

# Beneath the Tip of the Iceberg

## Technology Plumbs the Affective Learning Domain

Until very recently, it has been prohibitively expensive and impractical to attempt to develop learning technologies that mapped to the affective domain. Now there's a broad category of products known as Affective Computing and a specific product category called Affective Learning Technology. Both are being used to develop products designed for the affective learning domain.

By Sam S. Adkins

In 1956, a group of educators led by Benjamin Bloom identified three overlapping human learning domains: cognitive learning, psychomotor learning, and affective learning. They represent the knowledge, skills, and beliefs, respectively, of a human performer. The integrated framework of these three domains has since become known as Bloom's Taxonomy.

Even though the three domains are tightly integrated aspects of human learning, traditionally only the skills and knowledge domains have been part of the corporate training focus. Training professionals have shied away from the affective domain because of its complexity. Until very recently, it has been prohibitively expensive and impractical to develop learning technologies that mapped to the affective domain.

In the case of the classroom experience, the affective is a layer provided by a human teacher. In higher education and corporate classrooms, role play (human-to-human collaboration) is used to teach affective domain subjects such as sales techniques, patient interactions, and employee management methods.

Now, new learning technologies have emerged that are automating learning designed for the affective domain. These new technologies are the equivalent of the railroads that opened new territories in the past. They're now providing access to the last domain of human learning, the Final Frontier. There's a broad category of products known as Affective Computing and a specific product category called Affective Learning Technology that are designed for the affective learning domain.

MIT's Media Lab is developing a Learning Companion designed to mitigate belief systems that undermine learning accomplishments in children. The project is funded by the National Science Foundation. This isn't a tutor per se, but an affective companion that tries to alleviate frustration and self-doubt in young learners. It does that by first establishing a relationship with the child. It then attempts to ascertain the cognitive state of the child and interacts with the child depending on that cognitive state.

In the corporate sector, affective learning technologies are now beyond the research phase and are proliferating rapidly. These major factors are driving the adoption of affective learning technology products in the enterprise:

- \* workforce alignment
- \* workforce selection and retention
- \* workplace ethics
- \* customer analytics
- \* public safety and national security.

### The need for affective alignment

Large studies by FranklinCovey and *Gallup Management Journal* have identified high percentages of the workforce that misunderstand the business goals of their companies. Many workers are unaware of executive goals, but as many as 15 to 25 percent actively resist alignment or are disinterested in the corporate strategy.

A March 2002 study conducted by *Gallup Management Journal* found that only 31 percent of U.S. workers believe they're actually helping their company achieve enterprise-wide business goals. The study frankly admits that "the remaining workers are just marking time—or, worse, actively undermining their companies."

The Gallup study analyzed workers in almost 11,000 business units in 51 large companies, spanning 23 different vertical industries. The problem is

widespread. The latest U.S. Employee Engagement Index from Gallup indicates that 17 percent of employees are actively disengaged.

Vendors are responding to that problem with new technology. FranklinCovey has released a product it calls the xQ (Execution Quotient) Survey. Thirty questions in the Web-based xQ Survey are used to ferret out the underlying belief systems of people and organizations. The results are provided to management in the xQ Debrief Scorecard. Management can drill down through the survey data and look at results from any organizational layer, including data about specific individuals.

### The right personality for the right job

New affective-based personality assessments are being used routinely in pre-candidate screening. These new "personality tests" aren't to be confused with psychometrically unsound instruments such as the Myers-Briggs. These new forms of assessment are quite sophisticated and can map a candidate's personality profile. The psychometrics in these measurement devices are also defensible in court.

The best-known personality assessment taxonomy is the Big Five. It identifies five primary subcategories of the affective domain: Extraversion, Emotional Stability, Agreeableness, Conscientiousness, and Openness to Experience. A variation is known as OCEAN, which is an acronym for

- \* openness to experience
- \* conscientiousness
- \* extraversion
- \* agreeableness
- \* natural reactions.

A person's score on these assessments is used to determine his or her appropriateness for particular jobs. Companies that provide these assessments online include Fitability, ePredix, and TMP Worldwide, the parent company of Monster.

Careers in Construction indicates that "over 90 percent of large organizations and over 70 percent of small to medium organizations use some form of psychometric testing as part of their selection procedure."

Fitability claims that "studies have shown that for sales jobs, extraversion and agreeableness are highly predictive of performance. For blue-collar workers, conscientiousness and agreeableness show a positive relationship to job performance; extraversion and openness to experience are shown to be

unrelated or, in some cases, negatively related to performance.”

Fitability also indicates that “extraversion, agreeableness, and emotional stability are highly predictive of leaders’ performance.”

ePredix is a Big Five vendor that markets its products with illustrations showing an iceberg. The claim is that without a personality assessment, an employer only can see the tip of the iceberg, such as a candidate’s skills, knowledge, and experience—attributes that were once sufficient to get hired. Under the tip of this psychological iceberg is a large mass of innate abilities, motivations, traits, beliefs, values, and interests. These assessments are used to identify those attributes and map them to particular jobs. The use of these tools is growing fast. ePredix’s products have been used by more than 35 million job applicants and 1500 companies.

Aero Innovation sells a battery of assessment instruments that can measure the combined skills, knowledge, and affective states of a human. The batteries are used for training operational professionals in air traffic control, flight operations, nuclear plant operations, public safety, emergency rooms, and mass transit. Aero has also started marketing its products in the general HR markets, as Team Resource Management.

Simulation technology is also used in candidate screening. Kaplan markets call center simulations, in which job candidates are immersed in a simulation of the day-to-day, conflict-ridden experience of a call center agent. There’s a high turnover rate in the call center industry, and Kaplan reports that 10 percent of job candidates who take the simulations withdraw voluntarily from consideration after they realize they wouldn’t enjoy the job.

### The ethics of affective performance

Qwiz provides assessments that “measure aspects of contextual performance, such as personality and integrity, that are important across all jobs and industries.”

Breach of ethical behavior can be expensive for companies. So-called “honesty assessments” are rou-

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tinely given to candidates seeking employment in the retail sector as a preemptive strike against the “shrinkage” (read: theft) problem. The new Sarbanes-Oxley and HIPAA compliance regulations mandate financial accountability and patient privacy respectively. Noncompliance can shut a business down.

Ethics training is now proliferating in the enterprise due to corporate scandals, compliance mandates, and legal risks. LRN sells an e-learning product line called Legal Compliance and Ethics Center, or LCEC. The products contain conventional courses on ethics, as well as legal and compliance education. LRN claims there’s a link between ethics training and quality of products. Though ethics e-learning

isn’t new, linking the integrity of products with the integrity of employees *is* new.

One of LRN’s customers is LVMH, the company that makes the high-end Louis Vuitton luggage and the Dom Perignon champagne. Dov Seidman, CEO of LRN, says, “When people buy a bottle of Dom Perignon, a Tag Heuer watch, or a piece of Louis Vuitton luggage, they expect nothing but the best in quality. That speaks to the underlying integrity of the products, including the integrity of the people who make and market them. It’s very rewarding to be able to work with LVMH to help it protect its integrity and reputation.”

Innovative companies such as SimuLearn, WILL Interactive, Kaplan, and Insight Experience are bringing affective learning products to market that imbue ethical behavior via simulation. Simulation is the current method of choice for learning products dealing with particular subjects in the affective learning domains, such as ethics, teamwork, innovation, leadership, conflict management, and motivation. These products generate experiences for workers and, as the simulation unfolds, the technology measures beliefs and emotional states of mind. Simulation excels at that and generates a primary learning experience. All corporate role-play simulations tend to tap into the affective domain.

Perhaps the best-known e-learning product that deals with the affective domain is SimuLearn's Virtual Leader. It uses complex artificial intelligence routines to control the behavior of virtual characters, who have a large repertoire of verbal responses. The product pulls from a library of more than 200 body gestures and facial responses designed to elicit behavior from the real participants.

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According to CNET, Virtual Leader "simulates a series of company meetings in which the player has to manage a complex network of interpersonal relationships in a work setting. Players are scored based on how well they complete business goals, while maintaining relations with customers and co-workers."

WILL Interactive sells simulation products designed to teach adults and children about the consequences of their actions. Their Virtual Experience Interactive Learning Software, or VEILS, "weaves a tapestry from learning theory, gaming theory, filmmaking, psychology, and computer science."

WILL Interactive's patented interactive behavior-modification programs are already used in "a wide range of pressure-filled, realistic decision-making situations, including lifestyle choices, crisis negotiation, antiterrorism, and school violence," it says.

### The emotions of customer analytics

A worker's emotional state will often influence his or her behavior. There's now evidence to suggest that it's a primary factor in the prediction of performance. PeopleView, a provider of real-time Human Capital Management technology, markets a module in its products suite known as EQSight, which PeopleView says will "boost employee performance through improved emotional intelligence." It uses an emotional quotient (EQ) assessment tool called the Emotional Intelligence Appraisal.

It's usually second nature for any person to be able determine the emotional status of another person, providing there's access to a wide set of visual, verbal, and environmental cues. It's seldom possible to see the body language of another person in online situations. New technology is now on the market that can gauge a person's emotional status by analyzing his or her voice or text-based conversations.

Utopy sells emotion detection software called SpeechMiner, designed primarily for call centers. The technology can provide "global emotional analysis of

agents and customers, or micro-analysis of specific agents and customers." The technology can separate the voice of the agent and the customer on the same phone call and provide emotional analysis in real time. It enables an agent to visually see in real time when a customer is resisting a sale or when a customer's anger begins to escalate. It also allows a manager to watch the ongoing emotional flow of several agents at once.

SpeechMiner also tracks an agent's vocal performance for compliance. "You can leverage SpeechMiner to ensure that agents are properly reading all disclosures, that no misrepresentations are made, and that customers respond in the proper fashion. You need to sustain your organization's reputation as well as prevent customer lawsuits," says the maker.

Mindfabric also integrates emotional analysis into its automated customer support products. "User emotion analysis deciphers user emotions from their interactions with self-service systems or contact center agents. That information is stored in a relational database for further analysis or reporting (for service or product improvements) or can become part of the real-time customer interaction. For example, if the system detects that a user is impatient or frustrated, or asks, 'Why isn't my online loan application going through?' a business rule can be activated to connect the user directly to a customer service representative."

Call center technology has been the hub of many innovations in learning technology, such as skill-based routing. All call center training deals with affective learning domains—in particular, methods to defuse customer anger or frustration. Customer resistance to a sale has to be overcome. Integrated applications that fuse affective learning in the live workflow are now on the market.

Knowlagent, ePeople, Kanisa, and Envision are leading innovators in this space. Envision has integrated Utopy's emotion detection technology into its Click2Coach product. The Click2Coach product is a real-time, workflow-based performance analysis technology that enables agents and their managers to mitigate performance problems and skills gaps as they arise. Personalized e-learning and simulation can be directed to specific employees as a manager analyzes their performance in a dashboard.

### Affective public safety, the Semantic Web

The Semantic Web is perhaps the most promising technology relative to the affective learning domain.

New companies such as Semaview, Intellidimension, and McDonald Bradley are already developing products for the new standard.

The Semantic Web was originally conceived by Tim Berners-Lee, the leading innovator of the World Wide Web. According to Berners-Lee, "The Semantic Web is an extension of the current Web, in which information is given well-defined meaning, better enabling computers and people to work in cooperation."

The Semantic Web is an infrastructure that enables software and machines to "reason" about information on the Web. It's an extension of the current Web and not meant to replace it.

Semaview is developing "personalized information management" products and services using the Semantic Web and "is focused on creating the next generation of knowledge management tools using the latest technologies, such as agent-based computing, machine learning, and the Intelligent Internet."

Innovations in the Semantic Web are already being used by government agencies for gathering intelligence and ascertaining potential homeland security risks. It allows agencies to not only learn about the belief systems of people, but also the intentions of various people and groups.

McDonald Bradley is a company working with government agencies such as the Defense Intelligence Agency and the Defense Information Systems Agency to implement intelligence-gathering methods based on the Semantic Web.

### Pushing the boundaries

Not only are new affective learning technologies coming on the market, but they're being wrapped as XML objects that can be integrated with enterprise applications. There are components that measure the affective state of an individual and components that attempt to modify that person's state of mind.

HR-XML Organization is developing a wide range of XML standards that map to every phase of human resources, including competency

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maps and assessments. ePredix, along with Oracle, DDI, and Recruitsoft, are developing the assessment specifications for HR-XML.org.

Even though the XML standards coming out of the HR-XML organization are relatively new, already companies such as Oracle, CareerBuilder.com, Hewitt Associates, HireRight, Hire.com, Unicru, and Jobpartners are selling products developed on the standards.

The OASIS group is working on a standard known as Human Markup Language, or HumanML. Their goal is "to allow the conveyance of human characteristics through XML." The XML standard contains "sets of mod-

ules that frame and embed contextual human characteristics, including cultural, social, kinesic, psychological, and intentional features within conveyed information."

Human Physical Characteristics Description Markup Language, or HPCDML, is a superset of HumanML. HPCDML is being designed to "provide standardized description of physical characteristics of humans, with specific responsibility to harmonize and interoperate with widely accepted public health, medical, biometric, human modeling, and public safety standards," says OASIS.

The closest working XML standard that combines all three of Bloom's Taxonomy domains is the new Medical Markup Language, or MedicalML. It's already being used in medical training products in Germany.

Truly integrated products are rare, but it's now possible to develop a learning strategy that delivers remediation to all three learning domains simultaneously. The Final Frontier is in reach. **TD**

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