

Adult learning principles, technology, and agile methods combined to create greater learner engagement in this Lean Six Sigma Yellow Belt course redesign while demonstrating that these approaches can revolutionize the way organizations foster professional development.

Applying Adult Learning Principles, Technology, and Agile Methodology to a Course Redesign Project

Azizeh Elias Constantinescu and Newton B. Moore

Lean Six Sigma (LSS) transformations have been a core business imperative in many forward-thinking institutions and organizations that want to maximize profits and develop a fact-based decision mindset. These efforts often are started by providing education and training, but is that sufficient? Does training result in the gains expected from business leaders? Is the time-to-competence fast enough? Does it keep pace with the speed of business? Does training alone support the employee throughout the employee lifecycle? This article shares a case study that describes the UL

(formerly Underwriters Laboratories) LSS implementation.

The Journey

UL has been on its LSS journey for more than 13 years, and its program has evolved throughout that period to meet the changing needs of the organization. A decade into its journey, the company began to think about providing additional support to the LSS practitioners that would extend beyond a single training event and certification. The focus shifted to their long-term developmental need. The plan was to



deliver a suite of support services to anyone, anywhere, anytime around the world. Furthermore, LSS would be viewed broadly as the basic language of change for the enterprise and a cultural enabler for the organization to achieve world-class performance.

This approach began with the development of a LSS system of support and suite of services that were intended to generate professional growth for the community of LSS practice within UL on a just-in-time basis. Although traditional training and certification is still part of the system, more core elements were included such as creating a community of practice, leveraging social media to enable interaction; sponsoring showcases; and sharing best practices as well as developing a LSS knowledge channel, which contains curated, relevant, and useful materials that are constantly available. Additionally, webinars on select topics requested by the community were delivered, and the training courses offered were broadened. As the community of practitioners grew in numbers and competence, technical consulting services also became available.

The Opportunities for Improvement

UL's LSS Yellow Belt (YB) program provides an excellent example of how these services have been improved as experience with the support approaches has increased and learnings have been obtained. The first YB training was launched during the fourth quarter of 2016. This strategic decision enabled the language of change to be spread across the enterprise regardless of the involved stakeholder's role or technical expertise. The intent at UL always has been to enable process owners and operators to tackle continuous improvements at their worksites, using a common language and the fact-based LSS

problem-solving method. The two-day, instructor-led YB course addressed these specific goals and was well received when it was conducted globally.

In 2018, the business realized that it also needed to reach remote learners. About 25 percent of the workforce at UL is located remotely, so that employee segment has limited access to quality training. The challenge was to find an innovative method for delivering YB training and certification to those students. Enabling knowledge transfer and enhancing employee professional development also were key goals. By applying learning theory and adopting inputs from benchmark studies, an experimental approach was planned. It became clear that UL needed to take a critical look at the YB course design and content and to consider whether the material was instructor- or learner-centered. The company also needed to decide what tools and techniques are critical for the YB level of practice, and to explore new delivery methods in order to meet the business challenge.

Basic Learning Principles

When designing training programs, Johnson and Leach recommend using the following principles for developing and delivering material.¹ The objective should be to enable the student so that what is learned can be applied on the job.

1. "Basic types of training
2. Limitations to training
3. Natural learning via social activity
4. Change curve
5. Information processing
6. Readiness
7. Conditioning
8. Learning cycle
9. PESOS—an on-the-job training process; prepare the learner (readiness), explain the entire process, show (demonstrate), observe the learner, and supervise (follow up to encourage the learner).
10. Memory overload
11. Priority triangle
12. Gap analysis (training formula)
13. Retention rates
14. Attention span
15. Effect of anxiety
16. Confidence spiral"¹

The Redesign Platform

The redesign team saw this challenge as an opportunity to meet both the business and learners' needs by innovatively integrating the three following approaches:

- *Incorporating adult learning principles into the material design process to promote a learner-centered strategy.* The 16 adult learning principles shown in the sidebar were aimed at reducing what Johnson and Leach call "memory overload" and increasing reliance on a more natural learning process.¹
- *Leveraging technology to reach remote learners by using a system modeled after massive open online course (MOOC) design and the "flipped classroom" model.*² MOOC involves courses made available over the Internet to a very large number of people.

The flipped classroom is an instructional strategy based on blended learning that reverses the traditional learning environment by delivering instructional content outside of the classroom and then having homework done in the classroom.

- *Applying the agile design methodology to test the course design and content so that the curriculum could be adjusted quickly between classes based on learner feedback.* The agile design methodology is used most frequently for software projects. The UL team borrowed from that approach as modifications to the LSS YB class were investigated.

The Redesign Process

In order to integrate these three fundamental approaches, the traditional course design process was changed in many ways. Here is a brief summary of the new practices that were used to create breakthrough in the UL YB course contents.

- Material revisions occurred through several iterations where the design (and its improved versions) were tested on scheduled classes involving 10-15 students.
- Failures were identified quickly and their associated learnings led to rapid modifications. Being “scrappy” and imperfect was acceptable, and participants understood clearly that improvement iterations would be launched based on these experiences.
- Prior to each class, students reviewed an online orientation that explained the experimental nature of the course design and set appropriate expectations. Students understood there might be opportunities for improving the course and that they would be asked to provide feedback. They came to the training sessions with curious minds, wondering what they would experience with this new approach and offered invaluable insights and information that led to improvements related to the technologies, approaches, testing, and materials.
- Many approaches were used to gather feedback. For instance, in-class polling and idea generation helped identify changes in real time. Live edits of the materials and user-centric design elements were implemented and evaluated during the classes. Survey questions determined the application level of seven essential YB tools in the learners’ workplaces, which provided a more results-oriented form of assessing the redesign.

Delivery methods also were improved while the YB course was being revised. Ries describes a minimum viable product (MVP) as having only the features needed to satisfy early adopters of a new solution. They are eager for an improved approach and are forgiving of its need for improvements.³ This concept is integral to the agile methodology, and it reflects a lean orientation.

Students involved in the experimental classes knew that they would be experiencing a just-in-time course and would be asked to provide feedback on the good, the bad, the indifferent, and the ugly during the class. Based on their feedback, the course was adjusted for the next wave of learners. For example, MVP-1 used narrated Microsoft® PowerPoint® slides that were viewed online as a class group, but learners preferred to view the materials on their own ahead of the class session. So, MVP-2 leveraged technology to increase learner flexibility by allowing them to review the contents at the time/place that best suited their needs. Curated materials were posted on a Microsoft SharePoint® site. This shifted the design to a flipped classroom and allowed the class time to be more discussion-based, rather than lecture-based. In fact, the classroom discussions evolved into a learner-pull, instead of an instructor-push, approach. Coupling the agile methodology with technology enabled small changes to be made quickly and improve learners’ experiences during the development process.

Furthermore, the application of adult learning principles helped UL to realize that its courses reflected the trap that Dew described as “trying to teach participants everything they might possibly need to know about quality methods and philosophies.”⁴ Because the subject-matter experts on the design team were trying to include as much information as possible into a two-day course, the critical need-to-know and need-to-do objectives had been lost in a sea of information. During the agile redesign, the course was converted from 10 hours of instruction and six hours of disconnected practice to a more focused and readily applicable version that featured only two hours of instruction, four hours of focused practice and time for reflection on critical techniques needed by YBs, one hour of questions and answers, and one hour of testing for understanding.

Recognizing that memory overload is a reality and that learners’ attention spans are limited led the redesign team to narrow the content to the

critical elements required in order for the student to advance to the next level of understanding.¹ The intention was that by incorporating adult learning principles into the redesign, the knowledge transfer would be more effective and practitioners would be able to apply what they had learned quickly in their work assignments.

Conclusion

The synthesis of concepts from the adult learning principles, MOOC/flipped classroom, technology, and agile methodology has enhanced UL's redesign effort, creating a LSS YB training course that is learner-centric. This is a dynamic approach where the learners' inputs inform the content and delivery development process. It separates the must-have knowledge and skills from those that are less important. LSS YB training and certification are just one aspect of support and development that needs to be provided to practitioners as they begin using new concepts and tools as well as becoming increasingly mature in applying what they have learned. Through this innovative process, UL knows that people learn as they grow and they never are finished with their development. Therefore, UL will continue to move forward with course improvements that stem from agility, a scientific mindset, and practical experimentation. The company believes that this approach will provide the necessary support to practitioners throughout their involvement with LSS.

References

1. Scott D. Johnson and James A. Leach, "Training Fundamentals for Training Leads: Developing a Training Knowledge Base for Improved Training Performance," *UL University Training Course*, Northbrook, IL, April 2018, pp. 2-16.
2. Wikipedia, "Flipped Classroom," https://en.wikipedia.org/wiki/Flipped_classroom.

3. Eric Ries, *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*, Crown Business, 2011, pp. 76-77.

4. John R. Dew, "Learning About Learning: Advice on What to do When You're Called up to Teach Quality," *Quality Progress*, July 2018, pp. 30-35.



**Azizeh Elias
Constantinescu**

Azizeh Elias Constantinescu is a certified Lean Six Sigma Master Black Belt with 20 years of experience across the research and development, chemical manufacturing, mortgage, insurance, and the product testing/inspection/certification sectors. For the past 12 years, she has supported UL LLC on its lean transformation and acts as a lean leader within the enterprise. Constantinescu has helped to train and certify hundreds of LSS practitioners. She is the author of the book, The Art and Science of an Applied LEAN for Operations—Lean Sigma Practice Beyond Certification. Her email address is azizeh.constantinescu@ul.com.



Newton B. Moore

Newton B. Moore has led UL's organizational development initiatives for the past four years. Prior to that he led IT, nursing informatics, and quality initiatives at Lurie Children's Hospital. Moore also has been involved with corporate and university training related to quality compliance, business technology, and communication. Moore is certified as a Lean Six Sigma Black Belt. For more information, he can be contacted at newton.moore@ul.com.