) or PC + VCR station (videotape lecture group). The RA then reviewed the operation of the computer and the mouse, providing instruction and supervising practice with the mouse if necessary. All on-screen responses were conducted by clicking the mouse on the on-screen buttons.

Each session included three consecutive segments: a computerized pretest, the experimental training, and a computerized posttest. When the pretest was finished, the RA individually instructed participants to either initiate the interactive training (IMM group) or to press "play" on the VCR (videotape lecture group). Each participant wore earphones for privacy. To increase equivalency of exposure for both training regimes, the participants receiving the interactive training were asked to exit the IMM program after 60 minutes had elapsed, even if they were not finished. Each participant then completed the on-screen posttest. After each participant finished, the RA debriefed them and gave them their $20 payment. Each participant also received a certificate of participation and a set of handouts covering the training content.

### *Measures*

Participants' pre- and posttraining knowledge, intent, and self-efficacy were measured on the instructional content (i.e., speaking skills, reacting skills, redirection, and communication cards). The theory of reasoned action (Ajzen & Fishbein, 1973) and social learning theory (Bandura, 1977) provide the theoretical framework for the outcome measures. The theory of reasoned action posits that attitudes and behavioral intentions predict behavior. According to social learning theory, a change in one's belief about his or her ability to successfully execute a given behavior will mediate the initiation and maintenance of change in that behavior.

A test was developed by the authors to fit the program content to employ an assessment method that closely approximated real-life behavior. This computer-administered test consisted of short (i.e., 20 to 45 seconds) video vignettes in which an older male or female actor played the role of a confused resident. The vignettes on dealing with problem situations included: (a) vignette 1—positive greeting to an agitated resident, (b) vignette 2—acknowledging the concern of an accusatory resident, (c) vignette 3—redirecting after being accused of stealing, (d) vignette 4—using communication cards to redirect repetitive questions, (e) vignette 5—identifying the best communication card, and (f) vignette 6—acknowledging and redirecting a fearful resident. For vignettes 1, 2, 4, and 6, four different video responses to

the situation were presented by a female actress, playing the role of a nurse aide. One of the four responses was correct. Vignette 3 followed up on vignette 2 by asking, "What would you do next?" and program users responded to each of four new nurse aide video responses. Vignette 5 followed up on vignette 4 by asking program users to rate the likelihood that they would use each of four sample communication cards. In sum, participants responded to a total of six item sets.

*Behavioral intention*. After showing a video nurse aide response segment (or a sample communication card), the computer program switched to a screen, containing a written question. Voice-over narration read the words of the text. For each response, the participant was asked to rate the likelihood that he or she would "say something like this" (or "make a card like this") by clicking on one of seven on-screen buttons, constituting a 7-point Likert scale ranging from 1 (*not at all likely*) to 7 (*extremely likely*). The primary behavioral intention measure was the mean intention score across the six response sets.

*Knowledge*. After program users rated their intentions to use each of the four depicted responses (or communication cards), all four responses (or communication cards) were listed at once on-screen, and the participant was asked to select the best response. The primary knowledge measure was the number of best responses correctly identified across all six response sets.

*Self-efficacy*. At posttest only, self-efficacy to respond as modeled by the correct choice was measured after the intention and knowledge items. For each test-vignette, participants were shown the best-choice response and asked how confident they were that they could respond like that. A 7-point Likert scale ranging from 1 (*not at all confident*) to 7 (*extremely confident*) was used. Self-efficacy items were included at posttest only to preclude reactive effects from pretest exposure to the best-choice item. The primary self-efficacy measure was the mean self-efficacy score across all six response sets.

*Participant satisfaction*. After finishing the posttest, all participants responded to a four-item questionnaire regarding their reaction to their training program including usefulness, satisfaction, ease of use, and willingness to recommend it to a friend. For each question, participants were asked to rate their responses on a 7-point Likert scale ranging from 1 (*extremely negative*) to 7 (*extremely positive*).

## Results

### *Participants' Program Use*

The 44 participants in the IMM group spent an average of 55.48 minutes ($SD = 8.98$) using the interactive program. All users completed the four modules, and 11 users visited the Information Center. In the quiz sets in the program, all participants missed at least 1 question out of a total of 44 questions. They averaged 4.4 wrong responses ($SD = 1.92$; range = 1 to 9) and, as mentioned earlier, each wrong response initiated an automatic review of relevant program material. The average number of missed questions per person per content section ranged from speaking skills ($n = 13$ questions, $M = 1.5$, $SD = 0.60$) to redirection skills ($n = 10$ questions, $M = 0.4$, $SD = 0.82$). The percentage of participants who missed at least 1 question ranged from 93% in the speaking skills section to 30% in the redirection section.

### *Knowledge Acquisition*

*Overall program effects*. Repeated measures (pretest to posttest) analysis of variance was employed to examine the relationship between training condition and participant ability to identify the correct response across all six test segments (i.e., total number of correct responses identified). The condition by time interaction was highly significant, $F(1, 86) = 20.00$, $p < .001$, indicating that the IMM group identified significantly more correct responses at posttest than did the videotape lecture group. Specifically, the interactive intervention improved scores one standard deviation, whereas the videotape lecture group showed little improvement. At pretest, the IMM group correctly identified a mean of 2.23 ($SD = 1.26$) correct responses from the six segments. The mean number of correctly identified responses for the videotape lecture group was 2.18 ($SD = 1.02$). At posttest, the IMM group identified a mean of 3.41 ($SD = 1.35$) correct responses, and the videotape lecture group correctly identified a mean of 2.25 ($SD = 1.18$). The effect size (Cohen's $f$) was .51 (Cohen, 1988). Cohen defines an $f = .50$ as a large effect.

*Specific segment effects*. Chi-square analyses were conducted to examine the specific differences between scores of the IMM and videotape lecture participants on each of the six segments (see Table 2). At posttest, IMM participants were significantly more likely to identify the correct response on four of the six segments:

- vignette 1 (positive greeting with an agitated resident): $\chi^2(1, N = 88) = 5.06$, $p < .025$;
- vignette 4 (using communication cards to redirect repetitive questions): $\chi^2(1, N = 88) = 24.06$, $p < .001$);
- vignette 5 (identifying the best communication card): $\chi^2(1, N = 88) = 36.31$, $p < .001$; and
- vignette 6 (acknowledging and redirecting a fearful resident): $\chi^2(1, N = 88) = 3.93$, $p < .048$).

Overall, the IMM group had higher mean correct values on all the response sets.

*Improvement for participants who were unable to identify correct response at pretest*. Another evaluation of the effectiveness of the interactive program was participant improvement in identifying the correct response from pretest to posttest. The likelihood ratio test was used to examine the relationship between experimental condition and the percentage correct at posttest for participants who were unable to identify the correct response at pretest (see Table 3). Only five of the six segments had pretest data (vignette 5 had no pretest measure, so it was not included in this analysis). The percentage of the IMM group who were unable to identify the correct response at pretest but did identify the correct response at posttest was significantly higher than the percentage of videotape lecture group in four of the five segments that had pretest data. Specifically, IMM participants were:

- 4.68 times more likely than videotape lecture group participants to identify the correct response to vignette 1 (positive greeting with an agitated resident): $\chi^2(1, N = 41) = 5.30$, $p < .021$;
- 4.67 times more likely to identify the correct response to vignette 3 (redirecting after being accused of stealing): $\chi^2(1, N = 19) = 4.67$, $p < .027$;
- 22.4 times more likely to identify the correct response to vignette 4 (using communication cards to redirect repetitive questions): $\chi^2(1, N = 74) = 29.50$, $p < .001$; and
- 2.06 times more likely to identify the correct response to vignette 6 (acknowledging and redirecting a fearful resident): $\chi^2(1, N = 67) = 4.25$, $p < .039$.

## *Intention to Use Correct Responses*

*Overall program effects*. Repeated measures (pretest to posttest) analysis of variance was employed to examine the relationship between training groups and the mean participant behavioral intention to use the correct

**Table 2. Chi-Square Test of the Percentage of Interactive Multimedia Technology (IMM) and Videotape Lecture Participants Who Were Able to Identify the Correct Response at Posttest**

| *Vignette* | *IMM (%)* | *Video (%)* | $\chi^2$ | p |
|---|---|---|---|---|
| 1. Symptom: Agitated resident | | | | |
| Best response: positive greeting | 77.3 | 54.5 | 5.06 | .025 |
| 2. Symptom: Accusation | | | | |
| Best response: Acknowledge | 56.8 | 45.5 | 1.14 | |
| 3. Accusation, part II: What would you do next? | | | | |
| Best response: Redirection | 81.8 | 72.7 | 1.04 | *ns* |
| 4. Symptom: Repetitive questions | | | | |
| Best response: Use communication card | 77.3 | 25.0 | 24.06 | .001 |
| 5. Repetitive question, part II: | | | | |
| Identify best communication card | | | | |
| (best card = "I go to bingo at 10") | 88.6 | 25.0 | 36.31 | .001 |
| 6. Symptom: Fearful resident | | | | |
| Best response: Acknowledge and redirect | 47.7 | 27.3 | 3.93 | .048 |

NOTE: *df* = 1, 88.

response across the five situations depicted in the test vignettes that had pretest data (vignette 3 had no pretest measure). The condition by time interaction was highly significant, $F(1, 85) = 18.40$, $p < .001$, indicating that the IMM group had significantly higher behavioral intention at posttest than did the videotape lecture group across the five situations with pretest data. The effect size (Cohen's $f$) was large at .50 (Cohen, 1988). At pretest the IMM group's mean behavioral intention across five situations was 4.12 ($SD = 1.07$) on a 7-point scale, and the videotape lecture group's was 4.34 ($SD = 1.17$). At posttest, the IMM group's mean behavioral intention was 5.27 ($SD = 0.98$) correct responses, and the videotape lecture group's was 4.53 ($SD = 1.04$).

*Specific program effects*. As shown in Table 4, the IMM group showed significantly greater improvement in intention to employ the correct behavioral strategy:

- vignette 1 (positive greeting with an agitated resident): $F(1, 81) = 5.55$, $p < .021$;
- vignette 3 (redirecting when accused of stealing): $F(1, 83) = 4.22$, $p < .043$; and
- vignette 4 (using communication cards to redirect repetitive questions): $F(1, 83) = 30.31$, $p < .001$.

**Table 3. For Interactive Multimedia Technology (IMM) and Videotape Lecture Participants Who Did Not Identify the Correct Response at Pretest, Likelihood Ration Tests on the Percentage of Participants in Each Condition Who Were Able to Identify the Correct Response at Posttest**

| | | | *Likelihood Ratio Test* | | | |
|---|---|---|---|---|---|---|
| *Vignette* | *IMM (%)* | *Video (%)* | $\chi^2$ | df | p | *Odds Ratio (95% CI)* |
| 1. Symptom: Agitated resident | | | | | | |
| Best response: Positive greeting | 57.9 | 22.7 | 5.30 | 1, 41 | .021 | 4.68 (1.21, 18.04) |
| 2. Symptom: Accusation | | | | | | |
| Best response: Acknowledge | 26.3 | 19.2 | 0.32 | 1, 45 | *ns* | |
| 3. Accusation, part II: What would you do next? | | | | | | |
| Best response: Redirection | 60.0 | 11.1 | 4.87 | 1, 19 | .027 | 4.67 (0.73, 29.92) |
| 4. Symptom: Repetitive questions | | | | | | |
| Best response: Use communication card | 73.7 | 11.1 | 29.5 | 1, 74 | .001 | 22.40 (6.32, 79.41) |
| 5. Repetitive question, part II: | | | | | | |
| Identify best communication card | | | | | | |
| (best card = “I go to bingo at 10”) | NA | NA | | | | |
| 6. Symptom: Fearful resident | | | | | | |
| Best response: Acknowledge and redirect | 38.9 | 16.1 | 4.25 | 1, 67 | .039 | 2.06 (0.093, 4.56) |

NOTE: CI = confidence interval; NA = not applicable.

**Table 4. Intention to Use the Correct Response**

| | *Interactive Multimedia Technology* | | | | *Video* | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Pre* | | *Post* | | *Pre* | | *Post* | | | | |
| *Vignette* | M | SD | M | SD | M | S*D* | M | SD | F | df | p |
| 1. Symptom: Agitated resident | | | | | | | | | | | |
| Best response: Positive greeting | 5.28 | 1.80 | 5.90 | 1.34 | 5.51 | 1.58 | 5.47 | 1.52 | 5.55 | 81 | .021 |
| 2. Symptom: Accusation | | | | | | | | | | | |
| Best response: Acknowledge | 4.07 | 1.99 | 4.47 | 1.92 | 4.05 | 1.93 | 3.98 | 1.73 | 1.01 | 85 | |
| 3. Accusation, part II: What would you do next? | | | | | | | | | | | |
| Best response: Redirection | 5.07 | 1.30 | 5.57 | 1.40 | 5.51 | 1.55 | 5.35 | 1.48 | 4.22 | 83 | .043 |
| 4. Symptom: Repetitive questions | | | | | | | | | | | |
| Best response: Use communication card | 2.34 | 1.87 | 5.64 | 1.72 | 2.72 | 1.86 | 3.57 | 1.98 | 30.31 | 83 | .000 |
| 5. Repetitive question, part II: Identify best communication card(best card = "I go to bingo at 10") | | | 5.63 | 2.04 | | | 4.50 | 1.93 | | | .010[a] |
| 6. Symptom: Fearful resident | | | | | | | | | | | |
| Best response: Acknowledge and redirect | 3.68 | 2.04 | 4.86 | 1.84 | 3.86 | 2.24 | 4.32 | 1.91 | 2.52 | 82 | |

a. *t*-test comparison with posttest data: $t(83) = 2.63$, $p < .010$.

In addition, an independent sample *t*-test analysis of intention to use a correctly worded communication card (i.e., vignette 5), which was only gathered at posttest, found that the IMM group was significantly more likely to intend to use a correctly worded communication card, $t(83) = 2.63, p < .010$.

### *Self-Efficacy to Use the Correct Responses*

*Overall program effects*. Analysis of variance was employed to examine the relationship between experimental condition and mean participant self-efficacy at posttest to use the correct response across the six situations depicted in the test-vignettes. The condition effect was highly significant, $F(1, 84) = 15.63$, $p < .001$, indicating that the IMM group had significantly higher self-efficacy at posttest than did the videotape lecture group. The effect size (Cohen's *f*) was .42. At posttest, the IMM group's mean self-efficacy across the six situations was 5.86 ($SD = 1.0$) on a 7-point scale, compared to 5.00 ($SD = 1.02$) for the videotape lecture group. As shown in Table 5, independent sample *t*-test analysis of self-efficacy to use the correct response showed statistically significant effects at posttest for the interactive program compared to the videotape presentation on three of the six vignette-assessments:

- vignette 4 (using communication cards to redirect repetitive questions): $t(84) = 4.23$, $p < .001$;
- vignette 5 (identifying best communication card): $t(83) = 4.47$, $p < .001$; and
- vignette 6 (acknowledging and redirecting a fearful resident): $t(82) = 3.06$, $p < .003$.

Self-efficacy was not significantly different for the other three situations.

### *User Satisfaction*

Participants reported on 7-point scales that the IMM program was useful ($M = 6.1$, $SD = 1.21$), and they were quite satisfied with it ($M = 6.0$, $SD = 1.05$). They found it very easy to use ($M = 6.1$, $SD = 1.20$), and they would recommend it to a friend ($M = 6.1$, $SD = 1.17$). The *t*-test analysis indicated that compared to the videotape lecture group, the IMM group was significantly more satisfied with the program, $t(84) = 1.98$, $p = .05$, and there was a positive trend toward recommending it to a friend, $t(84) = 1.71$, $p = .09$.

**Table 5. Posttest Measurement of Self-Efficacy to Use the Correct Response**

| | *Interactive Multimedia Technology* | | *Video* | | | | |
|---|---|---|---|---|---|---|---|
| *Vignette* | M | SD | M | SD | t *Test* | df | p |
| 1. Symptom: Agitated resident<br>Best response: Positive greeting | 6.02 | 1.22 | 6.00 | 1.02 | 0.10 | 84 | *ns* |
| 2. Symptom: Accusation<br>Best response: Acknowledge | 5.40 | 1.85 | 5.02 | 1.64 | 1.01 | 83 | *ns* |
| 3. Accusation, part II: What would you do next?<br>Best response: Redirection | 6.05 | 1.38 | 5.74 | 1.36 | 1.02 | 82 | *ns* |
| 4. Symptom: Repetitive questions<br>Best response: Use communication card | 5.90 | 1.59 | 4.25 | 2.01 | 4.23 | 84 | .001 |
| 5. Repetitive question, part II: Identify best communication card (best card = "I go to bingo at 10") | 6.23 | 1.46 | 4.62 | 1.89 | 4.47 | 83 | .001 |
| 6. Symptom: Fearful resident<br>Best response: Acknowledge and redirect | 5.57 | 1.70 | 4.33 | 2.00 | 3.06 | 82 | .003 |

## Discussion

This study was designed to assess the relative efficacy of an interactive multimedia program to provide communication skills training for professional caregivers compared to that of a videotaped in-service lecture covering similar content. The interactive program was consistently found to be superior in all comparisons. Compared to the participants in the videotape lecture group, the IMM group participants were significantly better at identifying the best behavioral responses, and if they were wrong at pretest, they were significantly more likely to choose the correct response at posttest. Across all vignettes, the IMM group was 6.76 times more likely than the videotape lecture group to choose the correct response at posttest. The IMM group showed greater intention to use the recommended or correct behaviors, and the interactive intervention had a more positive effect on user self-efficacy compared to the videotape in-service. Overall, across knowledge, behavioral intention,

and self-efficacy measures, the interactive program effects averaged an improvement of one standard deviation. Such changes are of statistical and practical importance.

As demonstrated here, interactive exposure time of about 55 minutes can have a measurable effect on knowledge, self-efficacy, and intention to use recommended behaviors. Teri, Baer, Orr, and Reifler (1991) demonstrated the effectiveness of a brief training program for staff in special care units for patients with dementia, although that study did not involve a stand-alone interactive program such as that tested here.

Although, the type of criterion-referenced training tested here has not been commonly adopted (Burgio & Burgio, 1990), it has been highly recommended (Keckan, 1997). There are a number of possible explanations for the superiority of the IMM program in this research. The interactive program employed a criterion-referenced mastery learning approach, with periodic evaluations to ensure that program users were trained to full comprehension. Thus, the program tailored itself to the user's interactive responses, requiring review when comprehension questions were answered incorrectly. Tailoring messages—or in this case, personalizing review material—makes IMM programs more interesting and motivating (Brug et al., 1999; Noell & Glasgow, 1999). The interactive approach allows program users to learn at their own pace and review materials as desired. In addition, the users are required to be involved in the learning process—choosing sections to view and making responses via mouse clicks on graphic icons or "answer buttons." We suspect, but cannot verify, that the built-in accountability—that requires correct responses to comprehension test questions to proceed—was also a factor in keeping users on task. In contrast, the videotaped lecture involved only passive learning by program watchers with no accountability for content comprehension.

The IMM program also appeared to be somewhat more time efficient to use. The videotaped in-service and the interactive program were each viewed for about 55 minutes, but the minimum time to use the IMM program appears to have been somewhat less. Data were not collected on how long different IMM sections were used, nor on the length of required content reviews after incorrect responses on test items. Eleven of the interactive program users, however, had enough time to explore the Information Center. Moreover, the average IMM user made 4.4 incorrect responses, each requiring content review and subsequent retesting after watching a modeling vignette. Depending on the content, each review could take from 1 to 3 minutes, adding at least 4 to 13 minutes to the training time. Thus, in contrast to viewers of the videotaped lecture, interactive program users (who were knowledgeable about the content) could finish the training more quickly.

Taken together, the results of this study suggest that IMM programs may represent a more effective and efficient training tool than video-only programs covering similar content.

## *Implementation Issues*

Although this study demonstrates the viability of an IMM training approach, the implications of putting such a system in place should also be considered. Use of a CD-ROM program requires purchase of the software and perhaps of a computer system (about $600) that must be made available and maintained for use by relatively unsophisticated staff. Our informal inquiries suggested that current computer resources are usually reserved for administrative use in most long-term care facilities. Thus, there may be economic considerations and administrative resistance to a switch from traditional training approaches to IMM training.

There are clear incentives for the long-term care industry to improve staff training. Research indicates that appropriate training improves resident care and staff morale while reducing staff turnover (Grant et al., 1996; McCallion et al., 1999). Proven approaches, which are available 24 hours per day and minimize the need for staff trainers, should be cost-effective when amortized over time. Automated solutions will also be attractive as tools to satisfy OBRA training requirements for overnight shift workers, who may find this approach more convenient than traditional in-service training held for day shift workers.

## *Limitations*

This research had several limitations. First, the results reported here are primarily based on user self-report. Although these findings are based on user judgments about simulated real-life behavior depicted in video vignettes, the results could inspire more confidence if they were substantiated by field observations of the study participants implementing their newly acquired skills in real-world situations. Second, although the measurement instrument that was developed to address the program content has substantial face validity, additional psychometric testing is needed to establish its validity and reliability. Third, almost half the participants had some college education, which may not be representative of many professional caregiving staff. In addition, this program required that participants understand spoken English, and the effect of this program on nonnative English speakers is unknown. Furthermore, all the participants in this study had previously undergone at least some caregiving training. It is unclear to what extent the study findings generalize

to inexperienced caregivers. Although it seems reasonable to expect similar findings with less experienced caregivers, this study did not directly address this population. Finally, this research did not evaluate the relative merits of individualized training compared to a group training approach, which has the potential to promote peer discussion and interactions. Such peer interaction may increase group cohesion and provide useful insights for trainees. More research is needed to understand the relative merits of group training compared to individualized training. Thus, these results, although promising, must be viewed with caution pending further research.

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*Article accepted July 27, 2001.*

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