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TECHNOLOGY'S ROLE
IN ACTUARIAL EDUCATION

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THE CHANGING USES of technology are readily apparent in everyday life. GPS helps us navigate in real time while driving. We connect to friends and colleagues new and old through social media such as Facebook and LinkedIn. We even ask our phones for restaurant or movie recommendations or schedule (yet more) meetings!

How we learn is also affected by technology. We download mobile apps (e.g., flashcards)

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to our smartphones and study for exams as we ride the train to work. We also download mobile apps for easy access to program materials at our annual or spring meetings or symposia. We access SOA pre-qualification and professional development online courses using tablets or computers. The SOA's candidates take required associateship and fellowship courses online anywhere an Internet connection is available, submitting their responses electronically.

HOW DOES THE SOA USE TECHNOLOGY IN E-LEARNING?
In 2011, the SOA introduced podcasts as a way for section members to share knowledge in their areas of expertise. Using video to demonstrate competencies such as communication and relationship management was introduced in "Straight Talk: Effectively Communicating with a Non-Technical Audience," a professional development e-Course launched in 2012.

Embedded audio files coach candidates in the Fundamentals of Actuarial Practice (FAP) course, the FSA modules and the Decision Making and Communication (DMAC) e-Learning module.

The SOA provides synchronous (real-time) learning to members through webcasts and virtual sessions. In webcasts, speakers with expertise share their knowledge with other members through a live audio feed.

Attendees can submit questions through the webcast software and receive immediate answers. Members unable to attend our annual or spring meetings or symposia in person have the option to register and attend up to four sessions virtually. For example, 58 members signed up to attend the "Trend—Future Drivers and Bending the Costs" virtual session at the 2012 Annual Meeting. Members can attend both types of webcasts and virtual sessions via tablets or personal computers. Even if a session you are interested in is not available virtually, recordings of all sessions are available for purchase online.

ADAPTING TECHNOLOGY TO LEARNING STYLES
Individuals have preferred learning styles—visual, audio and kinesthetic are common examples. Visual learners need to see what they are learning; auditory learners need to hear what they are learning; and kinesthetic learners need to move around while learning. The SOA accommodates visual learners by using graphics and video in our courses. We provide podcasts and audiocasts to accommodate learners with visual and auditory preferences for learning. Tablets are one way to reach kinesthetic learners.

You may have heard or read about how technology extends the reach of social learning from one physical location to geographically diverse locations. As a student you participated in social learning when you learned from both your peers and a teacher in the classroom. In higher learning you may have worked on group projects. Social learning makes use of collaboration. The SOA's e-Learning discussion forums make collaborating between peers from different locations easier than ever before. As online learning becomes more prevalent among universities and professional organizations, the learner inevitably becomes more isolated. By facilitating a connection among learners through the use of these social interaction tools, exploratory learning occurs. A sense of community begins to evolve. Learners are able to more easily express themselves. Peer review introduces new concepts and new ideas. Resources are shared. The value and power of social learning should not be underestimated.

BACK TO BASICS

As technology continues to evolve, learning and development practitioners must take care to ensure that the theories underpinning how people learn are not ignored. (To learn more about learning theory go to *http://www.learning-theories.com*.)

In addition to learning theory, there are taxonomies for educational objectives that are considered when courses and exam questions are developed. The SOA uses a taxonomy developed by Robert Marzano when creating learning objectives and exam questions in the SOA's examination system. The taxonomy consists of three systems and the knowledge domain. These are critical for thinking and learning. Below is a graphic of Marzano's taxonomy.

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The SOA prequalification and professional development courses and online courses illustrate how the SOA uses these taxonomies when designing and developing courses and online modules for members and

The Three Systems and Knowledge[1]

SELF-SYSTEM		
Beliefs About the Importance of Knowledge	Beliefs about Efficacy	Emotions Associated with Knowledge

METACOGNITIVE SYSTEM			
Specifying Learning Goals	Monitoring the Execution of Knowledge	Monitoring Clarity	Monitoring Accuracy

COGNITIVE SYSTEM			
KNOWLEDGE RETRIEVAL	**COMPREHENSION**	**ANALYSIS**	**KNOWLEDGE UTILIZATION**
Recall Execution	Synthesis Representation	Matching Classifying Error Analysis Generalizing Specifying	Decision Making Problem Solving Experimental Inquiry Investigation

KNOWLEDGE DOMAIN		
Information	Mental Procedures	Physical Procedures

candidates. For example, online courses use quiz questions to meet the "retrieval" level of Marzano's taxonomy. The use of thought questions encourages learners to understand and apply the concepts being taught. Case studies and end-of-module exercises and assessments submitted for formal grading use the analysis and knowledge utilization levels of Marzano's taxonomy.

TECHNOLOGY AND LEARNING

As we move forward, the SOA will continue monitoring emerging technologies to determine if they will enhance the educational experience of our members and candidates. It is critical that technology enhance the learning experience rather than become the learning experience. The SOA is exploring how to help candidates learn complex concepts and models by using technology that enables experts to illustrate concepts on a whiteboard and explain what they are illustrating. For example, the SOA is looking at ways to simulate building modeling spreadsheets while an expert explains what is being done with the new FSA Quantitative Financial Investments (QFI) course currently under development. This could be something similar to what is being done at Khan Academy. (To learn more about the Khan Academy visit *www. khanacademy.org*.)

With the technologies described above, the SOA will continue creating learning experiences that incorporate learning theory, learning styles and Marzano's taxonomy. In the near future, we expect to launch a tool that candidates may elect to use to help them find one another and collaborate, where appropriate. Candidates will be able to reach out to members to ask questions. In early 2013, members will have new opportunities to participate in learning communities and create their own learning plans. Watch for more news about how you can take advantage of these exciting developments. As you can see, technology is truly enhancing how the SOA provides learning opportunities for candidates and members. **A**

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ENDNOTES
[1] *ftp://download.intel.com/education/Common/ in/Resources/DEP/skills/Marzano.pdf*.