Western Michigan University
ScholarWorks at WMU

Honors Theses

Lee Honors College

4-24-2013

Webmail Crisis 2012: A Case Study Analysis of the Western Michigan University Webmail Plus Failure

Matthew Vargo
Western Michigan University, vargo.mv@gmail.com

Follow this and additional works at: https://scholarworks.wmich.edu/honors_theses

 Part of the Organizational Communication Commons

Recommended Citation

Vargo, Matthew, "Webmail Crisis 2012: A Case Study Analysis of the Western Michigan University Webmail Plus Failure" (2013). *Honors Theses*. 2310.
https://scholarworks.wmich.edu/honors_theses/2310

This Honors Thesis-Open Access is brought to you for free and open access by the Lee Honors College at ScholarWorks at WMU. It has been accepted for inclusion in Honors Theses by an authorized administrator of ScholarWorks at WMU. For more information, please contact wmu-scholarworks@wmich.edu.

WEBMAIL CRISIS 2012:

A CASE STUDY ANALYSIS OF THE WESTERN MICHIGAN UNIVERSITY WEBMAIL PLUS FAILURE

Matthew Vargo
Lee Honors College, Western Michigan University
Telephone: (269) 449-5013
Email: matthew.b.vargo@wmich.edu

Honors Thesis Committee

Richard A Gershon, Ph.D., Advisor
Julie Apker, Ph.D.
Leah Omillion-Hodges, Ph.D.

ABSTRACT

Background Electronic mail, or email, can trace its origin to Arpanet. Arpanet was a network of interlinked computers created by the Advanced Research Projects Agency (Harrison, 2003). The proliferation of email from Arpanet in the 1970's to modern use has been apparent. Today, over 3.4 billion email accounts exist worldwide with expected growth (The Raticati Group, Inc., 2012). Webmail Plus is the email platform used at Western Michigan University. The system is a third-party cloud based service provided by Merit Network Inc. (Merit Network Inc., 2013). On September 27th, 2012, five hard drives failed at Merit Network in Southfield, Michigan. This failure rendered user accounts inaccessible resulting in the inability to utilize email, calendar, document storage, and task software.

Case Study The purpose of this honors thesis will be to explore Webmail Plus at Western Michigan University focusing on the technological and social consequences of its failure. The exploration will include an examination of the history and purpose of electronic mail systems, the causes and consequences of the Webmail Plus breakdown, differing technology dependences of these systems and future prospects of electronic communication at WMU. Special attention will be given to the importance of electronic communication in organizations such as WMU and the effects felt at the university when communication systems such as email break down. The argument is made that Webmail Plus is likely to remain the email platform on campus. Lastly, the general future of email as an entity integrated with many features delivered to a single device is theorized.

WEBMAIL CRISIS 2012:

A CASE STUDY ANALYSIS OF THE WESTERN MICHIGAN UNIVERSITY WEBMAIL PLUS FAILURE

Matthew Vargo

INTRODUCTION

When a new faculty member, staff member, or student joins Western Michigan University (WMU) they are provided with a unique Bronco NetID. This ID is used to access university tools and technology such as GoWMU, Webmail Plus, scholarly articles and university computers. Webmail Plus is WMU's electronic mail (or email) platform that supports university electronic communication (OIT, 2012).

On September 27, 2012 the Webmail Plus email system experienced a major breakdown due to the failure of five hard drives in mail stores provided by a Michigan-based non-profit, Merit Network Inc. The approximate length of the breakdown was 24 hours (Fletcher, 2013). Western Michigan University is comprised of more than 24,000 students and 4,000 faculty and staff (WMU, 2013). There are over 60,000 unique accounts on Webmail Plus for faculty, staff, and students at Western Michigan University (WMU News, February 8, 2010). Webmail Plus is integrated with many features. During the failure users were unable to send or receive email, check university calendars or schedule appointments, access document storage, or schedule tasks.

The purpose of this honors thesis will be to explore Webmail Plus at Western Michigan University focusing on the technological and social consequences of that failure. The exploration

will include an examination of the history and purpose of electronic mail systems, the causes and consequences of the Webmail Plus breakdown, differing technology dependences of these systems and future prospects of electronic communication at WMU. Special attention will be given to the importance of electronic communication in organizations such as WMU and the effects felt at the university when communication systems such as email break down.

This paper will utilize a case study method of analysis in order to explore the questions under investigation. Information was obtained through direct interviews with senior leaders at WMU involved with information technology management at Western Michigan University. Interviewees included Dr. James Gilchrist, Vice Provost and Chief Information Officer; Tom Wolf, Chief Technology Officer; and Joel Fletcher, Director, Workgroup, Operations and Distributed Computing. In addition, Interviews with important stakeholders within the WMU campus were conducted. The purpose of these groups was to explore the daily use of email by faculty, staff and students on campus, and the subsequent effects felt when Webmail Plus broke down. The voices of these interviews are woven into the fabric of this case study narrative. They illuminate key experiences of the Webmail Plus failure. Appendix 1 and 2, attached to this document, contain questions for interviews.

ELECTRONIC MAIL

Email can be described as a backbone to communication media; that is, it is a dominant and necessary form of computer mediated communication (Berry, 2011). Computer meditated communication (CMC) is described by Thurlow, Lengel, and Tomic (2004) as "usually concerned more specifically with human interpersonal communication on, through and about the internet and web" (p. 16). This section will explore the beginnings of electronic mail, the

expansion of email, and current statistics on the use of email to better evaluate electronic mail use at Western Michigan University.

The Origins of Electronic Mail

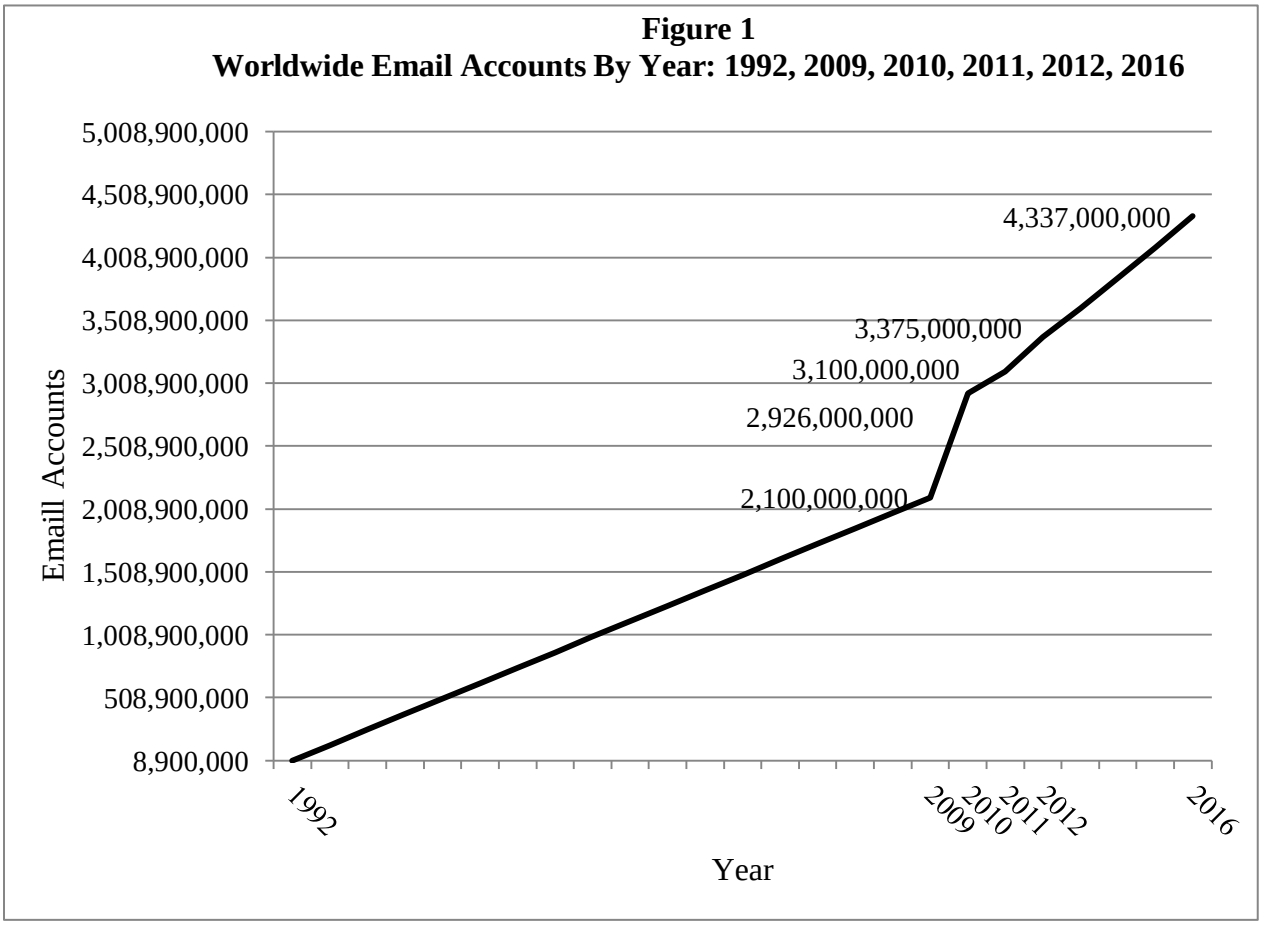
Electronic mail between computers emerged from the Advanced Research Projects Agency, a part of the Department of Defense. The agency's interconnected computers, or Arpanet, utilized the ability to send messages between the computers to share information. This software was written in the 1970's and served as the first version of electronic mail (Harrison, 2003). Ray Tomlinson is credited as one of the first pioneers of electronic mail at Arpanet. Tomlinson is also credited with creating the "@" sign to direct messages in 1972 (Zakon, 2011). The original purpose of his system was to share messages between interconnected computers. By 1973, Arpanet began utilizing email in three quarters of all electronic traffic between computers (Ralston, 2003).

Email, as a new form of communication, was quick to gain followership on future networked computers. Universities and companies, for example, provided electronic mail systems within their network (Ralston, 2003). Email use expanded due to the desire of users to easily share data and information typically held on a single computer, with others. Email was also seen as value-added software, in that it provided a service that was generally beneficial to the functions of an organization already utilizing a network (Baines, 1992). In 1992, it was estimated that 8.9 million email accounts existed within the largest 2,000 organizations in North America. (InforWorld, 1992).

In 2012, the number of email accounts was estimated to be 3.4 billion worldwide (The Raticati Group, Inc., 2012). This growth was facilitated by the advent of free personal email systems such as RocketMail in the 1990's. These email systems along with others such as

America Online and Hotmail connected individuals to the World Wide Web (Ralston, 2003). It is estimated that 75% of the email accounts today are personal accounts. Both personal and corporate accounts are predicted to grow in the coming years. It is estimated the number of accounts will soon break the 4 billion mark between 2015 and 2016. Email will continue to be a primary means of both personal and professional communication (The Raticati Group, Inc., 2012). Figure 1. charts the increase use of email on a worldwide basis from 1992 to 2012, with projections into 2016.

Figure 1
Worldwide Email Accounts By Year: 1992, 2009, 2010, 2011, 2012, 2016



Compiled Sources: (InforWorld, 1992; The Radicati Group, Inc., 2012, 2011, 2010, 2009.

MERIT & WEBMAIL

Webmail Plus is a large email system with over 60,000 accounts at Western Michigan University. It is accessible to users through computer and cellular phone platforms as a primary means of communication at WMU (WMU News, June 8, 2010). Additionally, Webmail Plus integrates the calendars and data storage of staff, faculty, and students. In this way, Webmail Plus is inextricably important to communication at Western Michigan University.

Email through Webmail Plus at Western Michigan University is provided by Merit Network Inc., a Michigan-based nonprofit formed in 1966. Merit provided network services supporting education and research. Merit owns and operates a regional fiber optic backbone, connecting numerous universities and schools, and has services including cloud storage and mail support (Merit Network Inc., 2013). Merit recently expanded their fiber optic connectivity from the Lower Peninsula of Michigan into the Upper Peninsula. Drawing on WMU News releases from 2008 and 2010, this section will focus on historic proceedings leading to Merit's Webmail platform. It will provide context for examining the causes and effects of the breakdown of the Webmail Plus system. The social and technological effects of the failure will be examined in the following sections of this paper.

University email was once split between two separate platforms. These platforms included E-Communication Services Webmail and GroupWise. Most student used E-Communication Services while faculty and staff predominately used GroupWise (Wolf, 2013). Both these systems were hosted in-house, which means WMU owned and operated the hardware for the platforms (Gilchrist, 2013). The separation created difficulties for student, faculty, and staff communication. For example, GroupWise had a calendar feature while E-Services did not. If a student was also employed through the university, a GroupWise account had to be created

for the student. These difficulties alongside a desire to integrate faculty, staff and student email prompted the Office for Information Technology (OIT) to begin looking for a new platform (Wolf, 2013). Early in February 2008 WMU announced its plans to study ways to improve email services on campus. The study, conducted by OIT involved campus meetings and university-wide surveys (WMU News, February 8, 2008). Merging the two systems into one was a primary concern in the search for a new system. According to WMU News, Merit Network Inc. visited the campus to describe their VMware Zimbra email services (WMU News, February 13, 2008). VMware is a company specializing in "virtualization and cloud infrastructure" that offers the email application Zimbra (VMware, 2013). Merit Network hosts this software as Webmail Plus for clients. Soon after the visit, WMU chose Merit Network Inc. to host their new email platform. In a later release by the university in 2010 it is stated that:

> WMU e-mail will have been migrated to Webmail Plus by July 31, and everyone at WMU will be using the same e-mail system for the first time since the earliest days of e-mail communication. (WMU News, June 8, 2010)

After the platform was designed, WMU transitioned over 60,000 existing email accounts, previously split on two systems, into the new Webmail Plus email system. The new platform supports mail as well as task scheduling, shared calendars, and online storage. It is compatible with many mobile devices including Droids, iPhones, and Blackberrys (WMU News, July 7, 2010). Webmail Plus is the single email platform utilized by the university.

The transition of student and faculty/staff email from two systems to one represents more than the convergence of two previously separated platforms. It transitioned Western Michigan University email, calendar, and task scheduling to a third-party cloud service. This also essentially upgraded all university email accounts to include tools such as calendar, task scheduling, and data storage previously only provisioned for faculty and staff accounts (Gilchrist, 2013). A cloud service is characterized by off-site server, storage, and network

components of an offered service available to users through the Internet. This is in contrast to an organization that provides the service in-house (Mell & Grance, 2011). This key feature has benefits and drawbacks. One benefit is that the OIT staff is not inundated with the demands of hosting and maintaining a university email system's hardware and network access. Joel Fletcher reflected that there are more fruitful things to invest staff time; he offered improving online learning environments at the university as an example.

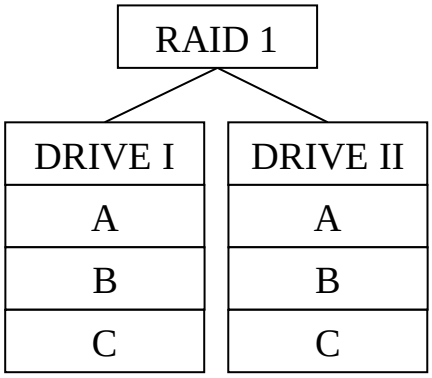
A major drawback of the Merit system is limited control of information. WMU OIT does not have administrative access into the Merit system other than when adding or removing student accounts. Reports about where and how information is stored cannot always be trusted (Fletcher, 2013). This sentiment is shared by Tom Wolf, Chief Technology Office in OIT (Wolf, 2013). In addition to limited control of information, the operation and maintenance of the system is not controlled by WMU (Fletcher, 2013).

The on-going relationship between WMU and the Merit system has proven to be challenging at times. At issue is university control over hardware and information coupled with intermittent performance failures. In particular was the Merit system's inability to fully accommodate the email and information requirements of Western faculty, staff and students. Merit's email storage (or stores) is located on a series of five major hard drives in Southfield, Michigan (Gilchrist, 2013; Fletcher, 2013). Each mail store is hardwired to Merit's network. The demand for physical connection between WMU's campus users and Merit's mail stores is insufficient and causes slow speeds when logging onto, receiving, and sending messages (Wolf, 2013). To track when services lagged, OIT decided to build a monitoring system. Still in use today, the system utilizes an automated task-scheduling program to electronically log onto each mail store, open a message, send a message, and other functions. It records the amount of

time it takes to do each task and reports the result every five minutes for each mail store. The average time is 20 seconds. When report times spike, sometimes reaching the maximum reporting limit of 120 seconds before timing-out, WMU contacts Merit reporting a problem. This system was and still is integral when reporting to Merit that WMU is experiencing a problem (Fletcher, 2013). The tracking system is one way that WMU remedies the loss of control over information in conjunction with less than optimal performance of outsourced services. It is also indicative of the strain that can occur between organizations and service providers. The relationship between WMU and Merit was strained before and after the Webmail Plus email crash (Wolf, 2013).

FIGURE 2.

HARD DISK DRIVER STORAGE DIAGRAM FOR RAID 1



Source: (Vargo, 2013)

Alongside the lack of control over information there exists a lack of power over hardware. WMU OIT is unclear about the physical hard disk mail stores and servers Merit uses for Webmail Plus (Fletcher, 2013). Hard disk drives rarely fail. One study found 1.7% of drives fail within one year of operation. The number rose to about 8.6% after three years (Pinheiro, Weber, & Andre, 2007). To protect data, a variety of backup systems can be utilized. For example, Redundant Array of Independent Disks (RAID) levels are used to guard against data loss when a drive fails. Figure 2 shows an example of RAID levels known as mirror drives. Mirror drive storage keeps the same copy of data on Drive I as Drive II. Both drives can fulfill requests for information from users. For example, when a student logs onto Webmail Plus to read an email, they may be accessing data stored on Drive I. One hour later if the student reads to same email, they may be accessing data from Drive II with no difference in experience. If Drive I fails, Drive II will fulfill

requests for information on its own until Drive I is removed and replaced. This will place a heavier demand on Drive II while it handles requests for both drives. When Drive I is replaced, the information from drive II will be copied over to it. The raw data transfer can take a lengthy amount of time and also delay drive response. Figure 1 demonstrates basic principles in RAID level function but most likely the drives hosting Webmail Plus are configured on a higher level. RAID 5, for example, distributes data between four separate drives so that if one fails the remaining three can support requests for information and repopulate the new drive when it is introduced (Fletcher, 2013).

COMPUTER MEDIATED COMMUNICATION

The use of Webmail Plus is an example of computer mediated communication. The term computer mediated communication (CMC) can be used to describe any electronic communication on or through the Internet (Thurlow, L., & A., 2004). In this section, I will explore the use of email as computer mediated communication. CMC has been described as essentially lacking in intimacy and leads to increased task-oriented communication. Social Presence Theory and the Social Information Processing Model are presented to provide evidence that CMC can provide connection similar to face-to-face communication. In addition, social context of electronic communication is discussed to strengthen and exemplify this argument. Exhaustion and anxiety from overuse of email is presented as a matter of technology dependence. Questions are raised as to what happens when CMC such as email is lost. Specifically, what negative effects were felt on campus when Webmail Plus broke down and was there any reprieved from technology dependence in its absence?

CMC, Social Presence, Social Information Processing Model & Social Context

Computer mediated communication through email is traditionally text-based. The content of email can has been described as somewhat lacking when compared to phone or face-to-face communication (Mano & Mesch, 2010, p. 62). Social presence can be described as:

> …the level of interpersonal contact and feelings of intimacy experienced in communication. In communication theory, this kind of psychological closeness is also sometimes labeled 'immediacy'. Social presence is communicated through visual cues like facial expressions, gestures and eye contact. (Thurlow, L., & A., 2004, p. 48)

Social Presence Theory proposes that CMC contains fewer visual cues and less closeness than face-to-face, and can lead to increased task-oriented communication (Thurlow, L., & A., 2004, p. 48). In contrast the Social Information Processing Model, developed by Joseph Walther, denies the conclusion that text-based communication lacks closeness compared to face-to-face interaction. Walther states research fails to peer into the day-to-day life of CMC, and the need for closeness is essentially the same in CMC and face-to-face communication. Walther also proposes that purpose and social context of CMC can affect the level of social presence. (Walther, 1992, pp. 58-59).

Social context can be described as a symbolic system within an organization, such as WMU, that is created, modified, and used by humans to interpret meaning. With increased use of electronic communication in organizations, CMC is regarded as an everyday occurrence and becomes a part of the social context. Computer mediated communication emerges, then, as a virtual space in which users engage in terms of the framework of their organization (Riva & Galimberti, 1998).

What is an example of social context? Social context can be qualitatively described in a variety of ways within organizations. Context of messages between faculty and students is important in institutions such as WMU. Martin, Myers, and Timothy (1999) offer five reasons

students' communicate with their instructors. These include *relational* (i.e. to foster a personal relationship), *functional* (i.e., course assignment specific), *excuse making* (i.e., missing class, late assignments), *participator*y (i.e. showing interest in a course), and *sycophantic* (i.e., causing a good impression). Specific to student-teacher relational development (the desire to foster a personal relationship) a number of factors are present. Instructors that are perceived as emailing their students more frequently, the presence of clarifying emails between students and instructors, and the exchange of messages that exceeds procedural or clarification reasons increase the likelihood of relational development between students and instructors (Young, Kelsey, & Lancaster, 2011). Relational communication between students and faculty in a university setting such as WMU is affected by both the reasons and perceptions of electronic communication.

Another description of organizational social context is the response to negative emails within organizations. Responses to negative emails entail multiple considerations by users. One consideration is facework, or the desire to maintain 'face'. Defensive climates emerge from messages that threaten the status of others. A second consideration in responding is the weighing of multiple goals. For example, an individual may want to respond promptly to a negative message, while at the same time wish to respond in a reflective manner (Stewart & Zorn, 2007). This description of social context is important because email communication has been linked to increased chance of dispute escalation when compared to face-to-face communication (Friedman & Currall, 2003). Tierra Marshall, Program Coordinator in the Office of Diversity and Inclusion, echoed the salience of negative message responses. She stated she has received messages that express negative emotion; she believes talking directly to the sender would generally avoid these experiences (Marshall, 2013). Navigating conflict is a piece of the email experience at Western

Michigan University. If email was not considerably important in organizations, the amount of negative emotion may be curbed or eradicated. Relationships have been soiled due to negative messages in email (Friedman & Currall, 2003).

Utilizing social context and the Social Information Processing Model, email technologies are understood as salient forms of communication that can lead to high amounts of connection and closeness. Relationships between users can be positively and negatively affected by CMC such as email. Although It may take longer to develop the same amount of closeness with CMC than face-to-face communication, the connection can produce the same results. (Thurlow, L., & A., 2004).

Email can be used to improve relations within an organization. It is not surprising that email which is easy to create, share, and discard grew into a primary tool for connection in organizations (Mano & Mesch, 2010, p. 61). In 2002, 98% of employed Americans had an email account (Fallows, 2002). Email serves users' increased need for efficient and inexpensive modes of communication. In the blog posting *10 Old New Rules for Business Emails,* Tim Berry explores proper email composition in business settings. Keeping messages short, sending single-topic emails, and utilizing professional tone are some of the rules offered (Berry, 2011). Publications with social norms such as this exist because the norms are important. Electronic mail, properly used, can improve management and inter-department relations (Mano & Mesch, 2010, p. 61). The combination of increased use and social norms help demonstrate email is a necessary communication tool in organizations today.

Computer Mediated Communication and Technology Dependency

Computer mediated communication has been shown to be intimately tied to the users within an organization. Faculty, staff and students can all be inundated by the increased

importance and use of email platforms such as Webmail Plus. Ambrosia Neldon is the News Editor for the Western Herald, a campus newspaper publication. She often receives mail from her staff and superiors. She also receives messages from outside sources reporting news at Western Michigan University. Neldon reported that she did not check her email during spring break 2013 at the university, which occurred March 1st – 10th. During that time period she received over 3000 email messages, or about 300 a day. Although this includes spam and junk mail, the amount was staggering to her. Neldon added when discussing her email use that her cell phone, which receives automatic email updates, is always notifying her of emails, texts, and other alerts (Neldon, 2013).

Information on exhaustion from the overuse of email has been emerging recently. In an article in the Los Angeles Times, Leslie Brenner (2008) wrote about this phenomenon. Brenner states that dependency on email is causing anxiety in organizations. The ability to focus and productivity are harmed by inundation. Brenner notes that email has become something without "business hours", or communication that extends beyond normal work hours. James Gilchrist, Vice President for Academic Operations and Chief Technology Officer at WMU, added to this by saying that he doesn't have vacation time without email. Clarifying, Gilchrist stated it is not a written rule that he must access email if he takes vacation days, but it's socially implied that he will (Gilchrist, 2013). Brenner states that over 35% of office work in organizations is spent communicating through email platforms (Brenner, 2008). Although Gilchrist did not explicitly say he experienced exhaustion from checking messages, he did report spending on average two hours per day checking and responding to emails he receives through Webmail Plus (Gilchrist, 2013).

It is interesting to note that some material has been produced to counteract exhaustion from email inundation. The purpose of an email charter is to provide a set of recommendations on ways to make email more efficient and responsive to user's needs. One charter was viewed over 50,000 times and received hundreds of online comments before leading to the final version seen in Table 1 (Anderson & Wulf, Email Charter, 2012)[1]

Table 1.
EMAIL CHARTER RULES FROM EMAILCHARTER.COM

1. Respect Recipients' Time	Minimize the time it will take to process and respond to an email.
2. Short or Slow is not Rude	Responses coming in later than or more concise than expected should be considered okay.
3. Celebrate Clarity	Use clear and short messages and subjects.
4. Quash Open-Ended Questions	Ask specific rather than open-questions
5. Slash Surplus cc's	Reduce unnecessary recipients that multiply response time.
6. Tighten the Thread	Remove unnecessary thread content when responding to emails.
7. Attack Attachments	Remove signatures and logos as attachments.
8. Give These Gifts: EOM NNTR	Use acronyms for End Of Message and No Need To Respond that can be used to expedite processing.
9. Cut Contentless Responses	Some messages do not require a reply.
10. Diconnect	Agreeing to spend less time doing email means receiving less email too.

Source: (Anderson & Wulf, 2012)

The use of email in organizations is essential. Email is a meaningful mode of communication that produces connection between users, and is a part of the greater social context in organizations. The expanse of this media has caused concerns about the overuse and exhaustion from inundation of messages. This raised important questions when considering the effects felt by university members during the September Webmail Plus break down. One question is to what degree did users feel disconnected when not able to access email,

calendaring, and other functions of Webmail Plus? Another question is did this provide any reprieve to those that use Webmail Plus extensively? These questions are explored in the next section of this paper, which covers the failure of Webmail Plus at Western Michigan University.

EMAIL FAILURE AT WESTERN MICHIGAN UNIVERSITY

On September 27, 2012 the Webmail Plus email system at WMU broke down for a single day. Faculty, staff, and students were unable to receive or send email, check university calendars, or utilize the other components of Webmail Plus due to a driver failure through the Merit Network. Email is an important communication tool that is predicted to grow in the future. It is especially important in professional settings where a mix of business and social interactions create closeness through computer mediated communication. In this section the causes of the break down will be explained. Effects both reported and potential are then discussed. Finally, recommendations from the findings are presented for university administration and staff moving forward.

Early in the morning of September 27th, Merit experienced five hard drive failures. Due to the relatively low chances for a single drive to fail, this conjunction is a substantial failure. The outage affected Western Michigan University and Kansas State University, who happen to share space on the same mail stores as WMU. Employees and students attempting to access Webmail Plus were requesting information from less drives, which was scattered in more places. This created loss of efficiency in addition to less bandwidth between Merit's system and WMU. The preexisting speed issues in Webmail Plus were multiplied resulting in the inability for users to access accounts (Fletcher, 2013). Although drives were replaced early in the day, the total recovery time was about 24 hours. This is due in part to the reconstruction of driver information by their RAID level backup systems (Wolf, 2013).

When asked about the effects of this email failure, Joel Fletcher and Tom Wolf offered similar explanations. Fletcher noted that email is unglamorous but necessary to organizational communication. He related email to plumbing in a house. Plumbing is expected to come standard in a house. Not many people think about and consider what the plumbing is doing when providing convenient services. But, Fletcher said, when the plumbing doesn't work, everyone notices and complains (Fletcher, 2013). Tom Wolf mused that email is like electricity. He said to pick a favorite morning routine: shaving, watching television, cooking; then he asked me to imagine not being able to do that activity. For many, that would be deeply inconvenient and might cause feelings of dissonance (Wolf, 2013). Both these comparisons demonstrate that email is commonplace, but integral to the functions of an organization. Similar to the loss of plumbing or electricity, disruptions in email service elicit feelings of loss of connection and recognition of dependence on electronic mail.

Effects felt by Administration, Staff, and Students

A large amount of business is conducted through email. Fletcher noted those in administration of the University seemed most affected by the loss of email and calendaring. When an issue arises, some of the first people to call OIT will be staff from administration. This has occurred during intermittent performance issues and during the failure in September. Fletcher brings to light, though, that those who oversee Western Michigan University "eat, sleep, and breath" Webmail Plus (Fletcher, 2013).

Social Information Processing Model proposes that communication such as email is the basis for strong connection in organizations (Walther, 1992). When administration is not able to access the features of Webmail Plus, this connection at the university is severed. For example, in order to contact the Student Affairs Office a student can fill out a form through their website that

is converted to an email after submission (WMU Student Affairs, 2013). This is a minor example of the communication hindered at the administrative level. Each week parts of university President John Dunn's schedule is posted online for public viewing. The compilation of this schedule and posting is contingent on information drawn from electronic calendars. This only scratches the surface. There are over 15 members of university administration that directly report to the President (WMU Office of the President, 2013). Many of these individuals also have staff directly reporting to them. Timothy Green is the Provost and Vice President for Academic Affairs at Western Michigan University. All 10 colleges at WMU including the Graduate College and Lee Honors College report to Dr. Green; additionally, University Libraries reports to Dr. Green (WMU Provost Office, 2013). Supporting this hierarchal structure from senior officials to other staff members relies heavily on email and calendaring functions in Webmail Plus (Wolf, 2013).

Gilchrist agrees that WMU administration relies heavily on the email and calendar features of Webmail Plus. Gilchrist is the senior authority for Information Technology at WMU. He reports receiving about 150 email messages a day. Many more messages are filtered out using spam filters. Gilchrist noted that he uses multiple devices to connect email including his personal computer and cellular phone. In addition, Gilchrist's day-to-day schedule changes often; because of this he utilizes a secretary to schedule meetings with others in administration and the WMU community. Sharing a scenario detailing his use of Webmail Plus, Gilchrist noted that calendar sharing is one of the most useful features of the program. Calendar sharing is the ability of users to share calendars with other users. University administration schedules most meetings this way, bypassing the need to call or interact face-to-face with one another. His use of the Webmail Plus system is typical of Western Michigan University administration. Without the Webmail Plus

system, administrators and secretaries are without access to crucial tools that create efficiency in work and push the university forward (Gilchrist, 2013). Fletcher agreed with this, stating that administration becomes frustrated when there is a disruption because it is so crucial to their functioning. The administration was especially frustrated by the breakdown in September due to the length of the failure, a total of about 24 hours (Fletcher, 2013).

University faculty and staff were also affected during the failure. Nicole Millar is the Assistant Director of Student Activities and Leadership Programs (SA&LP) at Western Michigan University. Her primary role in the office is to facilitate the development of Greek organizations on campus. Millar describes email as an essential tool for completing work. Her Webmail Plus account is the place in which valuable information is archived. During the loss of email and calendar access, she lost access to that valuable archive. Millar stated that she and the staff in the SA&LP office often desire time to complete university-specific work and the outage theoretically provided that opportunity. Because of Webmail Plus serving as an archive, that opportunity was never realized. Millar reflected rather humorously on finally having a break to complete work, but not having the tools to complete the work she needed to do (Millar, 2013).

Tierra Marshall experienced the same issue when attempting to do work at the Office for Diversity and Inclusion on campus. Marshall echoed that her university account contains a lot of information needed to complete tasks. She reports receiving 30 – 50 email messages a day. The failure was colossal and a great inconvenience to productivity. Instead of spending time on Webmail Plus, Marshall said she switched her focus to complete errands for the Office for Diversity and Inclusion (Marshall, 2013).

Due to the loss of the Webmail Plus calendar feature, Millar was unable to determine whether or not she had meetings to attend during the failure. This became acceptable among

WMU faculty, staff, and student because the entire campus was experiencing the same failure, Millar added. Staying primarily in her office for most of the day, meetings and exchanges were colloquial and ad hock. Millar recounts that students would enter her office with a comedic exchange about the inability to determine if they had a meeting or not that day, then deciding to meet regardless (Millar, 2013).

This phenomenon seems less applicable in communication from WMU to outside entities. Millar often interacts with staff at other universities and in national Greek office positions. She reports that some emails she was supposed to receive on September 27th never arrived in her inbox. Correspondents contacted her later to inquire about responses to messages she never received. The automatic reprieve from missed communication has not extended to these entities because they did not experience the failure (Millar, 2013). Electronic communication usually has multiple pathways to reach a destination. Redundancy creates a system that is reliable. Often the assumption that messages sent will always be received is made (Gilchrist, 2013). Millar has had to send a number of messages post-failure explaining her unintended absent communication (Millar, 2013).

It is a difficult task to assess the effects felt on the campus by employees. With over 4,000 members in roles ranging from graduate assistants to staff to full-time faculty, many constituents were affected (WMU, 2013). Ambrosia Neldon recalls her superior in the Western Michigan University Evaluation Center crying due to the break down (Neldon, 2013). Many University faculty and staff were either inconvenienced or put at risk to unintended consequences during the failure of Webmail Plus. These include collaboration of peers between universities, electronic communication between WMU and the state, negotiation of contracts with outside vendors and intra-university communication. There are hundreds of workflows on

campus that eliminate the need for paperwork. For example, Western Michigan University's travel authorization system utilizes email in its function. When an individual fills out the electronic form, a notification is sent through email to approve the authorization. This approval process includes budgets, scheduling, car rental, and other items that are all facilitated through email. Another example of hindered communication is monitoring systems. Automated building monitors may be programmed to send emails in case of issues or emergencies with the system. Without the Webmail Plus platform, those systems are rendered useless (Wolf, 2013).

Interviews with students revealed they were also affected by the break down. Erin Kaplan, a senior at the time of the break down, recalls waiting for results from the Graduate Record Exam (GRE) and messages from graduate schools (Kaplan, 2013). Brendan Shaw is a junior at WMU. Shaw thinks many students were affected by the break down due to the inability to communicate with faculty and staff at the university. His primary use of email is to communicate with his professors and considers it to be the most socially acceptable way of contacting professors because of the asynchronous and professional nature of email. Shaw thinks calling faculty and staff is not as professional as using email, and that email provides the best platform for students to receive answers to questions, set up meetings, and complete school work electronically (Shaw, 2013). Tom Wolf noted that he usually makes a point to answer his emails, although his voicemail often goes unchecked (Wolf, 2013). This supports Shaw's purposes for preferring email usage at the university.

Shaw thinks two of the biggest burdens on students during the break down were the inability to send messages to faculty and staff, and the inability to access homework stored in email. Students were not able, in his experience, to retrieve valuable information they had emailed to themselves or others, in order to complete assignments. Although university sections

of online courses were working properly, many students and faculty do not utilize those tools to communicate or store homework (Shaw, 2013).

Current use of email has caused feelings of exhaustion in some organizations (Brenner, 2008). This has led to antidotes to help alleviate the stress and anxiety caused from email inundation such as email charters, or sets of rules about email usage geared to create efficiency and lowering exhaustion (Anderson, 2011). When discussing this with Nicole Millar, she offered a story about the silver lining of not having email for the day. The staff in the SA&LP office decided to use their time cleaning and rearranging their offices (Millar, 2013).

Maleeka Love is the Coordinator of First-Year Seminar at Western Michigan University. She shared similar sentiments on the loss of Webmail Plus on campus. Love reported initially having feelings of disconnection when the Webmail Plus system broke down. She felt as if she was not going to be able to accomplish work. Love said those feelings then turned into the realization of how much technology dependence she has on email and calendar systems on campus. In the end, it produced a sort of freedom from email systems. Love purposefully came to the conclusion that she is perfectly able to "pick up a phone to call" or, satirically, "walk down the hall and talk to someone" (Love, 2013).

Alternative Connection During the Failure

The loss of email and calendar connectivity led to some university staff and students to seek out other communication platforms to remain connected (Kaplan, 2013). Two different purposes for alternative communications became apparent in interviews with staff and students. The first reason was to connect with others about the failure. Millar reported using social media sites such as Facebook and Twitter to communicate about the failure with fellow users at the university. In her experience, those she was connected to via social media began to make public

postings inquiring if others were experiencing issues with Webmail Plus. As people began to understand that the failure was universal and long-lasting, they began to have conversations about it (Millar, 2013).

During the Webmail Plus break down, Shaw reports seeing a lot of activity on social media sites Facebook and Twitter.

> I saw a lot of my friends on Facebook and Twitter posting updates about not being able to access their emails and calendar. My first thought was to create a funny hashtag on Twitter for the failure. I think my full post was only "#webmailcrisis2012" in a tweet. Later that day, I saw Nicole Millar in a meeting and she was talking about the #WebmailCrisis2012 twitter hashtag. We are not connected through social media so I knew the hashtag had caught on! (Shaw, 2013)

A hashtag, or "#", is used on the social media site, Twitter, to emphasize "keywords or topics in a tweet" and was created to organize messages (Twitter, 2013). The title of this thesis was initially inspired from this hashtag.

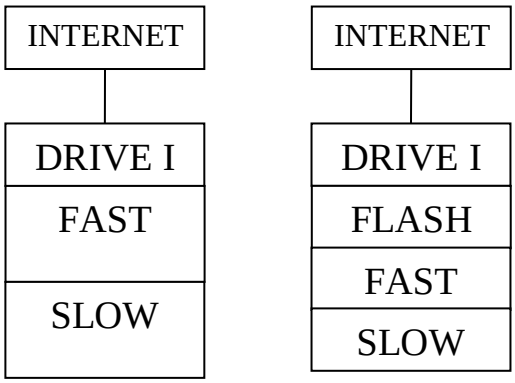
The second reason alternative communication became utilized was to compensate for loss of connection. Ambrosia Neldon recalls the day of the failure was a submission deadline for all stories at the Western Herald. At the time, she managed a staff of over 20 student reporters. Email is the primary means of communication between reporters to Neldon; similarly it is also primary from Neldon to advertisers and printers. A Facebook group page with all reporters was created to compensate for the loss of connection caused by the email failure. Reporters had to upload text documents to the page in order to submit them. Neldon had to use an alternative email account to submit stories for publication and communicate with advertisers (Neldon, 2013).

Webmail Plus and the Merit Network Post Failure

Following the break down, WMU OIT worked to solve the issues experienced with Merit. In a meeting in January 2013, Merit and OIT discussed preexisting problems with the

email system. From the meeting, Merit expanded the amount of mail stores allotted to Webmail Plus from five to eight. This expansion also included upgrading technology. Traditional hard drive storage includes slow and fast drives. Slow drives are slower in responding to requests for information. Fast drives are faster in response. Information is arranged between the two by its use to create efficiency. Information that has not been accessed recently is moved from fast to slow drives. Information that is used more often is included on the fast drives. This is why accessing email and information that is dated will take longer. The new drives that Merit installed include a new type of memory, flash. In Figure 3 this is illustrated. Information is still arranged by its relative use. The flash drive is much faster than typical hard disk storage. Flash drives increase the speed in which information can be accessed. The increase of mail stores and addition of flash drives have greatly improved the day-to-do use of Webmail Plus (Fletcher, 2013).

Figure 3.
MERIT ORIGINAL VS. NEW HARD DRIVES



Source: (Vargo, 2013)

Recommendations

A few recommendations to university administration and personnel emerged as a result of this case study. A reevaluation of university communication is needed on two fronts; first pertaining to how the university receives crucial messages and second being a plan to notify faculty, staff, and students about important communication issues. Difficulty arose from the Webmail Plus email failure due to warning messages from Merit being traditionally sent through email. Additionally, building and other monitoring systems typically utilize email to send an

automated message when an issue occurs. Redundant avenues of communicating messages should be created to assist the sending and receiving of crucial messages. Some evaluation has already occurred. For example Merit now can communicate via text message to staff members such as Tom Wolf.

A second front to reevaluating university communication is the creation of a plan to notify faculty, staff, and students about important communication issues. Many members of the campus community did not have access to any information about the Webmail Plus system failure. The only article relating to the failure was published online through the WMU student publication, The Western Herald. This article provided anecdotal evidence as opposed to facts about the causes and nature of the break down. A commitment to finding ways to inform campus members through phone or other technical means is needed. This could come in the form of registering faculty phone numbers for text/call alerts or the mandatory posting of news information on campus systems such as GoWMU. GoWMU is the access portal for most university affairs that includes links to email, bill information, class scheduling, and more.

The last recommendation emerges from stories of anxiety, loss of connection, and inability to work during the Webmail Plus system breakdown. It is important for university faculty, staff, and students to evaluate their own use of the Webmail Plus email system, including electronic communication, calendaring, and data storage. Individually preparing for an issue such as an email failure could help to alleviate the tension felt without these systems. Examples include backing up files to a personal computer or paper format and creating and keeping a list of important alternative email addresses and phone numbers.

THE FUTURE OF EMAIL AT WESTERN MICHIGAN UNIVERSITY

In this section, we will consider the future of email at Western Michigan University. A two pronged approach is used. These approaches include a look at electronic mail systems at WMU, and the future of email as a form of computer mediated communication. Explicit attention to the current email service at the university will be given in conjunction with examples from other universities and reports from interviews. This section's purpose is to provide a background for, and fruitful survey of the possibility of email in practical and theoretical terms.

Evaluating Electronic Mail Systems at WMU

The Webmail Plus failure highlights the need to reevaluate the dependency of Western Michigan University on Merit's email system. With the approval of the administration, WMU OIT formed committees to research alternatives to Merit's system. The committees were partially motivated to provide WMU with decision-making power if the system were to seriously crash again. Merit Network was made fully aware of this action. (Wolf, 2013). Over 70 people in the WMU community are involved in the project. Committees exist to study technology, functionality, security, and marketing of two different email providers: Microsoft Office 365 and Google Apps for Education. The committees are scheduled to deliver results to the administration by April 2013 (Fletcher, 2013). Gilchrist notes the contract with Merit Network is expiring in the summer and may or may not be renewed (Gilchrist, 2013). The final decision of the future of email rests with the administration (Wolf, 2013). Options include creating and hosting an in-house email system; switching to or renewing a third-party system such as Microsoft Office 356, Google Apps for Education, or Webmail Plus; or hybridizing an in-house/third-party email system (i.e., students hosted on a third-party system and faculty hosted on an in-house system)

Creating and hosting an in-house email system. Fletcher noted it would be easy to provide an in-house email system on campus (Fletcher, 2013). Tom Wolf added that prior to 2010, Western Michigan University did have an in-house email program for both students and staff (Wolf, 2013). Although a valid option, both Fletcher and Wolf mentioned this is very unlikely to be the course of action. Providing an email system like Webmail Plus on campus is more labor intensive than OIT wants to provide. In addition, the work is less rewarding for staff. It is far more likely outsourcing to a third party will occur. By outsourcing email services, OIT is able to focus on projects that are more rewarding to the staff instead of hardware and software maintenance. This benefit is contrasted by the loss of control over information and hardware. Outweighing the drawbacks, third-party email systems seem to be the most likely email system choice for Western Michigan University (Fletcher, 2013). Navigating the drawbacks leads us to a different option, switching or staying with Webmail Plus.

Switching or renewing a third-party email system. This involves looking at system offerings and components. Kansas State University (KSU) suffered the same Webmail Plus break down experienced at Western Michigan University. It is interesting to note KSU also decided to evaluate third-party email systems. Under consideration were such email programs as Google Apps for Education and Microsoft Office 365. Published December 19, 2012, the report includes a charge to provide options to KSU Chief Information Officer, Ken Stafford. The committee report found that Google Apps for Education and Microsoft 365 meet the needs of their campus.

The report highlights tensions that arise when deciding considering third-party email systems. The location of storage is important and functions like document storage, calendars, and applications are desired. Product and policy stability are also integral to satisfaction. Table 2 on

the next page provides information on the differences and similarities between the systems (KSU, 2012).

Table 2
THIRD-PARTY CLOUD BASED EMAIL SERVICES ATTRIBUTES

Email Service Provider	Data stored in U.S.	Calendar	Document Storage	Office Applications	Product & Policy Stability
Google Apps for Education		X	X	X	
Microsoft Office 365	X	X	X	X	
Webmail Plus	X	X	X		X

Source: (KSU, 2012) & (NACUA, 2009)

Where data is physically stored affects how a university is able to operate. The transmission of controlled information to certain countries is forbidden by the U.S. government (i.e., military or defense research). If a service provider cannot guarantee storage will be within the U.S., affected research must be communicated in by different means. (NACUA, 2009). This can cause a great inconvenience to university staff and faculty (Gilchrist, 2013). Microsoft Office 365 is stored in the U.S. while Google Apps for Education cannot be guaranteed (NACUA, 2009). Webmail Plus through Merit Network is stored in Southfield, Michigan (Gilchrist, 2013).

Discussions on features such as calendar, document storage, and office applications illuminate the growing desire for these integrated technologies. Google, Microsoft, and Webmail Plus offer calendar and document storage. The KSU report favored Microsoft Office 365's data storage system due to its compatibility with Microsoft products like Word and Excel. In contrast, Google storage systems strip documents of their Microsoft formats when uploaded (KSU, 2012). This did not seem to bother Brendan Shaw when he described the features he would like to see in an email system. Shaw thinks the visual appeal and ease of use of his Google account outweigh

other systems like Webmail Plus and Microsoft Office 365. He also thinks the availability of applications through Google is a strongpoint for the platform (Shaw, 2013). Nicole Millar seconds that; she anticipates a system that works and functions like Gmail, and thinks Google Apps for Education can provide that (Millar, 2013).

Product stability is important when evaluating any third-party system. According to the KSU report, the Google Apps for Education appearance and functionality fluxuates more and with little warning to users when compared to Microsoft Office 365; this is marked as a weakness of the Google platform (KSU, 2012). Policy stability is another component to system evaluation. Many policies can be contractually ensured by all three email platforms. For example, the agreement to not sell user email addresses to other organizations. Changes within the platform provider can inadvertently affect a university (NACUA, 2009). Webmail Plus enjoys less risk than the other third-party systems for policy instability. This is due to Western Michigan University influence at Merit Network Inc.

There are benefits and drawbacks from using Google Apps for Education, Microsoft Office 365, and Webmail Plus. Is a switch fto Google or Microsoft likely? Fletcher reported it is not, but is a possibility following the committee findings (Fletcher, 2013). There are built-in benefits of the Merit system that do not exist with other systems. First, Webmail Plus is already established and has been improving services to WMU (Wolf, 2013). Merit Network's mail stores are also located domestically and regionally close in Southfield, Michigan (Gilchrist, 2013).

Another benefit is that OIT operates the first gateway any message passes through when addressed to a user ending with "@wmich.edu". Fletcher estimates that about 80% of the messages coming into WMU are rejected at the first gateway. From here, the message is passed to Merit's IronGate to be filtered further. Messages can be rejected if they do not have a proper

address, a proper return address, or other known issue. Messages that meet requirements but appear skeptical can be filtered as spam. When a message is accepted, it is delivered into a user's mailbox. Although WMU OIT does not have authority over the physical hardware or software of Webmail Plus, they are granted privileges to see when messages are sent or received. This power is important when considering some of the used of Webmail at the university including sending tuition notices. This is also important in troubleshooting user issues such as not receiving an expected message. Joel Fletcher provided an anecdote that one student created an email filter to defer all messages with "cialis" in the title to a spam folder. The student called OIT when she did not receive a message from a classmate. In working with OIT, the student was able to figure out that her "cialis" filter also filtered the anticipated message with "specialist" in the title. Gateway control and access to sending/receiving messages afford OIT security and information (Fletcher, 2013).

Gilchrist highlighted an additional benefit of keeping Webmail Plus through the Merit Network as the provider of our email, calendar, and task-scheduling services. Gilchrist is Western Michigan University's representative on the Board of Directors at Merit Network. He described this position as mainly policy based. Included in this, is a voice and a vote in any policy changes the Michigan-based nonprofit might make. As of now, WMU owns the emails that are generated and received by university users. Switching to a different provider such as Google Apps for Education or Microsoft 365 would take ownership away. Another risk in switching, is that WMU would have no active voice in the policy changes surrounding email control, ownership, or operation. With Merit, the administration has an active voice (Gilchrist, 2013).

Previously experienced, little control coupled with performance issues strained the relationship between Western Michigan University and the Merit Network (Fletcher, 2013). Microsoft 365 and Google Apps for Education are third party platforms that exist outside the state of Michigan. Western Michigan University has little to no influence over these systems. A decision to switch would probably result in more loss of control over information and hardware. Currently, it seems the Webmail Plus system is an advantageous third-party cloud service. (Fletcher, 2013). Recent upward trend in performance and improved communication between Merit and WMU have positioned the Webmail Plus system as the ideal third-party choice.

Hybridizing in-house/third-party email systems. This represents a third option for Western Michigan University. As noted in the report by Kansas State University, email/calendar could be offered through one system (i.e., Webmail Plus), and other applications through a different system (i.e., Google Apps for Education) to provide utility and functionality to users (KSU, 2012). Hybridization could also take the form of splitting in-house and third-party email systems for different types of users (i.e., faculty and staff on an in-house system, students on a third-party system). We will focus on the practicality of this option. In a study of 496 colleges and universities, two-thirds outsource email for students compared to one-fifth for faculty and staff (Green, 2011).

Offering a hybrid of email systems might help to alleviate some tensions that arise between picking either in-house or third-party platforms. The most likely option would be to provide student email on a third-party platform and faculty/staff email on an in-house system. Options for student email could include Webmail Plus, Google Apps for Education, or Microsoft Office 365. This would grant benefits to WMU OIT to not have to manage software and hardware for students, a large number of users. It would also circumvent any possible issues for

professors by guaranteeing local storage of all data, including research data that is federally prohibited from being stored outside the United States.

Switching to a system like Google for student might be a better possibility with hybridized email services at WMU. Stanford University switched from an in-house email system to Google in their spring 2012 quarter. The transition was partially prompted by students who forwarded university email to private accounts. Of those Stanford students, 95% forwarded email to private Google accounts (Najarro, 2012). This popularity, along with the lack of issues pertaining to the location of data storage adds to the plausibility of a Google-based system for students.

Although there are benefits to hybridizing systems, I do not foresee Western Michigan University pursuing this option. One major reason is the previous decision to unify campus onto one email system (Wolf, 2013). Better performance by the Merit Network and already secure domestic data storage warrant the Webmail Plus email platform a better option that aligns students, staff, and faculty onto one system.

In the Coming Years, Exploring Email and Connection in the Future

Email is a form of computer mediated communication that is integral to organizations' operations. Shaw stated that email as a form of communication is here to stay. He and Jasmine Neldon both believe that electronic communication has become one of the premier forms of professional communication today (Shaw, 2013 & Neldon, 2013). Gilchrist added email plays a bigger and bigger role in organization function (Gilchrist, 2013). Tom Wolf compared email to electricity in a house, something many people assume as standard (Wolf, 2013). Fletcher offered a similar analysis, instead using plumbing as the comparison (Fletcher, 2013).

James Gilchrist reminisced that email replaced the memo as the tool to get work done and it seems the face of organizational productivity continues to change and evolve (Gilchrist, 2013). Tools are emerging as benefits-added services to email including electronic calendaring and document storage and sharing. These tools are merging into the email platform to create more robust systems that increase connection among users. Fletcher offered a conception of email in the future as something wholly tied into users work and social lives (Fletcher, 2013). Wolf expanded upon this. He sees the email platform as something that supports voice, video, mobile texting, calendaring, document sharing and other technology that is accessible and integrated into a single device. New technologies are already providing many of these things, such as Google Apps, but Wolf sees the future where this is the standard for communication (Wolf, 2013). Gilchrist often referred to his cellular phone as the new extended platform for these technologies (Gilchrist, 2013).

The advent and integration of tools and applications into multiple devices may render many separate devices unneeded. In 2012, the estimated number of households in the U.S. with only cellular phones was 32% compared to only landline phones at 10.2% (Blumberg, et al, 2012). Tom Wolf demonstrated sending a text message via the Webmail Plus email system to his cellular phone during our interview. Those technologies that provide a single service (i.e., landline phones, a stand-alone email service, etc.) are slowly being weaned out and replaced by technologies that handle many services (i.e., cellular phones that connect to email, calendar, and data). It seems to me the future of email is really the future of computer mediated communication. That is to say technology is merging into systems accessible to people with a variety of different applications in a single mode of delivery.

This honors thesis has examined Webmail Plus email failure at Western Michigan University. By exploring email as a salient form of communication, the effects of loss of connection were explored through interviews with staff and students. It became apparent in this project that email is a necessary tool for efficiency and work in organizations. Workflows, inter-organizational communication, and connections between students, faculty, and staff were impeded in the breakdown of the Webmail Plus system. The breakdown, in conjunction with other performance issues, caused the administration to begin evaluating alternatives. I believe Webmail Plus will continue to host Western Michigan University's email platform for the foreseeable future. The full implications of email and corresponding technologies appear to be the integrating of many technologies and applications (i.e., calendars, voice, video, etc.) into single devices (i.e., personal computers, phones, etc.). Email emerged and continues to maintain itself as a prominent way to connects users.

ENDNOTES

[1] Chris Anderson, a staff member at TED who began an email charter to free users from "email's relentless growth". TED is a national nonprofit devoted to "ideas worth spreading". Through conferences, videos and local events the organization engages with audiences through open-source information on Technology, Entertainment, Design, and related topics (TED, 2013).

INTERVIEWS

Fletcher, J. Director, Operations, Workgroup and Distributed Computing, Western Michigan University. (2013, March 13). (M. Vargo, Interviewer)

Gilchrist, J. Vice Provost for Academic Operations and Chief Information Officer, Western Michigan University. (2013, April 4). (M. Vargo, Interviewer)

Kaplan, E. Student, Western Michigan University. (2013, April 5). (M. Vargo, Interviewer)

Love, M. Coordinator First Year Experience Programs, Western Michigan University. (2013, April 10). (M. Vargo, Interviewer)

Millar, N. Assistant Direct Student Activities & Leadership Programs, Western Michigan University. (2013, April 1). (M. Vargo, Interviewer)

Neldon, A. News Editor Western Herald, Western Michigan University. (2013, April 2). (M. Vargo, Interviewer)

Shaw, B. Student, Western Michigan University. (2013, April 10). (M. Vargo, Interviewer)

Wolf, T. Chief Technology Officer, Western Michigan University. (2013, March 22). (M. Vargo, Interviewer)

REFERENCES

Anderson, C. (2011, June 30). *The Email Charter: An Idea Worth Spreading*. Retrieved from TED: Ideas Worth Spreading: http://blog.ted.com/2011/06/30/the-email-charter-an-idea-worth-spreading/

Anderson, C., & Wulf, J. (2012). *Email Charter*. Retrieved from Email Charter: http://www.emailcharter.org/index.html

Baines, A. (1992, August). Electronic Mail. *ProQuest Business Collection*, p. 24.

Berry, T. (2011, January). *10 Old New Rules for Business Emails*. Retrieved from Small Business Trends: http://smallbiztrends.com/2011/01/3-simple-rules-for-better-business-emails.html

Blumberg, S., Luke, J., Ganesh, N., Davern, M., & Boudreaux, M. (2012). *Wireless Substitution: State-level Estimates From the National Health Interview Survey*, 2010-2011. National Health Statistics Reports.

Brenner, L. (2008, August 11). *The E-mail Inbox is Falling Out of Favor*. Los Angeles Times.

Darnay, K. (2012, September). *A History of Email*. Bismark Tribune.

Fallows, D. (2002). *Email at Work: Few Feel Overwhelmed and Most are Pleased With the Way Email Helps Them Do Their Jobs*. Washington, D.C.: Pew Internet & American Life Project.

Friedman, R., & Currall, S. (2003). *Conflict Escalation: Dispute Exacerbating Elements of E-mail Communication*. Human Relations, 1325-1347.

Google. (2013). Google Apps for Education Customers. Retrieved from Google: http://www.google.com/enterprise/apps/education/customers.html

Green, K. (2011). *Campus Computing, 2011*. The Campus Computing Project.

Harrison, T. (2003). *Electronic Mail*. In Encyclopedia of International Media and Communications.

InforWorld. (1992, March 16). *Electronic Mail Use to Skyrocket*. InfoWorld, p. 40.

Kolowich, S. (2012, October 12). *Outsourcing Privacy*. Inside Higher Ed.

Kolowich, S. (2012, October 3). *Cloud Computing Ground War*. Inside Higher Ed.

KSU. (2012, December 19). *Final Report: Email Upgrade Committee*. Retrieved from Kansas Student University: http://www.k-state.edu/its/emailupgrade/references/NACUAnotesonemail.pdf

Mano, R., & Mesch, G. (2010). *E-mail Characteristics*, Work Performance and Distress. *Computers in Human Behavior*, 61-69.

Marshall, T. (2013, April 9). (M. Vargo, Interviewer)

Martin, M., Myers, S., & Mottet, T. (1999). *Students' Motives for Communicating With their Instructors*. Communication Education, 48(2), 155-164.

McEleny, C. (2010). *Social Media: Social Dominance*. New Media Age, 29.

Mell, P., & Grance, T. (2011). *The NIST Definition of Cloud*. Gaithersburg, MD: National Institute of Standards and Technology. Retrieved from http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf

Merit Network Inc. (2013). *About Merit Network Inc*. Retrieved from Merit Network Inc.: http://merit.edu/about/

NACUA. (2009, December 16). *Cloud Contracting: Outsourcing E-mail@youruniversity.edu*. Retrieved from NACUA NOTES: http://www.k-state.edu/its/emailupgrade/references/NACUAnotesonemail.pdf

Najarro, I. (2012, February 10). *Zimbra to be Axed, Replaced by Gmail*. The Stanford Daily.

OIT. (2012). *Office of Information Technology*. Retrieved from Western Michigan University: http://www.wmich.edu/it

Pinheiro, E., Weber, W., & Andre, L. (2007, February). *Failure Trends in a Large Disk Drive Population*. Retrieved from Google: http://static.googleusercontent.com/external_content/untrusted_dlcp/research.google.com/en/us/archive/disk_failures.pdf

Ralston, G. (2003). *Electronic Mail*. In Encyclopedia of Computer Science.

Riva, G., & Galimberti, C. (1998). *Computer-Mediated Communication: Identity and Social Interaction in an Electronic Environment*. Genetic, Social, and General Psychology Monographs, 124(4).

Smith, A., & Rainie, L. (2010). *8% of Online Americans Use Twitter*. Washington, D.C.: Pew Research Center's Internet & American Life Project.

Stewart, A., & Zorn, T. (2007). *Responding to Negatively Emotive E-mails within Organizations: Communicative Strategies*. National Communication Association.

TED. (2013). *About TED*. Retrieved from TED: Ideas Worth Spreading: http://www.ted.com/pages/about

The Radicati Group, Inc. (2009, May 6). *Email Statistics Report, 2009 - 2013*. Retrieved from The Radicati Group, Inc: http://www.radicati.com/wp/wp-content/uploads/2009/05/e-mail-statistics-report-2009_brochure.pdf

The Radicati Group, Inc. (2010, April April). *Email Statistics Report, 2010 - 2014*. Retrieved from The Radicati Group, Inc.: http://www.radicati.com/wp/wp-content/uploads/2010/04/Email-Statistics-Report-2010-2014-Brochure.pdf

The Radicati Group, Inc. (2011, May 18). *Email Statistics Report, 2011-2015*. Retrieved from The Radicati Group, Inc.: http://www.radicati.com/?p=7269

The Raticati Group, Inc. (2012, April 10). *Email Statistics Report, 2012-2016*. Retrieved from The Raticati Group, Inc.: http://www.radicati.com/wp/wp-content/uploads/2012/04/Email-Statistics-Report-2012-2016-Brochure.pdf

Thurlow, C., L., L., & A., T. (2004). *Computer Mediated Communication: Social Interaction and the Internet*. London: Sage Publications Ltd.

Twitter. (2013). *Using Hashtags on Twitter*. Retrieved from Twitter: https://support.twitter.com/articles/49309-using-hashtags-on-twitter#

VMware. (2013). *Who We Are*. Retrieved from VMware: http://www.vmware.com/company/

Walther, J. (1992). *Interpersonal Effects in Computer-Mediated Interaction: A Relational Perspective*. Communication Research, 52-90.

WMU News. (2008, February 18). *Merit Network makes first e-mail presentation*. Retrieved from WMU News: http://www.wmich.edu/wmu/news/2008/02/035.html

WMU News. (2008, February 8). *What Featured do you want with WMU Email?* Retrieved from WMU News: http://www.wmich.edu/wmu/news/2008/02/017.html

WMU News. (2010, July 7). *GroupWise users moving to Webmail Plus*. Retrieved from WMU News: http://www.wmich.edu/wmu/news/2010/07/005.shtml

WMU News. (2010, June 8). *New e-mail service introduced at campus forums*. Retrieved from WMU News: http://www.wmich.edu/wmu/news/2010/06/016.shtml

WMU Office of the President. (2013). *Office of the President*. Retrieved from Western Michigan University: http://www.wmich.edu/president

WMU Provost Office. (2013). *Western Michigan University Division of Academic Affairs Organization*. Retrieved from Western Michigan University: http://www.wmich.edu/provost/vpaa-org-chart.pdf

WMU Student Affairs. (2013). *Contact Student Affairs*. Retrieved from Western Michigan University: http://www.wmich.edu/studentaffairs/contact/

WMU. (2013). *Fast Facts*. Retrieved from Western Michigan University: http://www.wmich.edu/about/facts

Young, S., Kelsey, D., & Lancaster, A. (2011). *Predicted Outcome Value of E-mail Communications: Factors that foster Professional Relational Development between Students and Teachers*. Communication Education, 60(4), 371-388.

Zakon, R. (2011, December). *Hobbes' Internet Timeline*. Retrieved January 28, 2013, from http://www.zakon.org/robert/internet/timeline/

APPENDIX 1: WEBMAIL CRISIS 2012 INTERVIEW QUESTIONS SET A FACULTY AND STAFF INTERVIEW QUESTIONS

QUESTIONS

1. Can you please describe the relationship WMU has with the Merit Network's services?
2. Can you please describe the events of September 27th, 2012, when Webmail Plus broke down on campus?
3. Can you explain the reasons behind these complications?
4. What administrative effects were felt by the break down?
5. Was the break down avoidable, and if so, what things about the Webmail Plus system have changed to prevent future complications?
6. Can you share any anecdotes surrounding the failure that could shed some light on effects felt on campus in its absence?
7. What actions were taken by WMU and the Merit Network to correct the Webmail Plus break down?
8. In what ways has the Webmail Plus failure affected the relationship between WMU and the Merit Network?
9. Do you see any future complications with Webmail Plus in the future?
10. Email services have been an integral part of university communication for some time, what future do you imagine email has at WMU?

APPENDIX 2: WEBMAIL CRISIS 2012 INTERVIEW QUESTIONS SET B STUDENT INTERVIEW QUESTIONS

QUESTIONS

1. Can you please describe your general use of Webmail?
2. Can you share your experience of the events of September 27th, 2012, when Webmail Plus broke down on campus?
3. What do you know about the causes of the failure?
4. What do you think were the effects felt by most students?
5. Can you share any anecdotes surrounding the failure that could shed some light on effects felt on campus in its absence?
6. Did you or others you know default to different forms of electronic communication during the failure?
7. In what ways did the failure affect your view of Webmail Plus?
8. Email services have been an integral part of university communication for some time, what future do you imagine email has at WMU?