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Usability of KITIKIT: a mobile-based app for implementing customizable online product ordering

A Balcita[1], RJ Ventayen[2] and T Palaoag[3]

[1] Don Mariano Marcos Memorial State University
[2] Pangasinan State University
[3] University of the Cordilleras

[1] amypanedabalcita@gmail.com
[2] dayjx@yahoo.com
[3] tpalaoag@gmail.com

Abstract. Pugo, branded as the woodcarving capital of La Union, is well known for woodcarving products. The town has skillful tribes who practice woodcarving. One of these tribes was the Ifugaos, and when they learned that the art of woodcarving could make money for them, a wave of Ifugaos migrated along the Marcos Highway to showcase their hand-carved wood products. The widespread of woodcarving business was due to the availability of the raw materials, tools used and durability of the product. Home decors, furniture and other sculptural forms made out of wood are some of the products that are now distributed in the market. This research was then conceptualized for the benefit of the woodcarving industry *stakeholders. The researchers proposed the KITIKIT, a mobile app to ease the searching for* hand-carved wood products. Usability testing using USE questionnaire had been conducted to find the level of usability of the KITIKIT. The results show that the proposed application is acceptable to users in terms of usefulness, ease of use and satisfaction.

1. Introduction

In the modern-day era, so many things are transformed. The advent of technology has modified the way humans live, work and spends amusement time. Computers are taken into consideration the lifeblood of society; they are everywhere. The advancement in discoveries, each in hardware and software, keep coming, day in and day out. Technology changes and improves at a rapid pace, and business and companies have coped with it. This is because as the ultra-modern know-how of improvement in computer science grows, human's standard increases. They seek and crave for higher and extra environment-friendly approaches to accomplish tedious undertaking [1].

At present, human beings at the back of large and small organization adopt modern technology to survive and compete with market demands. Also, through the use of an online ordering system, different transactions and processing systems have become computerized for greater ease and accuracy. The net and web have been firmly entrenched in modern day commercial enterprise practices. Businesses migrate into the online system for various reasons. One of these is that an online system can decrease operational fee considering that transactions are done through the web. An online ordering system is a powerful tool for business, adapting to these technological advancements is needed for everybody to improve their business internationally or locally and cope up with the problems that come along with it [2].

Rayport mentioned that when ordering online, the transaction is known as online ordering. Online ordering systems help customers to buy goods through the internet. Online ordering has been around over the past two decades, involving many activities associated with the customers. Online ordering has become popular because of the way that it can expand your order and allow your customers a more natural means of placing orders [3]. Samsudin explained that information and communication technology (ICT) had been utilized to automate movement tasks in enterprise transactions such as customer registration system, billing system, and inventory system. However, the evolution of wireless technology and the emergence of mobile gadgets have no longer solely supplied end users enjoyment in using computerized structures but additionally new methods to communicate information. The convergence of wireless and cell applied sciences can facilitate a ubiquitous platform for implementing commercial enterprise applications such as food ordering system [4]. Kasemsap mentioned that businesses nowadays are using an online ordering system to automate transactions. It enables the customers to access the information. Thus, it is observable that companies are dependent on the current high-technologies to improve their operation [5].

The woodcarving industry in Pugo, La Union, is refining its services to its customers and staff through computerized processes and system. Thus, the researchers conducted a study which helps solve the problems in the traditional method. Through this online ordering system, an automated process had been convenient for customers, orders are easier to manage, and attracted more customers because transactions are processed online.

The researchers aimed to develop a mobile app and analyze the usability of the application when being used by stakeholders in searching for hand-carved wood products. This study specifically aimed to identify the information requirements in the development of the KITIKIT, to identify the features of the KITIKIT and finally to identify the level of usability of the KITIKIT. This application got its name from a wood carving tool called KITIKIT, the Iluko term for carving knife that woodcarvers use to pare, cut, form and smooth wood.

2. Literature Review

2.1 Electronic commerce (E-commerce)

E-commerce is rapidly gaining ground as a regularly occurring and used enterprise paradigm. More and more extra commercial enterprise houses are imposing websites and apps imparting functionality for performing business transactions over the web. It is realistic to say that the method of purchasing on the net is becoming commonplace [6]. Devendra and Toral characterized that electronic commerce, commonly known as e-commerce, comprises of the buying and selling of products or services over electronic frameworks such as the web and other computer networks [7]. According to Gangeshwer, the slicing aspect for companies today is e-commerce. It facilitates new types of data based entirely on enterprise strategies for reaching and interacting with customers like online advertising and marketing, online order taking and online purchaser service. It can additionally minimize price in managing orders and communicating with a massive vary of suppliers and trading partners, areas that usually add significant overheads to the cost of products and service [8]. At present, many business establishments, institutions, agencies, and persons tailored the modern approaches of buying and promoting their merchandise or products through internet access. The appreciation of social advertising has shifted and no longer seen as a cutting-edge or fad, having a flexible and well-managed presence in each of the "big three" the Facebook, Twitter, and Google. It has turned out to be a need to for any enterprise searching for to impenetrable a place in both the way of life and digital marketplace.

With the increase in the number of people who participated in shopping online, people and business from Pugo are finding ways to cope with the changes brought about by the digital age. There are many Facebook group pages managed by Pugonians that exists. Users utilize it to post the products they sell, browse through products for sale, and for sellers and buyers to communicate, therefore using Consumer-to-Consumer (C2C) type of transaction. The website is an intermediary, directly just there

to suit customers. They do longer check the best of merchandise being offered. By using the Facebook group to shop online, there are many risks and problems that arise, as most of the transactions between the buyers and sellers are completed independently on the website. According to some concerns about the group page, comments of the buyers and sellers are the following the non-delivery of products which have been paid for, delivery of defective products, false reservations of buyers, and also obscure payment and delivery schemes, among others.

The Municipality of Pugo is established as the center of wood trade in Southern part of La Union. The Department of Trade and Industry had approved hand-carved wood products as the *One Town One Product (OTOP)* of the municipality. At present, there are twenty-eight established wood carved shops. The people from nearby towns come into the town of their needs because of the presence of many shops that sell hand-carved wood products. These wood carved shops are somewhat outdated and lagging behind since they are still doing the traditional mode of business. They advertise their products through flyers and during exhibits conducted by the Department of Trade and Industry. Most of the services like record keeping and booking services are done manually. These shops also don't maintain a database for their products and their customers. The sellers even admit that they are knowledgeable of the benefits of online shopping yet their problem is that they don't know how to convert their traditional business into an online store. While their commercial enterprise of in-Store is doing well, the researchers believe that the establishment wishes a new business model which is going online for i. Leveraging its existing in-store unit enterprise and ii. Developing omnichannel to accommodate the change in client behavior that is empowering these clients for purchasing decision making and executing their purchase in any channel as per their convenience [9]. Because of these scenarios, the researchers were inspired to develop a mobile app for the sellers of hand-carved wood products of Pugo, La Union. This can help in fast buying and selling procedure 24/7 as well as easy to find products. Through the proposed KITIKIT it will be simpler for the wood carved shops to pick up clients, promote items or products, low operational costs, way better quality administrations, and services, no require of physical company set-ups, and clients can select items or products from diverse suppliers without moving around physically [10].

2.2 Usability Testing
Usability is commonly comprehended as the methods for improving the ease-of-use during the early design process [11] [12]. Usability testing on the other hand, generally involves the evaluation of the accessibility of an application from the user's perspective with regard to different aspects of the application functions [13] [14]. Aside from the development of the mobile app KITIKIT, another focus of this research is on assessment of the usability of the KITIKIT by using USE questionnaire [15]. Evaluating usability of mobile applications is considered one of the key issues in application development [16] [17]. There are many researches that conduct usability testing from end-users perspective [18] [19] [20] [21]. Usability is one of the key parameters to make a mobile application used and loved by the users, and also enabling users achieving their specific goals. Usefulness, ease of use, and satisfaction are key factors that determine user experience when they are engaging with an application [22].

3. Methodology

3.1 Software Development Methodology
The methodology that was utilized in this study is Agile Methodology which is an iterative aspect development methodology, where both development and testing process are concurrent. Testing is not a separate phase; coding and testing are done interactively and incrementally, resulting in the final stage production, which sports are meeting customer requirements. Further, continuous integration leads to early defect removal and hence time, drive and cost savings [23]. One of the agile strategies is Feature Driven Development (FDD) that is beneficial because it demonstrates that the researchers can focus on domain modeling on an iterative and incremental undertaking and due to the fact it proves

that agile-like methodologies can scale. FDD indicates that the researchers can spend a short amount of time at the beginning of the project to establish a clear perception of the area in which they are working and use that appreciation to formulate an ambitious plan besides getting caught in analysis and design paralysis [24].

FDD is a production strategy which highly oriented on ensuring out small blocks of client-valued functionality. This drives builders or developers to come up with working elements once every two weeks usually and it can tune down the project progress with precision FDD, which is one of some agile improvement processes, is an iterative and incremental software improvement method having the main reason of delivering real working software program repeatedly. [25]

Thus, the researchers selected FDD as the methodology for the reason that the method for the motive that its techniques enable and put into effect the repeatable delivery of operating software immediately with correct and significant facts to all vital roles inside and outside the project. FDD methodology helps the researchers to develop and deliver the application in a short period. It can also scale down and still provide value to the development process. The different phases of the FDD are shown in Figure 1.
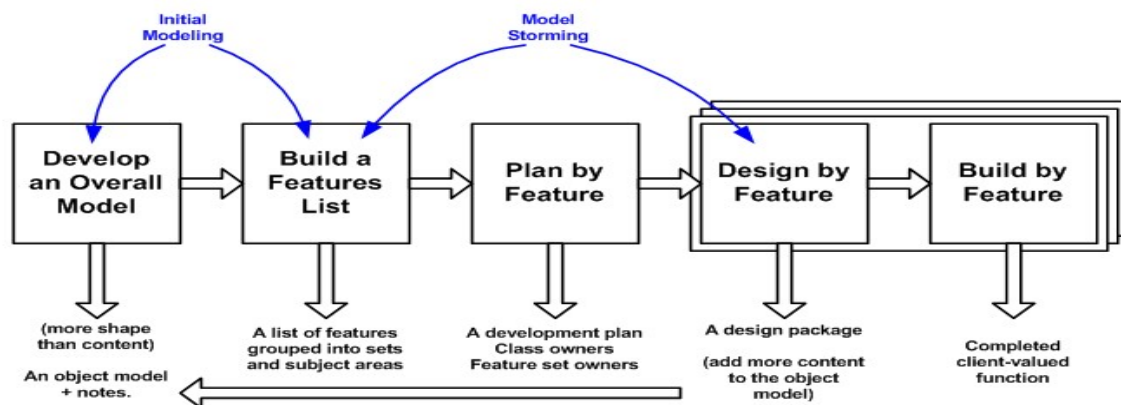

Figure 1. The FDD Project Life Cycle

3.2 Scope and Delimitation
This study focused more on searching business establishments such as woodcarving shop stores. It provides explicit information about the products and services being rendered, location, and the contact information of the establishment owners. It also provides a secret message where the users communicate with the owners. A map is also included to indicate the directions going to the establishments. The mobile application is accessible everywhere; however, the participating establishments are only within Pugo, La Union. It does not have a GPS to detect the location of the user. The app does not cover the online payment. The study is designed to develop an android shopping app that exclusively caters the buy and sell of hand-carved wood products in the Municipality of Pugo, La Union. The creation of a database server, administration website, production of other mobile versions of the app outside of the Android version (e.g., iOS, Windows) will not be covered in this study.

3.3 Data Gathering Techniques
The researchers made use of the following tools and procedures in gathering data for the study:
- Interview
  This type of data gathering technique has been used by the researchers to gather information from the twenty establishment owners. A face-to-face and a survey with guide questions that

aims to acquire the most relevant data taking considerations of the stakeholder's opinions, interest, and business workflow.

- Observation
  This method that was used by the researchers is to observe the owners on how they respond to their prospect clients on their struggle in finding quality hand-carved wood products.
- Documentary Analysis
  This is a technique which the researchers used to analyze the given data provided by the establishment owners such as legal papers to prove that the establishment is operating legally.

3.4 Usability Evaluation

This usability evaluation aims to find out how far the stakeholders can interact effectively and how far the application provides user guidance, provide information, and provide consistent interaction [26]. The procedure in conducting a usability evaluation is to use a questionnaire, one of which is the USE questionnaire. The USE questionnaire used 14 questions to evaluate the application from 3 aspects: usefulness, ease of use and satisfaction. The 14 questions were given to 60 respondents as can be seen in Table 1.

Table 1. Number of Respondents

Respondent Types	Number of Respondents
Establishment Owners	20
Clients	20
Product Specialists	20

The researchers surveyed the Municipality of Pugo, La Union using the usability metric based on Measuring Usability with the USE (Usefulness, Satisfaction, and Ease of Use) Questionnaire done by Arnold M. Lund published on October 2001. The questionnaire is constructed with five-point Likert rating scales extending from strongly disagree to Strongly Agree. The respondents tested the proposed system and filled up the questions corresponding to the following categories of usefulness, ease of use and user's satisfaction. To interpret the results, Table 2 presents how the data has been interpreted qualitatively.

Table 2. Data Interpretation.

Point Value	Mean Range	Descriptive Rating
1	1.00 – 1.79	Strongly Disagree
2	1.80 – 2.59	Disagree
3	3.00 – 3.39	Just Right
4	3.40 – 4.19	Agree
5	4.20 – 5.00	Strongly Agree

Table 2 shows the interpretation for each category based on the average results from the survey on the measure of usability of KITIKIT. The information from the table above corresponds to the description of the average score for each category on the study and the total average for the overall usability.

4. Discussion of Findings

4.1 Information Requirements of KITIKIT

Business Workflow. The researchers have interviewed a total of 20 establishment owners regarding the structure and flow of the business. The interviewees have come to discuss first the processes and

methods they use to advertise their products and what are the requirements needed to accomplish when the customer would like to reserve for the product. Also is the proof that they are running the business legally like the Bureau of Internal Revenue permit and the business operating permit, the information on the means to contact the establishment owners, the detailed description of the products being advertised together with its price and the exact location of the establishment. From the gathered data, the database of the system was designed using MySQL.

4.2 Process of Information Extraction in KITIKIT.
The system's information extraction for the search function takes place using Entity Extraction of Google's Natural Language Processing (Google NLP) API. The query string is the part of the uniform resource locator (URL) containing information that does not fit helpfully into a hierarchical way structure [27] , these are sent to Google NLP for Entity Extraction and responds with JSON (JavaScript Object Notation is a light-weight data-reciprocation format) formatted payload containing the entities within the transmitted sentence [28]. Entities are notable parts of a sentence that most likely include relevant data concerning the whole context of the passage. The system extracts these entities from the search query and compares each entity against the details related to the establishments. For example, the query "Stores in Marcos Highway with Furniture and Home Decors" contains the following entities: "Stores," "Marcos Highway," "Furniture," "Home Decors." These entities will be queried over the database with each of the establishment detail. If one member of the establishment's information hits the first entity, the establishment will gain a point for the search and another if the second hits and so on. The hits represent the establishment's relevance with the query. Therefore, the establishments with the highest number of a hit are shown first then down to the establishment with only one hit.

4.3 Features of the Proposed Application
Features of the proposes application:
- Establishment Overview
  For a user to look for a product, they must navigate to the app's establishment details screen that presents the establishment's relevant information and documents, its products, the gallery, and its ratings.
- Establishment reviews
  Reviews are essential to help clients create a critical decision in choosing a product. The app lets the previous clients of an establishment give feedback both in words and in a quantifiable rating score that reflects their experience from the establishment.
- Establishment Gallery
  To help the clients get an overview of the establishment without the need to pursue the establishment physically, the researchers considered a gallery feature that will provide a good experience and a clear picture of the prospected products.
- Private Messaging
  The in-application chat enables the establishment representative and the prospect client to share relevant information regarding the transaction of product reservation.
- Security
  It pertains to the safety of every user access levels of user accounts and the administrator account in the system.
- Google Map
  This integrated Google service shows the navigation of the map and how it is used in the application.
- File Maintenance
  In this feature it let the users manage their accounts and update their master files.

4.4 Usability Level of KITIKIT

The following tables show the results of the usability metric interpreted by the researchers for the proposed system. Table 3 shows the effect of the usefulness of KITIKIT. Respondents strongly agree that the system is useful with a highest weighted mean of 4.90. A weighted mean of 3.80 which is the lowest average for the question whether the system saves time when they use it. Hence, the majority of the respondents agree that the system is useful regarding utilizing time, effectiveness and user's expectation.

Table 3. Usefulness of KITIKIT

Indicators	Mean	Descriptive Rating
It helps me be more effective	4.10	Agree
It saves time when I use it	3.80	Agree
It is useful	4.90	Strongly Agree
It does everything I expected it to do	4.00	Agree

In Table 4, the highest weighted mean which is 4.20 which is an evaluation that the system is user-friendly. However, respondents gave the lowest assessment which is 3.70 to the usage of the system. Some of the navigation is easy to use, but the system design should be more simple.

Table 5 shows the satisfaction level of KITIKIT. The respondents were satisfied with how the system works with a highest weighted mean of 4.10. The lowest weighted mean is 3.70 which evaluate the respondents feel that they should have it. The respondents were satisfied with the system, but researchers need to consider the need to have it and the features that will make the system fun to use.

Table 4. Ease of Use of KITIKIT

Indicators	Mean	Descriptive Rating
It is easy to use	4.00	Agree
It is simple to use	3.80	Agree
It is user-friendly	4.20	Strongly Agree
It is flexible	3.90	Agree
Using it is effortless	3.70	Agree
I can use it without written instructions	4.10	Agree

Table 5. Satisfaction of KITIKIT

Indicators	Mean	Descriptive Rating
I am satisfied with it	4.10	Agree
I would recommend it to a friend	4.00	Agree
It is fun to use	3.80	Agree
I feel I need to have it	3.70	Agree

The average of the total weighted mean for each usability was shown in Table 6. The usefulness category has the highest weighted mean of 4.00 which indicates that the user agrees on the usefulness of the system. While the measured usability on the proposed system on ease of use has an average result of 3.90, the result indicates that the users agree to the ease of use. Lastly, the measure of usability on satisfaction has an average of 3.90 which shows that the respondents agree on the satisfaction of the proposed system. Overall, the total average on the measure of usability is 3.90 which means respondents agree on the measure of usability.

Table 6. Usability of KITIKIT

Indicators	Mean	Descriptive Rating
Usefulness	4.00	Agree
Ease of Use	3.90	Agree
Satisfaction	3.90	Agree

5. Conclusions and Recommendations

The information extraction would be a great asset to the proposed application for the search function takes place using the Entity Extraction function of Google's API. The features of the intended application include Establishment Overview, Establishment reviews, Establishment Gallery, Private Messaging, Security and File Maintenance. These features will surely help the stakeholders who are searching for the hand-carved wood products. Based on the evaluation done by the possible users of the system, the system is efficient, useful, and easy to use and the users are satisfied with the overall functionality of the proposed system, but some usability needs improvement. The researchers recommend that information extraction should not only focus on Google's API since the study has NLP it should also include more of its type. The proposed system has already its core functions and services. However, it is recommended that the mode of payment should be handled by the system for more convenience to the client and future researchers to include a feature which allows the filtering of the price range.

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