PRIVACY ISSUE IN THE INTERNET OF THINGS: SECURITY THREATS AND CHALLENGES

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ABSTRACT

The Internet of Things enable many new productive and efficient services that may improve people's everyday lives, but these useful features on Internet of Things may also cause threats to people's privacy and create serious security challenges. This research provides a general overview of the different privacy issues and security challenges prevalent in the Internet of Things environment and what measures can be taken to prevent those privacy and security risks. The research analyzes the privacy issues and security challenges focusing on the evolving features and trends in the Internet of Things. Privacy and security threats examined pointing out the challenges that need to be addressed to ensure security as the Internet of Things becomes a reality in people's everyday lives.

Keywords: Internet of Things (IoT), Privacy, Information Security, Smart Device

INTRODUCTION

The possible threats to information security that compromises people's privacy continue to grow as technology evolves. This evolution can be result of a new technology, new process to adopt technology or result of the application of an existing technology in a new way. A trajectory in which, smart gadgets capable of supporting prevalent network interconnectivity, automation, mobility, real-time data dissemination and acquisition are the norm. Smart is now a word associated with many daily life devices, such as cars, smart phones, smart TVs, and even kitchen appliances. With continuous evolution of advanced technology, the Internet has stepped into a new phase called Internet of Things (IoT) as a significant innovative model in the field of Information Technology. IoT allows diverse things to communicate with each other, anticipate, sight, and perceive surroundings with nominal human intervention in everyday life (Kaur & Kaur, 2017).

However, despite all its benefits, IoT may also create negative impact on various issues such as privacy, security, availability, interoperability, reliability, etc. The fact that computers, smartphones, smart T.V.'s, and other smart IoT devices can give outsiders a view inside people's home. Sensitive information can be collected when people use their smart devices, appliances, streaming video, or vehicles -- all could be part of IoT smart environment. Taking the advantages of the weaknesses that home networks may have in IoT smart devices, hackers can have a large insight into people's life activities, preferences and personalities. This possibility of security breach requires people to better protect themselves. However, current research shows that most of the cases people who are using those IoT smart devices are not aware of those security risks and when they become aware of – it's too late. Their privacy has already compromised that may causes even their security risk. In this context, this research focused on privacy and security threats

reviewing various research papers from existing literature that address those issues and provided proposals how to address those security challenges in IoT environment.

LITERATURE REVIEW

Internet of Things (IoT) is a computing concept that describes the idea of smart physical devices being connected to the internet and being able to identify themselves to other smart devices under smart environment. In IoT environment, network connections establish not only between users' computers and smartphones. The IoT refers to the connection of everyday life physical devices to the Internet. Everyday physical devices may include from regular household things such as tv, kitchen appliances to vehicles, even medical equipment such as heart monitors that all can be connected through the IoT environment. In near future, with ever-advancing technology, more and more smart devices will join in that list of IoT.
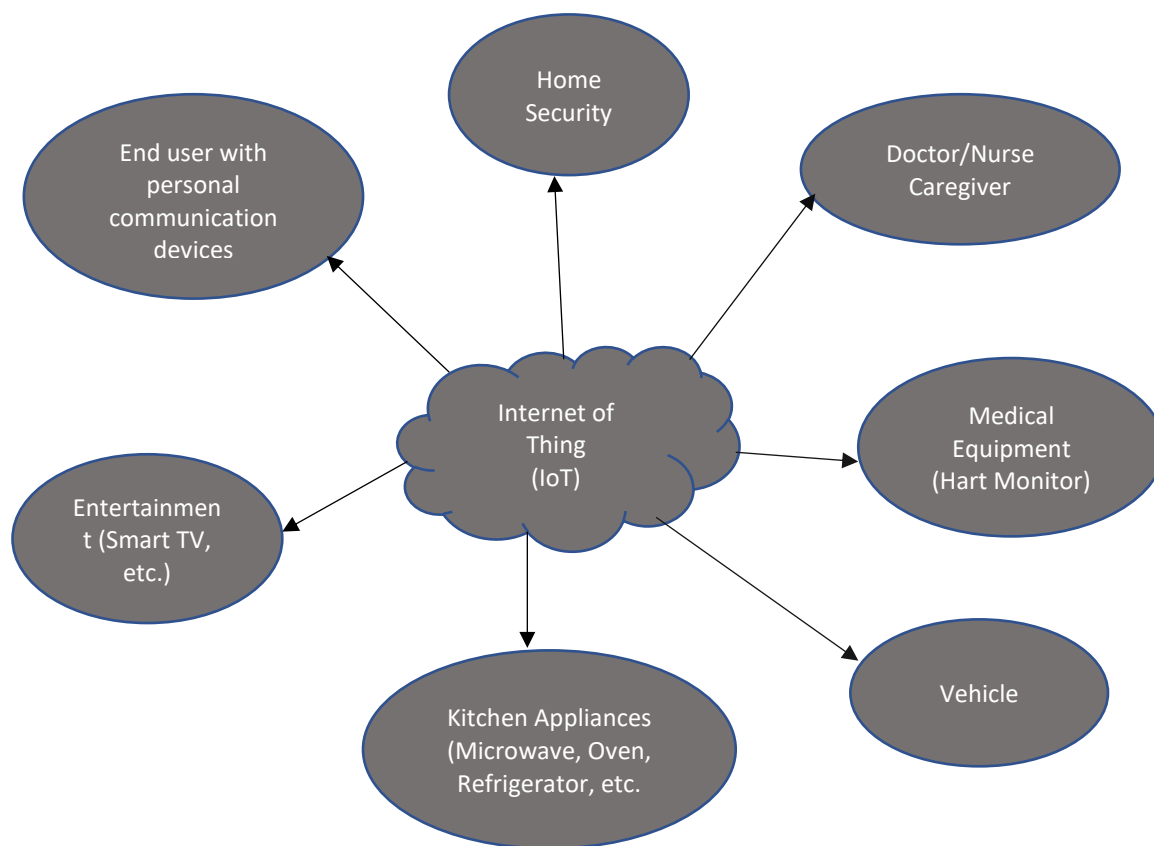

Figure 1: End users and smart application areas in the Internet of Things

IoT is a fast-developing paradigm that aims at providing quality and efficiency by connecting smart devices (things) around people's everyday life. The purpose of IoT is to ensure productive and effective lifestyle by integrating smart *things* or devices with various advanced emerging technologies such as cloud computing, big data, wireless sensor networks, etc. The highly dynamic concept of IoT is forwarding the life to the autonomous world thus providing smart environment

that may have enormous financial impact in future. A study finding concludes that by 2025, approximately 2-3 billion people in the world will have access to the internet with economic growth caused by IoT is estimated to be in the range of $2.7 trillion to $6.2 trillion (Manyika et al., 2013).

The emergence of the Internet of Things (IoT) has enhanced the way data, information, and knowledge is transmitted from virtual to the smart physical devices. IoT proves to be beneficial in various ways, including enhancement of data collection, improvement of access and control of devices, as well as increase of efficiency and productivity. However, IoT may be a catalyst for concerns related to confidentiality, integrity, availability as well as resilience (Bouazzaoui et al., 2018). The online security failures in IoT environment can be severe with serious consequences. Therefore, the research on security issues in the IoT is extremely important. The evolving nature of technologies and features of the IoT as well as the emerging new ways of people's interaction with the IoT environment lead to people's privacy threats and challenges (Ziegeldorf et al., 2014). People's privacy is a serious concern in IoT because in the IoT environment everything is connected with the internet. As a result, people's sensitive data and information can be compromised without their awareness of the risk of using IoT (Thilakarathne, 2020). Whilst IoT can provide great opportunities for improved services to people, it may cost their desire for privacy (Maple, 2017).

In this context, the research questions of this study were:
1) What are the privacy issues and security threats underlying the use of IoT?
2) What measures can be applied to address those privacy and security threats?

Thus, the objective of this study was to get a general overview of the different privacy issues and security threats prevalent in the IoT and what measures can be taken to prevent those privacy and security risks. Reviewing the existing literature this study identified the general factors related to privacy risks and security threats in the use of IoT and the measures needed to address those threats. The main objectives of those IoT security research are: 1) ensure privacy, confidentiality, and security of the end users; 2) safeguard the network infrastructures, data, and smart IoT devices; and, 3) guarantee the availability of the services offered by IoT.

Define Internet of Things (IoT)

Internet of Things (IoT) refers to the evolution of the internet that enables a wireless network infrastructure that connected to a large number of smart devices to collect data and communicate with each other in order to make smart decisions to provide services (Alhalafi & Veeraraghavan, 2019). The IoT is defined as a network interconnection of smart devices in everyday use that are often equipped with ubiquitous mechanism (Sahmim & Gharsellaouib, 2017). IoT is interconnection of sensing and activating smart devices providing the ability to share information across network platforms through a unified framework to enable innovative applications. This process is achieved by seamless large-scale sensing, data analytics and information representation using cutting edge ubiquitous sensing and cloud computing (Gubbi et al., 2013).

According to Sahmim and Gharsellaouib (2017), IoT is based on processing of large amount of data in order to provide useful service to people in their everyday life. The IoT environment is composed of embedded software, electronics and sensors along with smart physical devices. The

physical devices are remotely controlled via the connected network infrastructure and facilitates direct integration between the physical world and communication networks. The purpose of IoT is to significantly contribute into providing improved robustness, accuracy, efficiency in services, and to eventually enhance economic profits. Consequently, IoT has been widely applied in different applications -- from household appliances to transportation, environment monitoring, energy management, building automation, etc. (Sahmim & Gharsellaouib, 2017).

What is Privacy?
Privacy is a very broad and diverse view that defined in many perspectives in the literature. The concept of privacy can be shifted from media and data communication to territorial and physical privacy. According to Alkeinay and Norwawi (2014), privacy is the right or opportunity to decide who has the access to an individual's personal information and how that information should be used. With increasing use of online data processing, information privacy has become the predominant issue in today's digital world. Information privacy is the right of an individual to select what personal or financial information that individual wants about him/her is known to what people (Ziegeldorf et al., 2014). Thus, the privacy is defined as the assurance that people maintain their control over their sensitive data (Sahmim & Gharsellaouib, 2017).

Privacy is one of the vital issues in the IoT IoT environment because smart devices in the IoT systems collect various sensitive personal and sensitive information of users such as financial accounts, users' purchasing habits, geographical locations, physical or medical condition, life style, everyday behavior, and many others. Reveal of that information without users' consent can seriously affect their privacy that should be protected for their safety and security (Ziegeldorf et al., 2014).

Privacy Threats and Security Challenges in IoT and Solutions
Although there are numerous benefits of using IoT, but like all new advanced technologies it also can create many privacy issue and data security challenges that allow malicious party manipulating the flow of data or tampering it with IoT devices (Ziegeldorf et al., 2014). The existing literature shows that there are a variety of data security threats and privacy issues that need to be addressed. The current researches deal with several issues of data security and privacy in the IoT systems pointing out the questions such as who has access to data? Where is data stored? How many copies exist in the cloud computing? Are laws and privacy policies followed by the data users? etc. (Sahmim & Gharsellaouib, 2017).
Breach of information privacy in IoT is a broader data security issue that can create serious threat to people in general. Information privacy is often perceived as a part of data security, which is defined as the composite of three attributes - *Confidentiality*, *Integrity*, and *Availability (CIA)*. The online data security is defined as a set of mechanisms to protect sensitive data from vulnerable attacks by unauthorized malicious party, and to assure guarantee of data confidentiality, integrity, availability, and authenticity (Sahmim & Gharsellaouib, 2017). These attributes are complemented with reliability, safety, and maintainability of smart devices in IoT when combining security with dependability (Heurix et al., 2015). The general privacy and security threats underlying the use of IoT are as follows:

Confidentiality: The information can only be accessed by authorized people because if that information is not secured, the consumers will loss financially and the company or the organization involved in that business will eventually lose its reputation and business (Mir et al., 2011). To tackle the confidentiality issue in data security, many techniques are developed. For example: encryption, obfuscation, anonymization, sticky policy, trusted platform module, data segmentation, etc. Also used methodologies such as identity & access management, key management, security management, etc. (Sahmim & Gharsellaouib, 2017).

Integrity: Data can be corrupted when it is available on an insecure network system. When data is modified by third party without an authorization, it loses its integrity. This unauthorized change made to the data, whether by human error or intentional tampering, compromises the reliability of data (Mir et al., 2011).

Availability: Availability means that the Information requested or required by the authorized users should always be available when requested. Availability is often the most important attribute in service-oriented online businesses that depend on information (Mir et al., 2011).

Authentication: Authentication ensures the evidence of identity between communicating parties in virtual network. Authentication access control in data are vital to create a secure communication channel between different smart devices and services in IoT environment. Access control, especially Role-based and Access Control (RBAC) can be one of the measures to ensure authentication (Ziegeldorf et al., 2014). The security of IoT system can be assured by implementing secure authentication mechanisms in IoT (Alhalafi & Veeraraghavan, 2019).

Smart Device Usability: Many smart devices in IoT environment might not have flawless system to alert the user when a security breach happens. That makes it difficult for the user to know that a security breach has occurred and the user need to be concerned and take action about that. As a result, the security breach might last for a long time before being detected and corrected by the user. Similarly, the users might not be aware that a sensor exists in their surroundings, even in their household, that is listening and recording all their personal conversation or information, and possibly allowing a security breach to be continued for a long period of time without detection. People's everyday life devices such as smart phone, Alexa, etc. can listen their users' conversation and record it only to pass that information to third party or when requested. Therefore, users need to be cautious while they are communicating sensitive information via these smart devices.

Trust: Trust is a is a vital factor and a fundamental element in the adoption of a new technology. Successful implementation of above measures can develop users' trust, which is very important in people's adoption and continuing use of a new technology. People trust the technology they use for their services that ensures their privacy. People will not adopt a new technology if they do not have sufficient trust in that technology in safeguarding their privacy, security, safety, and this is particularly true in complex network systems such as the IoT (Maple, 2017).

CONCLUSIONS AND IMPLICATIONS

This research presents an analysis of recent research on IoT security and privacy issues. The research provides a basis for discussing privacy in the IoT systems by concisely framing the notion of information privacy. An extensive literature review of privacy and security challenges in IoT identifies relative insufficiencies of research on the ever-evolving paradigm of IoT. Therefore, further emphasizes needed for a detailed assessment of privacy threats especially with newly emerged smart devices used in IoT environment. The research summarizes different existing privacy threats in the perspective of evolving paradigm of IoT. Technical challenges with new smart devices in IoT are also reviewed in the context of threat that may provide clear directions for future research in this field.

This research suggests for a privacy and data security-based IoT systems, especially because with evolving IoT the privacy issue remains as a constant challenge and must be addressed to ensure people's data security. The most robust solution in enhancing the privacy and data security of the IoT system should be focusing on ensuring the less availability of users' identifiable data outside their own domain. To achieve this goal, the IoT systems should emphasis more on local data processing rather than centralized data processing. The IoT systems should also enhance the horizontal communication - instead of vertical communication - between the smart devices under its network. In addition, different privacy and data security safeguarding approaches such as encryption, data anonymity, obfuscation, etc. can be applied to the distributed IoT networks (Alhalafi & Veeraraghavan, 2019). Furthermore, the smart devices in IoT system should have the capacity to authenticate queries that respond to the requests only from legitimate individuals.

The main contribution of this paper is to provide an overview of the current research on privacy and security challenges in IoT. This research motivates the need for a further detailed analysis of privacy issues and security threats in the IoT. These privacy issues and data security threats need to be addressed by all the stakeholders, from the manufacturers of the devices, developers who make these remote monitoring systems to the policy makers to ensure privacy and data security in the IoT system is not compromised (Thilakarathne, 2020).

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A LITERATURE REVIEW OF KANBAN AND SCRUM: HISTORY AND EFFECTIVENESS

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ABSTRACT

Project management has become an important factor is successful project implementation. Kanban and Scrum have begun to displace older methods. They are based on lean and agile methods respectively. Each of these methods has a unique history and benefits. Studies have shown when these project management tools can be used most effectively. It appears that Scrum may be the more popular method despite Kanban's advantages in many cases. Further examination of this must be undertaken.

Keywords: Project Management, Kanban, Scrum, Agile, Lean

INTRODUCTION

As projects become increasingly complex and important to the growth of businesses, several methodologies have developed and evolved to meet the need for project management and the needs of different projects (Besner & Hobbs, 2012; Cesarotti et al., 2019; (Jin Xiu Guo, 2019; (Jovanovic & Beric, 2018). This increasing importance and complexity put a strain on a company's resources and ability to complete projects. The complexity of these projects demands using a project management methodology that can handle this complexity (Araujo et al., 2015; Kaleshovska et al., 2015; Kunjadić & Milosavljević, 2014; Valle & O'Mara, 2015). While an adequate project management plan does not guarantee, the successful completion of a project, it is unlikely to succeed without one (Jin Xiu Guo, 2019).

While there are many traditional models of project management, there has been a shift more recently to Agile and Lean methods (Cesarotti et al., 2019). There was a trend by some companies to adapt traditional project management methods internally to fit their needs but that trend has reversed as standardized methods have evolved (McHugh & Hogan, 2011). These newer methods, especially those based on lean and agile methodologies, have proven to be effective in improving the success of IT projects (Lei et al., 2017). As lean and agile methods become more dominant in the IT development world. It is important to understand how they function and exist in that world, and are they equal in their performance and presence?

PURPOSE

This paper will explore the current literature as a means of exploring the similarities, differences, advantages, and disadvantages of the Scrum and Kanban methodologies. These methodologies are representative of the Agile and Lean methods respectively. It will trace the history and development of these methodologies and how they are applied in the field today.

DISCUSSION

Kanban

Kanban is the basis of the Toyota method (Anderson, 2010). It is a system that works naturally in the manufacturing environment is was designed for. The idea which drives Kanban is to limit the Work in Progress (WIP). It is designed to be a pull system. Work cannot be move forward (or pulled) until the work ahead of it has been moved to the next state (Kniberg & Skarin, 2010). A step is completed before the next one begins. The WIP is limited by the number of items in a workflow state. (Kniberg & Skarin, 2010). There may be several jobs in a given state if the WIP progress rules allow for that. In this case, one of them must move forward for another new job to come into that state (Kniberg & Skarin, 2010; Lei et al., 2017). Because of this pull system, the workflow can be shut down by a stoppage of one or several processes as WIP rules do not allow for proceeding if a step is not complete. Kniberg & Skarin (2010) explain that this is a strength of Kanban as it forces the team to focus on resolving this problem in order to keep the process moving.

Kanban was first used in software development by a team at Microsoft headed by David Anderson. This team was struggling with a project and it was an attempt to help the team visualize the project and limit their WIP (Ahmad et al., 2014; Anderson, 2010). The WIP progress restriction works hand in hand with the Kanban board. This a board that has the process state represented in columns and the work to be done is written on cards and moved across the board during the execution of the plan (Joyce, 2009; Kniberg & Skarin, 2010). The board is a powerful instrument in seeing how a project is progressing as bottlenecks and gaps in the workflow are more obvious in this visual format (Lei et al., 2017). This visual representation along with the WIP limitations and pull nature of the system provide Kanban with its greatest strengths plan (Joyce, 2009; Kniberg & Skarin, 2010). Also, since work must be finished before it leaves a stage the quality of that product is inspected as it goes, not just at the end (Lei et al., 2017).

Scrum

Scrum as a methodology was introduced in 1995 as an alternative to the traditional waterfall methodologies that were being used as project management structures (Kaleshovska et al., 2015). The fundamental feature of Scrum is an iterative process in which "sprints" are conducted for a fixed time regardless of whether the anticipated work is completed (Kaleshovska et al., 2015; Kniberg & Skarin, 2010;). A sprint takes a feature or product from the product backlog and attempts to produce something which is ready for release in the time allotted for that particular sprint (Valle & O'Mara, 2015) (Kaleshovska et al., 2015). The sprint is led by a scrum master who is responsible for addressing any issues that interfere with the sprint (Kniberg & Skarin, 2010). A key feature of Scrum methodology is the structure of its meetings. During the sprint, daily meetings are held to address what happened, what will happen, and is anything preventing it from happening (Kaleshovska et al., 2015). An end of sprint meeting allows for a respective look on what went right during that sprint and how changes can be made to improve future sprints. (Kaleshovska et al., 2015; Kniberg & Skarin, 2010; Valle & O'Mara, 2015). When the next sprint begins the next feature from the backlog is added to it. This gives us the iterative process that defines Scrum (Kaleshovska et al., 2015; Kniberg & Skarin, 2010).

Comparison

Scrum and Kanban are effective techniques to manage complex projects because they are both more adaptable than the more prescriptive (more rules) older techniques like Waterfall, but of those two Kanban is more adaptable. (Kniberg & Skarin, 2010). While most commonly associated with Kanban, both Scrum and Kanban restrict WIP. The difference is that Kanban restricts the amount of work in any given state, while in Scrum the amount of work during a sprint is restricted (Kniberg & Skarin, 2010). Scrum's meeting requirements, while crucial to its success, are lacking in Kanban which allows for larger teams that are freer to tackle problems on the fly (Kniberg & Skarin, 2010; Lei et al, 2015). Regarding team makeup, Scrum is best served by a small cross-functional team while Kanban thrives on members with specialized skills to handle the repeatable task found in its methodologies (Lei et al, 2015).

Lei et al (2015) conducted a survey using a Likert scale to determine how each method succeeds at handling the six factors important in project management: schedule, scope, budget, risk, resources, and quality. The results demonstrate that there are clear benefits to using either Scrum or Kanban in managing software development projects over older methods. Kanban outperforms Scrum at maintaining the project schedule more than any other factor. It also outperforms scrum in all the other factors except budget but not to the same degree (Lei et al, 2015).

CONCLUSION

There are real benefits to using Kanban rather than Scrum for IT projects. This is borne out by Lei et al's (2015) study, but it does appear that scrum usage is dominant in the field from a review of business publications and online articles. While this informal review shows more scrum usage, further investigation and research into whether scrum is more widely used or is just written about more often is necessary. To further explore this topic, a scientific study of available job postings for project management personal should be undertaken to examine if the requirements tilt towards Scrum or Kanban. Additional information will also be gained by interviewing project management leaders in the industry to determine why they have chosen their particular method.

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IMPLEMENTATION OF SOCIAL MEDIA IN HEALTH CARE INDUSTRY: US MIDWEST REGION

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ABSTRACT

Aim is to research to what scale the hospitals are adopting social media and implementing with respect to the hospital characteristics. We are conducting a review of the hospitals social media activity on social networking sites like Facebook, Twitter, Instagram and YouTube. We are studying all the 912 hospitals in Midwest region reported in the American Hospital Association annual survey. We reviewed the social networking websites of these hospitals to understand the scale of social media adoption relative to the hospital characteristics such as bed count, region, ownership type, teaching status and urban or rural designation. We determine the utilization with the data from user activity on each different social networking platform such as likes in Facebook, followers in Twitter and Instagram, and views & subscribers in YouTube. Most of the hospitals have their presence on at least one social networking website but the utilization depends on many factors of the hospitals characteristics.

INTRODUCTION

Almost 79 percent of the people in United States use internet are active on social network website Facebook (Greenwood, et al., 2016). With the number of people on social networking, most of the entertainment, food, electronics, automobile, beverage businesses across the industries have made their presence on social networking platforms to reach their potential customers and keep in touch with them all the time. This is an effective way of marketing and building strong relationship with the customers. This social networking strategy might be followed by hospitals too, to reach out to the patients and to constantly be in touch with the people giving out healthcare information and news. But we know very less about the usage of social media platforms by the hospitals (Glaser, 2016). Adopting the plan of action to be active on social media platforms would increase the hospital's market share and popularity and gives an opportunity to develop their missions on healthcare agendas. Hospitals cannot have a complete control over the discussions and comments on social media, but they could drive the social media with their presence and strong content. Online health groups and communities created by the hospital, patients and people who involve in the groups, employees of the hospital, etc. are the people who would be responsible for the content of healthcare and hospital related information. This whole process wouldn't actually cost anything for the hospitals. Social media websites play a very important role for clinics and hospitals in reaching out directly to patients, consumers and their families, also helps in broadcasting information related to wellness and health, appreciate staff, promote health services and products and taking feedbacks and opinions from the patients about those services. (Kordzadeh N, 2015).
Audience engagement, Relationship between hospitals and patients starts when a patient logged into the hospital records and ends when he is done with his/her treatment. But nowadays, the relationship is continuing as he check-in to the hospital on its social media web site (Christina, 2011). when a hospital creates a Facebook page and posts healthcare information and latest news about the hospital facilities and stuff, it's marketing in a way, giving information to the people

they connected on Facebook which empowers the patients and their families who look for the information regarding the hospital and healthcare information (Raina, 2014). The likes on Facebook could not totally be accurate with respective to the actual popularity of the hospital but it gives an edge to analyze the data with some statistics and surveys. And lot of factors may give different understanding such as most of the likes for a hospital comes from a set of people who live in the neighborhood. *Information dissemination*, the ratings on Facebook, Instagram and other social media platforms reflect the service, performance and patient experience of the hospital. Hospitals are using YouTube videos to educate the patients to introduce the procedure, pre-operative preparation, post-operation follow ups and such information which could be informative for the patients and people who go through process and also can reduce the fears and encourage them to engage in taking their own care (Huang, E, 2013). Maintaining the social media relationships among hospital, patients, healthcare processes and researches are being evolved fast day by day. It has become highly important that hospitals are discovering innovative ways to keep in touch and engage with the patients who are outside the hospital environment.

Social Media: Utilization by Hospitals
In the modern technology age, people are more active and easily approachable through social media platforms than mails and phone communications and since it's cost effective and easy for the hospitals to adopt and implement the strategies to embrace social media presence (Larsson, et al., 2016). With Physicians using social media it brings down many barriers between patients and physicians as they can directly get the guidance and by this and we can directly get an insight into how these modern technology tools are helping physicians, Physicians being on social media also helped them in research field, advancing their career and learning new things by interacting with many medical professionals. One of the main benefits of physicians on social media are that they can easily have access to more descriptive, precise and more reliable information (Lauren, 2016). Even though the social media has raised some hospitals are unconvinced and reluctant to use social media. The Ohio Hospital Association pretends that even though the social media usage has increased, only 15% of their hospitals dedicate full-time professionals to maintain their social media sites (Newswire, 2013). Furthermore, some health care professionals in rural and suburbs have reservations to use social media as privacy and security concerns. They even think that social media can cause negative publicity of hospital through negative comments from patients (Richter, et al., 2014). On the flip side, hospitals are succeeding in implementing social media with minimal expenditure. The targeted audience through a Facebook post, Twitter tweets, YouTube videos, and Instagram uploads are immense. In this study, we attempt to explain the adoption & utilization of social media among hospitals in Midwest region and analyze whether the adoption & utilization of social media changes from hospital to hospital depending on its characteristics like profit status, bed count and so on.

Social Media
Social networking started with people's desire to be connected with their old school friends. This later evolved into social media sites that enable people to get connected and share thoughts with others in the same community (Facinelli, 2009; Hackworth, 2010). Health care, industry suppliers, trade organizations, area developers, franchises, and potential franchises, and consumers are already into social media based communication. This form of communication is accessible, flexible and easy to use. Social media makes a greater part in business growth. Every brand needs

to have a social media presence (Hackworth, 2010). The way businesses are communicating with their customers have changed a lot with web applications, which simultaneously connects business with vast audience. The other major advantage of social media communication is it allows businesses to communicate with its customers in their personal space (at homes, after hours) (Facinelli, 2009). Businesses can use social media in two ways, building a new application or using the existing ones. They can build a new application which generates viral campaigns. But this would be difficult as they need to spend some resources like time and human efforts to do this. The later one is easy to use the existing application, which is effortless, and no expertise is needed for this. They can use existing brand sites that are being used by billions of users across the country, which makes them easy by eliminating search for audience.

Social Media in Health Care

Healthcare industry has struggled a lot to understand the impact of social media on their respective healthcare services from an organizational point of view but it's clear that usage of social networking sites to share health related information would grow exponentially. There is a demand from patients and consumers that they need to have access to timely healthcare data from medical experts, which lead many hospitals to adopt and embrace the social media platforms to connect with the patients and consumers. (Michael, C. A. 2013). The process of progress occurring require revamping and upgrading healthcare associations who now wind up deciding whether to change their traditional frameworks, described by strict and inflexible arrangements of data, to ending up as new associations that can recombine the global needs considering local demands (Ginevra, 2013). In this situation, hospital need to create viable communication forms, encouraging clinic-patient relationship, actualizing and sharing data, reacting to patient's feelings, overseeing vulnerability, empowering to make decisions and encouraging patient's self-managements.

Social Media Adoption Across US

Social networking sites provides various features that enables users to fulfil their individual needs. Generally, people use social networks like Facebook, twitter to share their status, pictures and get engaged with people whom they are connected to. Other than this they use these platforms to get connected and frequently updated with the information they desire. YouTube is used to watch and share videos. Social media population has been increased over the few years drastically all over the world, especially in the states where the usage of social networking sites has increased from 8% to 72% in 9-year period from 2005 to 2013 (George, et al., 2013). People of all ages and professions are using social networking sites frequently. As of now, people who are using Facebook have exceeded 2 billion worldwide and Twitter users number has crossed 284 million, and 3.25 billion videos are viewed on YouTube. Social media is an electronic tool that enables communication, collaborate relationship and allows users to share context globally. These social networking sites enable hospitals to maintain personal connects with the patients in a community and people who they serve. Social media depth is still undiscovered, and its usage is still in infancy. No matter what ever the organization it would be social media gives an identity to the organization beyond name and standard of care (Sarringhaus, 2011). More over social media adoption and utilization in hospitals is budget neutral. With the most available social media options like Facebook, Twitter, YouTube and so on, they are freely available on cloud. Only cost associated with are marketing professional and human resource department who manages it.

Facebook
This is the most eminent social networking site that allows people around the globe to communicate with each other, in an easy yet effective way (Hackworth, 2010). As of now, people who are using Facebook have exceeded 2.6 billion worldwide. Hospitals use social media to get in touch with people who live in the same community. They post something related to health and awareness that reaches people who opens it and read it and then like or dislike it. Whenever a person visits a hospital facility they check-in saying what are their feelings being at that place. People can search for hospitals home page and as they like the page, they start receiving news feeds and posts that they can like or share.

Twitter
It is a microblogging social media platform that enables users to post 280-character messages so called tweets. This distinctive social media is growing day by day and its now to crossed 284 million users. With the rapid usage of internet, it has impacted on how users interact, share their experiences and make a living, among many other ways of connecting microblogging is very much current way of directly approaching desired person of contact, Twitter is a best example for that, there are situations in which social media channels like Twitter come very handy and play a very crucial role in getting the right data and the most effected persons in times of crisis, for this we can take an instance when H1N1 Pandemic occurred where key words were used to get more information regarding sharing resources, statements of personal experiences, opinion, humor, frustration, concern, misinformation and questioning which gives all the required data for the organizations working on it for a better way of service and can make much more efforts.

Instagram
Like Facebook and twitter, Instagram too enables users to hold a profile through which they can upload photos into their cloud space. They do get news feed through which they can share their feeling for the uploaded photo. It has been estimated that there are 500 million daily active users around the globe who use Instagram to share photos and news feeds. Yet hospitals, they just began to use Instagram as a tool to attract people. They can use Instagram to be identifiable by posting content about good health practices, and advertise for wellness events whenever necessary. The Key for hospitals to get connected with people is to be consistent with their posting content (Smith, 2016). They can get into communities empowering people about their brand through their posts.

YouTube
It is the most popular video hub, that allows users to post their media content on web that can be viewed by people from any part of the world. The major advantage of YouTube is that its free, flexible, and easy to use. Hospitals can use YouTube to upload media related to their policies and services available at their facilities. As an instance, hospital can post videos of their admission process, through which they can reduce complications in their admission process. They can post videos of critical cases that they have solved any suggest some preventive actions to people to be away from those kinds of diseases (Hackworth, 2010). The only thing people need to do is to subscribe to YouTube channel related to hospital, to get notifications about videos that are being posted by hospital. These videos provide valuable information to the users, and good advertisement to the hospital brand too.

METHODOLOGY OF THE STUDY

Design of the Study
We have collected the hospital-related social media activity on four popular social media platforms Facebook, Twitter, YouTube, and Instagram. For each of the platform, we have reviewed the adoption and utilization of social media among the hospitals in Midwest region. To understand the adoption of social media by the hospital, we will analyze the hospital's existence and number of accounts following the hospital as the parameter. And in order to understand the utilization of social media by the hospital, we will analyze the hospital's activity and frequency of posts as the parameter.

Population of the Study
We included hospitals in Midwest region reporting complete data to the 2010 American Hospital Association Survey (AHAS). The study included 912 hospitals in the region. Hospital characteristics were derived from the AHAS, including ownership/profit status (public, private nonprofit, private for-profit), teaching status (yes/no), urban designation (yes/no), bed count (small: less than 99 beds; medium: 100 to 299 beds; large: 300 or more beds), and state (Illinois, Indiana, Ohio, Michigan, Wisconsin). We extracted data for each hospital from the 4 social media platforms. Data included whether each hospital had an account (adoption) and, if so, activity on each social media account (utilization). These platforms were selected because of their widespread popularity, free public access, and availability of posted usage metrics. Webpages on Facebook, Twitter, Instagram and YouTube are created by hospitals. Hospitals can create accounts and then post messages and pictures through these accounts to their followers.

Data Collection
To acquire information from every one of the four social networking platforms, we initially identified the website for every hospital through an Internet web search utilizing the hospital names from the AHAS study. We made a note of the links to the respective social media webpages of the hospital which are on the hospital's website connect us space. If at all the hospital doesn't have any information regarding its social media platforms on its website, we performed a direct search for the hospital's account on all the four platforms. In these cases, the character of every hospital's online networking website page was verified by checking the address of the hospital on the social networking page with the known address of the hospitals from AHAS surveys. We determined the adoption of social media by an aspect whether the hospital had a social media account. We determined the usage of social media by the hospital to be a measurement of social media utilization by the hospital which could be recorded from every social networking website. These included number of likes (Facebook), number of followers (Twitter), number of followers (Instagram), and number of subscribers (YouTube). For hospital centers with numerous accounts or pages on 1 platform, we chose either the page created by the hospital. To achieve that as accurate as we could get, we have chosen to not include the information of social media accounts which are not authorized by the hospital. The social media activity has been recorded for a period of one month (October 2017).

Statistical Analysis

We have recorded the percentage of hospitals having Facebook, Twitter, YouTube, and Instagram to determine the adoption of social media platforms across the hospitals in Midwest region. Due to the right-skewed distribution of utilization (likes, followers, subscribers, and insta followers), we report medians and Inter Quartile Range. We used ordinary least squares (OLS) regressions to assess the independent associations of hospital characteristics on the magnitude of social media activity. Due to the skewed nature of utilization, we used the log transformation of social media utilization to approximate the normal distribution. The variance inflation factor and normality of residuals indicated OLS regression was appropriate for these outcomes. For all analyses, a P value <.05 was considered statistically significant. We performed sensitivity analyses to assess the effect of attributing 1 hospital's social media page adoption and utilization characteristics to all hospitals in a network and all associations presented were unchanged. Therefore, data are presented such that each webpage represents a unique hospital. All statistical analyses were performed using ANOVA.

ADOPTION OF SOCIAL MEDIA IS WIDESPREAD

The adoption of social media websites by the hospitals varied across platforms, 763 (83.66%) hospitals having Facebook pages, 438(48.02%) hospitals having Twitter handles, 557(61.07%) hospitals have YouTube channels, and 183 (20.06%) hospitals have Instagram accounts. Overall, 289 (31.68%) hospitals had accounts on 3 platforms and 104 hospitals out of 912 has accounts on all the four social media platforms.

Utilization

Understanding the hospital characteristics with respect to the utilization of social media, Tables 1 and 2 display the magnitude of social media utilization differentiated by hospital characteristics. Hospitals in Ohio state, with larger bed count, under Government/Federal control, which participates in Network and hospitals like Children's rehabilitation, other specialty had significantly more social media utilization than their comparison groups across all 4 social media platforms. For example, large hospitals (>300 beds) compared to the smallest hospitals (<99 beds) had a median 6901 (IQR 2751-17004) versus median 1311 (IQR 640-2991.5) Facebook likes, median 2567 (IQR 840-7050) versus median 613 (IQR 150-4617) Twitter followers, median 267 (IQR 72-1384) versus median 69 (IQR 7-382) YouTube subscribers, and median 431 (IQR 17-1053) versus median 87.5 (IQR 39-622) followers on Instagram. The utilization of different platforms varies among the states. For example, Facebook and Instagram usage is really high by the hospitals in Ohio region whereas more number of hospitals in Wisconsin are using YouTube than other states. Hospitals in Illinois state are ahead of all other state hospitals in using Twitter platform. Hospitals participating in Network compared to hospitals not participating in Network had a median 3154(IQR 1181-11832) versus 1766.5(IQR 763-4641) Facebook likes, median 2496(IQR 578-6476) versus median 829(IQR 203-3903) Twitter followers, median 80(IQR 10-495) versus median 234(IQR 39-841) YouTube subscribers, median 175(IQR 62-660) versus median 457(IQR 102-934) Instagram followers.

Table 1: Magnitude of social media utilization, Facebook and Twitter

Social Media Platform	Facebook Likes(n=763)		Twitter Followers (n=438)	
	Median	IQR	Median	IQR
State				
Ohio	4416	1386-13338	1709	489-5732
Indiana	2337	767-6769	1135	382-6091
Illinois	1503.5	712-4102	1974	453-5834
Michigan	1533	569-4286	1136	206-1800
Wisconsin	1538	636.5-5401.5	1211	360-4652
Control				
Government, Nonfederal	1518	685-3761	700	142-1800
Non-Govt, not-for-profit	2502	1001.5-9707	1871.5	506-6476
Non-Govt, for-profit	701	189-3590	1135	131-3046
Government, federal	4139	2956-6430	1117.5	487-32835
Service				
General med & surgical	2188.50	965-6524.5	1558.5	374-5801
Surgical	419	129-727	1443	33-2853
Psychiatric	531.5	120-1518	700	13-1562
Cancer	12226.5	5525-18928	11942.5	3185-20700
Heart	13421.5	11832-15011	4363.5	2250-6477
Obstetrics & gynecology	15011	15011-15011	253	253-253
Rehabilitation	286	117.5-6940.5	2742	1358.5-5911
Orthopedic	899	718-1350	67	61-3879
Children's gen med & sur	61993.5	45218-119089	19257	12649-25208
Children's psychiatric	346	344-461	5256.5	50-10463
Children's rehabilitation	22283	122283-122283	1396604	1396604-1396604
Children's orthopedic	6842	6842-6842	1093	1093-1093
Children's chronic disease	4158	4158-4158	19254	19254-19254
Children's other specialty	660013	660013-660013	--	---------
long-term care hospital	712	180-4843	1135	1135-5248
Alcoholism dependency	2012	1844-2166	170	75-265
Network				
Yes	3154	1181-11832	2496	578-6476
No	1766.50	763-4641	829	203-3903
Physician				
Yes	2338.5	1072.5-4961.5	774	121-4652
No	2188.50	874.5-7798.5	1793	432.5-5962
Bed count				
Small (0-100 beds)	1311	640-2991.5	613	150-4617
Medium (101-300 beds)	2843	1349-6200	1827	543-6477
Large (301 or more beds)	6901	2751-17004	2567	840-7050

Table2: Magnitude of social media utilization, YouTube and Instagram

Social Media Platform	YouTube likes (n= 557)		Instagram Followers(n=183)	
	Median	IQR	Median	IQR
State				
Ohio	167	27-663	629	215-1406
Indiana	170.5	24-843	332.5	27.5-663
Illinois	71	17-349	405	71-863
Michigan	97	3-387	259.5	64-566
Wisconsin	202	45-873	82	39-429
Control				
Government, Nonfederal	1518	685-3761	158.5	37.5-552.5
Non-Govt, not-for-profit	165	24-789	370	75-795
Non-Govt, for-profit	167	15-276	390	30-572
Government, federal	0	0-347	61600	113-61652
Service				
General med & surgical	98	18-513	322	64-725
Surgical	5	0-342	64	64-64
Psychiatric	10	0-196	81	25-166
Cancer	558	234-9836	566	566-566
Heart			62.5	0-725
Obstetrics & gynecology			725	725-725
Rehabilitation			795	469-1329
Orthopedic	554	151-976	505	9-1001
Children's gen med & sur	257	174-7985	9012.5	7625-10400
Children's psychiatric	5777.5	2832-9276.5	118	118-118
Children's rehabilitation	9.5	4-17.5	1042	1042-1042
Children's orthopedic	29806	29806-29806	559	559-559
Children's chronic disease	2344	2344-2344	10686	10686-10686
Children's other specialty	80	80-80	390	0-390
long-term care hospital	2344	2344-2344		
Alcoholism dependency	167	167-406		
Network				
Yes	80	10-495	175	62-660
No	234	39-841	457	102-934
Physician				
Yes	164.5	18-663	88	78-800
No	66	12-333	106.5	62-622
Bed count				
Small (0-100 beds)	69	7-382	87.5	39-622
Medium (101-300 beds)	121	15-77	405	120-754
Large (301 or more beds)	267	72-1384	431	17-1053

From Table 3 and 4, we could determine the significant characteristics in Ordinary Least Square Regression for Facebook, Twitter, YouTube and Instagram. Physician characteristic isn't significant across all the social media platforms. State and Service characteristics aren't significant for Twitter. State characteristic isn't significant for YouTube. For Instagram, characteristics Control, Service, Network and Physician are not significant.

Table 3: OLS Regression of social media utilization, Facebook and Twitter

Social Media Platform	Facebook Likes(n=763)				Twitter Followers (n=438)			
	F-value	R-Square	P	Significant	F-value	R-Square	P	Significant
State	6.76	0.034587	<.0001	Yes	3.10	0.028087	0.0156	No
Control	21.44	0.078400	<.0001	Yes	7.87	0.052053	<.0001	Yes
Service	8.14	0.140911	<.0001	Yes	2.99	0.090831	0.0002	Yes
Network	17.31	0.028938	<.0001	Yes	19.57	0.054121	<.0001	Yes
Physician	0.07	0.000124	0.7878	No	4.61	0.013211	0.0326	No
Bed Count	25.76	0.122036	<.0001	Yes	11.51	0.064285	<.0001	Ye

Table 4: OLS Regression of social media utilization, YouTube and Instagram

Social Media Platform	Facebook Likes(n=763)				Instagram Followers(n=183)			
	F-value	R-Square	P	Significant	F-value	R-Square	P	Significant
State	1.81	0.013973	0.1262	No	4.15	0.090857	<0.0031	Yes
Control	7.30	0.041114	<.0001	Yes	3.81	0.064088	0.0112	No
Service	4.58	0.106122	<.0001	Yes	1.51	0.111417	0.1175	No
Network	11.25	0.027103	0.0009	Yes	2.74	0.020012	0.1004	No
Physician	0.48	0.001174	0.4900	No	1.16	0.008518	0.2834	No
Bed Count	12.66	0.060382	<.0001	Yes	5.24	0.075147	0.0065	Yes
Others	10.23	0.1496	<.0001	Yes	3.65	0.1673	0.0024	Yes

Table 5 and 6 gives us the information on the characteristics which determine the significance of utilization of social media. From the Tables which represents the OLS regression of social media utilization with other hospital characteristics (Total Outpatients visits, Total capital expenditures, Full-time physicians, Full-time medical interns, Full-time registered nurses and Licensed practical nurses) with respect to the four social media platforms Facebook, Twitter, YouTube and Instagram. The Full-time medical interns characteristic is significant with Facebook likes and not significant with rest of the 3 social media platforms. Full-Time registered nurses is significant for all four social media platforms across all the hospitals in Midwest region.

Table 5: OLS Regression of social media utilization, other hospital characteristics

Social Media Platform	Facebook Likes(n=763)			Twitter Followers (n=438)		
	t-value	P	Significant	t-value	P	Significant
Total outpatient visits	1.36	0.1758	No	0.62	0.5361	No
Total capital expenditures	-0.46	0.6489	No	0.21	0.8350	No
Full-time physicians	1.07	0.2839	No	-0.11	0.9114	No
Full-time medical interns	-2.61	0.0094	Yes	0.65	0.5149	No
Full-time registered nurses	5.09	<0.0001	Yes	2.33	0.0203	Yes
Licensed practical nurses	0.64	0.5205	No	-1.94	0.0529	No

Table 6: OLS Regression of social media utilization, other hospital characteristics

Social Media Platform	YouTube Subscribers (n= 557)			Instagram Followers(n=183)		
	t-value	P	Significant	t-value	P	Significant
Total outpatient visits	-0.18	0.8546	No	0.24	0.8079	No
Total capital expenditures	-0.86	0.3931	No	0.17	0.8635	No
Full-time physicians	1.36	0.1735	No	0.32	0.7492	No
Full-time medical interns	-0.98	0.3254	No	-0.03	0.9773	No
Full-time registered nurses	4.15	<0.0001	Yes	2.17	0.0322	Yes
Licensed practical nurses	1.73	0.0852	No	-0.86	0.3935	No

CONCLUSION

This quantitative study has many drawbacks, our study is based on five states of Mid-west region namely Ohio, Wisconsin, Michigan, Indiana and Illinois, as with the growing rate of adoption of social media across hospitals it shows the importance of social media in this present generation, however most of the hospitals are active on social media on various platforms we cannot exactly they are being utilized. In this study we have come across many hospitals which are very big and has served thousands of patients but when it comes to social media they weren't much active, in such cases we cannot calibrate the popularity and of the hospital on social media on adoption and utilization basis. And we realized that social media is actively utilized mostly by private group of hospitals where as it has been observed that public and federal hospitals were not much active on social media. We found many hospitals where the provided link on hospital homepage was not accessible and it was redirected to another hospital and with this exact utilization and adoption of the social media cannot be known and there were multiple accounts for several hospitals which will cause damage to hospital's actual social media accounts visit.

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THE INTERNET OF THINGS AND PUBLIC POLICY

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ABSTRACT

The relationship of the "Internet of Things" and public policy is discussed below. The definitions of these areas are used to establish their relationship. This includes using examination of the antecedent technologies and their relationships with public policy to discover a how public policy relates to the Internet of Things. It is important to consider that the Internet of Things is a category of technologies rather than a specific set of technologies.

Keywords: Information Technology (IT), Internet of Things, Public Policy

INTRODUCTION

The Internet of Things (IoT) comprises embedding computing and communications capabilities in everyday objects. This enables the objects to send and receive data via the Internet. The connectivity to the Internet is intended to improve the utility of the device for the user. This means that IoT is not a specific invention or technology. It is better considered as a category – that is IoT is comprised of everyday objects that have been enhanced by connectivity to the Internet. Thus, there are three ways public policies can be involved in IoT; it can involve the addition of connectivity, it can involve and require changes to the regulation of the enabled objects, it can involve new regulation that the enabled object now requires. Some common examples of this are e-readers that can provide definitions and references from the Internet or fitness monitors that keep a record of your activity on the Internet to provide users with the ability to track their progress.

TECHNOLOGIES AND POLICIES THAT ENABLED THE EMERGENCE OF THE INTERNET OF THINGS

The IoT has its foundations in several technologies.

The Telegraph
The telegraph can be said to have enabled today's Internet. It is a system where electrical signals are transmitted over a wire laid between stations. The signals represented Morse Code, which uses a set of dots and dashes to each letter of the English alphabet. The telegraph illustrates three key points in the diffusion of a technology: the role of government funding and regulation, the importance of the patent, and the need for standards.

In 1838, Samuel Morse demonstrated his telegraph invention to US Congressional representatives in Washington DC and in 1843, Congress appropriated $30,000 to test the feasibility of developing a large-scale system. Morse is believed to be the first private citizen to receive government funding for applied research (Audretsch, et al, 2002). By 1850, 12,000 miles of telegraph lines crossed

between major US cities (Standage, 1998) and European countries adopted the Morse telegraph as a means of communication.

In the United States, states enacted laws to regulate the burgeoning industry. In 1845, the state of New Jersey passed a law that granted a single firm the power to build telegraphy infrastructure along public roads and waters and imposed a penalty of $100 for damaging the firm's poles or wires (Nonnenmacher, 2001). At least in New Jersey, this enabled a monopoly and was indicative of the need for standards so that communications could be carried across state lines.

In the United States, the first law regarding patents was the U.S. Patent Act of 1790. The Act defined the subject matter of a U.S. patent as "any useful art, manufacture, engine, machine, or device, or any improvement there on not before known or used." On July 31, 1790 Samuel Hopkins was issued the first patent, signed by President George Washington, for a process of making potash, an ingredient used in fertilizer (USPTO, 2001). The Act has been amended over time.

Today, the US Patent and Trademark Office (USPTO) operates within the US Department of Commerce. In 2015, the latest year for which data is available, the USPTO processed close to 300,000 patent applications. US patents are valid in the United States, and inventions may be protected in up to 143 countries through the Patent Cooperation Treaty (PCT) as overseen by the World Intellectual Property Organization (WIPO).

Standards serve to make policy meaningful and effective. It is a commonly accepted rule that has been established by an authority, custom, or general consent (Merriam-Webster, 2018). In the example of the telegraph, Morse Code is a standard means of communications. It was adopted as the standard for telegraph systems around the world, and in use for 150 years especially by ships until ships transitioned to a satellite- based Global Maritime Distress and Safety System. Some amateur radio operators may still communicate via Morse Code, as do people with speech disabilities (Luna, eta al 2002).

Globalization was evident early on within the telegraphy industry. Companies were founded, including Western Union in the United States, The Electric Telegraph Company in the United Kingdom, and The Western and Brazilian Telegraph Company. In 1851, Morse's design was officially adopted as standard for telegraphic communication in Europe.

The International Telegraph Union (ITU) was established in 1865 in Paris to manage international telegraph networks. In 1945, it became a specialized agency within the United Nations (UN) and its name has since evolved to the International Telecommunication Union (ITU) as its mandate expanded to cover voice telephony, radio-communications, communications satellites, and other technologies.

Radio
The development of radio also contributed to the Internet of Things. In 1864, James Clerk Maxwell theorized that radio waves can propagate through space. In 1888, Heinrich Rudolph Hertz proved electromagnetic waves could be transmitted through the air and in 1894, Gugliermo Marconi

completed a commercially successful radio transmission system. These theorists and inventors were in the United Kingdom, Germany, and Italy respectively.

It took several decades for regulation of radio to emerge. The Communications Act of 1934 in the United States licensed radio and telephone service providers. It established that communication technology is an interstate good. The Act also created the Federal Communications Commission (FCC). The Communications Act of 1934 was updated by the Cable Communications Act of 1984, the Cable Television Consumer Protection and Competition Act of 1992, and the Telecommunications Act of 1996.

Computers
The computer chip and the Internet comprise the foundation of the IoT. Computer technology progressed from the nearly room-sized ENIAC, introduced in 1946 to the IBM's introduction of a prototype that is smaller than a grain of salt in 2018. The evolution was enabled by transistors and microprocessors.

The Internet has been regulated from its inception. It is a protocol. A protocol is a system of rules that explain the correct conduct and procedures to be followed in formal situations. In the United States, Internet providers are considered public utility providers and regulated by the FCC. As a globally distributed network, the Internet cannot be regulated by any one country.

The Internet Corporation for Assigned Names and Numbers (ICANN) is the non-profit organization that is responsible for the databases of names and internet addresses that enable the Internet to operate. While it is incorporated in the state of California, it sets policy globally regarding governance of the Internet. In 2018, its Government Advisory Board has 176 governments and 3 inter-governmental organizations as members from all over the world. ICANN has developed policy for the Domain Name System (DNS), as well as internal operating policies and general practices.

The Internet and computer chips are now pervasive. We have created an IoT. The first "thing" on IoT was a Coca Cola vending machine at Carnegie Mellon University. Computer science majors put micro-switches in the Coke machine to sense how many bottles were present in each of the machine's columns. The switches were hooked up to a mini-computer that students and staff could access. Over a few decades the IoT has grown to over 8 billion connected devices in 2017 (Gartner, 2017).

Devices and Product Safety
The Consumer Product Safety Commission (CPSC) has jurisdiction over the physical products that comprise IoT. The CPSC is an independent federal regulatory agency. Its mission is to protect that public from unreasonable risks of injury or death associated with the use of the thousands of types of consumer products, which include many of the devices that comprise IoT. CPSC oversees product recalls, enforces penalties, and provides research and information to Congress for policy making. Some laws that form the basis of its oversight include:

- Consumer Product Safety Act (CPSA). The CPSA, enacted in 1972, established the

CPSC and gave it authority to set up safety standards and issue bans on products.
- Consumer Products Safety Improvement Act (CPSIA). The CPSIA was signed into law in 2008. It expanded the CPSC scope and budget. It set new testing levels for materials such as lead and phthalates and established documentation requirements. Some of the industries that fall under its jurisdiction include apparel, shoes, personal care products, accessories and jewelry, home furnishings, bedding, toys, electronics and video games, books, school supplies, educational materials and science kits.
- Federal Hazardous Substances Act (FHSA). This law requires cautionary labeling on products that contain toxic, corrosive, flammable or combustible ingredients.
- Child Safety Protection Act (CSPA). This law extends FHSA regulations to help prevent children from choking on small objects that are contained in products.

In recent years, the CPSC had identified a number of issues wrought by IoT that are unresolved. Many of the issues fall under product liability laws. For example, electronic devices, even small ones, can emit heat and can burn if left on flammable surfaces. In 2016, Intel recalled its Basis Peak smartwatches (Burt, 2016). The watches overheat and could have caused blisters and burns on a user's skin. Intel refunded the purchase price.

Voltage in excess of 30 Vac or 60 Vdc can cause shocks, and most IoT devices require more than that. Appliances such as refrigerators run at 220 Vac, and even personal assistants like Alexa require 110 Vac. Researchers are working on low-voltage batteries for wearables. Product liability laws would cover shocks.

Wearables also raise concerns in terms of their components, which could include plasticizers, UV stabilizers, pigments or antimicrobials. These additives could irritate or damage skin.

Small IoT devices are regulated under the Federal Hazardous Substances Act. Choking, strangulation, and asphyxiation may be a hazard if components or "things" are ingested. All children's toys sold in the US must pass a rigorous small parts test. This test is required by the Consumer Product Safety Improvement Act of 2008 and Federal Hazardous Substances Act under the Code of Federal Regulation (CFR). The test measures whether a toy is too large to enter a child's esophagus, rendering it safe to play with since it is unlikely to be swallowed.

In the United States, consumers can file injury lawsuits against the IoT device manufacturer, as well as other stakeholders in a supply chain such as the distributer or retailer. Members of the European Economic Community adopted the Product Liability Directive in 1985. Similar directives have been adopted by governments in Brazil, Peru, Australia, Russia, Switzerland, Argentina, Japan, Taiwan, Malaysia, South Korea, Thailand, and South Africa. China passed a Tort Liability Act in December 2009, but it is difficult to implement since many manufacturers are state-owned. China then adopted a Statute on the Choice of Substantive Law in Foreign-Related Civil Relationships in April 2011, which enables Chinese consumers injured by foreign-made products to request that Chinese courts apply the law of the defendant's place of business.

Privacy
The product of IoT is data. There are many regulations for data, especially for protecting privacy. IoT may not have a graphical user interface so alerting users about privacy policy may not be straightforward. IoT relies on the cloud, and that raises privacy concerns. IoT and privacy is a current, global topic.

In the United States, data collected by devices on the IoT is subject to The Federal Trade Commission Act (15 U.S.C. §§41-58), which outlawed unfair methods of competition when it was enacted in 1914. Today, it prohibits unfair or deceptive practices in the collection of data, which applies to offline and online data. The Act established the Federal Trade Commission, which today has oversight for data security, mobile privacy, and big data.

Other US laws that pertain to IoT include the Electronic Communications Privacy Act (18 U.S.C. §2510) and the Computer Fraud and Abuse Act (18 U.S.C. §1030). These laws regulate the interception of electronic communications and computer tampering, respectively. The Children's Online Privacy Protection Act (COPPA) (15 U.S.C. §§6501-6506) applies to the online collection of information from children.

In addition to federal laws, there are privacy laws in 48 states plus the District of Columbia. The state of California was the first state in the nation to enact legislation. The California Online Privacy Protection Act was passed in 2003 and amended 2013. It requires commercial websites and online services to include a privacy policy on their website. In 2017, state senator Jackson introduced Senate Bill 327 to ensure the security of connected devices. If it passes, it will require any manufacturer that sells or offers to sell a connected device to a consumer in California to equip the device with reasonable security features appropriate to the nature of the device and the information it may collect, contain, or transmit, that protect the device and any information contained therein from unauthorized access, destruction, use, modification, or disclosure.

Passed in 2010, the Massachusetts Standards for the Protection of Personal Information requires companies or persons who store or use personal information about a Massachusetts resident to develop a written, regularly audited plan to protect personal information.
IoT devices may be subject to regulation from other industries. For example, data collected by medical-related devices is subject to The Health Insurance Portability and Accountability Act (HIPAA) (42 U.S.C. §1301 et seq.). HIPAA regulates medical information and applies broadly to health care providers, data processors, pharmacies and other entities that come into contact with medical information.

Global Policy Actions
The European Union (EU) passed the European General Data Protection Regulation (GDPR), to become effective in May 2018. This regulation is truly global; it applies to organizations located within the EU, and to organizations based anywhere in the world if they process and hold personal data of residents in the European Union. GDPR defines personal data as any information that is related to an identifiable person such as name, identification number, or location data.

CONCLUSION

The technologies and public policy that have contributed to the rise of IoT have been discussed. The idea that the IoT is not a specific technology has been shown by the examples of IoT that have been discussed above. In effect, the idea that IoT is more of a category of objects that have been enhanced by connectivity to the Internet is shown, Additionally, the three ways that public policy interacts with IoT have also been shown. Examples above show that the addition of connectivity itself is sometimes regulated. There are also examples that show that the change in the way an enhanced object is used requires that the regulation of that object be revised. Thirdly, the enhanced object sometimes requires new public policy to address the fact that the enhanced object now needs regulation. IoT is unique among emerging technology in that the relationship of IoT to public policy is multifaceted.

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STUDY OF THE SECURITY OF COMMERCIAL DRONES[1]

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PURPOSE OF THE STUDY

This study was conducted on security concerns in the class of drones available to the public ranging in price from $20 to $5000. The experiments and demonstrations performed were of the three following exploits. A Denial of Service (DoS) attack can be done on this class of drones in an open wireless network to slow down drone responsiveness and possibly cause complete failure. The SkyJack[2] program can be used to take over this class of drone during flight and make the drone a "zombie" drone of the SkyJack program. The ability to fly this class of drone autonomously with Node.js opens various scenarios of physical threats. The scenarios where drones are being used to cause physical harm include a drone being used as an explosive payload delivery device, or chemical/biological weapon delivery device. The findings of experiments in this project reflect a lack of basic security. Basic network security such as network authentication can be used as one method to mitigate these threats.

BASIS FOR THE STUDY

The advancing popularity of drones poses a significant threat to the cyber, land, sea, and air environments. Drones are essentially flying computers. The lack of security-first design in these systems makes individuals, as well as public and private organizations, susceptible to cyber-attacks via drones. Drones are becoming ever more popular with untrained individuals. This lack of operational training poses a threat to every environment in which the drones operate. In addition to the lack of operator training, the absence of security in the remotely controlled devices threatens these environments. With these threats being so prevalent in the industry the questions that arise are; What if any security is provided by the company and/or the drone?, and Are commercial drones susceptible to attacks when controlled by WiFi?

The source of the data that was collected comes from experiments performed by the author. With these experiments the author was able to take remote control of the Parrot AR 2. Data processed via demonstration of the exploit. Literature review shows exploits still apparent in current version.

IMPLICATIONS

There are two main areas of consideration when talking about drone security. The first is the ability to cause physical harm to people. This could be done in two ways, intentionally and unintentionally. The unintentional harm comes from inexperienced operators. These operators can hurt themselves and/or others by performing actions with the drone they are not experienced with or flying in areas where they should not be operating a drone. Flying a drone into bystanders

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[1] Commercial Drone – Drones available to the public ranging in price from $20 to $5000
[2] SkyJack is a drone engineered to autonomously seek out, hack, and wirelessly take over other drones written by security researcher Samy Kamkar

or themselves can cause serious harm from high speed propellers and hard plastic parts moving at high speed. The second security concern comes from people who are intentionally trying to do harm to people with drones.

CONCLUSION

All the attacks and experiments that were performed require that the attacker have access to the drone and be able to connect to the drone with a network capable device. Physical security, just like in Information Technology, is of the utmost importance when dealing with these types of attacks. If the attacker can touch the drone, it is already compromised. Make sure that the ground controller device for the drone is always secure. If that is a phone, tablet, or computer make sure that this device is secure and protected from malware. An attack such as this has already happened to the US military, where personnel installed games on the same computer being used as the drone ground station. This computer then became infected with malware and allowed for the drone to be compromised (Corrigan, 2017). Antivirus and malware protection on all devices will limit unwanted access to the drone and drone controllers. SkyJack poses a serious threat to the safety of spectators and bystanders near drones in flight. To ensure that the drone is secure always minimize an attacker's ability to connect to the drone. If the drone pilot is the only person able to connect to the drone, some of the risk can be mitigated. As the drone market grows and matures, these types of remote connection issues and autonomous control scenarios will be minimized as security researchers discover and eliminate the flaws in current drone systems. The security flaw is when this class of drone is connecting over WiFi and allows any network capable device to connect to the drone's network without authentication. Authentication of the drone network is imperative to resolve some of these scenarios. This class of drones, (drones available to the public ranging in price from $20 to $5000) is a popular space for hobbyists and beginning drone pilots. There are currently security issues in this class of drone as there are with many new products in their infancy. The Parrot AR v2 drone is a good example for this class and has shown the security issues currently facing this class of drone.

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DID YOU KNOW? EDUCATIONAL APPLICATIONS FOR THE INTERNET OF THINGS

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ABSTRACT

Did you know that the Internet of Things (IoT) includes over 100,000 devices and technologies that have every day, business, and personal productivity applications? Professionals agree that the Internet of Things (IoT) is "rapidly disrupting markets and transforming business strategies" (Arm.com, n.d.), and "[c]onnected machines and objects in factories offer the potential for a 'fourth industrial revolution,' and experts predict more than half of new businesses will run on the IoT by 2020" (Burgess, 2018, para. 2). They are also just starting to come on the scene as educational tools. So, what can these connected gadgets and gizmos offer us in education? This interactive presentation will present some new technology tools and devices from the library of the Internet of Things and how they can be used in higher education to prepare the IT, CIS, BMIS, and EdTech professionals who will be designing, programming, and implementing these tools in the variety of business and educational organizations they join as professionals.

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LEVERAGING DRAMATURGICAL ANALYSIS TO UNDERSTAND THE TRANSITION FROM FACE-TO-FACE TO VIRTUAL ENVIRONMENTS

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EXTENDED ABSTRACT

Proposed Study
One of the most significant technological adaptations of all facets of society to the COVID-19 epidemic has been the shift from face-to-face interaction to computer-enabled virtual (audio and video) forms. While this shift solves many practical problems and even introduces new opportunities (e.g., advantages of working from home), nonetheless it also changes the structural parameters of social interaction in ways that can lead to embarrassing gaffs or other kinds of social failures (Wolff et. al, 2005; Aggar, 2012, Beck, 2018). Symbolic Interactionism (Mead 1934; Blumer, 1969) and one of its more specific formulations, dramaturgy (Goffman, 1959; 1967; 1969; 1983; Hogan, 2010), offer a comprehensive framework within which to identify the critical features of this shift and its implications for social actors.

Basis of Study
The data for this study include ethnographic field notes (mostly anecdotal observations of audio and video conferences) as well as articles from academic articles and news stories that identify issues of virtual conferencing. These data do not represent a rigorous basis for ethnographic or quantitative analysis, but nonetheless offer some key insights in the dramaturgical challenges and changes that take place when a group shifts from face-to-face meetings to virtual meetings.
Key dramaturgical concepts such as *front stage*, *back stage*, *outside*, *border/regions*, *discrepant roles*, *communications in/out of character*, and *impression management* are invoked to shed light on why certain virtual gaffs have the potential to occur as well as how purely audio versus audio & visual conferencing each have their own interesting advantages and disadvantages.

Implications and Conclusions
The shift to online/virtual conferencing is novel to many and represents a change in the taken-for-granted structures of self-expression and communication. This study draws on often amusing instances and anecdotes and places them within a dramaturgical framework that offers theoretical insights to those studying the impacts of new technologies on the social order as well as practical guidance to those participating in virtual communication and exchange.

Keywords: Teleconferencing, technology, dramaturgy, collaboration

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INFORMATION SYSTEMS AND OPERATIONS/SUPPLY CHAIN MANAGEMENT: A SYSTEMATIC LITERATURE REVIEW

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INTRODUCTION

Even before COVID-19, information systems (IS) researchers and operations/supply chain management (OSCM) researchers were starting to investigate ways to use information technologies to improve the visibility, performance, and effectiveness of supply chains. However, despite the mitigation plans developed at the 2012 World Economic Forum (Appel, 2012) to deal with global supply chain disruptions, COVID-19 created crisis-level disruptions in supply chains worldwide (Doherty, 2020). COVID-19 emphasized the need and urgency for more IS/OSCM research. The purpose of this research is to help focus IS/OSCM research by answering the following questions: 1) What are the major OSCM themes for IS/OSCM research; conversely, which OSCM themes have a dearth of IS/OSCM research? 2) What are the main theories used to guide IS/OSCM research? 3) In which journals is most IS/OSCM research published?

RESEARCH METHODOLOGY

We followed an established protocol for systematic literature review to select and collect data from the source database, theories, journals; to code data using inter-rater reliability; and to analyze and report the findings.

Data Selection and Collection. We chose to use the Web of Science database, based on its comprehensive coverage of the Information Systems and Social Sciences literature (Meho & Sugimoto, 2009). We used the 103 theories used in IS research, as referenced by the Association for Information Systems (https://aisnet.org/page/ISResearch?&hhsearchterms=%22theories%22). This list broadly and inclusively covers the theories used in IS-OS cross-disciplinary research. The journal basket for this study was based on a previous literature-review research (Merigo & Yang, 2017) and the list of journals included in the Harzing list under the "OR, MS & POM" category (www.harzing.com, accessed April 3, 2018). A total of 85 information systems and operations and supply chain management journals were included. We created an ANDed search string representing all the SC/POM journals and ran that individually against each shared theory from 2008 to 2019. The entire search process was completed in one session on one day from one computer to ensure consistency in data results from the dynamically changing Web of Science and across researchers. Results from the Web of Science were exported into groups in EndNote.

Coding. The initial Web of Science keyword search returned 4,378 articles. We followed a two-step process for screening and selecting articles relevant to this research. We first scanned the title, abstract, and keywords of each article, coding them based on their inclusion of both IS and OSCM references. Articles outside the scope of the IS/OSCM overlap were removed from further

consideration. We then performed several rounds of inter-rater reliability and discussions resulting in 126 articles from 29 journals. During the first round of scanning and second round of inter-rater coding, we also fully reviewed some articles for which the title, abstract, or keywords did not clearly reveal IS/OSCM related studies. We did so to ensure we captured all the articles in the IS/OSCM disciplines.

The 126 research articles represented an unwieldy quantity of information. Therefore, a return to the literature was necessary to categorize the data. OSCM research themes were derived from Taylor and Taylor (2009). Industry categories were based on the Global Industry Classification Standard sectors. Statistical analyses and methodological processes were grouped by similarity.

Analysis. This abbreviated abstract is organized around the three research questions.

What are the major OSCM themes for IS/OSCM research? Supply Chain Management was the primary focus of IS/OSCM research, followed by Operations Strategy and Performance Management. Little research has been completed in the other OSCM areas. Although a simple search for "supply chain sustainability" returned over 900 articles, only 4 included the integration of information systems: this is a rich area for interdisciplinary research.

Table 1: Articles per OSCM Theme

OSCM Theme*	SCM	OS	PM	RPS	PDD	SO	SCS	QM	LM
Number of Articles	73	16	11	7	5	4	4	4	2

* OSCM Themes: SCM: supply chain management; OS: operation strategy; PM: performance management; RPS: resource planning systems; PDD: product design/development; SO: service operation; SCS: supply chain sustainability; QM: quality management; LM: lean methods.

What are the main theories used to guide IS/OSCM research? Seven theories* were referenced in 81% of the papers. The remaining theories were referenced 4 or fewer times; some papers referenced more than one theory.

Table 2: Articles per Theory

Theory	RBV	IPT	TCE	CT	DCT	GT	IT
Count	30	19	13	12	10	10	8
Percent	0.24	0.15	0.10	0.10	0.07	0.08	0.06

* Most-referenced theories: RBV: resource-based view; IPT: information processing theory; TCE: transaction cost economics; CT: contingency theory; DCT: dynamic capabilities theory; GT: game theory; IT: institutional theory.

Further analysis revealed an overlap between the main theories and three main OSCM themes. The totals below will not align to the counts in Table 2: some papers included multiple theories; not all OSCM themes are illustrated.

Table 3: Articles per Theory and OSCM Theme *(abbreviated table for space restrictions)*

Theme/Theory	RBV	IPT	TCE	CT	DCT	GT	IT
SCM	20	7	10	9	7	6	6
OS	6	3	2	2	2	2	1
PM	3	2	0	2	1	0	0

In which journals is most IS/OSCM research published? Six journals* published 52% of the IS/OSCM papers.

Table 4: Articles per Journal

Journals	IJPE	JOM	IJLM	IM&DS	IJPR	IJPD&LM
Count	15	12	11	10	9	8
Percent	0.12	0.10	0.09	0.08	0.07	0.06

* Journals: IJPE: International Journal of Production Economics; JOM: Journal of Operations Management; IJLM: International Journal of Logistics Management; IM&DS: Industrial Management & Data Systems; IJPR: International Journal of Production Research; IJPD&LM: International Journal of Physical Distribution & Logistics Management.

Conclusion. IS/OSCM is an essential area of research providing ample opportunities for interdisciplinary research.

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HOW MENTORING PLAYS A ROLE IN RETAINING FEMALES AND MINORITIES IN STEM DEGREES

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PANEL DISCUSSION

According to the U.S. Bureau of Labor Statistics, the number of computing-related jobs will reach 5.3 million by 2028. This means that, from year 2018 to 2028, the U.S. education system must provide 590,000 graduates to fulfill this demand. Employment of computer and information technology occupations is projected to grow much faster than the average for all occupations (U.S. Bureau, 2020)

The CompTia 2020 Cyberstates study on the U.S. tech industry states that there were 370,000 new jobs added in 2019 and that there is a 1.9 trillion estimated direct economic output of the tech industry, representing 10 percent of the national economy (CompTia, 2020). Studies show significant progress in students who recover from a grade decline show that personalized support, mentorship and guidance can positively influence student retention. Students, especially from underrepresented populations, benefit from strong connections with faculty members who can serve as an engaged role model (Cuseo, 2017). A study conducted by Glass (2013) shows that a lack of mentors is an important factor in fewer girls studying cybersecurity in middle school, high school and at the collegiate level. If the mentor projected a stereotypical image of a"geek or nerd", girls were less likely to believe in their success in the field. The success of role models for young women for young women is needed to help girls succeed in cybersecurity.

LeClair, Shih, and Abraham (2014) indicate that while equal pay and advancement opportunities are important for the retention of women in cybersecurity, having mentors is more important. The mentor does not need to be female but needs to have an interest in the mentee's success. Cheryan, et.al (2011) found there to be no difference between male or female recruiters in the STEM field but found that women mentors are more effective for keeping women in the field.

It is the panelist's belief that if students are matched to faculty mentors upon acceptance to the University, they will have a positive experience in their field of study. A dedicated student/faculty mentoring relationship allows the scholars to have personal, accessible support for matters directly related to the computing field.

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THE INTERNET OF THINGS (IoT) IN HIGHER EDUCATION: A PRELIMINARY STUDY

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ABSTRACT

The Internet of Things (IoT) refers to the connection of devices other than standard products such as computers and smartphones to the internet. IoT is becoming an increasingly growing topic of conversation in the work place and beyond as it has the potential to impact how we live, work, and learn. IoT devices and technologies can be found almost everywhere. While it might not seem like an obvious application of the IoT, education is on that list. IoT in the higher education field has the potential to bring significant value to academia, but without thoughtful implementation and understanding, that value may not be fully realized. Given the increased use of IoT services in higher education and the potential benefits to institutions, this research in progress will investigate student and faculty perceptions and attitudes of IoT usage as a means of enhancing the higher education learning experience. A sample of faculty and students at a public university located within the Southeastern United States will be utilized as part of this study. A survey adapted from a previous study, will be used to collect a demographic profile and data to measure perceived critical mass, attitude, perceived benefits, and continued intent to use IoT in a higher education setting. Preliminary research will be presented and feedback will be incorporated into future work. The results will likely be useful to higher education leadership who seek to use IoT to create smart campuses and enhance the learning experience for students and faculty.

PROPOSED RESEARCH METHODOLOGY

Participants

A convenience sample of faculty and students at a public university located within the Southeastern United States will be utilized as part of this study. The sample will consist of participants from the University's six academic units: School of Arts and Letters, School of Aviation, School of Business, School of Health and Natural Sciences, and School of Computing, and School of Education and Behavioral Sciences.

Instrumentation

The survey questionnaire will consist of two parts: demographic profile and construct items to measure perceived critical mass, attitude, perceived benefits, and continued intent to use in a higher education setting. The construct items are adapted and based on an instrument previously developed and validated by Hsu and Lin (2016).

Procedures

The survey will be administered electronically using Survey Monkey©. An email containing a hyperlink to the instrument will be sent to the University's faculty and student email distribution list. The participants will be guaranteed the anonymity of responses and assured that responses will not be shared.

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THE USE OF IOT IN THE LIVING LAB INNOVATION ECOSYSTEM

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ABSTRACT

The main goal of the study is to present the Living Lab ecosystem, which is used to test new products and services based on IoT technology. This solution allows to minimize the distance between the designer and the user. Creating, testing and implementing innovations is carried out in such a way as to engage the target recipient as much as possible.

The solution allows you to explore and experiment with interactive IoT solutions, open data, and developer-friendly platforms for future IoT innovations. This stimulates the creation of new effective solutions in e.g. the urban environment (Smart City). The solution allows you to develop and demonstrate the best organizational practices in the field of information collection and management.

In the future, it develops a scalable data management platform that allows you to collect and integrate many types of data, including: personal data or "small data" (collected by smartphones, activity tracking devices or new wearable sensors); myth data (wi-fi data, campus maps, event data, etc.); as well as types of external data (data on social media, transport data, weather, city data, etc.).

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THE SOCIAL MEDIA MACHINES: AN INVESTIGATION OF THE EFFECT OF TRUST. MODERATED BY DISINFORMATION ON USERS' DECISION-MAKING PROCESS

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PROPOSED STUDY

Social media networking sites (SMNS), such as *Facebook (FB), Instagram (IG),* and *Twitter* (TW), have played a progressively essential role in how users share information, knowledge, and persuade each other. However, the usage of SMNS is a double-edged sword because it brings convenience, but it is not without risky privacy and security behaviors (Lee, Kim, & Ham, 2016). Some users are concerned about their private information (PI) 's privacy, but, freely self-disclose their PI in exchange for the benefits of using the sites (Zhang, 2018). This contradicting phenomenon is called the *privacy paradox* and has caused substantial data breaches (DB) incidents. Research literature has demonstrated that breached companies have developed educational and training programs to help SMNS users improve their security and privacy decision-making behaviors after a data breach. Despite the privacy and security measurements in place, SMNS users continue to self-disclose their PI (Taddei & Contena, 2013). Why does this cycle persist? Is there a problem with how information is presented in SMNS? This cycle seems to be attributed to the *conforming influence of social norms* and *how information is presented in SMNS* (Colliander,2019). At present, most SMNS users get their daily news from FB, TW, or IG, but users are often not sure if the information gathered is true or false. The rapid proliferation of **disinformation***, information disseminated with the intent to harm,* in SMNS has dramatically influenced and reduced people's trust in the information at hand. The review of the literature has shown that in times of crisis or unease, *such as COVID19, natural disaster or War*, when the veracity of the information is hard to establish, users make decisions only based on the information available (Burnap et al., 2015; Mendoza et al., 2010). Since **trust** is an essential factor in SMNS, mistrust hinders users' abilities to make informed decisions. Research suggests that people make decisions based on the available information (Gupta, 2019); therefore, it can be deduced that the **decision-making process** of SMNS users has been forever altered. By examining trust moderated by disinformation, this study will examine the factors that affect SMNS users' decision-making behaviors. This topic is important to the IACIS conference participants because the spread of disinformation through SMNS has much broader implications for democracy and society. This research can contribute to the knowledge of SMNS users' trust, behavior, and decision-making process. Furthermore, this study could shed a brim of light on future US social media governance.

BASIS OF THE STUDY

This study will test three social media networking sites, *FB, TW, and IG*, with disinformation empirically. This quantitative study will employ a role-play scenario where participants will be subjected to experimental posts embedded in a web-survey tool. Before collecting data for the main study, an expert panel will review, and pilot test the study. The web-based scenario survey will be designed with a 5-point Likert scale and distributed to SMNS users to gather data on

their decision-making process. Participants will be instructed to imagine that they saw the scenarios posted by a distant acquaintance on FB, TW, or IG. In order to maximize validity, real pieces of news will be used. Each scenario will be followed by a questionnaire to measure the variables in the hypothesis. Some of the items for this study will be adapted from the prior related literature constructs. Data will be collected from adult social networking members over four to six weeks to establish the relationship between disinformation, trust, and decision-making. The survey will be distributed to SMNS users attending a local community college, to professional connections and LinkedIn networks. This research will use the Pearson correlation coefficient (PCC, also referred to as Pearson's r) for the data analysis process.

IMPLICATIONS

Social media plays an increasing and essential role in the US Democracy and our national security because people worldwide use SMNS to share information to persuade others (Bessi et al., 2015). The social media paradigm is making US laws and cultural norms to be under conditions of uncertainty (Colliander & Wien, 2013). Given the urgency and the challenges presented by the powerful persuasion and influence of disinformation, and in light of the US government's current challenges with social media regulation or lack thereof, there is a clear need for research on the relationship of social media and the decision-making process (Napoli, 2019). This research could provide valuable information on SMNS users' demographics, trust predictors, and the disinformation moderating factor related to the decision-making process. This study can help formulate a better understanding of SMNS behaviors and future governance.

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PANDEMIC RESPONSE: BEST PRACTICES IN IT LEADERSHIP

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ABSTRACT

December 31st 2019, the World Health organization (W.H.O) issued a warning of a pneumonia like virus gaining traction in Wuhan China. Over the next month 282 cases were reported in Asia, and shortly after, the first case was reported in the United States (Taylor, 2020). This virus was determined to be a novel strain of coronavirus, an infection that can affect both humans and animals. Within three months of its original report, the W.H.O reported 750,890 cases of novel coronavirus 2019 (COVID-19), and on March 11th 2020 COVID-19 was officially declared a pandemic (Chappel, 2020). The rapid spread and lack of knowledge on both the transmission and treatment of the virus resulted in waves of shelter in place orders disrupting business operations and supply chains. IT leadership was faced with the rapid implementation of crisis management plans as well as on the fly adaptions required by shelter in place orders. Four CIOs from various businesses discussed the unique challenges in dealing with a rapidly spreading pandemic, strategies to mitigate loss of business continuity, and lessons learned in the transition to hybrid or fully remote work environment. This paper recounts and analyzes the best practices gained from these interviews.

Data was collected through online video interviews with CIOs from both for-profit and non-profit businesses. CIOs recounted their experiences in leading their technology teams during shelter in place orders freely with little direction. The transcripts of the recorded interviews were then analyzed for similar strategic approaches, aspects of success, and areas that needed improvement. The results revealed best practices in dealing with the unexpected loss of a centralized work environment, strategies to leverage technology to maintain business continuity, and procedures to incorporate into future pandemic response plans.

This study was limited to CIOs that were both available and willing to share potentially sensitive information regarding their organizations. Future studies could utilize these qualitative results to craft a quantitative survey with more directional focus. This additional quantitative data could add value to the strategies shared by the CIOs that were part of this study.

Keywords: IT Leadership, Crisis management, COVID-19, Pandemic

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THE ROLE OF SOCIAL INFLUENCE, BEHAVIOR CONTROL, CRITICAL MASS, TECHNOLOGY READINESS, AND CONFORMITY IN TECHNOLOGY USE: A MULTI-THEORY PERSPECTIVE

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Understanding the factors that influence information technology (IT) use has been a major focus of scholars and practitioners in the information systems field for more than two decades. Many theories and models were developed with the aim of explaining why people and organizations use IT. According to most IT use models, the use of an IT is determined by beliefs a user holds about its perceived usefulness and its perceived ease-of-use. The theory of reasoned action that is the basis for the initial IT models (e.g., the TAM by Davis, 1993) also states that beliefs about the perceived usefulness and the perceived ease of use are determined by external variables; in particular by normative beliefs. In the 1990s and early 2000s, empirical tests of the TAM over the years indicate that the constructs in the model explain about 30% of technology use at best, which led researchers to carry out more studies in order to gain a better understanding of IT use and adoption by individuals and organizations.

In order to determine what other factors could help better understand and explain IT use, we did a thorough review of the information systems' literature. As a starting point, we searched academic research databases. A search of the eLibrary database of the Association For Information Systems using the keywords "IT use", "Technology use" and "IT adoption" for articles published between 2005 and 2019 yielded 152 entries from the following five major IS conferences: ICIS, AMCIS, ECIS, PACIS, and BLED. The examination of those articles showed that the general trend is to investigate the external variables that could explain the perceived usefulness and the perceived ease-of-use of IT as well as moderating factors. The result of that investigation is two-fold. First, there is no clear pattern with regard to the choice of the external variables as discovered earlier by Legris, Ingham, and Collerette (2003) who analyzed 22 articles published in six major IS journals. Second, we realized that the IT use is explained by a multitude of theories but none of the existing IT use models provides a real multi-theory perspective to explaining IT use. In this study, we revisited the major theories that play a role in explaining IT use and came up with a comprehensive theory-based IT use model. The proposed model emphasizes the role of social influence, behavior control, critical mass, technology readiness, and conformity in IT use. The model is discussed along with the research propositions it implies. The theoretical and practical implications of the study are also discussed

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WOULD FEELINGS OF BOND AND PERCEIVED FAIRNESS INCREASE A STUDENT'S RETENTION INTENTIONS TOWARD A UNIVERSITY?

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INTRODUCTION

This study examines the influence of feelings of bond and perceived fairness on university retentions. Based on the affect theory, the psychological contract theory and the perceived justice theory, this study focus on the nomological network validity of feelings of bond and perceived fairness and whether these feelings and beliefs could influence student retention intentions. The results could shed light on the importance of both affect and belief factors on perceived fairness and help universities to improve retention rates.

THE STUDY

This research proposes that perceived fairness could play an important role in in students' retention beliefs toward a university. The organizational justice theory emphasizes the role of perceived fairness in workplace and proposes that perceived fairness would have significant impact on an employee's intentions and organizational citizenship behavior (Niehoff and Moorman 1993; Maxham and Netemeyer 2003). Although perceived fairness beliefs are mainly examined in organizational context, it might be possible that students may also have these beliefs based on their dealings with universities. One potential source for these perceived fairness beliefs might be a university's policies or procedures. These policies or procedures would specify what kind of services can be expected from the university. The psychological contract theory proposes that formal, written documents, such as existing policies, protocols, and actual contracts, are important sources of psychological contract. Therefore, it might be possible that a university's policies and procedures may induce psychological contract beliefs in students. These beliefs, perceived binding agreement between entities in a relationship, could significantly influence whether a student believes that he or she is being treated fairly or not. These beliefs, in turn, could have significant impact on student retentions.

Students' experiences are not limited to just cognitive in nature. Their feelings may also play vital roles in determining behavioral intentions. The theory of affect emphasizes the importance of feelings in human behaviors and proposes that affective responses could have significant or even primary influence on behavioral intentions (Crites, Fabrigar & Petty, 1994). The current study also aims to examine and validate the role of the feelings of bond toward a university. Feelings of bond is labeled as affective bond. Built on the theory of affect, this research explores the origin and nature of affective feelings and investigates whether these feelings could influence retention beyond salient cognitive beliefs toward a university.

Data would be collected from through interviews and surveys. Quantitative data will be summarized and analyzed through structural equation modeling techniques. The instruments for designated constructs will be validated through a nomological network approach. Interview data can reveal additional insights and would provide a context for the study. Contributions and limitations of the research will also be presented.

IMPLICATIONS

Increasing university retentions became a very important target for many universities and their faculty in recent years. Enormous effort has been invested to recruit and retain students. This investigation could help university administrators to easily improve their retention strategies if the effect of feelings of bond and perceived fairness on student intentions is indeed valid.

Keywords: Feelings of bond, Perceived Fairness, Psychological Contract, Intentions

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SMART TOYS FOR AN EDUCATIONAL FRAMEWORK

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PROPOSED STUDY

The objective of this project is to design a toy that will learn, in order to ease frustration and reinforce success for children with autism. One of a number of challenges autistic children face is transitioning from one subject to another, specifically when transferring knowledge from one context to another. Often this triggers emotional outbursts, further hindering learning due to frustration. This study investigates the use of machine learning to support a multisensory toy to assess emotional responses while learning. Pressure, orientation, and sequence handling of the toy are some of the independent variables used to feed data to the neural network. Data from the interaction is relayed, stored, and processed using a Cloud-Fog-Device framework to inform the system's next pedagogical decision. Visualizations of the information pipeline between student and toy will map the pattern of interaction in an attempt to identify optimal and suboptimal moments to engage the student. Patterns of learning are compared across populations of children who do and do not suffer from autism, offering insight into emotional readiness.

BASIS OF THE STUDY

There are three forms of engagement that influence learning: behavioral, emotional and cognitive (Hannafin, 1989; Fredricks, Blumenfeld, & Paris, 2004; Dickey, 2005). Decisions made by the toy about the lesson plan will be based on monitoring each state of engagement to identify high and low sequences. Observing physical interaction is one form of monitoring behavior or emotions, akin to test scores for cognitive engagement.

Some teaching aids, such as Intelligent Tutoring Systems (ITS), have established pedagogical practices that encourage learning through repetition and scaffolded modular sequences. However, few of these systems consider the emotional or mental challenges that face children and recommend teacher or parent participation (Kulik & Flecher, 2016). Many educational games have been developed to position learning in the context of a positive (fun) experience to encourage learning, but these typically lack the flexibility to accommodate learners who struggle with the content in order to keep them engaged (Filsecker & Kerres, 2014). In education, progress is made through consistent improvements made by the student as well as adjusting for variations from that consistency. Current applications of IoT in health and transportation focus on any occurrence of anomaly detection that deviates from the current operations of a device. Smart consumer products, on the other hand, regulate based on the consistent performance of the device where the function of labeling is binary or parametric within a fixed sample range of known input-output pairs of the function (Jordan & Mitchell, 2015), making little use of anomalous data. This study presents a framework for educational devices that use machine learning; balancing interactions that are anomalous and consistent with learning objectives as the basis for decision-making. The framework pairs Cloud-Fog-Device processes with content, context and responsiveness to user feedback that addresses the shortcomings of ITSs that dampen emotional / behavioral engagement and the prescriptive nature of lessons in educational games.

Based on the Bin et. al (2010) data mining model, the smart toy data is well formed and data types are known, requiring less servicing. The Cloud-Fog-Device layers process data collection, data management, and event processing that supports low latency and at the same time recognize the moderate severity level for predicted decisions that are poorly fit. The smart toy collects data through physical interactions and is analyzed using Fog computing, drawing comparisons between task completion rates to physical interactions to identify positive learning outcomes. Machine learning processed in the Cloud provides predictions for the best 'next' task, customizing each play session with the toy. Similar distributed processing models are described by Farahani et. al (2019) in their eHealth system that also require low latency responses but in educational contexts are driven by the user experience. Improvements to tailored lesson pathways are predicated on previous interactions and success or failure to complete a task. From play sessions, we expect to see patterns emerge that indicate moments of frustration, pride, thoughtfulness, and joy among other emotions that correspond to physical inputs of positive and negative learning experiences. These patterns can be used as a benchmark, adapting to any child's emotional, behavioral and cognitive learning state as they acquire new information as well as use it in different subjects.

IMPLICATIONS

In an educational context, decisions made by smart objects are not highly critical–they do not involve life or death decisions–and therefore do not focus only on the anomalous response that deviates from the norm. Conversely, learning is not a consistent climb over time; it progresses, levels off and sometimes deteriorates due to interpretation, making decisions about learning pathways difficult (Gaines, 1987). The design of the toy should support an educational environment shaped by the communication between user and smart object in an effort to alleviate the need for a teacher's time and repeated assistance. Educating autistic children in particular requires both constant monitoring and regularly mitigating mood, which is expressed through physical interaction (Schaaf et. al., 2014). This is particularly evident when switching subjects, expecting learned information to be transferred into new contexts. More importantly, the primary object is to identify patterns of learning through cognitive behavioral and emotional expressions of interaction. Haptic patterns provide a map of physical manifestation that leads to knowledge acquisition (Fogtmann, et. al., 2008). Using these maps, machine learning can react to consistent and anomalous human response appropriately easing learning by keeping children engaged.

CONCLUSION

In an effort to identify patterns in learning, this study examines a framework including machine learning that uses educational toys for data collection. The value of these patterns to aid teaching and bolster tutoring systems cannot be overstated. Not only does the framework have the potential to change the way we deliver education, it can also help those who struggle with the pace and complexity of typical learning environments.

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LANGUAGE – HOW DOES IT FIT INTO ONE'S CULTURE (ORGANIZATIONAL AND OTHERWISE)

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This study will examine the place that language plays in one's culture. Culture, in this particular case, includes the general environment and the workplace. This is an important factor as we think about our current workplace (COVID-19) and the United States as whole (riots and actions). With individuals working from home and not everyone being able to "see" the nonverbal cues of others, words mean more than ever (Allen, 2012). The language used within one's organization helps define its culture (gothamCulture, n.d.). One of the areas of interest for this year's conference is organizational culture. This paper will investigate one of the nuances of organizational culture, which is language. The effects of gender and race on what is perceived as acceptable and unacceptable behavior is to be examined. These behaviors are drivers of an organization's culture, whether it be a nonprofit, a for profit, a corporation, or a university.

The data is being collected utilizing student from two southeastern universities. One is a predominantly white institution (PWI) and one is an historically black college or university (HBCU). A Likert scale is being used to determine how much the participants agree or disagree with a series of statements about language (Statistics How To, n.d.). The data will be analyzed using Excel. Z-tests will be conducted to determine if the if the majority of the participants have statistically significant opinions on the topics/scenarios presented. The data will be analyzed across race, gender, and classification, where possible. The expectation is that certain types of language will be more acceptable outside the office than inside the office. The expectation is that certain types of language will be more acceptable coming from males than females. The gender of the individual making the judgement will also be considered (Jacobi, 2014; Muhanović et al., 2018; "Offensive language," 2008; Tett, 2016). There are mixed results within the literature.

The implications of this study should help managers and organizational leadership the importance of how words are utilized in the workplace. What is offensive or not can be examined. What might be considered harassment can be considered. The conclusions to the research will be exploratory with additional research to be conducted at a university and/or corporate level. College-level students are the future of the workforce, but we also need to understand those that have been in the workforce think and what different kinds of industries or types environment within an industry may have to say on the matter.

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THE BENEFITS OF LOGIC TRAINING FOR INFORMATION SYSTEMS AND BUSINESS COMMUNICATION

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ABSTRACT

Natural language is filled with ambiguity. Most of the time people resolve ambiguities using context clues and common sense. But this not always reliable, and it can be especially problematic in cross-cultural communication, particularly in business situations when precision is important. Information systems design and development is a prime example of where precision is critical. A poorly articulated design specification may lead to wasted development hours and unusable or cumbersome systems. At IACIS 2019, we presented a proposal for the intentional integration of training in formal logic methods for information systems students. Strong audience participation leads us now to propose a panel for IACIS 2020, where we may converse as colleagues about the inclusion of formal logic instruction in our information systems curriculum.

Keywords: Systems design, software analysis and design, formal methods, logic

INTRODUCTION

Doug Lenat, an expert in artificial intelligence, explains that people use logic to resolve ambiguities in ordinary speech hundreds of times every day, usually without even realizing it (Lenat, 5:07). But subconscious logic can introduce significant risk within business and technical settings, because actions may be taken based upon assumptions that are not fully checked and may not be correct. When crossing business communication with information system design, development and use, such actions may be expensive and detrimental to organizations. Natural language is more comfortable and familiar than logic. When precision is necessary, as it invariably is in information systems, careful communicators can combine the comfort and familiarity of natural language with the precision of logic by expressing their thoughts first with logic, and then again with natural language. With this approach they can recognize and avoid ambiguities before committing them to the natural-language version (Meyer, 1985).

At IACIS 2019, we proposed a concept for integrating principles of formal logic into information systems education, and argued that it is not only beneficial, but incumbent upon us as IS educators to include such content. Our presentation was met with enthusiastic response and a clear desire for more discussion about what how include, and how, in our instruction. We therefore propose a panel comprised of experts in logic, business communication, and information systems design and development, to lead an open discussion with IACIS participants to further the objective of returning logic instruction to IS courses. Although the panel will be comprised of scholars in the above mentioned areas, we do not propose to present from the 'sage on the stage' perspective. We envision this panel as a highly interactive and open discussion among all interested participants.

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SUMMARY

We recognize that in a world of mobile apps, multimedia sound bites, Tweets, texts and social media posts, today's students are conditioned to rely upon subconscious logic in response to nearly every interaction they experience each day—from environmental stimuli, to completion of their coursework, to eventually reacting to responsibilities at work. Thus, we must prepare information systems students now to enter the workforce with the ability to reason consciously. Logic was eliminated as a required subject in schools in the early 20th century because education reformers thought it was not necessary. However, business professionals as early as the late 13th century learned to use logic as a practical tool to solve business problems. Modern business professionals should take a lesson from that distinguished heritage and learn to use logic again, formally and intentionally.

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JOB PLACEMENT AND ITS LEADING FACTORS

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ABSTRACT

Job placement has always been a big challenge especially for students approaching graduation from college. Several factors including a college degree, field of study, and practical experience contribute to finding the best matching job. However, the importance and weight of these factors are still unknown. This research paper attempts to fill this gap through a qualitative study. It presents a list of study areas that have the highest and most consistent levels of job placement after graduation among college graduates. The results of this research will help college students seeking jobs on how to prepare themselves and how to prioritize factors to reach their goals.

Keywords: Job Placement, Higher Education, College Graduates

INTRODUCTION

Many factors contribute to getting a good job such as interpersonal communication skills, higher education, major of study, on-campus jobs, and summer internships. In the following paragraph, a critical review of the literature with a concentration on job placement factors is provided.

The paper titled "Does Higher Education Still Prepare People for Jobs", which is written by Tomas Chamorro-Premuzic et al. studies whether higher education prepares people for jobs. It raises the point that there is a gap between what students learn in college and what they are expected to do in the workplace. Although ROI (Return-On-Investment) of college degrees is at its highest level among young people, the value-added from a college degree decreases as the number of graduates increases. The authors believe that universities could greatly enhance the value of their degree if they teach their students more critical and soft skills. Employers need more candidates with people skills, higher resilience, empathy, and integrity than those just who have technical skills. The authors theorize that by taking more time to teach students critical soft skills the existing gap between employers and candidates looking for a job will be filed to a large extent (Chamorro-Premuzic & Frankiewicz, 2019).

The other relevant literature is a dissertation titled "The Academic and Co-Curricular Factors That Predict Full-Time Job Placement and Starting Salary Upon Graduation for College of Business Students" Written by John Schalk. The main objective of that paper was to explore the academic and extracurricular activities in order to predict job placement along with the starting salary of business students upon graduation. Its results suggest that GPA, internships, and areas of specialization are the factors that have the most effect on full-time job placement.

The only gap in this research is that it solely focuses on business students and lacks data from other majors or fields of study (Schalk, 2013).

The next article is titled "The Effects of a Campus-Wide Student Employment Program on Securing Full-Time Employment, Salary, and Job Satisfaction after Graduation." (Burnes, 2018). This study investigates the effect of students' on-campus employment on future job placement. Its results show that total working hours have no significant effect on employment outcomes. Instead, hours related to the academic field of study affects job placement but with a minor effect on job satisfaction and salary.

Crystal Kang's article "Jobs Report Cites Power of Education" addresses youth who have not finished high school and the community's efforts in aiding them in job training and educational pursuits. The theory presented in that research was that providing temporary summer positions in new STEM (Science, Technology, Engineering, and Math) programs in high schools helps to lower the youth poverty level. The way the town of Bridgeport was going to accomplish the goal was through company incentives (Kang, 2014).

Verhulst, D., et al. in their article titled "Differences in Horizontal and Vertical Mismatches across Countries and Fields of Study" look at job satisfaction and fields of study differences in some countries. Degrees that have more of an umbrella field of study, such as technology, have less job mismatching due to being able to work in any field compared to someone with a more focused field of study like education. It was also found that countries with higher education rates and higher quality education experience fewer mismatches as well. The article used HEGESO (Higher Education as a Generator of Strategic Competences) data to test horizontal and vertical job/field of study mismatches (Verhaest, 2017).

Desheng Lai et al.'s research "Differences between the Employment of higher Education Students from the Cities and the Countryside and the Fairness of Higher Education" focused on the difference in employment, wages, and job satisfaction between urban and rural students. The authors theorized that urban students have a higher percentage overall in employment capability, wages, and job satisfaction than rural students. The study looked at personal ability and how to acquire employment capability with the use of qualitative data. (Lai, 2011).

Ruth Brooks and Paul L. Youngson's article "Undergraduate work placements: an analysis of the effects on career progression" explored if being a student had a higher chance of getting a job after college. The authors believed that having an internship during some duration of undergraduate school would give students a higher chance of acquiring a job after graduation, compared to students that did not have an internship. Having an internship allows students to gain more experience and that future employers would rather have a new higher with experience, than someone who has none. Brooks' article is lacking the majors that our paper is aiming to talk about, along with that it is not only about the United States, but more focused on the United Kingdom and their job placement rates (Brooks, 2014).

The article "Best College Majors for Highest Paying Jobs: 2018 Edition" stated how different majors are projected to change in the upcoming years. It gives insight into what specific majors are estimated to get popularity in the future. It was projected and stated in the article that two of the highest expected job growth rates were in the fields of mathematics as well as statistics (GetEducated, 2020).

The article "Work Experience Vs Education: What's the Difference" by Annie Mueller is a study on whether work experience influences job attainment for college graduates. A theory from the article is that no single argument can cover all the potential situations of job seekers, potential employers, and career success, in terms of work experience or different education levels. The objective of the article was to see if higher education helps individuals to succeed in the real world and to see if work experience provides the necessary skills for an individual's next job (Mueller, 2019).

Given the reviewed literature, we are going to present new findings in job placement among students in the next section. The rest of the paper is organized as follows. In the Data Collection and Analysis, the details about data collection, and data analysis are discussed. In conclusion, the obtained results with their interpretation are provided.

DATA COLLECTION AND ANALYSIS

The main objective of this research is to figure out what the leading factors are for job placement of recent college graduates. We plan to find whether or not students who participate in more career preparation events, as well as those who are in hot fields of study, will find more success when finding jobs compared to others. In order to test these ideas, we conducted qualitative research through surveying Ball State University members. The entire Ball State campus including faculty members, staff, and students who were above 18 years old was asked questions about their experience with job placement. The survey was conducted online through a questionnaire designed on Qualtrics.

From 21 February through 10 April, 94 records were collected, 15 of which were incomplete and 79 records were complete. After addressing the missing values, a qualitative analysis of the available dataset was conducted.

Table1: Respondents' position and employment status

Position	Employment
Professor (4)	(2) Employed full-time, (2) retired
Staff (5)	All Employed full-time
Student (55)	(4) Employed full time, (9) Unemployed looking for work, (36) Employed part-time, (6) Unemployed not looking for work
Alumni (15)	(11) Employed full time, (3) Employed part-time, (1) Retired

Table1 shows that the majority of the respondents were undergraduate students who mostly have part-time job experience. They all have been involved in at least one of the job preparation events such as career fair, dialogue day, career center consultation, and participation in a club-specific to their field of study. Among students, 29 were from the College of Business and 26 from other colleges such as nursing, education, architecture, and psychology. Over 75% of the business students were satisfied with the education they received and also, they feel that finding a job in their major after graduation will not be a big challenge. Approximately, 70% of students within the College of Business do not believe it will be hard to find a job after graduation. 75% of the students from outside the college of business are satisfied with the education they received, however, over half of those students believe it will be hard to find a job after graduation. 48% of students in the College of Business participated in 3 or more career

preparation events such as internships, career fairs, career center consultation, dialogue days with professionals, or clubs related to their field of study. All respondents from the college of Business participated in at least one of these career preparations events. However, only 34% of students from other majors participated in any of these career preparation events, while 23% do not participate in any at all. We also found that 58% of students in the College of Business changed their major at least once, while other majors only 19% of students change their major during undergraduate studies. From the collected data those who have entered the job market in a field unrelated to their major, 90% of those respondents were non-business majors. We found that 70% of respondents who have already entered the job market found a college degree to be somewhat important. Also, for undergraduate students, with a business-related major, 77% of respondents believe that a college degree is very important. For undergraduate students with a non-business-related major 93% found a college degree to be moderately important.

CONCLUSION

In conclusion, because of the high demand in the job market for business experts, business students are satisfied with their major and the education that they receive. They also do not foresee big obstacles in their way to find a job upon graduation. While our study does show that most business-related majors are likely to change their major at least once, we believe this is just better preparing them for after graduation in finding a field that they enjoy and are passionate about. Due to the vast number of business-related majors, business students can explore many avenues while staying in the field of business. Students also find job preparation events extremely important in finding a good job. It appears that business students are more involved in extra preparation for their future careers, rather than relying on just the degree itself. Our study shows how critical is the role of career centers and the events they hold to connect students with employers, as well as building students' confidence levels when it comes to finding a job. While the small scale of our study shows that business majors find a college degree to be slightly more important than others, this shows that the importance of a degree can vary depending on the field of study. This also shows that business-major students rely more on career preparation events such as career fairs, internships, and career center consultations for job finding. Other majors rely more on the practical skills that they learn and how they are able to apply them rather than participating in the various career preparation events. Based on our study, we can conclude that for business majors, career preparation events are vital to being prepared to enter the job market, while for non-business majors, it is the application of the skills learned that will best prepare students for the job market.

This project is approved by the Ball State University IRB review board under **1570784-1**

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