Measuring the success of Abacus Student Information System implemented by Toledo Community College (TCC)

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Abstract

A management information system (MIS) is a computer system consisting of hardware and software that serves as the backbone of an organization's operations. An MIS gathers data from multiple online systems, analyzes the information, and reports data to aid in management decision-making. The purpose of an MIS is improved decision-making, by providing up-to-date, accurate data on a variety of organizational assets, including: financials, inventory, personnel, project timelines, manufacturing, real estate, marketing and raw materials. This research will present a practical analysis of how the ABACUS System at Toledo Community College (TCC) benefits the teachers. As a part of the growing population of the Toledo Community College (TCC) the institution has progressed into using the online grading system in the form of ABACUS. ABACUS has afforded parents the ability to track how well their children are doing and to become more involved in their child's learning and process in school. Questionnaires will be given to 40 participants to determine whether the ABACUS system is beneficial to the teachers at the Toledo Community College (TCC). This research will establish results, which will be put into practice on in the future. After calculating our findings, we understand that most participants agreed with the quality of the Abacus System and approximately 3.3 percent of the participants didn't agree.

Keyword: ABACUS, Management Information System, Education Sector, Technology, Inventory, Personnel, Manufacturing, Real Estate, Institution.

Introduction

Today in the rapid life that we are living in, most of the parents are office goers and school becomes a safe haven to leave their children behind and go. Thus, schools play an essential part in the wholesome and the holistic development of each student they have been enrolled. It does not merely perform as an intermediate in which the children study and imbibe new things and habits but they are depicted to the actual world where they get to interrelate with their landed gentry and learn many things through understanding which nothing else can provide. They feel that as technology is advancing, new forms of teaching, guiding and other features should also be improved. One such feature is using a grading system in education to judge a student's capability and knowledge. Along with grading system ABACUS is a Belizean made grading system and is used at the Toledo Community College (TCC), in our research, we want to find out if the teachers are finding it reliable for them to use when it comes to inputting grades for their students or inputting attendance. In a general grading system, a student's real scores and its associated marks are not accounted on the official transcript, which denotes that their GPA will not have an effect on either a pass or a fail mark category and this is exactly what is being done at the high school.

Originality

The submission of this paper has not been published or accepted in a journal or conference proceedings, nor presented at another conference. However, this is the first time that the Abacus System is being evaluated. There are also no published copy of how the system works and how it affects teachers.

Literature review

1.1 Evolution of Student Information Systems (SIS)

Technology continues to evolve and so is the need for academic institutions in being able to keep up to par with technological advancements. As reference by Ozerbas, (2018) "Learning environments enriched with technology have shifted from simple computer labs to highly technological environments equipped with computers, projection machines, internet connection and communications technologies." (Ozerba, 2018). Technology plays a critical role in an educational setting as it serves to aid in learning, teaching and administration purposes. Its role in administrative purposes is expansive also covering areas pertaining to managing a student populations record, building classroom schedules, allowing registration purposes and managing student information in terms of academic performance. The vast availability of technologies and software made to handle student records are growing as the need and recognition for a system that can meet all the criteria needed for efficiency and effective records and data management become a necessity for academic institutions. The usage of data and information pertaining to students' school records, academic performance history, grades and other pertinent information outside of the academic realm has grown to show the correlation of good performance in the classroom tied to cognitive development and social or economic factors tied into students' performances. Thus the expansive reach and use of students' data is growing and continues to be critical data that will become helpful for future studies and experiments that can help to foster better understanding of academic performances and the effects technologies play, in boosting student academic grades yet also with an understanding of the combined effects of social and outside environmental factors.

1.2 Importance of Student Information Systems (SIS)

Consideration for the implementation of a computerized student information system requires careful planning in order to ensure its cost effectiveness. Previously institutions worldwide and especially in the Caribbean have kept to traditional means of keeping students' data and likewise managing students grades and records. The growing demand for technology has increased and the rapidness in response to finding the data needed has pushed institutions to find more effective, yet cost conscious solutions to managing their growing students' data. Every institution is different, its work environment, its student population and especially its needs. Thus there must be a recognition of the specific and pertinent needs of each institutions and how it will use the data and information it keeps on record. Every institution has a unique need. As noted by Fetaji, (2016) "With the improvement of technology these days leading Universities around the world are using well developed Information Systems for the purpose of improving their services

to the students as well as facilitate the work of their administration." Thus institutions of both secondary and tertiary levels are utilizing technology for meeting specific and growing user needs.

The advent of technology has cut downtime of paper and manual work to minutes if not seconds with today's technology and the easy with which information can be accessible has become customary. The increase need for better administrative purposes is likewise paramount. Schools have begun adapting from an endless pool of open source technologies and software to better meet the needs of their students and especially staff. Although these technologies and software are able to meet the schools needs in terms of security, centralization of data and the designing of reports, they have their limitation and are often not custom made or tailored to the individual needs of each institution that utilizes them. Open source technologies are created by a global network of freelance engineers and programmers contributing time, effort and knowledge to the development of technologies that are similar and perhaps as technologically advanced as their commercial counterparts.

Factors to consider during the procurement of a student information system are numerous, with consideration for the specific needs requirement of the school, purpose and usage, flexibility and support and of course the cost factor. According to Mukerjee (2012), "Cost remains one of the biggest contributing factors to the choice of a system, its implementation and its ongoing maintenance and support. (Mukerjee, 2012. p. 52). Thus the usage of a student information system must be cost effective. It must also provide the necessary support needed for maintenance and for IT staff to manage its performance and ensure its continued smooth operation.

1.3 Users of SIS

The main users of SIS software of often administrators, teachers, parents and students. Though each group has varied uses for the software, they are all vital to each unique set of users. SIS software functions as a data warehouse in keeping students' records in one centralized place, manage the admissions process, handle billing and payments, and additional features more for school administrators. Students often use the SIS technology to check their class schedule, grades, and attendance as well as maintain communication with their teachers. SIS software provides information pertaining to a student's schooling.

1.4 Perceived benefits of SIS

The perceived benefits of SIS usage are expansive including improved management of enrolled and prospective student data, reduced time spent on maintaining and organizing student records, increase communication between divisions and departments and overall provide a more unified resource location for relevant stakeholders, including alumni, faculty, support staff, and donors. SIS systems likewise can be cost-effective if designed in a manner that reliance is not heavy on local machines and servers.

Thus the perceived benefits are many and instructor's reliance on the system becomes regular as usage becomes tied into classroom settings, taking attendance and even outside of the classroom in field settings. According to an article on student information systems, it notes that "Teachers are relying on their SIS to give them that understanding of how the student is doing, and where they need to improve," (Media group, 2018). This is perhaps one of the most important perceived benefits of utilizing a SIS, which allows instructors to monitor the progress of each individual student, especially grades and attendance and find measures that will allow them to improve academic performance.

1.5 Summary

Technology has evolved and continues to evolve as newer needs arises. Technology has allowed the human race to automate work and get tasks completed in less time than before. The growing needs of businesses, organizations and institutions that rely on the usage of information technology and databases will increase as the demand for meeting clients, users and customers' needs increases. Schools around the world are utilizing management information systems termed as student information system to manage data produced in school and classroom settings. The importance of student information system is beyond the classroom as it is integrated with the outside aspect of teaching and meeting not only academic needs but helping to understand the correlation between factors contributing to students' academic performances and good grades. Users are varied from administrators, students and other stakeholders including parents who all have a stake in the well-being of students and their academic performances.

Methodology

Research Model

The data collection instrument used in conducting our research was a questionnaire/survey, which consisted of six sections and a total of twenty-three questions. We used the convenience sampling due to the fact that there was a limited time span and also a large population to look at. The convenience random sampling was more beneficial to us and easier to work by since we are all working. We targeted thirty teachers from Toledo Community College. The survey was conducted manually and was collected back the same day we distributed them. After the data collection, the responses were tallied up and placed into charts using SPSS, to determine how many of them agreed or disagreed. From the results, we were able to make conclusions and recommendations on how useful Abacus is for the teachers.

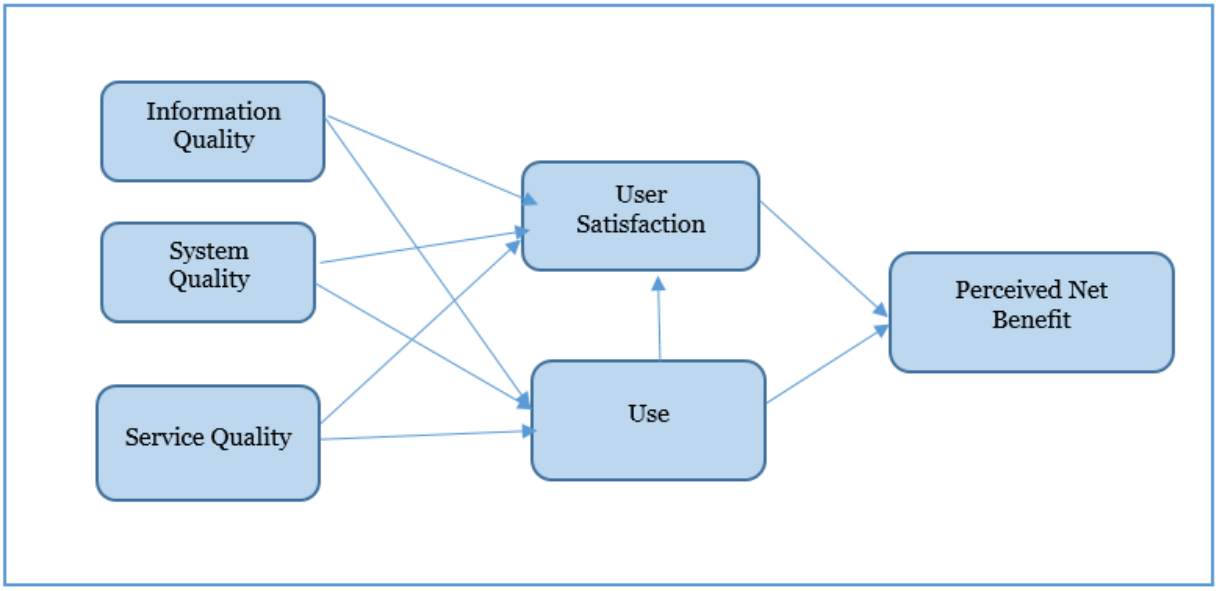


Figure 1Modified Research Model

Hypothesis

H1. System quality will positively impact user satisfaction.

H2. Information quality will positively impact user satisfaction.

H3. Service quality will positively impact user satisfaction.

H4. Use will positively impact user satisfaction.

H5. Information quality will positively impact use.

H6. System quality will positively impact use.

H7. Service quality will positively impact use.

H8. User satisfaction will positively impact perceived net benef9.

H9. Use will positively impact perceived net benefit.

Construct Measurement

The quantitative collection of data was carried out through the usage of past verified instrument. A reliable and valid instrument is Bailey and Pearson (1983) which has been tested and has become a commonly used instrument in the Information System field. For that reason, the information quality was measured by a six item scale just as Baily and Person (1983); however, it was modified to fit the specific context of the student information system being tested. In reference to system quality a three item scale instrument of Ashibly (2011) was modified and used. In this research, it is considered service quality as a valid judgement of the system success as a result the measurement of service quality a five item scale by Chang et al. (2009) was modified and used. Furthermore, for the measurement of use, a modified three item scale was used based on researches by Balaban et al (2013) and Rai et al (2002). The User Satisfaction dimension was measured using Seddon and Yip (1992) four item scale. The perceived benefit was measured by Alshibly (2011) and Tansely et al (2001) four item scale, however again a modified version.

Table 1. Measurement Items for Questionnaire

Construct	**Survey Questions**
Information Quality	IQ1: Abacus system provides information that is exactly what you need IQ2: Abacus system provides information you need at the right time IQ3: Abacus system has sufficient information IQ4: Abacus system provides information that is easy to understand IQ5: Abacus system provides up-to-date information IQ6: Abacus system provides information that is relevant to your needs
System Quality	SQ1: Abacus system is easy to use SQ2: Abacus system is user friendly SQ3: Abacus system provides interactive features between users and the system
User Satisfaction	US1: Most of the teachers have a positive attitude towar Abacus US2: You think that the perceived utility about Abacus is high. US3: Abacus has met your expectations. US4: You are satisfied with the Abacus system
Use	U1: You use Abacus frequently

	U2: You depend upon the Abacus system U3: You have the adequate information needed to use Abacus
Perceived Net Benefits	NB1: Abacus system helps you improve your academic performance NB2: Abacus system helps teachers save costs NB3: Using the Abacus system improves assessment and teaching NB4: Overall, using Abacus enhances teaching performance

Description of participants

The Toledo Community College has approximately over 50 instructors and over 600 students. The study was carried out with participants who are lecturers or instructors for the various department of the Toledo Community College, spanning across the Business, Science, Arts, Vocational and General studies departments. Participants include instructors from varied backgrounds, including varied years of experiences in the teaching profession.

Sample Size and Data Collection

To conduct this research, surveys were issued out to instructors to obtain a reasonable sample size reflective of the population consisting of 30 questionnaires. The surveys were issued out through convenience random sampling.

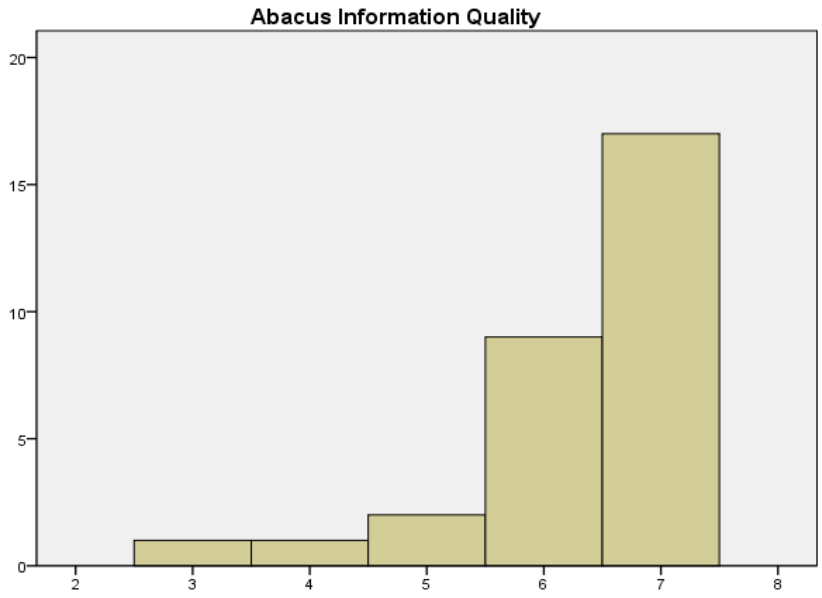
Data Analysis and Results

Table 2. Characteristics of Respondents (N=30)

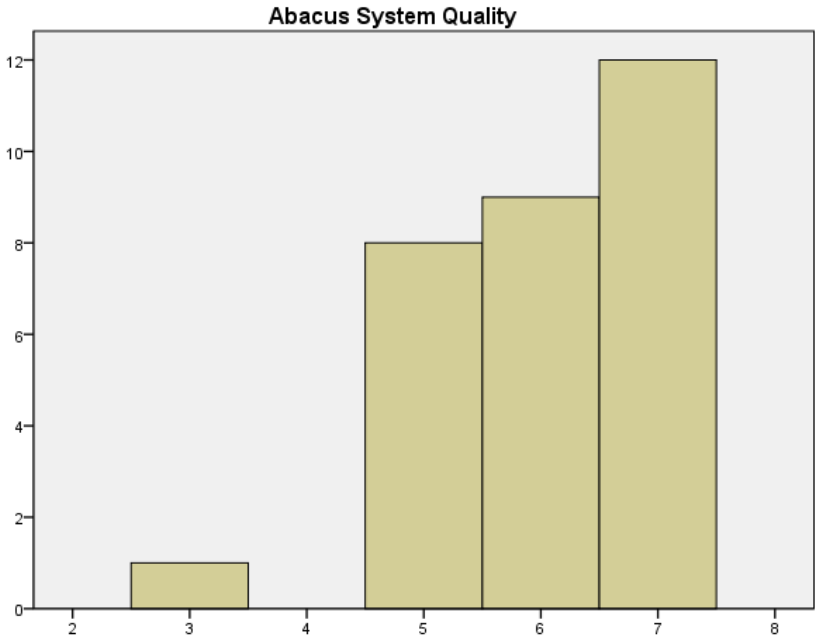
Characteristics	Number	Percent
Gender		
Male	13	43.3%
Female	17	56.7%
Age		
< 25	3	10%
25-35	17	56.5%
36-45	9	30.2%
46-55	1	3.3%

>55	0	0
Computer Experience		
<5	2	6.6%
5-10	3	10%
11-15	11	36.7%
15+	14	46.7%

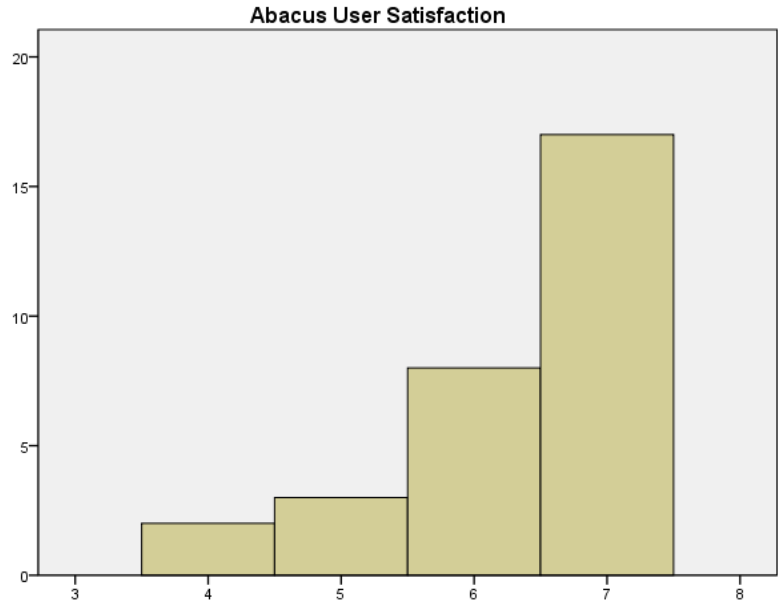
Data was gathered from 30 teachers of the Toledo Community College, in Punta Gorda Town. The data and results represent 5 histograms and an average of the findings. The responses varied from 1 which represents strongly disagree to 7 which represents strongly agree.



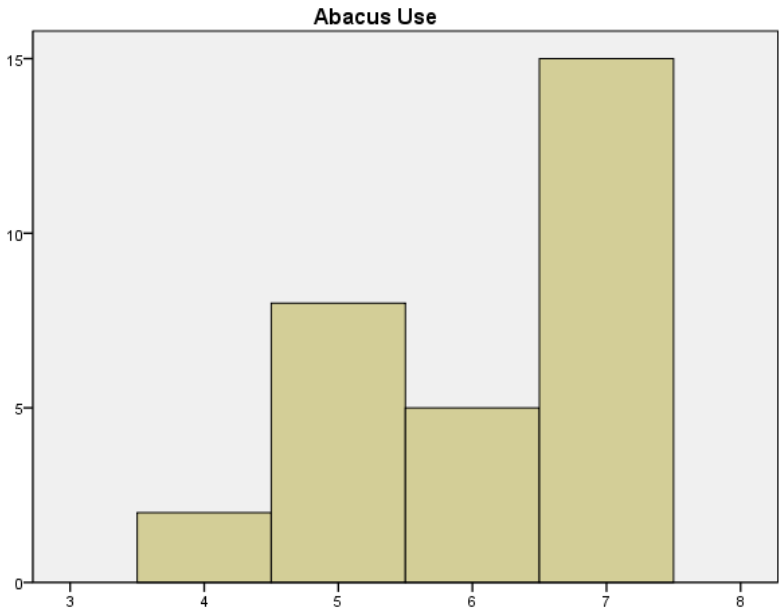
The histogram above shows the response of the teachers about the Abacus Information Quality. The result shows that 17 of the respondents strongly agree representing a total of 56.7% of the total population of 30 participants in the survey. They were a few that also agrees that Abacus system provides the exact information one needs. Only 1 respondent somewhat disagrees. 1 respondent neither agrees nor disagrees.



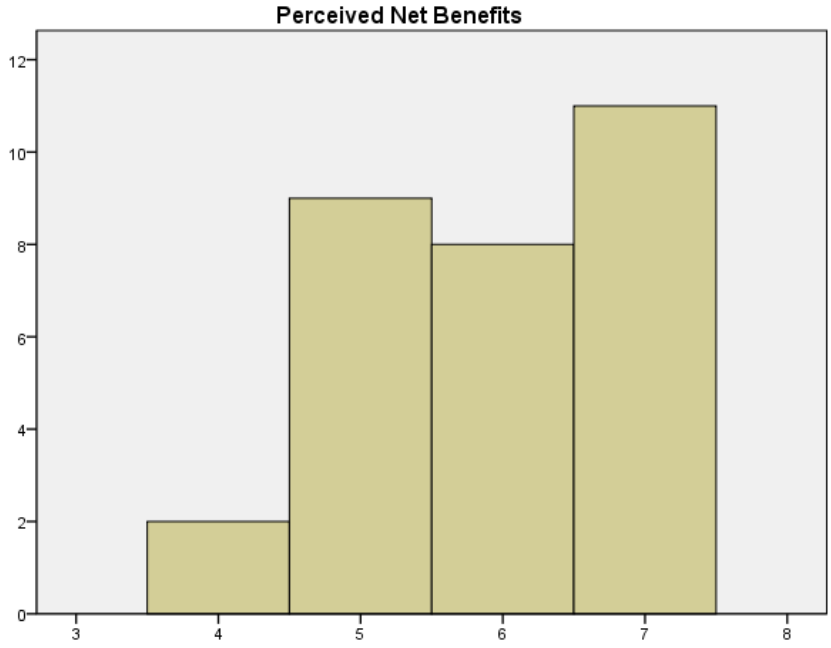
The histogram above shows the response of the teachers about the Abacus System Quality. The result shows that 11 of the respondents strongly agree. Most teachers agree and couples disagree.



The histogram above shows the response of the teachers about the Abacus User Satisfaction. The result shows that 17 of the respondents strongly agree and are satisfied with that system. They were a few a very few that agree or disagree.



The histogram above shows the response of the teachers about the Use of Abacus. The result shows that most teachers use abacus frequently. A few only use it when they really need too.



The histogram above shows the response of the teachers about the Abacus Perceived Net Benefits. The result shows that the respondents strongly agree. Some choose to agree or disagree.

Conclusion/Implication/Discussion

The teachers at the Toledo Community College find Abacus as a very helpful tool for them in the teaching profession. They have been using it for only two years but prefer that system over the prior one and would recommend it to other schools in Belize. After assembling all the data collected from the questionnaires we noticed that the teachers are delighted with the Abacus information quality. They totally agree that Abacus provide the information they need to assist them with their teaching methods, provides up-date information and provide sufficient information for them. When it comes to the system quality of Abacus they strongly agree that the system is easy to use, is user friendly and has interactive features. The teachers are satisfied with the system and have a positive attitude towards it. In addition, they believe that it has met their expectation in variety of forms especially when it comes to entering grades, entering attendance, helping the students stay updated with grades and make it easier to print report cards. They use Abacus very frequent since they need to input attendance and grades on a daily basis. Most teachers depend on Abacus since the system can automatically tell them which student has missing grades or who is doing the best in class. They believe that the system do benefit them because of the different ways it helps them and make everything easier for them.

Limitation

Although this research has been completed, however, there were some limitations that were encountered during the process which contributed to shortfalls to the proper interpretation of findings and results. First of all, the time frame allotted for constructing the research proposal was very limited, especially when conducting interviews with teachers and they are unable to give us some of their time or some of them are just too busy. Additionally, some teachers desiring to please the researchers may have selected any score on the scale that do not represent their actual thinking about Abacus. Lastly, a larger sample would have been more accurate and reliable, maybe extending the research to a next high school that uses the Abacus system.

Future research

In the future, sufficient data would need to be collect on Abacus System and with this foundational information at our fingertips, the hypothesis for our findings can be tested.

Acknowledgements

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Reference

Alshibly, H. H. (2014). Evaluating E-HRM success: A Validation of the Information Systems Success Model. International Journal of Human Resource Studies, 4(3), 107. doi:10.5296/ijhrs.v4i3.5929

Bailey, J. E.; Pearson, S. W., (1983). Development of a Tool for Measuring and Analyzing Computer User Satisfaction. Management Science, 29, (5), 530-545

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.

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.

Chitra, R. (2018). Grading System in Education.

Fetaji, B., Fetaji, M., Jashari, X., Ebibi, M., Ljajic, S., Kamberovic, H., & Iseini, B. (2016). Assessing and Evaluating UBT Model of Student Management Information System using ANOVA. *TEM Journal*, *5*(3), 313–318. https://doi.org/10.18421/TEM53-10

Finkel, E. (2012). Not Your Mother's STUDENT INFORMATION SYSTEM. *District Administration*, 76–80. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=77927825&site=ehost-live

Ozerbas, M. A., & Erdogan, B. H. (2016). The Effect of the Digital Classroom on Academic Success and Online Technologies Self-Efficacy. *Journal of Educational Technology & Society*, *19*(4), 203–212. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=120696898&site=ehost-live

Management Information Systems. Accessed September 12, 2018 via https://www.inc.com/encyclopedia/management-information-systems-mis.html

Mukerjee, S. (2012). Student information systems – implementation challenges and the road ahead. *Journal of Higher Education Policy & Management*, *34*(1), 51–60. https://doi.org/10.1080/1360080X.2012.642332

Rai, A., Lang, S. S., & Welker, R. B. (2002). Assessing the validity of IS success models: An empirical test and theoretical analysis. *Information systems research*, *13*(1), 50-69.

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.

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

Appendix

Questionnaire I – Abacus System at the Toledo Community College

Purpose

This questionnaire will be used to get feedback from the teachers that uses Abacus for . This questionnaire asks for information about yourself and how often you use the Abacus system. Your responses will be kept confidential.

Instructions

This is a survey, there are no right or wrong answers. Please tick the boxes to mark your answers.

1. Background Information	Answers:
Please indicate your gender:	Male ☐ Female ☐
Please indicate your age:	<25 ☐ 25-35 ☐ 36-45 ☐ 46-55 ☐ >55 ☐
Please indicate amount of computer experience you have in years :	<5 ☐ 5-10 ☐ 11-15 ☐ >15 ☐

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

2. Abacus Information Quality	Disagree ----------Agree
Abacus system provides information that is exactly what you need	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Abacus system provides information you need at the right time	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Abacus provides sufficient information	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Abacus provides information that is easy to understand	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Abacus provides up-to-date information	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Abacus provides information that is relevant to your needs	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
3. Abacus System Quality	**Disagree ----------Agree**
Abacus system is easy to use	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Abacus system is user-friendly	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Abacus system provides interactive features between users and the system	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
4. Abacus User Satisfaction	**Disagree ----------Agree**
Most of the teachers have a positive attitude towards Abacus	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
You think that the perceived utility about Abacus is high.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Abacus has met your expectations.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
You are satisfied with the Abacus system.	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
5. Abacus Use	**Never ----------Often**
You use Abacus frequently	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
You depend upon the Abacus system	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
You have the adequate information needed to use Abacus	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

6. Perceived Net Benefits	Never ----------Often
Abacus system helps you improve your academic performance	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Abacus system helps teachers save costs	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Using the Abacus system improves assessment and teaching	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐
Overall, using Abacus enhances teaching performance	1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐

Thank you for your participation.