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# Unified Communications Technology: The Considerations for Adoption for Administration and Pedagogy

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## Abstract

We are in a different place, where today's learners require educators to broaden their methods of pedagogy in order to interact more effectively with digital-native learners (Dietz, 2010). Educators need a less structured and more informal learning setting that leverages already established teaching tools supporting a constructivist learning environment (Dietz, 2010). In addition, institutions need to leverage these technologies with their business processes in order to provide for greater efficiencies and collaboration (Herrell, 2011).

In support of these findings, The College of Staten Island (CSI) has researched unified communications (UC) technology that uses a unified learning environment. This comprehensive solution will be used to replace a life-cycled phone system, as well as enhance administrative processes and pedagogical applications. This paper will discuss the technology status at CSI, options in support of a UC environment, and alternative technologies that provide similar functionality. Challenges and opportunities associated with a UC environment will be addressed, as well as how this environment can respond to individual learning styles when teaching to a diverse student population. As part of this decision of implementing a UC system, one must consider whether it is worth the resources to implement this technology or whether disparate

systems with the same functionality will suffice. This paper will address that question by describing the strategy CSI is following in order to move towards the successful adoption of a UC environment in both administrative and pedagogical applications.

**Introduction**

We are in a different place, where today's learners require educators to broaden their methods of pedagogy in order to interact more effectively with digital-native learners (Dietz, 2010). These learners feel technology helps them learn, and in some cases, feel that the convenience of technology facilitates their learning (Thompson, 2013). In addition, there is an increased population of minorities that make up this core group and are coming from diverse backgrounds (Center for Public Education, 2012). As educators, we need to use technology that "encourages the development and use of diverse teaching strategies designed to respond to each student as an individual" (Saravia-Shore, 2008, chapter 2).

Technologies have already been used successfully to reach out to the diverse population of today's learner in both an online and face-to-face environment. Due to the ubiquitous nature of these tools, many of them have become commonplace in the learning environment, starting from K-12 through University settings (Colbert, 2005). Research shows that using technology to address a variety of learning styles improves learning, especially when introducing complex subject matter (Dunn & Griggs, 2000; Gardner, 2004; McLaughlan & Kirkpatrick, 2004). Research also shows that providing instruction in a hybrid modality demonstrates improved learning outcomes, as compared to traditional face-to-face environments (CUNY, 2013). The use of video conferencing, which can be seen as both an asynchronous and synchronous learning tool, can also be used to enhance this learning environment. According to Hrastinski (2008),

synchronous learning supports a variety of types of communication and enhances the learning setting. “When these technical possibilities are integrated with pedagogically designed tools, the educational functions of video potentially extend far beyond the narrative” (Shephard, K, 2003, p. 299).

The plethora of tools that are available to enhance the learning environment still remain a constant. However, what has changed is the way today’s learners want to use these tools. According to Dietz (2010), educators need to create an environment that is less structured and more informal by leveraging the already established teaching tools that support a constructivist learning environment. Technologies such as video, wikis, discussion boards, and instant messaging should be used more efficiently and effectively to distribute content regardless of who the learner is, where the learner is located, and the individual learning style. There needs to be an environment in place that is more intuitive, less restrictive, and more unified, providing for seamless integration with all of the learning tools that have been established**.** However, this environment does not come without a cost. The evolution of technology provides a challenge to Colleges and Universities as they need to be able to evaluate the appropriate time to initiate these environments. Also, higher educational institutions need to take into account budgetary constraints and infrastructure, as well as evaluating whether the technology that is today’s latest fad will be on the list for obsolescence.

The College of Staten Island (CSI) has researched the use of unified communication technology that supports an open and unified learning environment as described by Dietz (2010). This paper will discuss the current technology status at the College and available options that can leverage a robust network infrastructure. A sampling of alternative technologies with similar functionality to a unified communications system will also be provided. Challenges and

opportunities associated with creating this unified environment will be addressed, as well as how these technologies respond to individual learning styles when teaching a diverse student population. This paper will speak to whether it is worth the risk, resources, and money to implement a unified communications system and CSI's approach to making the appropriate decision. Part and parcel of this strategy will be the method CSI is following in order to adopt a UC environment for both administrative and pedagogical applications.

**Technology Status at the College**

The College of Staten Island (CSI) (http://www.csi.cuny.edu/aboutcsi) is a four-year, senior college of The City University of New York (CUNY) that offers exceptional opportunities to all of its students. Programs in the liberal arts and sciences and professional studies lead to bachelor's and associate's degrees. The master's degree is awarded in 16 professional and liberal arts and sciences fields of study. The College participates in doctoral programs of The City University Graduate School and University Center in Biology, Chemistry, Computer Science, Nursing, Physical Therapy, and Physics. There are 14,199 students enrolled, 13,155 of whom are undergraduates. Enrollment gender is 61 percent female and 41 percent classified as non-white ethnic background (http://colleges.findthebest.com/l/2757/CUNY-College-of-Staten-Island2014).

The College of Staten Island (CSI) has been in the forefront of providing quality education to a diverse student population (U.S. News & World Report, 2012; Washington Monthly, 2012). CSI's infrastructure provides the technology backbone that enables a variety of tools to be used in support of teaching and learning. The 10G network backbone and high speed wireless connection provides for an environment conducive to creativity and flexibility in the

learning environment. Some of the technologies that are currently in use at CSI include the Blackboard Learning Management System (LMS), which provides the foundation for course material in both synchronous and asynchronous modalities as well as numerous third party applications that integrate into the LMS. For example, video capture and web conferencing technology options include Camtasia Studio, Panopto, SKYPE, and Blackboard Collaborate. Social networking tools are also widely used throughout the College, as well as desktop sharing solutions such as VisionPro.

Despite CSI's advancements in state-of-the art technology that provide the network backbone, the evolution of telecommunication advancements has been a challenge. The ability to provide for a stable and robust network had to be the number one priority in order to pave the way for all other technology initiatives. With that said, the College is now ready to make advancements to their telephony infrastructure, which has reached its life cycle. CSI is faced with the realization of having to replace the phone management system, the telephone devices, and hardware that supports CSI's voice mail and directory services, while at the same time plan for business continuity in the event of a disaster. CSI is implementing a unified communications (UC) system to address these challenges. This comprehensive solution will also be used to enhance productivity in administrative areas, as well as support pedagogical activities in the teaching and learning environment.

The technology options associated with a UC system can be overwhelming as there are numerous vendors that offer similar solutions. Decisions need to be made whether a unified communications environment is worth the investment and whether the value can be maximized to serve both administrative and academic purposes while leveraging a robust networking infrastructure. Alternatively, is investing in a comprehensive unified communications

environment necessary, or is the continued use of disparate applications to meet these requirements sufficient? As CSI reviewed the use of existing technology to support administrative and pedagogical practices, along with realizing the necessity for telecommunication upgrades, it became apparent that a unified communications system would be the appropriate solution.

**Technology Options for Consideration**

CSI sees their telephony challenge as an opportunity to leverage the College's robust network infrastructure, while at the same time take advantage of new advances in telecommunications in support of a unified learning environment. These new advances, which would include a unified communications system, could possibly eliminate the plethora of disparate applications that have the same functionality and are being used in isolation. However, creating this unified learning environment does not come without a cost. The question remains whether the technology is worth the investment and whether the investment can be optimized not only by administration but in the teaching and learning environment as well. In order to address this question, the following describes a unified learning technology system and components, as well as a sampling of alternative technologies currently used to enhance pedagogy with similar functionality.

*Unified Communications and Management*

The convergence of voice, video, and data communications around a shared IP-based infrastructure connects teams and information and enables an effective collaborative experience (cisco.com, 2014, Unified Communications section). The ability to unify and collaborate on a single network provides the flexibility to provide a common context and seamless user

experience. Unified communications can offer an underlying network architecture that will optimize your institution's offerings because it encompasses virtually every piece of collaboration software under one platform (Greenfield, 2006). Unified communications integrate multiple modes of communications; it is not a single product but a collection of elements (Wikipedia.org, 2014, Unified Communications Components section). Table 1 lists each of these components, along with a brief definition and how each component can be used in the teaching and learning environment.

Table 1

*Unified Communications Components*

| Component | Definition | Use Case |
|---|---|---|
| Presence | Knowing where intended recipients are, and if they are available, in real time | Collaborate seamlessly on a project with users in separate locations. Members know availability and how the individual can be contacted by accessing a directory, which interacts with mobile devices, calendars, etc. Through a single click the user can communicate with each other using the selected modality (chat, video, voice, etc.) |
| Instant Messaging | Real-time text over the Internet between two or more parties | Facilitates instant feedback and high levels of interactivity and engagement among faculty and learners |

| Component | Definition | Use Case |
|---|---|---|
| Unified Messaging | Integration of different electronic messaging and communications into a single interface accessible from a variety of devices | All vital information specific to a project can be managed in one place instead of switching between different systems to improve collaboration and team efficiencies. For example, email, text, IM, voice mail, video, calendaring, etc. will appear in the user's email inbox |
| Speech access | Translation of spoken words into text | Speech recognition can be used to improve learning, providing improved access to students with physical or learning disabilities. In addition, students who experience poor writing mechanics can use this technology to get their thoughts easily on paper |
| Conferencing (audio, web, and video) | Real time collaboration in which multiple users can communicate over the Internet via voice and video as well as other features inherent in web conferencing tools (i.e. texting, VoIP (voice over IP), application sharing, polling, and whiteboard) | Web conferencing allows users to collaborate from multiple locations where ideas are shared and generated. Web conferencing tools can facilitate synchronous learning environments by fostering online discussions, presentations and lectures and bridge the gap between teachers and learners |

| | | |
|---|---|---|
| Mobility | The ability to use all unified communications features on any mobile device as well as support single number reach, where an individual can receive calls from any medium via one number. | Enhance the learning experience by providing anytime and anywhere access to individuals, learning materials and services |

*Unified Communications End User Software, Hardware, and System Software Requirements*

The ability to provide functionality and services within one unified platform requires specific software, which is proprietary to the specific vendor. For example, if you are choosing Cisco solutions for your UC environment, then you will be using software called Jabber. Alternatively, other vendor solutions might be leveraging a Microsoft product called MSLync. Both of these applications provide similar functionalities. The selection may be determined by the licensing agreements, email applications, and telecommunication infrastructure at your institution. The ability to integrate with these services is key to a successful unified communications environment.

In addition to software, a UC environment requires complex hardware and system software, which is dependent on your institution's network infrastructure and telephone system. The following is a sample of some of these requirements:

1. Unified Application Server: Focal point of the unified communications environment and provides for the integration of all services and applications
2. Media Server: Performs all telephony functions, such as teleconferencing, text-to-speech, and speech recognition

3. Developer Tools: A visual editor that allows the user to build, develop, and debug applications running on the application server
4. Communications Manager/System Manager: Software solution that manages the entire phone system, including phones, gateways, and unified communications features
5. IP Phone System: Ability to transmit calls over an IP network (Internet) instead of traditional methods using a public switched telephone network
6. PBX: A private Branch Exchange (PBX) is a switch station for telephone systems that allows for the linking of phone lines to one main number

*Challenges and Opportunities Associated with Creating a Unified Environment*

Developing and implementing a unified communications (UC) environment does not come without its challenges. There are obvious hurdles associated with the purchase of hardware and software for a Voice over IP (VoIP) solution, including the purchase of equipment such as IP phones, specialized network equipment, and servers for backup and redundancy. In addition, costs associated with the licensing and maintenance of the applications that perform the UC functionality need to be considered. There may also be a charge associated with the lingering traditional phone lines that remain in place.

Besides the obvious challenge of cost, there is the underlying hurdle of ensuring the network infrastructure can support the additional bandwidth required to sustain voice traffic (Schaffhauser, 2008). In some instances, the network may need to be re-architected in order to support a unified environment. In addition, there may be significant changes in the way the organization manages their Microsoft Exchange and Active Directory, where information such as

phone numbers and extensions, which were previously ignored, may need to be added (Rash, 2010).

The ability to calculate a return on investment is a challenge in itself. Yes, there will be a savings associated with a reduced amount of maintaining switches. However, a true ratio compares the value of the results from the deployment to the amount of money spent to buy and maintain the system (Schaffhauser, 2008). This ratio can be difficult to calculate, based on the subjective nature of whether the system's functionality truly provides improved business processes and enhancements in the teaching and learning environment. "Here's what we have. Here's what we need. Here's where we want to be. Here's how we plan to get there. You want to be careful to roll stuff over in an integrated, thoughtful fashion, so you don't end up with a solution that doesn't meet your requirements going forward" (Villano, 2007, p. 2).

Despite the numerous challenges associated with a unified communications (UC) environment, opportunities present themselves as well. The worth of the investment can be realized in many areas that will ultimately offset the cost. The list of features identified in Table 1 provided functionality of a UC system and some examples of how this system could enhance the teaching and learning environment. The use of numerous disparate applications to facilitate these pedagogical functions and business processes could be eliminated, since many of the functionalities are inherent in a UC environment. For example, the use of telepresence could facilitate courses and staff development to a large population of users. Collaboration and effective communication can be facilitated through instant messaging, real time presence, and video/web conferencing.

In addition to the concrete returns, there are intangible outcomes, which will benefit the organization. The UC platform will simplify the management of communication and

collaboration where employees, faculty, and students can engage more seamlessly and effortlessly (Herrell, 2011). Users participating in a voice conference call could extend the conference to a video conference without requiring new logins or reinitiating the call. In addition, the availability of these users would be apparent to the organizer. Finally, users would be able to participate from any device. The ability to provide for this unified and engaged environment would lead to greater efficiencies in both the academic and administrative areas.

The use of social media applications that are a component of the UC environment will also provide intangible benefits to the organization, where communities of interest will evolve; eventually social applications could become the dominant form of communication. This is key to communicating with today's learner, as their preferred method of communicating is facilitated by social networking technologies such as twitter, text messaging, and instant messaging (Nicholas, 2008; Shamoon, 2009; Langer, 2008).

A Unified communications environment would enable learning and collaboration to occur better, faster, and more efficiently. As described by Dietz (2010), a unified communications infrastructure "makes communication instant, collaboration continuous, and learning accessible, personal, and meaningful for today's learners. In addition, your administrative staff is more productive, your instructors can connect with colleagues wherever they are, and your information technology staff can leverage and more easily manage your technology infrastructure" (p. 46).

**Sampling of Technologies with Similar Functionality Inherent in Unified Communications Systems**

The functionality inherent in a unified communications system can be seen in alternative software that is already widely used in higher education. Table 2 provides a list of some of the most common software used in the teaching and learning environment, along with a brief definition and example of use. The pedagogical application of this software is similar to the use cases previously described for unified communications components as well as those noted in Table 1.

Table 2

*Alternative Software with Similar Functionality to a Unified Communications System*

| Technology | Use Case | Vendor Option |
|---|---|---|
| Web/Video Conferencing | Synchronous collaboration tool that delivers such features as white board, desktop sharing, mobile integration, and instant messaging | Blackboard, Adobe Connect |
| Lecture Capture | Simultaneously record the audio of a lecture, the content on the computer and video of the instructor at the podium | Echo360 |
| Screen Capture | Create video tutorials and presentations by directly recording mouse movements and what is being displayed on your screen | Camtasia/Captivate |
| Social Networking | Online network that connects friends, family, and business associates | Facebook, Twitter, LinkedIn |
| Video Conferencing | Allows users to communicate with peers by voice, video, and instant messaging over the Internet | SKYPE, FaceTime |

**Technologies Responding to Individual Learning Styles**

The 21st century learner has transformed the educational process to a new level, whereby learning can no longer be pushed on students. These millennial learners have the desire to get information the way they want it and when they want it. This change in attitude has inspired educators to provide subject matter in a way that complements their learning styles by utilizing the benefits of technology (New Media Consortium, 2005). A unified communications system provides the environment that meets the demands of these millennial learners.

Students entering higher education are coming from a variety of backgrounds and instructors are concerned about how to respond to these learners' needs, resulting in a renewed interest in finding those strategies that can be used effectively to have a positive impact on learners and satisfy the requirements of the institution (Sadler-Smith & Smith, 2004; Smith, 2002). Educators are eager to understand how students process information, and, in particular, how they respond to situations, which could lead to further comprehension of new material (Cuthbert, 2005).

Research has shown that technology can be especially useful when introducing complex subject matter and that it can support collaborative and interactive learning activities consistent with constructivist learning principles (McLaughlan & Kirkpatrick, 2004; Valdez, McNabb, Foertsch, Anderson, Hawkes, & Raack, 2004). This constructivist approach to learning lends itself to a variety of technologies that can be used to facilitate a flexible online learning environment and support the 21st century learner. Within this learner-centered community, the instructor needs to remain flexible by developing a structure that is responsive to individual needs and incorporating hands-on activities, allowing the student to connect to the material

intellectually, emotionally, and physically (Dunn & Griggs, 2000). The functionalities inherent in a unified system will allow for this to occur.

Proponents of a unified communications (UC) environment contend that productivity is enhanced since users are able to see when individuals are available and communicate using the fastest modality. Despite the availability of UC functionalities within separate applications, the ability to access these functions under one umbrella pushes the envelope to facilitate greater communication and discovery and improved pedagogy. “However but Integrating these technologies and utilizing their individual strength in concert, a truly powerful collaborative platform emerges” (Vanchieri, Sebby, & Dooley, 2013, p. 238).

**Adoption of a Unified Communications System to Enhance Pedagogy**

Acting on the desire to facilitate greater communication and improve pedagogical applications, the College of Staten Island experimented with Blackboard (Bb) Collaborate in order to promote learning beyond the regular class meeting time. The timing seemed appropriate as web conferencing platforms were gaining in popularity and the technology required to support these teaching tools, such as broadband connections, significantly improved (Wang, Jaeger, Liu, et al., 2013). Instructors leveraged the virtual classroom environment in Collaborate in order to provide online tutoring and real time class sessions. Using Collaborate’s web conferencing features, the instructor enabled desktop sharing in order to display the lecture notes via a PowerPoint slide deck. In addition, instant messaging and message boards were also used in order to answer questions as the instructor conducted the lecture. Although the instructors leveraged Bb Collaborate to facilitate a synchronous learning experience, one should note that there are feature sets available in this tool that support an asynchronous learning environment as well. For example, podcasting and voice recordings could allow for instructors to create

personalized lectures and notes to be viewed outside of the classroom environment. Easy podcasting allows instructors to create instant lectures and notes, while voice recordings provide thoughtful, quick feedback to students (www.blackboard.com/Platforms/Collaborate/Overview.aspx, 2014).

Based on the robust feature set of the product, one would assume the learning environment would be enhanced, as it supports a collaborative environment. Research supports this assumption whereby synchronous learning supports a variety of types of communication more than asynchronous learning (Hrastinski, 2008). When evaluating seminar discussions in both a synchronous and asynchronous environment, the data revealed a greater percentage of sentences were related to content in a synchronous environment as opposed to the asynchronous learners. This was attributed to a time factor where learners had to meet certain expectations during a three hour time limit. In addition, "e-learners felt more psychologically aroused and motivated, since this type of communication more closely resembles face-to-face communication (p. 54). This was also seen in research conducted by Park and Bonk (2007,) where real-time communication helped to promote more interactive and meaningful engagement during the discussions.

This synchronous instruction could also be provided in a hybrid modality in order to enhance the learning experience. Based on research performed at Lehman College (CUNY) from the period 2004 through 2013, the student success rate in hybrid courses exceeded the general success rate for all courses measured by grades. Implications are that the student population at Lehman and by extension, CUNY, will benefit from hybrid modes of instruction rather than asynchronous modes. Hybrid learning provides an opportunity for the learning process to

become much more engaging for students and for students to drive the learning process more directly (Reynard, 2007).

Despite the findings of the success rate of using synchronous technologies to enhance the learning environment, the functionality of Blackboard Collaborate did not render a seamless learning experience as one would have hoped. Based on instructor and student feedback, the learning environment was hampered by technical difficulties. For example, students were required to download a Java client in order to participate in the Collaborate session. This proved to be a challenge for many students. In addition, the interface was not intuitive, requiring the instructor to provide technology support instead of focusing on the lesson. Bower (2001) found similar findings in his research where the "teachers' ability to use the web-conferencing technology impacted on the effectiveness of delivery and learning on several occasions" (p. 69). Finally, the record/publish feature did not work very well, so it was not frequently used.

The asynchronous tools inherent in Blackboard (Bb) Collaborate were also not being used. Instructors chose to use alternative technologies like Camtasia and Panopto to record lectures and create podcasts. The decision to use disparate applications rather that opting to use Collaborate's functions was due to comfort level as well as the concern for accessibility and storage of the podcasts. Large files being stored within the Bb infrastructure could cause extreme latency when delivering course material. In addition, the instructor did not want to limit the student's access to the material since the Bb podcast was only available within the LMS environment. The result was an inconsistent learning experience ending with frustrated students and faculty who opted to no longer explore the possibilities of using Bb Collaborate in a learning environment.

As information technology was making advancements in their telecommunications infrastructure, they saw the challenges within the Bb Collaborate environment as an opportunity to leverage the features and functionalities of a unified communications system in both administrative and pedagogical applications. The replacement of the life cycled phone system and obsolete infrastructure could become more than just a robust phone system. Rather, this new infrastructure could have a much greater impact on the College community in both administration and pedagogy. The challenges experienced by instructors and students in their use of the virtual tools within Bb Collaborate could be addressed through this unified environment since all of the features and functionalities were available. Furthermore, students would be connected through one interface regardless of the modality they were using. Meaning, through a seamless connection from a mobile phone, website, or email, a learning connection could be established. All of the disparate systems that were currently being used could be eliminated. The instructor would now be focused on teaching and learning and not on the technology.

**Is a Unified Communications System Worth the Investment?**

It is quite challenging for the institution to decide on the optimal technology solution that would provide the greatest return on investment. Is it worth the resources and cost to implement a unified messaging system? Or, can we leverage disparate applications already in existence with similar functionalities? Is your institution at a place in time that will necessitate upgrades to a phone system? If yes, what do you want to get out of this system? Unfortunately, there is no simple answer to these questions and the decision is dependent on the institution's current infrastructure, cost, and culture. Some key points CSI considered when deciding on a UC system were:

- Has your current phone system reached its lifecycle? If yes, are you looking for a more unified and comprehensive system that could change operating procedures and be integrated into the teaching and learning environment?
- Will you be required to replace and configure the server and system software?
- What is your network capacity? Can the network handle VoIP traffic?
- Does your institution already have systems in place that provide web conferencing functionality and foster collaboration? How widely are they used? What resources are required to maintain these separate systems?
- Are any of the functionalities inherent in a unified communications system currently being used in the teaching and learning environment? How easy and accessible are these solutions? Will the user population be flexible and amicable to exploring alternative solutions?
- How important is it for your institution to integrate all communication modalities under a single interface?
- What systems are in place to handle emergency alerts?
- Do you have systems in place that are reliable? Do you have redundancy built into your infrastructure?
- What is the culture of your institution? Is it important for a user to be reachable from any device from one contact number?
- How geographically dispersed is your institution?

According to the U.S National Education Technology Plan (U.S. Department of Education, 2010), the model for a twenty first century learner is powered by technology that consists of a comprehensive infrastructure providing every learner, educator, and every level

of our education system with the resources they need to excel. This infrastructure includes people, processes, learning resources, policies, and sustainable models for continuous improvement. It is critical to take this model into consideration when deciding on whether a unified communications system is the optimal solution for your institution. As CSI reviewed each of these questions, it became apparent that a unified communications system would provide for an environment that is conducive to the twenty-first century learner. In this regard, the next step was to develop a strategy for implementation.

**Recommended Strategy to Implement a UC Platform**

The implementation of a UC platform requires a thorough analysis of the institution's infrastructure as well as an understanding of how the features and functions can be applied in administrative and academic environments. At CSI, the following steps were followed as part of this analysis. This strategy can be used as a guide for other higher educational institutions who may be contemplating a UC environment.

*Step 1: Evaluate your current information technology environment*

A complete understanding of your information technology environment is needed before you can consider a unified communications system. This includes an assessment of your telecom and networking infrastructure as well as your staff's skills and capabilities. Based on this assessment, you will be able to gauge whether a UC environment is feasible.

*Step 2: Set clear objectives*

Outlining measurable objectives that align with the requirements set by your institution is key when considering a UC system. These objectives need to be prioritized according to (a) items that need to be replaced to maintain business continuity and reduce risk, (b) educational

outcomes, pedagogical practices and business processes that could leverage the technology, and (c) the cost and resources associated with these outcomes.

*Step 3: Finding the best solution*

Based on the results from steps one and two, a significant amount of time needs to be given to evaluating the technology partner who will be responsible for deployment, integration, and coordination of the key elements. A collaborative and inclusive approach should be taken; technology staff who maintain the network, telecom environment, email, and active directory should be part of the decision making process. Faculty should also be included as they are the users who will be leveraging the technology in the teaching and learning environment. This team should develop a schematic of their desired infrastructure and use this as a baseline when evaluating technology solutions. The team should also prepare to visit technology partners in order to obtain an overview of proposed solutions. Subsequently, on-site visits should be scheduled so that the vendor can perform a more granular needs assessment that will yield to the statement of work.

When evaluating vendor partners, there are several variables that need to be considered. Obviously, the partner will need to have an extensive background and expertise with dealing with IP data networking. However, technical skills are only part of the equation. Partners need to have a comprehensive solution that can be scaled for growth in both administrative and academic areas. In addition, a proven track record with higher educational institutions should be a requirement. Finally, the partner should have a strong financial viability.

*Step 4: Compare, contrast, and decide*

The statement of work provided by the vendor partners needs to align with the objectives outlined in step two. The institution will need to do a thorough analysis of the recommended design, technology components, and consulting costs associated with implementation. It is also important to consider ongoing costs for support and maintenance as well as the timeline for implementation.

*Step 5: Create a migration plan*

Building on the objectives outlined in step two, prioritization needs to be given to the areas that need to be replaced in order to maintain business continuity and enhance pedagogy. Working hand-in-hand with the vendor partner, the information technology staff, administrators, and faculty, you will need to create a well-constructed migration plan. This plan will include specific administrative and academic areas that will utilize the components of the unified system. As part of the planning process, you will need to consider the skill set of the faculty and staff, key milestones, and the areas of business and instruction that will be impacted based on the migration. The migration plan should not be completed in isolation. Rather, information technology staff should collaborate with administrative and academic units by create working groups that will foster adoption of the new technology across the institution.

## Plan for Adoption and Implementation

Once the appropriate unified communications (UC) system platform was decided, CSI began to formulate the implementation plan. This plan included not only the implementation of a new telecom infrastructure to support a UC system, but also a plan to leverage the UC features of in administration and academic areas. This was going to be accomplished in two phases. Phase

one would be the implementation of unified messaging, a component of a UC system. This would promote a culture shift throughout the College by introducing a new telecom environment to the user community. This new environment would involve the distribution of VoIP phones, which would provide for the integration of voice mail messages within the College email system. These messages would be accessible from any platform and location, including mobile technology. This would be the first iteration of creating a unified communications environment and preparing the college community for the adoption of the more robust feature set inherent in a unified communications system.

Phase II would involve the introduction of a unified communications (UC) system to a cohort of users. The UC working group, in conjunction with senior leadership, will select a group of administrative staff to begin using UC functionality based on their function and responsibilities. These administrators would be trained in using Lync, the application embedded in a UC system that provides for a robust set of applications supporting collaboration and communication. A seamless interface will allow for the user to start a chat, a call, a video call, or view a contact card with a single click from any device (Microsoft, 2014). Also, having the knowledge of when the user is available and what modality is being used will facilitate collaboration and provide for greater efficiencies. Extensive training and documentation will be provided in order to allow for a successful implementation.

In parallel to working with administration, Phase II will also include introducing UC functionality to faculty constituents to enhance their teaching and learning environment. Working with the Faculty Center for Professional Development (csi.cuny.edu/facultycenter, 2014) instructors who previously used Blackboard Collaborate in their teaching environment will be selected to use Lync. Both asynchronous and synchronous tools will be used, including such

features as web and video conferencing, instant messaging, and screen captures. The instructor will also be able to archive the sessions for later viewing through the recording feature, which allows presenters to record all aspects of a Lync session, such as audio and video, IM conversations, PowerPoint presentations, handouts, etc. Unlike the Bb Collaborate platform, the archives will be accessible from any location because they will be published to a location available outside of the Lync interface. Through the collaborative efforts of the Faculty Center and information technology staff, extensive training will be provided to both faculty and students. The learning environment will be less structured and more unified providing for seamless integration with all of the learning tools that have been established.

## Summary

"The components to support connected teaching are available now. Unified learning and collaboration is about unifying enterprise technologies—infrastructure, applications, and social networking—in a way that's optimized for education to improve learning and ensure efficient administrative operations" (Dietz, 2010, p. 47). A unified communications (UC) environment encompasses every piece of collaboration that is used for both administrative and pedagogical applications. One can argue that a UC platform will be able to help groups dramatically (Greenfield, 2006). It can impact all areas of your organization while providing for greater efficiencies and enhanced learning environments. A synchronous learning environment provided by the UC platform can enhance learning by providing for real-time communication, which can promote more interactive and meaningful engagement during the discussions (Park & Bonk, 2007).

Despite these favorable outcomes, there are many items to be considered before taking the UC plunge. These items include not only technology requirements and staff resources, but also the culture of your organization, which may support the belief that technologies currently in use are sufficient. However, along these lines, there may be opportunities for enhancements as the current technologies are not performing at the desired level. It is also important to have good relationships with your vendor partners so that the appropriate UC technology that best fits your organization for both administrative and pedagogical applications could be realized.

Making the appropriate decision for your institution is not a simple one and following a specific strategy should alleviate any diversions and complications. The decision should be attained from a collaborative process and not be done solely by information technology staff. The decision should involve leveraging your current infrastructure as well as looking towards the future growth ofyour institution within the administrative and academic arenas. Specific questions will need to be answered in order to arrive at an appropriate decision that fits the strategic plan for your organization. It is important to remain cognizant of the qualities of today's learners, who are coming from diverse backgrounds and feel the use of technology improves their learning. There needs to be a fusion of traditional and leading-edge tools that empower an individual to explore, discover and exchange information without traditional boundaries or constraints (Vanchieri, 2013). A seamless integration of these tools needs to be made available to the administrative and learning environments, providing for easy access and operability (Vanchieri, Sebby, & Dooley, 2013).

CSI recognizes the difficulty in deciding whether a unified communications environment is worth the investment and whether the value can be maximized to serve both administrative and academic purposes. CSI's requirement to replace their life-cycled phone system while

leveraging their robust network was a critical component of the decision making process. However, what was equally important was the ability to leverage the unified communications system in both administrative and academic venues. The opportunity to provide a seamless interface for the learner that was easy to use and had the same robust features of collaboration tools being used in a disparate fashion could not be ignored and was paramount in the decision making process. In addition, the timing was right since the users of these tools were frustrated and were looking for alternatives. As noted by the Director of the Faculty Learning Center, "it was a hard sell to get the faculty to use Collaborate" (2014).

CSI followed a specific strategy that addressed the challenges across administration and academic units, which led to the appropriate decision to invest in a comprehensive unified communications environment. CSI recognizes the significant impact a unified communications system could offer and looks to provide for a truly powerful organization that spans beyond the boundaries and facilitates collaboration, experimentation, and an enriched learning environment. One that is more intuitive, less restrictive, and more unified and provides a seamless and collaborative learning atmosphere. CSI will continue to look for opportunities to expand the use of UC technology among administration and pedagogy, as well as the ability to continue to leverage this technology across all modalities.

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