

## COGNITIVE MAPPING FOR ILOOKOUT FOR CHILD ABUSE: AN ONLINE TRAINING PROGRAM FOR EARLY CHILDHOOD PROFESSIONALS

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### ABSTRACT

This article delineates the theory and framework for an innovative child abuse training program for mandated reporters called 'iLookOut'. *iLookOut* is an online learning delivery system that utilizes mastery learning and self-determination theory in the Core Training program, along with spaced retrieval and retrieval practice in a follow-up micro-learning program that reinforces learning from the Core Training. A cognitive mapping model provides the structure for documenting and organizing the learning content in both the Core training and the follow-up micro-learning program. The article provides a conceptual framework for designing and implementing effective and efficient online learning programs.

**Keywords:** distance learning; cognitive mapping; learning; engagement; online learning

### INTRODUCTION

There are relatively few studies of Early Care & Education (ECE) professionals' child abuse reporting practices, particularly compared with published studies on other mandated reporters who have high levels of contact with children (e.g., teachers, nurses, doctors). In those that have been done, ECE professionals are less likely to have ever reported child maltreatment compared to other professionals who work with children (Zellman & Bell, 1990); this was due in part to the minimal education ECE professionals received about child abuse and what regarding the level of concern and/or circumstances warrant reporting (Alvarez, Kenny, Donohue, & Carpin, 2004; Kenny, 2007; Carter, Bannon, Limbert, Docherty, & Barlow, 2006).

The small body of quantitative and qualitative research examining reporting experiences of ECEs (including kindergarten and pre-school teachers (Sundell, 1997; Bishop, Lunn, & Johnson, 2002) has revealed high levels of uncertainty about the decision to report, perceived "conflicts of loyalty," (Svensson & Janson, 2008) and complexities that, taken together, have caused some ECE professionals to feel as if they are "dancing on the edge." (Feng, Chen, Wilk, Yang & Fetzer, 2009).

ECE professionals report wanting to preserve relationships with families and avoid causing harm, but at the same time meet their legal, professional, and ethical responsibilities. One consequence of such uncertainty and conflict is report latency, with one study finding an average time of 14 months between ECE professionals having suspicion and making a report (Sundell, 1997) -- a situation that, if left unaddressed, risks dire outcomes for many young children.

The emergence of the internet and other technological advances provide a mechanism for educating ECE professionals about child abuse and its reporting, even in remote areas. But evidence-based curricula are lacking. This paper describes a methodology for crafting an integrated curriculum that meets the needs of ECE professionals and can be delivered via online learning modalities.

### **The Need**

Every day, thousands of children experience one form of child abuse or another at the hands of a parent or other caregiver. Annually, there are 680,000 confirmed cases in the United States, and research provides strong evidence that this number is likely much higher (Finkelhor, Turner, Ormrod, & Hamby, 2010; Hussey, Chang, & Kotch, 2006; Kohl, Jonson-Reid, & Drake, 2009; Stoltenborgh, Bakermans-Kranenburg, van Ijzendoorn, & Alink, 2013; Stoltenborgh, van Ijzendoorn, Euser, & Bakermans-Kranenburg, 2011; Stoltenborgh, Bakermans-Kranenburg, Alink, & van Ijzendoorn, 2012; Stoltenborgh, Bakermans-Kranenburg, & van Ijzendoorn, 2013; Sedlak, Mettenburg, Basena, Peta, McPherson, & Greene, 2010).

The youngest children –those under 5 years of age– are more likely to be victims of all forms of child abuse other than sexual abuse. Because they are more vulnerable, these children experience serious injuries –including death– at much higher rates than older children. (U.S. Department of Health & Human Services, 2018). However, not all consequences of abuse are as immediate as broken bones and black eyes. Each of the various forms of abuse can have profound effects on children’s physical, psychological, developmental, and overall emotional well-being –with conclusive evidence of the strong relationship between child maltreatment and subsequent anxiety, depression, substance use, intimate partner and family violence, as well as heart disease, strokes, and cancer (Norman, Byambaa, De, Butchart, Scott, & Vos, 2012; Flaherty et al., 2013; Jonson-Reid, Kohl, & Drake, 2012; Mills et al., 2011; Danese & McEwen, 2012; Shonkoff & Garner, 2012; Hadland et al., 2015).

In the face of these staggering facts, it is perhaps surprising that ECE professionals –who provide care to 8-12 million children in the U.S.– (Laughlin, 2013; Laughlin, 2006) report only about half of 1% of confirmed cases of child abuse. (U.S. Department of Health & Human Services, 2018).

Because ECE professionals interact with so many young children on a daily basis, they are in a unique position to identify and respond to suspected child abuse. They may be the only people outside of a child’s immediate family to have extended opportunities to discern red flags and/or subtle signs of abuse that might lead to early detection, the potential to help prevent patterns of abuse from taking hold, and the opportunity to support over-worked and overwhelmed families before abuse occurs. With the right preparation and resources, ECE professionals can also serve as key supports for children and families who are struggling (Dinehart, Katz, Manfra, & Ullery, 2013). Yet protecting children is far from straight-forward or low stress task –to the extent that some ECE professionals have identified “reporting possible abuse” as the most troubling ethical issue they face in their workplace (Clyde & Rodd, 1989; Feeney & Sysko, 1986).

### **Two-Phased Approach**

The *iLookOut for Child Abuse* learning program (*iLookOut*) has two distinct phases. The first is the Core Training, which uses a video-based storyline, experiential learning theory, and practice modules to provide ECE professionals a strong, standardized foundation for understanding what child abuse is, what to look for, and what to do (and not do).

The second phase provides Advanced Training using spaced practice and spaced retrieval to augment the original instruction and provide continuing reinforcement delivered via email or a smart phone application. We have used the term “pinging” for as shorthand to represent the combination of spaced practice and spaced retrieval. We chose the term “pinging” because we think of the process as similar to the sound waves that submarines send out to gauge progress and location. In our case, rather than sound waves, our Advanced Training pings offer micro-learning opportunities, reminders about what to look for in cases of child abuse and feedback on progress toward completing the training. Such continual reinforcement related to child abuse encourages ECE professionals to re-process, synthesize and (most importantly) apply what they have learned about child abuse and what can be done to help protect children and promote their well-being. Because *iLookOut*’s pinging is iterative, and dispatches brief messages over time, this micro-learning can be tailored to the availability and needs of individual learners.

This paper describes *iLookOut*’s two phases, and explains how the distance learning curriculum that is now deployed to ECE professionals across Maine and Pennsylvania (Core Training only/Phase I) can serve as a model for others looking to deliver trainings and associated resources and reinforce learning over broad

geographic regions. . In this context, “Core Training” refers to the initial 3-hour *iLookOut* learning program, while “Advanced Training” refers to the micro-learning activities sent out as pings to smart-phones or other mobile technologies.

### **Core Training**

Given the broad and dispersed population of ECE professionals in Maine, and the acute need for mandated reporter training, we sought to create an online program that could be delivered to ECE professionals where they worked. The *iLookOut* Core Training uses a video-based storyline and game-based techniques to more effectively engage ECE professionals, along with pre/post-testing to measure knowledge, attitudes, and satisfaction (Levi et al., 2019)

Like other online programs, *iLookOut*’s Core Training provides ready, low-cost access to multi-media learning 24/7, and can be paused/resumed as desired. *iLookOut*’s content is written at an 8<sup>th</sup> grade level, and provides standardized education for a workforce known for wide variability in entry level training, skill-sets, work environment, and professional development opportunities.

### Mastery Learning

The *iLookOut*’s Core Training was designed to ensure that all ECE professionals could master basic information about how to identify signs of child abuse. This mastery learning philosophy recognizes that under appropriate instructional conditions virtually all learners can master what is being taught (Block & Burns, 1976; Bloom, 1971). *iLookOut*’s Core Training creates those conditions by organizing the curriculum into discrete units; providing interactive instructional activities along with various didactic exercises and resource handouts; embedding assessments within these activities; and requiring learners to master the learning objectives before moving to the next discrete unit. (Bloom, 1971; Melton, 2008).

Mastery learning is an approach that recognizes that aptitude for learning may be more closely linked to an individual’s perseverance and time spent than to any notion of “ability” (Bloom, 1971; Melton, 2008). As with criterion-referenced tests, which assess the performance of each test-taker without regard to the performance of others (Shrock & Coscarelli, 2007), there is no limit to the number of ECE professionals who can excel in completing the *iLookOut* curriculum.

### Self-Determination Theory

Motivationally, *iLookOut*’s Core Training program is based on Self-Determination Theory (SDT). This macro-theory which has been used to explain human motivation in many endeavors (including sports, healthcare, religion, work, and education) posits that human beings primarily perform tasks/activities because of an internal drive rather than some externally driven theory of operant conditioning (Ryan & Deci, 2000a; Ryan & Deci, 2000b). Among other things, SDT has helped to identify factors that either facilitate or undermine human motivation. For example, one of SDT’s sub-theories, cognitive valuation theory, proposes that events and conditions that enhance a person’s sense of autonomy and competence intrinsically support motivation, while factors that diminish perceived autonomy or competence undermine intrinsic motivation.

In the context of SDT, autonomy involves a person feeling that they are in control of their actions, and can influence the outcome of those actions. To help foster this sense of autonomy, the *iLookOut* Core Training provides ECE professionals with opportunities to make meaningful choices in response to the scenarios playing out in the video-based storyline –particularly with regard to possible signs of child abuse.

Another key aspect of SDT involves the human drive to take on challenges and achieve a sense of mastery. SDT describes this as striving for competence, and posits that factors that enhance an individual’s ability to experience competence (e.g., opportunities to acquire new skills or overcome challenges) are intrinsically motivating. *iLookOut*’s Core Training provides ECE professionals many such opportunities to be challenged, to demonstrate mastery, and to earn digital badges that offer visible acknowledgement of their achievements.

*iLookOut* also incorporates SDT’s third major element, relatedness –the experience of feeling meaningfully connected with others. *iLookOut*’s Core Training does this by helping ECE professionals identify with being part of a profession and community that is united in its goal of promoting children’s well-being.

### **Pinging and Advanced Training**

Despite the many strengths of *iLookOut*’s Core Training, it is well established that gains in knowledge are quickly lost unless they are somehow reinforced ( Murre & Dros, 2015). Because decades of research show that spaced practice and spaced retrieval optimize learning (Ausubel, & Youssef, 1965; Caple, 1996; Kerfoot, 2010),

the *iLookOut* programs were designed to include reminders of interactive micro-learning activities that are sent to learner's smart-phones and emails. These pings serve to reinforce and augment the concepts that were originally taught in the Core training.

### Spaced Retrieval

Broadly speaking, the concept of *spaced retrieval* involves providing learners with course content spaced over time. Spaced retrieval has been shown to be an effective tool for aiding student retention (Carpenter & DeLosh, 2005), and has been more widely promoted through computer-based adaptive instructional models such as ALEKS (Doignon & Falmagne, 1985) and LearnSmart (McGraw-Hill, 2013). In contrast to the standard practice of asking learners to digest large amounts of content all at one time, spaced retrieval avoids learner fatigue, as well as setting unrealistic expectations. For *iLookOut*'s Advanced Training phase, spaced retrieval also allows learners time to process and reflect on new information at multiple points in time, rather than simply moving on.

Spaced retrieval helps learners retain access to memorized information over long periods of time because the spacing promotes deeper processing of the learned material. Ideally, the time between the learning events is greater than 24 hours, but shorter times have also been found to be effective. As long as eight years after an initial training, learners who engaged in spaced retrieval exercises showed better retention than those whose learning was more concentrated time period (Clark & Mayer, 2011).

*iLookOut*'s Advanced Training sends participants weekly pings, each constituting a learning module that includes an activity (reading, game, video, etc.) along with various question-items. Learners must complete the modules in succession, and may review their content after completion; but learners may not proceed to the next module until its predetermined release date. Successful completion of a set number of modules ultimately earns learners a badge.

### Retrieval Practice

By design, our use of retrieval practice requires ECE professionals to recall or retrieve information they have learned, and complete both "knowledge checks" and In-Practice exercises that provide opportunities to apply newly acquired knowledge. The benefits of retrieval practice are well-established across diverse groups (Larsen et al., 2009). But the advent of computer technology has added the ability to not only record learner responses and performance, but also standardize and formally integrate spaced practice into learning curricula.

Retrieval practice improves recall performance in part because the act of retrieving information from memory actually strengthens the existing memory trace, and often creates additional retrieval routes (Dobson, 2013). Because these changes increase the probability of successful retrieval in the future (Roediger & Butler, 2013), retrieval practice can significantly enhance long-term retention of what ECE professionals have learned.

Despite the known efficacy of spaced practice and retrieval practice, it was not obvious how best to apply them vis-à-vis *iLookOut*'s overall curriculum. To develop a systematic approach for doing so –i.e., to determine the appropriate sequencing and content for Phase 2 of *iLookOut*–we adopted a "Cognitive Mapping" approach to design a comprehensive pinging curriculum.

### **Cognitive Mapping**

Cognitive Mapping was first introduced in 1948 by educational psychologist, Edward Tolman (Tolman, 1948) to explain how rats learned the locations of rewards in a maze, and as such generated a practical model for mapping their environment. Cognitive mapping is now in wide use in many different venues (including health research (Stadler, et al, 2013) and engineering (Dixon & Lammi, 2014)), not only to identify and illustrate how key elements are (or should be) inter-related, but also to create strategies for integrating, measuring, and analyzing various factors and outcome.

Cognitive mapping helps explore learner characteristics that improve learning (e.g., self-regulated learning components of goal-directedness, motivation, goal feedback, etc.). One such characteristic involves outcome expectations (Schunk & Zimmerman, 2006). Rooted in Tolman's concept of field expectancies, a learner's outcome expectations are based in their ability to anticipate particular relationships between a (e.g., lightning) stimulus and a response (e.g., thunder). Such expectancies help people form cognitive maps, which are internal representations of these expectancies, along with a catalogue of actions that are more (or less) likely to help individuals attain their goals.

Cognitive maps are particularly important for latent learning –i.e., learning that occurs after the initial period of teaching/exploration/etc. Latent learning may occur at any number of points in time, but may be most pronounced when the learner realizes how what has been taught applies in real-world settings –which in the case of ECE professionals is likely to be when they are working with infants and toddlers.

According to a Social Cognitive framework, learners will act in a manner they believe is likely to be successful, and will adopt observational and behavioral frameworks that conduce to success. As such, *iLookOut*'s cognitive map was designed to both 1) help our research team understand the relations between the various components of the Core Training and the subsequent pings, and 2) create a prototype of the internal model we hoped our learners would develop over the course of *iLookOut*'s two phases. In this way, the cognitive map developed for *iLookOut* provides a template to help ECE professionals more effectively connect and integrate information, ways of observing/interpreting, and particular practices so as to optimize and take full advantage of latent learning.

By definition "cognitive maps" are mental or conceptual models, "thinking maps" that, like other forms of cartography, map territory. But here it is cognitive "territory" rather than geographic terrain that is being characterized. Sometimes, cognitive maps provide a linear progression of a concept, or the relationships between various factors. They also can serve a developmental purpose, by helping people (be they researchers, policy makers, teachers, or learners) develop a deeper understanding of how different elements are (or should be) related to one another.

There are many applications of cognitive maps. *Perceptual* applications tend to focus on a) inquiring and/or gathering information; b) noticing/attending to; or c) differentiating/distinguishing. *Cognitive* applications tend to focus on a. organizing data and/or finding patterns/relationships; b) interpreting/understanding data; c) analyzing data; d) troubleshooting/diagnosing; e) drawing conclusions; f) framing; g) illuminating; or h) estimating probability/confidence levels. *Evaluative* applications focus on a) assessing/judging; b) measuring effectiveness; c) predicting future success; d) assigning importance/priority; or e) providing feedback. *Volitional* applications include a) identifying desires; b) defining/clarifying purposes; or c) planning. *Behavioral* applications include a) performing/behaving; b) implementing a plan; c) communicating; d) learning; e) improving skills; or f) developing.

Of these, *iLookOut*'s cognitive map was developed for the following purposes: coordinating learning content (Core Training and Advanced Training), implementing a plan, predicting likelihood and degree of future success, providing feedback, monitoring and measuring progress, evaluating and assessing achievement, organizing data, and finding patterns. This allowed us to both fully align existing content, strategies, and outcomes, and also identify critical areas that were not sufficiently fleshed out or appropriately integrated. For *iLookOut*'s Advanced Training in particular, this involved 1) distinguishing the learning points for the different concepts; 2) demonstrating associations between various components; 3) mapping individuals' actual progress through different stages of learning; 4) clarifying the purposes of various components of the learning program; and 5) creating a framework for how learners will progress through various activities so as to develop their skills. Figure 1 provides a very simplified cognitive map showing how key elements from *iLookOut*'s Core Training and Advanced Training fit together to create a unified whole. Such integration is crucial because any misalignment could potentially confuse or demotivate learners, fail to leverage spaced retrieval/practice, and/or undermine latent learning.



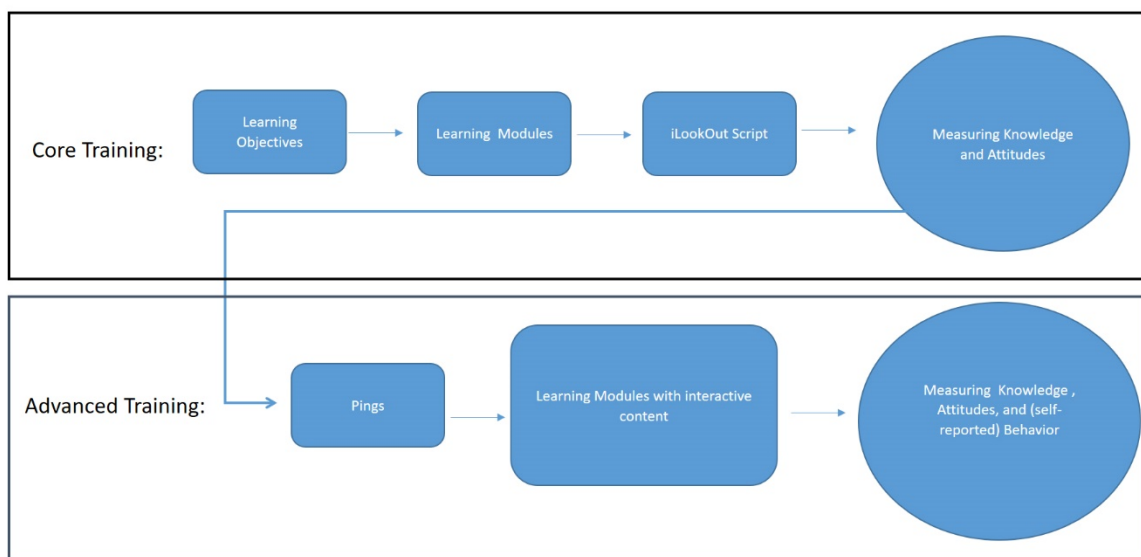


Figure 1. Simplified Overview Cognitive Map

Figure 2 provides more detailed mapping of the Core Training, showing where and how learning objectives manifest in the storyline, discrete learning modules, and post-training knowledge tests.

Learning Objectives (LO) of iLookOut		Script Intervention & Learning Modules (LM)	Learning Module Type	Knowledge Test (KT) Conceptual Areas	Attitudinal Items
LO1: Understand and recognize possible child abuse, including:	LO1.1: What does and does not constitute child abuse	(LM-1) Types of Abuse	Slide	(KT1.2) Places duct tape over a child's mouth as a form of punishment (Y/N/U) [LM-18]	Do you feel confident in your ability to identify signs of child abuse/neglect? (Self-Efficacy #1)
		(LM-6) Types of Child Abuse	Slide and Resource File Handout #3: Types of Child Abuse	(KT1.3) Causes any kind of physical injury to a child (Y/N/U) [LM-6]	
		(LM-7) "Possible Signs of Abuse"	Multiple Choice	(KT1.4) Causes a child substantial pain from disciplining him/her (Y/N/U) [LM-18]	
		(LM-16) "Intimate Partner Violence"	True/False	(KT1.5) Impairs a child's physical functioning from discipline him/her (Y/N/U) [LM-6]	
		(LM-18) "Reporting Requirements"	Multiple Choice (Y/N/U)	(KT1.6) Forcefully slaps a child under one year of age (Y/N/U) [LM-18]	
	LO1.2: How and where abuse occurs	(LM-9) Facts About Abuse	Resource File Handout #4: Facts Abuse Abuse	(KT1.7) Physically abuses his/her partner (aka domestic violence) in the presence of a child (Y/N/U) [LM-16]	
LO1.3: Risk factors for abuse		(LM-8) "Thinking Carefully About Abuse"	Multiple Choice	(KT2.8) Often has body odor, wears clothes that don't fit, and is inappropriately dressed for the weather (Y/N/U) [LM-5]	
				(KT2.9) Is always hungry, and often found stuffing food in his/her pockets to take home (Y/N/U) [LM-7]	

Figure 2. Sample Cognitive Map for Core Training

Figure 3 provides a more detailed mapping of a portion of the Advanced Training, corresponding to the learning content in Figure 2. In addition to listing the topic and content for each week's pings, this cognitive map shows the kind of activity and teaching modality learner will experience.

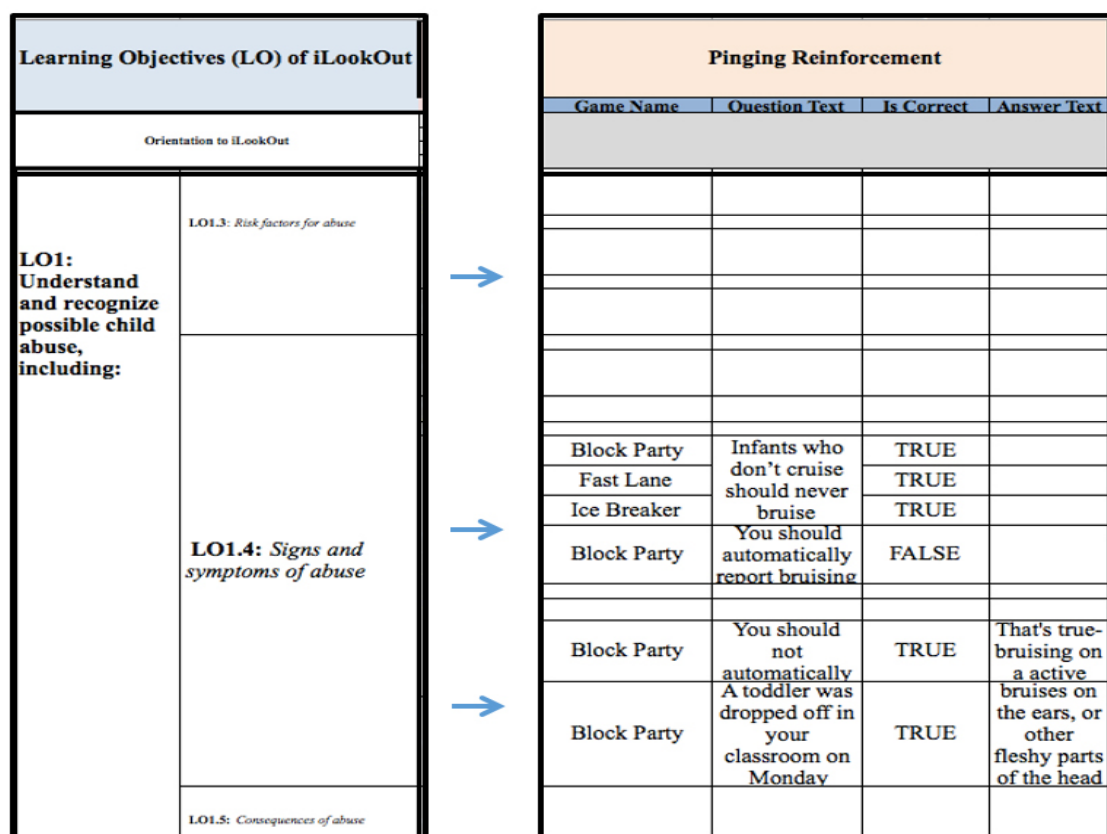


Figure 3. Sample Cognitive Map for Advanced Training

## Conclusion

The mapping process is critical for ensuring that key learning objectives are aligned with both content and teaching modalities, and that concepts and educational activities are appropriately sequenced to support the developmental goals of *iLookOut*. This cognitive mapping also helps to ensure consistency, cohesiveness, and alignment of the Core and Advanced Trainings.

The use of cognitive mapping is not common in non-academic settings. Yet, as described in this paper, this process can have great value for developing conceptually rich and well-integrated training programs, particularly for those wishing to leverage the power of spaced retrieval and spaced practice. This can be particularly valuable for topics like child abuse that are both contextually nuanced and emotionally complex. As such, this description of *iLookOut* is presented as a prototype that other researchers, designers, and developers of curricula may wish to consider and improve upon.

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