Interagency Collaboration Produces Sharable Training

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ABSTRACT

The Veterans Health Administration (VHA) Employee Education System (EES) has launched a collaborative effort with their counterpart agencies in the Air Force, Army, Coast Guard, and Navy to develop reusable training content that demonstrates effective instructional design, high production quality, and applicability to multiple agencies. This effort is in direct support of the Advanced Distributed Learning (ADL) initiative and is proving the Sharable Content Object Reference Model (SCORM®) concept.

This paper summarizes efforts of the first two pilot training programs developed under this initiative, noting insights applicable to the ADL community and others involved in interagency cooperative efforts. The first course, dealing with the prevention and management of workplace violence, provides learners experience through scenario-based exercises. The second is a training program for Pharmacy Technicians. It is extensive in scope, preparing technicians for certification exams, and providing didactic, laboratory, and clinical training. Both programs are, or will be, developed to the SCORM® 2004 specification.

The diversity of these two programs reveals critical success factors for the design, development, and management of SCORM-conformant training. At a course management level, this includes increasing the effectiveness of interactive collaborative efforts. At the course creation level, this includes the design of learning objects for maximum reusability and sharability, the use of sequencing strategies to provide flexibility, and the impact of SCORM on project activities.

ABOUT THE AUTHORS

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BACKGROUND

In September of 2005, the Department of Veteran Affairs, Veterans Health Administration, Employee Education System, established a policy calculated to institutionalize, as far as is possible, a culture of openness and reusability in government healthcare training. This policy was based on an Executive Decision Memorandum (EDM) (Twitchell, 2005). Veterans Health Administration (VHA) is in a unique position to nurture this effort. Department of Veteran Affairs (VA) healthcare facilities provide a broad spectrum of medical, surgical and rehabilitative care. VA operates more than 1,300 sites of care, including 157 hospitals, 725 ambulatory care and community-based outpatient clinics, 136 nursing homes, 43 residential rehabilitation treatment programs, 206 Veterans Centers, and 88 comprehensive home-care programs. The VA healthcare system is the largest in the world and although education and training is always subordinate to patient care, it is viewed as an essential element in maintaining the highest standard of care and readiness.

The funding of effective healthcare education and training has always been a concern and, with increasing healthcare needs and services, the necessity of leveraging the limited budget has become increasingly important. One means of leveraging training dollars within government healthcare comes from the congressionally commissioned and Department of Defense (DoD) mandated efforts of the Advanced Distributed Learning (ADL) initiative office and its Sharable Content Object Reference Model (SCORM). ADL was chartered to provide the means for reducing training redundancy within the Department of Defense specifically and in government generally. Although versions of this model have been available for some time, it has only been recently (with the release of SCORM version 2004) that it has become more practical, even instructionally efficient and effective, to institutionalize conformity to the model.

In September of 2005, the Employee Education System signed the Executive Decision Memorandum into policy, officially endorsing and adopting the SCORM specification and laying out a plan of execution. EES initiated steps in the plan to convert all existing training, and to develop all future training, conformant to this model. The plan also includes updating training delivery infrastructures and systems to provide the benefits of this conformance.

The establishment of this policy was dependent upon a reasonable business case and return on investment (ROI), as well as the probability of organizational interoperability and committed sharing partnerships and the alignment of this effort with VA/VHA organizational objectives. EES set the following goals:

(1) Develop and conduct educational interventions that support VA and VHA strategic priorities and result in measurable learning and performance change.
(2) Provide a learning infrastructure that increases access to and timeliness of learning opportunities.
(3) Create partnerships to better develop, deliver, and use EES educational products and services.

The remainder of this article is written from the perspective of EES.

VITAL Collaborative Training Network

In order to meet these goals, we determined the need to establish cooperative design and development relationships and sharing partnerships with other healthcare service-providing government agencies. The list of such agencies includes all DoD agencies, the Department of Homeland Security, and the Department of Health and Human Services. At that point, no known organization existed to assist in this collaborative effort and much time was spent identifying appropriate personnel, gaining support and cooperation, and negotiating working agreements.

Initially, the effort was referred to as the Collaborative Health Training Initiative. Word spread quickly and, as interest grew, the initiative evolved into what has been named the VITAL Collaborative Training Network. The goals of this network are to:

• Identify education and training needs that cut across government healthcare organizations and are suited to maximum cost avoidance and savings for multiple agencies.

• Collaboratively develop healthcare training that is accessible to, and can be shared by, all federal

healthcare agencies, as well as other participating public and private healthcare organizations.

- Reduce costs born by individual agencies by sharing resources for course design, development, deployment, and maintenance.

- Reduce duplication of effort among federal healthcare-providing agencies.

- Promote quality, highly interactive curricula that appropriately and efficiently meet instructional goals and objectives through the application of predetermined instructional standards and formal instructional design processes.

- Support the ADL initiative by developing SCORM conformant training, in alignment with DODI 1322.26 (*Development, Management and Delivery of Distributed Learning*) and compatible with partner Learning Management Systems (LMSs).

In summary, our efforts were calculated to help organize and focus the collaborative strengths of multiple government agencies providing healthcare, to collectively elevate each agency's instructional integrity, and increase interoperability, affordability, durability, reusability, accessibility, and maintainability of their training programs.

Pilot Courses

To achieve these responsibilities and the corresponding VA goals and objectives, we determined to initially focus on training projects that held the highest potential for generalized application, reusability, and return on investment. The initial strategy was to identify a small test course that could be used as a pathfinder and prototype; a course with stable and established content that would test the collaborative process and pipeline rather than the coordination and consensus of subject matter experts. In early 2005, we identified the "*Prevention and Management of Disruptive Behavior*" (PMDB) course as meeting these criteria. This course was completed in September 2006 and accomplished several important goals, including:

    (1) Established a workable cooperative relationship with the Department of the Navy, sharing funding and management responsibilities.

    (2) Formulated a pattern for collaboration with other agencies through establishment of an interagency design team with Navy, Air Force, Army, and VA representation.

    (3) Established an instructional design and development benchmark.

    (4) Documented a case study for future reference for the VA, other government agencies, and the ADL community.

    (5) Identified and established a collaborative design and development network.

After successfully launching the PMDB course, we determined the next course would need to expand the envelope of our operational domain, proving the flexibility and applicability of our collaborative model across a range of courses and training environments. We began looking for a more extensive course or curriculum that would present size and complexity challenges. We felt that we needed a course that would help us unite government agencies, challenge our organizational structure and processes as well as force us into interactions with multiple subject matter experts, organizational policies, procedures, methodologies and even management and administration. Only then would we understand the needs of an interagency collaborative development network and the requirements for success; only then could we prove the viability of the mandate to jointly fund and collaboratively design and develop large education and training interventions successfully.

An ideal candidate for such a case study arose out of a VHA need to acquire or develop a training program for Pharmacy Technicians. Prior to this, the VHA had been able to hire trained and certified Pharmacy Technicians. Changing business conditions and objectives created a desire for internally-available Pharmacy Technician training. The VHA began discussions with the Navy about acquiring content from the Navy Pharmacy Technician Training program. However, resources for converting this content for VA use were not available and the idea stalled until it was considered to be part of EES's collaborative initiative. At this point, resources to perform a training analysis and high-level curriculum design were acquired. In the spirit of collaboration, the analysis was scoped to include other federal agencies willing to participate. Almost serendipitously, the effort coincided with a DoD decision to consolidate healthcare training programs. Over time, an interagency design team consisting of Air Force, Army, Coast Guard, Navy, and VA representatives was formed.

DESIGN AND DEVELOPMENT PROCESS INITIAL INSIGHTS

At the time of authorship, both projects were in development. Initial observations and lessons learned

are organized according to the design and development process applied to these courses.

Soliciting Interagency Participation

Forming a collaborative network of training partners is one of EES's goals and these projects provided the substance needed to solidify relationships. The Navy was already a partner. Counterparts in the Air Force, Army, and Coast Guard were contacted and eventually incorporated. Interagency design teams were formed. Membership on these teams ideally consists, where appropriate, of a subject matter expert and training representative from each participating organization.

Incorporating stakeholders early on in the process is essential for product quality and consistency, particularly the design of truly sharable training. When the appropriate stakeholders are unknown, adequate time should be allotted for identification. Even when the benefits are obvious and the costs to the organization are minimal, one should be prepared to address concerns that run the gamut from the need for agency-specific training to cumbersome organizational processes and requirements for training development.

Selection of design team members has proven to be a step requiring some thought and analysis on the part of those assigning personnel. Those participating should have the ability and knowledge to make decisions related to the content and/or training implementation. Ideally, while occasionally inevitable, members should be able to participate throughout the life of the project. Changing project membership midstream can cause havoc with continuity of design decisions and the consequent project delays can be debilitating.

Decision Making and Arbitration

With good facilitation, a design team can typically reach consensus on every decision. Where multiple organizations are involved, we have found it helps to have a neutral third-party organize and facilitate the process. In these projects, a nonprofit research and development company skilled in facilitation, SCORM, and training development took that role, organizing and executing the projects.

The arbitration process should be discussed early on in the project to decide how a final decision is reached amidst controversy or disagreement. In the case of PMDB, the recognized subject matter expert in the field was designated as the "final say," or singular point of authority. The Pharmacy Technician Training program has five organizations participating at relatively equal levels, and decided to give each organization one vote when consensus cannot be reached. To date, it has not been necessary to take a vote, but the process is in place should this situation occur.

Particularly in the early stages of an organization's implementation of the SCORM specification, it might be necessary to educate team members about SCORM 2004 sequencing and navigation capabilities. When the goal is to develop sharable content, reaching agreement on "core" content is the main task, but each organization also has the option to develop contextual segments of content that can be delivered to only their own target audience. This should alleviate some of the pressure to agree on everything.

Project Kick-off

The main purpose of a project kick-off meeting is to gather together (virtually or physically) the main stakeholders and lay out the high-level plan for achieving project goals. Products, timelines, critical success factors, communication methods, and roles and responsibilities for the entire team are presented, discussed, and approved.

The kick-off meeting is ideal time to focus the team on the project vision. Establishing criteria for overall project success is an important kick-off discussion, which will function to mitigate surprises and miscommunications as the project progresses. These criteria set the team on a course toward common goals.

When there are significant changes, an additional meeting may be required. In the case of the Pharmacy Technician Training Program, a DoD decision changed the operating environment and additional stakeholders were added to the team, necessitating a second kick-off meeting months after the project originally started. This second meeting proved to be a critical project milestone.

Project Communications

Our interagency design teams are a geographically disparate, busy group of people. An in-person Design Team meeting (3-5 days) scheduled early in each project proved invaluable to the development of a functional team and in improving communications throughout the life of the project. Throughout the project, regular review sessions were scheduled using technologies such as web-conferencing and tele-conferencing. Project activities and deliverables were organized on password-protected internet (see Figure

1) sites, providing immediate visibility into project status and access to archive documents and the most recent project materials.

Figure 1. Pharmacy Technician Training Project Website

Analysis and Requirements Gathering

Maximizing potential for reaching agreement and designing a solid, sharable course usable by all participating organizations meant communicating individually with each design team member at the start of the project to solicit input on their particular areas of expertise. All were asked about overall requirements for the training; subject matter experts were queried about audience characteristics, content, and the learning environment. Training representatives contributed design and technical requirements. Requirements were entered into tables, given unique numbers, and formed the basis for requirements discussions at design team meetings. These requirements were approved and signed off by design team members prior to full-scale design and development.

Sharing the draft requirements early is important for team communications and decisions. The requirements define the measure of success.

When combining the needs and requirements from multiple organizational stakeholders, plan for extra time in the analysis phase; understanding how these requirements align adds integrity to the resulting design.

Design Workshop

Travel budgets are tight within the government, but one in-person working meeting near the beginning of the project can create efficiencies throughout the life of the project. Each of these projects had an in-person Design Workshop (see Figure 2). The PMDB workshop was held at EES facilities in Salt Lake City, Utah, in November 2005, with Navy, Air Force, and VA representatives in attendance (Army representatives joined the project at a later date). The Pharmacy Technician Training workshop was held at Fort Sam Houston in San Antonio, Texas, in June 2006. The entire design team was in attendance, with training and subject matter experts from the Air Force, Army, Coast Guard, Navy, and VA.

At the workshops, analysis results and requirements are typically finalized and design elements are discussed and agreed upon. The meetings are organized to solicit stakeholder input, as well as discuss important issues and possible barriers to success. Advanced planning and concentrated effort have made these meetings very productive, improved interagency communications throughout the life of the project, and streamlined tasks for team members during the remainder of the project. There are many benefits of a face-to-face design meeting, but above all are the spirit of teamwork and cooperation it fosters. In each case, members left the meeting unified on a common vision, secure that remaining details would be tracked and coordinated with their guidance.

Figure 2. PMDB Design Workshop – SCORM Sequencing Activity

Design Workshops are also a time for learning and clarifying misunderstandings. Training in SCORM sequencing and navigation was included in the PMDB

workshop. The hands-on portion of the training allowed participants to experiment with the PMDB content, exploring the possibilities through which a learner might experience the course. At the Pharmacy Technician Training workshop, many participants were inexperienced with the state and operation of web-based training and the capability of strong, media rich, and highly-interactive training experiences.

Design Concept and Prototype

The Design Concept details all aspects of the final product from lesson structure, to activity trees showing course organization and sequencing rules, to interface design and development specifications. The process of creating the report is where the team makes critical decisions. It allows them to think about how to structure the course, optimize the content for reusability, and be creative in presentation and instructional strategies. It's important to "push" issues until they are completely clarified and agreed upon. Doing so can prevent misunderstandings and rework.

A rapid prototyping model (Twitchell, 2000) was followed, beginning early in the process, to gain feedback from the design team in working out design and development decisions, but also to the extent possible, to work out potential development obstacles, and perform SCORM testing.

Using a rapid prototyping approach (see Figure 3) provided fodder for discussion about instructional strategies. As the content was still being finalized and storyboards were yet to be written, activities, media, and content were placeholders, but helped team members create a solid design for the final product.
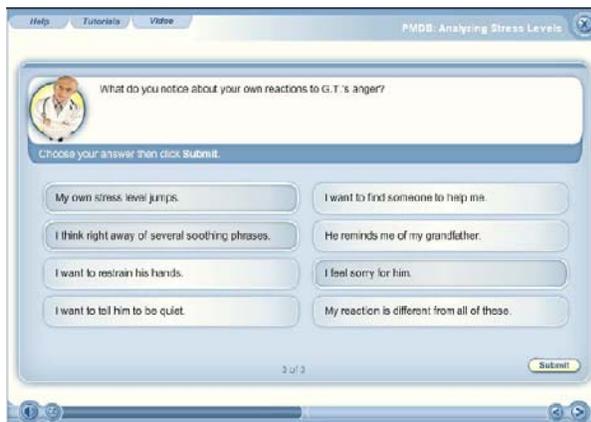

Figure 3. Screenshot from PMDB Prototype Content Analysis and Instructional Design

The content was analyzed and updated according to the requirements specified by the design team. Once the final content was approved, it was molded into storyboards according to the course design laid out in the Design Concept. For both courses, the focus was on sharability. Activity trees (see Figure 4) showed the final decisions for reusable learning objects and sequencing.
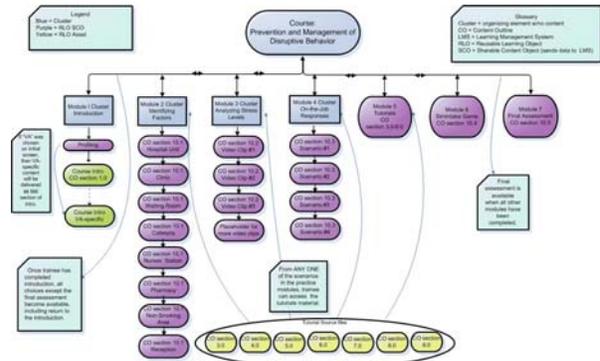

Figure 4. PMDB Activity Tree

One of our lessons learned after developing the content for the PMDB course was to rework the training content from the original course prior to sending it out for review from other organizations, as this material may not have been edited or reviewed in years. It is preferable to organize it in a way that makes it accessible to team members and to the extent possible, presenting the content in context-neutral chunks. This speeds up the content review process and assists the design team in breaking content into reusable learning objects.

The Air Force, Army, and Navy each had established Pharmacy Technician Training programs. In this case, it was necessary to perform a curriculum comparison of the three programs, overlaying VA and Coast Guard needs. At the Design Workshop, the design team established a "core" curriculum based on the results of the analysis and curriculum comparison.

When first approached about collaborating on content, a common concern expressed was the need to incorporate content specific to the organization. In both courses, when the team members were brought together for a content comparison, the content was determined to be surprisingly similar. In the PMDB course, for example, only a few alternative screens of content were required for VA learners. Transparently implementing a small learning object that only VA learners see is simple using SCORM 2004 sequencing capabilities. The same concept also works for larger programs such as the Pharmacy Technician Training program, where learners will have a program individualized to their job role and organization.

Designing and Developing to SCORM

At the time of authorship, the Pharmacy Technician Training program is in initial design stages. The core curriculum has been chunked into basic reusable components, but further analysis is needed to break these into clusters of reusable learning objects and to further define sequencing rules. Therefore, the majority of this section is based on the PMDB course.

The contractor managing the design and development of these courses is a leading SCORM developer, particularly for SCORM 2004. Working with experienced personnel has allowed the government to sidestep many issues and challenges typically encountered by those designing and developing to SCORM for the first time.

It is also advised that the instructional designer, graphic designer, and developer/programmers start collaboration at the beginning of the project. Understanding the instructional design can save the developer time and rewrites. Likewise during design, the developer can make suggestions that will streamline the production process down the road.

One of the biggest challenges turned out to be implementation in Learning Management Systems (LMSs). None of the stakeholder LMSs were capable of running the course during the time of PMDB development. The ADL Run-Time Environment (RTE) played the content, and was used by the contractor team, but government team members encountered challenges in installing the RTE. The contractor had access to a SCORM 2004 conformant LMS. The LMS vendor claimed to be ready to host SCORM 2004 conformant content, but after confirming the contractor's content and code were conformant, the vendor worked with the contractor to resolve playback issues. Consequently, providing prototype iterations for design team review proved difficult. We resorted to web-conferencing and screen-capture demos until we were able to provide LMS access. Web-conferencing and other demos were sufficient tools for demonstrating the prototype, but did not allow team members to experiment with the prototype at their leisure.

There is still much to be studied about the best design for SCORM 2004 within LMSs. While LMSs are perfecting their systems, it is advisable to regularly test components in each target LMS. Even in the future, LMSs will have control over how navigational elements outside of the content are displayed. A thorough understanding of each target LMS is important for effective SCORM 2004 implementation. Finally, it is essential to follow an effective Instructional Systems Development model. Sound instructional design theory is generally independent of the technology or delivery modality, however, the optimal application of theory and research is always a tailored process dependent upon content, audience, and many other variables. Executing sound instructional design theory (Twitchell, 1994) is a key factor for success; indeed it is crucial to make theory-based strategies operational if the instruction is to be effective. Finding SCORM-friendly design strategies to make operational Advanced Organizers, to optimize retention of facts, to teach concepts, the recall of facts or in bringing procedures to a state of automaticity, have to be addressed by their instructional objectives and necessitate the employment of skilled instructional designers and developers. Every effort has been taken to ensure the highest standards of instructional design in these collaborative projects.

Metadata

Metadata is critical to future reuse of content. In 2004, the VA determined that a comprehensive healthcare metadata tagging taxonomy was needed. An evaluation of existing taxonomies was undertaken and after reviewing the options and evaluating the time and cost of development, it was determined that the MedBiquitous taxonomy was most mature and best suited for the healthcare community in general and particularly advantageous for the VA. The MedBiquitous non-profit healthcare organization welcomed the adoption and offered their expertise and assistance in adapting the taxonomy and in the initial implementation. Although the effort is not complete, the use of this boiler plate taxonomy has saved months of work and expense. As the taxonomy was in the process of being developed, it was difficult to define specific requirements in the statement of work. Specific elements to be tagged were not contained in the Design Concept, and metadata for reusable objects was created later than would typically occur.

508 Compliance

The audience of the PMDB course in particular necessitated compliance to government Section 508 accessibility requirements. The architecture was designed to accommodate the color-blind, sight-impaired, hearing-impaired, and those who prefer not to use a mouse. SCORM 2004 sequencing allowed for delivering multiple-choice instead of drag-and-drop exercises to those who require keyboard shortcuts

instead of mouse usage. A separate screen-reader friendly HTML page will display content, and a default option is available for closed captioning of audio and video (see Figure 5).
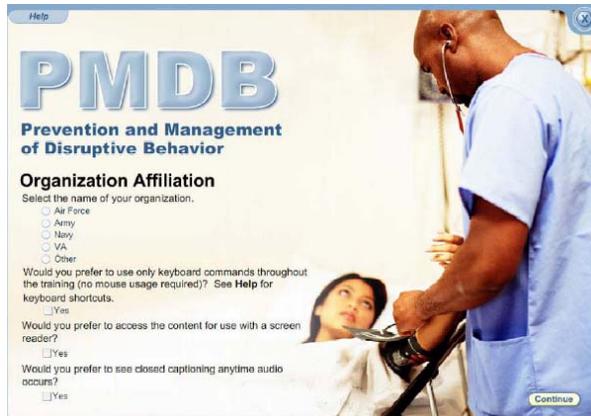

Figure 5. "Section 508" Presentation Triggers

CONCLUSION

Healthcare training offers a unique atmosphere for collaboration and sharing in that the many healthcare-providing agencies in the government adhere to a model of best practice and research-based standards that are nearly universally accepted. This means that consensus is much more easily reached than in other training domains. We have outlined the first two projects of their kind using a collaborative design and development philosophy and model. These projects are purposefully diverse: 1) PMDB, largely soft-skills training, consisting of approximately three hours of training content, and 2) the Pharmacy Technician Training program that will combine three accredited training programs, for future use by five organizations, and converting as much as 150 hours of didactic training to an online format. These projects have purposely pushed the envelope of interagency administration and management, instructional design and development processes, methodologies and organization. There have been many challenges and much learned, all contributing to the realization of a new collaborative training paradigm in government healthcare training.

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