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Research paper



A Study of Web Design for Customer Billing Telephony System Using User Experience (UX) Approach

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Abstract

Telecommunications industry has gone through series of development efforts to make services available to consumers and to provide quality services. The hardest challenge in telecommunications industry is to meet the customer satisfaction in billing system such as the accurate billing, easy to understand and resolving billing issue, the billing problem resolution speed, the service cost performance, rate discount degree, and rate communication. Hence, the improvement of these issues can enhance the customer satisfaction. User Experience (UX) is an approach that takes in consideration on user's preference, emotions, physical and psychological responses, perceptions, behavior that occur before, during and after using the system in designing the user interfaces. Obviously, this creates innumerable design and experience opportunities which represent the holistic view with of the pragmatic aspect and hedonic aspect. Nowadays, UX is becoming an important issue in developing web based system and it has been discussed by many researchers. This research is focus on a study of customer billing telephony system in order to decrease the challenges in telecommunications industry. A survey conducted to collect data from the customers of telecommunication industry. The result shows that the improvement of billing system is needed to improve the efficiency and correctness in billing process. It is expected that by implementing the UX approach, it will improve the customer billing telephony system. In addition, it gives the positive perceptions and experiences of a service in order to increase the customer satisfaction.

Keywords: *Web Design; Customer Billing Telephony System; User Experience (UX) Approach*

1. Introduction

Nowadays, telecommunications industry is one of the main facilities provided by service providers whether government or private agencies to public. The service providers are in charge for telephone, mobile virtual network operators, wireless communication, Internet, cable and satellite TV. Telecommunication billing is used by service providers to collect consumption data, calculate charging and billing information, produce bills to customers, process their payments and manage debt collection [1]. Telecommunication companies need an effective and accurate billing system to assure their revenue. The telephone billing system is a mathematical, statistical and logical processes carried out as figures or data obtained from customers. The billing system produced the billing status in the format of report summary and bill [2]. The bill is the most regular form of communication between the telecom companies and their customer [3]. Nowadays, the modern software service is a vital component to drive businesses allowing more productivity and greater successful of organization.

Many factors can influence customer satisfaction such as understanding representative users, working environments, interactions and emotional reactions. These factors need to considered in designing the billing system. The User Experience (UX) approach takes into account of the user's preference, emotions, physical and psychological responses, perceptions, behavior and undertakings occur before, during and after using the system must be considered in designing the user interfaces [4]. An effective and accurate billing system can support customer and service providers to manage the revenue and maximize customer satisfaction. The objective of this work is to present the study of billing telephony system among customers in Klang Valley. The result will be used in supporting for system design of Customer Billing Telephony System. The paper is structured as follows. Section 2 discusses literature review. Section 3 describes the methodology. Section 4 describes the customer billing telephony system practice. Section 5 presents the discussion and conclusions section.

2. Related Work

2.1 Customer Billing Telephony System

The customer billing telephony system is used for providing location information and other information about a calling telephone to the caller during a telephone connection in a data network telephony system. Data network telephones configured for operation with an extensive database and other user account information. The user's account consist a location identifier that identifies the physical location of the telephone. The location identifier may provide address information, latitude and longitude configuration, directions, or other information. For example, the location information is communicated in a data communications channel be-

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tween the caller and the callee. The billing telephony process start when the customer makes calls, the connections made by the network (such as switches) create Call Detail Records (CDR) of the activities which include the identification of the customer and other information relevant to the billing system such as call duration and call distance. Besides that, the billing system receives records such as a long distance service provider or roaming partners. Then, the data are stored into the customer database. At that time, the billing system reformat the CDR into an internal layout that is proprietary to carried, guides and update the CDRs with the correct customer and rating information. After each CDR has been rated according to the customer's rate plan, it is stored in a "Bill Pool". The Bill Pool is a data store containing all CDRs that have been rated and are waiting for the month-end cycle billing process to aggregate them and display them on a customer's bill. The invoice will produce once the billing run is completed and will email to the customer.

There are numerous works being done to different aspect of customer telephony billing system. Most of the researchers were focused to improve the customer satisfaction and loyalty in the telecom sector [5], [6], [7] the result revealed that customer satisfaction has the most significant positive effect on customer loyalty. [8] proposed lightweight agent-based approach and secure mobile payment protocol to measure the performance of mobile payment applications and to supports multiple payments. [9] proposed a new central billing system to consolidate bills for user without the need to track and pay the bills individually. [10] conducted a study and stated that the mobile telecommunication need to focus on call center, customer support, post services, corporate image, delivery and speed in order to improve their customer satisfaction. [11] proposed the investigation on the determinants accuracy of the Billing Systems in Sudanese Telecommunications companies for voice calls and SMS only. [12] developed a new web application using freeRadius framework to resolve the financial leakage in billing system. [13] conducted a survey on the factors influence customer satisfaction in various telecom companies at Riyadh, the results highlighted that customer care services, promotion schemes and service quality were gave high impact on the customer satisfaction. [14] proposed the research model for the customer satisfaction and satisfaction loyalty that consists product, price, distribution, promotion and customer service. Therefore, there is lack of study that employed the UX approach to solve the problem that related to customer billing telephony system.

2.2 User Experience (UX)

The UX approach involve user's preference, emotions, physical and psychological responses, perceptions, behavior that occur before, during and after using the system in designing the user interfaces [4]. There are many factors that influence a user's experience with a system such as the user's state and previous experience, system properties, and the usage context/situation [15]. In addition, understanding representative users, working environments, interactions and emotional reactions help in designing the system are also important in the UX approach. [16] had using the UX approach for engaging stakeholders of security requirement in elicitation and specifications. In this UX approach, there are focusing on personas and scenarios which is related to security and requirement analysis activities. The approach is concern in capturing the requirement of such as security, usability, the assumptions about users and also the lack of end-user accessibility.

The UX components consist of information architecture, interaction design, usability, prototyping and virtual design. Information Architecture is related to connect people to content. Interaction design makes arrangements with the interactions between users and a screen. The visual design reacts to the user goals supported in interaction design to communicate using varies media such as graphics, images, fonts, colour and icons using a prototype. The usability checks the validity of prototype design in order to meet the need of people that come from different backgrounds or limitations. All the user needs and limitations for the product must resolve by the UX designer. The usability testing conducted to gain the level of user understanding of how to use the product and to get feedback from them. The prototype offers a way to iterate based on feedback from stakeholders and users in the context of usability studies until it is forms to as final product. The visual design is crucial part of a product development where putting the user's experience into the product. This is important and takes as main consideration by many companies in a way for showing the company prestige and brand. The visual design can be influential in how desirable and engaging a product and can even cause to overlook usability problems. Sometimes, the visual design can be driving apart, if designers emphasize aesthetics and sacrifice usability. However, the aesthetics and usability can be viewed as being positively connected. The visual design enlightens in supporting the greatest selection on how a product works via colour, visual hierarchy and typography.

3. Research Method

This research used the UX approach and a questionnaire. The questionnaire was designed with the purpose of seeking specific information from the respondents. The questionnaire used to investigate the practices and the challenges of billing telephony system. It is also a good way to collect perception data from users. It is inexpensive but can potentially gather large number of respondent's response. Thus, it is one of the famous and widely used methods. This questionnaire is specifically designed using five point Likert Scale methods to capture the important data that need to be evaluated and overall can achieve the objectives. The questions were divided into three major parts/sections:

Part 1: The demographic profile questions/Background information

Part 2: The Practices of Billing Telephony System

Part 3: The Suggestion to improve customer billing telephony system.

Part 1 comprises the demographic profile questions relating to gender, age, education background, experiences with the current service provider. While in Part 2, the questions involved are on the customer satisfaction of the current customer billing telephony system. This part consists of questions about the user interface design of customer billing telephony system. Lastly Part 3 is about the respondent suggestion to improve current system. The questionnaire contains close-ended questions. Close-ended questions are easier to answer process and analyze. These close ended questions used in the questionnaire are numerical rating scales as strongly agree (1), agree (2), neutral (3), disagree (4) and strongly disagree (5). All of these questions are taking from standard questionnaire that has been used widely and verified by experts and professionals in order to improve customer billing telephony system. A total of 60 respondents in the Klang Valley were chosen randomly and involved in this study.

Then, the UX approach that focusing on user requirements part is used to describe user profile. The profile consists of user characteristic, user pain points, user needs and ideal features of the user's needs.

4. Study Existing Billing System

In this section, there are two type of results analysed and presented. Section 4.1 discusses the quantitative results and section 4.2 described the persona for the Customer Billing Telephony System (CBTS).

4.1 Analysis and Result

The Table 1 shows the demographic profile of respondents. From the demographic profile questions, this study found that about

53% of them are females and 47% are males within the group age of 25-45 years old. Majority of the respondents are using post-paid mobile plan and fixed-line that is nearly 90%. Most of them received their bill through mail (50%) and e-mail (30%). All of them have experience using post-paid mobile plan and fixed-line. This shows how important customer billing telephony to their customers. Table 2 shows that 60% of respondents were unsatisfied with the current billing telephony and invoicing and 40 % only were satisfied with the current billing telephony. The reasons are they unsatisfied with the current billing process and did not receive the complete and accurate bill/invoice from service provider. For credit and payment, 55% of respondents are unsatisfied with the current process and 45 % are satisfied. This is due to the schedule payment was not consistent. For customer support, 30% are satisfied with the current services and 70% are not satisfied due to they received their late feedback from the customer support. The table 3 shows that more 90% agreed with the proposed customer billing guideline that has been provided. They agree that all the proposed guidelines can give good experience for the customer when they're using new telephony billing system.

Table 1: The Demographic Profile

No	Criteria	Percentage (%)
1	Gender	Male (44)
		Female (56)
2	Age	<=25(15)
		26-35(50)
		36-45(30)
		>45(5)
3	Education Background	Diploma(15)
		Bachelor's Degree (65)
		Master Degree (20)
4	Present Job Position	Student(25)
		Working(75)
5	Organization/Company	Computer Hardware(20)
		Computer Software (50)
		Education(10)
		Financial Services(20)
7	Experience in billing telephony	<=5 (58)
		6-10 (30)
		11-14(7)
		>=15 (5)

Table 2: The Practices of Billing and Invoicing Telephony System

Component	Strongly Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
Billing and Invoicing	30	30	0	40	0
-satisfy with the current process					
-receive complete and accurate bill/invoice					
Credits and Payment	25	30	0	45	0
-satisfy with the current process					
-schedule provided is consistent					
Customer Support	30	40	0	30	0
-satisfy with the current service					
-receive fast feedback					

Table 3: The Proposed Customer Billing Guidelines

Component	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
Bill Format and Accessibility to Billing Information	2	7	33	58
-Customers (including disabilities) are able to access the billing information in quick, simple and easy way.				
-Customers are able to access to their online billing statement with a minimum of 3 months.				
-Customers should receive their bills/invoice thru their email address.				
Bill Organization and Presentation	0	5	20	75
-Customer should receive the organized billing information.				
Customer Information	0	2	40	58
-Customer should access to the secure on-line billing information.				
Descriptions of Billed Charges	0	2	50	48
Customer should receive the detail information regarding charges and their method of calculation.				
Disconnection	0	2	0	98
-Customer should receive notification/message in 14 days prior disconnection date.				
Billing Accuracy	0	2	0	98
-Customers will be entitled to a refund for inaccurate bill/invoice.				
Billing Timeliness	0	2	0	98
-Customers should receive their bill/invoice on a timely basis.				
Payment	0	3	0	97
-Customers should be given a period of no less than 30 days from the date a bill/invoice is issued to make payments.				
-Customers should be received the reward point for paying their bill/invoice before payment due date.				
-Customers should be able to make payment online.				

Billing is the process of generating invoices which contains information of charges, discounts, payments and outstanding balances that calculated by OBRM (Oracle Billing and Revenue Management) at each Billing Period (BP) for customers. Invoicing is the next activity in every Billing Cycle (BP) after billing job completed. Invoicing is needed to export bill in xml form in the next step of ICP Billing and Invoicing. This process involving preparation steps before running invoicing and invoicing process itself. The Fig. 1 shows the process flow of billing and invoicing system.

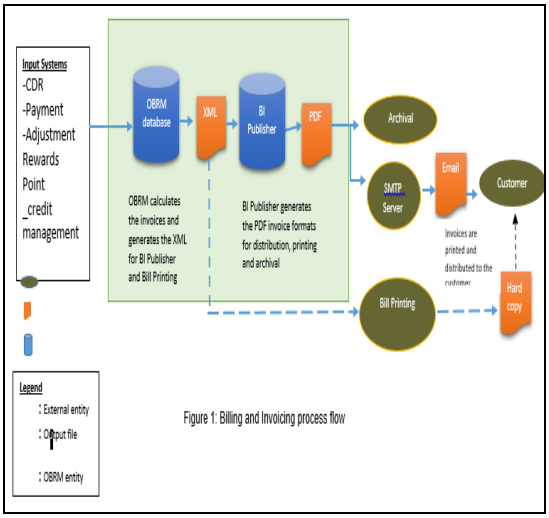

Fig. 1: Process Flow of Billing and Invoicing System

4.2 UX Personas for CBTS

The UX profile for describing of Customer Billing Telephony System (CBTS) is shown in Fig. 2. This user profile is the synthesized data collected from the existing customer billing telephony system (part 4.1.) The UX profile is group into four (4) elements which are characteristic, pain points, needs and ideal features.

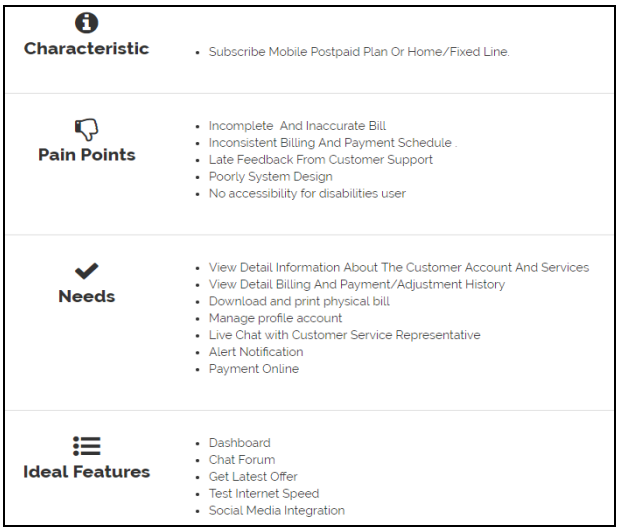

Fig. 2: UX Personas for CBTS

4.2.1 Characteristic

The user characteristic for CBTS is users that subscribing mobile post-paid plan and home or fixed line. The personal data such as age, gender, education background and job position are consider as a factor in influencing on accessibility, presenting and learning level of understand ability of CBTS.

4.2.2 Pain Points

Users are very concerned on receiving the incomplete, inconsistent and inaccurate the bill/invoice on time/schedule. Besides that the customer support provided late response for the users if they have problems in billing and payment. In other hand, the users are highlighted no accessibility for disabilities user.

4.2.3 Needs

Users have shown their attention to view their detail information regarding the customer information, account and services that have been subscribing billing, payment and adjustment history. Users were preferred to download and print the bill and able to communicate in real time such as live chat. Users suggest getting alert notification for each activity and process occurred such as updating the users account profile.

4.2.4 Ideal Features

The ideal features for CBTS are dashboard, chat forum, get latest offer from service provider and test the internet speed connection. This prototype also integrates with current social media such as Facebook, Twitter and so on. Hence, all the features added will gain the best experience to the user.

5. Conclusion

This research is about conducting a survey to investigate the customer's practices of CBTS. The findings will help researcher in facing the challenges that confronting in telecommunications industry which are able to attain the customer satisfaction in billing system such as the accurate billing, easy to understand and resolving billing issue through improving the existing customer billing telephony using the UX approach. The results highlighted that more than (90%) of respondents agree with the customer billing guidelines as proposed used to build customer billing. The billing format and accessibility to billing information, bill organization and presentation, customer information, description of billed charges, disconnection, billing accuracy, billing timeliness and payment are important criteria in the CTBS guideline which must be addressed when designing the customer billing. Besides that, 100% were agreed for the good bill organization and presentation is needed that may be guaranteed them to receive an accurate and practical of billing services. In addition, the study shows that the UX approach can complement to propose a good interface design for CBTS.

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