FINAL REPORT:

**Building Incident Response Team Emergency Communication
at The University of Michigan College of Pharmacy**

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EXECUTIVE SUMMARY

The Building Incident Response Team (BIRT) in the College of Pharmacy (CoP) at The University of Michigan is seeking a more efficient and reliable communication method in emergencies, particularly in a fire emergency. The current communication method in a fire emergency heavily relies on the safety manager as an information hub to collect and process all the information from BIRT members through text messages, which is both inefficient and invulnerable, especially when the safety manager is absent from the building.

Nulli Secundus Consultants conducted a thorough study on the decentralized communication method during emergencies with a qualitative research method named contextual inquiry to both collect the qualitative data in current situations and to reveal potential solutions. This analysis process involves detailed background research on emergency management, six interviews with two building managers, two BIRT members, and two fire safety specialists. We finally used a qualitative analysis method named affinity diagramming to aggregate all the information and help us draw our conclusions and make recommendations.

This report will later detail all our findings on the communication process and staff management in the event of a fire emergency in the College of Pharmacy at the University of Michigan. These findings include:

1. Clear and consistent communication
2. Constant communication flow
3. Team collaboration
4. Adequate training
5. The hierarchy structure of BIRT
6. One-to-one communication model

Based on our findings and a series of studies and comparisons of different potential solutions, this report will later detail our recommendations to the problem, which includes:

1. Have clear and uniform language in messages
2. Keep information moving quickly
3. Conduct training meetings more often
4. Provide more hands-on training for a variety of situations
5. Have a back-up liaison
6. Create a one-to-many communication model

I.   INTRODUCTION

This report is a culmination of a semester-long consulting project between students within the University of Michigan's School of Information and the safety officer for the College of Pharmacy at The University of Michigan. In an effort to improve the speed and accuracy of incident communication within The College of Pharmacy's Building Incident Response Team, background research, interviews and walkthroughs, observations, and data analysis were conducted to facilitate an appropriate solution.

This report details the research methodology, findings, and recommendations specific to the scope of this project. Relevant background information about the College of Pharmacy, tools, and materials that provided additional useful information to create this document are also included.

II.   BACKGROUND INFORMATION

THE COLLEGE OF PHARMACY'S MISSION

Founded in 1876, The College of Pharmacy (CoP) at The University of Michigan (UM) is currently ranked top three in the nation, according to US News.[1] Over the last 142 years, the CoP has produced top leaders and innovators in a research-intensive healthcare system.[2] Moreover, the CoP spans over three academic departments and research centers in an expansive, complex maze of halls and classrooms. The CoP's mission statement states their "mission is to educate and inspire a diverse group of future pharmacists and pharmaceutical scientists to be leaders, advance patient care, and improve health for all".[3] Furthermore, they also seek to provide their students with the foundation to solve the health problems of today and tomorrow.[4]

BUILDING INCIDENT RESPONSE TEAM (BIRT) INITIATIVE

The Division of Public Safety and Security (DPSS) at UM provides resources for emergency preparedness, which includes "The Building Incident Response Team (BIRT) program that provides a coordinated emergency response within particular buildings on campus" [5] Each BIRT typically consists of two voluntary roles: the BIRT liaison and BIRT members.[6] According to DPSS, the liaison is the team leader appointed to provide information to emergency first responders and coordinate members.[7] Equally important, members are familiar with their immediate area and building-specific evacuation procedures and help assist in quickly evacuating buildings, providing direction for sheltering and assisting in wayfinding.[8] In a building that contains several units or is connected to another builder, BIRTs must coordinate and share information with all necessary parties.[9]

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[1] The Best Pharmacy Programs in America, Ranked. (2019). U.S. News & World Report, U.S. News & World Report. Retrieved from https://www.usnews.com/best-graduate-schools/top-health-schools/pharmacy-rankings.
[2] Our history. (2019). Retrieved from
https://pharmacy.umich.edu/academic-research-about/about-college/our-mission-philosophy/our-history
[3] Our Mission & Vision. (2019). UM College of Pharmacy. Retrieved from https://pharmacy.umich.edu/node/240
[4] Our Mission & Vision. (2019). UM College of Pharmacy.
[5] Division of Public Safety and Security, The University of Michigan. (2019). Resources For U-M Faculty And Staff: Building Response Initiatives. Retrieved from
https://dpss.umich.edu/content/emergency-preparedness/resources-for-u-m-staff/building-response-initiatives/
[6] Division of Public Safety and Security, The University of Michigan. (2019).Resources For U-M Faculty And Staff: Building Response Initiatives.
[7] Division of Public Safety and Security, The University of Michigan. (2019).Resources For U-M Faculty And Staff: Building Response Initiatives.
[8] Division of Public Safety and Security, The University of Michigan. (2019).Resources For U-M Faculty And Staff: Building Response Initiatives.
[9] Division of Public Safety and Security, The University of Michigan. (2019).Resources For U-M Faculty And Staff: Building Response Initiatives.

THE COLLEGE OF PHARACMY'S BUILDING INCIDENT RESPONSE TEAM

In the event of an emergency in the connected CoP building and the North University Building (NUB), before first responders arrive, BIRT is tasked with ensuring the safety of occupants of the building, e.g., students, faculty, and staff. Each member is assigned a zone of the building and is responsible for relaying if that zone is cleared or not. Currently, this communication is being done via text messaging. This information is then relayed to the BIRT liaison, which subsequently communicates with first responders. An important aspect of the BIRT is clear communication, so first responders know where the emergency is and if there is anyone in need of assistance inside the building. The CoP BIRT's objective is to quickly empty both buildings during an emergency without compromising personal safety.

THE PROBLEM

The building alarm systems are not connected. Therefore, issues arise when the alarm is set off in the Pharmacy building, but no alarm sounds in the connected NUB. In other words, a fire in the CoP building will NOT trigger the alarm in the NUB. This leads to a breakdown in communication when the source and resolution of the alarm need to be communicated with multiple buildings that house several departments in a timely manner. Confusion arises when BIRT members do not know where the source of the alarm is located, further inciting chaos as people do not know when to return after an emergency evacuation or to seek shelter. The communication issue may be compounded if the BIRT liaison is out of the office during an emergency incident.

III.   METHODOLOGICAL OVERVIEW

We followed a user-centered research method called contextual inquiry to conduct our research and analysis for this project. This approach includes three main steps: background research, collecting raw data, and analyzing qualitative data. We have done thorough background research on this project to understand the client's problem in four different directions, including physical building environment, emergency communication, emergency psychology, and best practices. Furthermore, we conducted a series of interviews in which participants were selected with the assistance of our primary client. Interviewees include both BIRT members and building safety managers, as well as emergency procedure experts, e.g., fire safety, to provide high-level insights and ground details. Finally, we conducted a qualitative data analysis called affinity diagramming to analyze and aggregate all the data we collect from interviews to shape our conclusions.

INTERVIEWING AND COLLECTING RAW DATA

Our interviews were all conducted during the months of October and November 2019. For each interview, there were two team members present: one person was responsible for asking (conversational aspect) the interviewee questions, and the other person assisted by taking notes. We prepared three different interview protocols for various interviewees based on their job categories and responsibilities. During the interviews, our notes not only focused on the interview contents but also about non-verbal details the interviewees exhibited. After each interview, all team members gathered to review the interview notes and recordings. Affinity notes, which are critical points of the interview, were made together based on a rate of one affinity note per one minute. We have collected more than 300 affinity notes through this process, and they are the raw qualitative data that we used to analyze in a later step.

ANALYZING AND BUILDING AN AFFINITY WALL

The method we used to analyze the data is called affinity diagramming, which consists of gradually grouping affinity notes based on different themes and building a hierarchy of different groups to aggregate information from the notes to distill insightful conclusions from all the interviews. We started by grouping notes that have similar ideas and tagged the group with one sentence of a theme that the notes revealed. Then we categorized all the groups based on themes followed by tagged the second-level groups with sentences that described a broader theme. We repeated these steps three times. Finally, we created an affinity wall diagram with a hierarchy of four levels, and three big themes, which are training, communication, equipment. Each theme

has two conclusions focusing on different aspects. Total, we amassed six significant findings through this process, and they are a solid foundation for our recommendations for the solutions.

IV.   FINDINGS & RECOMMENDATIONS

Through stakeholder interviews, our team was able to identify some of the most critical factors which affect the CoP BIRT members communication in an emergency. These findings can be summarized into a few main topics: clear and consistent communication, constant communication flow, team collaboration, adequate training, the hierarchy structure of BIRT, and the use of a one-to-one communication model

UM's emergency preparedness process includes different guidelines and responses for different types of disasters. For example, in the event of a fire, all students and staff are advised to know the locations of fire alarms, extinguishers, emergency exits, etc.[10] During a tornado, students are advised to stay under heavy, supported objects such as desks. If there is an active shooter, students are asked to call 911 first. Then, they should run, hide, or fight as a last resort.[11] UM does have a Building Incident Response Team, which consists of members trained to assist the community in an emergency.[12] UM uses an all-hazards approach to prepare for an emergency. UM also provides drills & exercises as well as emergency alerts to the community and has an app to help relay messages and improve safety.[13] Based on our interviews and findings, we propose criteria that should be adhered to and recommend a final implementation communication tool.

FINDING 1: CLEAR AND CONSISTENT COMMUNICATION

The stress and infrequency of emergency situations causes confusion among BIRT members which leads to lack of communicate during emergencies.

SUPPORTING EVIDENCE:

BIRT members are given codes to text when their zone is clear of occupants. For example, if a member is assigned the east-west wing of the fifth floor, they would reply, "EW5 all clear". In our interviews, members expressed these codes are not used because members are unable to remember the exact code to text. This leads to the BIRT liaison receiving many variations of text communication or BIRT members not sending any communication at all due to confusion.

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[10] Emergency Preparedness. (2019). Retrieved from https://sph.umich.edu/about/emergency.html
[11] Emergency Preparedness. (2019). Retrieved from https://sph.umich.edu/about/emergency.html
[12] Emergency Preparedness. (2019). Retrieved from https://sph.umich.edu/about/emergency.html
[13] Division of Public Safety & Security. (2019). Emergency Management. Retrieved from https://dpss.umich.edu/content/about/our-departments/emergency- management/

RECOMMENDATION: Have simple and clear language for messages.

Through our findings, we recommend an explicit messaging standard be implemented. Currently, there is a considerable discrepancy between communication among BIRT members. Notably, the liaison receives many messages that are not communicated coherently. Therefore, in place of having separate text messages coming through, we recommend the possibility of using a group messaging system that can accommodate up to 100 people. In these messages, training needs to be incorporated so that there is a clear script that is more straightforward, e.g., "Zone 1: clear or Zone 1: not clear - person is stuck [location] or is refusing to leave [location]. This will help ensure that centralized communication allows any member to communicate with other members coherently in the event of an emergency.

FINDING 2: CONSTANT COMMUNICATION FLOW

The speed and accuracy of communication in an emergency is of the utmost importance. With that in mind, currently the BIRT team fails to keep a constant flow of communication due to several factors not limited to decentralized sharing of information and having inadequate BIRT backup liaisons. In relation to this, it is imperative to have more than one BIRT member be in charge of zones incase one BIRT member is not available during an emergency. Furthermore, all zone members should have their communication devices on them to ensure contact with the appropriate personnel should it be required. Any disruption in communication flow could result in further difficulty for BIRT members to effectively do their job.

SUPPORTING EVIDENCE:

Overall, members of the BIRT team are not required to fight fires or to save many lives; their duty is to simply inform building occupants a fire alarm was set off and direct them to leave the building. During an interview, E02 elaborated that a BIRT team member is never responsible for fighting a fire, and they should never put their life risk to attempt fighting a fire. A BIRT member should also help occupants find the nearest emergency exit; this is an essential role of a member because people are creatures of habit, and may only know a few ways in and out of the building, not necessarily the safest fire exit. In relation to the University of Michigan at large, BIRTs are a small part of the larger emergency/disaster response initiative; the BIRT is part of the immediate response team. E01 said that overall the BIRT team is a tiny part of the university's emergency plan, but is still an essential role.

In an emergency, the speed and effective flow of information are critical to emergency responders. There is an overlap of staff in each building, and many BIRT members are a part of different parts of the organization. This allows for a less hierarchically structured communication network, allowing information to reach more people. Research suggests that building social

connections in an organization can help build credibility for emergency communication.[14] Having this structure of communication will help keep occupants calm during an emergency.

Some BIRT members do not carry their phones on them during the workday. B01 explained, some BIRT members have a personal or work policy where they do not keep their phones on them. If an alarm is set off, depending on where a member is in the building, they may not have a chance to grab their phone. In this case, the member will either have to find the BIRT liaison or another member and relay the status of their zone. Lastly, the changing of members on the BIRT can also lead to a break down of communication, this may be due to staff turn over, people leaving the BIRT, and new members being added.

RECOMMENDATION: Keep a rapid communication flow.

At times, there may be staff or faculty turnover during the academic school year.. These factors make it very difficult to incorporate all staff in an emergency plan. Some types of technology and practices that could make the emergency planning system more robust are the use of fixed camera systems and other remote sensing equipment, expanded use of social media, comprehensive training and drills for all new students and staff, plans for collaboration among different departments, and policies for how administrators and managers work together to relay information to the community as quickly as possible. In order to implement rapid communication flow, it is imperative that procedures are set in place to make users aware to ensure phones are not locked away or inaccessible. Furthermore, not waiting for individuals to leave the premises is another way to ensure rapid communication flow. The BIRT members interviewed have already demonstrated a positive response to adopting new approaches that are recommended to ensure the safety of everyone during an emergency. This suggests that the team is capable of adjusting quickly to the changes in procedures which may help to increase rapid communication flow.

FINDING 3: TEAM COLLABORATION

BIRT members meet before and after a drill or an actual emergency; BIRT members do not feel these meetings occur often enough to have them be prepared in the event of an emergency.

SUPPORTING EVIDENCE:

BIRT members of both the CoP and the NUB hold meetings to discuss areas for improvement and new training procedures to be implemented. M01 said that before a drill occurs, BIRT members are required to attend a team meeting, this is done to ensure each member

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[14] FEMA, Emergency Management Institute. (2002). Effective Communication: Student Manual.

is aware of what their duty is in an emergency: their zone to check, their exit route, how to communicate, and to whom they should communicate with. Additionally, B02 said that members are told they should treat the drills like a real emergency. These meetings are short but vital to team members being able to execute their responsibilities in an actual emergency. After a drill or real emergency, the team will also hold a meeting; this gives all members a chance to discuss their experiences, and talk about ideas for improvement.

RECOMMENDATION: Conduct training meetings more often.

In evaluating the recommendations for the CoP BIRT, it is essential to understand what kinds of policies are in place currently among other BIRTs specifically, at the UM. Currently, BIRT meetings are conducted on a quarterly basis. After conducting interviews, our team decided to provide a new timeline for meetings on the first Monday of every month. This ensures that most members are at work and will be able to attend meetings. Furthermore, these meetings should have set standards such as if members are to miss two or more meetings, additional training needs to be attended, and furthermore, more than three absences could result in terminating their position within BIRT. Conducting monthly meetings is imperative as it ensures that everyone is participating, and new ideas are being listened to by all members, and a joint discussion brings forth new ideas, and collaboration allows for better communication so that the team doesn't depend only on one BIRT liaison.

FINDING 4: ADEQUATE TRAINING

BIRT members receive training but often feel that this training does not occur often enough and may not adequately prepare them for a real emergency.

SUPPORTING EVIDENCE:

Becoming a BIRT member is an entirely voluntary position; potential members may be asked to join, but are not required to hold a position. Upon joining, team members receive training. This training includes a PowerPoint and video presentation from the UM DPSS, shown in Figure 1. BIRT members attend team meetings on an ongoing basis, and conduct a general walkthrough of their zone, and take part in emergency drills. BIRT members receive a map indicating the zone they are responsible for clearing in an emergency. Some BIRT members find training to be minimal, and this causes some BIRT members not to take their position seriously. Members have also expressed an interest in receiving more training in areas that include medical, severe weather, and active shooter emergencies. Members would also like to see more drills during peak times, rather than in the mornings before many employees may be at work. Moreover, members think this will give drills a more real feeling, better preparing them. Lastly,

some team members would like to receive more training to identify the dangers that can be caused by a fire or to see more posted signs indicating these dangers. For example, in the courtyard of CoP, there is a propane tank underground, making this an unsafe exit way, but some BIRT members and building occupants may not be aware of this.
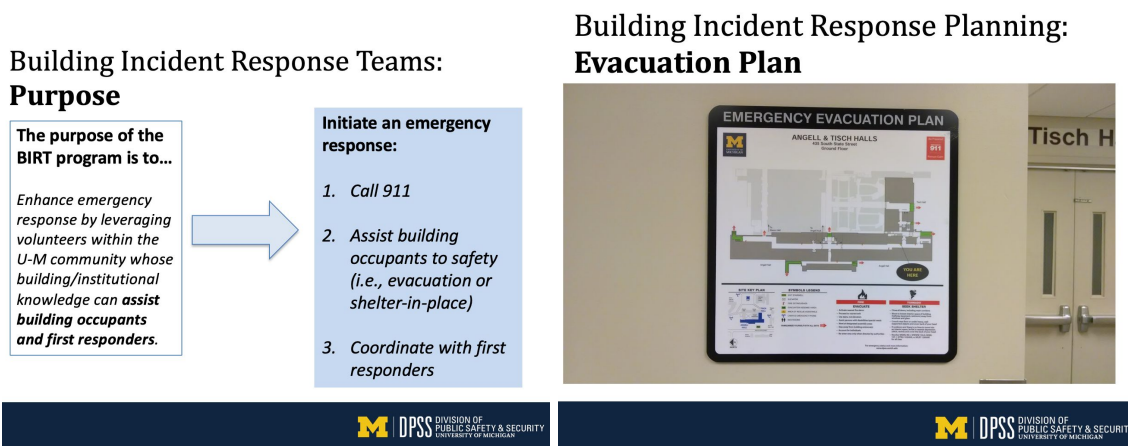

Figure 1: examples for slides that are in the BIRT training slides provided by DPSS.

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RECOMMENDATION: Conduct hands-on training for a variety of situations.

UM has adopted many of the practices that are recommended for an effective emergency incident plan. UM has different guidelines to best address various emergencies such as fires, tornados, etc. It has an all-hazards approach and provides drills and exercises. UM has a plan for business continuity and incorporates some technology such as emergency alerts via text, an app, as well as updates and info on the website. The current emergency response plan could be improved and eliminate threats more effectively, but UM has many of the challenges discussed earlier in developing its emergency plan. The student body is around 46,000 students, and the overall campus includes several hundred buildings. The importance of practicing for a variety of situations is significant because safety precautions need to be in place for not just fires but other incidences as well. For example, in early Spring 2019, there was a potential threat for an active shooter on the UM campus, and although there is some form of the material provided to BIRT members, there is no official training in place. Once again, we recommend having a once a semester meeting (apart from monthly team meetings) to conduct hands-on training for tornado emergencies, fire, active shooters, among other equally important emergencies. This will ensure all members are fully aware, confident, and prepared to address all concerns in the event of an emergency. Since fire safety is our primary concern, the team can benefit from utilizing some of the procedures from fire drills as many of the skills are transferable across a variety of emergencies.

FINDING 5: THE HIERARCHY STRUCTURE OF THE BIRT

In the event of an emergency or a drill, if the BIRT liaison is not present, this is not discovered until BIRT members try to communicate with the liaison and receive no reply.

SUPPORTING EVIDENCE:

The one-to-one communication model is affected when the BIRT liaison is not present. The CoP and the NUB have separate modes of communication because of the safety managers that oversee the buildings. Figure 2 shows the complexity of CoP's and NUB's connection. As a result, each team's communication channels being separate, the involvement of one team in an emergency does not guarantee the participation of the other. Since there are two separate safety managers, if one of the BIRT safety managers is not present, M02 says the other safety manager can assume the role for both teams and work with emergency responders. The drawback to this fill-in process is the absence of a safety manager is unknown until the occurrence of an emergency. Quick thinking from the BIRT team is essential for the flow of communication in this instance. M01 says that communication will be slowed, but will be done via an ad-hoc plan between members and the NUB building liaison if they are also present.

Figure 2: Map of the fourth floor of the North University building, showing the complex connection with the College of Pharmacy building.

Some of the challenges of emergency response are the failure of the communication system, which can be caused by a technical failure due to damage from the emergency or just a glitch in the system.[15] During any emergency, people may not be able to think as clearly and logically due to the stress of the situation.[16] People also process and articulate information less effectively in stressful situations, which affects both the sender and recipient of the information. [17] Many organizations have a hierarchical structure, where decisions are usually made by directors and managers.[18] This approach can prevent decisions from being made quickly enough in an emergency and also lead to decisions made without all of the essential information. If there is a breakdown in communication, decision-making could be decentralized, potentially leading to each division, making separate decisions or decisions that oppose each other.

RECOMMENDATION: Have a back-up liaison.

The CoP BIRT could add a backup liaison who makes decisions in case the primary liaison is unavailable. It is crucial to set up a formal plan and indicate a second in command to the liaison in case they are not on campus physically, are out on a meeting, etc.

FINDING 6: ONE-TO-ONE COMMUNICATION

The College of Pharmacy currently relies on one-to-one communication in an emergency; this slows the flow of critical information to first responders. This flow of communication also fails the BIRT liaison is not present.

SUPPORTING EVIDENCE:

As our team conducted interviews, the topic of communication was mentioned by multiple interviewees. We found the CoP currently relies on one-to-one text message communication. Communicating this way often leads to a breakdown of reliable communication in the critical and urgent time during an emergency. In the CoP, each BIRT member is assigned a zone of the building; they are responsible for guiding people out of and directing occupants to clear the building. Once the BIRT member checks their respective building, they text the BIRT

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[15] Channa, Muhammad Ibrahim, and Kazi M. Ahmed. "Emergency Response Communications and Associated Security Challenges." *International Journal of Network Security & Its Effective Communication: Student Manual.* FEMA, Emergency Management Institute, 2002.

[16] FEMA, Emergency Management Institute. (2002). Effective Communication: Student Manual.

[17] Kobialka, Daniel. (2014). Manage Stress During a Crisis. Retrieved from https://www.everbridge.com/blog/manage-stress-crisis/.

[18] Manoj, B.S., and Alexandra Hubenko Baker. "Communication Challenges in Emergency Response." Communications of the ACM, vol. 50, no. 3, Jan. 2007, p. 51., doi:10.1145/1226736.1226765

liaison and report if their area is all clear or if there are occupants in need of help. This one-to-one way of communication affects the spread and efficiency of information.

INEFFECTIVE COMMUNICATION METHODS:

RADIOS

In evaluating various secure technology equipment, we have determined radios as being ineffective tools of communication. Radios need to be charged, are bulky devices, making them more challenging to carry, and people may forget and leave them behind in an emergency. Also, the popularity and usage of radios have decreased significantly during the past several years. Different divisions of the same entity may use different radio frequencies, which makes effective communication more complicated, and may also require more resources.

INTERACTIVE APPS

If an app were the primary or one of the main sources of communication during an emergency, a lag or an error in functionality could prevent or delay communication from being distributed to many students and staff. This puts the lives of all students and staff in much more dangerous and could significantly increase the financial damage and death number from any calamity. Also, each app requires many hours of work and usually multiple staff, which may cost a large amount of money and take a long time to develop and implement. In addition, complex systems and apps frequently require prior training in order to be able to retrieve all of the necessary information.[19] Apps also can become dysfunctional or ineffective if they depend on a particular technology to use that is obsolete.

Interactive Apps and complex systems are becoming increasingly ineffective due to a number of factors:
1. They are financially not feasible
2. They require lots of work and hours
3. They could lag during an emergency

RECOMMENDATION: Group Messaging System-WhatsApp

Finally, we recommend a group messaging system. To have a successful emergency response plan, one of the most critical requirements is interoperability, which allows different

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[19] Andreas Kuehn, Michael Kaschewsky, Andreas Kappeler, Andreas Spichiger and Reinhard Riedl. (2010). Interoperability and Information Brokers in Public Safety: An Approach toward Seamless Emergency Communications

units and divisions to collaborate to reach common goals.[20] Communication should be integrated through a shared platform that is reliable, easy to access, secure, and resilient.[21] The entire BIRT should act in cohesion, and therefore different modes of communication are not recommended. Information needs to be shared in real-time so that rapid decision-making can occur during any serious emergency.[22] Because information overload may occur in a disaster, massive amounts of data need to be analyzed and stored successfully.[23] As the result of our research, an excellent communication tool is WhatsApp. This tool will allow the BIRT liaison to use different ringtones for receiving emergency response messages from different BIRT members. Also, WhatsApp will enable messages, videos, pictures, alerts, etc. to be sent immediately and more quickly than standard text messaging.

Whatsapp also offers a business integration application programming interface (API) that can be used for organizations.[24] While larger businesses mostly use it, this app makes it easy to send automated messages and reach all people quickly.[25] It also has a chatbox to receive answers to any questions quickly and can incorporate analytics to provide insights and essential safety recommendations to all people.[26] This is an important feature according to B01 who said that some members "will receive an all clear text or a text will be sent to a few members who are expected to pass on the message". During an emergency, a delay by several seconds could cause much more damage to property or increase the risks faced by all students and staff at UM. WhatsApp allows multiple users in the chatbox to see the messages, therefore should one individual miss any message another user can pick up on it and take appropriate action. Further to this point, E01 mentioned that "centralized communication is critical to effective evacuation and reentry". Keeping this in mind while we evaluated for a sensible approach, it has been found that a group messaging system will enable a centralized communication protocol in the event of an emergency. Whatsapp is easy to learn how to use and is accessible on any smartphone. Also, it is used by millions of people around the world, and it allows the sender to see whether the message has been read by the recipient. If a message hasn't been read by the recipients, the sender would know and would be able to use a different method of communication to reach them. This tool also makes it easy for the public to disseminate information to others who do not have access to WhatsApp when the emergency warning is released.

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[20] Kuehn, etc. (2010). Interoperability and Information Brokers in Public Safety: An Approach toward Seamless Emergency Communications
[21] Kuehn, etc. (2010). Interoperability and Information Brokers in Public Safety: An Approach toward Seamless Emergency Communications
[22] Littleton. (2016). What's up with WhatsApp for emergency communications? Urgent Communications
[23] Kuehn, etc. (2010). Interoperability and Information Brokers in Public Safety: An Approach toward Seamless Emergency Communications
[24] Botanalytics Blog. (2019). Retrieved from https://botanalytics.co/blog/2019/04/04/whatsapp-business-api/.
[25] Botanalytics Blog. (2019).
[26] Botanalytics Blog. (2019).

HOW TO SET-UP AND USE A WHATSAPP SYSTEM

Below we will go through step by step to set up a WhatsApp Group Account:

To create a group:

1. Go to the **CHATS** tab in WhatsApp.

2. Tap **More options** ⋮ > **New group**.
   - Alternatively, tap **New chat** 🔵 > **New group**.

3. Search for or select contacts to add to the group. Then tap the green arrow.

4. Enter a group subject. This will be the name of the group that all participants will see.
   - The subject limit is 25 characters.
   - You can add emoji to your subject by tapping **Emoji** 😊.
   - Optionally, add a group icon by tapping the **Camera** icon. You can choose to use your **Camera**, **Gallery** or **Search Web** to add an image. Once set, the icon will appear next to the group in the **CHATS** tab.

5. Tap the green check mark when you're finished.

Figure 3: Step-by-step group chat set up. Retrieved from WhatsApp FAQ Page.

Invite into groups via links

If you're a group admin, you can invite people to join a group by sharing a link with them. To share a group invite link:

1. Go to the WhatsApp group chat, then tap the group subject.
   - Alternatively, tap and hold the group in the **CHATS** tab. Then tap **More options** ⋮ > **Group info**.

2. Tap **Invite via link**.

3. Choose to **Send link via WhatsApp**, **Copy link** or **Share link** via another app.
   - You can also share a group invite using a QR code by tapping **More options** ⋮ > **Print group QR code**.
   - If sending via WhatsApp, search for or select contacts, then tap **Send** 🟢.

Figure 4: Step-by-step-how to invite to members to groups links. Retrieved from WhatsApp FAQ Page.

Creating a group messaging system is relatively simple, and encryption services are available as well. WhatsApp is an excellent tool because it "combines one-to-one, one-to-many, and group communication by offering private chats, broadcasts, and group chats".[27]

In Figure 5, we see various features of WhatsApp on an Android device. This high-level overview shows a toolbar in Figure 5a, and the user can start a private chat by clicking on the message icon on the toolbar and choose a contact from their contact list.[28] In order for the Safety Officer to create a new group, he/she has to open the menu and choose a new group. "Then, the subject of the group (a free text) must be defined, and a group icon can be uploaded. Afterward, up to 100 contacts from the contact list can be invited to join the group. The creator of a group has administrative privileges and can add and remove people from the group at any time and also promote other group members to group administrators".[29]

An example of a group chat can be seen in Figure 5b. Members post to the messaging group, and their conversations are marked in speech bubbles. Apart from the exchange of text messages, WhatsApp also allows us to send photos, videos, and audio files, contact data, as well as the current location of the user which is essential during an emergency.[30] "In a conversation, every type of message is seamlessly integrated into a single view, as Figure 5 shows. Every user of WhatsApp will be notified as soon as a new post arrives, whether in a group or in a private chat. This notification can be a sound, an icon, or a pop-up window, which is depicted in Figure 5c".

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[27] Seufert, M., Hosfeld, T., Schwind, A., Burger, V., & Tran-Gia, P. (2016). Group-based communication in WhatsApp. *2016 IFIP Networking Conference (IFIP Networking) and Workshops*. doi: 10.1109/ifipnetworking.2016.7497256

[28] Seufert, etc. (2016). Group-based communication in WhatsApp. *2016 IFIP Networking Conference (IFIP Networking) and Workshops*. doi: 10.1109/ifipnetworking.2016.7497256

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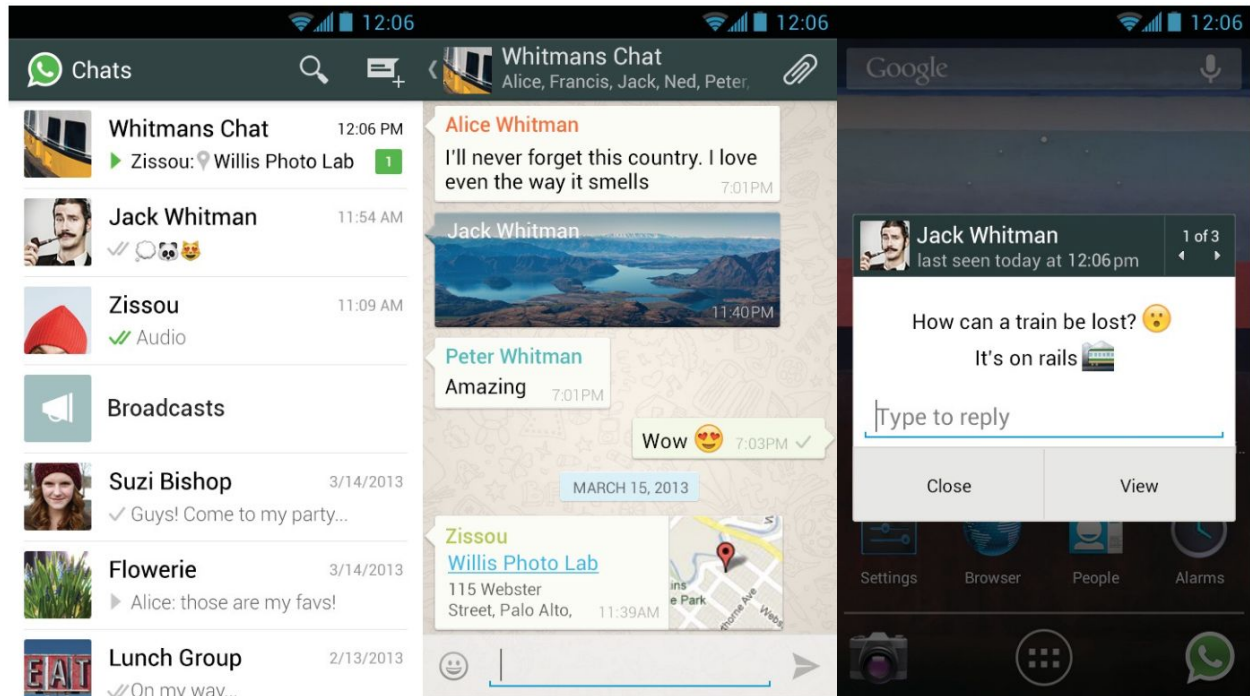
Figure 5 (a-c): Screenshots of whatsapp, retrieved from the official website of whatsapp (Seufert, Hosfeld, Schwind, Burger, & Tran-Gia, 2016).

V.   CONCLUSION

The CoP BIRT has provided invaluable emergency response to building occupants since its inception. However, communication amongst the lisaion and members has become ineffective without the use of an effective communication tool. To address the lapse in information exchange, background research, interviews, and analysis helped illuminate that the BIRT was missing a group messaging system like WhatsApp and a backup for the liaison in the instance of an absence. For improved communication BIRT members should also work to use a uniform vocabulary when communicating, keep correct information fast moving, and provide training more often and expand on what training is currently provided.

WhatsApp will ensure fast and effective communication for the BIRT to relay critical information. Testing will need to be conducted to verify that WhatsApp is the right fit for the CoP BIRT. In the future, the team may also explore a more customizable business integration API. We recommend setting up and testing the group message during a team meeting. This prevents implementing a new communication system from interfering with actual emergencies and drills. We believe that utilizing all the recommendations mentioned above will create a stable foundation for a successful emergency response plan.

VI.   REFERENCES

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