

**Evaluating the Effectiveness of  
Information and Communication Technology  
in a Small International Education Association**

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Congratulations, Doctors!

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## Executive Summary

The East Asia Regional Council of Schools (EARCOS) is an international regional association sponsored by the U.S. State Department offering in-service professional opportunities to the teachers and leaders of international foreign schools that support dependents of American government offices, commercial interests, and non-governmental organizations. EARCOS personnel steadily adopted information and communication technological (ICT) tools to help manage the influx of information, knowledge, and data to support rising school memberships of the last twenty-five years. However, this mix-and-match ICT approach focused little on compatibility, integration, and employee training among the organization's social and technical factors, resulting in work processes that prevent the EARCOS staff from fully benefiting from its current digital and technological tools.

EARCOS wants a technology upgrade, but leadership is unsure where and which areas of information, communication, and technology are its weaknesses and strengths. The Sociotechnical system theory shaped this study to focus on the organization's technology, goals, people, and processes to guide the organization's ICT improvements in the right direction. This quality improvement project will set out to answer the following questions:

1. How are the staff currently using tech for internal communication and documentation?
2. To what extent do employees feel their current internal communication processes and technology effectively ensure they have the information they need to perform their work?
3. What are the goals driving the processes and the technology at similar organizations that impact external communication to their members and internally with their employees?

The interview analysis of all nine EARCOS office members and two members from other similar international education associations brought about the following findings:

1. The EARCOS staff does not fully utilize the variety of digital tools at their disposal for internal communication and documentation due to the lack of an ICT adoption design.
2. The lack of standardized office protocols impedes the efficiency and effectiveness of knowledge and document management.
3. Faculty's feelings toward the organization's current IT protocols depend on the level of understanding employees have with the ICT tools and their access to the stored knowledge and information.
4. The ICT designs at similar international education associations are committed to compatible cost-benefit digital tools and training that help their small teams manage communication and information.
5. Organizational leadership must directly manage the ICT design and its tools to staff by personally understanding the digital tools or ensuring the individual responsible for ICT design and management aligns with their goals and objectives.

The five findings resulted in the emergence of four recommendations:

1. Identify and communicate the technological goals of the ICT tools to EARCOS staff.
2. Identify standardized office practices focused on improving employee collaboration and work processes regarding knowledge and document management.
3. Include training for staff in all areas of the ICT design.
4. Hire a digitally savvy, organized, and creative individual in the next open position.

## Introduction

The East Asia Regional Council of Schools (EARCOS) is an international regional association supporting over 190 English-speaking member schools, with more than 164,000 pre-K to 12th-grade students, in East Asia. It is one of many international coordination education organizations sponsored by the U.S. State Department that provide professional development and networking opportunities to the region's educators it supports. The initial purpose of these global associations was to offer in-service professional opportunities to the teachers and leaders of international foreign schools that provide schooling for the dependents of American government offices, commercial interests, and non-governmental organizations (NESA Center, n.d.).

Over the last 50 years, international foreign schools have significantly increased worldwide due to host country student populations seeking an international K-12 education (Morrison, 2019). According to ISC Research's 2018 Global Report on the International Schools, in the previous five years, these schools experienced a compound annual growth rate of approximately 6%, a student yearly growth rate of just under 7%, with Asia experiencing the most growth over any other region (ICEF Monitor, 2018).

The evolution of international schools throughout the Southeast Asia region has increased school memberships into regional coordination education associations. Administrators and educators seek networking and professional development opportunities to stay abreast of current best practices in education. With the rise of memberships, fees, and conference attendees, these small coordinating associations rely on information communication and technology (ICT) software to help their office staff support and manage the influx of information. According to EARCOS's webmaster, the number of delegates the association supports has more than doubled



since 2005, resulting in the need for an ICT update that is dynamic enough to handle the rise of information.

Effective and efficient use of ICT is critical for EARCOS's small team, supporting its diversified and expanded membership base. The tasks ICT addresses within organizations help teams manage, store, and access increasing amounts of information while simultaneously improving employee collaboration and reducing human hours on computerized and algorithmic tasks. ICT is a critical organizational tool that saves time for customers and employees through "various technologies and streamlining processes, to achieve development regardless of distance through networking" (Japan International Cooperation Agency, n.d.). In the case of EARCOS, ICT provides the organization with opportunities to adequately support its member schools' communities while keeping the ever-changing membership database updated. The importance of ICT in the organization is underlined by the inclusion of technology as one of the five objectives of the association's vision found on its website, *connect schools, communities, and individuals through the use of technology to promote collaboration, communication, intercultural understanding, and access to broader educational opportunities* (EARCOS, n.d.). Therefore, the Executive Director (ED) of EARCOS, Dr. Greene, sees value in assessing the ICT system and its usage strengths and weaknesses.

For this project, I will study the ICT practices of the EARCOS office staff, the usage of the ICT tools at their disposal, and the ICT practices from similar international coordination education agencies. Based on both data sets, I will highlight areas of improvement and make recommendations to help EARCOS identify ICT needs to improve employee technological awareness and use with new ICT practices and tools.

## Organizational Context

The organizational context will cover the goals, people, technology, and processes based on the sociotechnical systems (STS) theory, as described further in the conceptual framework section. The association hosts four annual conferences: Institute on International Admissions and Guidance, the Spring Heads Institute/Retreat, EARCOS Teacher Conference (ETC), and the EARCOS Leadership Conference (ELC), with all four bringing together dynamic and leading voices in education, research, technology, resources, and innovation. The ETC and ELC, two of the largest international conferences of this kind, bring together roughly 1,000 educators, presenters, and sponsors. These conferences aim to provide professional development (PD) and networking opportunities to member and non-member schools alike, such as child safeguarding, improving financial health, leadership training institutes, and international school recruitment opportunities. Due to the current global pandemic and safety protocols, the last in-person conferences were in 2019.

Beyond these networking conferences, EARCOS also sponsors monthly weekend workshops, hosted by various member schools. These workshops focus on a broad range of topics that include research-based education practices, school community mental health, communication best practices, and effective remote teaching and learning protocols, to name a few. In 2018, the organization celebrated its 50th Anniversary in supporting international administrators, teachers, and students in the East Asia sub-region.

The EARCOS staff is a small but diverse group of individuals. The ED, Dr. Ed Greene, who at the start of this project (2020) was in his second year, and the Assistant Director, are former educators from the United States with various international school leadership experiences between them. Of the other seven faculty members, all local Filipino hires, three carry a

significant amount of institutional history between them; the Information Technology (IT) coordinator, Webmaster, and ELC coordinator have been with the organization since 1999.

The EARCOS office in Laguna, Philippines, is on the Brent International School Manila campus, a short drive south of Metro Manila. As the COVID-19 global pandemic disrupted working and living conditions throughout the world, local and international organizations in the Philippines were hit exceptionally hard. Due to government mandates regarding organizational operation's health and safety, schools in the country have not hosted in-person instruction since March 13, 2020, with online education expected to continue through the start of January 2022, at least. These restrictions have also affected the EARCOS office staff's in-person operations due to its location on a school campus. As of this writing (December 2021), the EARCOS office remains partially closed, with most staff working from home.

EARCOS moved its operations online in the span of a weekend. The Philippine government released a community lockdown on Friday, March 13, with it going into effect the following Monday, March 16. Some of the office's in-person internal ICT protocols seamlessly transferred to the digital world. Moreover, others, such as communicating internally via email and the reliance on video conferencing apps, increased.

The increased reliance on ICT due to the pandemic highlighted the need for EARCOS's stakeholders, such as the ED, the EARCOS Board, and indirectly the members' schools, to assess the association's current ICT practices and usage. The ED wants to evaluate the efficiency and effectiveness of the office's external communication and internal knowledge, and data management systems. He asked, "what does EARCOS have, and what is it missing with regard to the technological improvements necessary for basic clear two-way communication?" Dr. Greene is also interested in learning how other small international coordination education

agencies run, saying, “what we don’t know hurts us more than our size.” The aim is to increase internal communication between office staff, ensuring they have the necessary information to perform their work while supporting member schools. Specifically, to increase the efficiency and effectiveness of work outputs from this small office team that supports its growing international school clientele.

Such work outputs require documentation and communication, and for this, EARCOS personnel use various technological tools such as Microsoft 365 and Google Workspace. These help store, access, and retrieve membership data and can be used for such tasks as keeping up with membership dues, contact information, members’ leadership positions, registrations, speakers, and finances related to upcoming PD workshops and conferences. Tools used solely by the two financial office members are Quickbooks, to handle Philippine peso and US dollar accounts receivables, and Authorize.net, which administers online receivables and payables for PD webinars. Filemaker Pro is desktop software and the office’s oldest digital tool; it encompasses the overarching databases of EARCOS’s members and the financial status of those accounts.

When employees were primarily working in the office, internal communication was mainly done face to face with email and Skype used for external contact with international school members, conference sponsors, speakers, delegates, and vendors. When the EARCOS office began to work from home due to the Philippines lockdown measures, Dr. Greene introduced Zoom as its video conferencing software to host monthly team meetings and webinars for all remote PD opportunities. Table 1 below lists the communication and documentation tools currently utilized by the EARCOS office team.

### **Table 1**

*EARCOS's ICT Tools for Documentation and Internal Communication*

COMMUNICATION	DOCUMENTATION
Google Workspace: Forms, Sheets, Docs, and Drive	Google Workspace: Forms, Sheets, Docs, and Drive
Microsoft 365: Powerpoint	Microsoft 365: Word and Excel
Email	Filemaker Pro
Video Conferencing: ZOOM and Skype	Authorize.net and Quickbooks (Accounting team only)

The Board of Trustees is also heavily involved in EARCOS's digital upgrade. At the start of this project, the Board was active in overseeing EARCOS's 11-year-old website, receiving a complete overhaul to ensure its features were more dynamic, the layout was more responsive to the movement of the mouse, and that it enhanced the users' overall experience while navigating the website. According to the ED, the purpose of these upgrades, along with the association's focus on improving its ICT design, "is sort of the backbone to another issue, which is even bigger, which is marketing. When we have our tech tools identify what we need to do for internal and external communication, I [ED] may have to find a consultant in marketing."

The outcomes of my project could potentially inform the organization's ICT implementation design. More specifically, it could improve the organization's knowledge and document management processes while highlighting how its current IT tools can improve its internal two-way communication.

### **Problem of Practice**

The problem is that the organization has experienced considerable growth in its information and knowledge management due to its increasing memberships. This growth has forced employees to store, access, and manipulate escalating amounts of data while using various ICT tools on which they have received little to no training. The increased dependence on

technology has only been exacerbated due to the abrupt and long-lasting remote working climate brought on by the current COVID-19 global pandemic. Significantly impacted by the worldwide pandemic, the organization has provided many online learning events in the 2020-2022 school years. Now, for the sake of efficiency and effectiveness, the ED wants to digitally streamline its document management and communication processes further. The rapid change from an in-person working environment to a fully online setting emphasizes the need for EARCOS to audit their ICT practices and usage while underlining possible areas for improvement.

The structure of EARCOS's organizational chart and the responsibilities of each office member do not allow for a lot of in-house collaboration. The ED's focus on increasing technology usage within the office is brought upon by his desire to improve communication and data sharing amongst all employees. However, the majority of the office members, employed for ten years or more, are used to an in-person work environment that is not dependent on technology. Dr. Greene explains that the communication method before working from home due to COVID-19 was primarily verbal with the "internal communication almost all done by foot...but we don't need to communicate that much internally in the office."

EARCOS wants a technology upgrade, but precisely where and in what area of ICT they are not sure. Identifying the organization's current ICT system and the specific advantages it allows in similar organizations is EARCOS's first step in targeting particular areas of its potential ICT design. Suppose the ICT practices of the organization are not evaluated and improved, in that case, there is a risk of information overload amongst faculty who may not know information exists, understand how to access the data, or develop separate work processes that impede rather than enhance expected work outcomes.

At the start of this quality improvement project, it was clear that the causes behind this area of inquiry were a lack of leadership objectives regarding the organization's ICT design. In particular, what are the short-term goals of the ICT system, and what are the expectations for employees to work with the technology? What training is provided for employees to work with provided ICT tools, and what are the office protocols employees should follow to guide their work when accessing, storing, and managing knowledge and information processes?

The four areas of focus from the Sociotechnical Systems Theory (STS) highlight the need to balance the social factors of goals and employees, or people, with the technical ones of technology and processes to ensure seamless implementation of an organization's ICT systems design. This deliberate attention to both social and technical factors is identified in the research to limit—or completely prevent—frustration between faculty members and a “me vs. it” mentality when employees are left confused after being forced to operate technology in their everyday work processes.

### **Literature Review**

The lack of technical training and an ICT adoption plan were already recognized as a problem at EARCOS. Research has identified several other factors influencing ICT implementation in an office environment. The literature review focuses on defining information, knowledge and document management, implementing an ICT design in a professional environment, and the impact ICT plays on an organization's work processes, structure, and communication. Evidence gleaned from this review will guide answering the three research questions and navigating toward recommendations. The literature will also identify how leadership teams' efforts either support employees to apply or, in some cases, regrettably reject ICT's potential benefits in their overall workflow.

### *Knowledge and Document Management*

Knowledge management describes the management of documents by office staff; with the term “document” evolving from hard copy correspondence and memos to include electronic mail messages, spreadsheets, and all other forms of electronically stored information (Nastase et al., 2009). Coakes explains that knowledge management allows employees to manipulate the data under its control, including “the ability to acquire, document, transfer, create and apply knowledge” (2006, p. 581). Zantout and Murir (1999) describe this manipulation as human interpretation, and state knowledge management is the outcome of this documented data and information. The underlying focus in defining knowledge and information management targets what employees are doing with organizational data once they know it exists, where to find it, and how to correctly interpret the data with appropriate access. In other words, knowledge and information management occurs once the data exists and is known to employees. Employees can feel ignorant about this information if they know the data exists but are unsuccessful in locating its whereabouts (Zantout & Murir, 1999).

“In many organisations, there is a sense of frustration that the organisation “knows” lots of things, but it does not always know what it knows and what it does not know!” (Heath, 2003, p. 185). Six behaviors define an organization’s views toward information it collects and the type of management applied: information integrity, information formality, information control, information sharing, information transparency, and proactiveness (Marchand et al., 2001; Choo, 2013). EARCOS’s information integrity, formality, control, or proactiveness is not questioned by its stakeholders. Instead, the organization’s inability to share and make its information transparent (amongst staff) appears to be inhibiting its internal communication and collaboration.



Coakes explains that employees' transparency and open access to information directly impact effective worker performance (2006).

A review of the features of the document management systems (DMS) used by the Industrial Development Bureau of the Republic of China, a leader in digital document management, views technology as “stimuli altering an individual’s perceptions, expectations, and evaluations in decision making (Tarng & Liu, 1994, p. 9). For this reason, the value of information does depend on the perceptions of the person documenting and sharing information, highlighting the need for a standardized system and workflow (Tarng & Liu, 1994; Zantout & Marir, 1999). A standardized system and workflow would improve the efficiency and effectiveness of retrieving the information (Zantout & Marir, 1999) and the users’ opinions on the value of the information and communication technology application (Peansupap & Walker, 2006).

The value of information is further influenced by the users’ understanding of the information. The user should be trained to understand the information coming their way. This training allows the user to determine what to do with the information and define its value to the organization (Tarng & Liu, 1994). Organizations and users of information systems who understand the importance of the information and knowledge they are manipulating have an effective working environment (Coakes, 2006), as it is more valuable to know “what to do” with information rather than simply knowing how to access it (Tarng & Liu, 1994). ICT plays an essential role in knowledge and documentation management in our current society where electronic data is only increasing. ICT can support knowledge management, but technology depends on a well-informed user who understands the technology itself, the organizational data, and the knowledge they are tasked to store and retrieve (Nastase et al., 2009).

The literature on the importance of knowing that knowledge and information exists, what to do with it, and how ICT supports employees in interpreting this data is an integral part of an organization's data management. Herrmann argues that proper knowledge integration is essential for a successful sociotechnical systems design, where "success" is defined as the ICT tools achieving the outcomes expected by both the leadership and the employees utilizing the technology (2007). Though I conclude in this section that ICT is critical in knowledge and information management, it is equally essential that leadership define its employees' expectations regarding this management and how technology helps the organization meet these outcomes.

#### *Implementing ICT in a Professional Environment Requires an ICT Adoption Plan*

I will now focus on the factors influencing an organization's ICT design and those that should be part of any ICT adoption plan. ICT implementation links identifying and adopting a technical system and applying that technology toward management's desired use of the technology (Klein & Sorra, 1996; Lederer et al., 1996; Bondarouk & Sikkel, 2002). Introducing new technology into an already functional system does not automatically change the way people work. For that to occur, leadership needs to define the purpose and objectives of the new technology precisely. As in most organizations, senior management's vision and long-term decisions must commit to adopting ICT by allocating funding, defining the expectations within this technological framework, and providing the necessary training to help their employees utilize this new technology within their work (Peansupap & Walker, 2006).

Peansupap and Walker expressly state three main barriers that hinder an organization's ICT adoption cycle: ICT investment decision, organizational adoption, and business results/outcomes (2006). Expanding upon these barriers should help organizations and their

employees avoid these common implementation obstacles. ICT investment decisions vary from organization to organization based on their size, budget, region, purpose, and leadership technological awareness. ICT investment decisions are directly related to the lack of technology awareness on the organization's part that handles the ICT budget (Peansupap & Walker, 2006). This lack of attention may also be tied to the lack of research on the impact of technology on organizing and management, even as technology usage increases throughout our professional tasks (Zammuto et al., 2007; Orlikowski & Scott, 2008). If an organization focuses on ICT as a short-term investment, it will not provide a system that can adapt to change (Tarng & Liu, 1994). Coake explains organizations must "know what they know" regarding how their current business activities are evolving and what is required of their working environment to function effectively and efficiently (2006).

Organizational adoption barriers include senior management's lack of IT adoption experience, fear of becoming too dependent on the technology, and the inability to lose control over systems that are not fully understood; other factors include the level of confidence and resistance from the user (Peansupap & Walker, 2006; Schroder, 2016; Bednar & Welch, 2019). Asking employees to undergo this type of adoption independently may also hinder or, at the very least, delay senior management's IT plan; employees working collaboratively within the new system and implementing the technology allows the group to learn from and ask each other questions toward understanding the ICT's intended purpose (Bondarouk & Sikkell, 2005). Getting to this level of collaboration includes sharing creative ideas that involve a level of forward-thinking and embracing innovation (Bednar & Welch, 2019).

The third barrier, business result/outcome, unrealistic or misrepresented ICT benefits negatively impact business results and outcomes (Peansupap & Walker, 2006). Curley explains

that achievable goals are required to successfully integrate technological systems in an organization (1984). Organizations' abilities to meet their goals are already complicated enough as the future constantly changes; conflicting goals only add to the complications (Pasmore et al., 2019).

The possibility of an ICT system not fully integrating into an organization's systems is very real. Staff may continue to communicate via phone, in-person, or on paper, even after ICT investments have been made (Peansupap & Walker, 2005). Management must balance the communication between being too specific on how the technology should be used (Peansupap & Walker, 2006) by defining the expected results without being too specific about how it is done (Applebaum, 1997). The organization's context must be considered when pondering the benefits of information and communication. The institution may have no prior significant ICT experience (Peansupap & Walker, 2006), or the workforce may include millennials and generation Z requiring increased autonomy and self-direction (Pasmore et al., 2019). Zorn compares the implementation of ICT to politics as it has all the dramatics of opposing forces' (2002).

In theory, the implementation of technology in the office should be making things easier for administrative and office staff. Yet, if these office updates are considered only with the technology in mind, ignoring the user, problems will persist for the user and the organization (Maguire, 2013). Not involving the user in the system design process is one of the leading causes of IT systems failure (Attarzadehe & Ow, 2008). Not offering proper training may be equally detrimental. According to the Chartered Institute of Personnel and Development, the time required to implement this training and direct employees toward this commitment is the main barrier to moving organizations toward a new way of working (Bednar & Welch, 2019).

As information grows within the organization, this increases data storage for the worker, which means the office staff needs the training to cope with this surge (Nastase et al., 2009). With so much information coming employees' way, information overload poses a real problem that introduces the institution to two problematic situations for workers: worker finiteness—the need to store and retrieve massive amounts of information successfully; and worker ignorance—the worker is unable to find the information they know exists (Zantout & Murir, 1999). Technology's impact on office staff may not always be positive (as seen in information overload), but its potential is significant within the organization's infrastructure (Huber, 1990). For example, by considering the documentation of information as a corporate fixed asset and investing in a DMS, office professionals can significantly reduce their time retrieving documents (Tarnng & Liu, 1994).

Based on the above review of the literature, I conclude that an ICT adoption plan starts with leadership's intentional goals and objectives, its ICT system, and how it will train faculty to reach those goals. This training should include how the users manage the information with the provided technology. Suppose organizations hope to build buy-in regarding the updated ICT system within their office staff. In that case, leadership should focus on compatible technology that fits current ICT tools and the user's level of digital savviness. It is imperative that employees understand and trust why they are asked to alter their work processes. The balance of the social and technical factors should be evident throughout this ICT adoption plan.

### *ICTs Impact on Organizations' Work Processes, Structure, and Communication*

Assessing ICT's impact on organizations' work processes, structure, and communication is vital because it clarifies what aspects of an ICT design negatively impact employees' outputs and collaboration. The common focus of technology in office settings is to increase the

information flow between subordinates to their supervisors (and vice versa), the speed at which that transaction occurs, and effective collaborative efforts, to name a few. Data, information, and the knowledge organizations continue to produce have increased in value, so much so, these are part of many organizations' capital assets. As the world becomes more digitally savvy, leadership teams are growing concerned with their technological prowess level for fear of falling too far behind against the competition, failing to meet growing customer needs, or simply failing to innovate during uncertain times, as witnessed during the current global pandemic.

The office's technological advances dramatically changed personnel's work patterns, including administrative assistants, executive secretaries, managers, and up the hierarchical chain to chief executive officers (CEOs) (Yap, 1990; Khalid et al., 2002). Boorsma and Mitchell refer to these technological advances in the professional environment as a new work model titled 'smart working' (2011). IT is no longer a tool for routine information and storage; instead, its impact on organizational changes leads to new possibilities for productivity gains (Dedrick, 2003). Information systems and technologies are growing to an importance equal to labor (Dewett & Jones, 2000). Similarly, ICT innovations are forcing organizations to change their structure due to technology's impact on the form and function of information; managers no longer need to rely on the "upward flows of information to surface problems with the ongoing operations and downward flows of instruction for making adjustments" (Zammuto et al., 2007, p. 751). The updated hierarchical structure is slimming down vertically while its horizontal reach expands globally.

ICT's impact on communication, whether internally or externally, locally or abroad, is significant. Traditional means of communication can be more widely accepted than their advanced counterparts as these may provide increased opportunities for informal conversations

(Sarbaugh-Thompson & Feldman, 1998; Trevino et al., 1987). Nevertheless, electronic communication has increased the overall amount of contact (Dewett, 2000). It has made it easier and cheaper to reach out to those in other parts of the world; it has also increased the accuracy of communication toward specific target groups, such as bringing together information seekers with information experts with the pairing requiring little if any, previous personal contact (Dewett, 2000; Senna, 1997).

Given the potential pitfalls technology can have on individuals and the limited bandwidth some organizations may experience, it is crucial to help organizations understand where technology can improve their overall work systems and introduce technology to employees to help small organizations avoid wasting time and finances. Easing employees' stresses toward implementing the technology by understanding the ICT's purpose and providing sufficient training will also help the organization's teams successfully acclimate towards new technology in the workplace. Though it may be impossible to reorganize organizations' infrastructures without acknowledging ICT's significance on the system (Zammuto et al., 2007), it is worth noting, "research on the implementation of information and communication technologies (ICTs) has demonstrated convincingly that the success of such implementation efforts is as much a result of human interaction as a result of appropriate technology" (Zorn, 2002, p. 160).

With social and technical factors continuously interweaving to affect current organizational transformations, a framework that defines the successful integration of both is critical in identifying an ICT system design that specifically meets the needs of an organization. This merge will allow employees to reach joint optimization, setting the organization up to continue to meet its customer's needs with available ICT tools.

### **Conceptual Framework**

My conceptual framework analyzes how the employees at EARCOS use ICT to manage their daily work processes and how they feel about this usage based on the sociotechnical systems theory. The STS theory posits that a professional environment's social and technical factors are interconnected and hold equal importance and weight when designing an ICT system (Clegg, 2000). Applebaum describes the STS theory as a comprehensive look into an organization's overall system while flexible enough to be customized to meet most organizations' needs (Applebaum, 1997). The design of technological tools per the STS theory contrasts with traditional organizational methods where the technical components are the driving factor, with people filling in as needed; combining these two parts to produce satisfactory results is joint optimization (Applebaum, 1997). Joint optimization allows for creating new ways of working, for the employee, supported by introducing new technologies, which inspires further technological innovation (Winter et al., 2014).

People develop technical tools to increase desired outcomes. STS theory suggests these are not individual components to be studied and then forced to work together; instead, the social and technical integration promotes efficiency and effectiveness (Bednar & Welch 2006). Clegg (1979) describes the STS framework as a hexagonal system that includes six interconnected nodes: people, technology, infrastructure, processes, goals, and culture. In 1987, the principles of the STS theory design were updated to reflect the aims of the digital age (Clegg, 2000). The diagram below illustrates these elements of social (left) and technical (right) principles.

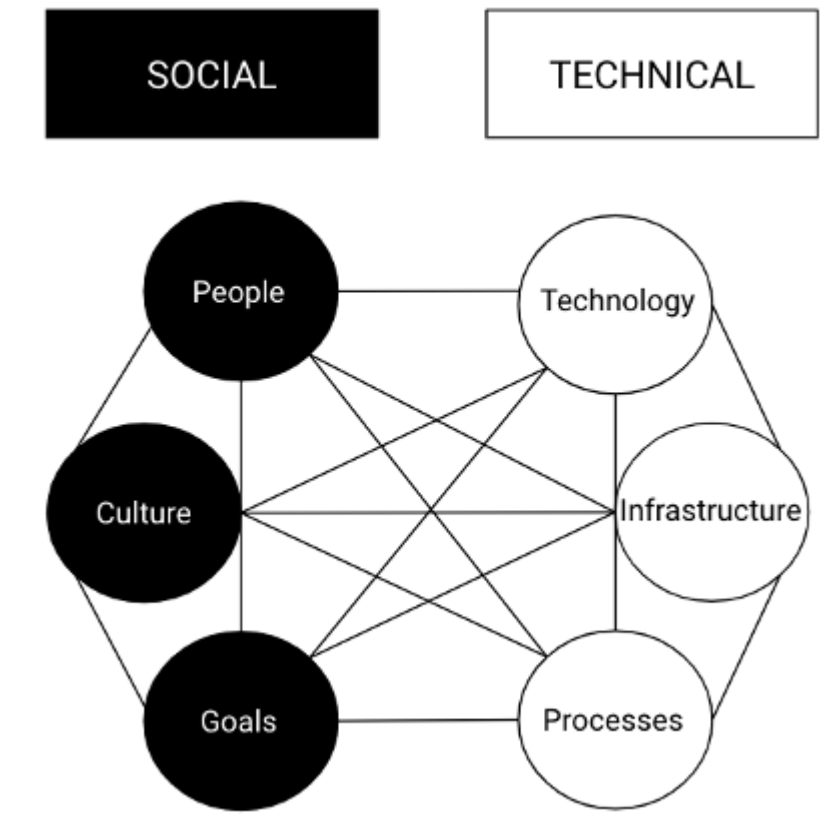
With the STS theory as my conceptual framework, I will analyze the partner organization's technology, goals, people, and processes for this study. I will not explore the culture and infrastructure nodes further due to the cost-benefits both nodes currently bring to the organization. The organization's location in the Philippines and its majority Filipino staff are



areas that, due to local labor laws and the limited infrastructure capabilities of its host country, cannot be drastically changed or improved.

### Figure 1

*Hexagonal Sociotechnical Systems Framework (adapted from Clegg 1979 & 2000; Challenger et al. 2010; Davis et al. 2014; Clegg 2017).*



Maguire warns against the sole reliance on an STS approach by identifying five organizational practices to be avoided in building a successful system design: 1) overly ambitious system concept that ignores the complexities brought into the system or onto the employees, 2) underestimating the level of change to the system and the users while believing the new IT system will miraculously manage, 3) bypassing feedback from the users through each

phase of the plan, 4) ignoring system functions and features the users may prefer when selecting appropriate software, and 5) overlooking the users (2013).

### **Research Questions**

To provide appropriate and financially responsible technological guidance to a small functioning office, critical to the professional development and networking needs of international schools across the East Asia region, this quality improvement project will look to the flexibility of the STS framework. Focusing on four of the six nodes of the STS model (goals, people, technology, and processes), the project will help EARCOS identify how its employees are using the information and communication technology for knowledge and document management, how the ICT tools operations and expectations were introduced to office personnel, and how the employees' applications of these digital tools are impacting the organization's work processes and internal communication. Ultimately, this project will make recommendations to improve EARCOS's ICT system design to increase internal communication and the sharing of information that will improve employees' everyday workflow.

This quality improvement project set out to answer the following questions:

- 1) How is the team currently using tech for internal communication and documentation?
- 2) To what extent do members feel their current internal communication processes and technology effectively ensure they have the information they need to complete their work?
- 3) What are the goals driving the processes and the technology ICT tools at similar organizations that impact external communication to their members and internally with their employees?

### **Study Design and Methodology**

To study the information and communication technology systems in a small international coordination education organization, I collected qualitative data through semi-structured interviews of all EARCOS staff and two executive directors from similar organizations. Originally, office observations were to be included in this data analysis when first speaking with the ED in December of 2019. However, the developments of COVID-19 over the next two and a half months made office observations impossible. Due to privacy concerns, a request to observe one of the monthly Zoom team meetings was denied.

Since technology and its terms have evolved exponentially over the last few decades, in conjunction with the organizational leadership being the driving force behind this quality improvement project, I opted against survey data collection to avoid misunderstandings and confusion with the terms and the expected ICT outcomes. For example, regarding the term “knowledge management” it is not only the process of “capturing, and making visible, knowledge”; it should also include the ability to “share knowledge” (Nastase et., 2009, p. 330). Likewise, the term “communication” in the digital working world does not only include a phone call, email, or “trips down the hall for face-to-face conversations” (p. 326); it is also the ability to “communicate through the exchange of documents” (p. 327) and “new technologies including high-speed networks, mobile telecommunications, video conferencing, virtual reality software” (Nastase et al., 2009, p. 332). Semi-structured interviews did provide a more in-depth understanding of how the current structures, processes, and communicated goals interacted with the social aspects of the organization. Table 2 below connects the qualitative methods to each research question.

## **Table 2**

### *Qualitative Data Types Per Research Question*

Research Questions	Data
1. How is the team currently using technology for internal communication and documentation?	Semi-structured interviews with the same questions for all EARCOS staff.
2. To what extent do members feel their current internal communication processes and technology effectively ensure they have the information they need to perform their work?	Semi-structured interviews with a different set of questions per staffing group: all EARCOS personnel, leadership, IT personnel, and general office staff (accountants, coordinators, assistant to the director).
3. What ICT tools are similar organizations using to communicate externally to their members and internally with their employees?	Semi-structured interviews with two executive directors from similar regional associations as EARCOS.

### *Participants*

To answer research questions one and two, I scheduled interviews from January to February 2021 with all eight EARCOS faculty. For research question three, Dr. Greene connected me to several Executive Directors of international, regional associations. Since Dr. Greene was looking for an upgrade to EARCOS's current technological tools, and the organization was in the process of overhauling its website, I contacted the two organizations whose websites offered a dynamic user experience and whose recent and upcoming PD workshops were up-to-date. The organizations and directors I interviewed in March 2021 are Dr. Peter Bateman, Head of the Association of International Schools in Africa (AISA), and Maddy Hewitt, Executive Director of Near East South Asia Council of Overseas (NESA).

### *Interview Protocols*

Due to the lockdown restrictions of the Philippines and with Dr. Bateman located in South Africa and Ms. Hewitt in Greece, all interviews were conducted via ZOOM. Within the EARCOS office, the interview questions were targeted to the stakeholder group being interviewed. My interview protocol utilized questions from Tarng and Liu (1994) (see Appendix A).

The EARCOS interviews addressed the four components of the STS framework and determined each office member's specific roles and responsibilities. Specifically, data was collected to understand how their current data management and internal communication protocols were developed, their feelings about the usability of the technology within their reach, how their work processes interact with each other, and employees' thoughts about future technologies and potential training opportunities. The organization's breadth and depth of its information will define the type of ICT tools its employees need. However, the literature and the STS framework clearly state that if organizations continue to focus on the kinds of technology believed to improve the efficiency and effectiveness of knowledge management while ignoring the user's (employee) needs, technological deficiencies will continue to persist. The information and the technology within an organization are only as valuable as the employees' capabilities regarding the digital tools and the contents those digital tools are acquiring, storing, processing, and transmitting.

For these reasons, a proper ICT implementation design in a professional environment is critical for any major technological and digital upgrades. Small organizations whose budgets require sound financial investments must first develop a long-term strategic plan that includes management's vision and long-term ICT commitment. Second, it must define the expectations of both its employees and the technological applications. Third, it must provide training for its users on both the technology and the value of its information, and finally, it must include the time to allow its employees to accomplish these objectives effectively.

To start this process and discover suggestions for the long-term strategic plan, comparing the strategies of similar organizations was the next step. EARCOS's total international school memberships make it the largest organization of its kind worldwide. Hence, in my initial contact

with the other two international associations, I was immediately in direct contact with both Executive Directors. The small structure of both organizations also meant these two organizational leaders were much more hands-on in implementing the technology and what they wanted it to do regarding knowledge and communication management. Responses from both Dr. Bateman and Ms. Hewitt answered the third and final research question.

### *Qualitative Analysis*

All interviews were recorded via Zoom with the transcript uploaded to Otter, an artificial intelligence software, that transcribed the discussions into searchable and accessible notes. The STS framework's factors and flexibility informed the deductive coding scheme. The four nodes previously chosen (people, goals, technology, and processes) from the STS framework make up the deductive coding with the thematic analysis consisting of communication, standards, training, and objectives.

## **Findings**

Five major findings were highlighted from the qualitative analysis. Interestingly, for research question three, *What tech tools are similar organizations using to communicate externally to their members and internally with their employees?*, the analysis not only supported the findings from research questions one and two, but also provided additional insight into the successful ICT design at two similar international regional associations. In short, it ultimately helped to frame the four recommendations provided to improve EARCOS's ICT systems design.

**Research Question 1: How is the team currently using technology for internal communication and documentation?**

**Finding 1: The EARCOS staff does not fully utilize the variety of digital tools at their disposal for internal communication and documentation due to the lack of an ICT adoption design.**

In answering research question one, regarding how the team is currently using technology for internal communication and documentation, the EARCOS faculty interviews highlighted minimal to no input, training, or design regarding implementing the current technological practices under previous leadership. This lack of thoughtful processes and procedures regarding ICT seems to have been prevalent in the organization for many years. Shortly after the assistant ED arrived, roughly 11 years ago, he observed the lack of data analysis and collection, “And when I started, there wasn’t much in the way of data collection...no data collection going on, not even in hardcopy form. There wasn’t a file, no analysis of the data.” At this point, he made a concerted effort to start collecting data in Excel from the leadership and teacher conferences regarding “how many people were in every single session...leadership [previous ED] began to see the value of all that data in predicting and saying to the hotel, ‘we only need these many lunches,’ for example. The accuracy was uncanny.” Shortly after starting this data collection, the assistant ED was introduced to the ease of sharing and communicating this data by discovering the Google Workspace tools. “I saw something about it and immediately went in and checked it out and signed myself up, and then spent the next several years trying to convince everyone in the office, stop using Excel, start using Google Sheets.”

Faculty employed during this time confirmed the introduction and communication regarding the new Google software. Yet, training was not provided to employees, nor was their input or feedback gathered regarding how these tools are compatible with their work. The longest-serving employee recalls a time, many years ago, when “training was critical in years

past,” referencing her training with Microsoft (MS) Excel and Word, “long before like, 2005, 2010, I think, that’s a time we all have training every summer.” And now with Google Docs? “No, it’s just like, when you’re doing it, that’s just the time you learn.” She states the previous ED made an effort to ask faculty which areas they needed training in and would bring in an outside consultant to provide this training. The training offerings ceased from approximately 2010 through the recent leadership transition change in 2019. The lack of time within the office was mentioned as one obstacle, “(previous leadership) was asking before if there is anything we want to have a training, but I don’t know, we don’t have time, it’s like every minute in the office is important to work on my own Excel and my own stuff.”

The power of Google Workspace tools is only beneficial to an office when the entire team understands its collaborative potential and its ability to keep data dynamic and up-to-date in real-time. If this is not fully conveyed and understood, Google Docs serve a similar role to that of MS 365 tools with more frustration as users are forced to learn to navigate a new software menu. The ELC coordinator, whose thoughts on Google are “I am not sure if it’s secure or not. So, putting data online, I don’t know,” had little knowledge with the Google tools trained the ETC coordinator, who has now been with the organization for three years. The ETC coordinator did have previous experience with MS 365 tools but none with Google, and when asked how she is learning how to use Google Workspace tools, she stated,

I just learned it myself, to be honest...there are some files that come from other people, which we need, but we don’t have any access to that. And that is really frustrating because sometimes they respond late, but the first frustrating part is we have to ask for access for that.



She did provide an update regarding how things are going now in the current remote working environment with, “I think it’s easier now since I’ve learned lots of things about Google Docs while receiving contributions from [fellow faculty members].” It seems the current remote work setup is providing faculty members with opportunities to understand better the power of the Google Workspace tools, which is increasing peer-to-peer collaboration on current data management and internal communication.

The office members who understand how Google Workspace manages data feel the positive impact on their work’s efficiency and effectiveness when managing information. These members account for roughly half of the office staff. Their ability to “learn as you go” has provided the following sentiments regarding the specific applications that fall under the following Google Workspace tools:

- Docs: “The advantage of Google Docs and Sheets is that everybody has access. If you want to have access to it, you have it.”
- Forms: “Google Forms is revolutionizing everything, to make it easy. Some of the inquiries of information gathering are now in Google Forms.”
- Sheets: “It’s easy to update; no need to inform them that I’m updating the spreadsheet. They can see what I input. They can see that I can see all the registrants that paid.”

Under new leadership, the focus on professional development for the office staff is a top priority. It is not lost on Dr. Greene that there is a disconnect between how office members are using both MS 365 and Google Workspace tools, stating:

One of the things that should come out of this (quality improvement project) is what kind of professional development is needed for people in the office? Some of it will be position-specific...the whole structure needs to be looked at in terms of what are we?

How are we working on using technology? What are the strengths and areas that we're not capitalizing on?

Regarding EARCOS's communication, the long-term goal of leadership is to improve its internal and external communication to current and potential members to focus its efforts on successfully marketing its weekend workshops and conferences. However, the office's internal communication was mentioned explicitly by the ED as an issue the organization hopes to address quickly, "the real issue, I think is communication...help us look at what we have and what we don't have in terms of basic communication, clear communication, two-way communication." Examples of this within the office are the inability to utilize the collaborative Google tools listed above and improve personnel expertise with one video calling service versus the current reliance on two similar software applications.

The "learning as you go" method has forced the office to keep Skype and ZOOM, video software tools required to host remote meetings and webinars. According to one office member, "So, how I see it working is that when people sort of chat with each other individually, they use Skype. When we have the team meetings, it's on ZOOM." Skype chat is used between all local office personnel with ZOOM primarily used by Dr. Greene when members are meeting with him directly, in monthly team meetings, and when hosting PD workshops for their members. This need to use both tools is annoying for some:

Again, something as simple as, why do we need both ZOOM and Skype? They do the same thing...there's so many of these little overlapping things that it would be so helpful if you just had it centralized, consolidated into one that would allow you to sort of focus your attention on one and not checking five different things.

New technology alone will not bring about change within an organization (Bondarouk & Sikkel, 2005). This type of imbalance is caused by the belief that the technology is inflexible in its application and the organization mistakenly creates a plan to help the employee manage the current digital tools at their disposal (Clegg, 2000). Suppose organizations are committed to developing a successful IT system. In that case, a design strategy is critical in identifying the expected outcomes new digital tools can bring to an organization and gathering users' inputs on the digital tools that will impact employees' expected results and everyday workflows (Maguire, 2000).

Before taking action in determining the types of technological tools required for an organization's ICT system, the design must start with a mission statement, "one that provides a clear definition of the primary objectives of the design process and identifies the major tasks that have to be undertaken" (Mumford, 2000, p. 131). Once leadership knows what they want from their ICT system, they can then shop the market for the tools that will help them meet their goals. Peansupap and Walker offer a cyclical approach to an ICT adoption design that includes, "ICT investment decision, organisational adoption, and business result/outcome" (Peansupap & Walker, 2006, p. 370).

The purpose of an ICT system should come early in an ICT adoption design. For this project, which deals explicitly with a smaller organization with limited funds, the first recommendation will focus on identifying and internally communicating the ICT's systems purpose before searching and purchasing compatible ICT tools. Other additional aspects to be identified early within an ICT adoption are: "how difficult will the system be to design and implement, what organisation and human changes will result from its use, and how serious are

the consequences likely to be if the system does not work as expected immediately?” (Mumford, 2000, p. 128).

***Finding 2: The lack of standardized office protocols impedes the efficiency and effectiveness of knowledge and document management.***

With only half of the team understanding the current technological tools at their disposal, a lack of standardized office protocols on managing, storing, and retrieving knowledge is a point of confusion for all office staff. Without designated intentional information and knowledge management processes, the team has created individual practices based on their needs and workflow. For example, both ELC and ETC coordinators use Google Forms for both conference registration portals where the data is then transferred into a Sheet, and “at the end of the day, I will collect and count the registration from that spreadsheet” and put it on an Excel file where it is then emailed to the presenters so the ZOOM workshop details can be shared to the right people. The ELC coordinator states, “the problem with Google is it goes straight to everybody, and if you delete this one, it’s really dead...before I make another change, I have to save a copy for myself” on Excel.

The lack of standardized office protocols regarding storing, naming, and retrieving knowledge and document management is confusing office members about where to locate specific information and to what extent they can manipulate the database or file once the data is found. This lack of guidance has resulted in the messy naming conventions of files, including author names or data titles. Moreover, staff members’ adoption of independent workflows slows down work processes due to a lack of transparency or confusion.

Further issues include the duplication of the same file, one in MS Excel and Google Sheets, to prevent knowledge from being deleted or lost and the duplicating, or copying, of

folders only to save them on personal hard drives due to the perceived territorial behavior of the “owner” who created the file. This may result when the owner unknowingly fails to share information or when that information is intentionally withheld:

But maybe there’s the sense of, I guess, people are very territorial about their information...folders are labeled with people’s names on them. So, there’s a sense of, if I need information, do I just go in and access it? Do I have to ask permission?

Those who understand the technology appear to be unaware of how their independent work impacts their peers. One of the more technologically savvy individuals in the office states, “for me, I think this is the easiest system by sharing my member database with my colleagues. If someone asks me for the list of heads of schools, principals, etc., it’s easy for me to export the file.” Without standardized office protocols to support all faculty, this same individual has no reason to update or change his workflow to accommodate coworkers’ needs. Even when it concerns the ED accessing specific data or member lists, he states:

I know we have a listserv that says head of school; I have no idea who’s on the list.

There’s only one person who does [he] has all the email addresses on file. And they’re in the directory, and I can look up and see who’s the director of the school, but if I want to make sure that everybody on that list is still the right director, right name, I can’t do that.

Ultimately, the lack of clear and intentional office practices regarding storing, sharing, retrieving, and gathering information impacts certain employees more than others. Employees who are making it work have greater access to the information and understand the digital tools at their disposal that put them in a position to create workarounds to positively impact their work while leaving the rest of the office confused.

To take advantage of knowledge, employees must know what information is necessary, acquire the information, and store, retrieve, create, manipulate, and apply the knowledge or information (Zantout, 1999; Coakes, 2006). As ICT increases in offices to help manage the rise of information, employees must utilize this technology properly to help the organization reap the advantages of its knowledge gathering. A practical document management system improves the time and productivity needed to find information if the characteristics of the retrieval needs are met (Zantout, 1999; Nastase et al., 2009). Knowing where corresponding documents are located and which documents users need to help satisfy their work outcomes applies to static information (e.g., manuals, policies, templates, etc.) and to live working documents requiring user collaboration. Still, here, additional support is needed (Zantout, 1999).

This type of collaborative work with knowledge and information documents is one primary reason for implementing the Google Workspace tools. In a recently published article, “10 Reasons Google Workspace is Worth the Upgrade,” the third reason listed is the employee’s ability to collaborate on documents, spreadsheets, and slides in in-person, remote working environments, or the combination of the two (Holland, 2021). Having the right technology for this collaboration is half the battle as the owners of files need to provide access to their peers within the office. “Collaboration needs are exemplified by the commenting on or approving of documents” (Zantout, 1999).

In years past, when dealing with hardcopy documents, knowing where to look for these documents narrowed down to at least one general location, the physical work site; even as technologically increased, employees still had to visit the office computer to access organizational information (Nastase et al., 2009). Now with the exponential improvements of ICT in document management and the introduction of cloud-based software, it is no longer about

knowing where to physically find the data, but wherein the digital space is the data stored; and also about ensuring that all data has a consistent naming convention to help everyone in the office continue to do their work uninterrupted.

Tarnng and Liu (1994) suggest documentation is a corporate fixed asset, and the productivity of the office will increase when the document manager and the document users have equal access to information. Not knowing where to find information, not having access to retrieve it, a lack of understanding the value of the data by the document manager, or worse, not knowing pertinent information exists, impedes a worker's overall productivity (Zantout, 1999). "A solution to overcome this problem needs to be developed, such as the adoption of a standardized approach to representing the semantic content of a text" (Zantout, 1999, p. 474). Standardized office protocols include a comprehensive file structure that prevents office staff from needlessly searching for knowledge (Maguire, 2014).

**Research Question 2. To what extent do members feel their current internal communication processes and technology effectively ensure they have the information they need to complete their work?**

***Finding 3: Faculty's feelings toward the organization's current IT protocols depend on the level of understanding employees have with the ICT tools and their access to the stored knowledge and information.***

The employee's feelings toward current IT protocols are all dependent on the individual understanding of the technology, the level of access they have toward manipulating and retrieving the data, and knowing where to look to find information needed to complete their work. The assistant ED, who introduced the current Google Workspace tools, states, "a lot of things existed and were being done with other tools that were not all that effective, reliable or

easy to work with...once everyone made the switch over to Google tools, life became a little bit easier.” His experience and feelings favor the office’s IT protocols since he understands how the Google tools operate.

The IT Manager has similar sentiments as he has immediate and direct access to knowledge and document management. He willingly shares it when his peers ask, stating, “I am not sure if my colleagues are happy with this workflow, but we are still using it in the office.” Lastly, the Webmaster, probably the most digitally savvy individual in the office, shares his thoughts on why there is a need for Google’s collaborative tools within the organization,

During 2005, we only had 98 (delegates)...to compare to this time; we already had 193 or 191 delegates. So to handle that number of member schools, you need an application that is dynamic. You cannot have it really doing the old system; I think your email will get flooded with more inquiries. We get lots of information.

Staff members frustrated with IT protocols struggle with the workarounds they have created to help manage their lack of understanding of the technology or the time wasted due to their inaccessibility of knowledge and information. One employee describes the frustration caused by asking her peers for information access as, “...well, well, that stops my work until they answer back. And it could be a few hours, it could be two minutes, but it could be a day.” Sending an email and asking for information is also a point of contention for the ELC coordinator, “I’m not sure if you know there are people who are receiving lots and lots of emails...they might not receive my emails with information about the certain session. So that's what I am worried about.”

The ETC coordinator’s apprehension about putting information online has caused her to create her own workaround by turning all databases she works with into Microsoft Excel files



before sharing the files with colleagues. She explains, “I am not sure if it's secure or not. So, putting this data online, I don't know.” The assistant to the ED expresses her thoughts on the whole Google Workspace, “I hate Google, such a pain,” with additional sentiments of her views regarding the office’s IT protocols:

For the past hour, I've been trying to think of...standard office protocols. You know, this is how we will do things... there's a certain sense of, set parameters for the way we do things...not even with technology, or with data, with anything that's what I think is missing with EARCOS, in general, is that there's no sense of uniformity or standard, even in terms of like, how you write the date.

This employee references the office’s use of both the American and British English standards of writing the date.

Zorn (2002) suggests a critical variable in the successful implementation of an ICT system within an organization is its employees’ emotions toward the technological tools and training offered. A worker’s attitude toward using tools in the workplace stir both positive and negative emotions dependent on the employee’s previous and current experiences with the ICT tools (Day et al., 2012). The positive outcomes “lead to changes in various aspects of professional competency, such as knowledge, skills, and attitudes” (p. 43) that result in continuous professional and technological improvements by the employee (Bonarouk & Sikkel, 2004). The adverse outcomes result in the increase of an employee’s levels of stress and frustrations toward ICT; it is a combination of the inconvenience of accessing information, technological malfunctions, and fear of how these new tools will impact their work (Tarnng & Liu, 1994; Zorn, 1999; Day et al., 2012).

The extent an organization supports its employees with its ICT design that includes training, proper IT support, input on the technological tools, and rewarding employees for using the technology determines the level of job satisfaction and improved attitudes toward ICT (Patrick & Laschinger, 2006; O’Driscoll et al., 2010; Day et al., 2012). This is achieved by successfully communicating the advantages of ICT on the user’s work and explaining when used appropriately; it is effective in its ability to manage increasing amounts of data without increasing the number of work hours (Tarnng & Liu, 1994; Peansupap & Walker, 2006).

**Research Question 3. What are the goals driving the processes and the technology tools at similar organizations that impact external communication to their members and internally with their employees?**

**Finding 4: *The ICT designs at similar international education associations are committed to compatible cost-benefit digital tools and training that help their small teams manage communication and information.***

The executive directors at both AISA and NESAs are committed to ICT tools that reduce human hours while increasing their office’s overall productivity. This outlook was a move both offices were taking well before the pandemic, with NESAs explaining their reason why: We’re going to be able to put our hands on the information quickly. And we’re going to be able to see what’s effective quickly, you know, because the data is there, and the data is easily retrievable, and it’s going to save human hours in terms of input and all those things that wasted human hours as well.

One advantage the AISA office had in its ICT system design is the majority of its personnel often worked outside of the office well before the pandemic. With the small team spread throughout the United Kingdom, Cape Town, Nairobi, and Australia, the office had

plenty of time to focus on what the ED suggested is a “way of work planning that was robust, but also efficient.” The main objective being, “our primary thing is, what is the function we're trying to achieve? And does this technology support that? Or does it block it?”

The ICT system design at both organizations focuses on three requirements:

1. Selecting the technology that is compatible with the existing office technology allows it to streamline current work processes quickly.
2. Upskilling and training employees to use the ICT system based on the ED’s expectations.
3. The technology needs to be affordable.

All three design criteria fit under the general umbrella of meeting the organization’s specific needs. Dr. Bateman explains that "technology needs to be systemic, holistic; it needs to be interoperable. It needs to be expandable and scalable. And I guess for us, you know, smaller organization, it has to be affordable...meet a specific need."

Below are two statements, one from each ED describing how critical it is to incorporate compatible ICT tools that easily streamline their employee’s work processes:

Here is this balance between the people who are using the technology and the technology.

If the technology takes over, then the people don't use it. And so we had to find that balance of trying to figure out which technologies would people uptake sort of most readily.

And from the second ED:

I can't tell you how many jobs I've been in, and it's been like this will streamline and this will, and then I ask them the question, are you sure that those are compatible systems?

Yes, yes, we can do it. Can it relate to our system? Yes, yes. Then you do it. And it's a nightmare because the systems are not compatible.

Figure 2 is an example of Ms. Hewitt’s goals regarding NESAs’ ICT system and how she views this system.

## Figure 2

### *The ICT System’s Goals at NESAs*

“You’re a system; all things matter in a system” from the technical to the social factors within the office, such as:

Make sure all documents are in a unified center	Setup Google accounts and merge mail settings together	Set up the NESAs site to house documents that were previously stored in separate portfolios
Upskill all 4.5 office staff by reorganizing	NESAs hired somebody knowledgeable in technology and coding who began to work with the communications team, who “brought all the skills the organization needed”.	

How successful is this approach at both organizations? "I have a high degree of positivity that our systems, our internal communication systems are fit for purpose, and that they assist us in doing the work that we need to do." Both EDs are confident their current ICT system design is flexible and adaptable to positively impact the office’s work processes and support their association’s members while appropriately managing costs.

And we're still changing the airplane. As the airplanes flying, we're still trying to become this modern organization that keeps relevant and keeps our members happy. And that has the right model to meet the needs of our members, which is our mission, but at the same time, be fiscally responsible and manageable.

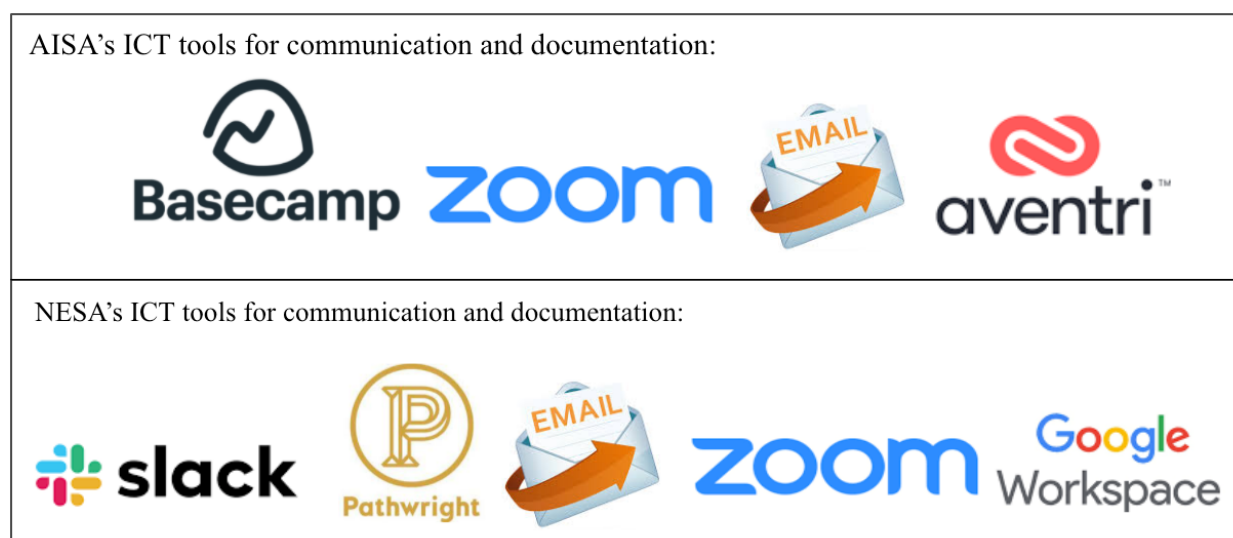
The purpose of both associations is to be “a membership organization that people look to” that brings “high intentions” to the “new ways of work.” These education associations must have an ICT system whose tools and software communicate with each other to keep the data sets up to date, that when they reach out to a member school, they use the correct name and title of

that school’s contact person. “The consequence is a reputational risk if you don’t get it right.”

Figure 3 shows the digital tools at the disposal at both the AISA and NESA offices.

### Figure 3

*The ICT Tools Utilized by Similar International Regional Education Associations*



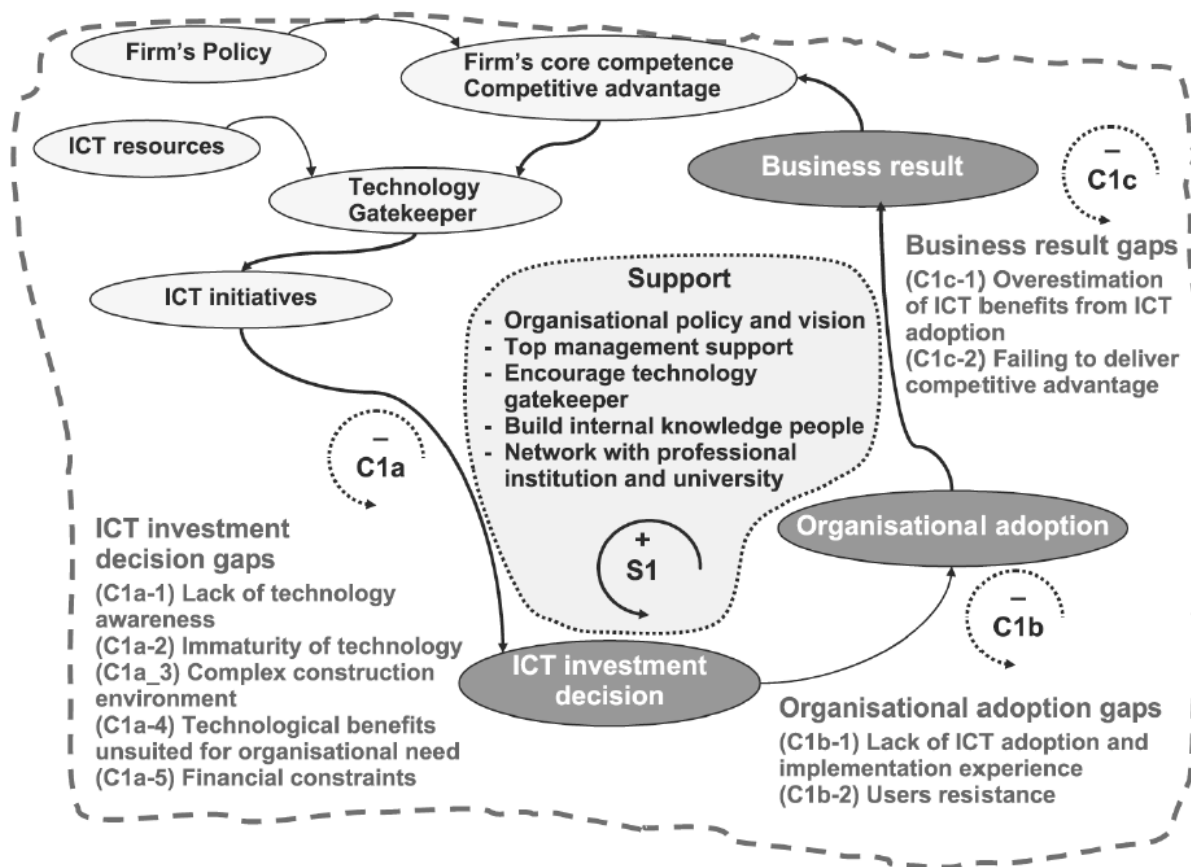
Cherns (1986) wrote the “Principles of Sociotechnical Design Revisited” (a review on his earlier work of the Sociotechnical principles initially written in 1976), describing *compatibility* as the first and most important principle of any organization’s technological design.

Compatibility references the “joint optimization” between both the social and the technical systems working together to reach the organizational objectives, and before this process can successfully be implemented, it “must begin with the start of design; the principle of compatibility foreshadows this” (Cherns, 1986, p. 159). The cyclical design mentioned in

*Finding #1: The EARCOS staff does not fully utilize the variety of digital tools at their disposal for internal communication and documentation due to the lack of an ICT adoption design, by Peansupap and Walker, is offered in Figure 4 below as one example of an ICT adoption design (2006).*

### Figure 4

*Peansupap and Walker's ICT Adoption Design Cycle (2006)*



If an employer wants their employees to use the ICT tools in the manner they were developed, formal training and technical support must be provided to all office staff (Damodaran et al., 1980). The research further states the fate of a successful ICT system rests in the balance of employees' ability to use the technological tools deemed appropriate for the organization's needs (Zorn, 2002)—highlighting the need for selecting an ICT system that meets the needs of the association and considers the level of digital savviness of the users. A user's ability to effectively operate the technology includes understanding the ICT tools (Maguire, 2014) and greater awareness of the knowledge those tools are managing (Nastase et al., 2009). "A well-trained multi-skilled staff team is also usually better able to cope with any limitations in the

system until they can be addressed by technical system updates or developments” (Maguire, 2014).

The developments in technology are exponentially increasing, allowing organizations to introduce new technology that is not only low in price but size (Khalid et al., 2002). ICT technology does not have to be a complete software package where the tools and applications reach optimal performance when paired. All the same, these do exist and are known as enterprise systems that “create a single database for transactions associated with a standardized business process” (Zammuto, 2007, p.751). However, smaller organizations can get by with an affordable mix and match approach of ICT tools. Google workspace does provide a cost-savings approach to document and data management in the digital world that is effective while increasing employee collaboration (Ul, 2014).

Still, the cost savings should not impede an employee’s ability to adapt to change as the information knowledge increases (Tarng & Liu, 1994). “This approach focuses on augmenting employees’ abilities and supporting, rather than automating, their activities” (Tarng & Liu, 1994, p. 10). Organizations should develop a team that will continue to evolve with the technology and the organization’s expectations in an exponentially changing digital world.

***Finding 5: Organizational leadership must directly manage the ICT design and its tools to staff by personally understanding the digital tools or ensuring the individual responsible for ICT design and management aligns with their goals and objectives.***

Interestingly, while the level of understanding each ED has toward ICT tools is quite different, that does not affect their involvement in the ICT system design; it only impacts who is implementing this digital change. Both ED’s know what they want the system to accomplish:

I do believe in Educational Leadership, and you don't just say we're doing it all because everybody else is, but you have to be mindful of it. And if you don't do something, you better know why you don't do it. And, you know what the impact is going to be in terms of your organizational health and well-being.

The AISA director has an educational, technological background that includes a master's degree in Micro Technology in Education and a Post Graduate Diploma in Online Instruction:

It [technology] always had been an interest of mine—how technology supports education in general. But when I got this job, how it supports the workflow process at a systemic level, not just like this button, that button, that we had to figure something that was sort of systematized.

This interest and background allowed him to be very hands-on in AISA's ICT design, where he searched for software tools that would help the employees complete outcomes when they were not always in the same office. His search brought him to the Basecamp software, and as he introduced this and several other ITC tools to his team, he “then, of course, put all of our staff through the training...wasn't complex, particularly for Basecamp. And once they [office staff] got into it, it just flowed very naturally.”

The only difference at NESAs is the ED is not that technologically savvy, “it's not an area of expertise for me at all. So I rely heavily on especially the new (digitally savvy) person, but everyone on the team to say, Yep, we need to move here. And we're going to be doing this.” This self-awareness allowed her to hire someone who will stay aligned with her vision when a position recently opened up due to retirement. She hired “somebody who is extremely gifted with technology, and she can build sites, she does coding...So we were able to bring on



somebody that had the kinds of skills that we needed.” The skills NESAs needed and the outcomes the ED wanted her staff to accomplish were very intentional:

We’re going to be able to put our hands on the information quickly. And we’re going to be able to see what’s effective quickly, you know, because the data is there, and the data is easily retrievable, and it’s going to save human hours in terms of input and all those things that wasted human hours as well.

Under her leadership and the onboarding of a digitally savvy employee, NESAs changed how it worked during the pandemic and accelerated its technological awareness, continuously evolving and adapting as remote working structures continued. “I, as executive director, understand conceptually the importance of leveraging the digital, so in that regard, you know, yes, we’re going to move in that direction. And we need to move in that direction and learn the technical expertise.”

The AISA ED agrees with this level of self-awareness and adaptability in individuals who fill leadership roles:

Effective leadership, as we know, is a discovery. It’s a process of discovering. And if you are one of those leaders that can’t do that, then you’re actually blocking the knowledge capacity of your organization. So it’s knowledge management 101, don’t pretend that you know everything.

“There is no single role of IT in knowledge management, just as there is no single technology comprising knowledge management systems” (Nastase et al., 2009). Technology’s ability to manage institutional knowledge is driven by organizational leadership’s objectives and their value on the incoming data (Garner 2002b; Coakes, 2006). Peansupap and Walker (2006) suggest an ICT system design is a long-term strategic plan developed and communicated by

leadership that includes the desired outcomes of the technology, the expectations on the user to apply the technology, and the allocation of adequate resources that fund the ICT system while supporting the employee.

The foundation of the STS framework calls upon organizations to place equal value on an organization's social and technical factors. Essentially, it calls for leadership to empathize with the employee as they embark on a new way of work while providing the technical and job-related support to be successful. This new ICT system will only be successful if the employee accepts it (Maguire, 2013). The employee will accept it if the training is robust enough to focus on the how, the why, the benefits, and the time to reflect upon the technology and its impact on their overall workflow (Peansupap & Walker, 2006).

### **Recommendations**

The recommendations follow the sociotechnical theory in its flexibility to cater to the needs of the EARCOS office. The recommendations consider EARCOS's small team relentlessly working to support a region hit hard by the global pandemic. East Asia is an area where many of its international (and local) schools are still experiencing strict government shutdowns, visa restrictions that have prevented expat faculty from seeing family or returning home since March 2020, or in many cases, have not returned to in-person instruction (as of December 2021). Each of the four nodes of the STS framework (goals, people, technology, and processes) that I focused on were prevalent in the five findings. When given appropriate attention, they will improve the organization's ICT implementation.

**Recommendation 1: *Identify and communicate the technological goals of the ICT tools to EARCOS staff.***

Pasmore (2019) provides an STS design to assist organizations in reaching joint optimization within its work context that includes three levels of design: strategic, operating system, and work; and three levels of outcomes: societal, organizational, and individual (see Appendix B). The main points under the levels of this STS design start with identifying a purpose (Pasmore, 2019). With this in mind, the first recommendation begins with identifying the goals (purpose) of EARCOS's chosen ICT tools.

It is clear the organization, or the assistant ED under previous leadership, found a need for digital tools in that "there wasn't much in the way of data collection." During my interview with the current ED about EARCOS's ICT systems design, the goal is to reduce, or eliminate, the division between the MS 365 and Google Workspace tools. This will allow the organization to focus on its long-term organizational goals of increasing communication to member schools and marketing to potential new members.

Still, the goal of new technology in the office should not solely focus on what the organization wants to accomplish; it should also include how these tech tools will contribute to the employees' workflow. This was a common theme in both NESAs and AISAs' organizations, represented in Findings 4 and 5, regarding their ICT systems goals. Users are the individuals most impacted by a new ICT integration, and to build buy-in with this group, they need to know why the old way of doing things is no longer working and why the effort spent in learning a new system is worth it (Cucciniello, 2015).

With this, the organization's short-term goals should include the ED's expectations from this quality improvement project, focusing on the type of professional development EARCOS personnel need once its current ICT tools are appropriately integrated and improving the office's internal two-way communication. Its long-term goals include leveraging its personnel and ICT

system to pursue a successful external communication design that incorporates effective marketing and social media strategies.

***Recommendation 2: Identify standardized office practices focused on improving employee collaboration and work processes regarding knowledge and document management.***

“Although organizations often introduce new ICT into the workplace to create more efficiencies at work and to improve the working lives of employees, aspects of ICT may have the opposite effect” (Day et al., 2012 p. 488). In Finding 2: *The lack of standardized office protocols impedes the efficiency and effectiveness of knowledge and document management*, we see the frustrations this caused for some EARCOS employees. Especially, as the lack of standardized office protocols in the organization’s current ICT system negatively impacted individual work processes by either delaying access to or preventing the manipulation of pertinent information.

With technology increasing its presence in office environments through document and knowledge sharing software, employees at all levels of the organization are seeing increased access to information, analyses, and peer-to-peer collaboration (Winby & Morhman, 2018). Standardized office protocols are designed to help employees work with the increasing amount of data as individuals and as a collaborative team.

At the simplest level, this involves an agreement on common software tools across the organization (such as a particular spreadsheet software tool, at a particular version number) so that a file created by one part of the organization can be accessed and opened by another (Heath, 2003, p. 184).

Protocols, or policies, provide a guide on how employees collaborate “that reduces ambiguity and increase the efficiency and effectiveness” (p. 11) of individual work processes (Snow et al., 2017), and in how to increase employee access to the data that positively impacts

organizational output (Tarnng & Liu, 1994). These protocols, or policies, should increase the efficiency and effectiveness of users to accomplish the following:

- Directly manipulate the documents
- Index and store to retrieve the documents
- Communicate through the exchange of documents
- Collaborate around documents
- Model and automate the flow of documents (Nastase et al., 2009, p. 327).

The frustrations EARCOS personnel have without these protocols puts them in a position to wait for access to be shared and to ask for access to the necessary information to complete their work.

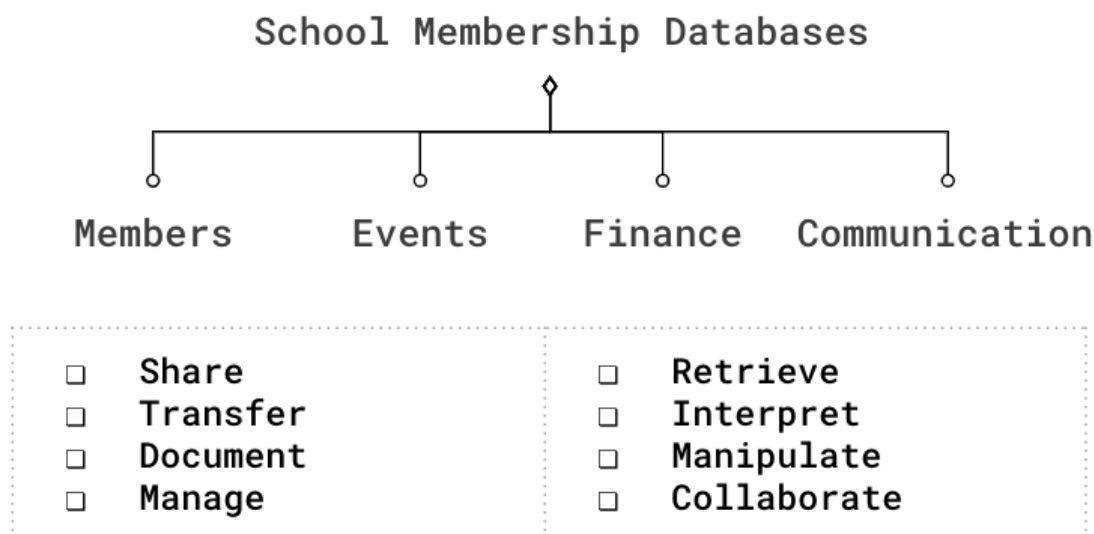
Lastly, identifying standard practices of retrieving and storing information prevents an organization's knowledge from developing into separate islands of information (Heath, 2003), resulting in worker ignorance in not knowing information exists or worker finiteness in not knowing where to find it (Zantout & Marir, 1999). Standardized office practices place heavy importance on an organization's information, data, and knowledge within an organization "by ensuring that it is shareable and retainable" (Heath, 2003, p. 189).

**Recommendation 3: *Include training for staff in all areas of the design.***

The data analysis in Findings 1-3 highlighted the employees' needs for training in the technology and the processes of sharing and retrieving information. Figure 5 below highlights EARCOS's databases and possible leadership expectations regarding knowledge and information management.

**Figure 5**

*The Document Management Expectations for Data Sets Critical to International Education Associations.*



The areas of the training recommended for EARCOS consider the organization’s information, leadership’s expectations, the data analysis, and by the following questions from Tarnq and Liu’s “Creating a Document Management System” (1994) (see Appendix C). EARCOS employees should have input in this training. They should be provided a detailed timeline that holds leaders accountable for delivering this professional development opportunity that also includes expectations on the employee to learn and implement their new skills.

Finding the time for training was expressed as an issue in the data analysis. Therefore, the training should be offered over several months, or throughout one year, to prevent any disruptions to the training schedule; thus ensuring leadership’s commitment to the new protocols and the technology expectations while providing employees opportunities for reflection and feedback. Peansupap and Walker suggest once leadership has committed to an ICT adoption or development decision, “there should be an ICT implementation process for providing personal learning and both technical and organisational support should be concurrently instigated” (see Appendix D).

Mumford (2000) explains that the sociotechnical design's most significant value is acknowledging the rights of employees, the advantage of working in teams, and employees' ability to participate in the technical decision-making process. Employees should be provided training on updated technological tools and given a say to ensure the devices and software are compatible with the user's workflow and expected outcomes. "It must always be remembered that a socio-technical approach requires the social to be given equal importance to the technical" (Mumford, 2000, p. 131).

Furthermore, the design should increase access for all employees to the information and improve their understanding of the value of the information they are storing. As data for organizations increases, so too does the responsibility of all office personnel in managing that information; as it is no longer the manager's sole responsibility to evaluate, select, and find information, it is now also the responsibility of office secretaries (Khalid et al., 2002). The importance of information is reached when all employees who manage this information are knowledgeable in the data. "The more people who share information, the greater it's worth" (Tarng & Liu, 1994, p. 9).

***Recommendation 4: Hire a digitally savvy, organized, and creative individual in the next open position.***

Today's digital-savvy individuals are no longer in narrowly focused computer programming and IT fields. Ms. Hewitt, at NESAs, describes this tech-savvy generational shift as:

Suddenly people that are 40 are going to be running schools, and they are tech-savvy, and they understand more about technology. They're more digitally native. And it's already happening. Those people that are younger, they're already coming in, and they can be at a meeting taking minutes, just as you're having the meeting and all the veterans

are saying, can you please put the keyboard away? And so these generational things are really, I think, will impact schools in the next decade. Hugely.

All positions and businesses worldwide are experiencing this digital workforce transformation. Pasmore suggests millennials are already in leadership positions with the following digital expert generation closing in; these groups come with a wide range of talents, expectations, and values that allow them to easily contribute to organizations applying the STS framework (2019).

The next open position at EARCOS does not have to be one of the current IT or webmaster positions currently filled. The next recruit merely needs to have the IT and digital knowledge to help the ED drive the technological change he is hoping to achieve while providing the in-house support some of the office members may need to continue upskilling as the office technology evolves. Having a co-worker familiar with the office expectations and the ICT system will offer one-to-one personal support and coaching from a confidant that prevents the users' learning gap from widening so much that dissatisfaction with the system begins to develop, or worse, that they give up on the system (Peansupap & Walker, 2006).

Maguire further believes the current workforce is so digitally savvy with technology taking over many people's homes, accessories, and cars that their expectations may not be easily met by specific digital tools and applications at work (2014). Adding the following responsibilities to the next open position will meet EARCOS's need in both the role it is trying to fill and the digital savviness they need from future employees:

- Knowledgeable in Google Workspace tools to increase collaboration and document management with peers.



- Full understanding of the settings, preferences, and capabilities within ZOOM that fosters collaboration with office peers and EARCOS members when working remotely.
- Will commit to and maintain the standardized office protocols for internal document management.

## **Discussion and Conclusion**

### **Limitations**

There are three significant limitations in evaluating the effectiveness of the ICT implementation within the EARCOS office. The first is COVID-19's impact on business operations in the Philippines from March 2020 until today (December 2021), which has prevented all offices from returning to work at 100% capacity. This meant first-hand observations of how EARCOS personnel utilized current ICT tools were non-existent, as was the option to see the document management this system produced. These observations would have provided further input and evidence on the employees' operability within the current ICT system, allowing me to in-depth the interview questions.

Secondly, I wonder if an anonymous survey of all nine office members would have provided a more honest and accurate reflection of the EARCOS members' feelings on the effectiveness of the internal communication processes and its impact on their work outcomes. I was quite pleased with the responses from employees struggling with the ICT design. However, members who may have been responsible for the current ICT set-up may have felt the need to defend their decisions in the interview versus openly answering survey questions on how they think the current system is working. In hindsight, as the Philippines implemented one of the strictest and longest lockdowns throughout the world, I can only wonder how on edge some office members were during our Zoom interviews due to the personal and external restrictions

they were experiencing at the time. These community restrictions included the inability to perform simple tasks such as grocery shopping or allowing their children under 18 to venture out in public. Then add to this experience, an outsider questioning their current technology usage and feelings about the ICT system. A survey may have provided a less threatening environment and an objective ear to share their concerns and feelings.

Lastly, when investigating similar organizations' goals and processes that impact external and internal communication, the data only includes the perspective of those organizations' Executive Directors who also happen to be responsible for their organization's goals. A survey to both the AISA and NESAs office teams or the members of their associations would have provided the level of impact those ICT goals have on the organization's ability to support both stakeholders. Though both ED's are confident in their ICT system design, the data is limited in gathering the views of other critical stakeholders within their organizations.

### **Delimitations**

As previously stated, the qualitative data focused solely on interview data of all EARCOS office staff and two ED's from similar associations. I interviewed each member with minor follow-up questions regarding conference statistics and dates to individual staff members. Throughout this capstone study, the EARCOS ED, Dr. Greene, was supportive and available for additional questions.

### **Conclusion**

The EARCOS office is one of many organizations worldwide that find themselves with an out-of-sync ICT system design that is causing more delays or frustrations than efficient outputs. Under the sociotechnical systems theory, organizations such as EARCOS can realize joint optimization between their technology and its employees by developing an ICT systems

design that considers all or a combination of the six nodes of the STS framework. Ultimately, the goal should be to establish a long-term strategy that allows employee work processes to continue innovating and adapting as the organization's knowledge and technology needs grow.

This quality improvement project aimed to help a small international regional association identify its ICT weaknesses and strengths. Based on the qualitative data and the findings, the areas of concern are not in its current technological tools but rather in the lack of direction and articulated outcomes it expects from its ICT system and office staff. In line with developing and communicating its ICT goals, the organization must support its employees by offering training for both the technology and the standardized policies expected from employees to continue their work uninterrupted. Hiring an organized, digitally savvy individual in the next open position will provide the additional support this hard-working team needs to continue to adapt to accomplish its current and future ICT goals.

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## Appendices

### Appendix A: Interview questions for EARCOS office personnel.

Interviewee's Position	Interview Questions
<p><b>Q1:</b> How is the team currently using technology for internal communication and documentation?  <b>Q2:</b> To what extent do members feel their current internal communication processes and technology effectively ensure they have the information they need to complete their work?</p>	
<p><b>Section I</b></p> <p>All EARCOS Personnel</p>	<ol style="list-style-type: none"> <li>1. Tell me about your role at EARCOS. <b>Q1</b> <ol style="list-style-type: none"> <li>1.1. What does your day to day work like? <b>Q1</b></li> </ol> </li> <li>2. What are the current ICT tools you use? <b>Q1</b> <ol style="list-style-type: none"> <li>2.1. How was this current system introduced? <b>Q2</b></li> <li>2.2. What training did you receive with the current ICT system? <b>Q2</b></li> </ol> </li> <li>3. Who developed or introduced the current information management system? <b>Q2</b> <ol style="list-style-type: none"> <li>3.1. How much of the current system was developed by your workflow? <b>Q2</b></li> </ol> </li> <li>4. To what extent do you feel their current internal communication processes and technology effectively ensure the team has the information they need to complete their work? <b>Q2</b></li> </ol>
<p><b>Section II</b></p> <p>Executive Director/ Asst. Executive Director/ Asst. to the Executive Director  (Tarng &amp; Liu, 1994)</p>	<ol style="list-style-type: none"> <li>1. How do you feel the current process of transmitting information is going? <b>Q2</b> <ol style="list-style-type: none"> <li>1.1. Effective? Efficient? <b>Q2</b></li> </ol> </li> <li>2. How do you engage with the information? <b>Q1</b> <ol style="list-style-type: none"> <li>2.1. How well is that information supplied today? <b>Q1</b></li> <li>2.2. What future changes are likely to occur in the environment of information management to which it must be able to respond in the future? <b>Q2</b></li> <li>2.3. What underlying data needs to be defined and shared consistently across organizational boundaries to ensure that information needs are met? <b>Q1</b></li> </ol> </li> <li>3. What functions of knowledge management are appropriate for this organization, and where do the most critical needs lie? <b>Q2</b></li> <li>4. What types and arrangements of data management computing and communication technologies are best for this organization? <b>Q2</b></li> </ol>
<p><b>Section III</b></p> <p>IT Personnel</p>	<ol style="list-style-type: none"> <li>1. To what extent does the leadership provide you with what the knowledge and data management processes should entail? <b>Q1, Q2</b></li> <li>2. Questions 1, 3, and 4 from Section II. <b>Q2</b></li> <li>3. What tech tools are similar organizations using to communicate externally to their members and internally with their employees that you are aware of? <b>Q2</b></li> </ol>
<p><b>Section IV</b></p> <p>Office Coordinators/ Accountants/ Webmaster/ Office Secretary</p>	<ol style="list-style-type: none"> <li>1. If you feel more training is necessary, what additional tasks do you need help with? <b>Q2</b> <ol style="list-style-type: none"> <li>1.2. When would a good time for training be? How do you think this could be fit into your daily schedule or workflow? <b>Q2</b></li> </ol> </li> <li>3. Questions 1 and 2 from Section II. <b>Q1, Q2</b></li> <li>4. Question 3 from Section III. <b>Q2</b></li> </ol>

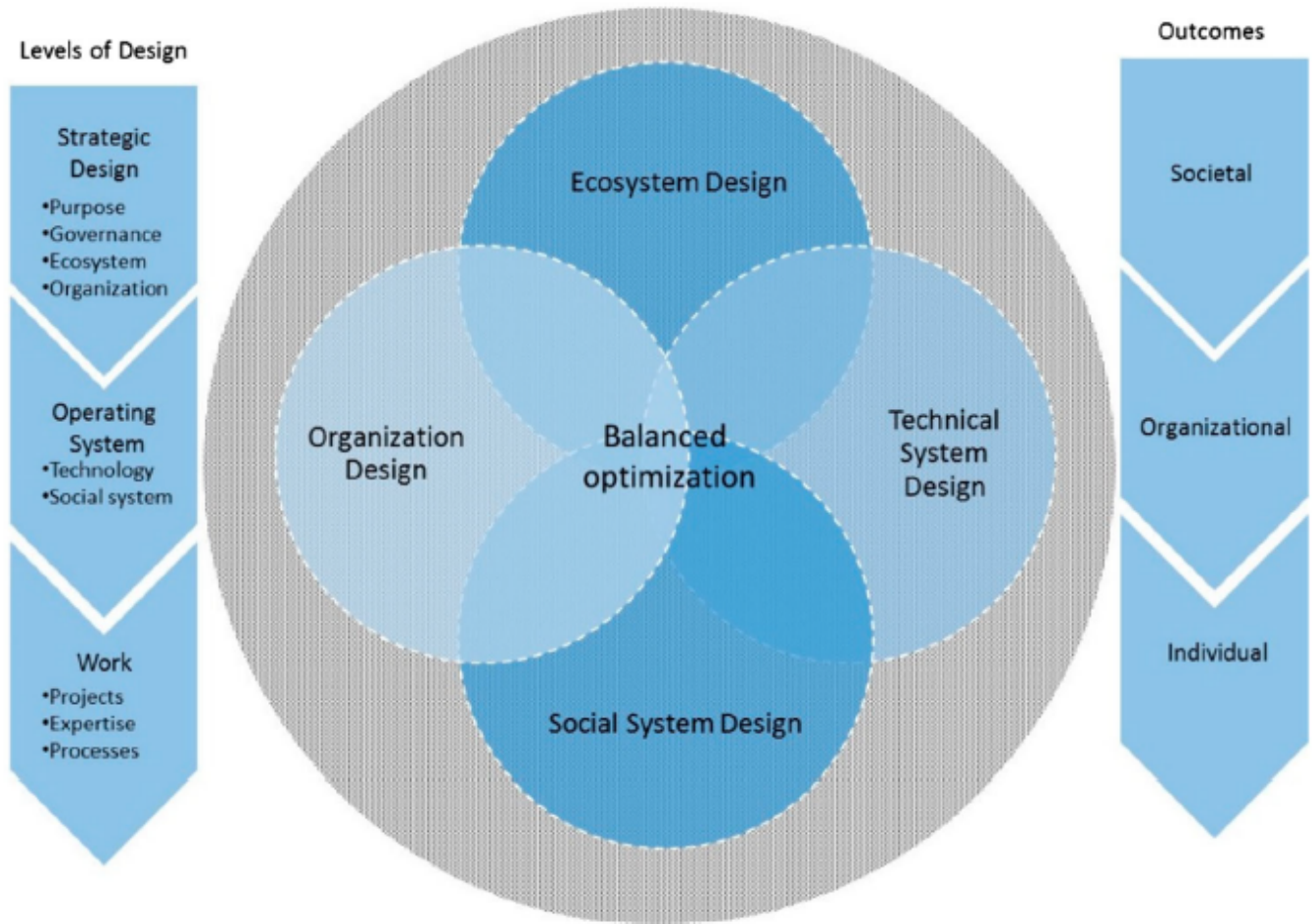
Interview questions for other international education coordination organizations.

<p><b>Q3:</b> What tech tools are similar organizations using to communicate externally to their members and internally with their employees?</p>
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#### Interview Questions

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1. Tell me about your role at X.
    - 1.1. What does your day to day work like?
  2. What are the current ICT tools you use?
  3. Who developed or introduced the current information management system?
    - 3.1. How much of the current system was developed by your workflow?
  4. To what extent do you feel their current internal communication processes and technology effectively ensure the team has the information they need to complete their work?
- 
5. How do you feel the current process of transmitting information is going?
  6. How do you engage with the information?
    - 6.1. What future changes are likely to occur in the environment of information management to which it must be able to respond in the future?
    - 6.2. What underlying data needs to be defined and shared consistently across organizational boundaries to ensure that information needs are met?
  7. What functions of knowledge management are appropriate for this organization, and where do the most critical needs lie?
  8. What types and arrangements of data management computing and communication technologies are best for this organization? (Tarng & Liu, 1994)
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9. What tech tools are similar organizations using to communicate externally to their members and internally with their employees that you are aware of?
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## Appendix B: STS design for organizations of the future.



(Pasmore, 2019)

## Appendix C: The basis for EARCOS’s recommended training initiatives.

The basis for EARCOS’s recommended training initiatives is based on the executive director’s questions before this quality improvement project started regarding the type of professional development required and from the research of Tarng & Liu (1994).

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| 1. What kind of professional development is needed for people in the office? | 1. The EARCOS office staff need training with the Google Workspace tools. Specifically, how to share and limit access to information without disrupting each others work processes or creating additional work for themselves, and understanding where to find or track deleted data. |
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| 2. What are we? | 2. From Finding # 4: The purpose of education associations is to be “a membership organization that people look to” that brings “high intentions” to the “new ways of work.” These education associations must have an ICT system that communicates to keep the data sets up to date, that when they reach out to a member school, they use the correct name and title of that school’s contact person. “The consequence is a reputational risk if you don’t get it right.” |
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| 3. How are we working on using technology? | 3. This is an area where EARCOS employees need to focus their training efforts. See Figure 5 (pg. 53) for the databases critical to international education associations and how the technology should support its employees in its document management. |
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| 4. What are the strengths and areas that we’re not capitalizing on? | 4. Strengths: The EARCOS faculty is a committed and professional group of employees loyal to the organization and the member schools it supports. These individuals are eager to improve their work processes and of the entire operation. The motivation and intent is present from the majority of office staff.<br><br>Weakness: There is some internal wasted hours for some individuals that is causing frustration as this limits their work outputs. Individuals who have access to and control the information have minimal understanding regarding who needs the information and why. |
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| 5. Why do we need to change our present method of document management? | 5. Not everyone who needs access to the office’s knowledge and information has access. Currently, there is one person who manages and stores the key databases, which is not ideal to increase the efficiency and effectiveness of work processes. Additional areas offered by the executive director include, “we need to have the right data...we have 190 schools that we serve.” And “if we had a structure that when things come along,...it allows us to communicate on a regular basis using |
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the technology we can expect many of the people in the region to see.”

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6. Who are the users of the information, and what must the document management system (or document manager) provide to increase employee satisfaction?

6. All office personnel including leadership are users of the information. The internal document management system must provide access to the information. Access means the ability to quickly find the information with the understanding that each employee knows the data exists and the ability to manipulate the data.

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7. What are the key objectives of data management?

7. See Finding #1

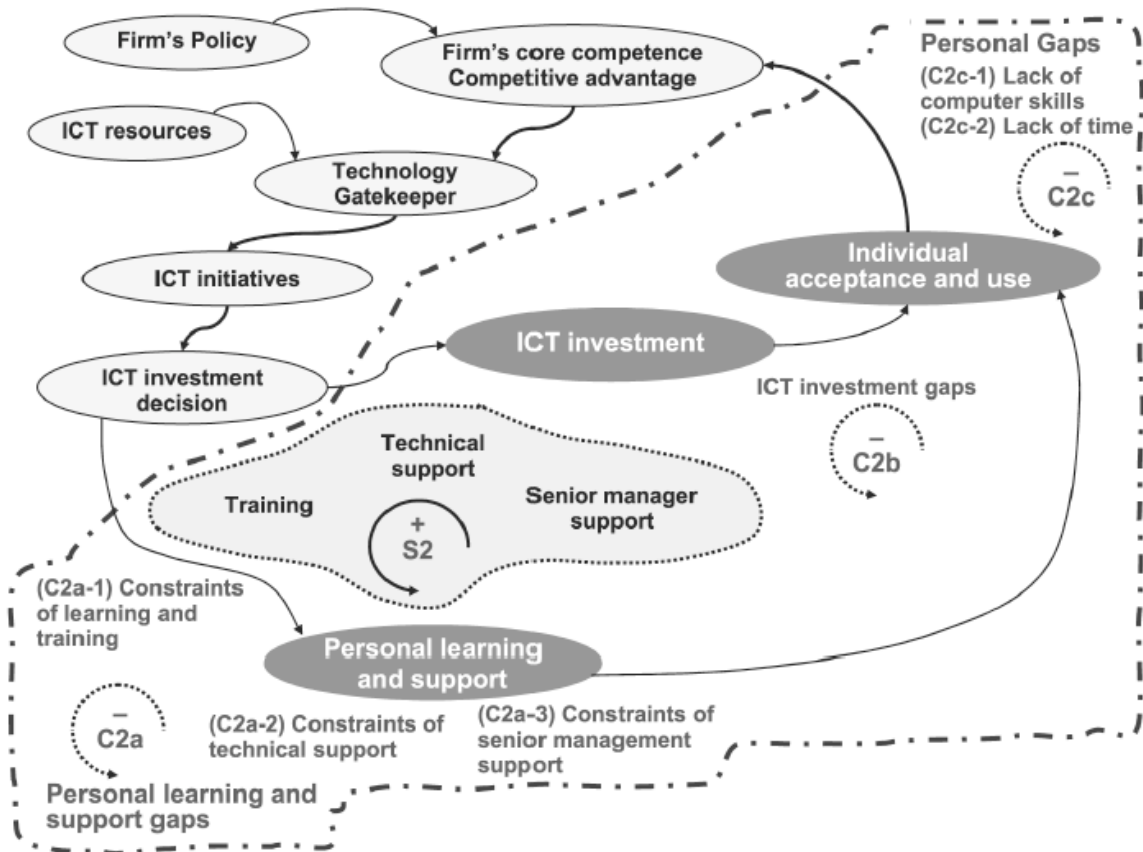
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8. How should the data be organized and conducted?

8. See Finding #1

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**Appendix D: ICT diffusion drivers and constraints at the individual level**



(Peansupap & Walker, 2006)