Research

Facilitating technology use in older adulthood: the Person-Environment-Occupation Model revisited

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Key words:
Technology, training, older adults.

This mixed methods study used a cross-comparative case study design to explore how previous experiences with technology can influence collaboration between older married couples during first-time use of technology, namely an in-vehicle navigation system.

Previous research suggests that, with age, collaboration with a married partner can maintain or, in some cases, even improve performance on cognitive-based, memory retrieval tasks. However, few studies have evaluated how older adults problem solve collaboratively through such tasks. Driving a car has been identified as a context in which older drivers and copilots (that is, spouse) work together to get to the places they need to go safely. With the advent of vehicular technology, including navigation systems, older drivers expect to share the cognitive load with their copilot.

Using the Person-Environment-Occupation Model, this investigation highlights key factors that influence the shared adoption and use of technology in later life. For occupational therapists, the results from this study can guide clinical decision-making when prescribing technology and considering collaborative training strategies that facilitate occupational performance in older adulthood.

Introduction

With the population ageing, technology that compensates for health-related changes holds much promise in promoting health and wellbeing (Hickman et al 2007). Facilitating the use of technology in older adulthood is identified as 'an important immediate and long-term goal for training research' due to the rapid expansion of technology in society and the growing cohort of older adults who represent potential users (Hickman et al 2007, p77). Recommendations for designing technology congruent with the needs of older users (for example, large icons and font size) have been outlined elsewhere (see Czaja and Lee 2007). Older adults as a group differ in their experiences and exposure to technology. There are many in this age group with limited exposure to technology, with some never having used a computer (Pew and Van Hamel 2004). For older users, Aberton (2005) found that a supportive learning environment, such as collaborating with others, could strengthen confidence when learning new computer skills.

The notion of collaboration as a means of facilitating performance in older adulthood has recently emerged as an area of gerontological research. The role of others in learning and cognition was raised in the child development literature by Vygotsky (1978). He noted that when children collaborated with a more experienced partner, such as a parent or teacher, they acquired skills more quickly. Similarly, in older adulthood collaboration with others, namely a married partner, has been suggested as a potential strategy to maintain or even improve performance on day-to-day tasks, such as banking and household chores (Vrkljan 2007). On memory tasks, such as narrative recall, older adults have been found to remember more information collaboratively than

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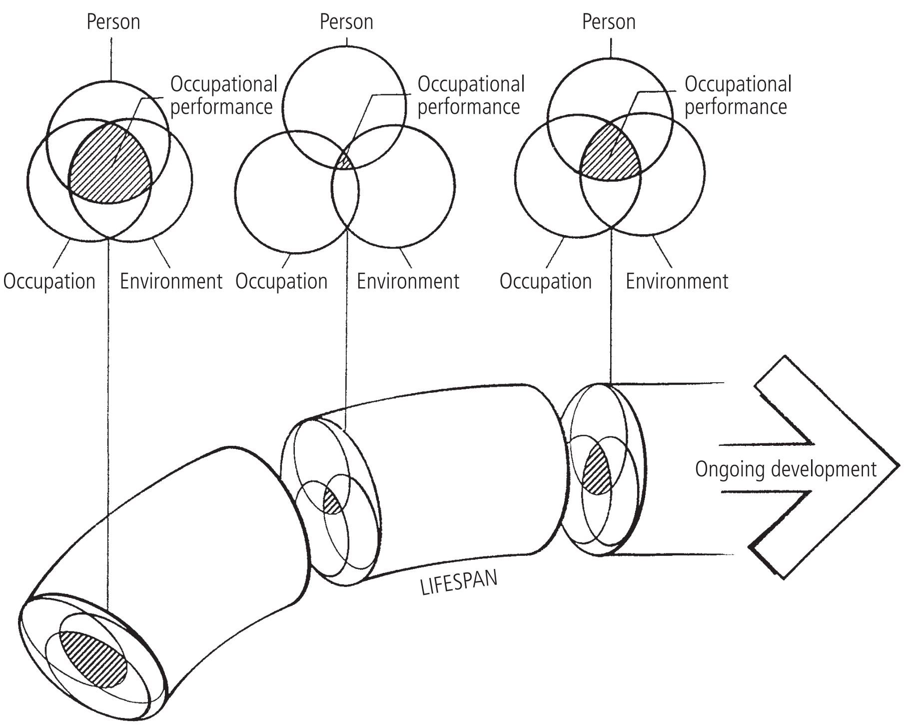
Fig. 1. The Person-Environment-Occupation (PEO) Model.*



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individually (Gould et al 1991, Dixon and Gould 1998). Research suggests that performance further improves if partners have an established relationship, meaning older married couples generally outperform their younger counterparts on such tasks (Margrett and Willis 2006).

Johansson et al (2005) categorised couples *a priori* on two measures of collaboration in order to determine why some older married couples performed better on memory retrieval tasks than others. The first measure, responsibility, referred to the degree to which each partner perceived his or her role in the relationship, whereas the second measure, agreement, pertained to how much couples share the same perspective. The results suggested that couples with scores indicative of higher responsibility but lower agreement achieved the best outcomes. According to Johansson et al (2005), collaboration can have a negative impact on performance when couples rely too heavily on their respective partner. Such collaboration, they reported, is most evident during unfamiliar challenging tasks. Therefore, understanding the interaction that occurs between older couples when performing such tasks might help to identify strategies that facilitate collaborative performance. In this context, operating new technology is an example of a situation in which older adults might expect to collaborate. Identifying factors that facilitate technology use amongst older learners is important to occupational therapists, who often prescribe various forms of assistive technology as part of their clinical practice (Miller Polgar 2006).

For occupational therapists, the Person-Environment-Occupation (PEO) Model (Law et al 1996) can serve as a framework through which to understand the complex interrelationship among factors that influence technology use in later life (Fig. 1). The main features of the PEO model are conceptualised as interacting dynamically across the lifespan. Transactions between person, environment and occupation factors combine to shape occupational performance, the central feature of the model. Occupational performance represents the execution of a task and refers to the experiences of people engaging in their occupations within their environment (Law et al 1996).

As illustrated in Fig. 1, the degree of overlap between person, environment and occupation factors serves to reflect the ability to perform a particular occupation at various points across the lifespan, such as operating technology. Using the PEO framework to explore the transaction of factors that influence technology use in older adulthood might help to identify strategies that enhance or act as potential barriers to this segment of users.

The present study reports findings from a mixed methods study (Vrkljan 2009) that explored the relationship between older drivers and copilots (that is, married couples) and the potential influence of in-vehicle technology, specifically navigation systems, on driving safety. Previous research suggests that the in-car environment is a situation in which older married couples perform driving-related tasks, such as navigating unfamiliar areas, collaboratively (Miller Polgar and Shaw 2003). Passengers are expected to assume more responsibility for driving-related tasks owing to the rapid advancement of in-vehicle technology, including global positioning systems (GPS), Bluetooth® and other electronic devices (Vrkljan and Miller Polgar 2005). The inside of a vehicle has been compared to an airline cockpit due to the advent of such technology. In this context, older drivers and passengers (that is, copilots) are expected to share the cognitive load. Hence, exploring how older drivers and their identified copilot (that is, married couples) collaborate when using technology is warranted.

The protocol utilised in this multi-phase study, including a step-by-step account of each phase, has been summarised in the method section. The purpose of the present investigation was to examine, in-depth, those factors that can influence the adoption and shared use of new technology in older adulthood. More specifically, the aims of this study were:

1. To explore how previous experiences with technology influence the interaction and performance of older married couples when using new technology, specifically a GPS
2. To cross-link results using the PEO model to determine how key transactions might inform clinical decision making when prescribing new technology to older clients.

A cross-comparative analysis of two couples selected from the sample was conducted in order to highlight these transactions. The PEO model was used to frame this analysis. This model provides a framework for occupational therapists to understand how transactions between person, environment and occupation factors combine to influence the shared adoption and use of technology in older adulthood. Collaborative training strategies that facilitate occupational performance in this context are discussed.

Method

Ethical considerations

The University of Western Ontario Research Ethics Board approved this study and its procedures for Health Sciences Research involving Human Subjects. All participants provided verbal and written consent to be audiotaped and videotaped for the purpose of the study.

Participants

Twenty-two healthy community-dwelling older couples (aged 60 years and older) or 44 older adults were recruited through an older people's community centre in south-western Ontario, Canada. The participants self-identified that they were healthy, with no major medical conditions that would interfere with the study. Each participant reported no previous experience with using a GPS system. The sample was recruited using a snowball sample of convenience, meaning that some participants learned about the study from other participants. Data collection and analysis procedures are summarised below.

Data collection

Each couple completed the following stages during the same session. Each session took approximately 1.5 to 2 hours to complete.

Stage 1, Questionnaires: Demographic information was collected on each participant, including age, perceived level of physical activity and health, and years driving with their married partner. The Mutuality Scale (MS), a self-administered questionnaire (Archbold et al 1990), was used to gather information on how participants viewed their relationship with their spouse beyond the driving context. The Survey of Technology Use (SOTU), a self-administered questionnaire, was used to assess each couple's level of comfort and experience with technology (Scherer 1998).

Stage 2, Interviews: Following completion of the questionnaires, interviews were conducted with each couple to explore how they worked together when driving in order to understand the context in which navigation technology would be used. Each interview took 20-30 minutes. Grounded theory methods, specifically a constructivist approach (Charmaz 2006), informed the line of questioning, which explored areas including driver and passenger roles in both familiar and unfamiliar areas as well as how these roles might have changed through their years of driving together. Each couple was then introduced to an in-vehicle GPS device, given that none had previous experience with using this type of technology (that is, inclusion criteria). The participants were asked to prognosticate how they thought they might use such a device when travelling together by car.

Stage 3, Usability testing: Usability testing guidelines were used to organise the training session and evaluation to ensure that all participants had the same experience with using the technology (see Dumas and Redish 1999). This part of the study took place in a laboratory setting in a room that was set up at the community centre. Each couple received the same training with the device. Training involved the investigator (BV) demonstrating the task (that is, programming a route to a restaurant, pharmacy and bank) combined with verbal instructions. The participants then repeated the same task, with verbal cueing as needed (BV). The participants were permitted to ask questions at any time during their training. They were asked if they were ready to be videotaped completing similar tasks. If requested, further practice was provided. Training the participants took approximately 20-25 minutes.

When the participants indicated that they were ready to proceed, they were presented with three scenarios. Scenarios are used in usability testing in order to simulate a situation in which a device would actually be used (Dumas and Redish 1999). Each scenario required participants to programme a route using the GPS to the following destinations: (a) a restaurant, (b) a pharmacy and (c) a bank. The exact name of each destination was provided. When completing the scenarios, each couple was instructed to complete the scenario 'as they would do so together'.

Stage 4, Debriefing: This final step of the study involved interviewing the participants about their perceptions of using the navigation device and determining whether their perceptions had changed following actual use of the device. According to Dumas and Redish (1999), this final step is important for determining the overall usability of a device. Debriefing with each couple took approximately 10-15 minutes.

Data analysis

Descriptive statistics for the questionnaires were tabulated across the sample. Scores from the SOTU were analysed for each pair of participants in order to determine if there were any patterns among the couples with regard to technology use. Data from the interviews (that is, Stages 2 and 4) were analysed using a constant-comparative approach (Glaser and Strauss 1967). Significant units of text and recurrent themes raised by the participants were reviewed by the investigator (BV) and a formal coding scheme was developed as thematic categories emerged from the data. A researcher

Table 1. Definitions of key codes categorised using the observation tool

Code	Definitions
Partner assistance	Verbal and non-verbal interactions between partner, including both guidance and confirmation approaches related to using the device (see definitions below)
■ Guidance	Seek input from partner using *open-ended* questions that facilitate operating of the device (for example, 'I don't know what button to press. What comes next?') and/or *directing* the actions of the partner who is operating the device (for example, Verbal: 'Press the route button now' and/or Non-verbal: Point to button partner should press)
■ Confirmation	Ask partner *closed-ended* questions that require a yes/no response (for example, Verbal: 'Do I press the Menu button now?' and/or Non-verbal: Points to a button and waits for partner to verify by nodding head before pressing button) and/or *validating* partner's actions by repeating the action that the partner has stated as his or her intended course of action (for example, 'Yes. Press X').

who was not affiliated with the project reviewed the coding process for accuracy (that is, peer debriefing). In addition, all participants were sent a summary of the themes and verified the findings, as per member checking procedures (Lincoln and Guba 1985).

The videotaped data of each couple's performance and interaction while using the GPS device were analysed using an observation tool developed specifically for this study. This tool was developed using standardised procedures outlined by Bakeman and Gottman (1986). These procedures were:

1. Reviewing all videotaped data and interactive behaviours that were observed, such as pointing to the screen (that is, non-verbal) and asking for help from partner (that is, verbal)
2. Each verbal and non-verbal behaviour was then named (coded)
3. Each behaviour (verbal and non-verbal) was tabulated across each of the three tasks.

Bakeman and Gottman (1986) referred to this tabulation as event coding. Event coding involves the process of quantifying qualitative data to track the rate at which certain interactions or 'events' occur. The dependent variable, partner assistance, was generated from the verbal and non-verbal interactions that occurred between participants as they completed each scenario (Table 1). In accordance with usability evaluation procedures (Dumas and Redish 1999), performance measures were also tabulated for each couple. These were the time to complete each scenario (that is, minutes and seconds) and the number of errors per scenario (that is, pressing the wrong button when programming a route).

The observation tool was pilot tested using two raters in order to calculate the interrater agreement between them and the primary investigator to ensure further reliability of the tool. Interrater reliability was calculated with 10% of the tasks randomly selected from the entire sample (that is, 12 of 120 tasks). A Kappa value was calculated to determine an average rate of agreement on the observation tool for raters. The reported Kappa value between raters was 85.8%, which is considered excellent (Landis and Koch 1977). Data from the observation tool were analysed using the Statistical Package for the Social Sciences, version 11.0.

Results

Differences in technology experience

Thematic analysis from the interviews suggested differences among the couples with regard to their perceptions of using the GPS device, which were linked to their level of previous experience with technology. Responses on the SOTU confirmed this difference. Each couple was categorised into one of two groups based on their combined SOTU scores:

1. *Experienced with technology*, couples in which both partners rated themselves as more comfortable with technology (n = 10) (mean = 7.80, SD = 2.69)
2. *Less experienced with technology*, couples in which one or neither partner was comfortable with technology (n = 12) (mean = 3.13, SD = 3.65).

A one-way analysis of variance (ANOVA) confirmed a significant difference between these groups with regard to age. The couples identified as more experienced with technology were younger (mean = 68.15, SD = 5.94) than those in the other group (mean = 73.50, SD = 4.28) (Table 2). Interview findings as they relate to the older driver/copilot relationship and the potential impact of in-vehicle navigation technology on driving safety were published in *Traffic Injury Prevention* (Vrkljan and Miller Polgar 2007).

The results from the observation tool indicated differences between groups in their rate and type of partner assistance. Although this difference was not large enough to reach statistical significance, the groups differed in their respective rate and type of partner assistance. Couples less experienced with technology had higher levels of assistance. The type of assistance that they provided to their partner was primarily supportive (that is, confirmation), whereas couples more experienced with technology provided less assistance to their partner overall but the assistance that they did provide was more directive with regard to guiding their partner's actions.

The focus of the present article was to explicate further how differences in level of experience with technology can affect the shared adoption and use of new technology. To do so, one couple was selected from each group (that is, experienced with technology or less experienced with technology) based on the maximal variation of results from each phase: questionnaires (that is, age and highest versus lowest score on the SOTU), interviews (that is, differences in perception of using in-vehicle technology) and observation tool (that is, most/least errors and rate/type of partner assistance). Another individual not affiliated with the project verified the selection process of each couple.

Using these data, a descriptive case study of each couple was constructed. Pseudonyms were used to protect their identity. The results from this cross-comparative case analysis highlight factors related to the person (for example, age and differences in technology-related experience), environment (for example, interaction with partner) and occupation (that is, task demands of using the device) that combined to influence each couple's ability to use the device in question (Fig. 2). The transactional nature of these factors is used to frame the discussion that follows these case descriptions.

Case study 1: Less experienced with technology

Person. Craig and Donna were 83 and 75 years of age respectively, retired, lived in their own home and did not have any children. They had been driving together for 50 years and had been married for almost the same amount of time. They reported that they were both in good health, with no major medical conditions at the time the study was undertaken. The results on the Mutuality Scale indicated that Craig and Donna each viewed their married relationship as positive. They described themselves as a 'driving team', who worked together to get to the places they needed to go to safely.

Occupation. With regard to technology use, Craig's and Donna's combined SOTU scores reflected their lack of experience with using technology (Table 2). Analysis of their first time of using the navigation device (that is, observation tool) indicated that they collaborated when operating the device, but were the slowest of all participants to complete each route-planning task and made the most errors (for example, pressing the wrong button) (Table 4). The measures of partner assistance indicated that their role was less active and primarily supportive (that is, confirmation) when using the device (Table 3).

Environment. Both Craig and Donna reported that they had never used a computer in their lifetime. Craig stated, 'We don't have a fear of technology, but we just don't have a need to learn how to use it.' They described the experience of operating the GPS as 'challenging' but felt that it was helpful to have a partner present, as Craig reported: 'We suffer from a lack of confidence' because 'it [device] is so foreign to us and we don't want to make a mistake.'

Table 2. Summary of demographic characteristics

	Group 1 Less experienced with technology (n = 12)		Craig and Donna (Group 1)	Joe and Cathy (Group 2)	Group 2 Experienced with technology (n = 10)	
	Mean	SD			Mean	SD
Age (years)						
Total* (couples)	73.40	4.32	79.00	61.00	68.15	5.94
Driver (male)	74.50	5.28	83.00	60.00	69.90	6.19
Passenger (female)	72.30	2.98	75.00	62.00	66.40	5.42
Years driving together	47.70	4.32	50.00	34.00	39.00	12.05
Health status (5-point Likert scale) 1 = Not healthy at all 5 = Very healthy	4.25	0.72	3.50	3.50	3.95	0.60
Physical activity (5-point Likert scale) 1 = Not active 5 = Very active	3.95	0.76	3.50	3.00	3.55	0.60
Survey of technology use – combined total	3.30	3.89	0.50	10.50	7.80	2.69
Mutuality Scale (Out of 4 = Positive)	3.56	0.39	3.40	3.93	3.49	0.55

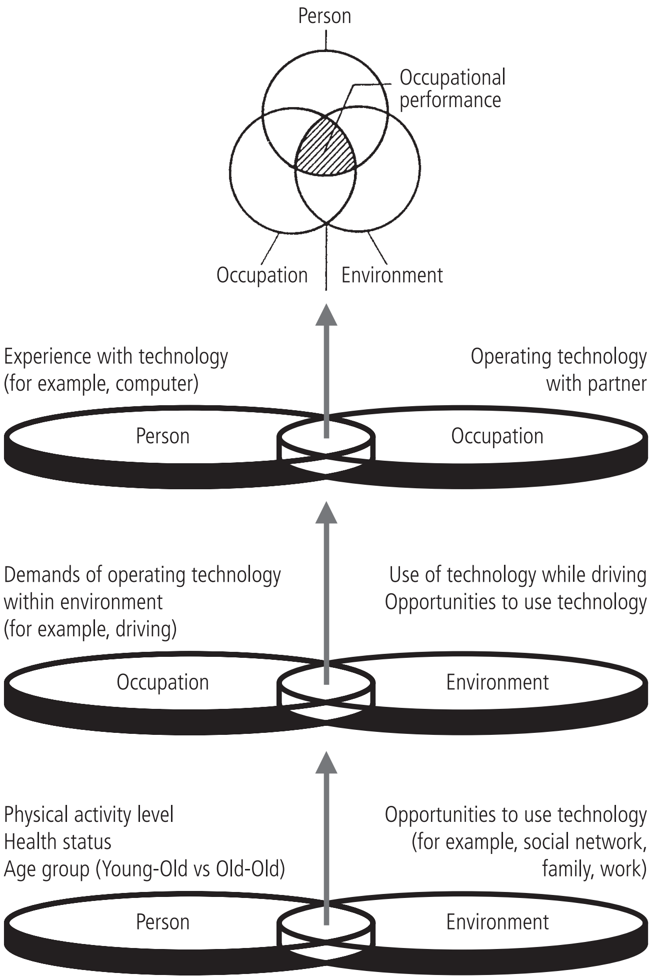
*Significant $p<0.05$.

Table 3. Measures of guidance and confirmation for Craig and Donna and Joe and Cathy

	Group 1 Less experienced with technology		Craig and Donna (Group 1)	Joe and Cathy (Group 2)	Group 2 Experienced with technology	
	Mean	SD			Mean	SD
			Guidance			
Task 1[A]	7.90	4.28	6.00	4.00	10.50	9.50
Task 2[B]	6.30	4.69	2.00	7.00	10.10	8.37
Task 3[C]	6.80	4.10	8.00	0.00	5.50	4.50
Total guidance	21.00	9.24	16.00	11.00	26.10	19.29
			Confirmation			
Task 1[A]	12.50	8.20	31.00	0.00	10.20	9.80
Task 2[B]	9.20	6.71	23.00	1.00	7.90	6.65
Task 3[C]	12.10	9.49	30.00	2.00	4.70	3.40
Total confirmation	33.80	23.20	84.00	3.00	22.80	17.14
Total partner assistance	54.80	26.91	100.00	14.00	48.90	35.03

Scenario 2: From the older people's centre, determine your route to the following: [A]Task 1: 'The closest XYZ doughnut shop.' [B]Task 2: 'The closest XYZ pharmacy.' [C]Task 3: 'The closest XYZ bank.'

*Fig. 2. Transaction between person-environment-occupation factors that influenced the adoption and shared utility of the navigation system.**



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They indicated that the device might be useful when they attended medical appointments with specialists in out-of-town destinations with which they were less familiar. They found that navigating in such areas was 'difficult' but that they did the best they could using maps or asking for directions.

Case study 2: Experienced with technology

Person. Joe was 60 years of age and continued to work part time while his wife, Cathy, was 62 years of age and retired at the time that the study was completed. They lived in their own home. Joe and Cathy had been driving together for 34 years. They reported that they were in good health at the time of the study and both viewed their relationship with their partner as positive. Both Joe and Cathy had experience with using various forms of technology. They described themselves as 'techies' and that they loved 'trying the latest gadgets'. Both used computers in their respective workplaces and at home.

Occupation. Joe and Cathy had extensive experience with using technology, as confirmed by their SOTU scores. When using the GPS device for the first time, the results from the observation tool indicated that Joe and Cathy had the lowest level of partner assistance when using the navigation system, but that when they did help each other it was more active (that is, guidance) (Table 3). They were the fastest and made the least number of errors of all couples in the study (Table 4). With regard to driving, they noted that Joe was usually the driver when they travelled together by car to unfamiliar destinations. They used web resources (for example, MapQuest®) to plan their out-of-town trips by car and to book hotels and locate restaurants along their route. Joe and Cathy described themselves as a 'good driving team'. Joe stated: 'Cathy's my total support person when we're driving. Her role is mostly companionship, spotting route changes and navigating on longer trips. When Cathy carries on a conversation with me, it keeps me more alert …'

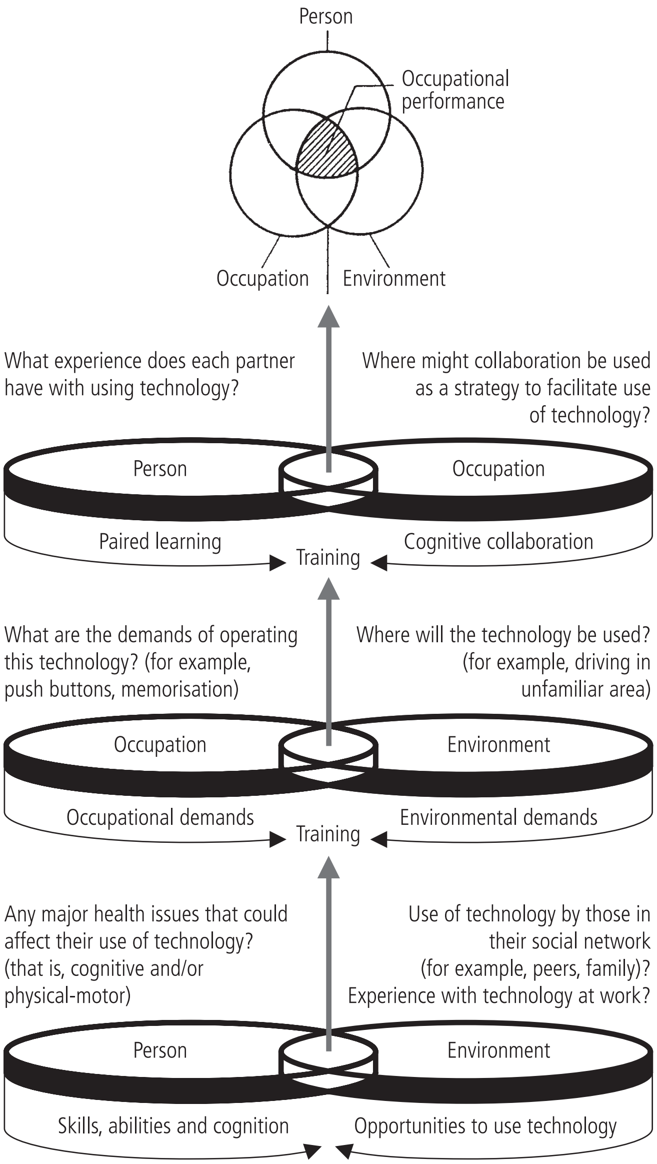
Table 4. Measures of performance for Craig and Donna and Joe and Cathy

	Group 1 Less experienced with technology Mean	SD	Craig and Donna (Group 1)	Joe and Cathy (Group 2)	Group 2 Experienced with technology Mean	SD
Time						
Task 1[A]	3:06	1:35	5:54	1:03	2:11	1:00
Task 2[B]	2:27	1:06	3:44	0:47	2:02	1:03
Task 3[C]	2:15	1:16	2:20	0:37	1:03	0:24
Total time	7:48	3:03	11:18	2:27	5:16	1:49
Errors						
Task 1[A]	2.00	1.56	3.00	0.00	0.70	1.06
Task 2[B]	2.30	1.77	2.00	0.00	1.30	0.95
Task 3[C]	1.10	1.10	1.00	0.00	0.70	0.82
Total errors	5.40	2.70	6.00	0.00	2.70	1.42

Scenario 2: From the older people's centre, determine your route to the following: [A]Task 1: 'The closest XYZ doughnut shop.' [B]Task 2: 'The closest XYZ pharmacy.' [C]Task 3: 'The closest XYZ bank.'

Environment. Joe and Cathy were familiar with navigation systems, but had never used this type of technology. Having a partner present while learning the device had benefits, as Cathy described: 'We would use this type of technology together, so it was good to have Joe here so we could assist each other.' During their debriefing, they wanted to know the cost of the device. Joe and Cathy were interested in purchasing a GPS system. They felt that the device would facilitate their travel by car 'as long as they both kept their eyes on the road'.

*Fig. 3. Key questions to guide clinical decision-making when prescribing to ensure congruency with skills, abilities and occupational needs of clients.**



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Discussion

As illustrated by the case studies, there are many factors that must be considered when analysing differences in the adoption and shared utility of new technology in older adulthood. For occupational therapists, determining how factors combine to influence technology use in older adulthood is necessary in order to identify strategies that might facilitate occupational performance. Training strategies should accommodate the diverse needs and range of experience inherent to older technology users (Czaja and Lee 2007). Older adults as a group differ in their experiences and exposure to technology (Aberton 2005). In addition, consideration must be given to the environment in which such technology will be used. The discussion that follows illustrates the utility of a transactional perspective of occupational performance to discern key areas that facilitate and/or act as barriers for technology use among the growing cohort of older adults who represent potential users. Implications for practice are outlined.

Use of technology in older adulthood: a transactive perspective of occupational performance

The PEO model (Fig. 1) illustrates that person, environment and occupation factors can influence occupational performance across the lifespan. By taking this model one step further and viewing occupational performance as a transaction among these factors, each layer in Fig. 2 highlights how particular transactions combined to influence each couple's performance and interaction while using the GPS device. Fig. 3 outlines key questions that therapists might consider in determining those elements that might affect occupational performance.

Person-Occupation

Analysis of person and occupation factors revealed that each couple's level of experience with using other forms of technology, particularly a computer, may have contributed to their ability to use the device in question. Craig and Donna had limited experience with using other forms of technology whereas Joe and Cathy were more familiar with using various types of technology, including iPods® and digital cameras. These differences corresponded to their perceptions of using new technology and their performance and interaction when using the GPS device. It is likely that Joe and Cathy transferred their prior knowledge of technology to this learning context.

According to the motor learning literature, learning transfer occurs when knowledge and skills from one situation can be applied in another context (Schmidt and Wrisberg 2000, Morrow 2003). As such, training approaches used by therapists should build on the previous knowledge and experience of learners, when possible. In circumstances where previous experience with technology is limited, Rogers and Jamieson (2000) suggested that training be tailored to the needs of the older learner. As illustrated in Fig. 3, this finding highlights the importance of providing training methods for older clients that are congruent with their skills, abilities and previous experiences with technology.

Occupation-Environment

Each couple's pattern of partner assistance exemplified underlying differences in their level of experience with technology. Joe and Cathy facilitated their performance by guiding their partner's actions, whereas Craig and Donna were less adept with technology and, consequently, less equipped with the computer skills and knowledge to facilitate their partner's performance. The term 'collaborative cognition' has been used to describe the process by which individuals work together to problem solve through a task (Strough et al 2002). In older adulthood, individuals are more likely to work with others when they perceive deficits in their own functioning or when contextual demands exceed their own capability (Strough et al 2002). Each couple's rate and type of interaction while operating the device reflected their experience with using technology. Although less experienced with technology, Craig's and Donna's rate of partner assistance was higher than that of Joe and Cathy. However, the type of assistance that Craig and Donna provided was less active and primarily supportive whereas Joe and Cathy were more specific, thereby facilitating their ability to problem solve collaboratively through the scenarios using the device. The findings in this study suggest that the quality of interaction may be more important than the quantity when it comes to paired performance.

In a clinical context, consideration must be given to both the demands of the occupation and the environment in which such technology will be used (Fig. 3). While the laboratory setting provided a unique opportunity to examine how couples interact during first-time use of GPS technology, it does not reflect the real world demands of operating this device while driving. All couples in the study identified that this technology would be used when driving to unfamiliar destinations.

Navigating unfamiliar areas can be a challenging cognitive task that can lead to potentially unsafe road behaviour (for example, late lane changes or eyes off the roadway) (May et al 2003). However, GPS technology has been identified as a potential resource to assist older drivers with route planning and way finding (Molnar et al 1996, Burns 1999). With the expected advent of further technology in the car cockpit, sharing the cognitive load (that is, cognitive collaboration) in a driving context may become even more important. Future studies involving a driving simulator will evaluate how collaboration on driving-related tasks, including GPS operation, can affect the safety of older drivers and passengers.

Person-Environment

Pew and Van Hemel (2004) identified that individuals aged 70 years and older have different reactions to technology because most of them retired without using a computer in the workplace. Each couple's social environment afforded different opportunities to use current and emerging technologies. Couples more experienced with technology, like Joe and Cathy, identified that they used computers to communicate with family and friends. Both couples noted that their experience with technology or lack thereof influenced their ability to operate the device.

Limited research has evaluated the role of a partner (for example, spouse) when learning new skills, such as learning to use technology, among this age cohort. Aberton (2005) identified that social interaction and the development of a learning community were integral for older learners in a study involving older adults enrolled in a beginner computer class. Having peers who were 'just like them' demonstrated that computer-based skills inspired others in the group. As part of their assessment process, occupational therapists should consider their client's familiarity with technology as well as the context in which the technology will be used. For example, if an older client is expected to use a device in his or her home environment, inclusion of his or her spouse or caregiver in the training process should be considered. Using training strategies that incorporate others in the learning process (for example, paired learning) and are congruent with their skills and knowledge of technology may translate to improvements in performance and a more satisfying user experience.

Limitations of the study and directions for future research

The results of this study must be considered in light of a few limitations. The main effect of partner assistance may have failed to reach significance due to the size of the sample. However, given the purpose of the study, the small sample size enabled a more in-depth analysis of factors that can influence the use of technology in older adulthood. Future research will involve a larger sample in order to examine further the implications of paired learning and other training strategies on technology use in this growing population of users.

Volunteers for this study also identified themselves as healthy with no major conditions that impeded their participation, which may not be representative of the health status of those in this age group. Future studies will involve a more diverse sample in order to evaluate how changes in health status (for example, cognition and vision) could influence collaborative performance on shared tasks. For instance, consideration must be given to the potential safety implications associated with encouraging collaboration in certain performance contexts, such as driving. For the driver, dependency on a partner who experiences a health-related change (for example, dementia), or if he or she passes away, could have serious consequences on performance, thereby increasing crash risk. Future studies using a driving simulator will evaluate further how older drivers and copilots work together in a driving context and the effects of collaboration on performance. Such evaluations could inform potential training strategies that facilitate on-road safety, individually and collaboratively.

Conclusion

Using a cross-comparative case analysis, the results from this study highlight key transactions among person-environment-occupation factors that can influence collaboration amongst older married couples when using novel forms of technology. Both couples represent the range of exposure and experience with technology inherent to older users. In clinical practice, occupational therapists should consider this range when prescribing assistive technology and, in particular, use training strategies that match the skill level of older clients. Training strategies that accommodate the complex and diverse needs of this client population are likely to lead to improved performance outcomes.

As exemplified through this cross-case comparison, a transactional analysis of occupational performance can be used as a tool to highlight key issues that can impede or facilitate performance. The model proposed in Fig. 2 illustrates the multitude of factors that can influence adoption and collaborative use of new technology in older adulthood. The questions outlined in Fig. 3 provide a framework for therapists to guide their clinical decision-making when prescribing technology and associated training strategies to ensure congruency with the skills, abilities and occupational needs of their clients. Given the increasing role of technology in our day-to-day lives and the growing population of older adults who represent potential users, it is critical that occupational therapists consider the context in which technology will be used.

Key messages

- Clinicians should consider the influence of others, namely married partners, when prescribing technology to older clients.
- The Person-Environment-Occupation Model provides a framework for occupational therapists to ensure that technology prescribed and associated training strategies are congruent with the skills, needs and level of experience with technology of their clients.

What the study has added

A transactional perspective of occupational performance can be used to inform clinical decision-making when it comes to determining technology and associated training strategies that facilitate shared adoption and use of technology in older adulthood.

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