Potential Success of the Library Information System: Mandarin M5

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Abstract

Overall, little research has been conducted on the success of the Mandarin M5 information system. This paper studies the potential success of a soon to be implemented system that will facilitate the use of libraries in the country of Belize. As technology globally advances, it is important for Belize to be able to keep pace with the modern technological era. The Mandarin M5 is a library information system that will allow users both external and internal to gain access to library resources from any location. The M5 will ease the search for information that otherwise would have to be done manually in a more tedious manner. The system is yet to be launched for public use throughout the country in the upcoming months.

Keywords: Mandarin M5, library information system, potential success, developing country

Introduction

Information Systems (IS) play a very significant role in an organization today. According to Bert Markgraf (n.d.) information systems gain importance by processing data input by the organization to generate information that is useful for managing its daily ongoing operations. This research project aims to determine the response and measure the purported success of an information system that is yet to be implemented by libraries within Belize. It is prominent for Belize to keep up with the continuous advancements in technology. IS enable organizations to be able to make better use of their data and to minimize workload (Davoren, n.d.).

The Mandarin M5 is a web-based integrated library system. Its online catalog provides access to library resources from any workstation, at the library or remotely, with an accessible internet connection. The M5 offers a simple, customizable interface tailored to meet the needs of the library's internal and external users.

Within Belize, information technology has not been fully taken advantage of. Individuals have grown used to manually entering and updating data, hindering the organization from becoming more efficient and productive. With library's implementation of the Mandarin M5, it allows for a significant number of benefits for internal users, as well as the external users. After entering and updating the online catalog of the library's books, new features become available that enables internal users to catalogue and keep better track of circulation, inventories and reports, creating greater efficacy. Moreover, after being fully implemented, external users will also benefit immensely of this new service in multiple ways. M5's new user interface, which can be accessed through a portal, is designed to refine user experience. External users will be able to search any book, view its availability and library location. In addition to this, external users will be provided with recommended books or readings based on their current searches. Although the Mandarin M5 system is still underway, it is unknown whether the execution of this Information System will bring guaranteed success to the organizational structure of the public libraries itself, as well as to the general external users.

However, due to the fact that technology is constantly evolving, libraries have begun to lose popularity. Individuals in today's society prefer to use the services of the World Wide Web, where certain information is readily available and at their disposal with a few simple clicks of a button, in contrast to visiting a library and searching for information page by page through a book. The internet is ubiquitous and when combined with an IS as part of a library's new service may recreate new functionality for libraries, primarily in developing countries, like Belize. In accordance with Herring (2010), "Libraries are icons of our cultural intellect, totems to the totality of knowledge." Therefore, the internet is not imitative of a library; it is merely a tool that is best used in addition to traditional research sources.

Originality

The originality of this research stems from the simple fact that it has never been conducted in the country of Belize. There is no current published research on how such information system as the Mandarin M5 will impact or automate the use of libraries throughout Belize.

Literature Review

Libraries are buildings that host a wealth of information in the form of book collections, periodicals, articles and other reference material that users can read, borrow, or refer to. Communities are allowed access to these banks of information in order to facilitate life-long learning. However, it is an overwhelming task for Librarians to manually document and categorize the vast amount of data stored within their libraries. Thus, library management systems have been developed to improve speed and efficiency of librarians' cataloguing and shelf management responsibilities. As a matter of fact, management information has been available to libraries for a very long time, through manually compiled records, but libraries haven't always had access to computer generated information (Gumilar and Johnson 1995). Outside of the United Nations, in developing countries, there was little use of any library automation whatsoever (Hopkinson 2009).

An extremely rare but highly efficient library management system consists of a combination of Decision Support System (DSS) and Radio Frequency Identification (RFID). RFID is a new generation of Auto Identification and Data collection technology which helps to automate business processes and allows identification of large number of tagged objects like books using radio waves.

DSS component is implemented using various data mining techniques for arranging the vast information of books, customer information etc in a systematic manner to help librarians with shelf management. Decision support system for the library makes it easier for customer to decide on, select and locate their books without manual intervention. Based on their selections and reading patterns, the system is able to recommend books that might suit user's interest. This can help the librarian to provide many services, such as managing the shelf according to the interest of users (Waykar, Shelar, Zanjure, Vibhute, Singh, 2012).

Libraries in developing countries will adapt information systems that are different than those being used in developed countries because of financial constraints (Hopkinson 2009). To date, no such technology has been replicated library systems in Belize. Despite the system's benefits, it might seem impractical and costly to implement such state of the art technology within public libraries in Belize. Reason being that developing regions, such as the English-speaking Caribbean (ESC), have far less capacity to absorb failures of implementing an information system than that of its counterparts in developed countries (Chevers, Mills, & Duggan, 2012). Thus, the cost of potential failure outweighs the presumed benefits of the system. Yet the need for a library management system is vital to the manageability and profitability of library resources in an era of fast and easily search internet based resources (DeLone & McLean, 2003).

The Technology Acceptance model is a model that was developed to study the acceptance of technology by measuring the perceived ease and usefulness of the technology. According to Venkatesh and Davis (2000), under the Technology Acceptance Model (TAM), what significantly influences social acceptance are both social influence processes and cognitive instrumental processes. In contrast, Miller and Khera (2010), stated that the main factor affecting the acceptance of digital libraries in developing countries under the TAM model was perceived usefulness. Study findings by Kapoor, Dwivedi, ET all, 2014, suggest that perceived usefulness and system quality are what positively impact user attitude which is what leads to users using the actual service.

Presently, within the Belize National Library Service and Information Systems Public Library Sector is in the process of implementing the Mandarin Library Automation System (M5) within each of their library branches. This system is designed to provide internal and external users access to library resources from any workstation, at the library or remotely using keyword searches. M5 also enables internal users to create custom reports and track external user activity.

The system itself is still in its infant stages but to determine its success we use the taxonomy by DeLone and McLean that bases an Information System success on 6 factors (1992). The model has since been updated and refined to include: System Quality, Information Quality, Service Quality Use, User Satisfaction, Intention to Use and Net Benefits (DeLone & McLean, 2002). Also to measure the success of the system's being accessible to external users will be measure using the Technology Acceptance Model's (TAM) (6) constructs, in particular, perceived usefullness, perceived ease of use, percieved behavior control, subjective norm, voluntariness, and behavior intention. A library information systems', namely the Mandarin M5, success is important because it will allow librarians to plan properly make informed decisions and determine if the needs of the public are being met (Gumilar and Johnson 1995).

Research Model/Hypothesis

In 1992, DeLone and McLean suggested that the dependent variable for information system research is Information System success. The Information System Success Model, later refined in 2003 and 2004 (DeLone & McLean, 1992, 2003, 2004), is one of the most heavily mentioned models within IS literature (Lowry et al. 2007). DeLone and McLean reconsidered the existing terms of IS success and their respective measures and classified them into six distinct dimensions: System Quality, Information Quality, Use, User Satisfaction, Individual Impact, and Organizational Impact. The IS Success Model was

DeLone and McLean's attempt to integrate the aforementioned dimensions into a thorough framework illustrated in Figure 1.

The model has been altered to meet the necessities of various information systems over time. DeLone and McLean (2003) state that "quality has three major dimensions: information quality, systems quality and service quality". System Quality embodies the characteristics yearned of an IS. These measures are based upon the usability aspects and performance traits of the system under research. These measures include: response time, reliability, functionality and flexibility. Information Quality substantiates the desirable characteristics of the output of an information system. This dimension encompasses measures such as: reliability, timeliness, completeness and presentation, which focus on the quality of information that the system produces and its usefulness for the user. Service Quality is representative of the quality of the support that the users obtain from the internal users of the information system. Measures inclusive of this dimension of quality are: responsiveness, reliability, competence, attitude and accuracy.

Furthermore, the dimensions Use and User Satisfaction are both interconnected as they both represent the degree to which and IS is utilized and the level of satisfaction that users obtain when utilizing the IS. Measuring user satisfaction becomes useful especially when the use of an information system is obligatory and the amount of use is not an appropriate indicator of the systems success. The success dimension, net benefits, compromises the degree to which IS contribute to the triumph of the different stakeholders. Net Benefits has been determined to have a positive relation with System Quality, even though most of the effect is moderated through system use and user satisfaction.

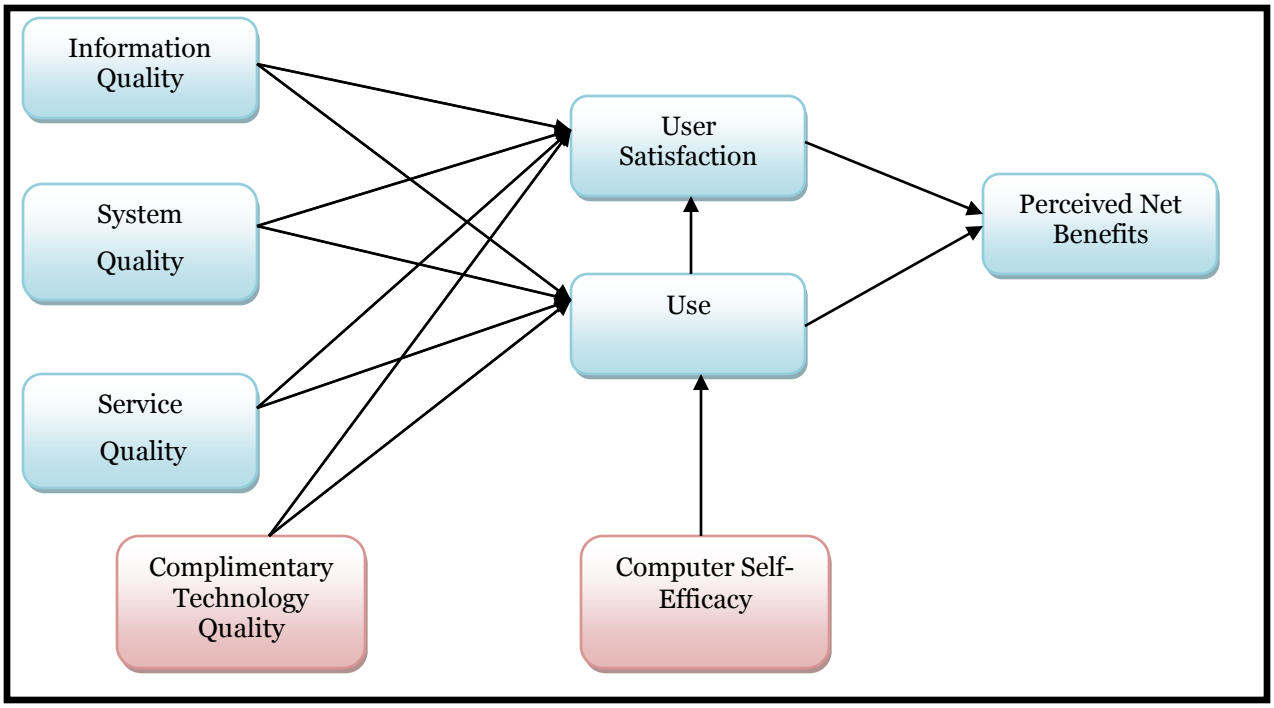

Figure 1 DeLone and McLean's Information System Success Model

DeLone and McLean's theoretical and empirical work is the cornerstone for the presumed relationship among the Mandarin M5's adaptable success. The study postulates the following twelve hypotheses, accordingly:

H1. Complementary technology quality will positively impact user satisfaction.

H2. Complementary 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. Information quality will positively impact use.

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.

However, applying the DeLone and McLean model to measure the system's possible success will only yield results representative of users who are already acquainted with the M5. So far, only internal users have been interacting with the system. Thus, a Technology Acceptance Model was tailored and used to measure the possible success the M5 can achieve once it is made available to the public. The modified model measures information system success based on (6) constructs which are perceived usefullness, perceived ease of use, percieved behavior control, subjective norm, voluntariness, and behavior intention.

In this model, perceived usefulness, perceived ease of use and behavoiral control are the main determinants of behavioral intention to use the system which determines whether or not the system will actually be utilized.

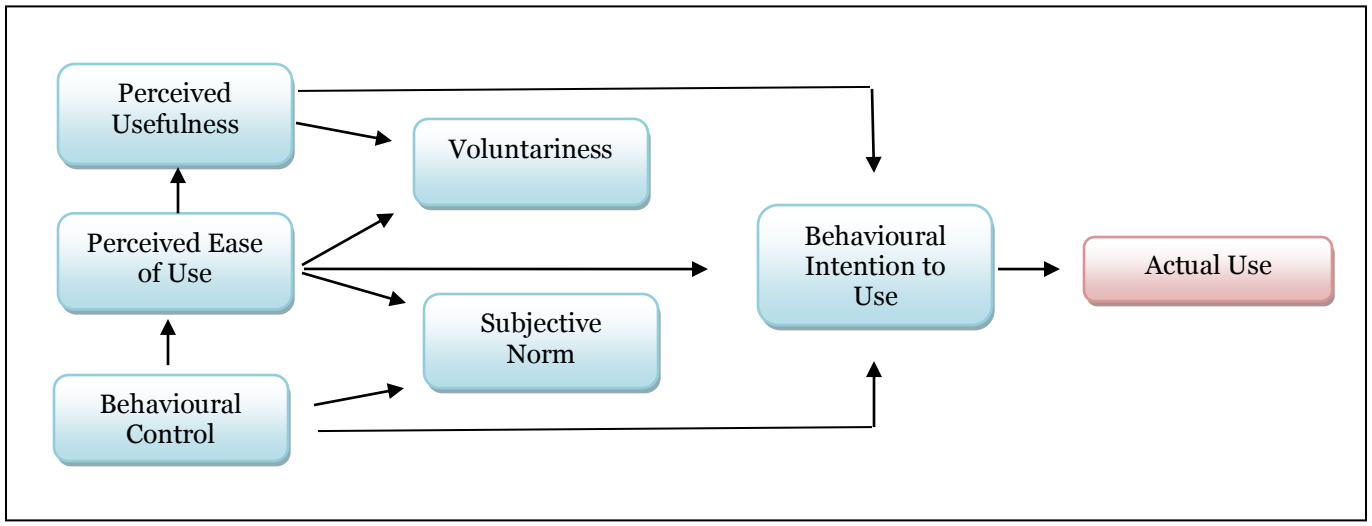

Figure 2 Modified Davis (1989) Technology Acceptance Model

Methodology/Research Design

A quantitative research, with the use of convenience sampling for external users and random sampling for internal users, was conducted to gather information on the potential success of the Mandarin M5 that is soon to be implemented into the library system to facilitate library use via an information system. Both sets of respondents, external or internal, were presented with two different surveys accordingly. A total of 50 questionnaires were issued. The determinants of the success of the mentioned system not only depends on internal users who have direct acquaintance with it but also on external users who are the intended audience hence the reason for two different surveys for each participant cluster.

The surveys, were distributed via email to different partakers throughout the country for it to be possible to generalize the information and responses retrieved from the participants. Due to time restriction, the questionnaires dispatched to external users were on the basis of convenience sampling, meaning individuals were chosen on the basis of how accessible and available they were to participate in the study. For internal users on the other hand, random sampling was used due to the fact that any of the 16 library branches throughout Belize could have been chosen as participants for the study.

As aforementioned, 50 questionnaires total were distributed, 25 to random external and 25 to the internal users in the different library branches across the country. However, only 46 were received being 21 and 25 from internal and external users accordingly. In relation to internal users, it was required for the partaker to have or have had access to the Mandarin M5 at least once. It was different for the external users since the information system has not yet been launched and participants haven't had any interaction with the M5. Hence, the reason a brief introductory letter was attached to the external user questionnaires for each individual to have a general overview of the system. Attached within appendix find the different surveys distributed to the both types of users while the sources are presented in the following table.

Table 1. Construct and Source

Internal User Questionnaire		**External User Questionnaire**	
Construct	**Source**	**Construct**	**Source**
Information Quality	Bailey & Person (1983)	Perceived usefullness	Gumilar, D., Johnson, I, M. (1995)
System Quality	Alshibly (2011)	Perceived ease of use	Kapoor, K., Dwivedi, Y., Piercy, C, N., Lal, B., Weerakkody, V. (2014)
Services Quality	Chang et al (2009)	Percieved behavior control	Venkatesh, V., Davis, D, F. (2000)
Complementary Technology Quality	Teece, D. J. (1988)	Subjective norm	Gumilar, D., Johnson, I, M. (1995)
Computer Self-Efficacy	Chevers, D, A., Mills, A, M., Duggan, E, W. (2012)	Voluntariness	Gumilar, D., Johnson, I, M. (1995)
User Satisfaction	Seddon Yip (1992)	Behavior intention	Venkatesh, V., Davis, D, F. (2000)
Use	Balaban et al., (2013); Rai et all, (2006)		
Perceived Net Benefits	Ashibly (2011); Tansley et al, (2009)		

Table 1 Construct and Source

Analysis

The primary purpose of our study was to measure the possible success of the Mandarin M5 Library Information System when it is fully implemented throughout public libraries in Belize. The data for this study was collected from a sample of Senior Librarians and Library assistants from 16 public library branches that have already begun interacting with the M5. Data was also garnered from a sample of external users to measure if the M5 system would yield success when made accessible to the public.

Out of the 25 questionnaires distributed to Internal Users of public libraries countrywide, 21 questionnaires were returned, yielding a response rate of 84 percent, which is considered acceptable. 25 questionnaires tailored specifically for external users were also distributed and all 25 were returned, generating a 100 percent response rate. The respondents' characteristics are presented in Table 2.

Male participants represented a lower percentage of the completed sample (approximately 24% for internal users and 48% for external users) compared to female participants who contributed to 76% and 52% of responses for internal and external users respectively. 57% of the internal participants were aged 25-35 years and 62% had obtained education up to Associate level. These internal participants worked within the libraries for 5 to 10 years (57%).

Approximately 68% of respondents for the external users were aged between 10 to 20 years and 32%, 24% and 24% were Associates, Bachelor and High-school graduates respectively. Furthermore, 48% of these respondents have never made use of library resources or services.

Table 2 Characteristics of Respondents							
Characteristics of Internal User Respondents							
Gender		Age		Education		Working Experience	
Male	24%	Less Than 25	29%	PhD	0%	Less Than 5	29%
Female	76%	From 25 to 35	57%	Masters	0%	Over 5 to 10	57%
		Over 35 to 45	14%	Bachelors	10%	11 to 15 years	14%
		Over 45 to 55	0%	Associates	62%	Over 15 years	0%
		Older than 55	0%	High School	29%		
				Primary School	0%		
Characteristics of External User Respondents							
Gender		Age		Education		Use of Library Resources	
Male	48%	From 10 to 20	68%	PhD	0%	Daily	0%
Female	52%	Over 20 to 30	28%	Masters	4%	Often	28%
		Over 30 to 40	0%	Bachelors	24%	Rarely	24%
		Over 40 to 50	4%	Associates	32%	Never	48%
		Older than 50	0%	High School	24%		
				Primary School	16%		

Table 2 Characteristics of Respondents

Internal Users Data Analysis:

All the items in both the internal user and external user response analysis were measured using a 7-point Likert Scale with anchors ranging from strongly agree (7) to strongly disagree (1). The histograms below illustrate the internal users' assessment of the M5 under eight constructs based on the DeLone and McLean model. Namely, information quality, system quality, service quality, complementary technology quality, computer efficacy measure, user satisfaction, use and perceived Net Benefits of the M5. The histograms showcases the frequency of Likert rating chosen for each construct.

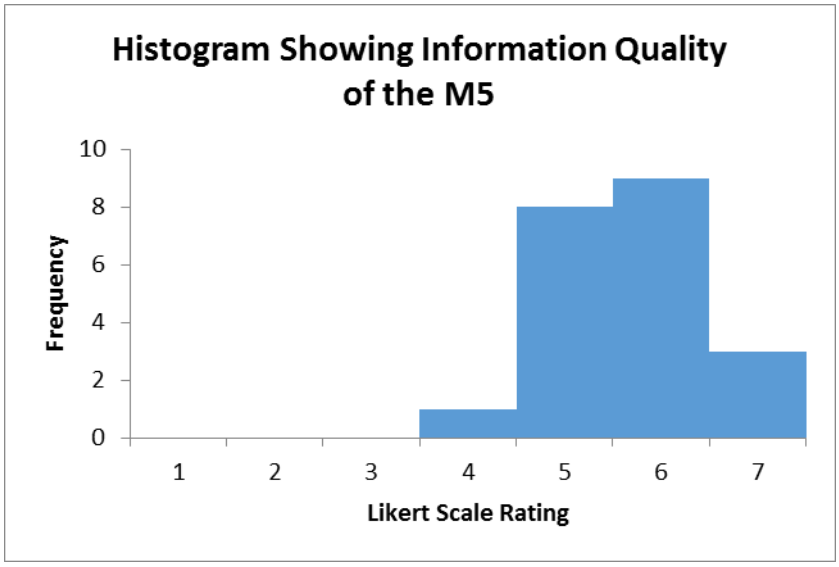

Figure 3 Histogram Illustrating Information Quality Provided by the M5

The histogram above is a graphical representation of internal users' responses based on information quality of the M5. The results display that majority responses are clustered in the (5) and (6) rating. This categories would be between agree and strongly agree. Note that there were not any strongly disagree or disagree responses based on the quality of information of the system.

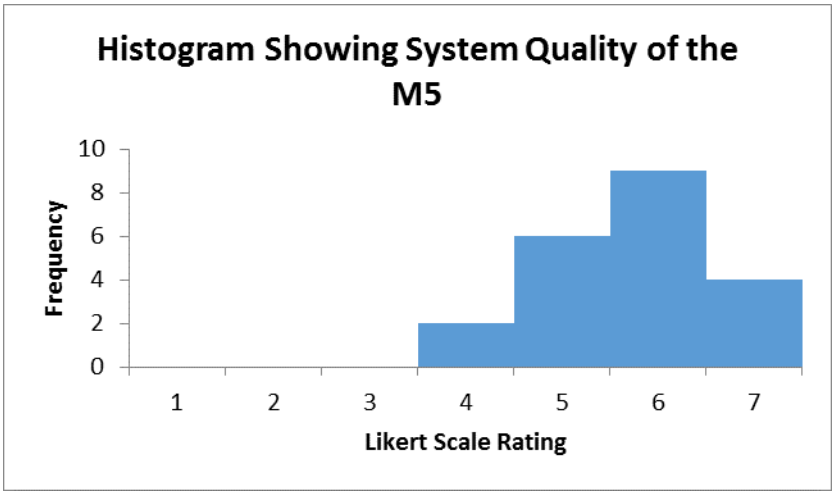

Figure 4 Histogram Illustrating System Quality of the M5

The histogram above is a graphical representation of internal users' responses based on system quality of the M5. The results display that majority of responses are clustered in neutral (4), agree to strongly agree (5) to (7). Note that there were not any disagree or strongly disagree responses based on the quality of information of the system.

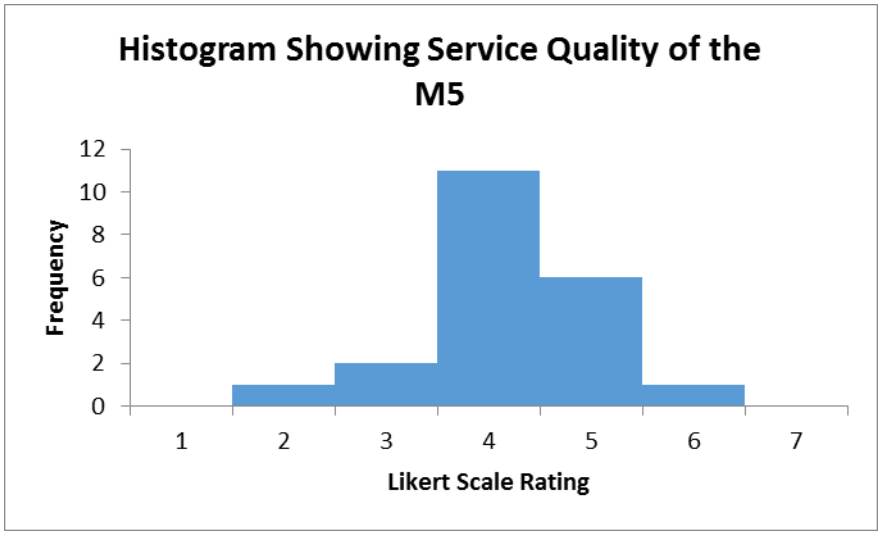

Figure 5 Histogram Showing Service Quality of the M5

The histogram above is a graphical representation of internal users' responses based on service quality of the M5. The results display that responses range from disagree (2) to agree (6) with the highest frequency being clustered in neutral (4) and (5). The results show that users are not fully satisfied with the technical assistance needed for them to overcome any technical difficulty in using the M5.

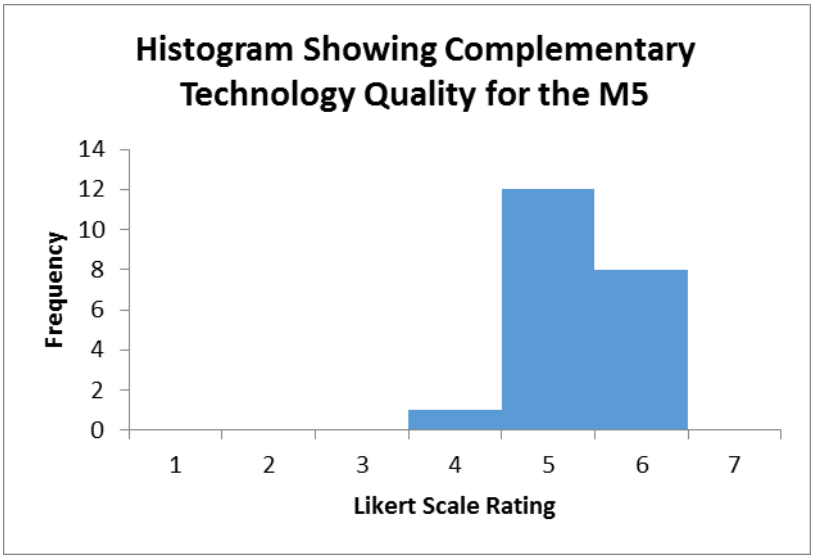

Figure 6 Histogram Showing Complementary Technology Quality for the M5

The histogram above is a graphical representation of internal users' responses based on complementary quality of the M5. The results display that majority of responses are clustered in agree (5) and (6) which is a favorable response. Note that there were not any strongly disagree, disagree or strongly agree responses based on the quality of information of the system.

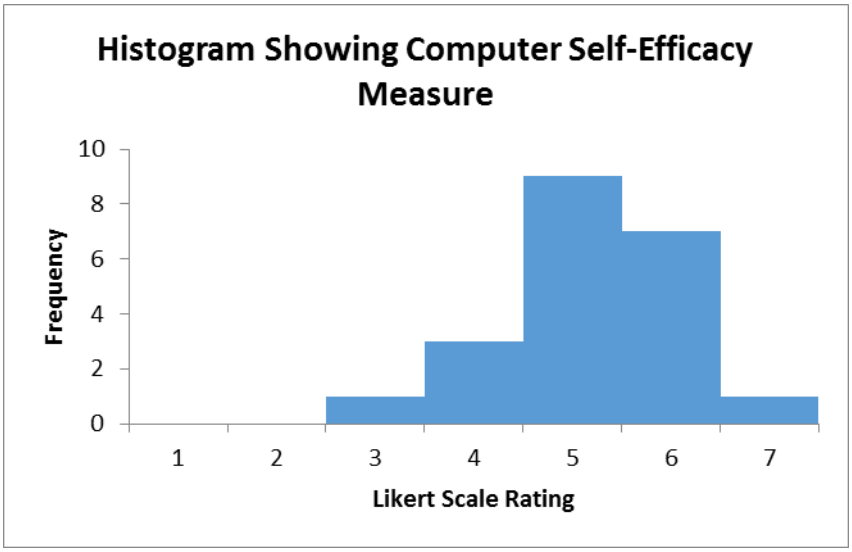

Figure 7 Histogram Showing Computer Self-Efficacy Measure

The histogram above is a graphical representation of internal users' responses based on computer self-efficacy of the M5. The results display that responses range from disagree (3) to strongly agree (7) with the highest frequency being clustered in agree (5) and (6). The results show that users are for the most part able to use computer efficiently. Though some did express neutrality (4) and disagreement (3).

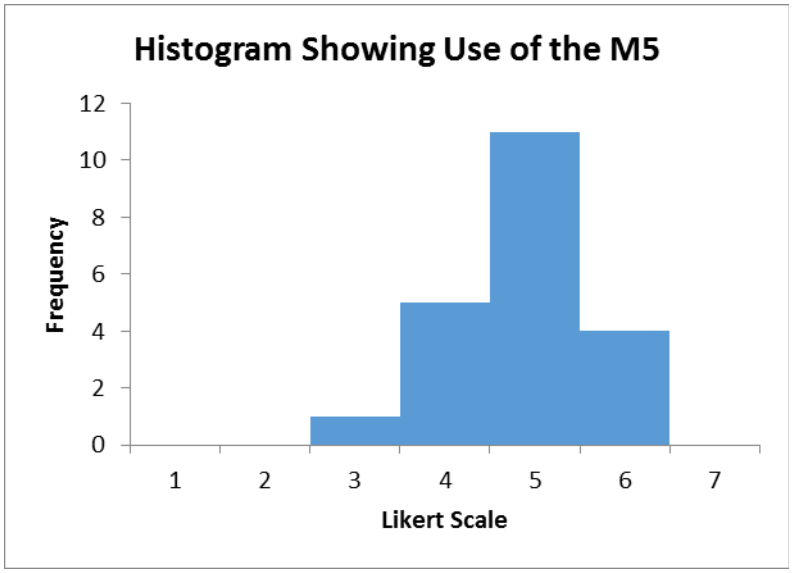

Figure 8 Histogram Showing Use of the M5

The histogram above is a graphical representation of internal users' responses based on use of the M5. The results display that majority of responses are clustered in neutral (4) and agree (5) and (6). Although no one strongly agreed (7) or strongly disagreed (1), the results are still slightly unfavorable. There are some users who disagree (3) or are neutral about the use of the M5 which indicates this area needs further investigation as to why respondents feel this way.

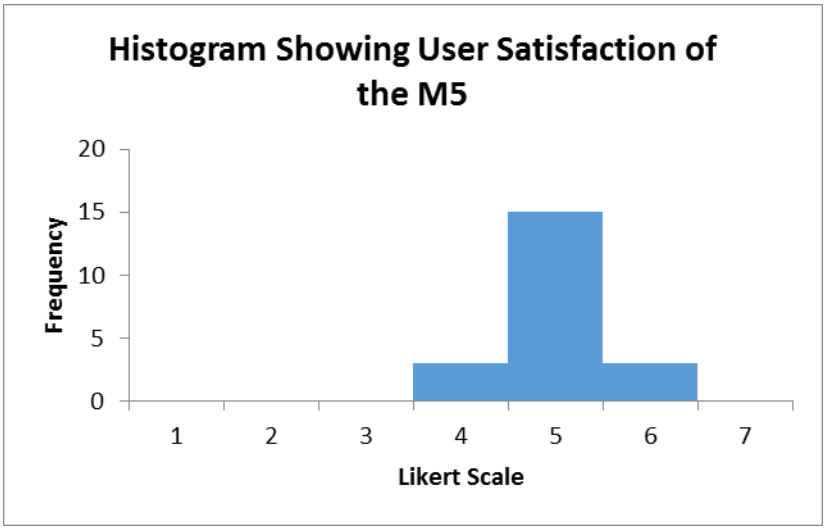

Figure 9 Histogram Showing User Satisfaction of the M5

The histogram above is a graphical representation of internal users' responses based on their satisfaction of using the M5. The results display that majority of responses are clustered in agree (5) with frequency of the neutral (4) and agree (6) being equal but relatively low. This indicates that although users are not in strong agreement or disagreement, the overall responses are still favorable.

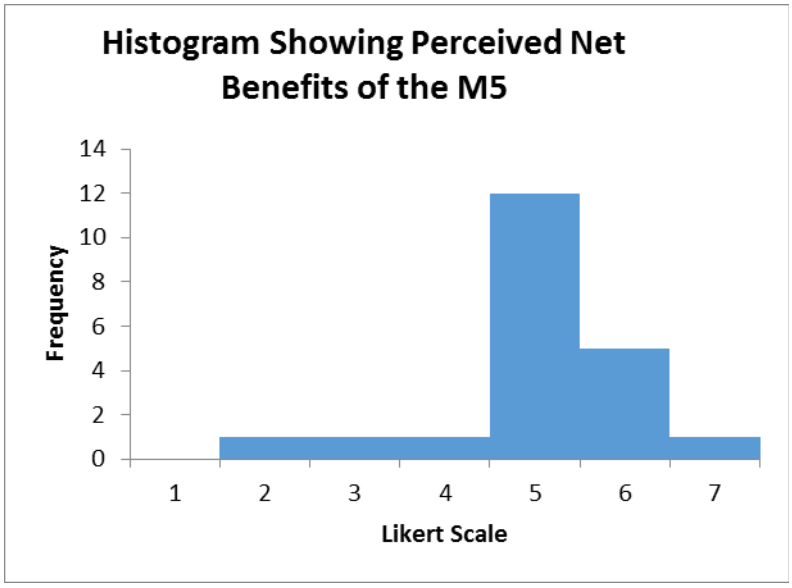

Figure 10 Histogram Showing Perceived Net Benefits of the M5

The histogram above is a graphical representation of internal users' responses based on the perceived net benefits of using the M5. The results illustrate that responses fell within the range of disagree (2) to strongly agree (7). This indicates that some users do not agree that that the benefits of using the M5 outweighs its costs. However those in disagreement are a smaller portion of the overall sample thus perceived net benefits still garnered slightly favorable results.

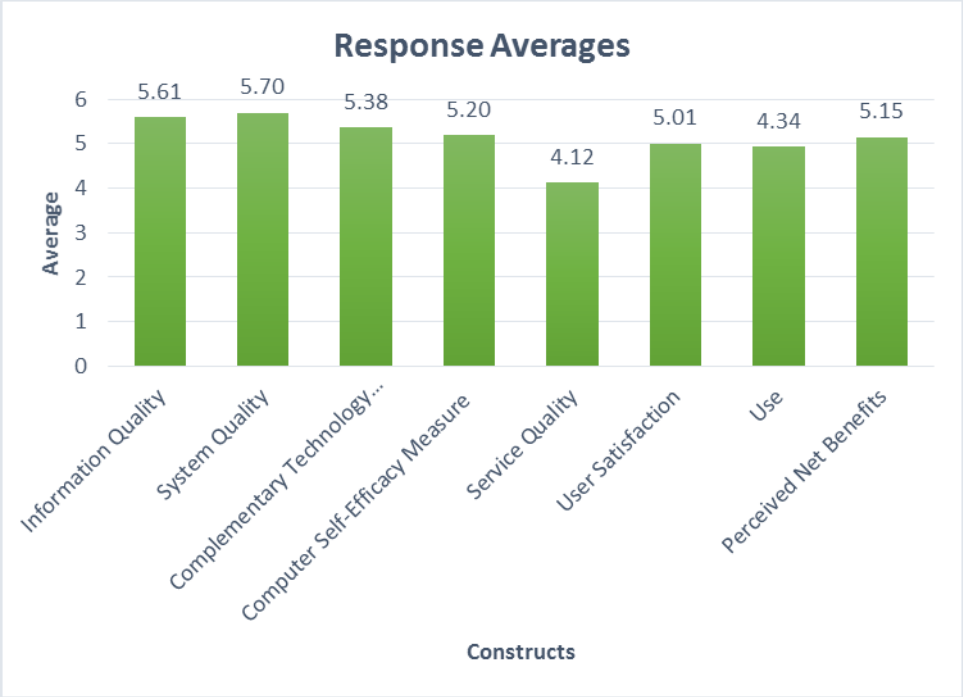

Figure 21 Bar Graph Illustrating Response Averages for Each Construct

As illustrated in the bar graph below, the data gathered from the internal users directly acquainted with the M5 show favorable responses towards the M5 in the areas of information quality, system quality, complementary technology quality, computer self-efficacy, user satisfaction and perceived net benefits. The average number chosen on the Likert scale for these constructs were 5 which is slightly favorable. The System Quality construct had the highest neutral response compared to the other tested constructs (5.70).

However, in regards to service quality and use, the averages were 4. This can be attributed to the service quality being hampered due to lack of technical assistance when library assistants or senior librarians encounter difficulty in using the M5. When unable to get past these difficulties this affects their efficient use of the system. Another factor affecting use of the system is that librarians are still in the process of cataloguing their books and updating the system database. Until this is completed, some features of the M5 cannot be utilized.

External Users Data Analysis:

Due to the system's implementation being in it infant stages, the public does not presently have access to the M5. However, using the Technology Acceptance Model, a questionnaire tailored for possible external users was constructed to measure its possible success in terms of: perceived usefullness, perceived ease of use, percieved behavior control, subjective norm, voluntariness, and behavior intention. The bar charts below illustrate the overall results for each construct.

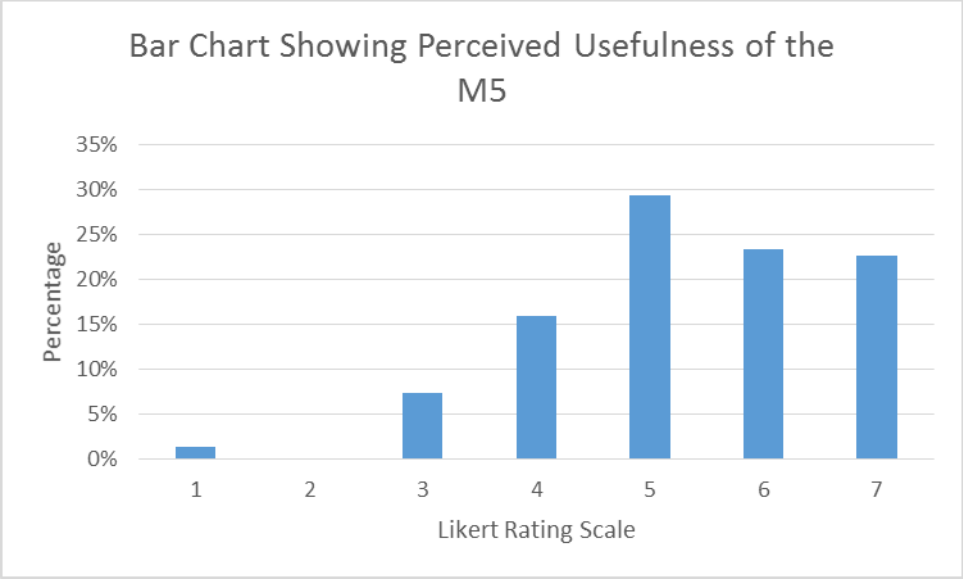

Figure 12 Bar Chart Illustrating Perceived Usefulness of the M5

The Bar Chart above is a graphical representation of external users' responses based on the perceived usefulness of using the M5. The results display that majority of the responses are clustered in agree (5), (6) and strongly agree. The highest choice for this construct was agree with 29% of respondents choosing (5). 1% of respondents chose (1) strongly disagree and 16% were neutral (4). This indicates that with the exception of a select few, potential users agree that the M5 can be useful.

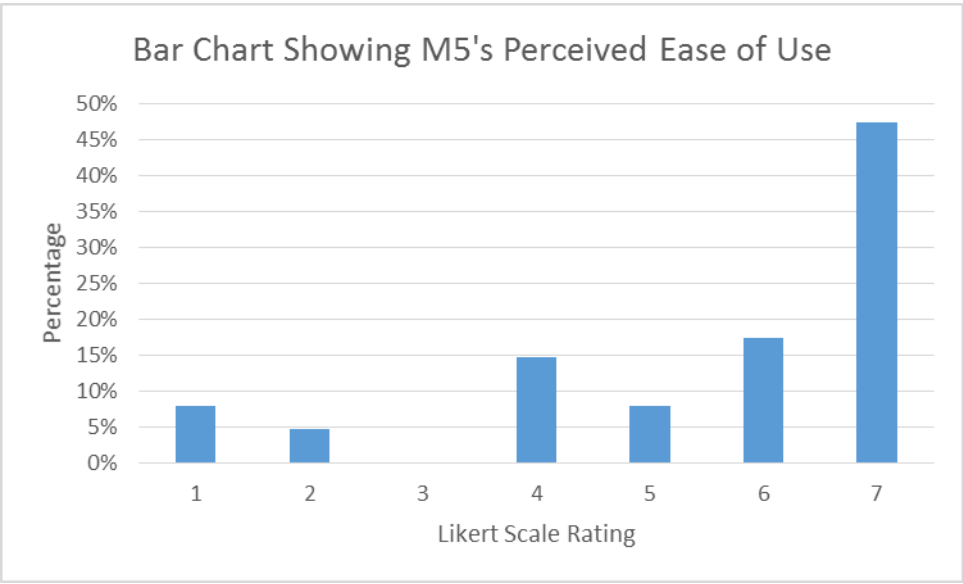

Figure 13 Bar Chart Illustrating System's Perceived Ease of Use

The Bar Chart above is a graphical representation of external users' responses based on the M5's perceived ease of use. The results display that majority of the responses are clustered in neutral (4), agree (6) and strongly agree (7). The highest choice for this construct was strongly agree with 47% of respondents choosing (7). 8% of respondents chose (1) strongly disagree, 5% disagree (2) and 15% were

neutral (4). This indicates that with the exception of a select few, potential users strongly agree that the M5 can be easy to use. The mixed responses can be attributed to the respondents not being able to test a prototype of the system first before answering the questionnaires.

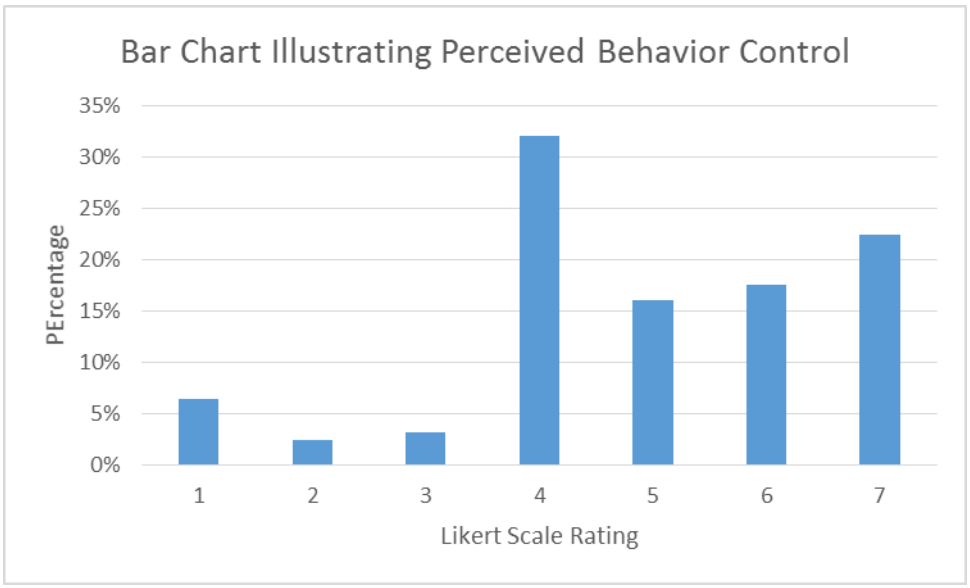

Figure 14 Bar Chart Illustrating Behavior Control

The Bar Chart above is a graphical representation of external users' responses based on the behavior control when using the M5. The results display that majority of the responses are clustered in neutral (4), (6) and strongly agree (7). The highest choice for this construct was strongly agree and neutral with 20% of respondents choosing (7) and (4). 16% and 17% of respondents chose (5) and (6). However the responses varied with 6% strongly disagreeing, 2% and 3 % disagreeing. This indicates that with the exception of a select few, potential users agree that they will maintain control over using the M5 while others remain neutral. Once again this mixed response can be attributed to the users' being unable to test the M5 beforehand.

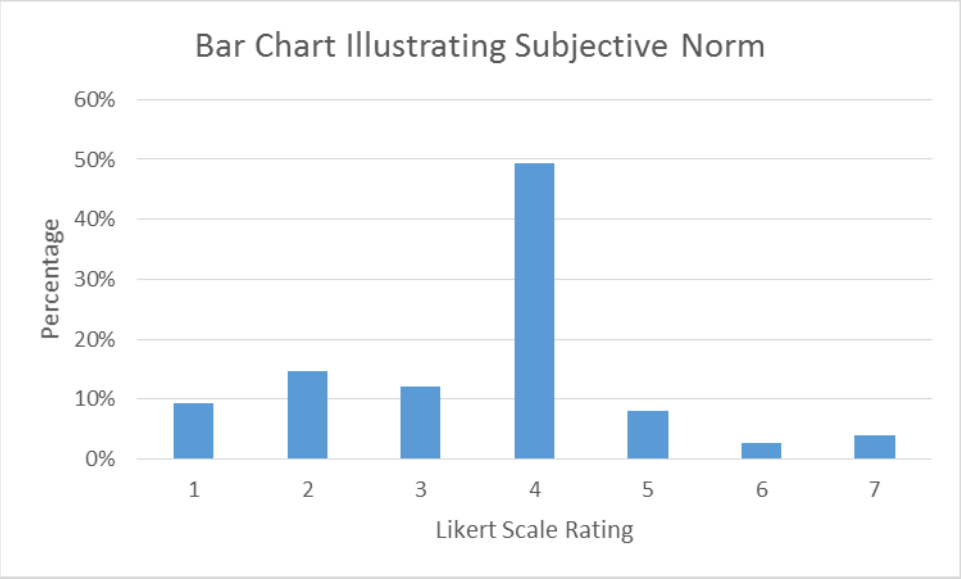

Figure 15 Bar Chart Illustrating Subjective Norm

The Bar Chart above is a graphical representation of external users' responses based on the subjective norm of using the M5. The results display the responses vary from strongly disagree (1) to strongly agree (7). The highest rating under this construct was neutral (4) and was chosen by 49% of respondents. These results are unfavorable and indicate that potential users are mostly neutral about or disagree that using the M5 will be influenced by subjective norms.

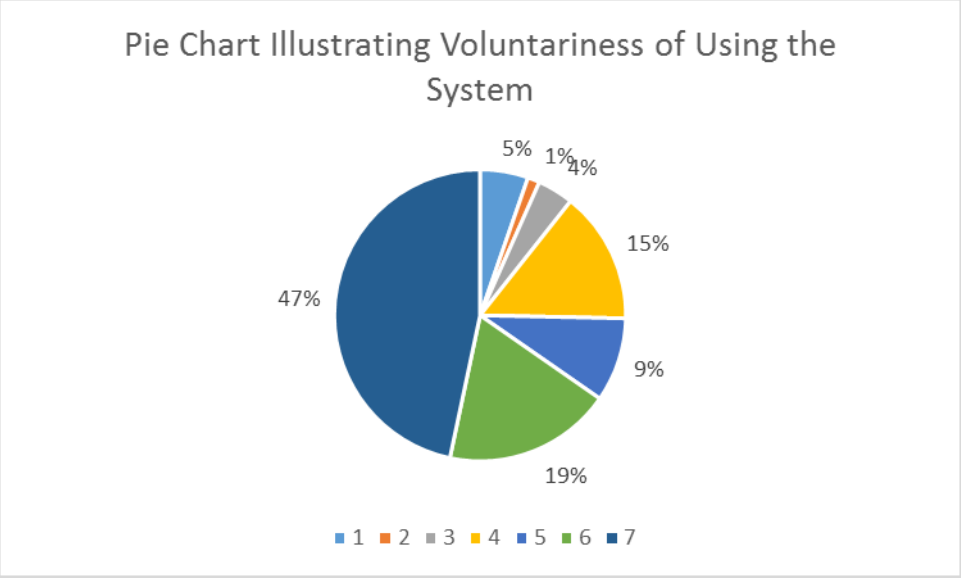

Figure 16 Pie Chart Illustrating Voluntariness of Using the M5

The Pie Chart above is a graphical representation of external users' responses based on the voluntariness of using the M5. The highest choice for this construct was agree with 47% of respondents choosing (7) strongly agree. 19% and 9 % chose agree (6) and (5). While 15% were neutral (4) and the remainder

disagreed 1% and 4% while 5% strongly disagreed. This indicates that with the exception of a select few, potential users strongly agree that their potential use of the M5 will be voluntary.

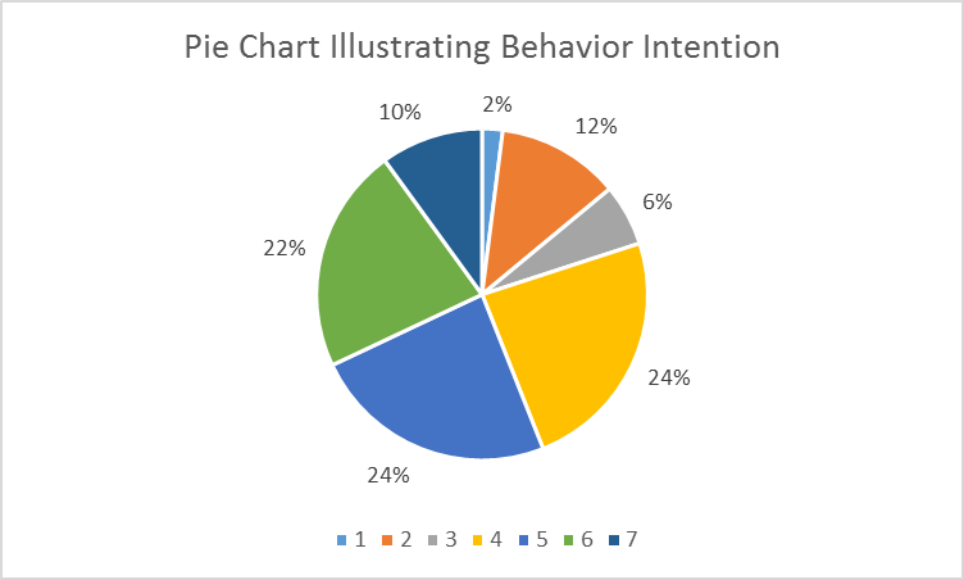

Figure 17 Pie Chart Illustrating Behavior Intention

The Pie Chart above is a graphical representation of external users' responses based on their intention to use the M5 once it is fully implemented. The highest choice for this construct was neutral and agree with 24% of respondents choosing (4) and (5). This indicates that with the exception of a select few, potential users agree that they would use of the M5. However since a large percentage of respondents were neutral, it can be concluded that in reality not many external users would actually utilize the system when fully implemented.

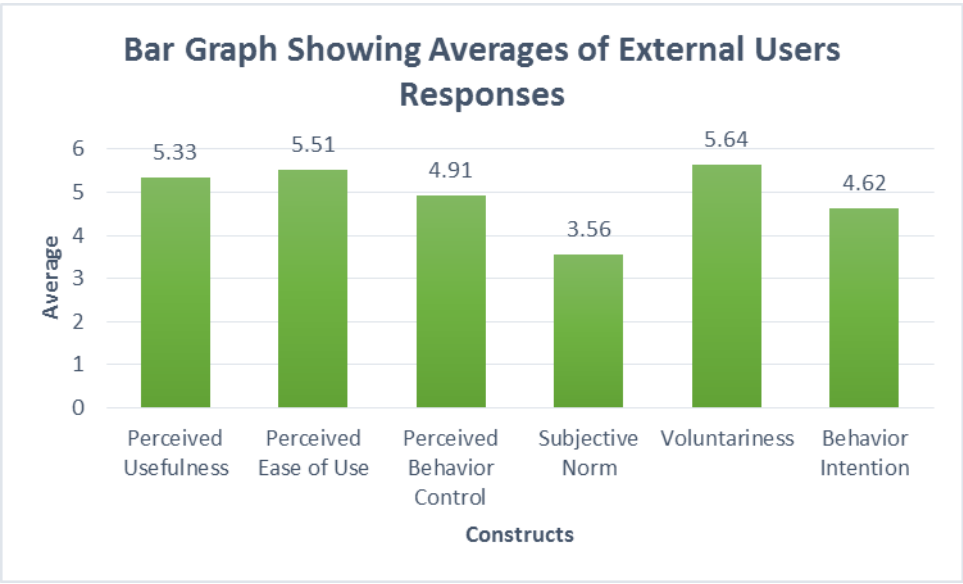

Figure 18 Bar Graph Illustrating Response Averages

Averages for the respondents rating of the M5's perceived usefulness, perceived ease of use were favorable as most rated these constructs with a 5. Respondents also agreed that if the M5 was accessible to them, their use of the system would be voluntary meaning, lecturers or employers would not require using the system to be compulsory. Since the users were not able to test the system, perceived behavior control was rated at an average of 4 which is along the line of neutrality.

Furthermore, on average the respondents disagreed that their potential use of the M5 would be due to subjective norms or influences from their peers. Lastly, despite the overall agreement of the system's perceived usefulness and perceived ease of use, the respondents' intention to use the system after it is implemented was averaged at 4.62 which goes along the lines of neutrality.

Conclusion

Discussion

In an era where technology impressively advances on a daily basis, libraries have somewhat if not altogether lost their popularity. During the course of this research, the possible success of the Mandarin M5 has been studied by completing surveys through internal users and probable external users of the information system. The purpose of the M5 is to make the use of libraries in Belize more effective not only for the internal users of libraries but also for external users who want to access information in a less time consuming manner. Though the said system can only be used to search books available and their location (individuals are still required to personally obtain the book or information required at the library location itself) it can be considered a start to revolutionize the way libraries are known for and treated. In the country of Belize, especially, technology in libraries is not explored at its full potential, hence, the launch of this new website/information system can begin to gain back the attractiveness libraries can offer.

With help from both the TAM and DeLone and McLean models an overall analysis was conducted. The constructs available on the surveys allowed researchers to examine which were the strong suits or weaknesses of the Mandarin M5 according to the individuals who partook in the study.

From the analysis presented above, it can be gathered that most of participants agree or strongly agree (chose 5-7 on the Likert scale) with the usefulness of the Library Information System Mandarin M5. In accordance with internal user response, most respondents agree that the M5 has a positive perceived net benefit but service quality averages with a neutral of 4.12 meaning that internal users do not necessarily agree nor completely disagree that support staff is available to users to assist with technical difficulties or keep the software up to date frequently.

External users, even though have had no direct contact with the M5 as yet, responded with a 47% strongly agree on voluntariness of the information system. However, the responses to the constructs were not constant since some were based on agree yet others remained neutral. It can be speculated that the neutral responses on behalf of the external users is due to the fact that there has been no immediate contact between them and the information system. Whereas, the neutral responses of the internal users can be attributed to their not being fully exposed to all the features of the M5 as yet.

Implications

The M5 might prove to be more useful to internal users because it provides them with more uses such as tracking books, generating reports, simplifying search tasks etc. However, it can also provide benefits to its external users. Though a main drawback here, is that in a digitalized world, search for pdfs on the internet is more convenient than borrowing a hardcopy version from the library. This drawback can be speculated to be the major factor in subjective norm being rated (3.56). Thus, based on the responses, the system is received with slightly favorable or neutral reviews which indicates there are areas of the system that need improvement or modification. Perhaps to improve the internal user attitude towards the system, service quality as a weakness can be tended to in order to enhance use of the system. For external users, there can be partnership between school and the libraries in order to spread awareness and encourage the use of the system for recreational or education purposes.

However, despite the valuable information that was retrieved from the respondents, due to the limitations mentioned above, a qualitative research that would have yielded more information could not be conducted.

Limitations and Future Research

As with any research conducted, several limitations were encountered during the semester long process. The most prominent limitation faced throughout this research was that the Mandarin M5 website that is being integrated into the library systems has not yet been released for public use. Meaning, the external users who partook in the survey have had zero direct contact with the M5 website. These users responded to the questions asked based on a general overview presented to them in the survey. For this reason, the information received in relation to external users is limited and might be misrepresented.

Furthermore, internal users of the system have not yet completed cataloguing their book collection thus some features of the M5 are still pending to be utilized. This limitation affects the internal users' overall assessment of the M5 because they have not yet experienced its full potential and benefits.

Moreover, other limitations that can be named are time and sample size. Time to conduct the research was limited to a semester's length which includes several other projects that were needed to be completed along the way. Referring to sample size, though 50 participants were initially chosen, 46 were recovered from respondents. Also, another limitation faced was that researched had to recur to convenience sampling hence the sample population for external users may not be able to be generalized like the internal users responses can which can, as mentioned before can lead to data misrepresentation.

In order to expand on the knowledge gained after conducting this research future research should be conducted throughout the country of Belize as to better be able to generalize the results. Future research should consider testing the system's success after both internal and external users have full access to the system's features. Future research should also focus on a larger sample size that will allow researchers to reproduce a more in-detail data analysis that will enable them to draw more accurate conclusions on whether the system is truly successful or not.

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Appendix

Internal Users Questionnaire

Questionnaire– "Efficiency of BNLSIS use of Mandarin M5" (All Employees)

Purpose

This questionnaire asks for information about yourself and about the productiveness, competence, and ease of use of the library management system "Mandarin M5". The system has recently been introduced to its internal users and we would like to measure its success thus far and it possible success after it is fully implemented.

Please answer the questions in relation to your library. Your individual responses to the questionnaire will be strictly confidential and used solely for the purpose of this study.

Instructions

This is a survey, not a test; there are no right or wrong answers. Please print in the spaces provided and tick the boxes to mark your answers.

1. Background Information	Answers:
Please indicate your age:	Less Than 25 ☐ 25 to 35 ☐ 36 to 45☐ 46 to 55 ☐ Older than 55 ☐
Please indicate the number of years you have been working for this company:	5 years ☐ 6 to 10 years ☐ 11 to 15 years Over 15 years ☐
Please indicate your gender:	Male ☐ Female ☐
Please indicate highest education level attained:	PhD ☐ Masters ☐ Bachelors ☐ Associates ☐ High School ☐ Primary School ☐

Indicate your agreement with each statement by rating it from (1) strongly disagree to (7) strongly agree.

2. Information Quality	Disagree ---------- Agree
The M5 provides information that is exactly what you need.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
The M5 provides information you need at the right time.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
The M5 provides information that is relevant to your job.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
The M5 provides sufficient information.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
The M5 provides information that is easy to understand.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
The M5 provides up-to-date Information.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
3. System Quality	**Disagree ---------- Agree**
The M5 is easy to use.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
The M5 is user-friendly.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐

The M5 provides high-speed information access.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The M5 provides interactive features between users and system.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
4. Complementary Technology Quality	**Disagree ----------Agree**
The software on the device (desktop computer, laptop, mobile device) used to access the M5 is adequate.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The device hardware (desktop computer, laptop, mobile device) used to access the M5 is adequate.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The device (desktop computer, laptop, mobile device) used to access the M5 has an adequate internet connection in regards to speed and reliability.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
5. Computer Self-Efficacy Measure	**Disagree ----------Agree**
I COULD COMPLETE THE JOB USING THE M5…	
If there was no one around to tell me what to do as I go.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
If I had never used an information system like it before.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
If I had only the M5 manuals for reference.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
If I had seen someone else using the M5 before trying it myself.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
If I could call someone for help if I got stuck.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
If someone else had helped me get started.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
If l had a lot of time to complete the job for which the M5 was provided.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
If I had just the built-in help facility for assistance.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
If someone showed me how to do it first.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
If I had used similar information systems before this one to do the same job.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
6. Service quality	**Disagree ----------Agree**
The support staff keep the M5 software up to date.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
When users have a problem, the M5 support staff show a sincere interest in solving it.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The M5 support staff respond promptly when users have a problem.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The M5 support staff tell users exactly when services will be performed.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
7. User Satisfaction	**Disagree ----------Agree**
Most of the users bring a positive attitude or evaluation towards the M5 function.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
You think that the perceived utility about the M5 is high.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

The M5 has met your expectations.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
You are satisfied with the M5.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
8. Use of the Information System	**Disagree ----------Agree**
The frequency of use with the M5 is high.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
You depend upon the M5.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
I was able to complete a task using the M5 even if there was no one around to tell me what to do as I go.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
I have the knowledge necessary to use the M5	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
9. Perceived Net Benefits	**Disagree ----------Agree**
The M5 helps you improve your job performance.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
The M5 helps the organization save cost.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
The M5 helps the organization achieve its goal.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
Using the M5 improves the assessment and training.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
Using the M5 in job increases my productivity.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐
Overall, using the M5 enhances recruitment and performance management.	1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐

Please return this survey to the person who gave you the form.

Thank you for your participation.

External Users Questionnaire

Dear Participant,

We are students from the University of Belize, Central Campus pursuing our Bachelor's Degree. As per the project requirement, we are conducting a survey regarding the possible success of the soon to be implemented "Mandarin M5".

The Mandarin M5 is a library management system that will not only allow internal users of public libraries to automate their library book collection but will also allow external users to access the information on the library database online. Once the information system is fully implemented, external users will be able to access this online database through the BNLSIS website. The user can then search for books or other library resources based on genre, author, name of book, content, publication and other key words. This simply allows the user to locate and identify in which library the book or resources is available in. This makes it less time consuming for the user to know where the information they need can be found within the library as opposed to physically sifting through the books. If you are willing to participate, please continue to answer the following questionnaire.

Questionnaire– "Efficiency of BNLSIS use of Mandarin M5"

Purpose

This questionnaire asks for information about yourself and about the productiveness, competence and ease of use of the library management system "Mandarin M5". The system has recently been introduced to its internal users within the Belize National Library Service and we would like to measure its possible success when it is made available to the public.

We kindly ask you answer the following questions at the best of your knowledge. Your individual responses to the questionnaire will be strictly confidential and used solely for the purpose of this study.

Instructions

This is a survey, not a test; there are no right or wrong answers. Please print in the spaces provided and tick the boxes to mark your answers. Your Survey ID number will be provided.

1. Background Information	**Answers:**
Please enter your age:	
Please indicate how often you use the library service:	Daily ☐ Often☐ Rarely ☐ Never☐
Please indicate your gender:	Male ☐ Female ☐
Please indicate highest education level attained:	PhD ☐ Masters ☐ Bachelors ☐ Associates ☐ High School ☐ Primary School ☐

Indicate your agreement with each statement by rating it from (1) strongly disagree to (7) strongly agree.

2. Perceived Usefulness	**Disagree ---------- Agree**
The M5 can enable me to accomplish tasks more quickly.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The M5 can improve my quality of work.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The M5 can make it easier to do my job.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The M5 can improve my productivity.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The M5 can give me greater control over my tasks.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
The M5 can enhance my effectiveness in completing my tasks.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
3. Perceived Ease of Use	**Disagree ---------- Agree**
My interaction with the M5 should be clear and understandable.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Overall, the M5 should be easy to use.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Learning to operate the M5 should be easy for me.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I should not become confused when I use the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I should rarely make errors when using the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I should rarely be frustrated when using the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
4. Perceived Behavior Control	**Disagree ---------- Agree**

I should be able to confidently use the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 [
I have the knowledge needed to use the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 [
I have the resources to use the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 [
I have the ability to use the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 [
I shall have control over using the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 [

5. Subjective Norm	**Disagree ----------Agree**
People who influence my behaviour think I should use the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
People who are important to me think I should use the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
My immediate supervisor thinks I should use the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
My close friends think I should use the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
My peers think I should use the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
People whose opinions I value would prefer that I use the M5 in completing my tasks.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
6. Voluntariness	**Disagree ----------Agree**
My use of the M5 would be voluntary.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I may be required to use the M5.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Although it might be helpful, using the M5 is not compulsory to complete my tasks.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

7. Behavior Intention	**Disagree ----------Agr**
I intend to use the M5 when it is implemented to perform my tasks.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
I intend to frequently use the M5 to perform my tasks.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

Please return this survey to the person who gave you the form.

Thank you for your participation.