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Abra State Institute of Sciences and Technology Cottage Rental Billing and Collection System (ASIST-CREBACS)

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ABSTRACT

In most organizations, Business Information Systems (BIS) make extensive use of information technology, such as personal computers. The study identified the ASIST cottage rental policies and procedures done in billing and collection of rental fees as a basis in developing the ASIST-CREBACS and evaluated the usability of the developed system in terms of usefulness, ease of use, ease of learning, and satisfaction. The study used the descriptive-applied type of research applying the Extreme Programming (XP) model. The researcher used Visual Basic 2008 which supports the Microsoft with NET framework as the programming language and My Standard Query Language (MySQL) as the relational database. Total enumeration of eight staff in the Cashiering and Accounting Offices including the cashier, the accountant, three collecting officers, and three billing clerks evaluated the usability of the developed system. The study used documentary analysis, interview, and the Usefulness, Satisfaction and Ease of Use (USE) questionnaire as data gathering instruments. The cottage rental policies are based on ASIST Implementing Order No. 023, Series of 2009 and the procedures done in billing and collection of rental fees are done semi-manually. As a result, the ASIST-CREBACS was conceived and developed. The ASIST-CREBACS was designed to fit the cottage rental policies and procedures done in billing and collection of rental fees because it was found to be usable.

Keywords **-** Cottage Rental, Billing, Collection, Extreme Programming (XP), Usefulness Satisfaction and Ease of Use (USE), descriptive-applied design, Philippines, Asia

INTRODUCTION

The reasons why computerized Business Information Systems (BIS) have become widespread are evident in their advantages such as speed, accuracy, and dependability. They also have a higher degree of flexibility due to their ability to be programmed to carry out a wide variety of tasks (Hardcastle, 2011).

The application of computer to the various facets of human endeavor has changed the way businesses are done by various professions by reducing the time needed to accomplish a given task and hence maximize productivity in the concerned establishments. With the high speed development of the car rental market, the traditional manual rental management is not enough for various business information processes. The study of Li (2013) proposed an enterprise-class development program of a car rental management system. On the other hand, the major concern of the study of Calma (2012) entitled "Computerized Rental with Billing System for Torres Rental Service" was to focus on how the computerized business records work for the rental and monitoring business. They developed a computerized rental with billing system that tracks the customer's rental of equipment and issues a receipt for every transaction and generates reports accurately and timely because they do not need to list down the records manually.

According to Myers (2003), the most important challenge in residential property management is to allow for efficient tracking of expected rent payments and actual payments received. She conducted a case study of the Mywick Residential Property Management System owned by Miss Jane Mywick, a real estate owner who has owned and rented residential units of duplexes and 4-plexes to individuals and to families for about 15 years; Miss Mywick must be able to track rents received and expected rents by unit, by tenant, and based on a date range. It can be noted that the amounts from any given tenant may change in any given month, most often in the middle of a lease agreement, due to changes in subsidy amounts. She must also be able to accept partial rent payments. Ms. Mywick needs flexibility in terms of accounting for the full rent from various sources, including subsidies, write-offs and special agreements with tenants.

As a business owner, being organized can help make daily operations run more smoothly. As a landlord, one of the primary obligations is to collect monthly rent from tenants. It is important to develop a system for collecting this rent. This system should be in place before even filling the first vacancy. Having a good system for collecting rent will not only make life easier, it can protect the landlord if he runs into any legal issues in the future.

The study of Elmetwaly (2011) emphasized that what people always need is an integrated information system to meet their daily needs in the area of the real estate business. Proposed information system include all of the processes necessary to manage and follow up real estate rental procedures of all different sizes and spaced locations. When building real estate information systems, it should be easy to use, quick in performance, serve all interests, serve all officials, and help in having and supporting decisions. Such real estate information systems can be used in producing numerous daily, monthly, and annual reports that describe and show the movement and workflow. The proposed real estate system was built by using Oracle databases.

Cottages for rent are no different from apartments. The same concept of tenancy applies wherein there is a landlord for apartments as there is management for cottages. Rental is collected regularly at a rate previously agreed upon by the landlord and the tenant. Along with the rental fee are specific rules and regulations which are more often than not, stipulated in a binding contract or agreement.

One of the Income Generating Projects (IGP) of the Abra State Institute of Sciences and Technology (ASIST) Main Campus in Lagangilang, Abra is cottages for rent. This IGP has been started since the early days of Lagangilang Agricultural School, now ASIST. It is the privilege of only bonafide and active employees of the state college to rent cottages. The ASIST administration is responsible in the management of these cottages. Two of the most important aspects in the management of these cottages are billing and collection of rental fees.

Considering the volume of transactions in both the Accounting Office and Office of the Cashier, the collection of cottage rentals seems to be quite neglected as these offices need to attend to higher priority concerns. Billing is done using the electronic spreadsheet Microsoft Excel but collection is done manually. A potential problem in the existing system of billing and especially in the collection of cottage rentals is dispersed information because there is no centralized, accurate, and timely system of billing and collection. The two abovementioned offices concerned can be found in adjacent physical locations but when it comes to the system of sharing of information, they seem to be distant from each other.

The in-house development of information systems for higher education institutions with specific identified problems and needs is becoming widespread in the Philippines. Gamba, Ocbian, and Gamba (2014), for example, developed a records archiving and document repository for the Sorsogon State College to overcome the barrier of server-client method of deploying the documents from one place to another and easier data access to its stakeholders. Gamale, Anuta, and Sayson (2012), on the other hand, tested the functionality of their Automated Class Scheduling System in terms of speed, data handling, accuracy, security, stability, and adaptability in making class schedules and found that the automated system is more functional than the manual because of its extra features which solve the primary problems in creating class schedules.

In this regard, the researcher considered developing a cottage rental billing and collection system. The system was developed to meet the specific needs of the billing clerk, the accountant, the cashier, and the collecting officers, that could lessen their time and effort, and to improve processes and flow of the existing system.

FRAMEWORK

The paradigm in Figure 1 shows the interaction of the Input-Process-Output (IPO) variables that were used in the evaluation of the usability of the ASIST Cottage Rental Billing and Collection System. The mentioned input was processed by way of validating in terms of usability to produce a useful, easy to use, easy to learn, and satisfactory ASIST Cottage Rental Billing and Collection System.

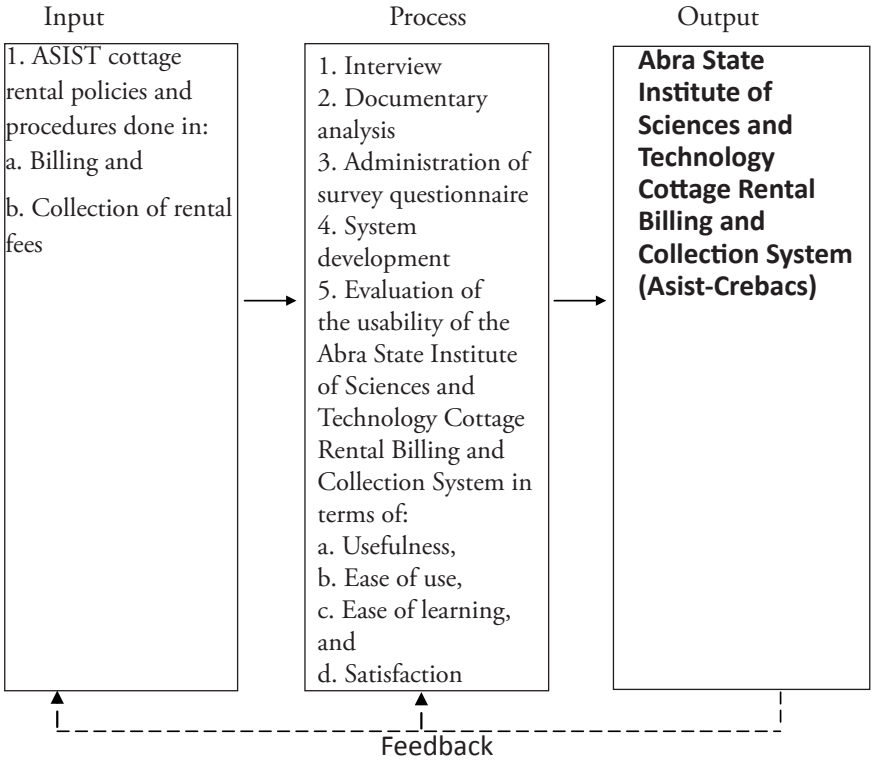

Figure 1. Research Paradigm

The feedback of the study was based from the results of the system being tested and evaluated by the users or respondents and this provided room for improvement.

OBJECTIVE OF THE STUDY

The study aimed to develop the Abra State Institute of Sciences and Technology Cottage Rental Billing and Collection System (ASIST-CREBACS). Specifically, it aimed to identify the ASIST cottage rental policies and procedures done in billing and collection of rental fees, develop the ASIST-CREBACS, and evaluate the usability of the ASIST-CREBACS in terms of usefulness, ease of use, ease of learning, and satisfaction.

METHODOLOGY

Research Design

The descriptive-applied type of research was used in the study. The identification of the mentioned variables was used as a basis for the development of the ASIST Cottage Rental Billing and Collection System which eventually led the researcher to use the applied type of research design.

The project study also used the applied research design that deals with design, development, and evaluation. In connection with this, the researcher applied the Extreme Programming (XP) model which has four phases namely, requirements gathering, software development, small releases, and maintenance.

Participants

The staff in the Cashier and Accounting Offices of ASIST served as the respondents of the study. Total enumeration was employed, thus, all of them were taken. They were chosen because they could provide needed information about the cottage rental policies and procedures done in billing and collection and in the evaluation of the usability of the ASIST-CREBACS. The researcher asked permission from all the respondents who were surveyed and interviewed.

The study only took only eight users as respondents in the evaluation of the usability of the ASIST-CREBACS because according to Dumas and Redish (1999), to develop a usable product, you have to know, understand, and work with people who represent the actual or potential users of the product. No one can substitute for them. Even managers, supervisors, or others who might be asked to speak for a group of users cannot substitute for the actual users.

Table 1. Distribution of Respondents

Position	Population
Cashiering Office	
Cashier	1
Collecting Officer	3
Accounting Office	
Accounting Clerk	1
Billing Clerk	3
Total	**8**

Instrumentation

In the development of the ASIST-CREBACS, the researcher used the Extreme Programming (XP) model as shown in Figure 2. It involves short, tight iterations of building, and releasing software. The Cottage Rental Billing and Collection System was designed to manage the billing, collection, and bookkeeping of ASIST cottage rental fees.

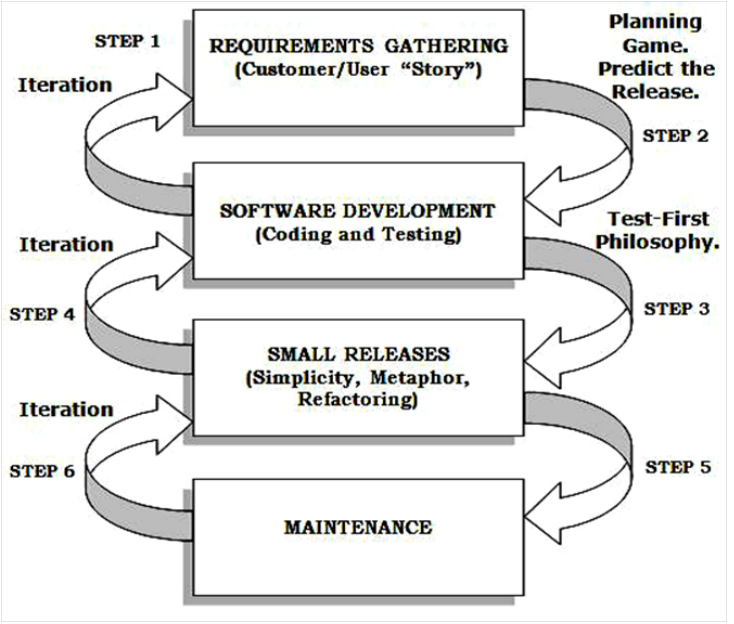

Figure 2. Extreme Programming Model

Requirements Gathering

In this phase, the researcher identified and analyzed specific information needed based on the user stories to develop an effective cottage rental billing and collection system. He converted user stories into iterations that cover a small part of the functionality or features required.

Documentary analysis and interview were used to determine the cottage rental policies and procedures done in billing and collection of rental fees. The researcher analyzed ASIST Implementing Order No. 023, Series of 2009. In the

analysis of documents secured from the Office of the President of ASIST about cottage rental and collection policies, the researcher found out that cottages are classified as Class A, B, C, D, or E depending upon the condition and structure of the cottage. Cottages were classified for purposes of determining new cottage rental fees. The increase of cottage rentals became effective starting December 2009.

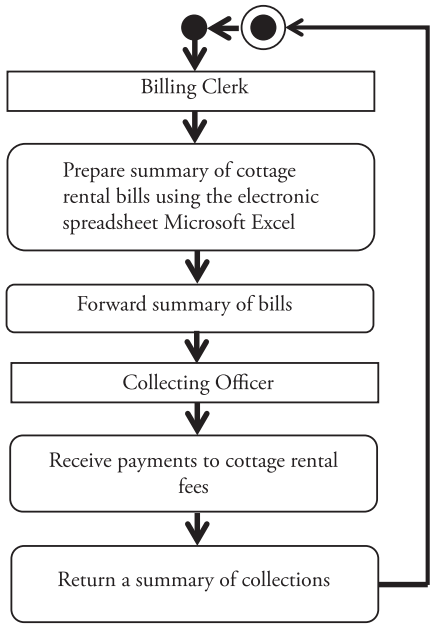

Figure 3. Activity Diagram of ASIST Cottage Rental Billing and Collection Procedures

Interview with the billing clerk and collecting officers was also conducted to determine the cottage rental billing and collection procedures of ASIST. As a result of the interview conducted with the billing clerk and collecting officers, the ASIST cottage rental billing and collection procedures were identified as illustrated in Figure 3. The cottage rental billing and collection of rental fees procedures start with: a.) The billing clerk prepares a summary of bills using the electronic spreadsheet Microsoft Excel, b.) The summary of bills is forwarded to the Office of the Cashier, c.) Anybody of the collecting officers receives payments to cottage rental fees, and d.) The collecting officer returns a summary of collection to the Accounting Office.

Software Development

The findings on the determination of the cottage rental policies and procedures done in billing and collection of rental fees were used as input to the software development. The researcher identified and analyzed specific information needed based on the user stories to develop an effective cottage rental billing and collection system. He converted user stories into iterations that cover a small part of the functionality or features required.

The software development phase involved coding, testing, and the complete design of the system. Coding constituted the most phases in the extreme programming life cycle. The researcher used Visual Basic 2008 which supports the Microsoft .NET framework as the programming language and MySQL as the relational database in developing the system. Extreme programming integrates testing with development phase rather than at the end of the development phase. All codes have unit test to eliminate bugs and the code passes all such unit test before release. In designing, the researcher considered the user interface and user-friendliness of the system.

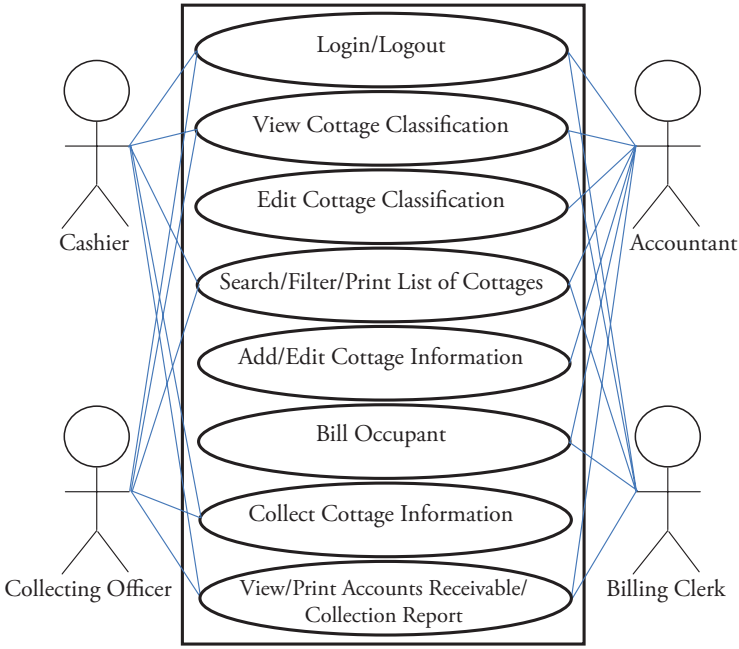

Figure 4. Use Case Diagram of the ASIST-CREBACS

The use case diagram of the developed ASIST Cottage Rental Billing and Collection System in Figure 4 indicates the functional requirements and activities of the different users. The accountant has an absolute control over the system except collection of cottage rental fees. The accountant's roles and privileges include logging in and out, viewing and editing cottage classifications, searching, filtering, and printing a list of cottages, adding and editing cottage information, billing occupants, and viewing and printing accounts receivable and collection reports.

The billing clerk can only login and logout, view cottage classifications, search, filter, and print a list of cottages, bill occupants, and view and print accounts receivable and collection reports. The roles and privileges of the cashier include logging in and out, viewing cottage classifications, search, filter and print a list of cottages, collect cottage rental fees, and view and print accounts receivable and collection reports. Lastly, the collecting officer can only login and logout, view cottage classifications, search, filter, and print a list of cottages, collect cottage rental fees, and view and print accounts receivable and collection reports.

Non-Functional Requirements

The Cottage Rental Billing and Collection System was exclusively developed for the Abra State Institute of Sciences and Technology Main Campus, Lagangilang, Abra. The following are needed for the implementation of the said project:

Hardware and Software Requirements

For the software to meet its best performance, it should have the proper hardware required. For the implementation of the ASIST Cottage Rental Billing and Collection System, the following computer hardware and software are needed and should be installed for the successful implementation of the system.

Hardware requirements	Software requirements
Intel Quad Core	Windows 7 or higher for the operating system
4 GB for physical memory	MySQL Data Provider for data provider
500 GB for hard disk drive	MySQL Server for database platform
at least 14 inches for monitor	

Small Releases

In the small releases, the researcher released the system to the users and he received feedback from them. Each feedback that specifies revised requirements became the basis of a new design. The process iterated and the system was re-released.

Maintenance

Maintenance phase resembles the final task in the system development life cycle (SDLC) implementation phase, data conversion, testing, and user training. The system was released to the users and training was conducted for them to learn the flow of the system.

The researcher used a survey questionnaire from the concept of Lund known as the Usefulness, Satisfaction, and Ease of Use (USE) questionnaire to determine the usability of the ASIST-CREBACS. Since the instrument is a standardized questionnaire and has been used successfully my many companies around the world and as part of several dissertation projects (Lund, 2001), it is presumed to be valid and reliable and that no more validation and reliability tests were conducted. The researcher personally collected the questionnaire to ensure a one hundred percent (100%) retrieval.

Data Collection

The data gathered from the respondents were analyzed and interpreted using the statistical treatment weighted mean. In terms of the usability of the ASIST Cottage Rental Billing and Collection System (ASIST-CREBACS), the data gathered were interpreted by using the Likert scale. It is a five (5)-point scale with corresponding descriptive equivalent as presented below.

Point Scale	Statistical Range	Descriptive Equivalent Rating (DER)	Descriptive Interpretation
5	4.20-5.00	Strongly Agree	Usable
4	3.40-4.19	Agree	Usable
3	2.60-3.39	Neutral	Usable
2	1.80-2.59	Disagree	Not Usable
1	1.00-1.79	Strongly Disagree	Not Usable

The variables with responses within the mean range of 2.60 to 5.00 were interpreted as Usable while those variables with responses within the mean range of 1.00 to 2.59 were considered as Not Usable.

RESULTS AND DISCUSSION

Description of the ASIST-CREBACS

The ASIST Cottage Rental Billing and Collection System is supposed to replace the manual operations done in the Accounting Office and Office of the Cashier. Cottage rental billing and collection are done electronically, not the usual way in which the staff use paper forms such as journals and ledgers to record day-to-day transactions manually and repeatedly. The computation of cottage rental fees and arrears is also automated. Government official receipt shall still be used to print receipt of cottage rental fees. The proposed system makes it is easier to search for the records of an occupant. The cottage number is required in all transactions. However, in case it is forgotten, the user can use the occupant's name instead. The system does not only generate a summary of bills, but also individual statements of account to be distributed to the occupants.

Another function that the ASIST Cottage Rental Billing and Collection System offers is the electronic registration of new cottages. The data of a new cottage are entered into the system by the accountant. The new cottage record is automatically added and saved into the file of all cottage records. The record can be updated as necessary. The ASIST Cottage Rental Billing and Collection System generates reports which enable the accountant, billing clerk, cashier, and collecting officers to secure a list of cottages and reports of collection and accounts receivable.

Features and Activities of the Developed ASIST Cottage Rental Billing and Collection System

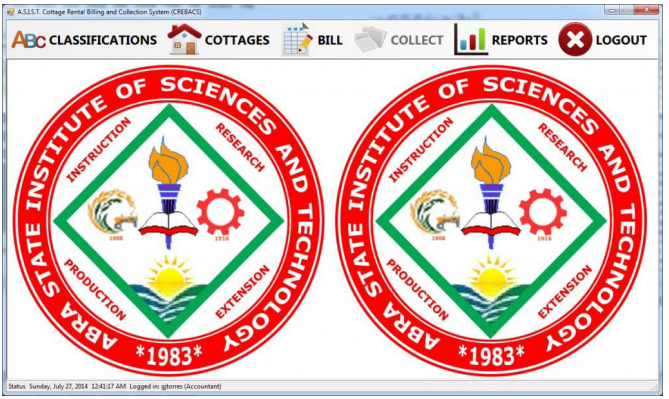

Plate 1. MDI Main Form

The MDI Main form allows accessing the function-specific menus in consideration of the logged in user's roles and privileges. There are six main menus which are "Classifications," "Cottages," "Bill," "Collect," "Reports," and "Logout." Only the Accounting Office staff can access the "Bill" menu while only the Office of the Cashier staff can access the "Collect menu." All other menus can be accessed by all users.

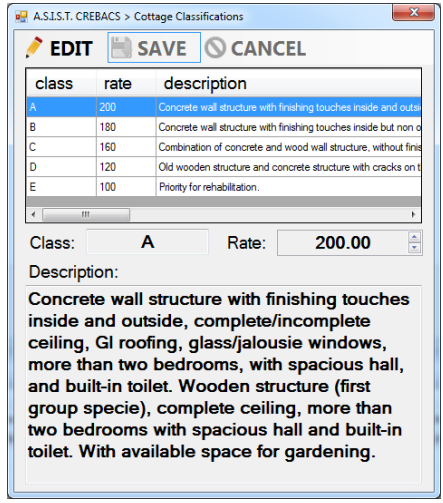

Plate 2. Cottage Classifications Form

The "Cottage Classifications" form displays the classifications of a cottage. Only the accountant can edit or update cottage information such as rate and description. All other users can only view the cottage classification information.

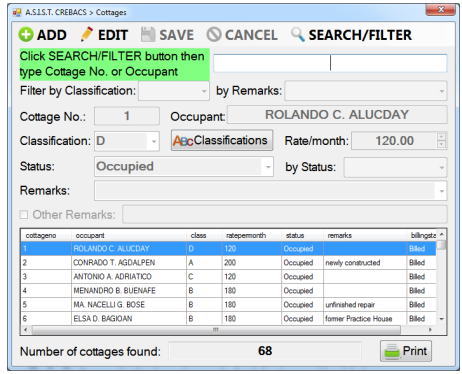

Plate 3. Cottages Form

The "Cottages" form allows adding and updating cottage information, searching, and filtering the list of cottages. This form allows the accountant to add and update cottage records. The "Add" button allows the entry of necessary information of a new cottage. It requires the accountant to input all required information before saving the record. The "Edit" button allows the accountant to update a cottage record in case there were inaccurate information previously entered or if there is a change of occupant, classification, rental fee, remarks, and change of the status of a cottage. The user can also search for a cottage and filter cottages by classification, by status, and by remarks and print a list of cottages as a result of searching or filtering.

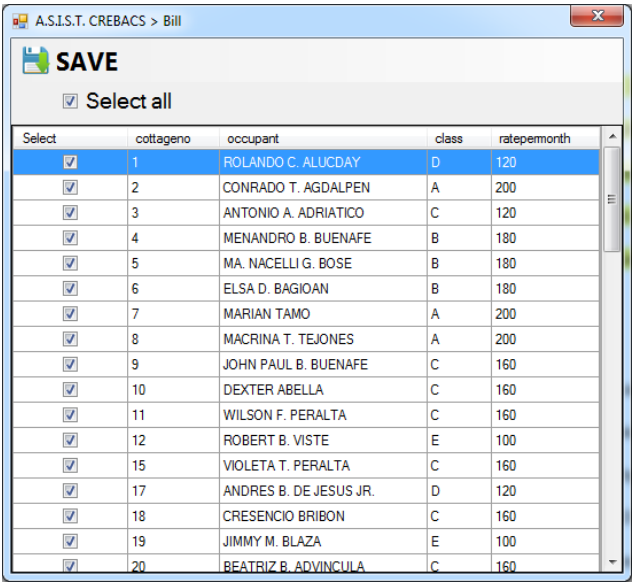

Plate 4. Bill Form

The "Bill" form is accessible by the accountant and the billing clerk only. The user must click the "Select all" checkbox to bill all occupants. Otherwise, the system will not allow the bills to be saved. If the "Save" button is clicked, the system prints individual statements of account.

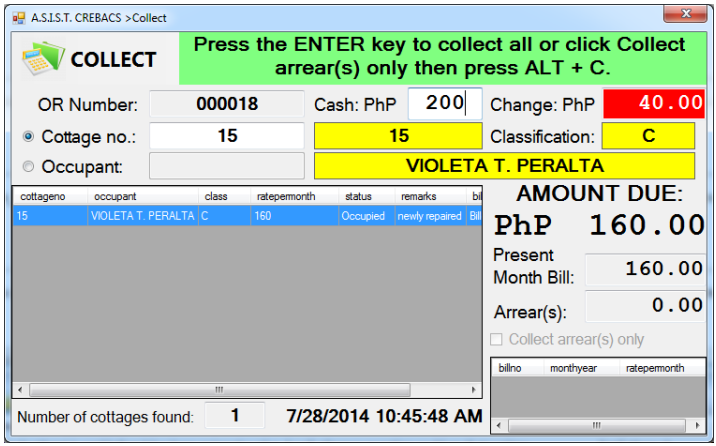

Plate 5. Collect Form

Only the cashier and the collecting officers have access to the "Collect" form. This form allows recording of cash receipts from occupants as payment to cottage rental fees. The user may collect arrears only or collect all cottage rental fees due to the occupant. The form displays the present month bill, the total and breakdown of arrears, and the total amount due. The system automatically computes for the change based on the input cash amount and prints an official receipt. All saved cash receipts are posted in the collections report.

Usability of the Developed ASIST Cottage Rental Billing and Collection System

Usefulness

With regard to the usefulness of the developed ASIST Cottage Rental Billing and Collection System, the respondents strongly agreed that the developed system was useful with an overall mean of 4.57 (see Table 2). It implies that the system is easy to operate. The overall results denote that the developed system is sufficiently customized to user needs.

Table 2. Usability of the ASIST-CREBACS in terms of Usefulness

Indicator	Mean	Descriptive Equivalent Rating	Descriptive Interpretation
1. This software helps the respondents be more effective.	4.40	Strongly Agree	Usable
2. This software helps the respondents be more productive.	5.00	Strongly Agree	Usable
3. This software gives the respondents more control over the activities of my life.	4.40	Strongly Agree	Usable
4. This software makes the things the respondents want to accomplish easier to get done.	4.60	Strongly Agree	Usable
5. This software saves the respondents' time when they use it.	4.60	Strongly Agree	Usable
6. This software meets the respondents' needs.	4.60	Strongly Agree	Usable
7. This software does everything the respondents would expect it to do.	4.40	Strongly Agree	Usable
Overall Mean	**4.57**	**Strongly Agree**	**Usable**

The results support the idea of Kiplagat (2009) that one way business establishments could increase efficiency is to increase their use of computers. Computers can remove the duplication of efforts often seen in the manual accounting systems and transaction recording. Processing payments by hand are time-consuming especially for businesses with many customers. Paper transactions can then be difficult to trace, leading to complaints from customers and, in some cases, a feeling of being cheated.

Tsakonas (2006) presented a model that analyzes the attributes of an electronic information services' components that affect user interaction and correlates them in the usefulness and usability evaluation process. An experimental study traces the relations between usefulness and usability, indicating that these evaluation parameters are interconnected and users do not find discriminating differences between them. Tsakonas and Papatheodorou (2008) found that several attributes of usefulness, such as the level and the relevance of information, and usability, such as easiness of use and learnability, as well as functionalities commonly met in these systems, affect user interaction and satisfaction. On the other hand, Lee (2000) found that a site's comparative usability and usefulness rating was found to be influenced primarily by how highly the user rated the ease with which

information could be found on the site and the reading of textual information. Both comparative usability of the site and site usefulness contributed uniquely to site visit frequency, but were not correlated with each other.

Ease of Use

In terms of ease of use of the developed ASIST Cottage Rental Billing and Collection System, the respondents strongly agreed with an overall mean of 4.29 (see Table 3). The indicators "this software is simple to use" and "this software is user-friendly" were both described as strongly agree with a mean rating of 4.60 and rated as highest of all the indicators. The lowest rating mean of 3.80 was obtained by the indicator "this software requires the fewest steps possible to accomplish what the respondents want to do with it." It was described as agree. This implies that the respondents feel convenient when using the system.

Table 3. Usability of the ASIST-CREBACS in terms of Ease of Use

Indicator	Mean	Descriptive Equivalent Rating	Descriptive Interpretation
1. This software is easy to use.	4.40	Strongly Agree	Usable
2. This software is simple to use.	4.60	Strongly Agree	Usable
3. This software is user-friendly.	4.60	Strongly Agree	Usable
4. This software requires the fewest steps possible to accomplish what the respondents want to do with it.	3.80	Agree	Usable
5. This software is flexible.	4.20	Strongly Agree	Usable
6. Using this software is effortless.	4.40	Strongly Agree	Usable
7. The respondents can use this software without written instructions.	4.20	Strongly Agree	Usable
8. The respondents don't notice any inconsistencies as they use it.	4.40	Strongly Agree	Usable
9. Both occasional and regular users would like it.	4.20	Strongly Agree	Usable
10. The respondents can recover from mistakes quickly and easily.	4.20	Strongly Agree	
11. The respondents can use it successfully every time.	4.20	Strongly Agree	Usable
Overall Mean	**4.29**	**Strongly Agree**	**Usable**

The results heighten the perception of Oppedisano (2002) that a well-designed user interface allows users to focus the majority of their cognitive energy on learning, and offers no operational complications, it maximizes user task completion and minimizes interfering factors, such as unnecessary interface complexity or performance.

According to Keil, Beranek and Konsynski (1995), usefulness and ease of use (EOU) are both believed to be important factors in determining the acceptance and use of information systems. Yet, confusion exists regarding the relationship between these two constructs and the relative importance of each in relation to use. Usefulness is seen as a function of task/tool fit, while EOU is viewed as a task-independent construct reflecting intrinsic properties of the user interface. Venkatesh (2000) further stated that much previous research has established that perceived ease of use is an important factor influencing user acceptance and usage behavior of information technologies. However, very little research has been conducted to understand how that perception forms and changes over time.

Ease of Learning

Ease of learning is an attribute in the usability of the developed ASIST Cottage Rental Billing and Collection System. It is used to test if the users have easily learned how to use the system. The indicator "the respondents easily remembered how to use this software" was described as strongly agree. It implies that the respondents got satisfied with the speed of the software in providing the output they needed. The lowest rating mean of 4.00 was obtained by the indicator "the respondents learned to use this software quickly." It was described as agree (see Table 4).

According to Nielsen (1994), ease of learning refers to the novice user's experience on the initial part of the learning curve. Initial ease of learning is probably the easiest of the usability attributes to measure, with the possible exception of subjective satisfaction. Ryu and Smith-Jackson (2006) determined the psychometric quality of the usability questionnaire items derived from a previous study by the same authors in 2005 and to find a subset of items that represents a higher measure of reliability and validity. The findings revealed a six-factor structure, including ease of learning and use, among others. In the study of Parlangeli, Marchigiani & Bagnara (1999), results lent a preliminary support to the hypothesis that a difficult to use hypermedia system can negatively affect learning performance. Quesenbery (2003) adds that ease of learning refers to how well the product supports both initial orientations and deepening understanding

of its capabilities. As a dimension of usability, ease of learning includes discovery that goes on for the complete life of a product.

Table 4. Usability of the ASIST-CREBACS in terms of Ease of Learning

Indicator	Mean	Descriptive Equivalent Rating	Descriptive Interpretation
1. The respondents learned to use this software quickly.	4.00	Agree	Usable
2. The respondents easily remembered how to use this software.	4.60	Strongly Agree	Usable
3. It is easy to learn to use this software.	4.20	Strongly Agree	Usable
4. The respondents quickly became skillful with this software.	4.20	Strongly Agree	Usable
Overall Mean	**4.25**	**Strongly Agree**	**Usable**

Satisfaction

With regard to the satisfaction of the developed ASIST Cottage Rental Billing and Collection System, the respondents strongly agreed that the developed system is likely to be used more often and used more effectively with an overall mean of 4.43 (see Table 5). The indicator "the respondents were satisfied with this software" was the highest indicator and described as strongly agree with a mean of 5.00. This indicates that in the development of the system, the end-user needs were considered and the respondents got fulfilled with the outcome. The indicator "the respondents feel they need to have this software" was the lowest indicator and described as agree with a mean rating of 4.00. It implies that the respondents did not find the system as difficult to use and that it is comfortable and acceptable to use.

The result justifies the idea of De Andres (2002) that satisfaction is the most elusive usability attribute, as it is completely dependent on subjective opinion of users. Users' continuance intention is determined by satisfaction, which in turn is collectively determined by perceived usability, quality, value, and usability disconfirmation (Chiu, Hsu, Lin, P. Sun, S. Sun, 2005). Flavián, Guinalíu and Gurrea (2006) performed a study to determine the influence that perceived usability has on the user's loyalty to websites that they visit. The results of the empirical analysis confirmed that greater usability was found to have a positive influence on user satisfaction, and this also generated greater website loyalty. Finally, it was found that user trust was partially dependent on the degree of

consumer website satisfaction. In the study of Lowry, Spaulding, Wells, Moody, Moffit & Madariaga (2006), users were asked to perform tasks of varying levels of interactivity at bookstore and e-card websites. Measures were obtained for the user's expectations of, desires for, and satisfaction with the websites. Results indicate that interactivity is successfully able to increase website satisfaction.

Table 5. Usability of the ASIST-CREBACS in terms of Satisfaction

Indicator	Mean	Descriptive Equivalent Rating	Descriptive Interpretation
1. The respondents were satisfied with this software.	5.00	Strongly Agree	Usable
2. The respondents would recommend this software to a friend.	4.20	Strongly Agree	Usable
3. This software is fun to use.	4.40	Strongly Agree	Usable
4. This software works the way the respondents want it to work.	4.40	Strongly Agree	Usable
5. This software is wonderful.	4.80	Strongly Agree	Usable
6. The respondents feel they need to have this software.	4.00	Strongly Agree	Usable
7. It is pleasant to use this software.	4.20	Strongly Agree	Usable
Overall Mean	**4.43**	**Strongly Agree**	**Usable**

Summary of the Usability of the ASIST Cottage Rental Billing and Collection System

It is evident that the respondents strongly agreed that the system is very usable with a grand mean rating of 4.39 (see Table 6). The highest rating mean of 4.57 (strongly agree) was given to "usefulness" which means that the users perceived that the cottage rental billing and collections system is useful. The least rating mean of 4.25 described as strongly agree was given to "ease of learning" which means that the developed system is effective for use. In terms of "satisfaction", the respondents strongly agreed that the system has satisfied their needs while "ease of use" was rated by the respondents as strongly agree.

This means that the system is very useful and has a very effective way of satisfactory usability. The results of the study of Calisir and Calisir (2004) indicate that both perceived usefulness and learnability are determinants of end-user satisfaction with ERP systems. In addition, perceived ease of use and system capability affect perceived usefulness, while user guidance influences both perceived usefulness and learnability. Brown (2002) aimed to extend knowledge

by examining perceived ease of use of web-based technologies in a learning environment, rather than a working one, and in a developing country as opposed to a developed country. Through a survey of 78 first year South African University students with little prior experience of Internet technologies, it was found that in a developing country context, perceived usefulness might not predict adoption, thus, amplifying the role of perceived ease of use as the main predictor of both usage and perceived usefulness.

Battleson, Booth and Weintrop (2001) pointed out that usability testing is an invaluable tool for evaluating the effectiveness and ease of use of academic library Web sites. In a related study, Yang, Cai, Z. Zhou and N. Zhou (2005) developed and validated an instrument to measure user perceived service quality of Web portals. They validated a five-dimension service quality instrument involving: usability, usefulness of content, adequacy of information, accessibility, and interaction. This scale provides a useful instrument for researchers who wish to measure the service quality of Web portals and for portal managers who want to improve their service performance.

Finally, Byun and Finnie (2010) determined a set of usability factors for evaluating e-government websites and described causal effects, which determine the extent to which e-government website usability affects user satisfaction and their intention to revisit sites for continued usage. Measurement data was gathered from user testing on the websites of representative administration departments in South Korea. Findings suggest that the usability strongly affected both user satisfaction and intention to revisit.

Table 6. Summary Table of the Usability of the ASIST-CREBACS

	Indicator	Mean	Descriptive Equivalent Rating	Descriptive Interpretation
1.	Usefulness	4.57	Strongly Agree	Usable
2.	Ease of Use	4.29	Strongly Agree	Usable
3.	Ease of Learning	4.25	Strongly Agree	Usable
4.	Satisfaction	4.43	Strongly Agree	Usable
	Grand Mean	**4.39**	**Strongly Agree**	**Usable**

The policies and procedures in billing and collection of rental fees variable should have been coupled with an identification of the problems encountered in the existing system to further strengthen the study. The XP methodology, though, was proven to produce a requirements-driven system because of its agile and iterative nature. Finally, although USE questionnaire's reliability has been

established in many studies, the usability of the developed system in this study can be further validated using a survey that leans towards both positive and negative statements such as the System Usability Scale (SUS) to eliminate bias on the part of the respondents. Bangor, Kortum and Miller (2008) present nearly ten years worth of SUS data collected on numerous products in all phases of the development lifecycle. The SUS, developed by Brooke (1996), reflected a strong need in the usability community for a tool that could quickly and easily collect a user's subjective rating of a product's usability. The data in their study indicate that the SUS fulfills that need. Results from the analysis of this large number of SUS scores show that the SUS is a highly robust and versatile tool for usability professionals.

CONCLUSIONS

The cottage rental policies are based on ASIST Implementing Order No. 023, Series of 2009 and the procedures done in billing and collection of rental fees are done semi-manually. Using the Extreme Programming model, a reliable and feasible cottage rental billing and collection system from development to implementation was achieved. The developed Cottage Rental Billing and Collection System was designed to fit the cottage rental policies and procedures done in billing and collection of rental fees in the Cashiering and Accounting Offices because it was found to be usable. Specifically, the developed system centralized cottage rental billing and collection information which were used to be dispersed. The Cashiering and Accounting Offices can now share the centralized information in a computer-based system, thereby, eliminating unnecessary and redundant procedures.

TRANSLATIONAL RESEARCH

A computer-based rental system will greatly simplify the record system used today by allowing the ASIST administration to focus on managing the cottage facilities rather than on bookkeeping and record tracking. The cottage rental management will be able to make informed decisions based on all the data rather than the individual components. The output of the study is intended to be presented to other educational institutions with an IGP similar to ASIST's cottages such as housing and dormitories and private real estate businesses like local apartments and boarding houses for possible adaptation after some form of customization.

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