T/TAC
NEEDS ANALYSIS

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Immersion Team 2007-2008:

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1 INTRODUCTION

Needs Analysis conducted by the 2007-2008 T/TAC Online immersion team builds upon the team's performance analysis completed on October 8, 2007. The performance analysis examined the current state of the Training and Technical Assistance Centers (T/TACs) and the associated T/TAC Online Web site sponsored by the Virginia Department of Education. The T/TAC mission is to "to improve educational opportunities and contribute to the success of children and youth with disabilities (birth - 22 years)." (TTACOnline.org)

The performance analysis completed by the 2007-2008 immersion team revealed a broad variety of issues and needs with respect to the client organization. After conducting additional interviews with T/TAC staff as part of the needs analysis process, the immersion team considered expanding the scope of the needs analysis. The team discussed this option with the client but then resumed in its original direction based on clarification of the priorities and perceived long-term needs of the client.

The performance analysis recommended more extensive needs analysis in three areas in support of the T/TAC mission which are listed here in priority order:

1. Possible development of a virtual collaboration center in the staff-only section of T/TAC Online to enhance productive collaboration and communication among T/TAC staff, provide a collaborative workspace for priority project teams, support collaborative development of training materials, and enhance collaboration in other areas depending on the needs identified.
2. Creation of resources to support T/TAC staff development with respect to their ability to use newer training creation tools, such as Flash, Camtasia, Articulate, Captivate, podcasting, accessibility tools, annotated Powerpoint presentations, or others.
3. Customization of T/TAC Online content for individual users.

Additional discussions with the client and key stakeholders concerning the results of the performance analysis resulted in a decision to focus on the activities and needs of the assistive technology priority project team within the regional T/TACs. The assistive technology team is the leader within the broader T/TAC organizational culture with respect to harnessing new technologies to accomplish organizational objectives more effectively and efficiently. It was also decided that the needs analysis should address only the first two recommendations noted above.

The needs analysis examines the capabilities and limitations of existing and emerging technologies and tools in light of the current activities and objectives of the assistive technology priority project team. The needs analysis attempts to identify what types of functionality are most feasible and would be most useful in a virtual collaboration center and what types of resources would be most valuable in supporting the use of newer training creation tools as envisioned in recommendations 1 and 2 above. The analysis thus focuses more on supporting performance (collaboration) than on instruction.

2 TARGET AUDIENCE

The Virginia Department of Education (VDOE) has issued several special education related mandates. The Training and Technical Assistance Center (T/TAC) has established priority projects in response to these mandates. Priority project teams consist of T/TAC staff members from across the state with the focus of supporting specific areas of the Virginia Special Education Improvement Plan (VDOE Training and Technical Assistance Center at George Mason University, 2006).

Based on additional data collection with the client and SMEs (Dr. Michael Behrmann, Dr. Marci Kinas, Dr. Shuangbao Wang, Anna Evmenova, Kristine Neuber, and Mary Wilds), the Immersion Team determined that members of the Assistive Technology (AT) Priority Project will be the target audience for a virtual collaboration center offered through T/TAC Online.

The AT Priority Project's "goal is to increase access to the general education curriculum for students with disabilities through the use of assistive technology (AT). This project supports the accommodations and modifications that are necessary for students with disabilities to master curricular objectives and to participate in statewide assessments" (Helen A. Kellar Institute, 2007).

AT Priority Project members are seen as the technology opinion leaders for their fellow T/TAC staff. They are motivated to investigate new tools that will reduce the amount of travel time for face-to-face meetings, and they are enthusiastic about exploring new technologies. If AT Priority Project members successfully collaborate in a virtual environment, its use will likely diffuse to other T/TAC priority project teams.

A VDOE Project Coordinator and 13 T/TAC staff members from five T/TAC regions within the state of Virginia serve on the AT Priority Project team.

Name	Title	T/TAC Region
John Eisenberg	AT Priority Project Coordinator	VDOE, Special Education Instructional Services Office
Michael Behrmann	Director, Helen A. Kellar Institute for Human disAbilities	George Mason University (Region 4)
Soojin Jang	Assistive Technology Coordinator	George Mason University (Region 4)
Seunghun Ok	T/TAC Online Manager, Helen A. Kellar Institute for Human disAbilities	George Mason University (Region 4)
Clare Talbert	T/TAC Online Coordinator, Helen A. Kellar Institute for Human disAbilities	George Mason University (Region 4)
Estella Landeros	Assistive Technology Coordinator for T/TAC	George Mason University (Region 4)
Brian Dye	Technology Coordinator	Virginia Tech (Regions 6 & 7)
Teresa Lyons	Severe Disabilities Coordinator	Virginia Tech (Regions 6 & 7)
Sharon Jones	Program Specialist - Early Childhood Populations	Virginia Commonwealth University (Regions 1 & 8)
Fran Smith	Technology Coordinator	Virginia Commonwealth University (Regions 1 & 8)
Mona Pruett	Program Specialist - Assistive Technology | Significant Disabilities	Virginia Commonwealth University (Regions 1 & 8)

Name	Title	T/TAC Region
Debbie Yancey	Coordinator	James Madison University (Region 5)
Carol Wiegle	Coordinator	James Madison University (Region 5)
Mary Wilds	Statewide Coordinator for Distance Education	Old Dominion University (Regions 2 & 3)
Brenda Lucus	Assistive Technology & Instructional Specialist	Old Dominion University (Regions 2 & 3)

* *Clare Talbert is not a member of the AT Priority Project, but as the T/TAC Online Coordinator, has been included in audience interviews to help the Immersion team better understand audience needs and audience interaction with T/TAC Online.*

The majority of AT Priority Project members have a master's degree in special education and, in the past, worked with students with disabilities in local school systems. Most of the AT Priority Project members have worked at T/TAC for 5-7 years. In addition to the AT Priority Project, each AT member is also involved in other Priority Projects within T/TAC. For some AT Priority Project members, the majority of their work time is spent on AT Priority Project tasks (approximately 80-85%), whereas others spend approximately half of their work time focused on the AT Priority Project (approximately 45-50%). This is largely due to the differences in regional T/TAC priorities.

3 CURRENT COLLABORATIVE/COMMUNICATION ENVIRONMENT

The 14 members of the AT Priority Project team are dispersed at several locations in Virginia. Their daily schedule may include meeting with school teams to provide training or support on a variety of subjects relating to children with disabilities. They may meet or collaborate with other AT Priority Project team members or sub-committee members to accomplish the tasks of the AT Priority Project team. Collaboration may be accomplished face to face, via email, via the phone, or using a combination of these methods. On occasion, conference calls are used to enable conversation among more than two people. Word processing documents are often exchanged as email attachments. Collaboration on electronic documents is normally asynchronous. T/TAC professionals have access to an area in the staff-only section of T/TAC Online where files can be posted and shared, but minimal use has been made of this feature.

The AT Priority Project members typically meet face to face a few times a year. This requires some members to drive a number of hours, even staying overnight in some cases--taking more time from their already hectic schedules. Sub-committees may have additional meetings. Two members of the team work from home offices.

The full team has also attempted to meet using available videoconferencing equipment in between face to face meetings. They report having technical difficulties with videoconferencing, such as delays in or complete lack of audio transmission. Not all staff members are comfortable participating in videoconferences. Most do not know how to use the videoconferencing technologies that are currently available to them.

AT Priority Project members may also meet or collaborate with other T/TAC professionals on other priority projects in their own location or across the state.

The AT team members all have basic computer skills. For example, they all use email, browse the Web, and use word processing software. They also have knowledge of assistive software tools relating to accessibility. Most team members rarely log in the staff-only area of T/TAC Online. Some individuals on the AT team have more advanced skills and experience in particular areas, such as blogs, learning management systems (such as Blackboard), and podcasting. Although they are fairly savvy computer users, they have not necessarily received extensive formal technical training.

Videoconferencing resources currently available include the following:

Videoconferencing cameras (Tandberg 770, 990): This videoconferencing equipment is for small to medium conference rooms. It allows viewing presentations on a computer screen and viewing and listening to a human presenter at the same time with DuoVideo and H.239 Dual Stream. The 990 has a built in bridge capability and can join up to 4 endpoints in a videoconference.

Codian MCU (Multipoint Conferencing Unit): T/TAC currently uses the tool to enable occasional videoconference meetings that join multiple endpoints across T/TAC geographic regions. The MCU is a bridge. It supports up to 20 videoconferencing endpoints.

4 DESIRED COMMUNICATION/COLLABORATION CAPABILITIES

Interviews with the target audience revealed that a variety of capabilities would be useful in a virtual collaboration center, including the following:

- Web conferencing, including sharing of computer desktop views which enables collaborative, real-time review of documents or presentations.
- A file storing and sharing capability for team documents that would be open only to AT team members.
- A better mechanism for tracking revisions to collaborative documents and tracking versions of documents.
- Improved videoconferencing experiences, including the ability to join in a video conference from a remote personal computer.
- Support for scheduling and use of videoconferencing resources available in existing, on-site conference rooms.
- Sharing web links to useful resources across regional T/TACs.
- Support for more interactive training development tools, such as Flash.
- Support for online training development.
- Capability for streaming video for training purposes
- Accessibility tools needed to facilitate use of the above functionalities by staff members who have disabilities.

5 AVAILABLE TOOLS AND THEIR AFFORDANCES

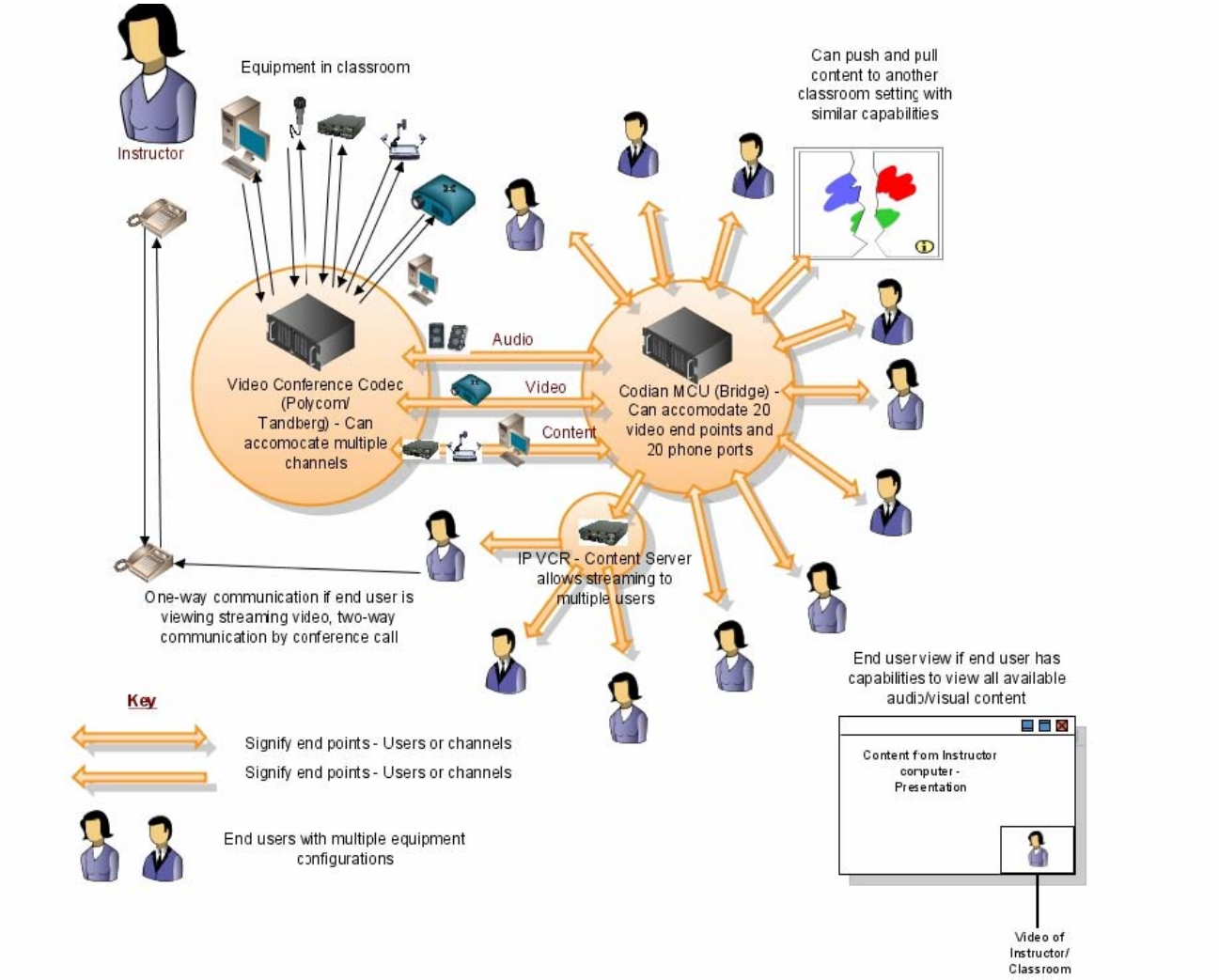
Various tools are available, most of which are not yet being used or are used very little. In some cases, this is because the resources were just purchased. The following is a list of the additional tools available with brief descriptions of their capabilities.

- **Movi Server**: This should enable staff on remote personal computers equipped with a microphone and web cam to join in to a videoconference without installing special hardware or software at their location. It should support 15 pc-based videoconferencing endpoints.
- **IP VCR (Video Conferencing Recorder)**: This is used in conjunction with videoconferencing systems to record conferences, point to point calls, and presentations. These recordings can be archived and played back later. The archival recordings could be appropriate in some cases for reuse as training content. IP VCR can stream live or recorded content to a Web interface--which can be viewed using QuickTime, RealPlayer or Windows Media Player--or to a H.323 video endpoint.
- **Adobe Connect (AC)**: Utility for sharing desktop views via an Internet connection. Licenses for a maximum of 60 simultaneous users.
- **Blackboard**: A learning management system with multiple capabilities, including file sharing, discussion boards, email, chat, virtual classroom, surveys, and training content authoring and delivery.
- **Tandberg Management Suite (TMS)**: TMS is a software platform for managing visual communication technologies. It supports management of on-site and remote video systems. It manages videoconferencing endpoints, multipoint conferencing units (MCUs), and gatekeepers. TMS has a Web based interface. (used by GMU, not T/TAC)
- **Tandberg Scheduler/ Codian Scheduler**: it enables automated scheduling of video conferencing.
- **Global Scheduling System**: It supports cross platform automated scheduling of video conferencing
- **Polycom Voice**: This is a sophisticated microphone/speaker for use with the standard telephone system. It can facilitate one-to-many or many-to-many voice communication via telephone.
- **Adobe Flash CS3 Professional**: Flash provides an advanced authoring environment for creating interactive content (including instructional media) for the Web as well as mobile platforms. Flash supports animation of visual elements and integration of audio and video recordings. It could be a powerful tool for developing more engaging multimedia Webshops for T/TAC Online. This could support the transition from providing face-to-face training to providing brief training modules for asychronous delivery online.
- **Wikis**: Enable asynchronous text communication and collaboration, including document sharing.
- **Podcasting**: Employs audio and video for delivering information asynchronously.
- **Blogs**: Enables chronological postings, thus supporting AT Priority Project members's need for achiving their thoughts and discussions.
- **Camtasia Studio**: This software allows users to prepare screen recording for training videos, PowerPoint presentations, lectures, video blog and podcast. It also allows text captioning as an overlay on or below the video.

- **Adobe Captivate**: It enables the creation of engaging simulations, software demonstrations, scenario-based training, and quizzes without programming or multimedia skills. It also converts the multimedia to Flash.
- **Adobe Presenter**. It enables high-quality presentations from within Microsoft PowerPoint through the use of audio, video and software simulations. In addition, it allows the use of question branching to tailor a learning path through a quiz based on answers
- **Lectora**: This sofware allows non-programers to create interactive multimedia content that support SCORM, AICC and LRN.

In order to betterunderstand the relationships and functions of the video conferencing tools used by T/TAC and George Mason University, the Immersion team created the following graphical representation of the current video conferencing capabilities. The instructor can use the video to capture what is occurring in the classroom, the microphone to capture the audio, the telephone to communicate with those who are streaming the video, and the computer for document and application sharing.

Figure 1. Current Video Conferencing Capabilities at GMU



6 COMPARISON OF CAPABILITIES AND AVAILABLE TOOLS

The two tables shown below provide a comparison of the desired capabilities mentioned by the AT Priority Project team, the tools that are currently available to the GMU T/TAC, and known implementation issues.

Collaboration/Conferencing Tools:

Desired Capabilities	Available Tools	Implementation Issues
Web conferencing, including sharing of computer desktop views	Adobe Connect	Unreliable audio quality resulting from bandwidth limitations. Accessibility issues. Would require training.
File storing and sharing capability for team documents, asynchronous and synchronous text communication and collaboration, ability to create group collaboration areas for AT Priority Project sub-committees	Blackboard	Requires separate login
Mechanism for tracking revisions and versions of documents	Wiki	Privacy concerns
Improved videoconferencing experiences	Tech support	Requires human tech support on back end. Staff not comfortable with use of equipment. Current technology is not as good as being there.
Ability to join in a video conference from a remote personal computer	Movi server	Bandwidth limitations. Not compatible with Macintosh for Virginia Tech. Potential for firewall issues at multiple sites. Preferred web browser is Internet Explorer 6.0. Requires installation of Web cams and availability of headphones with microphone.
Sharing web links to useful resources across regional T/TACs	del.icio.us	Would be public, not limited access

Desired Capabilities	Available Tools	Implementation Issues
Support for online training development.	IP VCR	Recording of videoconferences requires a scheduling protocol of some kind.
Accessibility tools needed to facilitate use of the above functionalities by staff members who have disabilities.	TeleTypewriter (TTY) or Telecommunications Relay Service (TRS)	TTY requires both ends to have the TTY keyboard and text display device. TRS requires a TTY keyboard and text display device at one end and a special operator who types whatever is said so that the person with the TTY can read what was said. The person with the TTY will type back a response, which the TRS operator will read aloud.
Videoconferencing	Tandberg 770 and Codian MCU	User-friendly scheduling functionality needed. Accessibility issues need to be addressed. Human support needed to use this tool on the back end.
Maintain, manage and monitor the video conferencing network within an organization.	Tandberg Management Suite Or Codian Management Platform suite	Would require purchases of additional licensing for T/TAC. Human support needed to use this tool on the back end. It is not cross platform compatible. Requires Microsoft Windows 2000 or XP Internet Explore 5.5 or higher. It is not cross platform compatible.
Support for scheduling and contacting of potential participants via email and reserve a room for a video conferencing	Tandberg Scheduler Or Codian Scheduler	Would require purchases of additional licensing for T/TAC. Human support needed to use this tool on the back end.
Support cross platform scheduling for video conferencing	Global Scheduling System	Would require purchases of additional licensing for T/TAC. Human support needed to use this tool on the back end

Training Development Tools:

Desired Capabilities	Available Tools	Implementation Issues
Support for more interactive training development tools, such as Flash	Flash	Very steep learning curve. Concerns with the accessibility of Flash content for persons with disabilities. Flash is a sophisticated development tool with a complex user interface that is not easy to learn. Harnessing the full power of Flash in developing interactive media includes knowledge of how to program Flash applications using ActionScript.
Supports audio and video delivery asynchronously.	Podcasting	Easy to create a simple podcast. Need a digital audio recorder that can create an MP3 file and space on a server to host the file. Creating more complex podcasts that incorporate music may be out of the comfort range for most of the audience here.
Support interactive training development such as simulations, computer demonstration, scenario based training and quizzes without programming or multimedia skills.	Adobe Captivate	Concerns with the accessibility of Flash content for persons with disabilities. Special consideration should be made for people who are blind or deaf and can't use the keyboard(keyboard accessibility).
Supports screen recording to make training videos, PowerPoint presentations for podcasting.	Camtasia Studio	Concerns with the accessibility of Flash content for persons with disabilities. Special consideration should be made for people who are blind or deaf and can't use the keyboard (keyboard accessibility).
Support interactive multimedia presentations without programming or multimedia skills from within PowerPoint	Adobe Presenter	Familiarity with PowerPoint is required.
Create custom interactive multimedia content that support SCORM, AICC and LRN which allows easy import, share, reuse and export of documents	Lectora	Concerns with the accessibility

For more details on the functionality of each tool please see Figure 2. Tools Capabilities Details in the Appendix.

After exploring audience needs and the affordances of available communication tools, members of the immersion team discussed with the client implementation issues with respect to the envisioned virtual collaboration center. These issues involve constraints imposed by factors such as bandwidth, browser requirements, system incompatibilities, and needs for human technical support that exceed what is currently available. The client acknowledged that it may not be possible to implement some features of a virtual collaboration center until technical issues that are beyond the control of the immersion team are resolved. The division of ownership, control, and rights of use of available resources among multiple organizations was also discussed as a possible barrier to implementation. The client reiterated a desire to take a long-term view and indicated that the team should not view current ownership and licensing issues as unalterable constraints.

7 RECOMMENDATIONS

7.1 Ideal Long-term plan

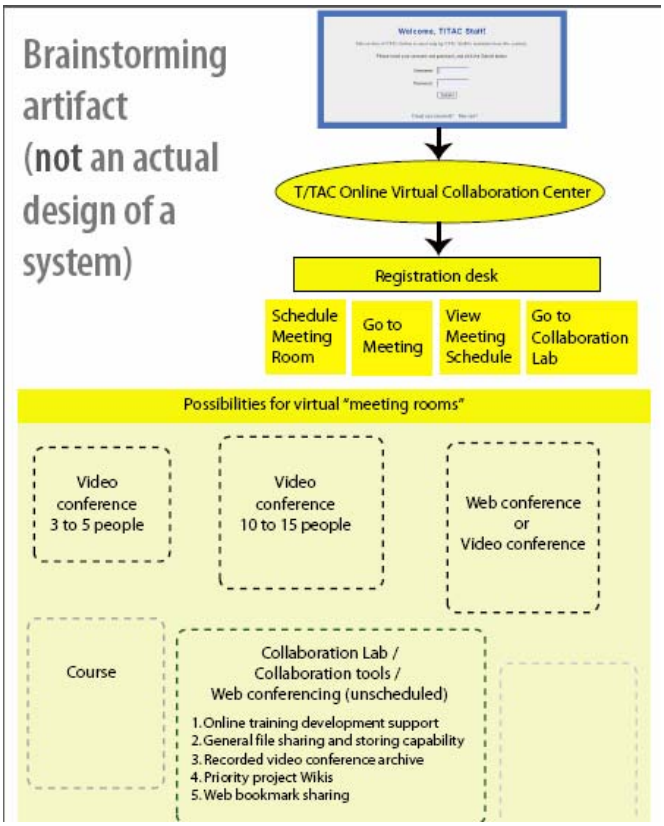
Interviews with 12 members of the Assistive Technology (AT) Priority Project team indicate that they would like to have the ability to collaborate, both synchronously and asynchronously, on deliverables (documents or training material) to meet the objectives of the AT Priority Project. Their vision of collaboration includes web or video conferencing and the ability to share documents. They also reported a need to have a central document storage area and the tools available to them to create more dynamic training materials. Training materials should support video, audio and mobile formatted documents that are accessible for people with disabilities. AT Priority Project members would need additional supports to help them develop training using these tools.

The AT Priority Project team are the opinion leaders in the use of emerging technologies. Once the team feels comfortable using the collaboration and development tools, other T/TAC staff will be onboard and there will be a trickledown effect in its use.

The GMU T/TAC has access to several web or video conferencing tools and document sharing tools. Ideally, these tools would be seamlessly integrated within a virtual collaboration center in the staff-only area of T/TAC Online with technical support available when required.

Logging into the staff-only area of T/TAC Online would give staff access to the Virtual Collaboration Center. At the center, staff would be prompted for the parameters of their collaborative activity and provided with solutions available through the Virtual Collaboration Center (type of collaboration they would like to engage in, number of participants, technical limitations). Staff members would then be able to set up a virtual meeting in advance or just prior to the desired meeting time at a virtual registration desk. They also would be able to join a previously established virtual meeting. Through web or video conferencing tools, they would be able to see and hear all participants in the virtual meeting. If desired, the participants of the virtual meeting would also be able to share and collaborate on documents. When the virtual meeting was over, the documents generated from the meeting, such as the agenda, meeting notes, and work papers would be stored in a central location for all meeting participants to access when needed.

Figure 2. Conceptual Overview of Virtual Collaboration Center Ideal



The Virtual Collaboration Center would also allow the set up of collaboration areas where asynchronous discussion and collaboration on documents and presentations can take place. This might be enabled through a wiki that is directly controlled on a T/TAC Online server.

In this Virtual Collaboration Center would be a collaboratory where T/TAC members could learn how to use tools such as Captivate, Camtasia, and Adobe Presenter to create dynamic, interactive training materials. The collaboratory will provide support for T/TAC members to create interactive training modules on the fly.

Figure 3. Representation of T/TAC Staff Using Virtual Collaboration Center

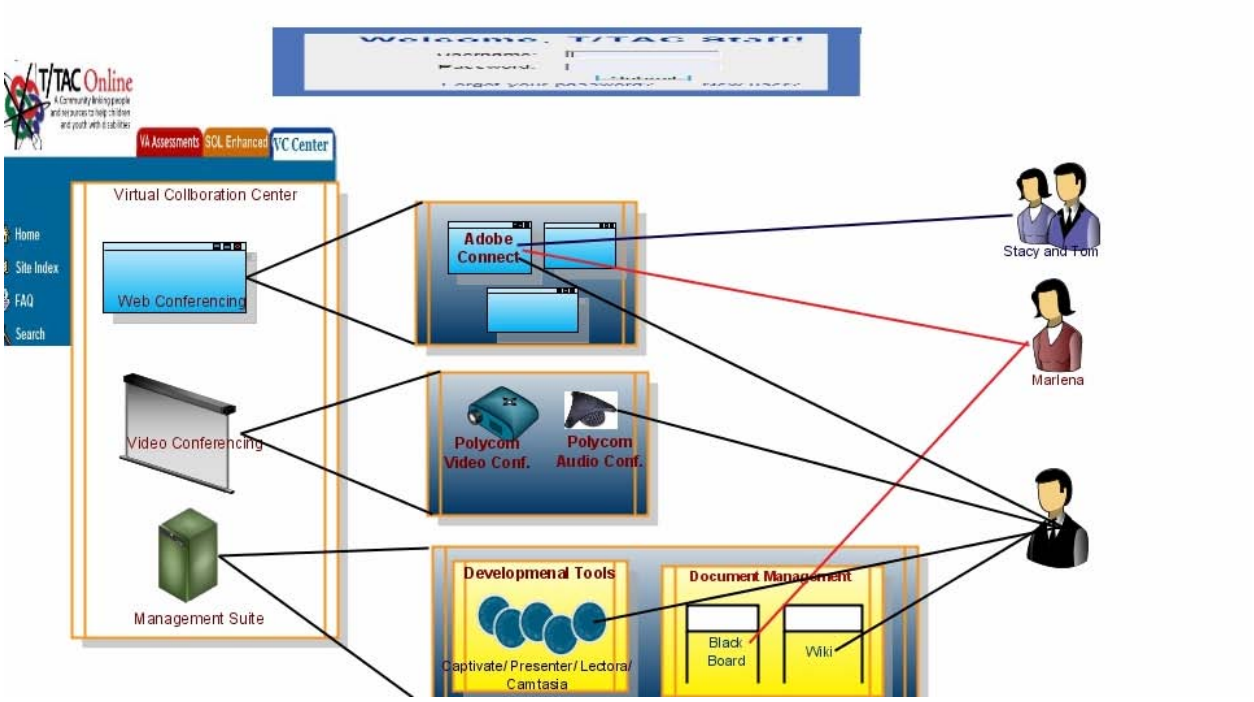
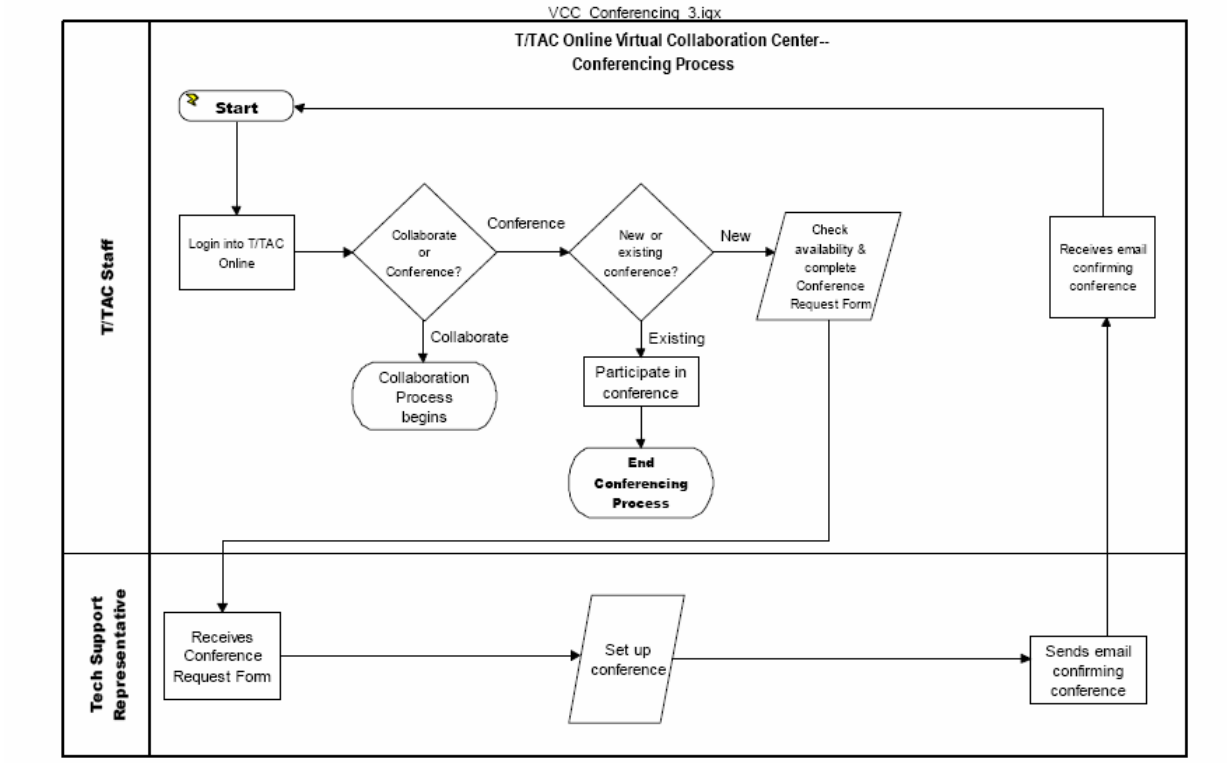


Figure 4. Flowchart of Conferencing Process



7.2 Realistic short-term plan (Initial development)

While a seamless Virtual Collaboration Center mentioned above is the ideal, in reality there are technical limitations such as firewalls, bandwidth, required web-browsers, disparate computer systems, and human intervention on the back-end that would make it difficult for the virtual collaboration center to operate seamlessly. To provide the AT Priority Project team with tools that will allow them to collaborate synchronously, to meet virtually, and to create training materials, the Virtual Collaboration Center should include tools or a combination of tools that can be implemented in the immediate future:

- Focus on the integration of Adobe Connect with T/TAC Online using telephone conference call for synchronous audio to address the inadequate audio capability of the program and general bandwidth limitations.
- AT Priority Project staff should have access to training development tools such as Captivate, Camtasia, and Adobe Presenter, and the ability to create podcasts.
- Focus on the integration of Blackboard functionalities with T/TAC online to capitalize on staff familiarity with this system.
- If T/TAC staff members would like to create training materials, they could go to the collabratory section of the Virtual Conference Center. There they will find information on how to access and use tools such as Camtasia, Adobe Presenter, and Captivate. Using these tools, they can create dynamic training materials.
- In the absence of scheduling software for video conferencing, create a simple video conference scheduling request form. This would be a simple html form that requests all details needed to set up a video conference using available video conferencing equipment. Based on the requester's designation of the proposed conference host, the form data would be forwarded via email to the responsible technical support person, who would make necessary arrangements and respond with an email confirmation.
- Provide an area for AT Priority Project members to house documents and engage in asychronous discussion on workplan items and sub-committee work (such as using the Group Area in Blackboard, a wiki environment, or integrating the bulletin board forum already in place in the staff-only area of T/TAC Online).
- Determine the ability to house wikis on the T/TAC Online server, or create the capability on T/TAC Online to allow asychronous, collaborative document creation similar to Google Docs.
- Design just-in-time support to ensure smooth navigation of the Virtual Collaboration Center.

The Immersion team recommends pursuing the following:

- While scheduling software does exist to enable the end user to schedule video and web conferencing on the fly, these systems are cost prohibitive. A potential alternative is to develop an integrated database on TTAC Online that would reserve video and web conferencing resources for end users. Logging into the staff-only area of T/TAC Online would give staff access to the Virtual Collaboration Center. A database would be linked to a simple video/web conference scheduling request form in the Virtual Collaboration Center. This would be a simple html form that requests all details needed to set up a video/web conference using available video and web conferencing equipment.

Based on the requester's designation of the proposed conference host, the form data would be forwarded via email to the responsible technical support person, who would make necessary arrangements and respond with an email confirmation. Reservation requests would be coordinated by a staff person at T/TAC Online to confirm conferencing capabilities within the T/TAC Online system. This staff person would then ensure the set up and provide troubleshooting during video and web conferencing sessions.

- The integration of Adobe Connect with T/TAC Online would allow AT Priority Project members to participate in an audio conference with the capabilities of document and desktop sharing to allow synchronous collaboration on a variety of tasks. By designating each AT Priority Project member as a perpetual host of an Adobe Connect session, they can start and facilitate meetings on the fly.
- The integration of Blackboard functionalities with T/TAC Online would provide an area for AT Priority Project members to communicate about Priority Project tasks asychronously (using threads in the Discussion Board) and act as a repository for important AT Priority Project documents. AT Priority Project sub-committees can also use Blackboard's Group Areas to track progression on sub-committee tasks and use it as a resource area for documents.
- One key component that is missing from Blackboard is the ability to collaborate and make revisions asynchronously on documents. This is where a wiki or providing some sort of collaborative document editing capabilities that track revision history would be helpful for the AT Priority Project. Wikis can be hosted on a secure server to allow more control over the availability of wiki content. AT Priority Project members could use a wiki to conduct ongoing editing of a document, presentation, or agendas. Wikis might also be used to develop interactive training modules for the T/TAC audience and can be included as part of the collaboratory.
- Use Blackboard for the online training development support area of the virtual collaboration center. This area will support the staff use of training development tools such as Captivate, Camtasia, and Presenter to facilitate more engaging, interactive training delivery. Training modules will be provided in Blackboard to AT Priority Project members to help them utilize the training development tools (Captivate, Camtasia, and Presenter). This will require that all AT Priority Project members have access to this suite of training development tools.
- Recommendation to hire an additional staff member dedicated exclusively to ongoing development and technical support of a virtual collaboration center. This staff person would serve as the "go-to" person for all support issues experienced by T/TAC staff anywhere in the State of Virginia.

7.3 **Persona-based Work Scenario**

Marlena Driver logs in to the staff-only area of T/TAC Online which has recently been transformed into a virtual collaboration center. Two clicks later, she has entered a space set up to store documents related to the work of her subcommittee on the Assistive Technology Priority Project team. She finds the current version of a word processing document and opens it. She and two team members in two other regions of the state have been writing and editing this document collaboratively (and asynchronously) over the course of the past week. She reads a new paragraph a colleague wrote yesterday and gets an idea. She calls her colleague on the phone and then adds the third member

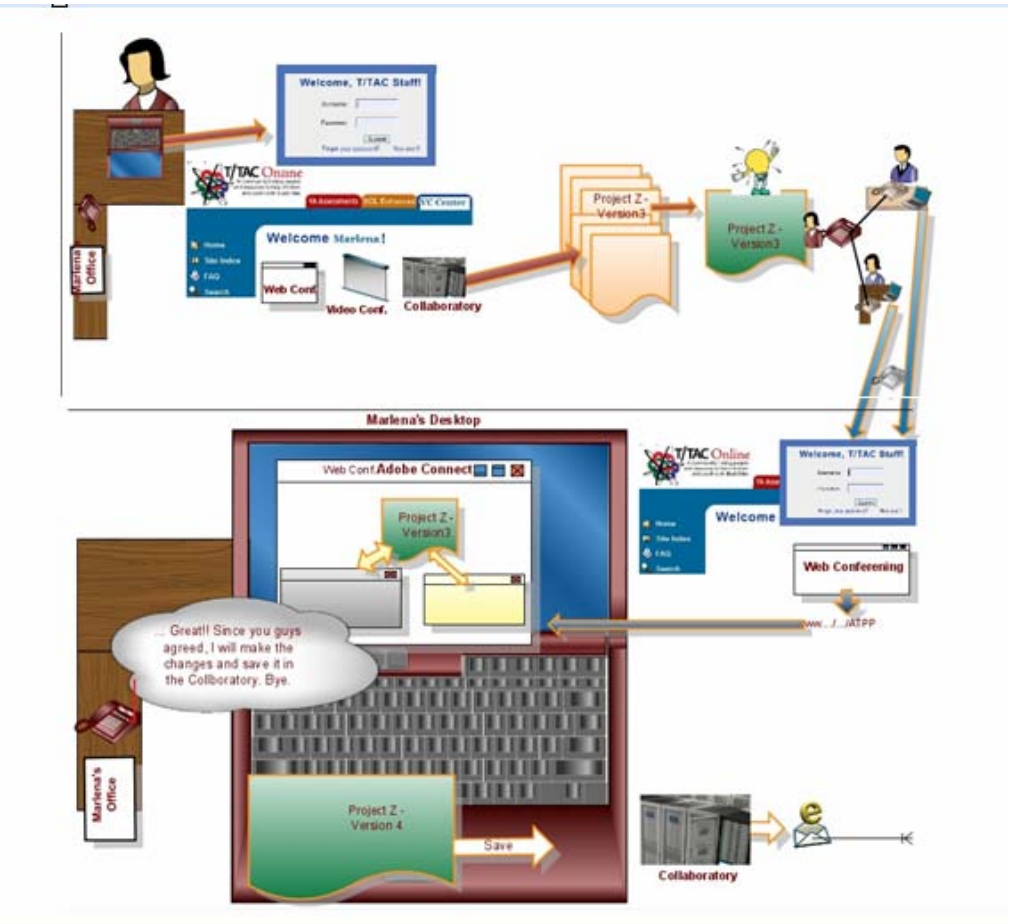
of her subcommittee in on the call. They agree to hold an unplanned virtual meeting with the aid of Adobe Connect.

Marlena's colleagues are already logged in to T/TAC Online so they reach their subcommittee's virtual space in two clicks each. In addition to housing documents, the subcommittee's virtual space has hyperlinks to resources on the Web they often use. One of these links brings each of the three team members into a standing Web conference set up for them a few months ago that is always available to them whenever they need it. The login to this Adobe Connect Web conference occurs automatically behind the scenes, so no one is aware that a login is required to join the conference.

Marlena shares a view of her computer desktop with her colleagues. First, she shares a view of the word processing document she had previously opened. Marlena explains her idea to alter the approach they have been taking to the task they have been working on. Then, she shares a view of a second window of her Web browser, as her colleagues look on. She navigates to the Web site of another organization that has information relevant to the task at hand. Marlena refers to information on a particular Web page and explains how it supports her idea. The three staff members discuss the matter for a few minutes over the phone and agree to implement Marlena's idea. The Web conference and simultaneous conference call end after 20 minutes.

Marlena makes more edits to the word processing document to carry out the consensus of the subcommittee members. She then posts the newly edited version of the document to the subcommittee's virtual space within the virtual collaboration center. An automatically generated email notification is sent to Marlena's two colleagues to inform them that a new file has been posted to the subcommittee's virtual space.

Figure 5. Depiction of Persona's Virtual Collaboration Center Experience



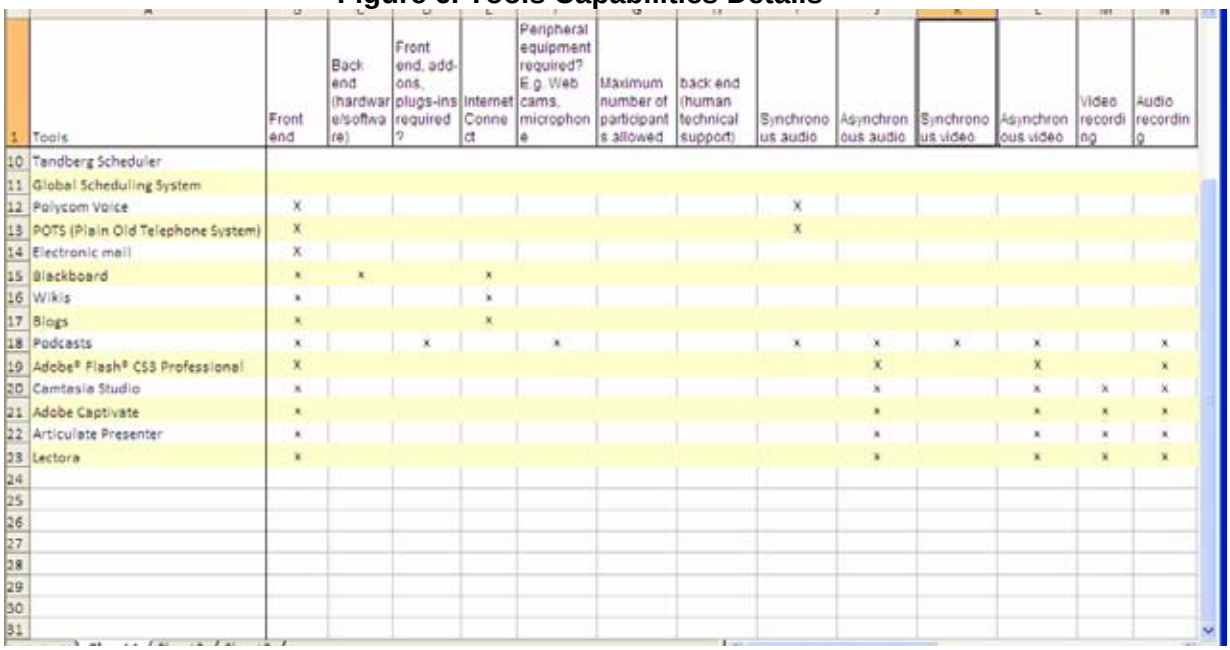
8 NEXT STEPS

The Immersion team suggests the following next steps for the Design Phase:

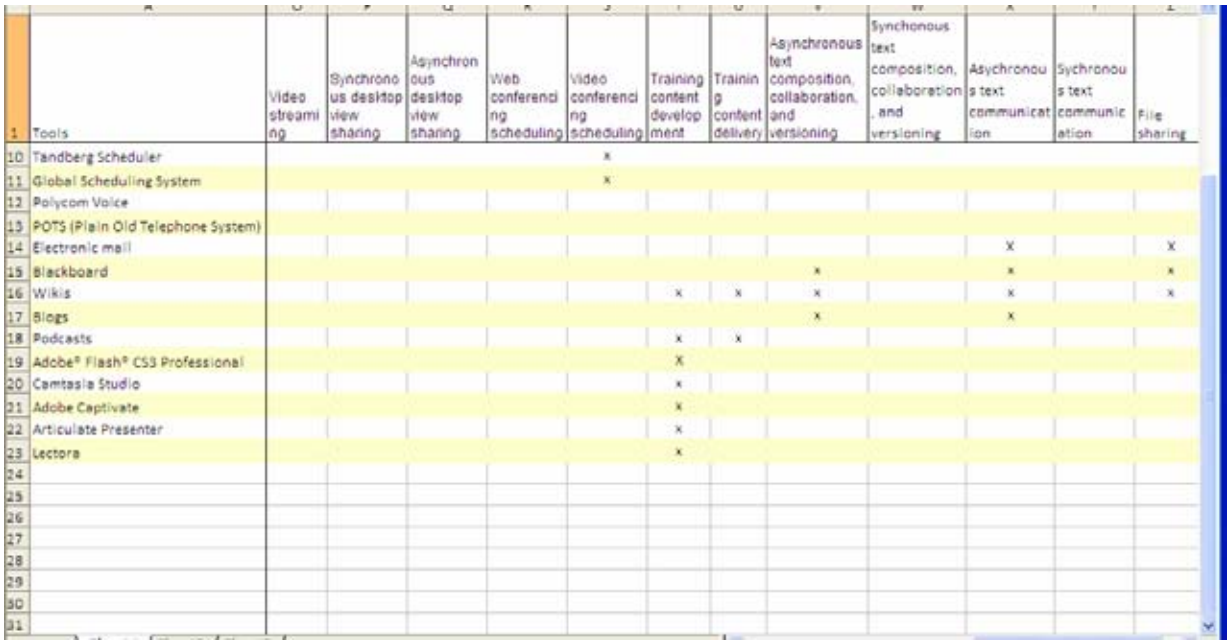
- Work with T/TAC staff to design a scheduling request form for usage of the virtual conferencing tools
- Create just-in-time support for usage of Adobe Connect
- Create mini-training modules to support usage of training development tools

9 APPENDIX

Figure 6. Tools Capabilities Details



Tools	Front end	Back end (hardware/software)	Front end, add-ons, plugs-ins required?	Internet Connect	Peripheral equipment required? E.g. Web cams, microphone	Maximum number of participants allowed	back end (human technical support)	Synchronous audio	Asynchronous audio	Synchronous video	Asynchronous video	Video recording	Audio recording
Tandberg Scheduler													
Global Scheduling System													
Polycom Voice	X							X					
POTS (Plain Old Telephone System)	X							X					
Electronic mail	X												
Blackboard	x	x		x									
Wikis	x			x									
Blogs	x			x									
Podcasts	x		x		x			x	x	x	x		x
Adobe® Flash® CS3 Professional	X								X		X		x
Camtasia Studio	x								x		x	x	x
Adobe Captivate	x								x		x	x	x
Articulate Presenter	x								x		x	x	x
Lectora	x								x		x	x	x



Tools	Video streaming	Synchronous desktop view sharing	Asynchronous desktop view sharing	Web conferencing scheduling	Video conferencing scheduling	Training content development	Training content delivery	Asynchronous text composition, collaboration, and versioning	Synchonous text composition, collaboration, and versioning	Asychronous text communication	Sychronous text communication	File sharing
Tandberg Scheduler					x							
Global Scheduling System					x							
Polycom Voice												
POTS (Plain Old Telephone System)												
Electronic mail										X		x
Blackboard								x		x		x
Wikis						x	x	x		x		x
Blogs								x		x		
Podcasts						x	x					
Adobe® Flash® CS3 Professional						X						
Camtasia Studio						x						
Adobe Captivate						x						
Articulate Presenter						x						
Lectora						x						

9.1 Detailed Tools listing

Tandberg 770, 990 (Videoconferencing cameras)
T/TAC currently uses the tool to enable occasional videoconference meetings. This videoconferencing equipment is for small to medium conference rooms. It allows viewing presentations on a computer screen and viewing and listening to a human presenter at the same time with DuoVideo and H.239 Dual Stream. The 990 has a built in bridge capability and can join up to 4 endpoints in a videoconference.

Videoconferences have the potential to replace some face-to-face meetings which entail driving great distances to get to meeting locations. Videoconferencing has the potential to enable collaborative work efforts across geographic distances.

Videoconferencing technologies are complex, and some back end technical support is always required. Technical support for troubleshooting when glitches occur may not be immediately available in some locations at the moment of need. Current videoconferencing technologies do not enable the same ease of communication that is present in face to face meetings. Not all staff members are comfortable participating in videoconferences. Not all staff know how to make use of the videoconferening technologies that they currently have available to them.

Codian MCU (Multipoint Conferencing Unit)
T/TAC currently uses the tool to enable occasional videoconference meetings that join multiple endpoints across T/TAC geographic regions. The MCU is a bridge.

Videoconferences have the potential to replace some face-to-face meetings which entail driving great distances to get to meeting locations. Videoconferencing has the potential to enable collaborative work efforts across geographic distances. The Codian MCU supports up to 20 videoconferencing endpoints.

Videoconferencing technologies are complex, and some back end technical support is always required. Technical support for troubleshooting when glitches occur may not be immediately available in some locations at the moment of need. Current videoconferencing technologies--especially in regard to videoconferencing to multiple endpoints--do not enable the same ease of communication that is present in face to face meetings. Not all staff members are comfortable participating in videoconferences. Not all staff know how to make use of the videoconferening technologies that they currently have available to them.

Cisco MCU
T/TAC no longer uses this tool.
Its uses are similar to those of the Codian MCU (bridge for multiple video conferencing endpoints)

Movi Server
T/TAC recently acquired this hardware. It should enable staff on remote personal computers equipped with a microphone and web cam to join in to a videoconference without installing special hardware or software at their location. It should support 15 pc-based videoconferencing endpoints.

Members of the Assistive Technology priority project team who work from home might find this especially helpful. It would allow staff who does not currently have easy access to videoconferencing sites to benefit from this mode of interaction without having to travel to a distant site.

Video conferencing via personal computer from a home office depends on the reliably fast upload speed of the Internet connection. Bandwidth is a potentially constraining factor.

IP VCR
T/TAC recently acquired this hardware.

IP VCR (Video Conferencing Recorder) is used in conjunction with videoconferencing systems to record conferences, point to point calls, and presentations. These recordings can be archived and played back later. The archival recordings could be appropriate in some cases for reuse as training content. IP VCR can stream live or recorded content to a Web interface--which can be viewed using QuickTime, RealPlayer or Windows Media Player--or to a H.323 video endpoint.

A means for scheduling recordings must be put in place, and the use of videoconferencing by T/TAC would have to increase, and the contexts in which it is used would have to enable the reuse of recorded content for training purposes.

Torrent
T/TAC no longer uses this tool.
Its uses are similar to those of the new IP VCR (recording and streaming of video conferencing content)

Tandberg Management Suite (TMS)
T/TAC does not use this tool. GMU uses it. T/TAC could buy additional licenses to enable use.

TMS is a software platform for managing visual communication technologies. It supports scheduling of video conferencing and management of on-site and remote video systems. It manages videoconferencing endpoints, multipoint conferencing units (MCUs), and gatekeepers. TMS has a Web based interface.

Challenges to use include the cost of purchasing additional licenses and reliance on expert technical support staff to use this tool on the back end.

Polycom Voice
T/TAC is not known to use this type of device currently. It is a sophisticated microphone/speaker for use with the standard telephone system.
It can facilitate one-to-many or many-to-many voice communication via telephone.
POTS (Plain Old Telephone System)
Used extensively for synchronous voice communication, including conference calling involving more than two parties.

Provides quick, easy voice communication.

Electronic mail

T/TAC uses email extensively for asynchronous textual communication and for file sharing via email attachments. Most email attachments exchanged are word processing documents.

Enables easy asynchronous textual communication. Enables easy exchange of word processing documents for collaborative document composition and revision.
Use of email for document sharing and collaborative revision poses a challenge for keeping track of the most current version of a document.

Adobe Flash CS3 Professional

T/TAC does not currently use Adobe Flash.

Flash provides an advanced authoring environment for creating interactive content (including instructional media) for the Web as well as mobile platforms. Flash supports animation of visual elements and integration of audio and video recordings. It could be a powerful tool for developing more engaging multimedia Webshops for T/TAC Online. This could support the transition from providing face-to-face training to providing brief training modules for asychronous delivery online.

Challenges in the adoption and use of Flash as a training development tool include a very steep learning curve and addressing concerns with the accessibility of Flash content to persons with disabilities. Flash is a sophisticated development tool with a complex user interface that is not easy to learn. Harnessing the full power of Flash in developing interactive media includes knowledge of how to program Flash applications using ActionScript, which (like JavaScript) is an ECMAscript derivative. Flash does provide some scripting support for nonprogrammers. The newest versions of Flash and the Flash Player (which is necessary for running Flash content) have made great strides toward making it possible to develop Flash content that is accessible to persons with disabilities, but accessibility issues must be given careful consideration during design and development of Flash content.

Adobe Connect (AC)

TTAC currently uses Adobe Connect for teachers to be able to share information/content during their training sessions. This is because they have not had the time to learn the entire features. The only thing among the functions that the teachers use is the document sharing capabilities, and the ability to share desktops.

The ATPP would like to enjoy the capabilities of AC in:

- Sharing documents synchronously.
- Collaborate on a document at the same time.
- Be able to hold meetings virtually and avoid traveling long distances for Face to Face meetings.
- Enjoying the use of new technologies that support audio and video.
- A means to archive all the virtual meetings.
- Confidentiality of meetings and contents is very important.
- The problem that the AT PP might have is with the audio which is not so good based on a variety of factors.

- A combination of the audio and document sharing would be ideal, but problems of audio might be frustrating for the AT PP.

The disabled would have a problem trying to even read the lips of speakers if the video is being used due to the poor size and quality.
The fact that they are always learning how to use new tools hence, need for training on the usage of Adobe Connect as a means to share and collaborate on documents.

Blackboard
TTAC currently uses blackboard for file sharing, message boards, and sending email to the members.

The ATPP would like to use it because it:

- Want the ability to collaborate while protecting privacy because it can be set up so that only people with permission can access it.
- Members can be able to collaborate or post discussions (asynchronous communication).
- Easy to use and learn
- The problems that they for see are:
- The fact that Blackboard involves too many steps and the ATPP would not find that comfortable.
- They also foresee it as moving outside TTAC online and would be another place to go to if not incorporated into TTAC online.

Podcasts
Being used only in Virginia Tech region of TTAC
1. Subscribes to the ATPP members' need to use newly emerging technologies since Podcasting is fairly new.
2. The fact that it employs the use of both audio and video attracts the ATPP members.
3. Storage and archiving for easier reference.

Blogs
Not being used currently by TTAC.
1. Provide a means of collaborating and communicating asynchronously
2. Saves postings in a chronological way, thus supporting the ATPP members' need for archiving their thoughts and discussions.

1. Not familiar with blogs and might entail a lot of training.
2. Concerned about the level of privacy that blogs may have.

Wikis
Not being used currently by TTAC
1. A means of communicating and collaborating asynchronously without having to travel to meet face to face
2. Capable of sharing documents asynchronously
Since it is a new technology, might require some form of training or job aids.

10 RESOURCES

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