Computer Conferencing

Super Sexy "6"

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Executive Summary: Computer Conferencing Report

This report provides an analysis and evaluation of the past, current, and future prospective on computer conferencing. Methods of analysis include text, audio, and video computer conferencing. Results of data analyzed show that computer conferencing is leaning towards the laggard stage of the Diffusion of Innovation chart.

The report finds that computer conferencing has come far from its beginnings. “What used to be text-based, business-oriented communication is now a more efficient, video-based communication with no particular orientation.” Discussed in the report are:

- Computer Conferencing Technology
- Competition
- Niches
- Cost and benefits of computer conferencing
- Future of computer conferencing

The report analyzed limitations of computer conferencing. Some limitations include:

- No internet connection
- Poor quality
- Expense of programs

Even though there are limitations, computer conferencing is considered one of the richest forms of communication improving users’ time, space and money. The technologies used will continue to improve by catering on factors of convenience and organization for business and personal use.

100 Facts

1. Some new features include slideshow presentations where images are presented to the audience and markup tools and a remote mouse pointer are used to engage the audience while the presenter discusses slide content.

2. Live or streaming video - where full motion webcam, digital video camera or multi-media files are pushed to the audience

3. VoIP - Real time audio communication through the computer via use of headphones and speakers.

4. Web tours - where URLs, data from forms, cookies, scripts and session data can be pushed to other participants enabling them to be pushed though web based logons, clicks, etc. This type of feature works well when demonstrating websites where users themselves can also participate

5. Meeting Recording - where presentation activity is recorded on the client side or server side for later viewing and/or distribution.

6. Whiteboard with annotation (allowing the presenter and/or attendees to highlight or mark items on the slide presentation. Or, simply make notes on a blank whiteboard

7. Text chat - For live question and answer sessions, limited to the people connected to the meeting. Text chat may be public (echoed to all participants) or private (between 2 participants)

8. Polls and surveys (allows the presenter to conduct questions with multiple choice answers directed to the audience)

9. Screen sharing/desktop sharing/application sharing (where participants can view anything the presenter currently has shown on their screen. Some screen sharing applications allow for remote desktop control, allowing participants to manipulate the presenters screen, although this is not widely used.)

10. Web conferencing is often sold as a service, hosted on a web server controlled by the vendor.

11. Offerings vary per vendor but most hosted services provide a cost per user per minute model, a monthly flat fee model and a seat model.

12. Some vendors also provide a server side solution which allows the customer to host their own web conferencing service on their own servers. Examples of this include Microsoft Office Communications Server

13. Web conferencing technologies are not standardized, which has been a significant factor in the lack of interoperability, transparency, platform dependence, security issues, cost and market segmentation.

14. Web conferencing is available with three models: hosting service, software and appliance.

15. An appliance, unlike the online hosted solution, is offered as hardware. It is also known as "in-house" or "on-premise" web conferencing. It is used to conduct live meetings, remote training, or presentations via the Internet.

16. Some web conferencing solutions require additional software to be installed (usually via download) by the presenter and participants, while others eliminate this step by providing physical hardware or an appliance

17. Some web conferencing services vendors provide a complete solution while others enhance existing technologies

18. System requirements that allow individuals within a group to participate as individuals (e.g. when an audience participant asks a question) depend on the size of the group.

19. Most vendors also provide either a recorded copy of an event, or a means for a subscriber to record an event. Support for planning a shared event is typically integrated with calendar and email applications

20. The method of controlling access to an event is provided by the vendor. Additional value-added features are included as desired by vendors who provide them.

21. In the early 1980's, the computer conferencing system CoSy was developed at the University of Guelph in Guelph, Ontari, Canada.
22. Some of the features of CoSy included an early form of email separated into baskets, conferences, conversations (discussion boards), a scratchpad, which allowed the user to prepare edit texts online and directories of users.
23. These conferences were split up into five categories: "read-only" (for posting notices), "read and write" (collaborative discussion), open or closed, confidential and public (details of conferences appeared in public conference directories).
24. Adobe offers a web conferencing program called Adobe Connect, which organizes meeting rooms into "pods" (each pod performs a specific role).
25. Prior to 2006, this program was known as Macromedia Breeze.
26. iMeet is a cloud-based video conferencing system supported by browsers such as Internet Explorer (7.0 and newer), Google Chrome (11.0 and newer) and Safari (5 and newer).
27. iMeet apps are also available for the iPhone, iPad and Android Smartphones.
28. Founded in 2003, Skype is a video-based conferencing program.
29. Google had been developing a conferencing system called Google Wave. However, they disbanded it in 2011, handed it over to the Apache Software Foundation.

30. The Apache Wave (as it's now called) mixes chat, email and collaborative document editing. It's currently in incubation.
31. Google+ is a social networking site developed by Google that allows "hangouts", which are video conferences with up to 10 people in your "circle" (group of friends).
32. During these "hangouts", you can also use other apps and can share documents.
33. LifeSize, a division of Logitech, provides HD videoconferencing; it was the first to bring it to market when it was debuted in 2005.
34. Computer conferencing can be done through email, chats/forums, and desktop videoconferencing, among others.
35. Although real-time text chat conferences began appearing in the late 1980s, it wasn't until the late 1990's when web conferencing became available.
36. This early web conferencing was developed by Starlight Networks.
37. Conferencing software TimeBridge was developed specifically for meetings and online collaborations.
38. It integrates with programs such as Microsoft Outlook and Google Calendar.
39. Computer conferencing began as early as the 1960s
40. In 1956 AT&T built the first Picturephone test system.
41. The idea of computer conferencing is a result of years of technological innovations. The development of electricity opened the door to many technologies which were once only a dream.
42. Early inventors and innovators with Television such as Philo Farnsworth who was the first inventor to transmit a television image comprised of 60 horizontal lines in 1927 and David Sarnoff who was the entrepreneurial force behind electronic television transmission and reception, laid the foundations of the technology we see today.
43. Murray Turoff is considered the father of computer conferencing.
44. Murray Turoff was a computer scientist who worked in emergency preparedness
45. Turoff was tasked with coming up with an electronic communication system under the Executive Offices of The President of The United States.
46. Turoff developed the Emergency Management Information System and Reference Index (EMISARI which is often considered the first computer-mediated, multimachine communications and conferencing system.
47. Turoff's developments are considered an early precursor to many of today's chat, messaging, conferencing, and collaboration systems.
48. Murray Turoff was a born to Jewish parents from Russia and Poland who immigrated to the United States in 1909.
49. Computer conferencing was first developed to aid government agencies during emergency situations.
50. video conferencing was first introduced, with a grand introduction at the 1964 World's Fair held in New York
51. In 1976 Network Voice Protocol Helped develop video conferencing.
52. In 1981 Packet Video Protocol was a new technology which help advance video conferencing. These things were still being mostly developed in lab however.
53. During the 1980s Computer conferencing technology was mostly use for corporations and military use.
54. In the early 1980s video conferencing began to go to commercial market however it was not practical and was an exurbanite amount of money.

55. In 1982 Video conferencing went to the commercial market for $250,000 that had lines that cost $1,000 per hour.
56. In 1986 and the price had dropped dramatically at $80,000 with a $100 per hour line fee.
57. In 1991, IBM introduced the first PC-based video conferencing system, named PicTel. Although it was a black and white system that was very inexpensive, costing only $30 per line, per hour, the system itself cost $20,000.
58. In the 1990s ITU standards began to be introduced which helped set up systems that could communicate with each other.
59. Cisco webex- Web conferencing and collaboration solutions, high-performing technology that is easy to use, mobile platform-any device anywhere, meeting up to 100 people. Plans start at $19/month https://signup.webex.com/webexmeetings/US/sem_acquisition.html?CPM=KNC-sem&TrackID=1031291&Country=US&psearchID=conference%20online
60. Gotomeeting- uses PC or Mac, free VoIP and phone conference, HD video conferencing https://www4.gotomeeting.com/m/g2msem3.tmpl?Portal=www.gotomeeting.com&c_name=gget-d-c&c_mark=NAPPC&c_kwd=computer_conferences-Phrase&c_prod=GTM&c_cmp=sf-70150000000ZgWy&c_cell=sLcD8IiIc-dc_pcrid_7467901480&gclid=CNLfx42Mw7wCFQtgMgoduHcAPA
61. NCH Software http://www.nch.com.au/phone/
62. MeetingBurner up to 15 participant, screen sharing and a phone-in line (Free)
63. OmniJoin- works only on PC running Windows XP or later, http://www.pcworld.com/article/2010325/web-conferencing-showdown-whats-the-best-software-for-online-meetings.html
64. Skype - http://www.dummies.com/how-to/content/how-to-manage-conference-calls-with-skype.html
65. Oovoo- http://voip.about.com/od/videoconferencing/tp/Apps-For-Free-Video-Chat-On-Your-Computer.htm

66. Computer conferencing technology encompasses a broad class of software and hardware tools that facilitate real-time (or nearly so) interactions over **computer networks,** and in particular, the **Internet.** Included under this heading are such applications as:
    - text-based chat programs
    - whiteboard utilities
    - groupware
    - instant messaging systems
    - audio and video conferencing software
67. These nascent technologies appeal to businesses because they have potential to save time in getting tasks done
68. Reduce travel expenses, and to enhance communications and collaboration across the organization.
69. Video and audio conferencing over the Internet require fast connections.

70. Otherwise, the process quickly becomes an exercise in frustration as words and images lag or are lost completely.
71. Simpler, text-based chat conferencing is less prone to traffic hang-ups, but is relatively inflexible for multi-person and multimedia collaboration and can be tedious to use for extended periods.
72. One of the first widely publicized conferencing systems, EMISARI, served as the foundation for the Emergency Management Information System.
73. End users want a single interface from which they can initiate any number of collaborative tasks without needing to start several separate programs or search for utilities buried in software menus.
74. Whether or not computer conferencing software is hosted locally or on the Internet, the trend has been decidedly toward removing barriers between the various kinds of conferencing and collaboration tasks.
75. Computer conferencing is emerging not only as a boon to productivity and cost containment over traditional alternatives, but for some companies it is a method of adding value to the enterprise's **intellectual capital.**
76. Despite all the new developments in groupware and PC-based collaboration programs, some observers speculate that increasingly computer conferencing and related tasks, including e-mail, will be outsourced to mass providers and accessed via standard Web browsers and plug-in utilities.
77. This view differs significantly from the current development trajectory, which has been to create separate applications for each major function, e.g., one program to manage e-mail and discussion boards, another to handle whiteboarding, and so on.
78. Installing and supporting the multitude of conferencing software alternatives is an expensive endeavor for large businesses, in terms of both staffing and software/hardware costs, making third-party hosting and turn-key availability an enticing proposition.
    a. http://www.referenceforbusiness.com/encyclopedia/Clo-Con/Computer-Conferencing.html
79. Currently, the traditional business-to-business video conferencing market is a $3 billion industry, predicted to grow to $5 billion by 2015 (Infonetics estimate, June 2011).
80. Incorporating other forms of visual communications including unified communications, online collaboration and web conferencing, rich media communications is a $10 billion industry forecasted to reach $15 billion by 2015.
81. Companies are becoming more distributed, there are more outsourced partners, telecommuting employees, and networks with remote branch offices, while at the same time the need for real-time interaction has grown.
82. Multipoint HD video conferencing is taking place of meetings that used to have to occur in person, while making businesses more efficient by cutting travel time and related expenses.
83. The applications for web and video conferencing are virtually limitless.
84. As video conferencing adoption grows, more line employees will conduct online meetings where they seek to accomplish day-to-day tasks — instead of boardroom applications comprised of executive talking heads, audio and video alone.

85. In a just a few short years, online video conferencing providers will make their services available on all desktop platforms and mobile devices.
86. Video conferencing will then be available in virtually every business conference room, desktop and laptop, plus smart phones and tablets.
87. This will include Windows and Macintosh computers along with any cell phone and tablet with a camera and Internet connection.
88. The barriers of different operating systems, mobile devices and interoperability will be solved and virtually anyone will be able to videoconference from anywhere.
89. The long-predicted videophone of the future is not a video phone at all; it is your desktop computer, a standard video peripheral or built-in camera, Internet access, and your video conferencing online service provider.
90. The long-term outlook for business video conferencing adoption is strong.
91. Video conferencing is driven by competitive pressures for speed, soaring fuel costs and travel limitations, while more complex products and services everywhere require better visual communication tools.
92. The enabling technologies are still improving: economies of scale will further reduce HD peripheral prices, while bandwidth and processing power are in increasing supply.
93. For business applications, video is not enough. A full suite of web collaboration tools are required for productive online meetings.
94. Video conferencing will soon be everywhere: desktops, conference rooms, and mobile devices, plus consumer video calling from home and virtually any Internet-connected device.
95. Consumer video calling and commercial, cloud-based online services will play a key role in expanding video conferencing adoption from corporate boardrooms to all employees at any-sized business. Anytime, anywhere, 'any device' video conferencing is on the way.
96. The benefits offered by video conferencing will soon be taken to a new level by technologies like motion tracking, facial recognition and simulation, intelligent audio technologies, handheld and full-scale holographic devices, 3D monitors, stereographic camera setups, and entire-room display technologies.
97. Recent months have already seen the introduction of digital projectors into mobile phones.
98. The top-end video conferencing products can include life-sized screens, crisp pictures, surround sound and even operating technicians.
99. Most classes will be by video conference (especially for distant learning students) and court trial.
100. Parole hearings and prison visits will primarily be done by this method as well.
101. ATM's will have video conferencing capabilities. The reason for this would be convenience and security reasons. It would offer live teller support and face recognition. The ATM's will be able to provide more service through those features.

Super Sexy Six Team Meeting

Date/Time: February 6, 2014 2:00p.m to 3:00p.m
Location: GAC Lab (Computer room in the science wing)
Attendees: Clint Berge, Andrew Campnell, Bao Lor, Mai Mueller, Jenna Ebenhoe, and Josh Bernhardt

OBJECTIVE
Develop ideas; discuss chosen topic and 100 facts. Please bring ideas and be ready to discuss and offer suggestions.

SCHEDULE
2:00 to 2:10 Socialize
2:10 to 2:50 Discuss topic and offer suggestions
2:50 to 3:00 Socialize/End of meeting

Super Sexy Six Team Meeting

Date/Time: February 20, 2014
Location: GAC Lab (Computer room in the science wing)
Attendees: Clint Berge, Andrew Campnell, Bao Lor, Mai Mueller, Jenna Ebenhoe, and Josh Bernhardt

OBJECTIVE
Formulate a powerpoint and review written portion of presentation.

SCHEDULE
2:00 to 2:10 Socialize
2:10 to 2:50 Discuss topic and offer suggestions
2:50 to 3:00 Socialize/End of meeting

- Greeting(review schedule on when we present etc…)
- Review PowerPoint slides(format, who is doing what etc…Run through?)
- Review outline
- Review audience analysis(Different perspectives)
- Update on written portion
- Set next meeting time and assignments.
- End meeting!

Super Sexy Six Team Meeting

Date/Time: February 27, 2014 2:00p.m
Location: GAC Lab (Computer room in the science wing)
Attendees: Clint Berge, Andrew Campnell, Bao Lor, Mai Mueller, Jenna Ebenhoe, and Josh Bernhardt

OBJECTIVE
Run through presentation and smooth out additional details regarding presentation

SCHEDULE

- Greeting
-
- Review the video intro…
-
- Feedback on where we are at
-
- Run through presentation (rough draft!) Stop and offer suggestions…etc…
-
- Set next meeting time and assignments.
-
- End meeting!

Continuous Improvements

The Super Sexy Six is currently working on continuous improvements based on feedbacks from peers and professors. Feedbacks are great tools that will help the group perfect the presentations; therefore we encourage any feedback to have a better understanding of the positives, negatives, and continuous improvement on behalf of the group. The feedback will be taken seriously and implemented on the next case/project.

Group Continuous Improvements

- Use the strengths of individual members
- Make sure text on PowerPoint is consistent and precise
- Do more citing in paper to add strength and validity
- Be creative with PowerPoint
- Rehearse Q&A and presentation
- Explain concepts in detail
- Add feedback to paper
- Have a checklist and deadline dates

Defining Computer Conference

Technology has shaped the way of communication by continue advancements. One of the Technologies that look promising in the future is computer conferencing. Webster Dictionary defines computer conferencing as “The use of computer and telecommunications technology to hold discussions between people operating computers in separate locations.” Computer conferencing is an emerging service that keeps various audiences connected through time, money and space. The future of computer conferencing looks to be endless.

Early History

Today’s computer conferencing involves years of innovated technology advancements that led to the high quality video content being used in computer conferencing today. Philo Farnsworth, the first inventor to transmit a television image comprised of 60 horizontal lines in 1927 and David Sarnoff, the entrepreneurial force behind electronic television transmission reception were the early innovators in the technology of computer conferencing. Through constant improvements of telephone, radio and television our connection to the world is easily accessible by extending the horizon for technology.

Over the years instant messaging and video phone calls became a reality. In 1956 AT&T first started to test the technology of the picture phone and later the technology was introduced in 1964 at the New York’s World’s Fair. After the introduction of the video technology, the future of information technology looked bright with endless possibilities.

It was not until 1971 that Murray Turoff helped computer conferencing to become a reality for the commercial market. Turoff, who many people consider the father of computer conferencing, was a computer scientist who worked in emergency preparedness. He was tasked with coming up with an electronic communication system under the Executive Offices of The President of The United States. Turoff developed the Emergency Management Information System and Reference Index (EMISARI) which is often considered the first computer-mediated, communications and conferencing system. This information data base and technology system was initially designed for governmental communication in case of emergency. Turoff design was considered an early precursor to several of today's chat, messaging, conferencing, and collaboration systems.

Limitations

In the early days of computer conferencing, technology was limited to certain computers and their systems. In the 1980s computer conferencing hit the commercial market however the price was high and the quality was low. In 1982 Video conferencing went for $250,000 with lines costing $1,000 per hour. Later, in 1986 and the price had dropped dramatically to $80,000 with a $100 per hour line fee. However, the cost seemed to outweigh the benefit in its earlier time. As the internet increased in quality and availability the cost decreased, and computer conferencing took off. Today technology is more efficient with multiple options varying from the number of visual content to the amount of lag (interval) time between users.

Computer Conferencing Technology

Computer conferencing has certainly come a long way from its humble beginnings. What used to be text-based, business-oriented communication is now a more efficient, video-based communication with no particular orientation. It can now be used by anyone, anywhere and at any time. But to know just how far computer conferencing has come over the last few years, one must look at how the technology developed over time.

One of the earliest computer conferencing programs to date came in 1982 at the University of Guelph in Ontario, Canada. This program, called CoSy, gave users the ability to send and receive email, hold conferences and coordinate conversations. These conferences were split up into five categories: read only, read/write, open or closed, confidential and public. Based on the category, users could post notices, respond to notices and hold meetings that were either open or closed to the rest of the CoSy community. Though this program allowed its users to communicate with colleagues in newer, broader ways, it didn't allow for audio/video communication; as a result, the user of this program had a leaner experience communicating with other people.

While CoSy was a good start to some, others saw the program as an incomplete form of important communication. Many people in the business world needed a middle ground; they needed something that allowed for face-to-face rich communication to connection from longer distances and throughout different areas. This was where Starlight Networks came in. Started in 1991, according to the Forbes article "Online Broadcasting", the main objective of the company was to develop video-streaming computer conferencing for businesses like Boeing and General Motors. It was not until the late 1997-98 when their program debuted, and businesses like the

ones mentioned began using Starlight Networks' program. Aside from improving business communication, Starlight Networks also paved the way for other companies to developing video conferencing systems comparable to theirs.

Another difference made over time was the overall reach and connectivity of the conferencing program. With programs like CoSy, the reach is minimal and is typically restrained to a certain network. If members of a group are out of town but would still like to meet at their normal time, CoSy, software would not allow the meeting to take place. The members would have to remain on campus in order to use the program to connect all the users. Programs like Skype came out and gave new possibilities for groups to hold meetings, as long as they all have internet connections. Skype and similar programs expanded the reach of computer conferencing; anyone with an internet connection can talk with anyone, anywhere and at any time with the use of their computer. Skype has helped video computer conferencing to become a reality for various consumers.

The most widespread computer conferencing program out today is Skype. Although Skype was founded in 2003 by Janus Friis of Denmark and Niklas Zenströmm of Sweden, the actual technology was developed by Estonians Jaan Tallinn, Ahti Heinla and Priit Kasesalu, according to the Ars Technica article " 'How can they be so good?': The strange story of Skype". Since its inception, Skype has certainly had a meteoric rise. The program accounted for 167 billion minutes, or just more than 2.7 billion hours, of borderless voice and video calling in a year.

Another similar program called GoToMeeting was developed after Skype. While both are video conferencing programs, GoToMeeting is business and work-oriented, while Skype evolved

into a social networking program over time. According to its website, GoToMeeting accounted for 34 million video meetings last year with the program up and running more than 99 percent of the time.

There is no one computer conferencing program that can be used to fulfill all communication-related needs. This is why the Rich-Lean model must be used to determine what medium suits the given situation. For example, a boss or project manager wants to inform their employees or group members that a meeting has been cancelled. Since this is leaner, simpler communication, a video call from Skype or GoToMeeting would be unnecessary. Instead, the better choice would be to email them about the cancelled meeting.

When the time comes for that all-important group meeting, but everybody's schedule doesn't match up, then the programs Skype or GoToMeeting would be the smartest and most effective choice. If a program like CoSy is used, the richness of conversation becomes lost. Important facial and vocal cues are thrown to the wayside, making it harder for the project manager or boss to effectively address the issues at hand. So to recap, simpler messages call for leaner communication while more complex messages call for richer communication. The complexity of the message follows the different choices of computer conferencing.

Why Chose One Over the Other

There are three categories of computer conferencing, and within each lies a certain niche (preference) during different uses of communication. Having a clear understanding of the difference between the text, audio and video computer conferencing will allow the correct form of message sent to the type of feedback that each computer conferencing can offer.

The chart “Niche for Computer Conferencing” details the reason behind the preferred choice of technology used.

Text, Audio and Video Conferencing

To understand computer conferencing as a whole, it’s important to highlight the different areas included in it, such as text, audio and video conferencing. These types of computer conferencing have different roles and implications in communication and vary from lean to rich. For example, one channel may be better suited for a message than another. In addition, certain situations require channels with more rich or lean feedback. Luckily, computer conferencing gives people options, and being perceptive about each of them helps people choose the best format for the message they intend to deliver. In addition, computer conferencing also helps receivers more easily access information.

Niche for Computer Conferencing

Computer conferencing types	Text	Audio	Video
Niche	• **Fast** • **No Emotions** • **Lean message content**	• **Vocal/sound** • **Moderate feedback** • **Richer message content**	• **Emotion packed** • **Fast feedback** • **Richest message content**

One form of computer conferencing is through text. An example of this is email. Email may be described as “messages and other data exchanged between individuals using computers in a network” (*Merriam-Webster, 2014).* An email system allows computer users to send text,

graphics, some sounds and animated images to other users. It developed from large organizations using an internal messaging system as a communication link among employees. The mass provision of email addresses for private individuals by internet providers led to the development of email as a system to supplement or replace communication by letter.

Another form of text conferencing is instant messaging. Instant messaging, or IM, is the exchange of messages in real time between two or more people logged into a particular instant messaging or IM service. Instant messaging is more interactive than email because messages are sent immediately, whereas email messages can be queued up in a mail server for seconds or minutes. However, there are no elaborate page layout options in instant messaging as there are with email. The basic operation is simple; type a brief message and press enter.

IM became popular after “Israeli-based ICQ introduced its service in 1996, which was later acquired by AOL” (Mistell, 2014). The major IM services are AOL's Instant Messenger called AIM, ICQ, Yahoo Messenger, Google Talk, Jabber and Microsoft's MSN Messenger, Windows Messenger and Windows Live Messenger. Although, third-party IM clients such as Trillian and Simple Instant Messenger were “designed to interface with multiple IM services, the IM clients from the IM service itself were always proprietary to that service” (Mistell)

For the three different kinds of computer conferencing that have been focus on, each one has a niche or special selling point. For text base, it is fast and convenient. Someone can send message and have all the information available in writing that they can refer to at any time. There is less emotional value involved, making text computer conferencing the ideal choice to get information to multiple people without having to worry about tone of voice or emotional expressions.

Another form of computer conferencing is audio. Audio conferencing allows multiple parties to connect using computers. This can be a solution for a number of problems that can arise when multiple parties need to meet. For example, with audio conferencing people who are distant and busy do not have to travel to their meetings, the meetings are done right in the home. There are numerous technologies that support audio conferencing, but in general, all you need is a computer and the internet.

Moving along, audio conferencing can be used in collaboration with websites where people can register and make calls to one another. For example, Skype offers free audio conferencing. There are usually features that allow additional participants to be added to the conversation. New people normally cannot join the meeting without actions being taken by someone already in the conversation.

In addition, there are more "sophisticated services that offer online audio conferencing options known as virtual meeting rooms. These may be accessed by numerous people without action being required from the host or the present participants. A virtual meeting room often offers valuable features such as the ability to make visual presentations, share files, and to allow private messaging between participants" (Dye, 2014).

In the case of audio computer conferencing the niche is based on the fact that there is sound which richen the communication channel. There is also immediate feedback between the conversations that can help clear any miscommunication in a timely manner.

The last form of computer conferencing is video conferencing. Video conferencing is a popular "method by which people in different locations communicate in real time with two or

more people at different locations via video (Mann, 2008). This ability to see the remote participants as well being able to hear them has many benefits over audio conferencing"

As the technology continues to improve, video conferencing is becoming widely used by all industry sectors. Multinational companies use it to communicate with international branch offices, while smaller companies use video conferencing to enable them to work with clients and suppliers in different countries. The equipment required for video conferencing is simple to operate. Gone are the days where videoconferencing required specialist technicians. Now, everyone can be shown how to place video calls after a quick training session.

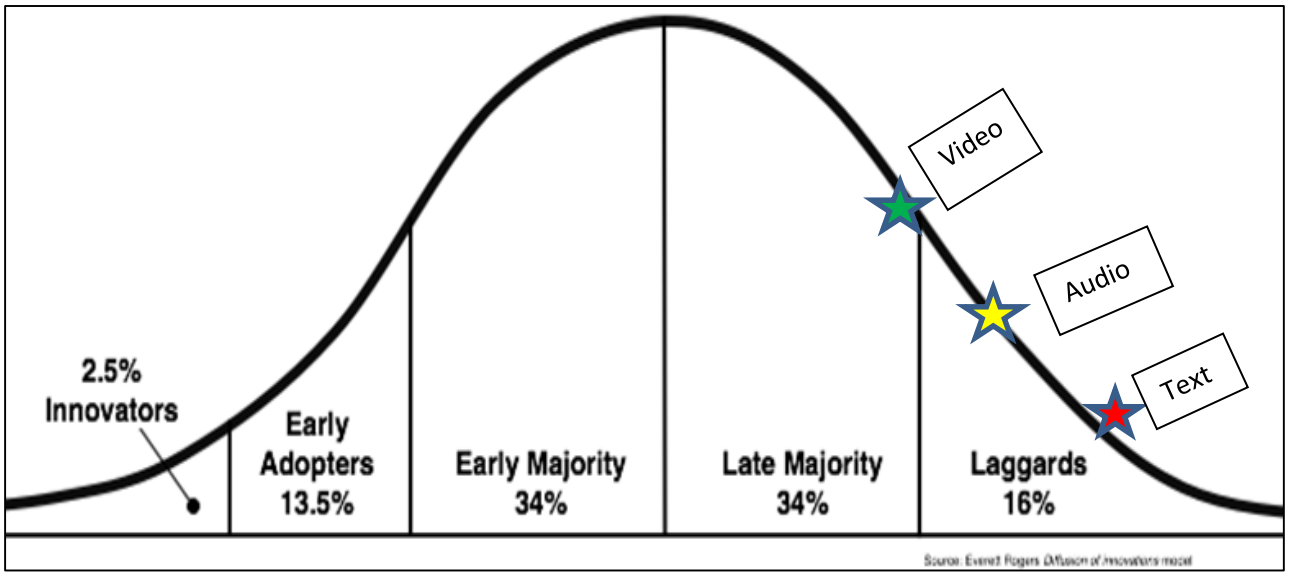
Overall, there will always be a need to travel to meet clients or partners, especially during the important early stages when relationships are being built. However, video conferencing enables the luxury of people being able to maintain those relationships easily and cost effectively. This can also be said for maintaining personal relationships. Now, with the help of video conferencing, people can easily FaceTime their friends, for example, to catch up with one another while they're away, perhaps at different colleges.

Lastly, some features of modern video conference systems are that they enable users to share documents and computer images with the remote party. When video conferencing is used in this manner it becomes part of a collaboration solution. Many legal firms and consultants use it to avoid billing clients travel time and are able to carry out more client meetings in any given time period.

To follow this further, video conferencing's niche is the currently the riches form of conferencing and preferred method. The fact that there is more visible emotional display that is similar to "face-to-face" communication, thus making video conferencing the richest form of communication yet. The instinct feedback of audio and visual cues makes this technology a

desirable medium for many users. This takes the focus on video conferencing to the next level and can be further discussed in the innovation process.

Diffusion on Innovation



As seen above, based on our information and research it was determined that video computer conferencing is in the "Laggards" stage of the Diffusion of Innovation model. Those who are not using some form of computer conferencing make up 16 percent as seen above. This conclusion is based on wide availability of the internet. Majority of consumers have access to, or own a computer, which video conferencing is becoming more widespread among corporate and academic users. Those who do not use computer conferencing do not feel a need for this accessible service, a small portion may consider the cost too highly to use in their daily lives. A large majority of the nonusers of computer conferencing falls into the older generation who did not grow up with the technology and feel no need to adapt to it. It is not to say that they will never adapt to this technology, the assimilation for this group will be slower.

Those who are the innovators in computer conferencing are the military, government agencies and corporations. The Early and late majority of computer conferencing users are adopting computer conferencing for personal use. Some examples are to stay in contact with friends and family while overseas. Early adopters are in their second to third trial of video conferencing, they had already seen the technological changes that can be compared to their first introduction of video conferencing; less bugs, less lag time and clear videos. Let's take a deeper look into the perspective of the innovators to the laggards of video computer conferencing.

Video, audio and text computer conferencing followed the same patterns, but each is located at different parts in the laggards' stage due to the time of introduction of the technology to the consumers. Although the technologies are all at different parts and may have consumed its saturation of users, the different forms exist mainly due to user's preference form of communication.

Characteristics and Perspectives

To have a better understand of how the process of innovation and the technology development dispersed; the graph "Perspective of Computer Conferencing" separates the advantages and disadvantages based on the differing perspectives from the innovators to the laggards. The Perspective of Video Computer Conferencing chart will detail the technology richness as video computer conferencing becomes more accessible to the average home users. The chart will conclude to assume the innovators start out with the riches form of communication, but the laggards actually gets the richest form of communication by technology advancement. The Perspective of Video Computer Conferencing chart details the process of technology in reference with its users.

Perspective of Video Computer Conferencing

Consumers:	Innovators	Early Adaptors	Early Majority	Late Majority	Laggards
Relative Advantage	Lean, new	Lean, tech. improving	Rich	More rich	Richest
Compatibility	Least	Little	Some	Most	Less
Complexity	Learning cost	Learning cost	Slight cost	Fairly simple	Simple
Trialability	None	Some	More	Available	Widespread
Observability	Not reality	Minimal	Some	Growing	Everywhere
Adaptability	Rigid	Little	Narrow tailoring	Increasing personalization	Flexible, tailor to person or device

An overall relative advantage for the innovators is having the richest form of communication available as opposed to a text or audio conferencing call. Although video conferencing was still in its early form when the innovators started to use this technology, it was in its richest form by being able to see facial cues from another user from miles away. The choices for the innovators were limited as they have to deal with poor quality and connection and the high price of new technology, but this was one cost that is necessary to maintain continuous technology improvements. Most of the time the laggards will have the best pricing, quality,

connection and choices, because the innovators paved the way to decrease the cost associated with technology innovations making the process easier to accept into the laggards' daily lifestyle.

Base on compatibility from the innovators to the laggards' computer conferencing was less compatible to the innovators in the sense that changed the status quo. Where we are today, video computer conferencing is becoming more compatible with the values and beliefs through the various groups from the innovators to the laggards. Computer conferencing, especially video conferencing, are becoming compatible for most consumers who seek out this service. The easy and desire of its use varies on business/professional level all the way down to personal usage. The technology is being built to tailor to each and their own needs.

Next how does complexity of the hardware and software differ in the various stages? The chart shows the innovators had majority of the complexity when the technology of video computer conferencing was introduced to the innovators. They had the biggest learning cost compared to the later users, but as time progressed and the software improves the compatibility of current systems, video conferencing calls integrated to home computers and eventually to smart phones. The level of complexity has changed dramatically from one innovation to the next as the communication level gets richer the learning cost seems to also reduce as technology becomes a daily part of our lives.

For the innovators computer conferencing had little to no trialiblility. As time moved on and the technology became more widespread and the laggards had many options on how they wanted to access the technology. Those who are in the laggard group have ample opportunities to try out video computer conferencing at little to no cost. The laggards had friends and family

that were willing to show and work with the laggards to persuade them of adopting the technology mostly due to the fact this will be their preferred choice of communication.

Next we dig into observability, which is the process of being able to see the technology. The innovators had little- to- no observability for video computer conferencing. In the innovator stage the technology was mainly focus for business use. It was not seen as a daily use in a person's everyday life. By the time the laggards become introduced to video computer conferencing, the focus changed from business only to personal everyday usage. The technology of video conferencing was seen almost everywhere. Anyone and everyone was using video computer conferencing throughout their daily activities. The technology integrated and by the time the laggards were introduced to video conferencing it was at its riches form. The laggards were able to observe the technology through friends, family and the main stream of media.

Adaptability is the final category which is the ability to customize or have it merge with the lifestyle of the individual. When the innovators of computer conferencing started the technology was not adaptable to fit with personal lifestyles. The resources and outlets to utilize computer conferencing were limited. Many early stages of video computer conferencing were hard to set up, and many did not have the equipment and compatible programs needed to conduct a video conference call. Over time, the technology adopted to various users, making adaptability easy for the laggards. Computer conferencing is not confined to text based or even audio based communication, but it has emerged to video conferencing for personal use. Computer conferencing has become tailored to the individual user through the continuous process of innovation; it has expanded from government/corporate mediums to becoming the world's choice of communication.

Benefits and Cost of Video Conferencing

In order to completely understand the impact video conferencing has made in our world, it is important to take a look at the benefits and costs associated with this choice of communication. In the chart B-C of Video Computer Conferencing chart, this breaks down video conferencing from the sender, the message to the receiver's feedback. This takes us to the question, "Does the benefit outweigh the cost?"

B-C Model of Video Computer Conference

	Senders	Messages	Receivers
Costs	• Have to have internet access • Cannot easily do on the go	• Still not as clear as face-to-face • Poor quality video can lead to poor message	• Poor video quality • Microphone issues
Benefits	• Easily give message • Eye contact with receiver • Able to read body language • Make sure receiver is paying attention	• Create a rich message • Message is easily delivered	• Can look at sender • Give facial expressions

To better explain the benefits and costs of video computer conferencing, we start with the cost. One obvious cost is the need for internet access. The fact is many people in the world are without any access to internet, and without internet access, video conference is impossible. Another cost is majority of people are not able to sit on their computer and video conference all

day, unless if that is what your job is, most consumers need the mobility of video conference calls on the go. These are a few of the costs associated with the sender.

The message itself can also prove to be costly for those who video conference. The best way to communicate with a person is to do so face-to-face in the same room with the person. Video conferencing provides a very good second option, but many times poor video quality is an issue. The video can freeze or get very fuzzy, thus the message will not be transferred in a clear way. The message is the entire reason for the conversation, if the sender is not getting that message across to the receiver in a clear and concise way, the entire conversation becomes meaningless. Poor video quality can also be an extreme cost for the receiver. As mentioned, getting the message from the sender to the receiver is the entire point of the conversation. Say for instance the receiver is not clearly receiving the message, the point of the conversation becomes meaningless and a waste of everyone's time.

Other cost are, issues with audio in video computer conferencing. The audio sometimes lags from speaker to speaker and words can get cut off or come out as only half of the word. The receiver might be able to clearly see the sender, but if they cannot hear the sender, the message is null. The point of video conferencing is being able to see and hear somebody speak and responding in a quick way. Video computer conferencing is built for a richer mean of communicating, but the defects of a perfect video conversation are still in the developing stage.

It is also important to look at the wonderful benefits people can gain by video computer conferencing. Pending everything is working well; it is easy for a sender to give a message. The sender does not have to sit and type a very long message to somebody and hope they get it on time. Instead through video computer conferencing, the sender can say the message and receiver

can respond with instant feedback. Aside from face-to-face, this is the richest form of communication there is.

Another plus is the eye contact the sender has with the receiver. Eye contact is such an important part of daily conversations and it is often overlooked until we do not have the ability to make eye contact. Along with eye contact there is body language; body language can explain many things that text and audio feed back along cannot. For example, two people are talking on the phone, the sender rambling on without making much sense to the receiver. The receiver is confused but feels rude by interrupting. The receiver has no choice but to wait until the sender is done speaking to ask for clarification. In video computer conferencing, the receiver will likely have a confused look on their face or will have a change in body language which will clue the sender that the receiver does not understand the message. The sender will be able to see this in real time and can tailor the message to make sense for the receiver. The real time feedback is critical to a wonderful communicating experience.

If a sender is taking the time to put together a well thought out message, they not only need to make sure the message is clear, but also that the sender is actually paying attention to the message. When talking on the phone, it can be easy for a sender to be working on something else and not really even paying attention to what the sender is saying. In video conferencing, the sender is able to look at the receiver and make sure they are taking the message in. It cannot be stressed enough how important it is, or both the sender and receiver are wasting their time and the message is lost. The benefits of the messages are extremely rich, upended only by face-to-face.

A rich message is a wonderful thing for all parties involved and will be seen as a reason to continue communicating in the future for both the sender and receiver. For the receiver, a huge

benefit is the ability to look at the sender. For many people, eye contact and body language increases the likelihood that the message delivered was clear. As mentioned as a benefit for a sender, the receiver is able to give facial expressions. These expressions could be smiles, frowns, confused looks, looks of praise, etc… Every look carries its own meaning and is needed so the sender can tailor a message accordingly. The instant feedback for both the sender and receiver in video conferencing makes this an amazingly rich means of communicating. The benefits outweigh the cost in richness and simplicity that technology has allowed the use of personal video computer conferencing.

Competitors

Like anything in life, there are options when it comes to video computer conferencing. We will discuss four different companies that are most common amongst users. A cost and benefit has been assigned for each to measure the difference between the competitors.

Competition	Cost	Benefit
Skype	No improvements	Free of charge
GoToMeeting	Not free	Use on any media tool
ooVoo	Multimedia issues	12 participants
Google Hangout	Must have Gmail	Free and easy

The first company is Skype. The program has been a popular tool used by consumers since its invention in 2003. It works as a great medium for families who has a member located away from family and friends. It provides people a wonderful opportunity to unite via web conferencing. One of the costs of Skype is since 2003 there has not been much technological upgrades. Many consumers left Skype in an effort to find a video conferencing tool with more technological advancements. Skype still remains popular because of its free pricing. Majority of consumer is still skeptical of video computer conferencing, the free- of- charge cost works well for this group despite of no technological upgrades. Anytime something is free, it will remain a popular option and Skype has done just that.

GoToMeeting has become popular recently as people are able to have meetings online. The free price is a benefit for Skype but has become a cost for GoToMeeting. The price of GoToMeeting is not free and is the main reason why the consumers are limited. Consumers tend to lean towards products that are free. This allows the consumers to try the product out with very little cost to the consumers. A benefit for GoToMeeting is while on the go, people may not always have their computers with them. That is where GoToMeeting has the advantage. The software makes GoToMeeting easily accessible and used on any media tool. Whether it is a phone, tablet or computer GoToMeeting can be trusted to connect people for a rich communicating process.

ooVoo has become a popular choice for users recently. What proves to be a benefit for GoToMeeting proves to be a cost for ooVoo. Many multimedia problems are reported for ooVoo with users saying it should mainly be used on a desktop computer. Phone user and tablet user has more cost than benefits according to consumers. One positive is that ooVoo can connect up to 12 people can participate at any given time. This is tremendous factor for those who want to have

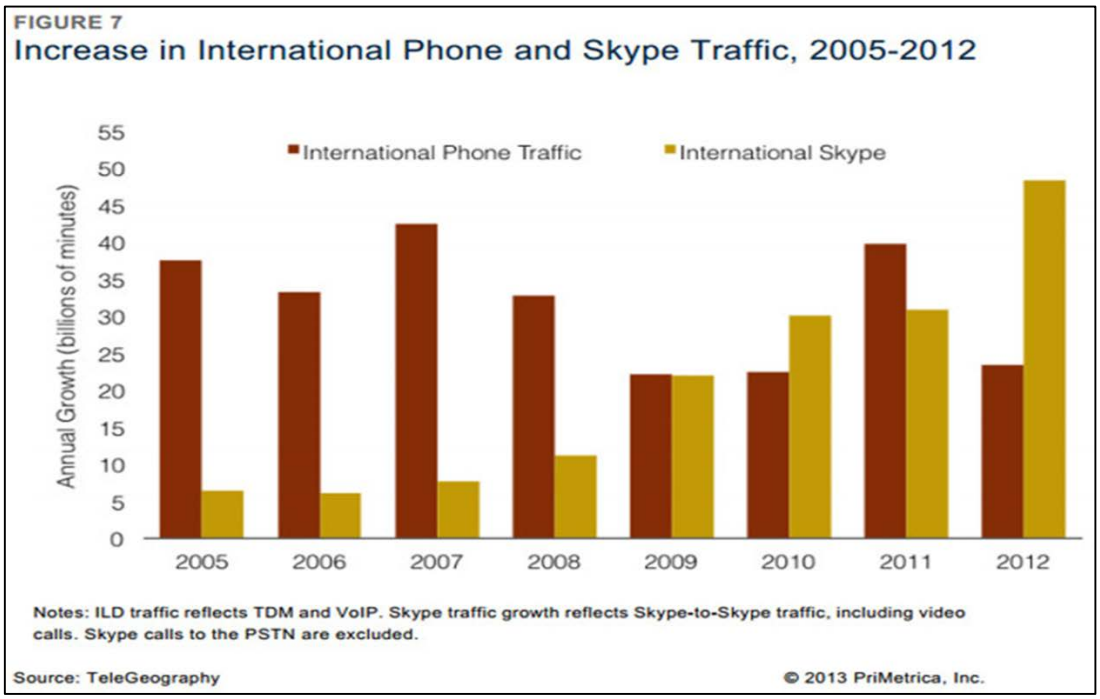
large meetings with employees or school groups. Twelve people communicating at one time may take some work, but can be a wonderful benefit if those people who are unable to meet in person.

Google Hangout is another branch of the powerful Google Company. Google Hangout allows several people to communicate at one time, however a cost is that people must have a Gmail account. Majority of consumers already have more than one email accounts and are have a hard time keeping track of the numerous passwords and usernames associated with each one. One of the benefits of Google Hangout is free and very easy to use. Google is becoming one of the world's top all-around sites. On top of that, a lot of people already have a Gmail account anyways. For example most phones come equipped with a Gmail account that the user has to create to log on. Many computer users are already using Gmail as their primary email source, making Google Hangout an easy option for them.

Overtime the change in technology will change the choice of medium for communication. Looking back on history and communication, the Pony Express was the fastest way to communicate and send information at one time, although the message would be unavailable for weeks or months, it eventually will be received. Compare the Pony Express today's technology of sending a message, it is faster, richer, and most importantly the feedback is almost instant. For example Skype verses landline phone calls, landline is comparable to Pony Express and Skype is the technology that is faster, better and instant. Skype had become compatible with consumers' daily lives and Skype gives a richer form of communication through the ability to visually see the respondent. Landline phone will become more extinct due to cost associated with mobility and versatility of the use.

One computer conferencing provider has made headway on the international market. Skype has seen an increase in international calls in comparison to international phone traffic. As of 2012, there has been more international Skype traffic than international phone traffic. This is an example of how video computer conferencing providers such as Skype are competing with the more traditional land line phone in terms of communication form. The following chart shows the traffic of Skype and landline phone communication and the amount of consumers preferred choice of communication.

Skype vs. Landline Communication



FUTURE OF COMPUTER CONFERENCING

The future outlook for computer conferencing such as text, audio and video is quite bright. These technologies will continue to cater to convenience and organization for business and personal use. As far as text conferencing goes, email use is expected to grow, but at a slower pace than some newer social tools. In contrast, instant messaging is predicted to increase three-fold, overtaking text messaging. In comparison, some experts say that higher growth is expected for audio conferencing as well, especially in developing countries. Meanwhile, more mature markets such as North America and Western Europe will likely experience decelerating growth. Lastly, the long-term outlook for video conferencing adoption in business is strong and will soon be widely available. Overall, each type of computer conferencing has advantages and disadvantages, however it looks as though they are here to say, and each have their own important implications for use.

To start, one form of text conferencing is email, which is expected to grow. However, email is "predicted to grow at a slower pace than some newer capabilities" (IBM, 2013). These newer capabilities include "blogs, microblogging, wikis, social file sharing, social communications and video collaboration". IBM predicts that email will retain "relevance as a key business collaboration tool by evolving toward a more integrated approach with newer social tools". These social collaboration tools will take users to an integrated business collaboration environment, in which users can switch seamlessly between the right tools for the right task.

Another form of text conferencing is instant messaging or IM. Many people tend to believe that IM is becoming less important. However, it appears that IM is here to stay. There has been a "boom of new instant messaging users in Asia", reported by Associated Press' Youkyung Lee (De Hoyos, 2012). According to Lee's article, "A handful of smartphone apps that began as basic

instant messaging services have amassed several hundred million users in Asia in just a couple of years, mounting a challenge to the popularity of online hangouts such as Facebook, as they branch into games, e-commerce, celebrity news and other areas". Instant messaging is predicted to "increase three-fold, overtaking text messaging by 2016". As a result, social media may become a victim to this growth. De Hoyo's elaborates in the article that "as Facebook's value declines, mobile users are finding more robust IM apps performing just as well if not exceeding the social media experience". Today, many iPhone and Android IM apps offer free messaging, file and photo sharing, games and more.

Another form of computer conferencing is audio conferencing. According to the research from the, *World Tabletop Audio Conferencing Endpoints Markets*, "as the diffusion of tabletop audio endpoints reach all-time highs in developed areas of the world, higher growth is expected in developing economies that enter the marketplace, including high-growth regions of Brazil, Russia, India, China, the Asia Pacific, and Central and Latin America" (Tierney, 2010). This research also shows that the growth of "decentralized enterprises will further drive the need for tabletop units in central offices". Meanwhile, more "mature markets such as North America and Western Europe will likely experience decelerating growth because the market is already saturated", Frost and Sullivan said.

When it comes to the conferencing industry, audio conferencing is still king. The technology helps companies transform the way they do business and connects people at a moment's notice. As the adoption of advanced unified communications technologies grows, the popularity of secondary markets, as well as the effect of developing regions looking for cost savings by slashing travel and implementing green policies, "are likely to account for a growing portion of future tabletop audio conferencing unit shipments and revenue," the report said.

Lastly, the long-term outlook for video conferencing, especially in business is strong. “Incorporating other forms of visual communications, including unified communications, online collaboration and web conferencing, rich media communications is a $10 billion industry forecasted to reach $15 billion by 2015 (Nefsis, 2014)”. Companies are becoming “more distributed, with more outsourced partners, telecommuting employees, and networks with remote branch offices, and the need for real-time interaction has grown”. Video conferencing is taking place of in person meetings, while making businesses more efficient by cutting travel time and related expenses. What’s even more is the applications for web and video conferencing are virtually limitless.

Soon, video conferencing will be available in virtually every business conference room for desktops, laptops, plus smart phones and tablets. However, the long-predicted videophone of the future is not a videophone at all. It’s the desktop computer, a standard video peripheral or built-in camera, Internet access, and the video conferencing online service provider. The barriers of different operating systems, mobile devices and interoperability will be solved and virtually anyone will be able to videoconference.

As it turns out, video conferencing will soon be everywhere. Especially since the cost is decreasing and the accessibility is increasing. Consumer video calling and commercial, cloud-based online services will play a key role in expanding video conferencing adoption from corporate boardrooms to all employees at any-sized business. The benefits offered by video conferencing will soon be taken to a new level by technologies like motion tracking, facial recognition and simulation, intelligent audio technologies, handheld and full-scale holographic devices, 3D monitors, stereographic camera setups, and entire-room display technologies.

To elaborate, a few years ago, researchers at Queen's University created a “life-sized, 3-D video conferencing pod that allows users to see the person they are talking to in 360-degree holographic-like clarity” (Netburn, 2012). The innovation is called TeleHuman and will be used with Kinect gaming systems. TeleHuman picks up a person’s image if they are standing within about eight feet of the acrylic cylinder. Part of it is because of privacy concerns, said Vertegaal, and part of it is because that's the farthest distance the Kinects can pick up an image. As for its use as a teleconferencing tool, Vertegaal said he thinks the TeleHuman could be available at a $5,000 price point in the next three years.

In the future, it is predicted that many college classes will use video conferencing, especially for distant learners. Other possibilities are court trials, parole hearings, and prison visits, which will be primarily be done by this method. Also, ATM's will have video conferencing capabilities for convenience and security reasons. This will offer live teller support and facial recognition. Soon, ATM's will be able to provide more service through its use of video conferencing capabilities and provide customers with richer experiences.

In conclusion, the widespread extension of capabilities and computer networks should further accelerate computer conferencing. Computer conferencing has the potential of becoming a communication and problem-solving medium and will help users avoid information overload. As text, audio and video conferencing continue to grow, they will each provide their own purpose and use in the market to suit the needs of those using it. As the technology continues to get better, people will use computer conferencing more in their everyday lives, whether it’s for school, going to the bank or sitting in on a meeting. Computer conferencing will provide convenient and beneficial tools to further help people complete tasks at work, as well as home, and promote easier ways to access information.

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