

Evaluating the Success of an Online Collaboration and Communication System: The Case of the Belize Defence Force

Vivian Courtney
University of Belize
College Street, West Landivar
Belize City, Belize
2016115572@ubstudents.edu.bz

Erin Flowers
University of Belize
College Street, West Landivar
Belize City, Belize
2014110561@ubstudents.edu.bz

Alexander Yuen
University of Belize
College Street, West Landivar
Belize City, Belize
2007115783@ubstudents.edu.bz

Zenon Ciego
University of Belize
College Street, West Landivar
Belize City, Belize
2005112617@ubstudents.edu.bz

Abstract

There are vast amount of research conducted on the success of information systems using the IS Success Model by DeLone and McLean consisting of six dimensions: information quality, system quality, service quality, use, user satisfaction and perceived net benefit. Little research though, has been done on IS Success in for Collaboration and communications systems for developing countries military. This study provided an empirical test of a modification to the IS model with the inclusion of complementary technology quality and computer self-efficacy as a construct of measure. Thus, this research focused on the seven modified dimensions in an effort to provide empirical evidence of the success of The Kerio Connect Client Collaboration and Communication system and determine which attributed the most perceived net benefits. In applying these constructs, we will see what is most favorable about the system if any and what is lacking whether system requirement or skill requirement, thus, the most successful in usage for the Belize Defence Force. This paper will conclude by discussing the limitations of the study, which should be addressed in future research.

Keywords: information systems, information systems success model, collaborative and communication system, developing countries, technology complementary assets

1. Introduction

This research project tested the overall Information System (IS) qualities of the Kerio Connect Client system. This ISs was selected to study its success when using the IS Success Model implemented by William H. DeLone and Emphraim R. McLean in 1992. These systems' success were determined by evaluating the relationship between information systems on the six dimensions of the model focusing on

information quality, system quality, service quality, usage intentions, user satisfaction and overall system benefits (DeLone & McLean, 2003). In this study, though, the researchers have made changes to the traditional model given that Belize is considered on a global scale as a developing country. In respect to such consideration, it was concluded that Belize simply lacks the necessary complementary assets needed to truly achieve IS Success. Organizations in Belize have invested substantially in information systems and programs, but these systems have failed to provide optimal success due to the country's poor investment in complementary assets and human skill sets needed to run any system.

In respect to the lacking complimentary assets, this research studied the six dimensions of this model along with the addition of testing the available complementary assets and its reliability, efficiency and overall effectiveness along with the human skill sets readily available.

Two trends related to collaboration and communications is fostering useful new conceptions of human computer interfaces. First, evolving theories of interpersonal collaboration and communication are beginning to be applied to human-machine interactions, demonstrating that thinking about human machine interactions as communication and dialogue— rather than, for example, a series of isolated commands and responses— can make systems easier to use. For this research we are more concerned with the second trend. The increasing use of computer systems in support of communication and collaboration among groups of people (whether for work, education, or entertainment) highlights the need for understanding interfaces as links among many people and machines, not just one person and one machine. In both of these arenas, better understanding and development of richer theories of collaboration and communication will lead to improvements in the ways people use the information infrastructure (e.g., to obtain information and services) or to interact with other people in order to communicate, collaborate, and form communities

The government of Belize through its Central Information Technology office based in Belmopan City commissioned the use of the Kerio Connect Client software system. In Kerio Connect Client you can manage emails, chat messages, calendars, contacts, tasks, and notes. The objective of this system to ease the flow of information across ministries, reduce the need for hard copy and increase productivity through the increased speed of information transferability. The Belize Defence Force is going through a learning curve to adapt to and implement new technologies and systems software as part of its daily operations. This research will aim to find out the return on investment from the Belize Defence Force through the utility of this software system.

This system was commissioned in early 2016 and there are not studies relating to this system or the Belize Defence Force utility of any other system. This research will lead and compliment future studies of the Belize Defence Force and this software system. The award-winning messaging and collaboration solution, Kerio Connect, meets the needs of small and mid-sized business. It offers unmatched deployment flexibility and broad mobile device support. Business users enjoy support for their favorite email client and Kerio Connect Client via their favorite web browser.

The originality of this research would not only be provisions of descriptions of Kerio Connect Client collaboration and communication system, but also its net benefit in relation to IS success. This comparison measurement created a relationship between these systems and the IS Success Model by DeLone and McLean. In this relationship building, the researchers added two dimensions, complimentary technology quality and computer self-efficacy, to test the reliability and availability of the complementary assets Belize and the Belize Defence Force offers. In addition, the researchers will analyze Kerio Connect Client in regards to the usage by both high ranking officers and regular enlisted soldiers of the Belize Defence Force using the IS Success framework.

2. Literature Review

Collaboration information systems makeup

Collaboration information systems comprise of several different components. These components are divided into two major categories; Hardware and Software. Under Hardware, we have client computers

and server computers. It is important to note that servers can be maintained within the firm, and it can be maintained external to the firm. The software component can comprise of many different programs such as Google Docs and Spreadsheets, Microsoft SharePoint Workspace, Google Wave, and CMS such as Moodle, Joomla, and Blackboard. Aside from the Hardware and the Software, there are additional elements that make up a collaboration information system. These include: Data (Documents, Discussion Lists, Task Lists, Wikis & Blogs), Procedures (Using the software, Team Collaboration) and People (Communication and collaboration skills)(Maine 2010).

There are three criteria that contribute to the success of a collaboration information system. These are: 1.) Having a successful outcome 2.) The growth in team capability and 3.) Having a meaningful and a satisfying experience. When it comes to having a successful outcome, a group must work at its best to achieve the best result possible. Now when talking about the growth in team capability, one needs to again do their best by improving in their individual skills, so that the groups capability is increased throughout the project. Lastly one needs to see the project, in which one is working, and see it as valuable and meaningful to make it a meaningful experience. One needs to be able to see the importance of what they are doing to be motivated to do a better job. This is where the element of people come in. Now to make it a satisfying experience, the team can form a great team working environment that makes the experience as satisfying as possible. At the end of the day, people need to try their best to get along with each other, share ideas and meet their common goal (Villamar, D. 1970).

E-mails and online conferences have become the standard in the business world. They've come to replace phone calls, snail-mail, and long flights and long stays in unfamiliar cities (Neely, 2010; McDonough, 2012). In this generation, online communication is the most commonly used communication of any sort and it is the most preferred method of communication. It is the backbone of most organizations. The importance and need of online communication is extremely high all industries, that's mainly because information, messages and thoughts are exchanged with just the click of a button. As mentioned above E-mails have taken the place of phone calls, etc. and in addition to that the introduction of chat rooms and instant messages within organizations has also sparked the use of online communication to different heights. The internet is what does the heavy lifting for most organizations today; it is what is used to get information to and from employees throughout the organization without even having to move from your position.

IS Success Collaboration Information Behavior

There is limited to no study covering collaboration information system in Belize same as the knowledge concerning collaboration information behavior (CIB) is not limited to organizations; the CIB concept is still relatively new in the information sciences field.

Researchers have discussed the importance of collaboration in organizational work and benefits of it (Ackerman, 2000; Dourish, 2004), A key concern when discussing CIB behavior is its definition. There is not a universally accepted characterization of CIB, we will use as the definition proposed by researchers from the University of Washington's collaborative information retrieval project: "activities that a group or team of people undertakes to identify and resolve a shared information need" (Poltrack, Dumais, Fidel, Bruce, & Pejtersen, 2003). The definition has two important concepts that are central to CIB behavior. The first concept is collaboration: people working together to seek information. The second concept is resolving an information need. This includes seeking, retrieving, and using information to solve a problem. The ever-increasing modes of communication and media in which to present information provided by current technology also complicate and enrich the interface challenge.

Beyond the view of interfaces to consider communication and collaboration becomes even more important when we consider combining video, voice, and graphics. Computer systems have become more than machines used to perform isolated tasks. They are now widely used as machines for communicating different kinds of information using a range of media, and they provide possibilities for structuring and interacting that were unavailable previously (traditional print, graphic, and broadcast media). The roles of theories of collaboration and communication differ across these arenas, but the value of a better understanding of what constitutes collaboration and what is needed for effective communication is

essential to both of them. Researchers are studying the conceptual aspects of CIB across a wide variety of domains. Researchers from the University of Washington have been exploring the collaborative information retrieval (CIR) activities of design teams (Bruce et al., 2003; Fidel et al., 2000; Fidel, Pejtersen, Cleal, & Bruce, 2004; Poltrock et al., 2003).

Communicating through the internet is beneficial to any organization; however there is a dark side, or in other words, a not so beneficial side to it. "Through online communication information is accessible 24x7, any place as long as you have an internet connection" (Jois, 2008). The above statement brings to life the benefit of online communication. (Jois, 2008) also stated that "unlike verbal conversation, online discussion is lasting and can be revisited". Those are two benefits of using online communication, however two not so beneficial points are: that they are no physical clues to help you not to be misunderstood or to misunderstand someone. "Without facial expressions and gestures or the ability to retract immediately there's a big risk of misunderstanding" (Jois, 2008). Also, there is the fact that you can be affected by the amount of information sent at the same time. "Information overload: a large volume of messages can be overwhelming and hard to follow, even stress-inducing" (Jois, 2008). Just like with anything in life, there is beneficial side and a not so beneficial side. That is the same thing with online communication. Nevertheless, online communication is important, and it will continue to be relevant for as long as the internet exist. "There is no limit to where the importance of online communication can be ended" (Jois, 2008).

IS success collaboration and communication information system in developing countries

There has been a boom in globalization in recent years largely due to ease of communication. As a consequence, globally distributed collaborations and virtual teams have become increasingly common in many areas such as new product development and information systems (IS) development (Sarker and Sahay, 2004). Proper application of technical and operational mechanisms such as collaborative technologies, IS development tools and coordination mechanisms are the key to successful system development projects (Carmel, 1999). Several studies have focused on issues relating to the dispersion of work and the constraints associated with information success and communication. In some of these studies, constraints such as temporal distance, geographical distance and socio-cultural distance are identified, and while they indeed increase the scope of organizational operation (Sahay, 2003). As students become more technologically aware and develop themselves so will the information systems firms in the country uses this will slowly increase out capacity and increase collaboration and communication more efficiently and effectively.

3. Research model Hypothesis and Methodology

This research project tested the overall Information System (IS) qualities of the Kerio Connect Client system. This IS was selected to study its success when using the IS Success Model implemented by William H. DeLone and Emphraim R. McLean in 1992. This systems' success was determined by evaluating the relationship between information systems on the six dimensions of the model focusing on information quality, system quality, service quality, usage intentions, user satisfaction and overall system benefits (DeLone & McLean, 2003) along with the two other additional models complementary technology and computer self-efficacy. In this study, though, the researchers have made changes to the traditional model given that Belize is considered on a global scale as a developing country. In respect to such consideration, it was concluded that Belize simply lacks the necessary complementary assets needed to truly achieve IS Success. Organizations in Belize have invested substantially in information systems and programs, but these systems have failed to provide optimal success due to the country's poor investment in complementary assets and human skill sets needed to run any system.

In respect to the lacking complimentary assets, this research studied the six dimensions of this model along with the addition of testing the available complementary assets and self-efficacy.

In conjunction with historical research, this study attempted to extend the DeLone and McLean model regarding IS Success to the developing world of technology. As seen before, the research model presented

in this study was an extension to the traditional model with the modification to include complementary technology quality and computer self-efficacy as a measurable construct. These inclusion are a key dimension in assessing overall system success in developing countries where internet connections are slow and inadequate. Thus, this study focused mainly on the perspective of the officers and enlisted soldiers of the Belize Defence Force, and used the six dimensions of IS Success inclusive of the additional constructs, complimentary technology quality and computer self-efficacy as shown in Figure 1.

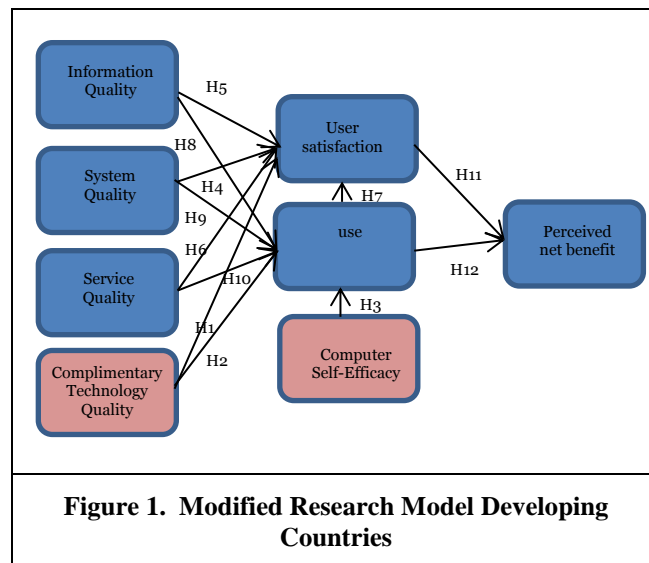


Figure 1 illustrates the six constructs of the DeLone and Mclean model inclusive of the additional construct, Complimentary Technology Quality and computer self-efficacy used to validate this research study.

The hypothesized relationships between collaboration and communication system success variables are based on the theoretical and empirical work reported by DeLone and McLean (2003). As they suggest, the success model needs further development and validation before it could serve as a basis for the selection of appropriate IS measures. Accordingly, the study hypothesized the following twelve hypotheses tested:

Hypothesis:

- H1. Complimentary technology quality will positively impact user satisfaction.
- H2. Complimentary technology quality will positively impact system use.
- H3. Computer self-efficacy will positively impact system use.
- H4. System quality will positively impact user satisfaction.
- H5. Information quality will positively impact user satisfaction.
- H6. Service quality will positively impact user satisfaction.
- H7. Use will positively impact user satisfaction.
- H8. Information quality will positively impact use.
- H9. System quality will positively impact use.
- H10. Service quality will positively impact use.

H11. User satisfaction will positively impact perceived net benefit.

H12. Use will positively impact perceived net benefit.

3.1. Construct measurement

Validated measuring instruments from previously verified instruments were used in this research for the quantitative data collection. The information quality construct was measured by a six-item scale from Bailey and Person (1983), with modifications to fit the specific context of Kerio Connect Client. Bailey and Pearson's instrument is widely accepted, has been tested for reliability and validity by several researchers, and has become a standard instrument in the IS field. A four-item scale was adopted and refined from instruments used by Alshibly (2011) were used to measure the system quality construct.

Service quality construct was measured using a four-item scale was adopted and refined from instruments used by Chang et al (2009). Use was measured by a four-item measure adapted from previous studies (Balaban et al., 2013; Rai et al., 2002). Computer self-efficacy was measured using a six-item scaled adopted and refined from instruments used by Compeau, D. R., & Higgins, C. A. (1995) and complementary technology quality was measuring using a three-item measured scaled adopted from Teece, D. J. (1988). In this research, we consider satisfaction as an evaluative judgment regarding a specific Kerio Connect experience and the affective attitude. This construct was measured with a four-item scale from Seddon and Yip (1992). The Kerio Connect perceived benefits defined as an achievement of a firm's objectives. This was operationalized by a six-item scale adopted from (Alshibly, 2011; Tansley et al, 2001). Table 1 presents the research constructs and related survey items used for measurement of each of these constructs.

Table 1. Measurement items for questionnaire		
Construct	Survey Questions	Source
Information Quality	IQ1: The Kerio Connect client system provides information that is exactly what you need. IQ2: The Kerio Connect client system provides information you need at the right time. IQ3: The Kerio Connect client system provides information that is relevant to your job. IQ4: The Kerio Connect client system provides sufficient information. IQ5: The Kerio Connect client system provides information that is easy to understand. IQ6: The Kerio Connect client system provides up-to-date Information.	Bailey and Person (1983)
System Quality	SQ1: The Kerio Connect client system is easy to use. SQ2: The Kerio Connect client system is user-friendly. SQ3: The Kerio Connect client system provides high-speed information access. SQ4: The Kerio Connect client system provides interactive features between users and system.	Alshibly, (2011)
Complementary Technology Quality	CTQ1: The software on the device (desktop computer, laptop, mobile device) used to access the Kerio Connect is adequate. CTQ2: The device hardware (desktop computer, laptop, mobile device) used to access the Kerio Connect is adequate. CTQ3: The device (desktop computer, laptop, mobile device) used to access the Kerio Connect has an adequate internet connection in regards to speed and reliability.	Teece, D. J. (1988)

Construct	Survey Questions	Source
Computer Self-Efficacy Measure	<p>CSE1: I could complete the job using the Kerio Connect if there was no one around to tell me what to do as I go.</p> <p>CSE2: I could complete the job using the Kerio Connect if I had never used the Kerio Connect like it before.</p> <p>CSE3: I could complete the job using the Kerio Connect if I had seen someone else using the Kerio Connect before trying it myself.</p> <p>CSE4: I could complete the job using the Kerio Connect if I could call someone for help if I got stuck.</p> <p>CSE5: I could complete the job using the Kerio Connect if someone else had helped me get started.</p> <p>CSE6: I could complete the job using the Kerio Connect if I had a lot of time to complete the job for which the Kerio Connect was provided.</p>	Compeau, D. R., & Higgins, C. A. (1995)
Service Quality	<p>SQ1: The support staff keeps the Kerio Connect client system software up to date.</p> <p>SQ2: When users have a problem, the Kerio Connect client system support staff show a sincere interest in solving it.</p> <p>SQ3: The Kerio Connect client system support staff respond promptly when users have a problem.</p> <p>SQ4: The Kerio Connect client system support staff tell users exactly when services will be performed.</p>	Chang et al., (2009)
User Satisfaction	<p>US1: Most of the users bring a positive attitude or evaluation towards the Kerio Connect client system function.</p> <p>US2: You think that the perceived utility about the Kerio Connect client system is high.</p> <p>US3: The Kerio Connect client system has met your expectations. You are satisfied with the Kerio Connect client system.</p>	Seddon and Yip (1992)
Use	<p>U1: The frequency of use with the Kerio Connect is high.</p> <p>U2: You depend upon the Kerio Connect.</p> <p>U3: I was able to complete a task using the Kerio Connect even if there was no one around to tell me what to do as I go.</p> <p>U4: I have the knowledge necessary to use the Kerio Connect.</p>	Balaban et al., (2013) Rai et al., (2002).
Perceived Net Benefits	<p>NB1: The Kerio Connect client system helps you improve your job performance.</p> <p>NB2: The Kerio Connect client system helps the organization cut cost.</p> <p>NB3: The Kerio Connect client system helps the organization achieve its goal.</p> <p>NB4: Using the Kerio Connect client system in the execution of my job increases my productivity.</p> <p>NB5: Using the Kerio Connect client system improves assessment and training processes.</p> <p>NB6: Overall, using the Kerio Connect client system enhances recruitment and performance management.</p>	Alshibly, (2011); Tansley et al, (2001)

Table 1. Measurement items for questionnaire

3.2. Sampling and data collection

The data for this study were collected from a sample of soldiers which included officers and enlisted members of the Belize Defence Force. The method of the research sampling is “purposive sampling” which gives the researchers to use their own judgment to select suitable people for the sample. A total of 30 questionnaires were handed out to various members of the force from different location within the country but only 25 were returned.

Table 2. Characteristics of respondents		
Characteristics	Number	Percentage
Gender		
Male	15	60
Female	10	40
Age		
Less than 20		
From 20 to 25	9	36
Over 25 to 35	11	44
Over 35	5	20
Education		
Bachelors		
Associates	2	8
High school	18	72
Primary school	5	20
Position		
Clerk	4	16
Officer	2	8
Regular enlisted	13	52
volunteer	6	24
Computer experience		
Years of experience	11	
Years of service		
Less than 3		0
More than 3	9	36
More than 6	3	12
More than 9	7	28
More than 12	6	24

The respondents' characteristics are presented in Table 2

4. Data Analysis and Results

Due to the small amount of sample size, hypothesis testing was not possible so the researchers analyzed the data utilizing applied research techniques.

The primary purpose of the study was to compare the usage and success Kerio Connect Client software Information and Collaboration system at the Belize Defence Force. One comprehensive questionnaire was used highlighting the usage of this Information System based on the DeLone and McLean Model were distributed soldiers at Price Barracks Ladyville Belize District. The results of the issued questionnaires were displayed through the use of histograms and bar charts. To allow for effective visuals, the histograms provided a better comparison of success between the two systems using the constructs of the theoretical model.

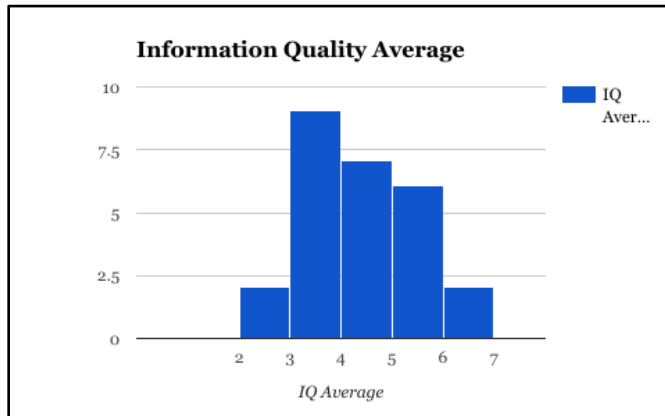


Figure 1. Average responses for Information Quality

The adjacent histogram shows the average responses of soldiers for the construct that measures information quality.

40% disagree that the information quality provided by Kerio Connect Client was poor while 32% believe it was

We attributed this negative skew to the fact that many of the features that this software is underutilized or not used at all.

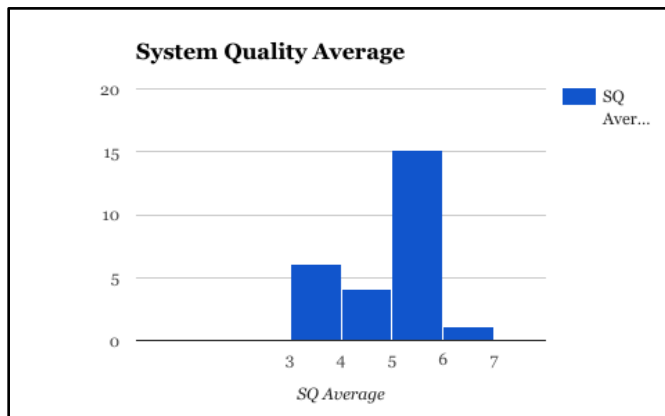


Figure 2. Average responses for System Quality

The adjacent histogram shows the average responses of soldiers for the construct that measures system quality.

The average agrees that Kerio Connect Client system quality is of good standing.

64%of the response shows that the users are not fully versed with the software to get maximum information quality.

We attribute this response to the fact that 52% of the respondents were not daily users of the system.

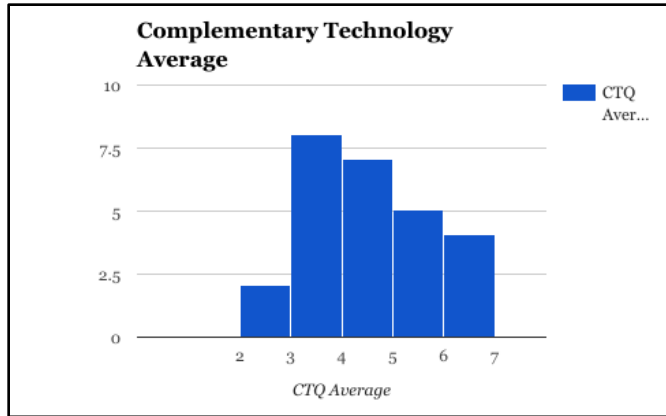


Figure 3. Average responses for Commentary Technology

The adjacent histogram shows the average responses of soldiers for the construct that measures complementary technology.

The average response shows that 40% of respondents believed that the complementary technology is poor but 36% of respondents agree that it is satisfactory.

We attribute this difference in opinion of the respondents to the fact that 24% of the officers and clerks have better internet access and functioning computer systems compared to the majority.

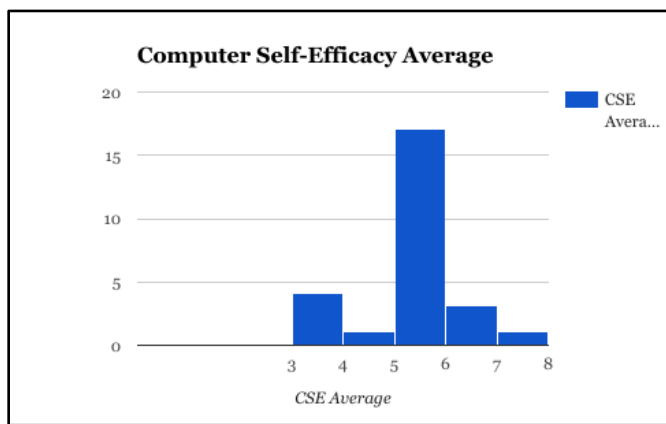


Figure 4. Average responses for Self-Efficacy

The adjacent histogram shows the average responses of soldiers for the construct that measures computer self-efficacy quality.

The average response shows that 80% of the respondents feel confident utilizing the software.

We attribute this to the fact that the vast majority utilizes the bare minimum of the software and are comfortable with that and may not know what else the software offers.

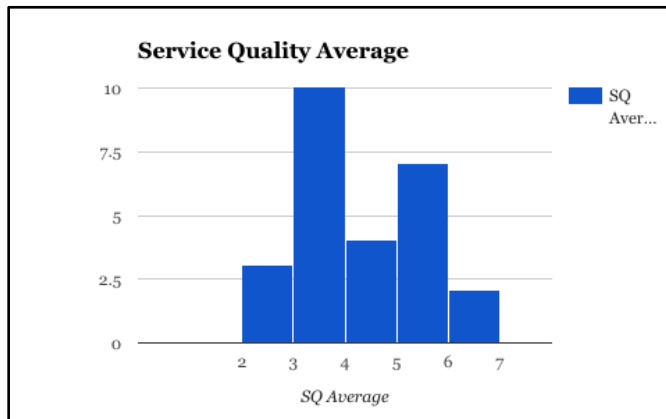


Figure 5. Average responses for Service Quality

The adjacent histogram shows the average responses of soldiers for the construct that measures service quality.

The average response shows that 48% of the respondents do not favor the service quality while 36% of persons equally favor it.

We attribute this to the fact that 24% of the respondents use the software on a daily basis and would have easier access to support IT staff to rectify issues.

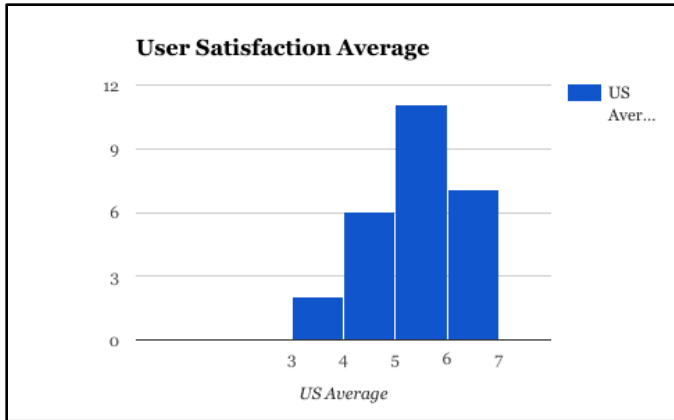


Figure 6. Average responses for User Satisfaction

The adjacent histogram shows the average responses of soldiers for the construct that measures user satisfaction.

The average response shows that 72% of the respondents were satisfied with the systems.

We attribute this satisfaction to the fact that majority of the respondents use the bare minimum of features that software offers.

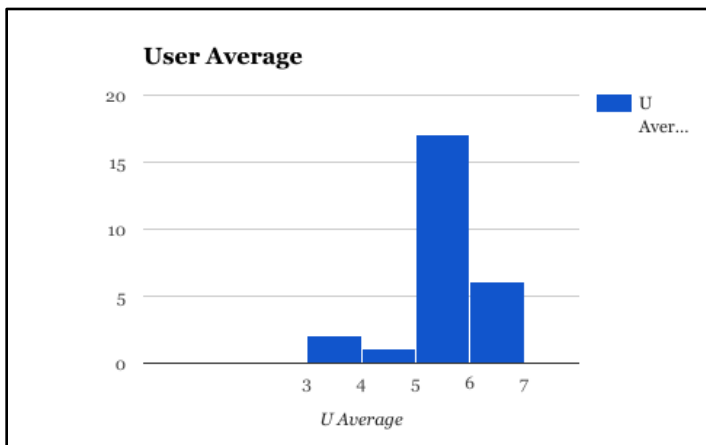


Figure 7. Average responses for User Average

The adjacent histogram shows the average responses of soldiers for the construct that measures use of Kerio Connect Client.

The average response shows that 88% use this system to accomplish tasks.

We attribute this high percentage to the fact that it is a requirement to use the systems and not they use it for preference.

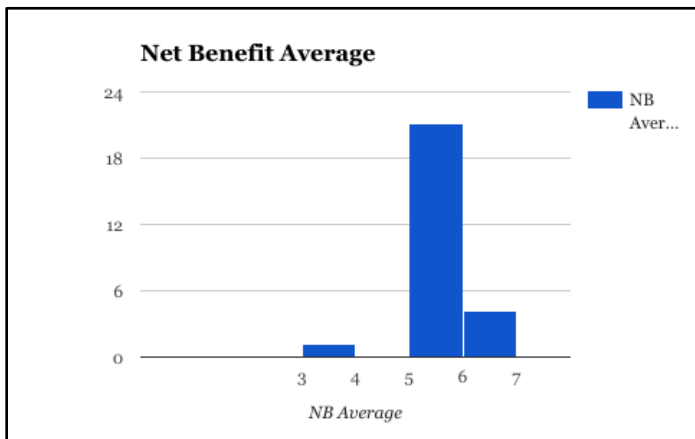


Figure 8. Average responses for Net Benefit

The adjacent histogram shows the average responses of soldiers for the construct that measures net benefit.

The average response shows that 92% of the respondents enjoy some net benefit from the utility of this IS in the execution of their work.

We attribute this high percentage to the fact that it is a requirement to use the systems and not they use it for preference.

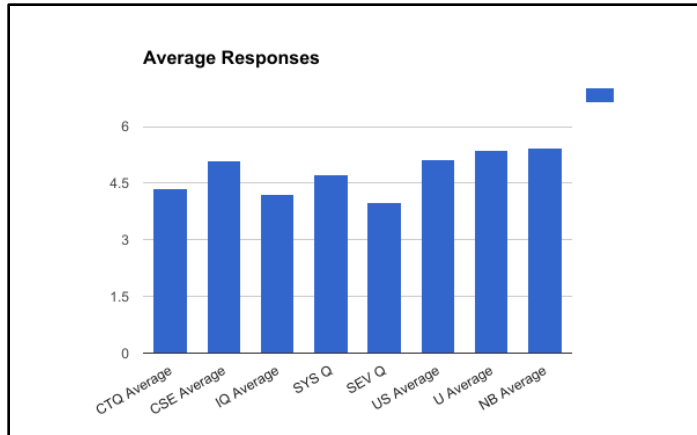


Figure 9. Average responses for all eight constructs

The adjacent histogram shows the average responses of soldiers for the constructs that were measures during this research.

The average response shows that system is successful and the variances in opinion from the respondents can be attributed to the level on interaction the individual has with the systems. Officers and clerks has more utility compared to regular enlisted and volunteer soldiers.

5. Conclusion

Discussion

This research has addressed the concern for measuring the success of Kerio Connect Client Information and Collaboration system. For this purpose, an Kerio Connect Client success measurement model was developed based on the DeLone and McLean (2003) updated IS success model, which captures the multidimensional nature of Kerio Connect IS success. The results show that information quality, system quality, service quality, complementary technology quality, computer self-efficacy, use, user satisfaction, and perceived net benefit are valid measures of Kerio Connect IS success. The hypothesized relationships between the eight success variables were significantly supported.

This research provides several important implications for Kerio Connect IS success research and management. According to the proposed model, perceived net benefit is considered to be a closer measure of Kerio Connect success than the other seven success measures. Perceived net benefit should develop if the formation of perceived quality, system use, and user satisfaction is appropriately managed. Thus, management attention might more fruitfully focus on the development of these psychological and behavioural processes.

In order to increase user perceived net benefit, the Belize Defence Force and Central Information Technology Office that regulator of Kerio Connect Client need to address better information quality, system quality, and service quality, which, in turn, will influence user system usage behaviour and satisfaction evaluation, and the corresponding perceived net benefit. In this model, system use was found to have a strong direct effect on perceived net benefit, indicating the importance of system use in executing duties and increasing perceived net benefit. Simply saying that increased use will yield more benefits, without considering the nature of this use, is insufficient (DeLone & McLean, 2003), as system use is a necessary condition of yielding benefits the Belize Defence Force as it a requirement to use the system.

The findings clearly indicate that the total effects of information quality on use, user satisfaction, and perceived net benefit are substantially greater than those of complementary technology quality and service quality. That is, in the context of the Belize Defence Force, beliefs about complementary technology quality have a more dominant influence on use, user satisfaction, and perceived net benefit than beliefs about system quality and service quality. Essential the Belize Defence Forces needs better hardware and faster and reliable internet access.

Limitations and Future Research

Our research has a few limitations; this research is limited in that we used a purposive sampling of a single ministry the Belize Defence Force price Barracks Camp for the data collection. A random sample from a pool of ministries that use this system would have increased the generalizability of the results.

With regard to inviting soldiers to participate in the survey, a representative from the Belize Defence Force Price Barracks was instructed to choose a sample that was as representative of the Force that has regular use of the software. However, by leaving the survey distribution to the representative we had very little control over the sampling process. Despite these limitations, the present study provides valuable insights into the study of Kerio Connect Client Information and Collaboration IS success.

Implications

Empirical evidence generated from applied research has shown that in determining success using the DeLone and McLean model of IS Success, Kerio Connect if a favorable given that it does yield a high net benefit. In this research, the six constructs of the model along with the two additional was tested in efforts to understand system success in developing countries. Studies from this research have shown that the inclusion of the seventh and eight construct provided results of interest to developing countries that are unable to effectively receive optimal success from the integration of information systems. The inclusion of complementary technology quality was significant because it the construct that needs the most attention. In an effort to manage any information system, a relationship between the people who uses the system, the technology to access the system and the organization in which these systems are implemented, must be satisfied.

References

- Ackerman, M. S. (2000). The intellectual challenge of CSCW: *the gap between social requirements and technical feasibility*. *Human-Computer Interaction*, 15(2-3), 181-205.
- Dourish, P. (2004). What we talk about when we talk about context. *Personal and Ubiquitous Computing*, 8(1), 19-30.
- Fidel, R., Pejtersen, A., Cleal, B., & Bruce, H. (2004). A multidimensional approach to the study of human-information interaction: a case study of collaborative information retrieval. *Journal of American Society for Information Science*, 55(11), 939-953.
- Bruce, H., Fidel, R., Pejtersen, A., Dumais, S., Grudin, J., & Poltrock, S. (2003). A comparison of the collaborative information retrieval behaviors of two design teams. *New Review of Information Behaviour Research: Studies of Information Seeking in Context*, 4(1), 139-153
- Fidel, R., Bruce, H., Pejtersen, A. M., Dumais, S., Grudin, J., & Poltrock, S. (2000). Collaborative information retrieval (cir). *New Review of Information Behaviour Research: Studies of Information Seeking in Context*, 1(1), 235-247.
- DeLone, W. H., & McLean, E. R. (1992). Information systems success: the quest for the dependent variable. *Information systems research*, 3(1), 60-95.
- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems*, 19 (4), 9-30.
- Al-Shibly, H. (2011). Human resources information systems success assessment: An integrative model. *Australian Journal of Basic and Applied Sciences*, 5(5), 157-169.
- Tansley, C., Newell, S., & Williams, H. (2001). Effecting HRM-style practices through an integrated human resource information system: An e-greenfield site?. *Personnel Review*, 30 (3), 351-371.
- Chang, H. H., Wang, Y. H., & Yang, W. Y. (2009). The impact of e-service quality, customer satisfaction and loyalty on e-marketing: Moderating effect of perceived value. *Total Quality Management*, 20 (4), 423-443.
- Seddon, P. and Yip, S. K. (1992), "An Empirical Evaluation of User Information Satisfaction (UIS) Measures for Use with General Ledger Account Software," *Journal of Information Systems*, 6(spring), 75-92
- Balaban, I., Mu, E., & Divjak, B. (2013). Development of an electronic Portfolio system success model: An information systems approach. *Computers & Education*, 60 (1), 396-411.
- Tansley, C., Newell, S., & Williams, H. (2001). Effecting HRM-style practices through an integrated human resource information system: An e-greenfield site?. *Personnel Review*, 30 (3), 351-371.
- UMaine Follow. (2010, September 01). Chap 2 collaboration information systems and teamwork. Retrieved April 19, 2017, from <https://www.slideshare.net/mgraham213/chap-2-collaboration-information-systems-and-teamwork>
- Villamar, D. (1970, January 01). What is MIS? Retrieved April 19, 2017, from <http://danielvillamar23.blogspot.com/2016/12/chapter-2-collaboration-information.html>
- Sarker, S., and Sahay, S. (2004). Implications of space and time for distributed work: an interpretive study of US-Norwegian systems development teams, *European Journal of Information Systems*, 13, pp. 3-20
- Carmel, E. (1999) *Global Software Teams: Collaborating Across Borders and Time Zones*, Prentice Hall, Upper Saddle River
- Sahay, S. (2003). Global software alliances: the challenge of 'standardization'. *Scandinavian Journal of Information Systems*, Vol. 15, pp. 3-21.
- Raya, F., Pejtersen, A.M. and Cleal, B., Bruce, H. (2004). A Multidimensional Approach to the Study of

- Human Information Interaction: A Case Study of Collaborative Information Retrieval. *Journal of the American Society for Information Science and Technology*, 55 (11), 939-953.
- Hansen, P., and Jarvelin, K. (2004). Collaborative Information Retrieval in an information-intensive domain. *Information Processing and Management*, 41, 1101-1119.
- Jois, N. (2012, November). Advantages and disadvantages of online communication. Retrieved from <http://www.bangthetable.com/advantages-and-disadvantages-of-online-communication-2/>
- Bagozzi, R. P., & Dholakia, U. M. (2006). Open source software user communities: A study of participation in Linux user groups. *Management Science*, 52 (7), 1099–1115.
- Capece, G., & Costa, R. (2009). Measuring knowledge creation in Virtual Teams through the Social Network Analysis. *Knowledge Management Research and Practice*, 7 (4), 329-338.