

## **Discussion**

Suggestions for turning the above research into practical recommendations and guidelines are divided into the familiar format of ADDIE (analysis, design, development, implementation, and evaluation) for ease of reference and familiarity. This is by no means meant to be an exhaustive or thorough model, but rather intended to provide supplementary support for educational designers when engaging in the ADDIE process independently.

### **Analysis**

As is the case of any project which is intended to reach an audience, whether that project is marketing, education, or outreach, an educational designer or instructor must research and understand the audience they wish to educate to maximize their results. Based on the sampled research, the greatest hurdle the older adult audience faces is deficits within executive function (Ortega et al., 2012). However, those deficits are not universal or standardized and will vary from person to person, class to class (Radulescu et al., 2016). As such, an instructional designer may benefit from using cognitive examinations prior to the development phase of planning so as to gain a more thorough and tailored perspective on their learners.

### **Design**

Inhibitory control poses significant challenges for older learners (Wilkinson & Yang, 2012; Ortega et al., 2012), but even in the event that the inhibition capacity is diminished due to age-related decline, countermeasures are possible through targeted training (Wilkinson & Yang, 2012). Likewise, associative memory capacity declines as age advances, but can be overcome or mitigated when given special consideration during design plans (Mohanty et al.,

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2016). By addressing the deficits, and where possible, designing training within the class or program to overcome them in the design structure itself, the instructor will be able to maximize the educational potential of the learners on a systems-level as opposed to a costlier, task-by-task approach.

Moreover, special care should be given so that the material being designed is challenging enough to reveal weaknesses that need to be addressed but not so challenging as to induce unnecessary stress on the older students (Lin et al., 2010). The fine line of challenge and impossible feat is one that every educator must walk, but none more precariously than the educator designing for the mature, older adult.

### **Development**

When developing materials for the older learner, an instructor can still reap the retention benefits of the CI effect (Lin et al., 2010), though the students will have less mental resources to allocate should the challenge of recollection after the fact prove too intensive (Mohanty et al., 2016). Because of a diminished capacity for episodic foresight (Lyons et al., 2014) materials should provide cues and provocation that might not otherwise be necessary in a younger audience as to alleviate the burden placed on the learner's predictive thoughts and actions.

Additionally, if the learning objective entails multiple subjects or tasks, the learner may benefit from proximal moves in topic (sociology to history, for instance) as opposed to more distant shifts (sociology to algebra), allowing the narrow scope of their focus to move alongside the material as opposed to struggling to keep up with it (Radulescu et al., 2016).

## **Implementation**

Learning in a public setting is a social process and requires a level of social decorum which older adults may struggle to maintain (Henry et al., 2009). As such, educational programs held with this audience should have clear—but forgiving—guidelines of expected behavior, which are mindful to the tandem decline of socially appropriate behavior and executive function. Moreover, because this student body will struggle with associative and feedback learning (Radulescu et al., 2016; Simon & Gluck, 2013), desirable behaviors and undesirable behaviors should be consistently and uniformly reinforced with appropriate action while allowing for a slower adjustment curve than might be afforded to a younger learner.

Although adaptive feedback—that is, feedback which is provided during the course of instruction or performance rather than at its conclusion—has not been shown to improve individual scores, it has been noted to stabilize the scores within a group (Wilkinson & Yang, 2012), thus strengthening the unit as a whole. This may be of some benefit to future educators or project managers as a formative evaluative tool during the implementation process, allowing them to gauge the success or weakness of their procedures on a group-level.

Lastly, semantic memory remains intact in older learners (Wingfield & Kahana, 2002) and may be used as a support structure to improve both item and associative learning skills (Mohanty et al., 2016) during implementation. By diverting some of the mental burden onto the stronger semantic memory, the educator will fortify the weaker, more diminished episodic memory and increase learner retention significantly (Mohanty et al., 2016).

## **Evaluation**

Older learners will perform best when the method in which they are taught is also the method by which they are evaluated (Mohanty et al., 2016). Trick questions or false-familiarity, while viable for younger learners and at times intentionally designed to tax the mental resources, should be avoided in this population who has less mental resources with which to engage the material (Kersten & Earles, 2010). As a result of diminished episodic foresight, evaluations are likely to produce higher performance scores if students are given more directed instructions for planning and preparation of the exam, thereby aiding them in predicting and modeling their behavior without requiring the allocation of mental resources (Lyons et al., 2014) which might otherwise be devoted to comprehension and synthesis.