Online Collaborative Course Design for Army E-Learning

Liston Bailey, PhD
Tammy Bankus, PhD

Abstract

The authors propose that learner interaction and engagement in distance learning courses require more than routine interactive treatments such as dragging and dropping objects. User experience and interactivity within the Army's offering of online courses should include levels of collaboration, along with social presence in each course. A discussion of related educational theories and design considerations is presented for consideration of Army instructional designers. In addition, the recommendations provided could enhance opportunities for collaboration and choice for learners.

Modern educational technology provides instructional designers with more options than ever before for creating immediacy, interaction, and collaboration in the design of distributed learning (DL) courses. In this writing, we suggest that the basic design features of online learning in Army DL courses can be enhanced to spark higher levels of engagement for soldiers and civilians. For too long, engagement in online learning has been erroneously construed as learner interaction with material on the screen–through gratuitous mouse clicking—that was expected to increase active learning.

Some writings have suggested that online learning should focus on communication and interplay among individuals rather than solely between the learner and media.[1] One can legitimately argue against the idea of course interactivity as simply an exchange of actions between the content and the user, measured on the basis of mouse clicks.[2] For example, a common design feature in Army online courses includes an area on the screen where the learner clicks an arrow to progress to the next learning section, in a linearly designed and controlled format. In fact, this form of learner-material interaction lacks needed learning relationships and strategies, so it can lead to poor learning outcomes.[3]

For the purpose of this article, we describe engagement as "the mobilization of cognitive, affective, and motivational strategies for interpretive interactions."[4] In this

context, these interactions are more likely to occur in a social context through on-task collaboration with peers. Learner-to-learner interaction and engagement requires more than merely engaging in learner-material interaction that consists of clicking repeatedly on a screen or dragging and dropping objects. In fact, this form of engagement is often referred to as passive learning. Passive learning "usually involves teacher-centered methods that favor direct instruction in which students often learn through listening to and observing lectures presented by an instructor," or in this case, passively going through lockstep content designed with little-to-no cognitive engagement or collaboration.[5] Based on the amount of innovative technology now available, the user experience and interactive treatments in Army online learning should include levels of social collaboration (e.g., peer-to-peer or learner-to-instructor), along with cognitively engaging activities.

Increasing Active Learning and Collaboration

An active online learning environment can be described as one in which learners cognitively engage with learning content, participate in socially constructed activities, and collaborate while learning.[6] This type of learning environment is likely to support higher levels of motivation, especially when learners are personally engaged or motivated to achieve a specific learning goal. When individuals perceive relevance and intrinsic value in learning materials, they are likely to engage in active learning activities such as reflection or self-monitoring. In addition, Army collaborative online courses could allow options for learners to *ask an expert* as they seek mastery of the learning objectives in a lesson or module.

The nature of DL requires learners to be able to engage in appropriate self-regulation.[7] This paper focuses on two theories of motivation and self-regulation that complement instructional design theories and can lead to a willingness to engage in learning activities: self-determination theory (SDT) and control value theory. The first theory, SDT, advances the idea of learners benefiting from more opportunities for autonomous (i.e., self-directed) learning within a course or area of study if they are intrin-

Liston W. Bailey, PhD, is a senior training analyst. He works in the Leader Development Division of Headquarters, U.S. Army Training and Doctrine Command (TRADOC) G-3/5/7. He holds an MA in education from Brooklyn College, City University of New York, an MPA from Old Dominion University, and a PhD in education from Capella University.

Tammy Bankus, PhD, is a senior instructional systems specialist for the Training and Integration Division at Headquarters, TRADOC G-3/5/7. She holds an EdS in educational psychology and instructional technology, an MEd in adult education, and an MS in psychology from University of Georgia, and a PhD in instructional design and technology, curriculum, and instruction, from Old Dominion University.

sically motivated to learn.[8] SDT as a characteristic of learning environments has been described as a path to increasing learner competence.[9] It is important to consider SDT when trying to design engaging DL content, since part of engagement involves personal levels of motivation. Intrinsically motivated individuals seek out learning experiences and tend to use effective learning strategies. For example, one can see versions of SDT in a course design where students can explore and practice using resources available in the online classroom to make use of self-assessments or to choose to work in groups.[10] The other educational theory worth mentioning is control value theory, which represents the concept that learners have achievement emotions about their skills and their abilities to complete an activity and attain its goal. At the same time, learners assign a value to the activity and focus on achieving success.[11]

Such theories provide a rationale for using instructional design techniques to challenge and engage learners while allowing for socially constructed learning experiences. When we design online courses so that intrinsically motivated students can control more of their learning path, we are supporting the precepts of self-determination, control, and intrinsic value as a part of active learning. Intrinsically motivated learning lends itself to collaborative learning strategies that enhance learning effectiveness. These theories provide the foundation for considering learner motivation and willingness to engage in effective DL activities.

Learner Collaboration in Distributed Learning

Collaborative behaviors in learning are differentiated by a learning framework with a continuum of four modalities, listed from most to least engaging: interactive, constructive, active, and passive (ICAP).[12] The ICAP framework for learning suggests that as students engage more with learning materials along this path, from passive to interactive, learning effectiveness also increases. In this sense, the idea of learner-to-learner interaction relates to social collaboration where learning activities build upon each other. Activities may require students to actively contribute to their learning in the form of defending or arguing a position, answering comprehension questions, or checking their assumptions with a partner. Interactive activities are proposed to be more engaging than constructive activities, and constructive activities more effective than active activities, with all three being more effective than passive activities. Higher-engagement learning behaviors may be supported if designers can promote *deeper engagement* through a diverse mix of learning strategies, tools, and dynamic materials. In this regard, online courses for the Army should be designed as collaborative learning opportunities with a balanced mix of learning strategies through technology affordances intended to drive the learning experience. A cognitive philosophy of course design that leverages the ICAP framework for collaboration can increase individual motivation and engagement.[13]

Current Army Distributed Learning Design

Army DL courses are too often based on a "one-size-fits-all" model of instruction. In other words, given the diverse composition of the Army's population of learners, online courses are designed to meet the widest possible audience. Granted, this way of designing online courses was once adequate as a way to disseminate knowledge to groups of learners in a Web 1.0 world. However, to incorporate learner-centric learning strategies and experiential learning options in line with the Army Learning Model, collaborative elements are needed.[14]

Many of the Army's DL courses are asynchronous in design. They do not take prior learning experiences into account, and they are not tailored to the individual. They offer limited feedback to learners and do not support learner-to-learner collaboration. For example, in spite of advancements in educational technologies and modern learning management systems, Army structured self-development courses for noncommissioned officers (NCOs) still rely mainly on passive activities such reading text on the screen or listening to a lecture.

Learning design of this nature is about passively taking in information. However, current research indicates that this type of education and training is neither learner centric nor effective at meeting the needs of adults.[15] A redesign of Army online courses, to make them more collaborative and engaging, could leverage Web 2.0 technologies and digital applications to support diverse learning activities. Granted, this proposal adds another layer to instructional design. While it is critically important to match objectives and course outcomes with appropriate strategies and methods, it is equally important to consider learner engagement.

For instance, for an objective that requires the learner to understand concepts, one could design an activity where the learner drags and drops examples to the appropriate category of concepts. While this is a strategy for teaching concepts, the activity of dragging and dropping material in and of itself does not mean that learning is occurring. Instead, the activity needs to include an element of learner engagement for deeper levels of cognitive processing. Given the same objective of dragging material to related concepts, and taking it one step further, the learner could engage with another student to explain why a given set is accurate or inaccurate. This collaboration engages the learner in "making meaning" with another learner.

Another example is to ask the learner to come up with additional categories the concept would fit into and to explain these categories to another student. The act of designing additional categories requires the learner to engage in elaboration strategies. The learner is then taking a concept and adding to its meaning, after which the learner must justify why this would be appropriate. In this sense, the strategy is matching the learning objective, while adding elements of engagement and interactivity, versus passive learning.

The DL environment can foster activities that encourage interaction, construction, and active learning through online discussions, debates, group projects, concept map-

ping, role-playing, content-related games, problem-solving activities, or even a semantic scavenger hunt. These learning activities require the learner to apply, synthesize, and construct new knowledge in collaboration with other learners, thereby changing a passive learning environment into an engaging one.

Media Alone Do Not Teach

Researchers in the field of learning science have long contended that media are merely a vehicle for delivering instructional content. Media do not on their own influence learners; rather, the strategies used to achieve the desired learning objectives influence them.[16]

Instructional designers need a strong understanding of what the intended learners need to know or do in order for learning to occur. While the media alone do not cause learning, technology offers certain affordances that allow an instructional designer to incorporate interactive media to help build effective outcomes. Even though this research is not new, Army learning institutions continue to design courses that unnecessarily add extraneous and ineffective strategies that do not truly engage the students in their learning. Courses such as these become nothing more than repositories of information, or what was once termed "shovelware."[17]

For instance, when an objective requires learners to think critically about an ethical implication of a course of action, but the content only requires them to read a linear selection of regulations, learners fail to experience the kind of interaction that could ensure they achieve the objective. Instead, the activity could ask learners to compare and contrast different ethics regulations. Then, they could engage in a scenario where one learner collaborates with another to defend an ethical position and to determine logical consequences. This strategy requires the learner first to understand given ethics regulations and then to engage in a collaborative problem-solving learning experience. In some cases, learner-to-learner collaboration may not be possible, but the learner could engage with a virtual tutor.

Options to design and develop such a learning experience range from low-cost (simple branching design) to complex (adaptive tutor) design. In a low-cost design, a feedback structure can be designed where the learner engages with a chat bot (text-based interaction), and the chat bot encourages the learner to engage in self-questioning activities or elaborate on positions. In a complex design, a probability-based decision tree can be used to determine a series of "if" and "then" features that would implement a similar strategy of self-questioning, feedback, and elaboration. In both examples, the learner is required to build on existing knowledge structures. Army instructional designers can build these types of interaction strategies into DL content. All of these examples require collaboration of some sort, which in turn can lead to deeper levels of learning.

Some may argue that the above examples apply only to education-related content. However, these techniques can apply to any content where learning requires

more than passive strategies. To give another example, if a learner is required to complete a series of steps to complete a task, the process can require the learner to interact with another learner or with a technology-based agent, where collaboration aids the learner in developing an understanding of when, where, and why a particular step is preferred. In this case, the added benefit is practice in a structured problem-solving environment.

To offer another example, in a collaborative design, students and their learning peers may participate in instant polls or use social media tools to share their understanding of the course content. Online audio or video quizzing, blogs, wikis, and Twitter feeds can easily be incorporated into a course design to enhance educational strategies.

Table. Suggested Collaborative Course Design Features

Method	Affordances
Learner pre-assessment	Allows the learner to assess current understanding of the content and needed areas to learn; aids the instructor in determining learner needs
Purposeful and chunked use of content (meaningful chunks of related content, especially critical for complex material)	Breaks complex learning materials into workable meaning chunks of content, allowing the learner to take advantage of available cognitive resources
File sharing and resource sharing	Encourages collaboration
Social media features (e.g., discussion boards, wiki building, blogs, vlogs)	Encourages collaboration
Collaborative activities and strategies	Encourages knowledge building and elaboration
Online self-assessments and quizzes	Enhances metacognition and self-regulation, scaffolds self-learning strategies
User control of content	Allows the learner to self-pace through content and review when needed
Scaffolding feedback	Provides quick and immediate feedback to help scaffold knowledge building. As the learner gains a foundational understanding, this would be delayed feedback to allow the learner time to work through and correct or understand issues.

(Table by authors)

An Online Collaborative Course Design

Up to this point, this paper has proffered the need to implement more interactive and collaborative instructional design practices for DL. It has emphasized

the need to consider matching learning and instructional strategies and methods to the desired course outcomes, while at the same time adding another level of learner engagement to the design. It is possible to design a DL course with deeper levels of learning effectiveness appropriately. This section will provide a potential DL course design for meeting interactive, constructive, and active-learning needs. A notional collaborative online course design would include the key methods and affordances outlined in the table (on page 71).

When designers integrate such features, they can create collaborative and engaging courses that will be similar to DL courses soldiers might receive from a university. Army DL courses should in the future make use of programming options that support purposeful use of media and dynamic visualizations. For example, newer versions of Cascading Style Sheets (version 3) (CSS3) and hypertext markup language (version 5) (HTML5) have adopted both audio and video tags to make it easier to integrate media into webpages. In addition, a Document Object Model is an application programming interface (API) format for the design of webpages used in DL courses that can allow for such flexibility that programmers can easily build documents, navigate structures, and manipulate content as needed.[18]

The Army, at the time of this article's writing, is shaping a DL contract vehicle that will potentially allow for the procurement and design of relatively complex pieces of media (e.g., games, virtual reality applications, or simulations) for use in DL courses. This is a positive development that will help to promote active engagement for online learners in the Army.

In addition, web tools such as chat boards and conferencing software are available that allow designers the opportunity to develop more collaborative DL courses. Examples of media that can be used to support more collaboration and scalable implementation in the design of DL collaborative courses include

- augmented and virtual reality apps,
- 3-D animations,
- immersive scenarios,
- mobile apps,
- real-time surveys or polls,
- video lectures or interviews,
- tutorials,
- audio books or podcasts, and
- blogs and wikis.

Mobile Learning Considerations

As the Army begins to move some learning content to the commercial cloud, soldiers will find greater opportunities to access nonrestricted DL content from anywhere on their mobile devices, such as Apple and Android devices.[19] Army online

courses in the future will need to be designed with mobile learning in mind, and they will need to use design principles associated with portability, social interactivity, context sensitivity, connectivity, and individuality.[20]

Security of the course materials and data integrity are of course important issues that must be considered when designing courses that include collaboration and social media elements. Nonetheless, DL is trending toward easy and open access to learning as a form of empowerment to the adult learner. This does not mean that the Army's online courses should be open access. Rather, the Army's goal should be to replicate some features of open-access courses without sacrificing data integrity. Other sectors of the economy, such as the financial services and healthcare industries, are overcoming security challenges that accompany access to just-in-time training with collaborative strategies.[21]

By having content that can be accessed at the point of need, a designer can tailor methods to objectives while considering both the affordances and limitations of the technology. For instance, if students were to access content through a mobile phone while riding a train to work, the content would need to be designed in blocked chunks that considered the screen-size elements and limitations, along with the ability to access materials while on the go. In this instance, an interactive multiplayer game in which an individual navigated through a virtual training environment to complete tasks would be inappropriate. However, if the individual were to use a personal laptop at home, the interactive game might be appropriate.

Ideally, any learner could engage in small chunks of content, measure his or her learning by accessing quizzes, and receive personal recommendations regarding needed content while progressing toward meeting learning objectives. The mobile content can include such features as augmented reality.

Commercially Used Design Approaches on the Web

An evolution is now necessary to adjust instructional design strategies to support meaningful user experiences while meeting the learning requirements of soldiers and Army civilians. For example, structured self-development courses for the Army's NCO cohort consist of as many as eighty hours of presentations that, in general, do not require meaningful forms of collaboration to cover the course material (e.g., online discussion). The course designs, linearly based with limited engagement activities, are not engaging or learner centric.

The user interface that Army online courses now present is less dynamic and vibrant than what is common in the private sector. For example, online e-learning offerings by edX, Coursera, or LinkedIn Learning are typically designed around an expert leading the learner through the learning content. They are usually built on an arrangement of chapters, short lecture videos, exercise sheets, and a chapter quiz or reflective activity through which learners can assess their understanding

of the content. Often, short, high-fidelity video and podcasts are provided to draw the learner's attention into a real-world context discussion of the lesson topics. Occasionally, in place of a scripted lecture, one individual interviews a subject-matter expert to shed light on relevant concepts and principles while learners watch. Words on the screen are rarely used in combination with graphics. Another appealing aspect of this manner of content presentation is that it provides a seamless user experience based on modern programming features that do not require students to open multiple screens to see their progress.

Content in commercially available DL courseware usually is chunked into small video segments. Each segment typically consists of an interview with a subject-matter expert (i.e., expert voices) or a narrated explanation of a real-world application of a concept, process, or procedure. In addition to the chunked video selections, there are exercises and collaboration activities learners may use to practice and apply their learning. This approach provides greater opportunities for authentic practice of the knowledge or skills being learned.

In contrast, Army online courses are too often force-moderated page turners that violate principles of multimedia learning, and they may add extraneous processing tasks for the learner. For instance, an Army design typically includes a PowerPoint presentation of content with an instructor's voice recorded over the slides. The content is designer versus learner controlled, and there is limited use of interactive, constructive, or active learning strategies. When the material is complex, this passive design can lead to a lack of learning or even negative outcomes because learners are unable to engage in active construction of their knowledge.[22]

Contrary to principles of effective instructional design, the Army's online courses often are overloaded with charts, graphics, or small symbols that may be difficult to read depending on the size of screen being used.[23] For example, the modality principle for instructional design states that people learn more deeply from graphics with narration than from graphics and online text.[24] This research is not new, so when will Army instructional designers start using more effective DL design principles? As the future of technology progresses and research continues to open up the possibilities of effective instructional strategies, Army instructional designers can shift current design strategies to take advantage of emerging capabilities.

Concluding Thoughts

This article is intended as a jumping-off point for stakeholder discussion about modernizing the design of Army DL products by making them more collaborative and engaging. The Army successfully manages an enormous training infrastructure that delivers resident and DL training annually to hundreds of thousands of individuals. However, the Army could promote a more active-learning environment within collab-

orative DL courses based on information technology advancements and trends in the DL industry. The following list contains additional recommendations:

● Make targeted use of a variety of media formats, and chunk content within DL courses.

● Incorporate media and design elements within online courses based on a cognitive philosophy of interactivity.

● Administer a pretest to allow learners to test out of portions of a lesson or module where it makes sense, and then "microteach" each learner by directing him or her to just those lessons or knowledge needed.

● Use appropriate instructional message design techniques to maximize learning opportunities (e.g., signaling key words and limiting unnecessary information).

● Include self-learning strategies to aid the learner in developing self-regulation skills (e.g., prompt note taking or self-questioning techniques).

● Use generative strategies to help with deeper levels of cognitive processing (e.g., elaboration or designing a new explanation for a theory presented).

● Allow for self-assessments where appropriate and provide additional opportunities for learners to reflect on their competencies and understandings of concepts.

● Include Web 2.0 collaboration (e.g., wikis, discussion threads, or online chat rooms) to allow groups of learners to check each other's assumptions about their experiences.

● Find opportunities to make online learning more social, and allow learners to collaborate using Web 2.0 tools and applications.

● Establish a design committee among Army schools to formulate the next generation DL design requirements for Army education.

In writing this article for the *Journal of Military Learning*, the authors are not simply offering a causeless critique of Army DL. Many of the current online DL courses meet their intended purpose of providing useful information to learners. Rather, this paper emphasizes opportunities to make online learning more collaborative and engaging through better instructional design. The American essayist Henry David Thoreau once wrote, "Knowledge is to be acquired only by a corresponding experience. How can we *know* what we are *told* merely?"[25] Active learning and collaboration in online courses are a vehicle for that type of corresponding experience.

Finally, the Army should conduct a review of design features for its online courses with the greatest number of learners. There may be opportunities to use current dollars better while making online courses more tailorable, collaborative, and engaging for more learners. ❧

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