AN AGILE DEVELOPMENT CYCLE OF A WEB-BASED MEMORY

INTERVENTION PROGRAM FOR HEALTHY OLDER ADULTS

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Abstract

The Memory and Aging Program is an in-person psychoeducation intervention for healthy older adults provided at Baycrest Health Sciences. The program has been shown to significantly increase participants' memory knowledge, strategy use, and satisfaction with their memory, promote healthier lifestyle behaviors, and decrease intentions to seek unnecessary medical attention. To increase outreach, a web-based version of the program was created through an agile development cycle: an iterative process involving end-users' feedback. The current thesis outlines this process according to the four translational (T) phases of the Clinical and Translational Research Spectrum. First, an overview of the design phase (T1) is provided. In the T2 phase, 26 older adults participated in piloting of individual modules. Additionally, 20 older adults completed the program in its entirety from their homes (T3). Qualitative feedback, results of memory measures, lessons learned for tailoring the e-learning experience to older adults, and next steps (T4) are discussed.

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Memory and Aging

There is consensus in the extant literature that the normal aging trajectory is accompanied by changes in memory abilities. However, specific memory processes are differentially affected with age. *Semantic memory*, which refers to memory for factual knowledge, has been shown to remain stable with age, similar to other memory processes such as *procedural memory* (knowing *how* to do something) or *implicit memory* (outside of conscious awareness), which also remain stable (Churchill, Stanis, Press, Kushelev, & Greenough, 2003; Verhaeghen, 2003). In contrast, the memory processes that are more vulnerable to change and that have been shown to decline with normal aging are *episodic memory*, which refers to autobiographical recall or the memory for past events, *prospective memory*, which is remembering to do something in the future, and *working memory*, or the ability to hold information in one's mind and manipulate it (Ihle, Hering, Mahy, Bisiacchi, & Kliegel, 2013; Park et al., 2002).

Many older adults experience everyday changes stemming from one of these processes, such as forgetting where they put their keys, failing to remember to take their medication, or forgetting a name soon after hearing it. Although these examples likely represent normal age-related decline, for many, the prospect of cognitive impairment or noticeable changes remains troubling. The vast majority of seniors are worried about dementia, while only 11% of the Canadian population over 65 will become affected by a neurodegenerative disease (Meng & D'Arcy, 2014). Many of these individuals, referred to as the *worried well*, may seek consultations or investigations from a medical professional in fear that these changes may be early signs of pathological aging or neurodegenerative disease such as dementia (Vandermorris

et al., 2017; Wiegand, Troyer, Gojmerac, & Murphy, 2013). Though they may ultimately receive reassurance, the means towards this conclusion, which may include consultations with specialists, laboratory tests, neuropsychological assessments, and/or brain imaging, requires considerable healthcare resources and is worrisome and time-consuming for the individuals themselves and their families (Galvin & Sadowsky, 2012). Overall, experiencing normal-age related decline and feeling worried as a result can impact an individual's feelings and views of themselves, relationships and social interactions, work, and recreational activities (Parikh, Troyer, Maione, & Murphy, 2016). However, older adults that are experiencing cognitive changes are proactive in looking for ways to keep their "brain active" (Parikh, et al.).

Memory Intervention Programs

An increasing number of researchers have created training programs and interventions to target age-related memory decline. These programs range from multidisciplinary interventions to educational programs to cognitive training games; however, a common underlying drive for their creation is the idea that cognitive health across the lifespan can be mediated through negative and positive modifiable factors (Hertzog, Kramer, Wilson, & Lindenberger, 2009). These modifiable factors include direct training of cognitive processes and/or compensatory strategies, as well as a variety of lifestyle behaviors such as exercise, diet, and stress management. Intervention programs may be designed to have one of these factors as their active intervention or may incorporate these factors in a psychoeducational component of a program.

Depending on the goals of the intervention, one disadvantage of a multimodal intervention program is distinguishing the "active" ingredients, in essence, which aspect of the intervention was most responsible for meeting its goals or the benefits acquired by its participants. For this reason, some interventions focus on a specific type of strategy. For

instance, a meta-analysis of process-based interventions in executive functioning and working memory (targeted training or practice of tasks within those cognitive domains) revealed significant effects on the trained tasks, as well as on near-transfer tasks that involved the same cognitive processes but differed slightly from the tasks that were used for training in the intervention (Karbach & Verhaeghen, 2014). A potential limitation of such targeted intervention is that participants may not experience functional daily benefits of the program. In general, there is evidence of improvement on far-transfer tasks, that is tasks that require a different cognitive domain than the one originally trained. However, the improvements are smaller in magnitude than the ones seen with target and near-transfer tasks (Karbach & Verhaeghen, 2014). Although a recent systematic review of randomized control trials involving memory interventions that included memory strategy training (with or without other interventions) found that participants did report an improvement in their perceived memory abilities and strategy use, as well as improved positive affect that extended to quality of life (Hudes, Rich, Troyer, Yusupov, & Vandermorris, 2018). Therefore, such interventions can also influence the beliefs one holds about aging and memory; specifically, it has been shown that negative beliefs and feelings of low self-efficacy in regard to one's memory can impact objective memory performance as well as overall well-being and quality of life (Horton, Baker, & Deakin, 2007; Levy, 2003).

Modifiable lifestyle factors such as exercise, diet, and stress management are linked to overall cognitive functioning (Hertzog et al., 2009) and thus have been the focus of a variety of memory intervention programs. For instance, a review of exercise interventions on memory found that acute exercise (short bouts of activity) can prime the molecular processes necessary for memory formation, whereas long-term exercise regimes optimize the molecular underpinnings involved in memory processing (Roig, Nordbrandt, Geertsen, & Nielsen, 2013).

In regard to diet, a systematic review of 30 longer term diet interventions found that although outcomes varied, the domains of working memory, long-term memory, and attention appeared to be most sensitive to dietary manipulation (Attuquayefio, & Stevenson, 2015). The basis for such interventions is the idea that what is good for heart health is also good for brain health. Along with the body of research in animal models, there is emerging literature in humans that a diet high in saturated fats and refined carbohydrates can disrupt the hippocampal and prefrontal cortex brain regions that are responsible for various memory functions including working memory and long-term memory, as well as attention and inhibitory control (Francis & Stevenson, 2013). A similar premise underlies mindfulness-based interventions that promote more effective management of stress, as stress-induced elevations in cortisol negatively affect hippocampal regions necessary for learning and memory (Tarshish et. al., 1998). This is an emerging area for interventions; thus, limited research is available compared to other modalities of intervention. However, preliminary results suggest that memory, executive functioning, and processing speed improve following mindfulness-based interventions with older adults (Berk, van Boxtel, & van Os, 2017). The extant literature provides equivocal findings on the subjective emotional and physical well-being in older adults following mindfulness-based interventions (Geiger et. al., 2016). Nevertheless, chronic stress over the lifespan has been associated with faster cognitive decline in older adults (Wilson et al., 2005), and increased risk of developing late-life dementia (Wilson, Arnold, Schneider, Li, & Bennett, 2007).

The Memory and Aging Program. As reviewed above, research shows that single-focus interventions do provide specific benefits, yet no one intervention can be conclusively considered superior to others. A combination or multimodal intervention approach holds promise for broadening and enhancing its impact. One such intervention, which is the focus of the current

paper, is the Memory and Aging Program, a 5-week in-person psychoeducational intervention developed and offered for over 20 years at Baycrest Health Sciences, a global leader in geriatric research and care. Participants are healthy older adults who are concerned or would like to learn about optimizing their brain health and memory performance. Sessions are two hours long with a coffee break and are held on-site at Baycrest in a group format of 15–20 participants. Participants are provided with a *Participant Workbook* in which they are able to follow along with highlights from each session and have an organized place to complete homework assignments and take notes (Troyer & Vandermorris, 2012). The program is facilitated by a clinical neuropsychologist and is also available at other sites offered by trained facilitators. The program is offered four times a year at Baycrest.

As the program is largely focused on memory, participants learn about which brain areas are involved in memory processing, different types of memory, and which types of memory remain stable with age and which are more vulnerable to the aging process. With this knowledge, participants are able to better understand what changes are to be expected with the healthy aging process, and which signs are indicative of potential pathological aging (Troyer, 2001). The bulk of the program focuses on the teaching and application of evidence-based external and internal memory strategies to real-life scenarios.

Nevertheless, the program emphasizes a holistic learning approach including biological, psychological, social, and environmental determinants of cognitive health in older adults (Troyer, 2001). Through interactive presentations and discussions, participants learn about the various modifiable factors that were previously described and are encouraged to make positive changes in these areas. These include the effects of cognitive stimulation, exercise, diet, social engagement, medication use, and stress on memory and brain health. The program was designed

to present participants with scientifically based research on the topics in a clear and understandable manner. Another component to supplement the psychoeducation of stress is the teaching of formal relaxation techniques including deep breathing and visualization. These techniques are demonstrated and practiced in class, and participants are encouraged to continue their practice outside of the program. Finally, participants learn how to set effective goals that are specific, realistic, and time-limited and are asked to create a memory improvement plan at the completion of the program (Troyer & Vandermorris, 2017).

Empirical evidence for the Memory and Aging Program. Several studies have investigated the benefits of the Memory and Aging Program. In 2001, a pre- and postevaluation study demonstrated that the program significantly improved participants' knowledge about memory and memory strategies, as measured by a *Memory Knowledge Quiz* designed specifically for the program, and a questionnaire, the *Strategy Repertoire* that presented participants with six memory situations requiring the application of various memory strategies (Troyer, 2001). Results also indicated increased satisfaction and confidence with one's everyday memory functioning as measured by the Contentment and Ability domains of the self-reported *Multifactorial Memory Questionnaire (*MMQ; Troyer & Rich, 2002). The third domain, which assesses the frequency of memory strategy use (MMQ- Strategy), did not show a significant improvement following the intervention. Objective memory measures were also employed to assess everyday memory functioning; although a word list and name recall task did not show significant improvement, a measure of prospective memory in which participants were asked to telephone the program facilitator did show significant improvement before and after the Memory and Aging Program (Troyer, 2001). This study also compared change scores with a community-dwelling sample that served as the control group; the aforementioned significant results also

produced medium to large effect sizes when comparing the change score of the intervention participants to the community-dwelling sample who completed the evaluation measures but did not participate in the intervention.

One limitation of Troyer's (2001) study was the lack of randomization of participants to the experimental and control groups; therefore, a subsequent evaluation of the Memory and Aging Program employed a randomized control design (Wiegand et al., 2013). This trial produced similar results as participants in the intervention group had significantly increased memory knowledge and strategy use compared to the waitlist control group. Although participants reported increased memory satisfaction (MMQ- Contentment) and increased strategy use (MMQ- Strategy), there was no group difference in terms of memory confidence (MMQ- Ability). As in the Troyer (2001) study, objective memory, as measured by a face and name learning task, did not improve. The prospective telephone task, which improved previously, was not employed in the Wiegand et al. randomized control trial.

The randomized control trial also assessed healthy lifestyle changes targeting improved overall health or memory, as well as the intentions to seek medical attention pertaining to a memory concern with a modified self-report question from the *Intentions to Seek Care Questionnaire* (Wagner, Phillips, Radford, & Hornsby, 1995). The results demonstrated that 67% of the experimental group, compared to 24% of the control group, reported making at least one positive behavioral change within the domains of diet, exercise, relaxation, cognitive engagement and social activities (Wiegand et al., 2013). In addition, individuals in the experimental group indicated a significantly decreased intention to seek medical attention relative to the control group one month following completion of the Memory and Aging

Program. Because all participants were screened to ensure they had normal cognition, this finding can be interpreted as a decrease in intention to use unneeded care.

In order to gain an in-depth understanding of the therapeutic mechanisms and benefits of the Memory and Aging Program that were perhaps not captured by conventional questionnaires and objective outcome measures, semistructured interviews were conducted with participants following the program (Vandermorris et al., 2017). A qualitative content analysis revealed a general theme of normalization, or feeling more normal about the memory changes one was experiencing; before the program, almost all participants reported feelings of worry regarding their age-related memory changes. However, the Memory and Aging Program fostered a process of normalization that led to the understanding of normal changes, feelings of acceptance, and reduced anxiety (Vandermorris et al., 2017). The results suggested that this occurred as a result of a combination of learning from the facilitator, as well as learning from other group participants. Therefore, a therapeutic benefit was found on an emotional level, and this may in part be responsible for the finding that participants in the experimental group were less likely to seek unnecessary medical care in regard to their memory concerns from the previous randomized control trial (Wiegand et al., 2013).

This finding, along with informal feedback throughout the years of the program led to the development of a self-reported questionnaire to quantify one's feelings of normalcy following a group intervention (Tatham, Vandermorris, Shaikh, Troyer, & Rich, 2018). This questionnaire, the *Subjective Normalcy Inventory*, was in part validated by the finding that participants of the Memory and Aging Program reported a significantly greater sense of feeling normal following the completion of the program relative to community-dwelling older adults who did not participate in the program (Tatham et al.). Finally, additional findings from Vandermorris et al.'s

(2017) qualitative analysis revealed that participants felt more motivated to be proactive in their lifestyle choices, thereby extending the therapeutic benefits of the program to a functional level. This increased sense of motivation, paired with the knowledge gained of modifiable lifestyle factors, may be responsible for the greater implementation of healthy lifestyle choices in the experimental group compared to the control group (Wiegand et al., 2013).

To date, over 1,200 older adults have successfully completed the Memory and Aging Program, with nearly all participants reporting satisfaction with at least one of the goals they had set prior to their participation in the program (Troyer & Vandermorris, 2017). However, as with any in-person intervention, there are limitations. Specifically, participation may be restricted for some individuals because of obstacles that prevent them from traveling to Baycrest, such as physical disabilities, transportation impediments, scheduling difficulties, or living in remote areas. To overcome some of these limitations, and to increase reach of the empirically validated program, a viable option is to translate the program in to a web-based version accessible to individuals who have a computer or tablet plus internet access.

Computerized and Online Interventions

There is no debate that technology and the emergence of the internet have changed society's way of living in many domains, and health care is no exception. As of 2000, 52 million Americans turned to the internet in search of health care information (Fox et al., 2000). Specifically, one of the primary reasons older adults access the internet is in search of health-related resources (Morrell, 2005). Currently, the older adult population is one of the most quickly expanding online user groups (Nahm et al., 2011). In light of the aging population and limited medical resources, there is an increased demand for interventions that are an alternative to in-

person care and prove to be cost-effective, user-friendly, and can be flexibly accessed by the general population (Rebok et al., 2007).

A systematic review conducted by Kueider and colleagues (2012) concluded that healthy older adults were able to benefit from computer-based cognitive interventions. The criteria for study inclusion involved "classic cognitive training tasks;" therefore, the review only reported objective outcomes and found significant improvements in performance within the specified cognitive domains. Most of the reviewed studies noted that older adults do not have to be technologically savvy to participate and receive gains from the computerized interventions. In a more recent systematic review and meta-analysis of computerized cognitive training programs, there was a modest effect of such interventions on improving cognitive performance in healthy older adults (Lampit, Hallock, & Valenzuela, 2014). A notable finding was that interventions administered outside of a laboratory setting, in essence, in-home and unsupervised, as well as training that required participation more than three times per week were ineffective (Lampit et al., 2014).

Psychoeducational interventions, closer in line to the Memory and Aging Program, have also been created in the format of an e-learning program. One such example is "Keep your brain fit!" that was designed for middle-aged and older adults (Reijnders et al., 2017). The intervention comprised three modules: the first involved psychoeducation on lifestyle factors affecting cognitive functioning; the second was a memory module that educated participants on the causes of memory complaints, memory self-efficacy, and memory strategies; and the last module focused on providing tips for improving attention, planning, and working effectively. Participants were provided with options to read this information in text format, to watch a movie clip of the researcher, or both. Screening conducted prior to the start of the program was used to

personalize some of the information participants received in the modules that were relevant to their lifestyle. Upon completion, participants were able to save or print off a personal workbook that was assembled with all exercises completed throughout the intervention, as well as a summary of the modules (Reijnders et al.).

The randomized control trial found that the experimental group reported significantly greater feelings of stability with regards to their memory functioning as they age, felt more in control of their memory performance, reported fewer cognitive mistakes, felt less hindered by their mistakes, and felt less worried about their cognitive functioning and less afraid of neurodegenerative disease compared to the waitlisted control group. Similar to past evaluations of the Memory and Aging Program, Keep your brain fit! did not produce significant improvements on objective cognitive functioning (Reijnders et al., 2017). In addition, this program was completed individually, without the possibility to interact with other participants. It has yet to be determined whether computerized training that involves a group interactive component is more effective than individual administrations, as suggested by Rebok et al. (2007). However, as a target population for such interventions is those living in remote areas or who are restricted in mobility due to physical limitations, an important aspect to consider is the reduction of social isolation and loneliness which older adults are most vulnerable to experience and which can be detrimental to overall health and memory functioning (Wilson, Harris, Hollis, & Mohankumar, 2011). Internet use among older adults that leads to a sense of belonging to an online community is associated with overall feelings of well-being (Werner, Carlson, Jordan-Marsh, & Clark, 2011). For example, older adults can achieve a sense of belongingness through online platforms such as Facebook (Sinclair & Grieve, 2017). Furthermore, a systematic review

demonstrated that the programs that were most effective at preventing loneliness in older adults involved educational and social components (Cattan, White, Bond, & Learmouth, 2005).

The research discussed above suggests that older adults are able to learn and successfully use online platforms. Nevertheless, interventions should always be tailored to the needs of their intended user-groups (Licciardone, Smith-Barbaro, & Coleridge, 2001). It is therefore important to understand the needs of older adults in order to ensure the efficacy and clarity of content delivery and reduce technological frustration, thereby improving enjoyability and reducing the risk of attrition. Given the burgeoning evidence that older adults can benefit from online psychoeducation under certain circumstances, and the success of the in-person Memory and Aging Program, we aimed to develop its web-based version. The process of developing that program is laid out in the remainder of this paper.

Current Paper

The Harvard Clinical and Translational Science Centre outlines four Translational (T) phases of the Clinical and Translational Research Spectrum ("Clinical and Translational Research Spectrum," n.d.); these phases are the steps that are necessary to execute before an intervention becomes available to the general public. The purpose of the current paper is to describe the process of translating the in-person Memory and Aging Program to one that can be accessed remotely on a computer. First, an overview of the initial phase of design and development (T1) is provided, followed by a description and review of data collected in the subsequent phase that involved testing the intervention under controlled conditions (T2). In the third phase (T3), the program was tested for usability in real-world environments. Insights gained throughout the development process, and preliminary pre- and postoutcome measure data are presented and discussed. The piloting described below was authorized under the development

of technology mandate at Baycrest Health Sciences, and therefore did not require ethics approval. Once the web-based program was developed and in order to use the data for the current paper, an addendum was submitted to an existing ethics application investigating the effects of the Memory and Aging Program on positive behavior change and everyday remembering (see Appendix A for the addendum and its approval).

T1

The initial translation phase (T1) involves testing findings from previous research for applicability with an online medium. A multidisciplinary team of researchers and clinical neuropsychologists, including the creator of the in-person Memory and Aging Program, Dr. Angela Troyer, and e-learning design experts were assembled to begin the project. As the in-person Memory and Aging Program has demonstrated significant participant benefits across several research studies, it was decided that content would be mirrored in the web-based version (Troyer, 2001; Wiegand et al., 2013). In addition to the aforementioned findings of older adults' desire, capability, and success using online tools and interventions, the e-learning design team was consulted for their expertise, and it was concluded that this type of course content was a feasible option to be presented with an online medium to the intended user-group. Next, the materials available to the facilitators of the in-person program including the administration manual (Troyer & Vandermorris, 2013), and presentation slides, as well as the *Participant Workbook* (Troyer & Vandermorris, 2012), were provided to the e-learning designers. Within the e-learning design process itself, there are specific guidelines in place when creating a new e-learning program which were followed in the T1 phase of the web-based Memory and Aging Program. These are briefly outlined below.

1. *Action Mapping*: is the process that involved assigning roles within the e-learning team, discussing delivery method of material, and creating a timeline for task deadlines and future phase meetings.

2. *Storyboarding*: during this storyboard meeting, a complete storyboard template was presented, and all content was reviewed by the team. Next, design elements such as themes, color scheme, narration, and interactions were discussed and confirmed. A delivery date was set.

3. *Design and Development*: this process involved taking all information determined in the *Action Mapping* and *Storyboarding* stages and applying e-learning best practice guidelines to produce the e-learning course.

Preliminary version of the web-based Memory and Aging Program. The program was created on an online learning management system (LMS) called Moodle (Moodle, 2018), where all administration of the program takes place. It can be accessed from a participant's home as long as there is an internet connection. As there are many terms used in various fields of research, it is proposed that such a program best fits with the definition of a *web-based* intervention proposed by Barak, Klein, and Proudfoot (2009):

> … a primarily self-guided intervention program that is executed by means of a prescriptive online program operated through a website and used by consumers seeking health- and mental-health related assistance. The intervention program itself attempts to create positive change and or improve/enhance knowledge, awareness, and understanding via the provision of sound health-related material and use of interactive web-based components. (p. 2)

Such an intervention comprises four key components that are outlined below with regard to the intended specifics of the finalized version of the web-based Memory and Aging Program.

1. *Program Content*: the program content is the necessary foundation of the intervention, and there are two main types; content for education (memory knowledge, normal aging, lifestyle factors, etc.) as well as content intended to engender cognitive or behavioral change, which involves the memory and relaxation strategies as well as the goal-setting lesson (Barak et al., 2009).

2. *Multimedia*: the use of multimedia in web-based interventions creates a more dynamic experience that will likely be more engaging for the participants (Barak et al., 2009). The current version presents the information in a variety of formats. Some of these include videos recorded by the program facilitators, audio clips, presentation slides with interactive graphics, animated cartoon characters with dialogue, and an opportunity to follow along with a text transcript.

3. *Interactive Activities*: interactive components can make a web-based intervention feel more personalized, thus creating a sense of connectedness to the program and enhancing the understanding and applicability of content on an individual level (Barak et al., 2009). Therefore, a variety of such activities are incorporated in the program, such as live polls, games to review content, memory tests, and homework assignments to complete in the *Participant Workbook*. In light of the goal of reducing social isolation and the emergent theme of normalization that occurred in the in-person setting in part through group interaction and understanding that other older adults are experiencing the same changes (Vandermorris et. al., 2017), a group interactive component was included in the current

program. Participants complete the intervention with other healthy older adults around the world. At the start, participants are asked to introduce themselves with the option to upload a picture. Subsequently, they are encouraged to participate in discussion boards that are guided with open-ended questions and to comment on their experience with the program and the homework. As privacy of personal information is a significant concern for older adults, they are provided with the option of using a username as opposed to their real full names (Chang, McAllister, & McCaslin, 2015). They are also informed that their information will remain private within the program; however, other participants will have access to what they post, so it is up to participants' discretion when to disclose personal information.

4. *Guidance and Supportive Feedback*: such support can be generated automatically or through human interaction (Barak et al., 2009). Participants of the web-based Memory and Aging Program virtually meet the facilitator, Dr. Susan Vandermorris through the introduction videos of each module, and they are aware that they have access to a professional clinical neuropsychologist for any questions they may have. Questions may be posted in the discussion groups. Additional supportive feedback is provided intermittently through encouraging responses to posts participants have shared. Participants are also asked to choose three program-specific goals at the start of the program. At the end, they revisit these goals and assess their progress and satisfaction within the chosen areas.

Content is divided into eight modules and requires the completion of all tasks prior to the release of the next module. Each module takes approximately one hour to complete depending on the speed of the participant, not including homework completion. Participants are told to

complete the program at their own pace, but it is recommended to complete one or two modules per week. All modules were initially tested by the e-learning design team. See Table 1 for a brief description of each of the modules.

T2

This translational phase involves testing the web-based intervention under a controlled environment. The Waterfall Model for technology development was created in 1970. It is essentially a linear, inflexible approach that requires the completion of each phase prior to moving on to the next (Stoica, Ghilic-Micu, Mircea, & Uscatu, 2016). Although this has been the conventional methodology of choice, the agile development cycle is most appropriate when developing technology for a specific end-user population (Davis, 2013). The agile development cycle is an iterative process that involves the end-users' feedback during each phase with the option of returning to preceding phases to implement modifications (see Figure 1 for an illustration contrasting the Waterfall Model and the agile development cycle).

For the T2 phase, community-dwelling older adults and Baycrest volunteers (n = 22) were recruited through online advertisements (see Appendix B), and received an email confirmation with more detailed instructions (see Appendix C for script). Once participants arrived at Baycrest, they were asked to fill out a consent form in order to obtain their permission to audio record verbal feedback and take photographs as they engaged with the technology (see Appendix D). In small group sessions, older adults were invited to the computer lab in order to pilot three individual modules. Research assistants, as well as an e-learning designer observed the participants as they completed the modules and noted any possible areas that required modification. Participants filled out feedback questionnaires (See Appendix E) for each module indicating *yes* or *no* to the following statements: (a) *This is easy to use*, (b) *This is something I*

would use, and (c) *This is something I enjoy*. The questionnaire also allowed for general comments or suggestions for improvement. Participants were subsequently asked to participate in a focus group to provide open-ended feedback which was later transcribed and analyzed. Upon completion of the piloting, participants were reimbursed for parking or public transportation costs.

Additionally, older adults who previously completed the in-person Memory and Aging Program were also recruited to participate in the piloting sessions (n = 4). Participants completed the same protocol on-site at Baycrest, involving the completion of the feedback questionnaire and participation in the focus group. Such participants were able to offer a unique perspective on the web-based material, as they were able to directly compare it to their in-person experience. Each participant in the T2 piloting phase received a letter thanking them for their participation and indicating how it contributed to the project (see Appendix F).

T2 results. After each piloting session, data were gathered and summarized. Group meetings were held with the researchers and clinical neuropsychologists in order to interpret feedback and decide upon necessary modifications. This information was then provided to the e-learning design team, and the appropriate changes were made. Results from this phase of translation are outlined below.

Piloting of Modules 2, 3, and 5 (Understanding memory, modifiable lifestyle factors, and memory strategies). For the piloting of these modules, of the 15 community-dwelling older adults who were new to the Memory and Aging Program, 14 completed the feedback questionnaire. Responses revealed that all participants found at least one of the three modules easy to use, enjoyable, and something that they would use outside of the laboratory setting.

Seven of 14 participants reported such feelings about all three of the piloted modules. The module that involved an interactive component was reportedly enjoyed by all but one participant.

Feedback was reviewed, and several rounds of modifications were made. In general, there appeared to be difficulties with navigating the modules, as some procedures that may seem intuitive to an avid technology user were not obvious to the participants; some of these things included how to adjust the sound, pause the videos, select items, etc. To remedy these difficulties, it was decided that a navigation module would be created.

Piloting of Modules 4, 6, and 7 (Stress and relaxation, practicing memory strategies, and strategies overview). Information gained from the first series of piloting detailed above, was incorporated in the design of Modules 4, 6 and 7 prior to in-person piloting. Seven older adults participated in the piloting of these modules and responses revealed that all participants found at least one of the three modules easy to use, enjoyable, and something that they would use outside of the laboratory setting. Four participants endorsed these responses for all three piloted modules.

Piloting of Module 8 (Summary and wrap-up). Module 8 consists of a review game, final thoughts, and creating a plan for memory or health improvement (i.e., setting goals). These components were piloted by four graduates of the in-person Memory and Aging Program as they possessed the background information requisite to participate in the review game and provide meaningful feedback on the way the course content was summarized. With the exception of one participant who noted "maybe" in terms of enjoyment and using the review game in a real-life setting, all four participants reported that each of the three components was easy to use, enjoyable, and something that they would use outside of the laboratory setting.

Piloting of Module 1 (Navigating the LMS system). A video of the LMS screen with an overlay of a voice and drawings was created to provide a lesson on how to navigate the system and adjust settings. An example from each type of format was provided in the video (e.g., how to navigate discussion boards, how to watch a video, etc.). Six of the participants from the preceding module pilots, two of whom were graduates of the in-person Memory and Aging Program, also piloted Module 1. Written feedback revealed that this module presented too much information in a single video. What follows is some of the feedback offered by participants:

- "Spoke too quick. Point [cursor] moves too quickly. Description of spot on screen too short and unclear"

- "There is a lot of information given all at one time… If people are not computer savvy, the navigation will overwhelm them."

It was therefore decided that the navigation module would not be used in the final version of the web-based program.

Qualitative feedback. Overall, this phase of piloting was instrumental in discovering technological glitches, adjusting settings, and fine tuning the modules. Table 2 provides an overview of the areas in which modifications were made and samples of participants' written feedback from the questionnaire and/or verbal feedback shared in the focus groups. Table 3 provides a sample of some of the positive feedback in regard to specific components of the web-based program.

T3

This translational phase involves exploring how the intervention will work in real-life settings. Community-dwelling older adults (n = 18) around Canada were recruited through online mediums (see Appendix G for recruitment flyer) to participate in the web-based Memory and

Aging Program in its entirety from the comfort of their homes. Interested participants received an information sheet (see Appendix H) outlining the nature of the pilot and what it entails. Prior to the trial's commencement, the e-learning design team created online versions of (a) the questionnaires for program-specific goal setting (see Table 4 for an overview of the goals), (b) primary outcome measures that were administered in previous evaluations of the in-person Memory and Aging Program such as the *Strategy Repertoire* (See Appendix I), and (c) questions surrounding intentions to seek medical care and healthy lifestyle behavior change (Troyer, 2001; Wiegand et. al., 2013).

Additionally, in a phone interview, potential participants were administered the *Memory Knowledge Quiz* (See Appendix J; Troyer, 2001) and asked two questions about their computer use in order to gauge their suitability to participate. Participants were asked to choose the most suitable answer to the following statements:

1. *I use a computer* (options: *At least once a day, once every few days, once a week, or once a month or less*)

2. *I feel comfortable using a computer* (options: *I feel very comfortable, I feel comfortable, I feel somewhat comfortable, or I feel uncomfortable*).

In light of a recent study that found less frequent computer usage predicted attrition in initial phases of online studies (Rübsamen, Akmatov, Castell, Karch, & Mikolajczyk, 2017), and in the hope of mitigating participant distress during the early stages of piloting, participants were required to use a computer *at least once a day*, and to *feel comfortable* or *very comfortable* using a computer. Considering that participants enrolled in the pilot through online mediums, it is not surprising that there were no participants who provided an answer below those criteria for computer familiarity and comfort. All participant questions were answered, and next steps were

outlined in the phone interview. Participants were then emailed a link to begin the registration for the web-based Memory and Aging Program. Once registered, they were able to complete the pre-questionnaires, as well as watch the introduction videos.

During this phase of piloting, each module was released on a weekly basis so long as the participant had completed all tasks in the previous module. The research team was able to monitor the completion of individual items for each participant. Once it was apparent that participants had completed the program, they filled out the post-questionnaire online and completed a post-interview over the phone. During this call, they were administered the *Memory Knowledge Quiz* and were presented with their initial three program-specific goals that they were then asked to rate for achieved level of satisfaction. Additional feedback was solicited. If participants did not offer any, prompts such as "Do you have any suggestions for improvement?" and "Did you enjoy the program?" were included. Upon completion, all participants were emailed a letter thanking them for their participation and feedback (see Appendix K).

T3 results. Within this phase, two separate and sequential pilots were conducted each with a new group of recruited community-dwelling adults. The nature of the agile development cycle allowed for modifications of individual modules (i.e. returning to the T2 phase) subsequent to the feedback collected from the first live pilot and prior to the commencement of the second live pilot. Below is an overview of the data collected and alterations that were made to the web-based program.

First live pilot results. Twenty-two participants were recruited and completed the pre-intervention measures. Eleven participants completed all modules and the post-phone interview; 10 of these participants also completed the online post-questionnaires. Several areas of technical

difficulty including registration, password creation, and browser compatibility arose in this first live iteration that may have been responsible for the high rates of attrition.

Memory knowledge and strategy use. The participants (n = 11) who were administered the *Memory Knowledge Quiz* over the phone before and after completion of the web-based program significantly improved, $t(10)= 5.85$, $p < .01$. Each participant's score increased following the completion of the program (see Figure 2), and in order to gauge the meaningfulness of the change the effect size was calculated for pretest and posttest score change. According to Cohen (1988), a Cohen's *d* of .08 corresponds to a large effect size, as in the case of the current calculation in which $d = 1.76$. Ten participants completed the online version of the *Strategies Repertoire* questionnaire. This questionnaire provides participants with six scenarios, and they are asked to list potential memory strategies that can aid them during such situations. Each participant's responses were analyzed before and after the program. In the post-program responses, one participant applied three new memory strategies, 3 applied two new memory strategies, and 6 out of 10 participants listed the use of one new memory strategy. Therefore, all 10 participants learned at least one new memory strategy that they could apply in real-life scenarios (see Figure 3 for results from participants in the first and second live pilots combined).

Seeking medical attention and lifestyle behavior change. As a part of the online questionnaires, participants (n = 10) were asked a question about their intentions to seek medical attention and to rate their current intention on a 5-point Likert-type scale with options ranging from "definitely not" to "definitely yes." Seven of the participants indicated "definitely not" both before and after completing the web-based program, and 2 out of 10 indicated "likely not" before and after (i.e., no change). One participant was "undecided" prior to starting the program,

and "likely not" at post-test, suggesting that the program may have led to a decreased intention to seek medical care in regard to that participant's memory concerns.

Participants were also asked about their lifestyle behaviors with the following question: "Have you made any lifestyle changes **in the past month** that may improve your health and possibly memory (e.g., lower stress levels, use of relaxation techniques, improved diet or exercise, engagement in cognitively or socially engaging activities). Five out of 10 participants reported that they did not make any lifestyle changes in the past month prior to the commencement of the web-based program, and reported that they had made a lifestyle change following program completion. Two out of 10 participants indicated they had made a change within the last month both prior and upon completion of the program. Three participants reported before and after the program that they had not made a lifestyle change in the previous month.

General feedback. During the post-phone interview, general feedback was collected from participants. A consistent theme that emerged was the enjoyment of a variety of formats (i.e., videos, animations, games) in which the information was presented. Participants stated that this aided in sustaining their engagement throughout the modules. In regard to the interactive nature of the web-based program, participants added that they appreciated the use of real-world examples such as Canadian landmarks, as well as funny cartoon animations that depict common and relatable scenarios such as a gentleman unable to find the remote in time for *Wheel of Fortune*. Some participants also mentioned the usefulness of having a transcript of each slide in order to follow along with the audio component. Additionally, there was an emerging theme of feelings of normalization about one's memory, consistent with findings from the in-person Memory and Aging Program (Vandermorris et al., 2017).

Participants who experienced technical difficulties were able to email the project coordinator and receive support from the e-learning design department; thus, all areas of difficulty were systematically logged and subsequently fixed. There was no navigation module at this time, so many questions were navigational in nature. Additionally, within the feedback, participants indicated a need for more detailed instructions. It was thus decided that a *Frequently Asked Questions* (FAQ) document would be created with all of the areas of concern or difficulty that have been recorded. An outline of the program was also created in order to provide participants with an overview of what the program entails, and this was uploaded at the top of the LMS (see Appendix L).

For the homework assignments, individual exercise sheets were available for participants to print off and utilize (see Appendix M for an example). However, some participants reported that they did not have access to a printer. This is in line with the feedback from the T2 piloting involving the in-person Memory and Aging Program graduates who spoke about the utility of having a *Participant Workbook* in which they were able to complete their homework and have a summary of the lessons. They explained it gave them a sense of comfort due to the familiarity of having a tangible book and offered them a piece of memorabilia from the program that they could reread in the future as a refresher. Another area that participants endorsed was the need for fostering interaction among participants of the program. Although there were discussion boards, there was little back and forth conversation amongst participants.

Several iterations of modifications were made to the specific modules to fix reported technical difficulties. In order to increase participant interaction, it was decided that "coffee breaks" would be incorporated weekly. Essentially, this was a live chat room that would allow participants to check-in with each other and the facilitator. In preparation for the second live

pilot, the program overview was added to the interface along with the FAQ document. Recruited participants were also directly mailed a copy of the *Participant Workbook* through an order made with the publisher.

Participants of the in-person Memory and Aging Program are asked to fill out a feedback questionnaire about various aspects of their experience following completion of the program (Troyer & Vandermorris, 2017). The second live pilot was used to test a modified version of the feedback questionnaire based on the areas involved in a web-based program (see Appendix N).

Second live pilot results. As many changes were made between the first iteration and this one by reverting back to the T2 phase as per the agile development cycle, the goal of the second pilot was to ensure that the technical glitches were resolved and to obtain feedback regarding the addition of the *Participant Workbook* and the "coffee break" chat rooms. Eighteen participants were additionally recruited through word of mouth and by advertising (see Appendix G) to a pool of individuals who had completed the online Cogniciti cognitive assessment test (Troyer et al., 2014). Each of these participants was mailed a *Participant Workbook*. At the end of piloting, nine participants completed the web-based Memory and Aging Program as well as the post-phone interview for feedback collection. Additionally, seven of these participants completed the online version of the *Strategy Repertoire* questionnaire, which was administered to continue to monitor the benefits of the program content itself and participant engagement with material.

Overall, most participants were satisfied with the *Participant Workbook.* For example, one participant said, "I found the booklet useful, felt it did a very good job of introducing things and reinforced a lot of the online content." One participant mentioned that it was an unnecessary addition as the forms were also available on the LMS. Several participants suggested that there ought to be specific instructions within the web-based program to guide users to the book, such

as indicating which pages are associated with a certain module and where the homework page is located.

In general, participants did not utilize the "coffee break" chat rooms. There were several reported reasons such as technical glitches, lack of interest, and scheduling difficulties as the chosen afternoon time did not work for participants in different time zones. One participant suggested the following: "While the concept of the weekly Coffee Break sessions is a good one, I never did manage to participate. So I'm wondering if an interactive format that is not limited to a specific time frame might work better."

Similar to the themes from the in-person Memory and Aging Program, as well as the first live pilot, participants shared a sense of relief when learning about the normal age-related memory changes one is likely to experience. They also tended to feel more in control of their memory, with one participant answering in the feedback questionnaire that the best part of the program was "Motivating me to take charge and that I shouldn't be so quick to accept that losing some memory is unavoidable." Additionally, participants consistently attributed their enjoyment and engagement to the many types of formats, games, activities, and homework., For instance, one participant shared, "I enjoyed the different approaches taken to providing information- the variety kept it all interesting."

Lastly, the results of the pre and post *Strategy Repertoire* questionnaire indicated that all but one participant acquired and applied a new memory strategy; 3 out of 7 added three strategies, 2 out of 7 added two, and one participant added one new strategy (see Figure 3 for results from participants in the first and second live pilots combined). Across both live pilots, a general theme was the acquisition of internal strategies, such as the *Seeing and Saying* strategy in which an individual must visualize the task and say it aloud in order to bolster memory encoding.

For example, a common memory mistake is forgetting whether one turned off the stove before leaving the house. Applying the *Seeing and Saying* memory strategy would involve the individual paying close attention to their actions while saying aloud, "I am turning off the stove." This is in contrast to external strategies such as keeping a record book or agenda, that was most frequently listed by participants prior to completing the web-based program.

 Program-specific goal achievement. Similar to the in-person program, participants are asked to choose three program-specific goals that best align with their intentions for the program (see Table 4). During the post-phone interview, participants were reminded of their three chosen goals and asked to rate them on a 5-point satisfaction scale. Figure 4 provides an overview of participant satisfaction with individual goals. Across the two live pilots, a total of 20 participants provided a rating for their three goals (see Table 4 for the percentage of participants that selected each type of goal).

 Overall, all participants (n = 20) were at least "somewhat satisfied" with at least one of their chosen goals; 16 participants were at least "mostly satisfied" with at least one of their goals, and 7 participants were "completely satisfied" with at least one of their goals.

Final Iterations

 Based on the feedback collected throughout the agile development cycle, several final changes were made. Additional logged technical questions were added to the FAQ document (see Appendix O for the final version of the guide incorporating feedback from T2 and T3 piloting created by the e-learning design team). This document was added to the LMS, and it was decided that it would be mailed to participants given the appreciation for a tangible reference source for those who do not have a printer. Along with the FAQ document, participants will be

mailed the *Participant Workbook,* and more detailed instructions for which pages to reference were added to the interface.

Given the lack of participation in the "coffee break" chat rooms, these were removed. In order to encourage participant interaction, the discussion board questions were modified and made more open-ended in hopes of increasing the range of types of responses. It was further decided that there would be increased moderation within the discussion boards, as having encouraging feedback, inviting participant responses, and redirecting to the goal of the topic at hand can increase engagement and provide an organized structure (Cudney, & Weinert, 2000; Nahm et. al., 2011). This can also be an opportunity for the facilitating clinical neuropsychologist to share evidence-based information regarding memory and health, debunk any common misconceptions, and promote feelings of normalcy among participants.

In the case of attrition in the live pilots (T3 phase) reported above, several participants stated that they dropped out due to technical obstacles. Despite many of the areas being fixed between the first and second live pilots, the attrition rate remained at 50%. The modules were structured to release a module once a week, so long as the participant had completed the previous module. This resulted in a minimum requirement of 8 weeks of participation in the web-based program. Therefore, some participant feedback included confusion surrounding when the module would be released, as well as participants travelling without access to a computer. It logically follows that the longer the time period required for participation in a study, the higher the rate of attrition. Further, participants may lose interest if there is a long wait period before the next module is released. Therefore, it was decided to remove the weekly release structure and to give participants access to the next module after completion of the preceding activities. This can also allow for increased flexibility, less confusion of when the next module will be released, and the

opportunity to complete the program at the participant's desired pace. Retention of web-based delivered programs has been shown to increase with prompt responding to any questions (Nahm et. al., 2011). Thus, the top of the web-based Memory and Aging Program LMS was equipped with an email address and a note that a technical support agent will respond within one business day.

Discussion

The current paper described the agile development cycle of creating and piloting a web-based version of a memory intervention within the framework of the Clinical and Translational Research Spectrum ("Clinical and Translational Research Spectrum," n.d.). The piloting that occurred within T2 and T3 phases spanned over 2 years and involved the intended end-user, healthy older adults, within each iterative phase. The T2 phase tested the intervention under controlled conditions that took place in a computer laboratory at Baycrest Health Sciences. This phase proved instrumental for tailoring individual modules to the specific needs of older adults, such as adjusting volume, speech speed, and font size, as well as locating areas where prompts were needed to further guide and instruct users.

The T3 phase of testing the intervention under natural conditions involved participants completing the web-based program in its entirety from the comfort of their homes. The web-based program at this phase had had all of its individual modules piloted, and the participants completed the program along with pre and post questionnaires and phone interviews, as well as all components of the modules such as participating in discussion boards, activities, and homework assignments. The T3 phase functioned to understand responsiveness to larger concepts such as participant interaction and engagement level, and informed the use of supplemental materials such as the *Participant Workbook*. Both the T2 and T3 phases were

necessary to assess areas of technical difficulty, and the agile development cycle allowed for fluid modifications from the program as a whole to individual modules. All of the information and data systematically logged were used to produce a comprehensive FAQ document that will be mailed to participants at the onset of program registration. Preliminary outcome measure data collected within the T3 phase suggest that the web-based program may increase memory knowledge and memory strategy use. Overall, participant feedback has been positive; emerging themes indicate that participants enjoy the variety of formats and find the design to be user-friendly. Participants additionally endorsed feeling more normal about their memory changes than they did before completing the program and found the content of the web-based Memory and Aging Program applicable and helpful in their daily lives.

Attrition from the live pilots was expected, as research indicates that online interventions tend to have higher rates of attrition compared to in-person interventions (Eysenbach, 2005; Peels et al., 2012). Similar to other studies of online-delivered interventions, there was a decline in discussion board postings over time (Wu, Delgado, Costigan, Maciver, & Ross, 2005). High attrition rates may occur for a variety of reasons such as the fleeting or "surfing" culture of the internet (Ahern, 2007). It may be that participants feel a greater sense of responsibility or investment when participating in person as there is more rapport established between intervention facilitators and other group members. Eysenbach went as far as to say that attrition is "one of the fundamental characteristics and methodological challenges in the evaluation of eHealth applications" (p. 2). One proposed solution is to tailor the web-based intervention program to the needs of older adults, which was the purpose of the current agile development cycle (Ahern, 2007).

Limitations and Future Research

Although the recruitment material used in the T2 and T3 phases required participants to be over the age of 50, other demographic information was not systematically collected. Therefore, the community-dwelling older adults recruited for piloting may not be representative of the intended end-user group in terms of sex, education, and ethnicity, which is a potential limitation of the described agile development. Additionally, the Memory and Aging Program is intended for healthy older adults, and the current piloting did not employ any questions about cognition nor were participants administered any cognitive screening examinations.

Understanding the reasons for participant attrition in online or web-based interventions and being able to predict or control such attrition is an emerging area of research. The current cycle had a 50% attrition rate within each pilot of the T3 phase. Although data were logged for participants that explained why they would not be continuing, we did not reach out and inquire about the reasons for discontinuation for all participants in the current cycle. Thus, this is another area that future researchers may wish to approach more systematically, such as by sending out a feedback questionnaire designed to understand the reasons for discontinuing with the web-based program. Further, demographic information can be used to understand group differences between individuals who drop out and those who complete the online study or web-based intervention.

Clinical Implications

The T4 translation research phase involves the investigation of study and intervention factors that influence the health of the population. The current paper described T1, T2, and T3 phases that were necessary to execute prior to T4 translational research. In the next phase, a randomized control trial of the web-based Memory and Aging Program will investigate whether this intervention yields similar positive outcomes as those evidenced in program evaluations of the in-person program. Participants will be recruited through online advertisements and

randomized into an immediate intervention group or a waitlist control. Similar to the T3 protocol, as all measures will be administered online or over the phone there are no geographic exclusions from where participants may be recruited.

The goal of T4 translation research is to improve global health. Depending on the results of this randomized control trial, the web-based Memory and Aging Program can be made available to the general public. It thus has the potential to mitigate memory concerns that are understandably worrisome for individuals, and may deter them from seeking unnecessary medical services that are lengthy, resource-intensive, and time consuming, which can prolong the time until they are provided with reassurance, thus exacerbating their stress. Given the benefits shown thus far, the web-based Memory and Aging Program has the potential to be a viable option for exponentially increasing the reach and number of older adults who can gain memory knowledge, learn memory strategies, make healthier lifestyle choices, and feel more confident and in control of their memory performance (Troyer, 2001; Vandermorris et al., 2017; Wiegand et al., 2013).

Conclusion

As the Canadian population is aging, the vast majority of healthy older adults will experience age-related memory decline. Though in-person interventions have shown a variety of benefits, they are limited to individuals within a restricted geographic location who are available at the scheduled times of the intervention and are physically able to attend. A solution to these limitations is to develop web-based interventions that participants may flexibly access from their own homes. The current paper highlights the value of tailoring the program to the end-user group and the utility of adopting the method of an agile development cycle, an iterative design process that does not place restraints in which stages modifications can be made. Such a process of

developing and piloting a web-based memory intervention program involves a multidisciplinary team of researchers, clinical neuropsychologists, and e-learning designers who are sensitive and empathic to the needs of the older adult population. Adapting the agile development cycle as a multidisciplinary team ensured that the web-based program was user-friendly and enjoyable to use. Participants of the program showed targeted benefits including increased memory knowledge and memory strategies, adaptation of healthier lifestyle behaviors, feelings of normalization about their memory, and overall satisfaction with their program-specific goals. These results demonstrate promise that the web-based version can produce similar outcomes as the in-person Memory and Aging Program.

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    promotion planning for older adults at risk of social isolation. *International Journal of

    Older People Nursing, 6*(4), 282-288.

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    patient-physician communication tool for heart failure disease management. *Journal of

    Medical Internet Research, 7*(1), e8.

Table 1

Description of Individual Modules Within the Web-Based Memory and Aging Program

	Module Description
Module 1	Navigating the LMS system
Module 2	Understanding what memory is, what brain regions are involved in memory, types of memory processes, learning about normal and abnormal memory changes
Module 3	Learning about biopsychosocial modifiable lifestyle factors affecting aging and memory
Module 4	Understanding the effect of stress on memory and health and learning relaxation techniques
Module 5	Learning about the rationale, procedures, and evidence supporting memory strategies
Module 6	Continue practicing a variety of evidence-based memory strategies
Module 7	Revisiting strategies with a helpful acronym and learning how to set effective goals
Module 8	Engaging in a review game, goal setting, sharing final thoughts, and providing feedback to the facilitator

Table 2

Overview of T2 Feedback and Areas of Modification

Area of Modification	Participant Feedback
Removed background music and excessive sound effects	"Don't like music, too loud. Hard to hear dialogue."[a]
Adjusted speed and volume of speech	"The commentary is too fast" "Speed made this a little harder"
Increased font size and adjusted visuals	"Progress bar should be a color - not white on white." *Font size is too small in certain slides*[ab]
Removed technical glitches and spelling errors	"Slight hang up before poll results opened" "Typo in slides - "any""
Removed all double-clicking	*It is difficult to double-click fast enough to initiate the command*
Located areas to include prompts on how to proceed or additional instructions	"No suggestion to "click next"" "You should be prompted to click on "Next"" "At the end no indication on how to proceed" "Clear indication of end of a section would be helpful" ""Type your answers in space provided" you must click in text box to start." (Including instructions to "click here in order to type.")
Formatted and modified activities	"Not enough space to complete answers" "Would be a good idea to see the results of all questions… and maybe try to do all exercises again." *I would like the opportunity to replay the review game to improve my score.* *The tone you hear when you make a mistake in the game is too discouraging*
Informed the need for supplemental materials	"The directions were easy to follow, but I would need either a written manual or be able to access the directions in the days to follow." *I don't have a printer at home, so I would not be able to print out the materials.*

[a]Feedback in quotations are extracted from the written feedback questions.
[ab]Information written in italics are gist themes reported from the audio-recorded focus group discussions.

Table 3

Sample of Positive T2 Comments from Feedback Questionnaires

Area	Participant Feedback
Interactive practice activity in Modules 6 and 7	"It solicited voice response from me!" "Excellent, engaging, funny, no "TMI" effect" "This module works well. Interactive and fun. Nice customization. Well done." "It is very helpful and I enjoyed it."
Stress and Relaxation (Module 4)	"The breathing exercise works for me, it relaxes me completely." "Little to improve. Excellent module." "Relaxation is similar to the yoga pose shavasana (as it is in Western practice). I will take those techniques home :). Also good info about the brain."
Memory strategies overview Module 8	"SHARP [acronym provided to aid in remembering all the memory strategies] is easy to remember and useful tool." "Very well laid out." "Good practice run for refresher of what I learned in the program."

Table 4
Overview of Program-Specific Goals from T3 Piloting

Goal	% of participants who selected goal
1. Understand how memory changes with age.	42.1
2. Feel more reassured that my memory mistakes are normal.	21.1
3. Have learned from my peers by sharing experiences with them.	5.3
4. Have a better general understanding about memory.	31.6
5. Feel more confident about my memory.	36.8
6. Feel less stressed and worried about my memory.	5.3
7. Know the latest research findings on memory and aging.	47.4
8. Understand how different medical conditions may affect my memory.	5.3
9. Understand how lifestyle factors such as diet, exercise, and cognitive (thinking) activities can affect my memory.	47.4
10. Understand how stress can affect my memory.	5.3
11. Use strategies to remember where I put things.	10.5
12. Use strategies to remember things that I need to do.	15.8
13. Use strategies to remember names.	15.8
14. Use strategies to remember dates.	0
15. Use strategies to remember facts.	10.53
16. Use strategies to remember recent events.	0

Note. N = 19. One participant who selected all the goals (despite instructions to select only 3) is not included here.
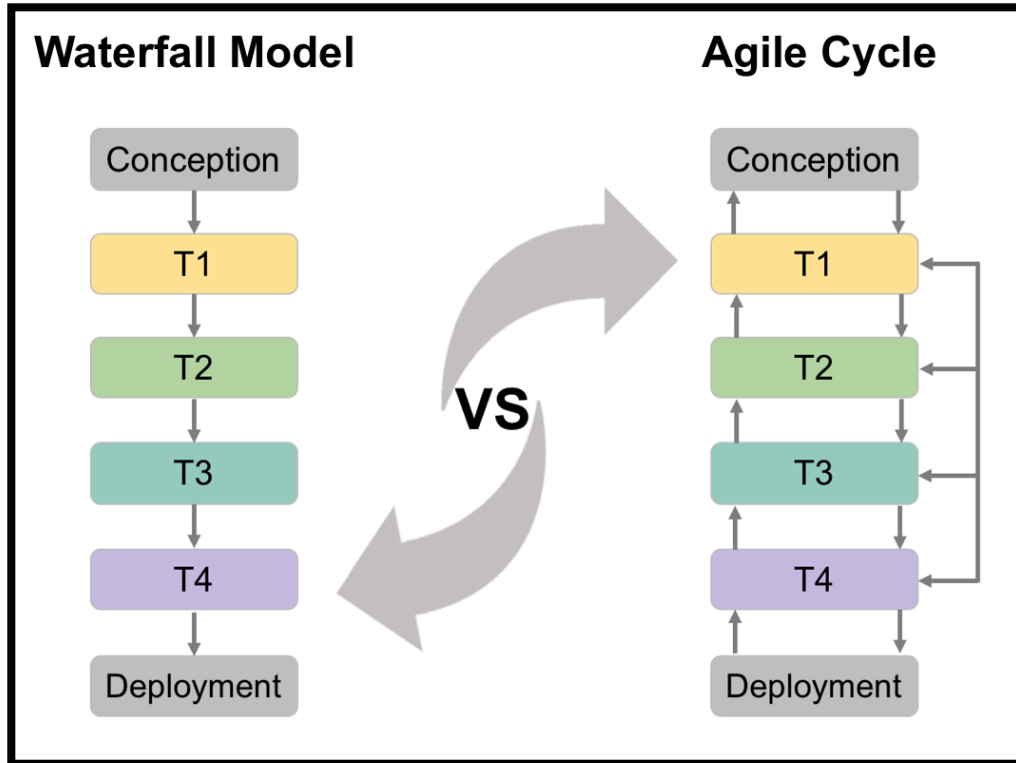
Figure 1. Illustration of the traditional Waterfall Model in contrast to the agile development cycle demonstrating the fluid capability to return to preceding phases of testing and development.
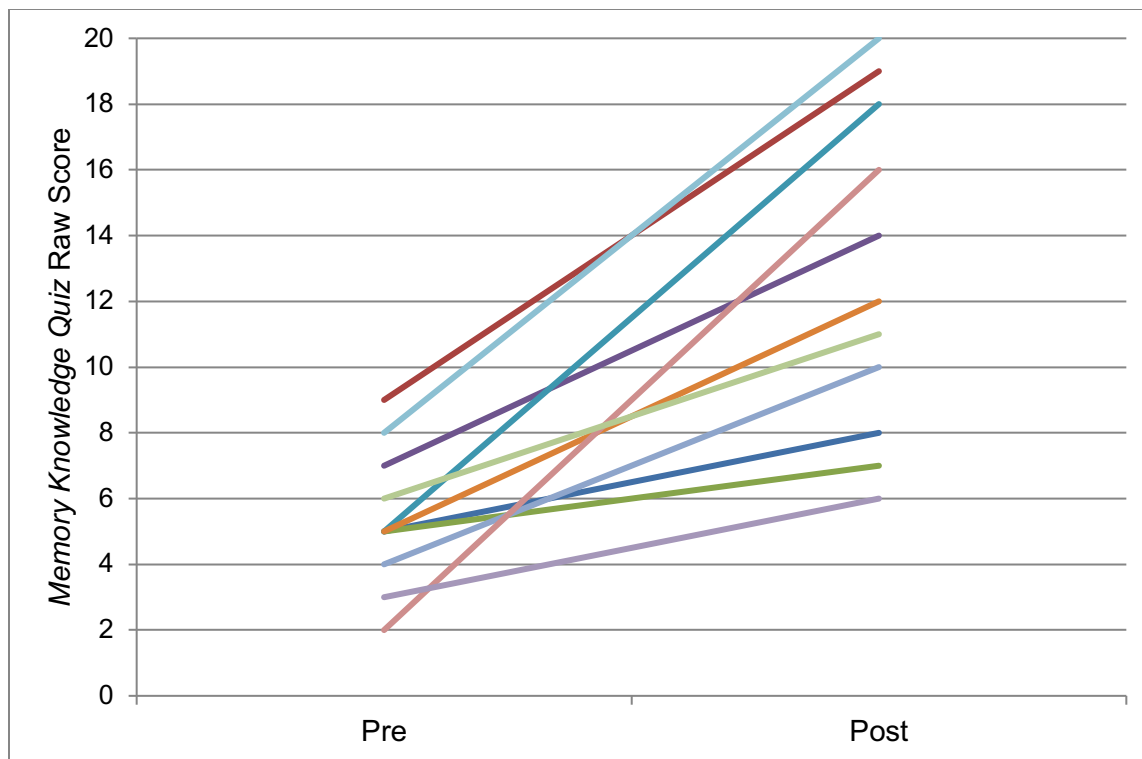
Figure 2. N = 11. Pretest and posttest individual participant scores on the *Memory Knowledge Quiz* during the first live pilot results in T3 (maximum possible score = 20).
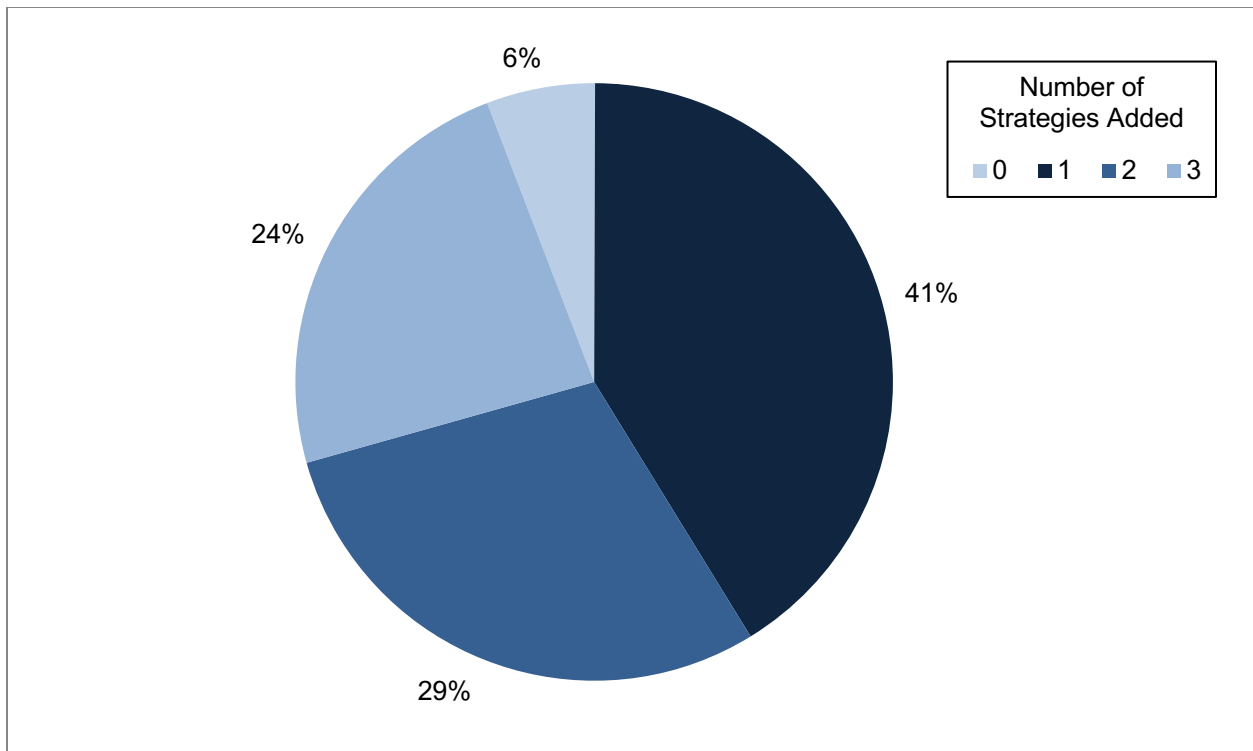
Figure 3. N = 17. Percentage of participants who added a new memory strategy after completion of the web-based Memory and Aging Program across both live pilots in T3 (as measured by the *Strategy Repertoire;* Troyer, 2001).
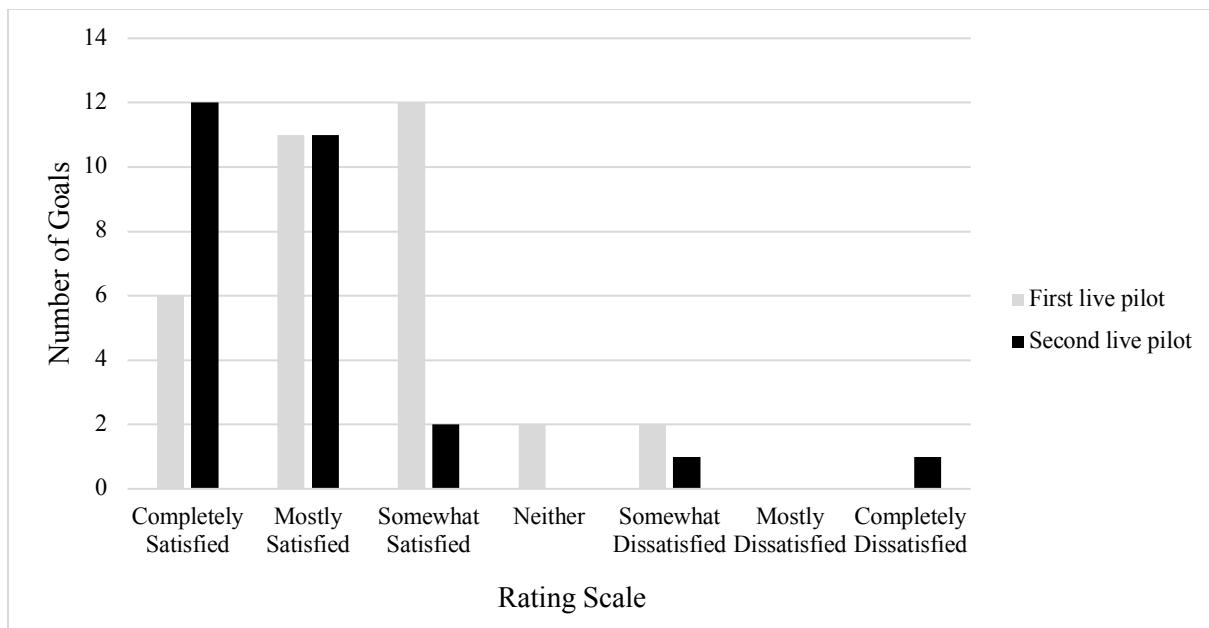
Figure 4. Program-specific individual goal satisfaction ratings from T3 piloting.

Appendix A

Ethics Addendum and Approval Forms

Baycrest Enriching Care
Enhancing Knowledge
Enlightening Minds

**Baycrest Research Ethics Board
Amendment Form**

Do not leave any box blank. Indicate "not applicable" by typing N/A. Submit typed, hard copy of this form with original signature to the REB office for review. See the Guidelines for Submitting Amendment and/or Administrative Change for more information.

Study Identification	
Principal Investigator: **Dr. Susan Vandermorris**	REB Number: **REB# 14-20**

Study Title:
Exploring the impact of a memory intervention on positive behavior change and improved everyday remembering

Sponsor: **N/A**	
Department/Division: **Neuropsychology and Cognitive Health Program**	Telephone: ▓▓▓▓▓▓
Fax:	Email: ▓▓▓▓▓▓
Name of Person Completing Form: **As above**	Telephone:
Fax:	Email:

Amendment Review Information	

Indicate type of change: ☑ **Amendment**   ☐ Administrative Change

Has this amendment already been implemented to eliminate an immediate hazard?   ☐ Yes   ☑ **No**

This request will be expedited unless the Chair determines that it is necessary to go to the full REB for review.

Indicate documents submitted with this form:
Note: (1) The date (mm/dd/yyyy) and Version # must be on every page of all documents. Revisions will not be accepted without dates and version numbers. (2) If you have made changes to the informed consent form (ICF) since its last REB approval, you must provide details and/or the rational for the changes in the "Amendment Detail" box below as well as highlight the changes (bold, underline or track-it) on the ICF form.

☐ Version #: Date: Version:	☐ Recruitment Tools (advertisements, websites, letter of introduction etc.)

☑ **Revised Protocol**
    Date: January 22, 2018   Version: 2
	☐ **Informed Consent Form(s)**
	    Date: Version:

☑ **Documentation summarizing rationale and change(s)** Date: ☐ Attached ☑ See page 2	☑ Questionnaires, Surveys, Interview Scripts, Diaries, etc. **Patient-Specific Functional Scale**

☐ Informed Consent Form for Normal/Control Study Subject Consent Form(s)
    Date: Version:
	☐ Investigator's Brochure
	    Date: Version:

☐ Addendum to Consent Form(s) Date: Version:	☐ Communication Tools (newsletters, medication instructions, etc.)
☐ Assent Form(s) **(used where subject is unable to consent; documentation is required to indicate his/her assent)** Date: Version:	☐ Other

Baycrest
Enriching Care
Enhancing Knowledge
Enlightening Minds

Baycrest Research Ethics Board
Amendment Form

Do not leave any box blank. Indicate "not applicable" by typing N/A. Submit typed, hard copy of this form with original signature to the REB office for review. See the Guidelines for Submitting Amendment and/or Administrative Change for more information.

Study Identification	
Principal Investigator: ██████████	REB Number: **REB# 14-20**

Study Title:
Exploring the impact of a memory intervention on positive behavior change and improved everyday remembering
Sponsor: **N/A**

Department/Division: **Neuropsychology and Cognitive Health Program**	Telephone: ██████████
Fax:	Email: ██████████

Name of Person Completing Form: **As above**	Telephone:
Fax:	Email:

Amendment Review Information	

Indicate type of change: ☑ **Amendment**   ☐ Administrative Change

Has this amendment already been implemented to eliminate an immediate hazard?   ☐ Yes   ☑ **No**

This request will be expedited unless the Chair determines that it is necessary to go to the full REB for review.

Indicate documents submitted with this form:
Note: (1) The date (mm/dd/yyyy) and Version # must be on every page of all documents. Revisions will not be accepted without dates and version numbers. (2) If you have made changes to the informed consent form (ICF) since its last REB approval, you must provide details and/or the rational for the changes in the "Amendment Detail" box below as well as highlight the changes (bold, underline or track-it) on the ICF form.

☐ Version #: Date: Version:	☐ Recruitment Tools (advertisements, websites, letter of introduction etc.)
☑ **Revised Protocol** Date: January 22, 2018 Version: 2	☐ **Informed Consent Form(s)** Date: Version:
☑ **Documentation summarizing rationale and change(s)** Date: ☐ Attached ☑ See page 2	☑ Questionnaires, Surveys, Interview Scripts, Diaries, etc. **Patient-Specific Functional Scale**
☐ Informed Consent Form for Normal/Control Study Subject Consent Form(s) Date: Version:	☐ Investigator's Brochure Date: Version:
☐ Addendum to Consent Form(s) Date: Version:	☐ Communication Tools (newsletters, medication instructions, etc.)
☐ Assent Form(s) **(used where subject is unable to consent; documentation is required to indicate his/her assent)** Date: Version:	☐ Other

Amendment Details

1. Provide justification/rationale for the change(s) and identify any change(s) made on the attached documents (e.g. flyer, informed consent form.

The proposed amendment seeks to update the chart review protocol to include: (a) one additional measure of client goal attainment and (b) broaden the study population to include those who participated in development of an online adaptation of this clinical program.

In addition, we would like to add co-investigators: Dr. Jill Rich (faculty at York University and Baycrest visiting scientist) & Iris Yusupov (graduate student) and Anthony Fallico (undergraduate honor's student)

2. If study subjects need to be informed of changes related to the amendment, describe how and when study subjects will be informed.

N/A

3. Provide the following information if study involves investigational drugs or devices.
   ☑ Not Applicable

   a) Does this study involve any of the following (check all that apply):
   ☐ Investigational new drugs
   ☐ Investigational biologics
   ☐ Investigational natural health products (NHP)
   ☐ Investigational medical devices
   ☐ Approved drug for a new indication (e.g., new age-group, disease entity)

   b) If the amendment involves any of the above:
   Is a "No objection" or authorization letter from Health Canada attached?   ☐ Yes   ☐ No

   If no, has, or will, a Clinical Trial Application (CTA) been submitted to Health Canada?   ☐ Yes ☐ No

   If pending, provide date of submission:
   Health Canada "No objection" file number:
   If "No objection" letter or authorization is pending, forward approval letter to the REB office as soon as it is available.

   c) Provide FDA IND number (drug studies) or PMA number (device studies):
   ☐ Not Applicable
   ☐ Pending (if pending, forward to the REB office when available)

Notification of REB Continued Approval

Date: **February 20, 2018**

To: **Vandermorris, S., Troyer, A., Davidson, S., Fallah, S., Au, A.**

Re: **Exploring the impact of a memory intervention on positive behavior change and improved everyday remembering (REB# 14-20)**

REB Review Type: **Annual**
REB Initial Approval Date: **March 20, 2014**
REB Expiry Date: **March 20, 2019**
Consent Form(s) Currently Approved for Use: Annual Review Form

---

The above-named study has received continued approval from the Baycrest Research Ethics Board (REB) until the expiry date noted above. If the study is expected to continue beyond the expiry date, you are responsible for ensuring the study receives re-approval. The REB must also be notified of the completion or termination of this study and a final report provided.

If, during the course of the research, there are any serious adverse events, confidentiality concerns, changes in the approved project, or any new information that must be considered with respect to the project, these should be brought to the immediate attention of the REB. In the event of a privacy breach, you are responsible for reporting the breach to the Baycrest REB and the Baycrest Privacy Office (in accordance with Ontario health privacy legislation – Personal Health Information Protection Act, 2004). Additionally, the Baycrest REB requires reports of inappropriate/unauthorized use of the information. As the Principal Investigator, you are responsible for the ethical conduct of this study.

The Baycrest Research Ethics Board operates in compliance with the Tri-Council Policy Statement, ICH/GCP Guidelines, the Ontario Personal Health Information Protection Act (2004), and Part C, Division 5 of the Food and Drug Regulations of Health Canada.

Appendix B

Online Advertisement for Participant Recruitment During T2 Piloting

Memory and Aging

Seeking volunteers who are comfortable using computers and interested in memory, aging, and brain health.

Baycrest is developing an internet-based brain health workshop based on our in-person Memory and Aging Program (www.baycrest.org/memory). We would like your feedback to ensure that this online workshop is user-friendly and provides useful information about how memory changes with age and how to optimize brain health.

We are presently recruiting volunteers for a small group meeting on **Friday July 22 from 10-12pm**. This will take place at Baycrest (3560 Bathurst St., Toronto). During the meeting, you would be asked to try out a few different pieces of technology and offer your feedback on each tool. To help us capture all viewpoints accurately, we would ask your permission to videorecord the session. We will reimburse your parking or TTC expenses and provide light refreshments.

In future, we will also be seeking volunteers to try out the program from their own computers, at home, and provide feedback on their experience. Please let us know if you'd like to be contacted for this purpose.

For more information contact
Iris Yusupov, graduate student
Phone:
Email:

Appendix C

Example of Email Confirmation for T2 Piloting

Dear…

Thank you for volunteering to participate in a small group meeting on learning and technology. As we discussed by telephone, Baycrest is developing a computer version of a brain health workshop called the Memory and Aging Program, and we would like your ideas and feedback to ensure that this tool is user-friendly and provides useful information regarding how memory changes with age and how to optimize brain health.

The meeting will be held on Friday July 22 from 10am - 12pm on the 5th floor of the Kimel Family Building (a volunteer will meet you outside the elevator). We will reimburse your parking or TTC expenses and provide light refreshments. During the session, you will be asked to try out a few different pieces of technology and offer your feedback on the experience.

As a conversation starter, we would also ask you to think about (and bring in, if possible) a piece of technology that you love, and one that you've abandoned. When we say "technology" we are thinking broadly here – anything from smartphones to paper and pencil; any tool you use to do things you want to do.

We suggest that you bring a pair of headphones that you feel comfortable using. If you do not own any, not to worry, a pair will be provided to you.

If you have any questions leading up to the session, please email me at ████████████████ or leave me a message with ████████████████████████

Thank you again and I look forward to seeing you tomorrow.

Iris

Iris Yusupov
Graduate student
Neuropsychology and Cognitive Health Program
Baycrest

Appendix D

Consent Form for Video/ Photography/Audio Recording of T2 Focus Group

Baycrest

CONSENT FORM FOR
VIDEOTAPING/PHOTOGRAPHY/AUDIORECORDING

Event: Memory and Aging Program online group feedback pilot session
Date: Friday July 22, 2016

This is to certify that I, _____ (name),
hereby   consent   to   have   Memory   and   Aging   Program   staff
videotape/photograph/audiorecord me for the purpose of program evaluation and
education.

_____

Participant Signature

_____   July 22, 2016
                    Witness   Date

Appendix E

Feedback Questionnaire Form for T2 Piloting

Memory and Aging Program Online

We will ask you to try three segments from a computer version of the Memory and Aging Program. Please fill out the following questions after each section. Later, we will come together as a group to discuss your reactions and thoughts.

Activity 1 – What is memory?

This is easy to use   yes/no

This is something I would use   yes/no

This is something I enjoy   yes/no

Comments? (e.g., what works for you, what could be improved, etc.)

_____

Activity 2 – Lifestyle factors that affect memory (videos)

This is easy to use   yes/no

This is something I would use   yes/no

This is something I enjoy   yes/no

Comments? (e.g., what works for you, what could be improved, etc.)

_____

Activity 3 – Practice retrieval (name learning exercise)

This is easy to use   yes/no

This is something I would use   yes/no

This is something I enjoy   yes/no

Comments? (e.g., what works for you, what could be improved, etc.)

_____

Appendix F

"Thank You" Letter for T2 Pilot Participants

THANK YOU FOR YOUR PARTICIPATION!

Your participation in this project involved being one of the first to test our newly developed online version of the Memory and Aging Program and providing us with valuable feedback.

The session in which you just participated will help us better understand how to tailor the eLearning experience to the needs of our future users. More specifically, we wish to ensure that the program is user-friendly, informative, and ultimately enjoyable to use. Our long-term goal is to determine whether the online program will be able to achieve similar success as the in-person Memory and Aging Program, in terms of increased knowledge about memory itself and memory strategies, improved self-reports regarding confidence and satisfaction with one's memory, adaptation of a healthier lifestyle, and even improved objective memory performance.

The important insights we have gained would not be possible without the contributions of time and energy from volunteers such as yourself. We would like to take this opportunity to say one more "thank you" for your generosity and participation.

If you would like an update on the study progress, or have any questions about your participation, please feel free to contact the principal researcher, Dr. Angie Troyer at ▉▉▉▉▉▉▉▉▉▉▉▉

Appendix G

Online Advertisement for Participant Recruitment During T3 Piloting

Memory and Aging

Seeking volunteers interested in memory, aging, and brain health.

Baycrest is developing an internet-based brain health workshop based on our in-person **Memory and Aging Program (www.baycrest.org/memory).**

The program consists of weekly modules that present information in a variety of forms including videos, animations, games and interactive discussion boards.

We are presently recruiting volunteers to be the first to pilot test the program from the comfort of their homes starting mid-January.

You will be asked to:

- Participate in the online Memory and Aging Program
- Complete a set of questionnaires online (before and after)
- Participate in discussion boards and chats with other volunteers doing the program
- Give us your honest feedback!

If you are 50 years old and older, have to access and feel comfortable using a computer, and would like to learn about how memory changes with age and how to optimize brain health, please email Iris at ▉▉▉▉▉▉▉▉▉▉▉▉▉ for more information.

Appendix H

Initial Information Form for T3 Pilot Participants

Thank you for agreeing to participate in a pilot of the online Memory and Aging Program!

The online version of the Memory and Aging Program is based on the in-person program, which is an education and intervention program that is offered several times a year at Baycrest (www.baycrest.org/memory).

The online version of the program covers the same material as the in-person program, but you can access the material from your own home and go through it at your own pace. The program modules include videos, slides, activities, memory exercises, discussion boards, and small homework assignments.

What you will be asked to do:
1. Complete a **10-minute** initial phone interview.
2. Complete a set of questionnaires online. This will take about **20 minutes**.
3. Participate in the online Memory and Aging Program. You will complete one module each week, and it will take approximately **8 weeks** to complete the program.
4. Complete a set of questionnaires (**20 minutes**) at the end of the program.
5. Complete a **10-minute** final phone interview.

Other things you should know:
The Memory and Aging Program that you will be given free access to has been designed to provide education about memory and how it changes with normal aging. You will receive training in the use of practical memory strategies, and will learn about ways to make healthy lifestyle behavior changes. In the future, this program will be made available to the general public for a fee. Your involvement in the current pilot will help us better understand how the Memory and Aging Program can make a difference in the lives of older adults.

Your participation is completely voluntary. You are free to leave the pilot at any time.

If you agree to join this pilot, we will collect data from the questionnaires and tasks you complete. **Once your data are entered in a dataset, it will be identified with a participant number only and will never be identified by name.** The information that is collected will be kept secure, and only the pilot team will have access to the data.

If you have any questions:
This project is a collaboration between Baycrest, Canadian Centre for Aging and Brain Health Innovation, and York University. If you have any questions, concerns or would like to speak to the pilot team for any reason, please contact Iris Yusupov at ███████████████████ or the project lead Dr. Angela Troyer at ███████████████████████████

Appendix I

Strategy Repertoire Questionnaire

ID Number: _____   Date: _____

Memory Situations

Below are several different situations that involve memory. After each situation, briefly list the things <u>you should do</u> to improve your ability to remember. Then circle any things you have listed that you <u>actually do</u>.

1. You made arrangements to meet a friend. You want to be sure you remember to meet him or her.

_____

_____

_____

_____

_____

_____

2. A family member or friend has moved. You want to remember his or her new phone number.

_____

_____

_____

_____

_____

_____

3. There are a number of things that you need to remember to do today.

_____

_____

_____

_____

_____

_____

4. You have met someone new, and you want to remember his or her name.

_____

_____

_____

_____

_____

_____

5. You frequently lose your keys or your wallet because you can't remember where you put them.

_____

_____

_____

_____

_____

_____

6. You want to remember details about things that you have done, such as trips you have taken or books you have read.

_____

_____

_____

_____

_____

_____

Appendix J

Memory Knowledge Quiz

ID Number : _____   Date: _____

Memory knowledge quiz

1. What are the three stages (or processes) that need to occur in order for a person to learn and remember something?

   _____   _____   _____

2. If you named three memory processes, which process is affected most by normal aging?

   _____

3. Name six **types** of memory. These refer to the kinds of information that are remembered:

   _____   _____   _____

   _____   _____   _____

4. There are a number of different **lifestyle** and **medical** factors that can affect memory, either positively or negatively. Name five lifestyle or medical factors that can affect memory. Do not include memory strategies.

   _____   _____   _____

   _____   _____

5. Name five memory **strategies** (i.e., strategies that help you to remember information). (hint: **SHARP**)

   _____   _____   _____

   _____   _____

6. Name two brain structures that are important for learning and memory.

    _____   _____

7. What is the name of the hormone that is released in response to stress?

    _____

8. Name two types of formal relaxation techniques.

    _____   _____

Appendix K

"Thank You" Letter for T3 Pilot Participants

THANK YOU FOR YOUR PARTICIPATION!

Your participation in this project involved being one of the first to test our newly developed online version of the Memory and Aging Program and providing us with valuable feedback.

The pilot in which you participated will help us better understand how to tailor the e-learning experience to the needs of our future users. More specifically, we wish to ensure that the program is user-friendly, informative, and ultimately enjoyable to use. Our long-term goal is to determine whether the online program will be able to achieve similar success as the in-person Memory and Aging Program, in terms of increased knowledge about memory itself and memory strategies, improved self-reports regarding confidence and satisfaction with one's memory, and the adaptation of healthier lifestyles.

The important insights we have gained would not be possible without the contributions of time and energy from volunteers such as yourself. We would like to take this opportunity to say one more "***thank you***" for your generosity, patience, and participation.

If you would like an update on the pilot progress, or have any questions about your participation, please feel free to contact the principal researcher, Dr. Angie Troyer at █████████
█████████

Appendix L

Overview of the Program

Program Outline

Week 1: Introduction

Description

This week you will be introduced to the Memory and Aging Program and to the other learners taking the program with you. You will also become familiar with navigating the learning management system, the discussion boards, and the modules. You will complete some preliminary questionnaires that will help us evaluate the program.

Activities

1. Module: Navigation
2. Discussion: Introduce Yourself

Week 2: What is Memory?

Description

This week, we will discuss the brain regions involved in memory, discuss memory processes and types, and provide examples of the difference between memory changes that are "normal" versus "not normal". You will participate in discussions and activities that will help you relate this material to your own experience with your memory.

Activities

1. Discussion: What has changed with your memory?
2. Discussion: What has not changed with your memory?
3. Module: What is Memory? Part 1
4. Module: What is Memory? Part 2

Week 3: Factors Affecting Memory

Description

This week introduces different factors that can affect memory in addition to normal aging. Some of these factors have a positive effect on memory, and others have a negative effect. Learning this content will help you recognize the different factors that may be impacting your own memory ability.

Activities

1. Module: Factors Affecting Memory
2. Discussion: Factors Affecting Memory
3. Week 3 Homework

Week 4: Stress & Relaxation

Description

This week we will be looking at another factor that can affect memory, stress. You will have the opportunity to learn and practice relaxation techniques that can help reduce stress.

Activities

1. Discussion: Review Week 3 Homework
2. Module: Stress & Relaxation
3. Discussion: Relaxation Techniques
4. Week 4 Homework

Week 5: Memory Strategies: Overview & Practice Retrieval

Description

In this week, the five memory strategies are introduced and the "SHARP" acronym is presented to help you learn the strategies. The rationale, procedures, and evidence supporting the strategies will be discussed with an emphasis on learning and trying the practice retrieval strategy.

Activities

1. Discussion: Review Week 4 Homework
2. Module: Overview of Memory Strategies – SHARP
3. Discussion: SHARP
4. Module: Practice Retrieval
5. Discussion: Practice Retrieval
6. Week 5 Homework

Week 6: Memory Strategies: Associations & Records

Description

This week we will continue with the memory strategies by taking a closer look at the rationale, evidence and procedures for using associations and records. Through a number of activities, you will have the opportunity to try out these strategies.

Activities

1. Discussion: Review Week 5 Homework
2. Discussion: Associations Practice
3. Module: Associations
4. Live Chat: Records
5. Week 6 Homework

Week 7: Application of Memory Strategies & Goal Setting

Description

This week you will practice applying memory strategies to practical memory scenarios. After this, we will review what you have learned in this program, including factors that impact memory functioning and SHARP memory strategies. You will create a plan to carry forward your learnings from this program to your day-to-day life.

Activities

1. Discussion: Review Week 6 Homework
2. Module: Application of Memory Strategies
3. Review Game
4. Module: Setting Goals
5. Discussion: Personal Goals

Week 8: Wrap-up & Feedback

Description

This week will give you the opportunity to provide confidential feedback on the course, complete questionnaires to help us evaluate the program and ask any final questions that you may have.

Activities

1. Final Message
2. Course Feedback

Appendix M

Example of Printable Homework Sheet

Memory aging PROGRAM

Assignment for Week 3:
Track Your Physical & Cognitive Activities

Use this table to track your physical and cognitive activities this week. List the date and name of the activity. If it is an aerobic activity, record the amount of time you spend doing it. If it is a strengthening activity or a cognitive engagement activity, place a check mark in the appropriate column. At the end of the week, tally your activities and see how you compare to recommended activity levels.

Day of the week	Activity	Minutes spent in aerobic activity	"X" for strengthening activities	"X" for cognitive engagement
	Weekly total			
	Aim for at least:	150 min	2	12

Appendix N

Final Version of FAQ Guide

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WELCOME TO THE ONLINE MEMORY & AGING PROGRAM GUIDE

TABLE OF CONTENTS

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GETTING STARTED

What if I need help?

You have options should you need assistance with accessing or navigating this course:

1. This guide has comprehensive step-by-step instructions with pictures to assist you.
2. There is a how-to video as part of the Getting Started.
3. If you are still having an issue and require assistance, please email eLearning@baycrest.org and someone will contact you within 1 business day.

How do I find the Baycrest Learning Management System (LMS)

- On your computer, open your web browser. We recommend Google Chrome, Microsoft Edge, or Mozilla's Firefox.

- Go to http://elearning.baycrest.org/
- If you don't have one of the recommended browsers but would like to download and install one you can find the links below:
  - ➤ Google Chrome https://www.google.com/chrome/
  - ➤ Microsoft Edge https://www.microsoft.com/en-ca/windows/microsoft-edge
  - ➤ Mozilla Firefox https://www.mozilla.org/en-US/firefox/new/

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How do I log into the LMS each time?

1. Go to http://elearning.baycrest.org/
2. Click **Log in** at the top right of the page.

3. Type in the **Username** and **Password** provided to you when you enrolled in the study.

4. Click **Log in**.

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How do I find the Memory and Aging Program?

Each time you log into the LMS you will need to go to the Memory and Aging Program course.

Go to **Course Catalogue** / **By Title (A-Z)** found on the top left menu bar, select **"M"** and then **Memory and Aging Program**.
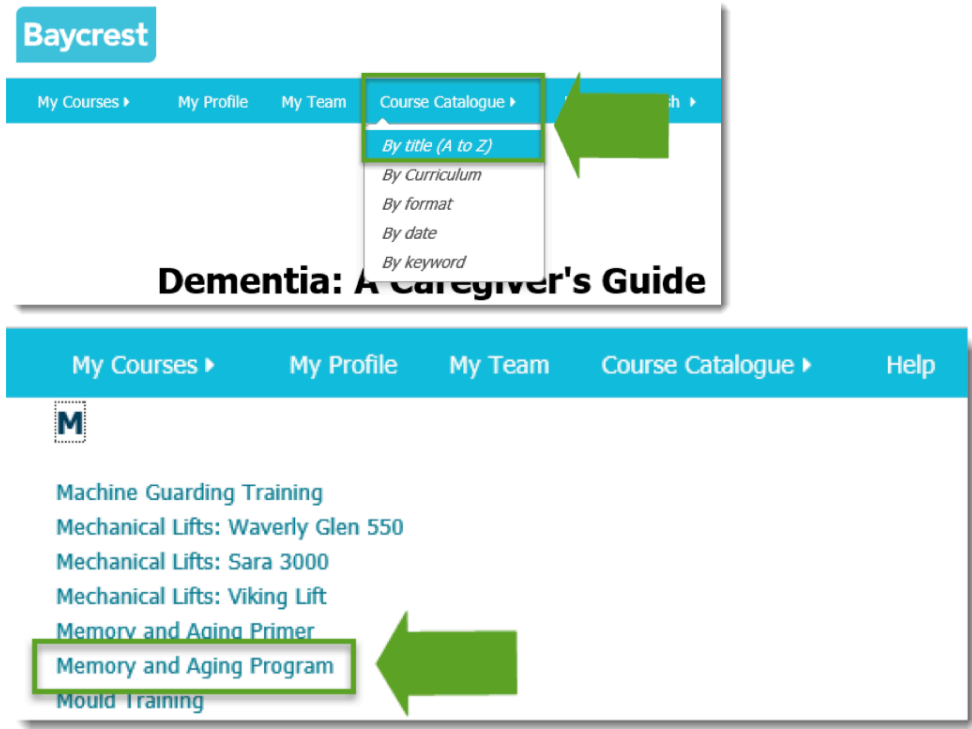
HOW DO I NAVIGATE THE COURSE?

How do I get from unit to unit?

1. When you first enter the Memory and Aging Program you will be in the "Chapter" view. Click the blue chapter heading to move to that chapter.

2. Once you are in a chapter you can use the links at the top and bottom of the page to go to the previous or next unit.

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What do the icons/pictures mean?

You will notice in the Memory and Aging Program that there are a number of icons/pictures. Here is a brief overview of what each one means:

1. This icon is for discussion boards. This is where you will post your comments, reflections, or questions. You can also read posts from other participants and your facilitator.

2. This icon is for PDF documents. These are documents that you can read, print, and/or save.

3. This icon is for surveys. These are forms where we will ask you to answer some questions.

4. This icon is for the eLearning modules. These are interactive learning activities and content for each unit of the course.

5. This icon is for web pages. These are links to other webpages related to the Memory and Aging Program.

What do the check boxes mean?

When you see a check box to the right of an item, it means this is a task you need to complete in that unit. For example, if it is a discussion board it means you should post an answer or comment. If it is a module, then you need to go through the entire eLearning module to complete the task. Once the task is complete you will see a check mark in the box. You will need to complete ALL of the tasks to be able to proceed to the next unit.

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What does it mean when it says: *Not available unless:*

If you are trying to start the next unit's activities and they are greyed-out, you may notice a message like the one below letting you know that it is **Not available unless:...** This message is letting you know that there are activities you need to complete before you can proceed. Check to make sure you have all of the check marks you need as per the diagram above. If you are still having issues, please contact ██████████████

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HOW DO I USE THE DISCUSSION BOARDS?

Unit 1 is the first unit you will have a discussion board where you will need to post an introduction about yourself. Other units have questions for you to answer.

How do I access the discussion board?

1. Click on the link.

Week 1 - Introduction

This week you will be introduced to the Memory and Aging Program and to the other learners t
and the modules. You will complete some preliminary

Discussion: Introduce Yourself   **click here**

Program Overview
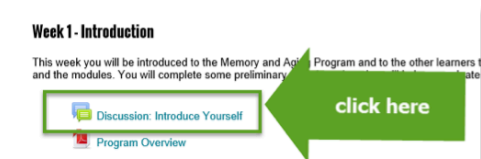
How do I add my post to the discussion board?

1. Click **Add a new topic**

Memory and Aging Program

Discussion: Introduce Yourself

Please introduce yourself. Who are you? What do you do? What are your motivations for taking this course? What are your expectations of this course? If you can, please post a picture of yourself here (optional).

*Please ensure you start a new discussion post when answering the discussion question.
*Please note that only people who are registered in this cohort of the Memory and Aging Program and your facilitator will be able to see your posts.

Add a new topic   **click here**

2. Type in a **Subject**, in this case it could be *Hi From John Smith*. Then type in your **Message**. In this case you will introduce yourself following the instructions from the facilitator. In other discussion boards you may be answering question(s) that have been asked by the facilitator.

Discussion: Introduce Yourself

Please introduce yourself. Who are you? What do you do? What are your motivations for taking this course? What are your expectations of this course? If you can, please post a picture of yourself here (optional).

The questions or instructions for each discussion board will appear here.

...ring the discussion question.

...s cohort of the Memory and Aging Program and your facilitator will be able to see your posts.

Your new discussion topic

Type your subject here.

Type your message here.

Subject*

Message*   Required

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How do I add my picture to my post?

3. If you would like to add a picture of yourself in your **Introduce Yourself** post, click the **Image** icon.

4. Click **Browse repositories**

5. Click **Browse** and find your photo on your computer. Type your name into the **Save as** field and then click **Upload this file**.

6. Type your name in the **Describe this image….** Field. Click **Save image**.
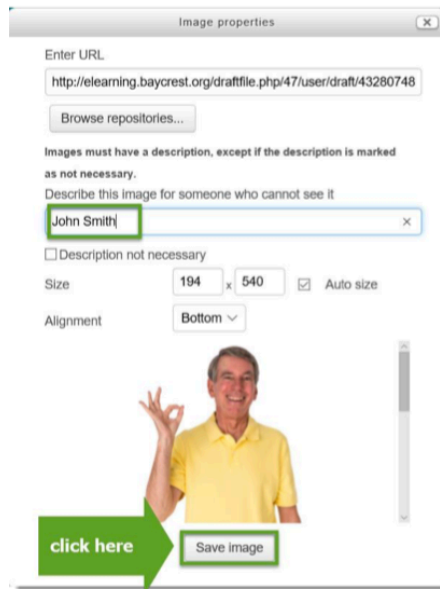
How do I save my post to the Discussion Forum?

7. When you are finished, click **Post to forum**

How do I read other participants' posts?

Once you are in the Discussion Forum, all of the participants posts will show below the question. You can scroll down to see all of the posts.

How do I reply to another participant's post?

To reply to another participants post:

1. Click **Discuss this topic**

2. Click **Reply**

3. Type in your reply and then click **Post to Forum.**

HOW DO I NAVIGATE THE MODULES?

How do I start the module?

Your first eLearning module is in Unit 1 and is called **Introductory Module**.
Click the link to get started.

What do I do if I get an error about Pop-Ups?

To play the eLearning modules you need to allow Pop-Ups for the website eLearning.baycrest.org.
You will find a links below YouTube videos that will help walk you through allowing pop-ups if
they are currently blocked. If you continue to have difficulty please contact
elearning@baycrest.org.

Google Chrome
https://www.youtube.com/watch?v=kyloCCzoTr0

Internet Explorer
https://www.youtube.com/watch?v=EuPyI8OGKek

Microsoft Edge
https://www.youtube.com/watch?v=sqMFWy6HCqI

Safari
https://www.youtube.com/watch?v=oPOfG4IzIZY

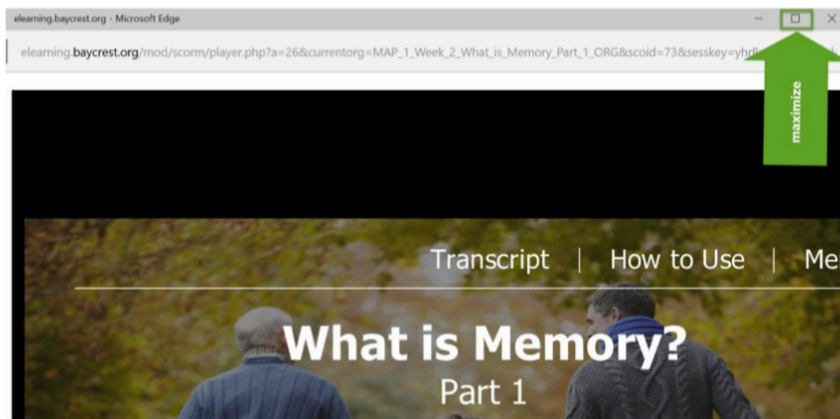**Firefox**
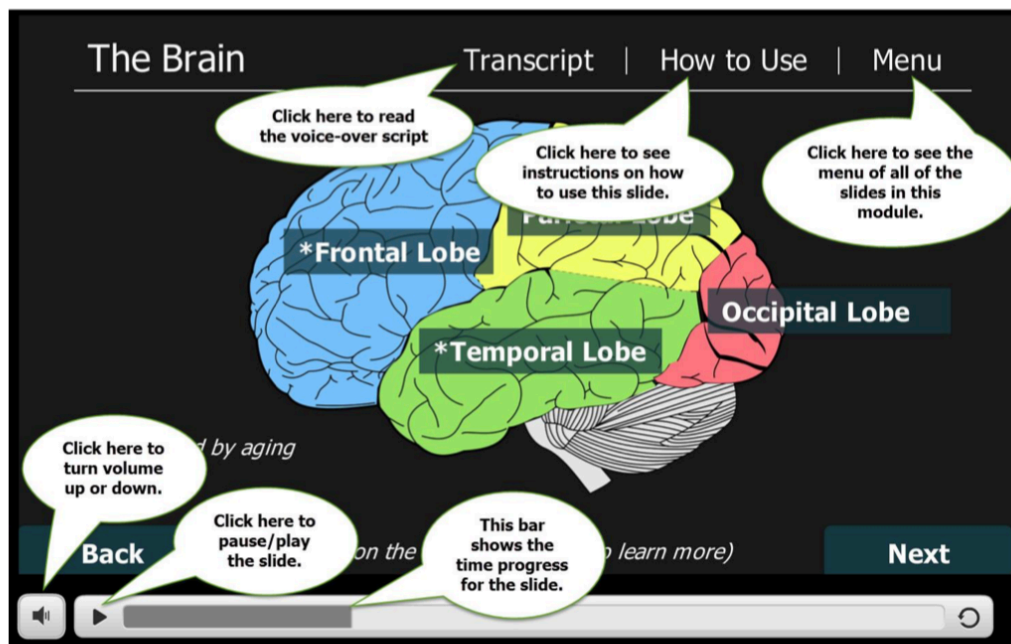https://www.youtube.com/watch?v=x3SSzlmJlVo

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How do I make sure I can see the entire screen?

To maximize the screen to make sure you can see everything, click the maximize button.

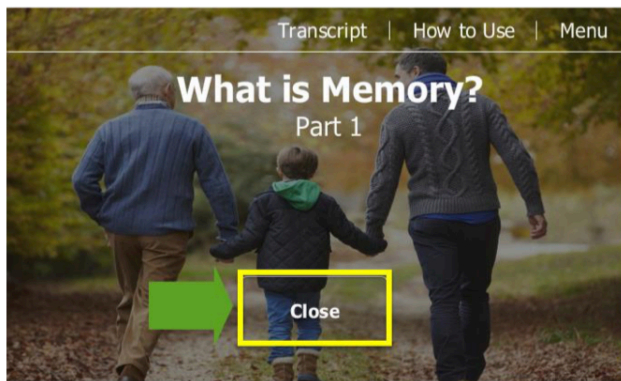## How do I navigate through the module?

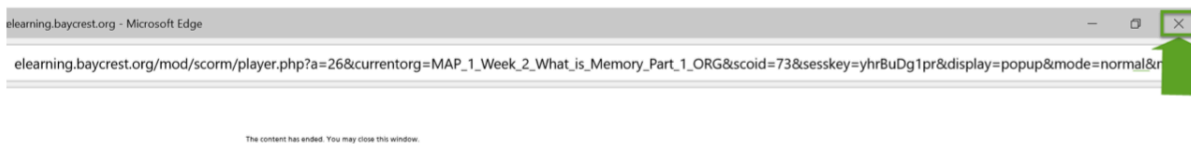Please see the image below showing the important features of each module.

How do I finish/close the module?

Click the **Close** button on the last slide.

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When prompted click the **x** at the top right to close the window.

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FAQs

Who do I contact if I need help?

If you require **administrative assistance** with the course please contact

████████████████████████████

If you require **technical assistance** with features of the online course please contact

████████████████████████████

## I am getting a pop-up blocker message, what do I do?

If your eLearning modules will not play because pop-ups are blocked, to allow pop-ups in your browser or iPad watch the appropriate link below:

- iPad: https://www.youtube.com/watch?v=Z9I2gC6huoU
- Google Chrome: https://www.youtube.com/watch?v=YNx2xvVt9Do
- Mozilla Firefox: https://www.youtube.com/watch?v=x3SSzlmJlVo
- Microsoft Edge: https://www.youtube.com/watch?v=iH9RcpQanF4

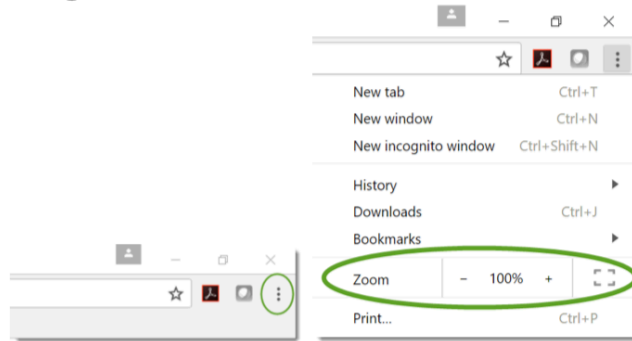## How do I make the words on the screen larger?

If you are finding the font size of the website too small, you can increase or **Zoom** the website using your browser.
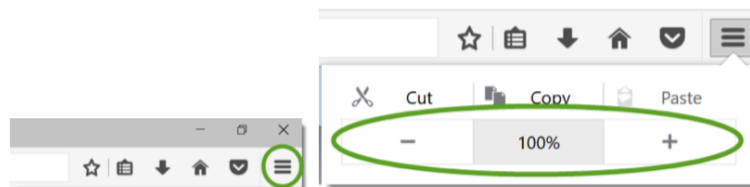
Microsoft Edge
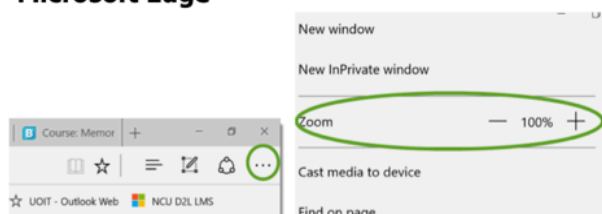
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Google Chrome

Mozilla Firefox

I am using a computer and it doesn't seem to remember where I left off in the modules?

The eLearning module needs the **"Cookies"** to be enabled in order to have a crumb trail to let it know where it left off. If the cookies are not enabled, the system won't remember where you were in the module. To watch a video on how to enable cookies choose the video for your browser:

- Google Chrome: https://www.youtube.com/watch?v=urKcVcW7Sas
- Mozilla Firefox: https://www.youtube.com/watch?v=WcyPVyW_Uek
- Microsoft Edge: https://www.youtube.com/watch?v=UqT3unxPgz0

I am using an iPad and it doesn't seem to remember where I left off in the modules?

The eLearning module needs the **"Cookies"** to be enabled in order to have a crumb trail to let it know where it left off. If the cookies are not enabled, the system won't remember where you were in the module. To watch a video on how to enable cookies on an iPad click here: https://www.youtube.com/watch?v=iX7wBW6qAi8