

# PalitTayo: An Online Trading System in the Philippines

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**Abstract** - Humans have learned to trade as a product of communication and to improve their social economic status. With the advent of technology, various methods was used to facilitate trading, specifically the use of internet, hence e-commerce also known as e-trade was introduced. In the Philippines, one common problem of available e-trade sites such as OLX.ph is the absence of social networking sites that allows community of traders to communicate, negotiate and eventually trade items. PalitTayo: An online trading system in the Philippines was designed to serve that purpose. The heart of the system is the provision of a social networking site that acts as a platform to come up with a community of Filipino traders online. The study used the waterfall methodology in developing the system. It used a combination of different programming languages such as CSS, CSS3, PHP, MySQL, JQuery, Adobe Photoshop, and DevPHP in creating the system. The system undergone system test through a test instrument formulated and verified by an IT expert using selected criteria such as reliability, response time and security. Test results showed that the system functioned accordingly and met expected results. To further assess the performance of the system, it undergone system evaluation using the TUP standard evaluation instrument for software materials. The system yielded an overall mean of 4.83 which means "Excellent". This indicates that the developed system can be a good platform in which local traders can use to build a community of traders and successfully trade their items.

**Keyword** - PalitTayo, Online Trading, E-commerce, E-trade

## INTRODUCTION

Since prehistoric times, humans learned to trade as a product of communication and civilization. Thapar [1] said that trading has been the main facility of prehistoric people to economically progress by bartering goods and services from each other before the innovation of modern day currency.

Machiwala [2] described trade as the exchange of goods, services or both. Trade is also sometimes referred to as commerce. Barter, on the other hand is the actual face of trade, characterized as the direct exchange of goods and services. Today traders generally negotiate through a medium of exchange, like money, which then makes buying separate from selling, or earning. The invention of money has made trade simpler. Trade between two traders is called bilateral trade, while trade between more than two traders is called multilateral trade.

Furthermore, Suranovic [3] identified that trade exists for many reasons. One particular cause is differences in demand. Trade exists between regions because different regions have a comparative advantage in the production of some tradable commodity, or because different regions' size helps getting benefits of mass production.

In the Philippines, one notable proof that trade existed is the presence of Galleon Trade, with a record of more than 250 years, it was the longest running shipping line of its time. Items from all over the globe docked in Manila Bay, and were stored in the Almacenes Reales which can still be found in Fort Santiago, Intramuros[4]. The eighteenth century witnessed plans and proposals to change the monopolistic framework of the galleon trade. Philippine commerce was still a transshipping operation — but they sowed the seeds of future developments: foreign merchants arrived in Manila; local merchants could travel to other Asian ports; export trade of native products was stimulated and local textile manufactures were encouraged [5].

Today bartering is a useful way for people with surplus or unwanted items (such as too much furniture or a bumper apple crop) to exchange them for items that would be more useful to them. Bartering may be less convenient than using money – money is very liquid, whereas bartering relies on the coincidence that two individuals will have exactly what the other wants, at the same time and in the right quantity. However, a growing number of Internet sites are

dedicated to connecting barterers and today there's a vast range of items to trade [6].

Locally, the only C2C e-commerce site that provides such services is OLX.ph., previously known as Sulit.com.ph. Just recently, this company has acquired Ayos Dito.ph, making OLX.ph the one and largest e-trading platform for C2C e-commerce in the Philippines. OLX also provides such services from other countries in Asia, particularly India [7].

It is very noticeable that locally available e-trade sites do not have a facility that allows local traders to effectively communicate and provide a platform for social networking to build a community of traders. In addition, present e-trade sites normally focuses on different cash transactions. No sites exists that focuses solely on bartering system that allow local traders to transact even without cash.

Considering the abovementioned situations, the researcher intends conduct a study and develop a locally made e-trading system web site that will focus exclusively in the Philippines and provide an avenue for Filipinos to experience the traditional way of doing trade: the barter system. The developed site was coined as "PalitTayo", an online trading system in the Philippines.

**OBJECTIVES OF THE STUDY**

The general objective of the study is to develop PalitTayo: An Online Trading System in the Philippines.

Specifically, the study aimed to; (1) design an online system that will; provide an avenue for members to find a trade match for their item; allow members to find a multiple trade match using search criteria; provide a platform for member to send message to facilitate successful transaction; and send trade and contact request to other members; (2) create an online system as designed using the following features such as PHP as the primary programming language, mysql as database, jQuery for client-side scripting (3) test and improve the android application; and (4) evaluate the performance of the system using selected criteria of ISO9126.

**METHODS**

This part presents the project design, project development, operation and testing, and evaluation of the study.

**Project Design**

PalitTayo: An Online Trading System in the Philippines is considered to be an alternative way for

Filipino Trader to trade their items locally. It will provide a customize environment for members by providing a platform with which traders can offer, discuss and eventually trade their items. A trader's community is provided to facilitate such function. To further explain the concept of the study Figure 1 presents the context diagram of the system. Drawing a context diagram helps you to understand how a system interacts with other systems, business units, and key personnel. [8]

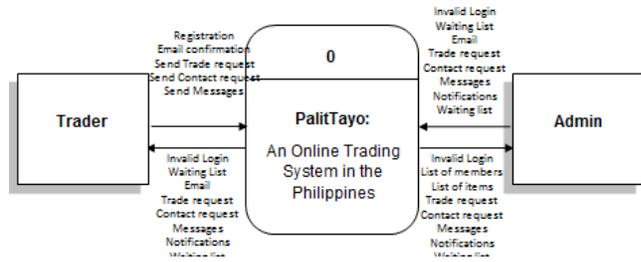


Figure 1. Context Diagram of PalitTayo

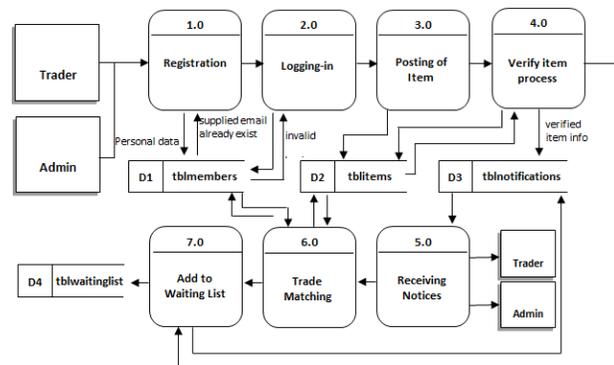


Figure 2. Top Level diagram of PalitTayo

To illustrate further, Figure 3 shows the top-level diagram of the developed system.

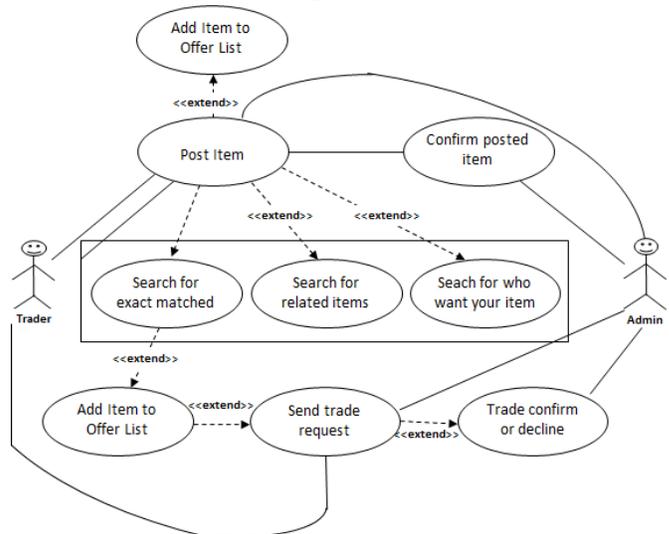


Figure 3. Use-Case diagram of PalitTayo

To further visualize the architectural flow of the online system and structural design of the software, a Use Case Diagram of the system in Figure 3 shows the trader's possible actions after registration. It models the functionality of a system using actors and use cases. Use cases are a set of actions, services, and functions that the system needs to perform [9].

### Project Development

The study utilized the system development life cycle in its project development. The said methodology is consists of the following steps: Data Gathering, Creating of the Project, Designing of the Project, System Improvement, Testing and Evaluation and the Final Output of the Project [10]. Figure 4 further illustrate this concept.

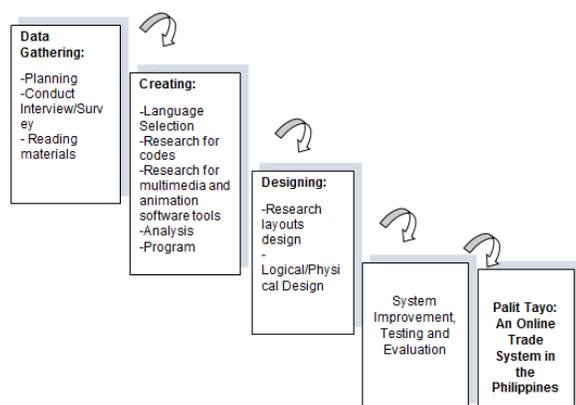


Figure 4. The System Development Life Cycle

**Data Gathering.** The creation of the project started from gathering necessary requirements needed to meet the project set objectives. Researches on different books published about trading and bartering was conducted. Interviews were conducted to different people who want to trade their items online. Mr. Stephen C. Ramirez, a collector of anime figures living in Naic, Cavite, Philippines was one of the persons interviewed. The gathered requirements from researches and interviews was then analyzed and defined. Information gathered was used to come up with a good design strategy.

**Creating the Project.** System creation is comprised of various stages of development. First, the study created a template to visualize the whole structure of the homepage by coding using CSS and CSS3; in addition, graphical images were created that was used for banners, logo and others. Additional images will be downloaded like icon. Adobe Photoshop CS6 will be used to create the background

designs and add for additional aesthetic appeal of the online system. To create the system various application software and programming languages was used that served as the front-end and back-end support of the online system. PHP-JQuery-AJAX were used, hence the combination of this three languages is the best way to make an interactive website. XAMPP tools were also used for the database of the system. Since MySQL and Apache Web server are package already in the tool and serve as database for storage and for web server. For online hosting, a domain was bought in Bluehost.

**Designing the Project.** The Context Diagram, Data Flow Diagram, and Use-Case Diagram were used as guides in identifying all the features required by the system. This served as basis on the number of pages that the system has. Moreover, these diagrams also identified what particular buttons are to be included in the homepage, and other pages that constitute the other modules of the software. Controls will be identified in each page through buttons or links to make each event perform its task. Images were also used to add beauty in the online system. The online system also used JQuery libraries to add flavor, appeal and good interaction between the traders and the online system.

**System Improvement, Evaluation and Testing.** To assess the performance of the developed system, testing and evaluation was conducted. Alpha and Beta Test were administered in each function of the system for improvement and identification of errors based on selected criteria of ISO 9126. The system was tested by ten (10) test participants. These participants are selected randomly from different locations to visualize the actual process of bartering between two or more people. To further assess the developed system, ten (10) IT experts and forty (40) traders or end-users performed an evaluation using selected criteria from the Technological University of the Philippines (TUP) evaluation instrument for software material.

### Operation and Testing Procedure

Alpha and Beta testing was used to validate and verify if the system meets the technical requirements that guided its design and development. The operation procedures listed below was followed in operating the system to make sure that the project performs according to specified requirements and functionality.

#### Operation Procedure

1. Register first to become a member of the site.

2. Log-in using the log-in form. If the trader forgot his user name or password, a link was provided at the button of the login page to facilitate recovery of such information.
3. After logging in to the site, trader will be directed to his own personal account page. On this page, traders were provided with a menu to explore the trade items displayed at the center of their account page. A menu was also provided to select items of choice of categories and location
4. If a trader is interested on a specific item, he/she must click the link “add to waiting list” to add that item to his/her waiting list items. The trader can also see the waiting list of possible traders if there is one.
5. To access the tutorials in using the system, on the main menu, the trader must select the PalitTayo links to access such function.
6. If a trader would like to add a member on his/her contact list an “add contact” button was also provided.
7. A control panel was also provided with the first name of the trader displayed to add some personal feel of the page. Once the name was clicked the “my profile” page will be displayed.
8. Member profile and recent activities is displayed. A drop down list will appear if the member hover the mouse on his or her name. The list includes My Items, My Contacts, My Trades and Logout link.
9. If the member will click the My Items, said page is loaded and it includes all the items that the trader posted (traded or not yet traded).
10. New item button is also included. If the member wants to post new item to trade.
11. If the item is not yet traded in the posted item, trader can edit its information including pictures and other details.
12. A search feature is also included which can search for a trade matches.
13. Trader can also delete an item if he/she wants to, using the “delete item” button.
14. Under My Contacts page, all the traders contact details are displayed. This includes functions such as add to or remove from group, and also delete a contact if the trader wishes to.
15. The member can add a new group if he or she needs to. The member can send a contact request to other members of the site and it will notify them, but that recipient must accept first to become his/her contact or decline it if the other party wants to.
16. Under the My Trades page, all previously traded items are displayed.
17. About Us link provides various PalitTayo information that include some explanation regarding trading or bartering;
18. If the trader is Admin status, an additional link Administrator is added in the main menu on his/her account page. An Admin pane is provided that displays statistics like total number of members, active and inactive, latest items uploaded and latest members.
19. In the Admin account section, a Members Pane is also included that displays all the members alphabetically. Admin can also delete a member using the delete button provided.
20. An admin can promote an ordinary member to an Admin using the promote button.
21. Another pane is group that will display the recorded members group. It also include edit group and delete group.
22. PalitTayo Items pane is also provided. In this section, the list of different posted items is displayed. The admin can verify requested item to be confirm or decline.
23. The admin can delete an item if he/she found out that such item posted violated the terms and conditions of the site.
24. The Categories pane is also included. This displays all item categories and also includes add category to add an item category, edit category to update category name, and delete category if the admin wants to delete that category.
25. If the end-users would like to leave the site, a log-out function is also provided for security purposes.

### **Testing Procedure**

As part of the Alpha Test, self-test to eliminate errors or bugs was perform. This was done by performing and testing the intended functions of each module. Each module was repeatedly tested to obtain the desired output.

The following procedures were observed during the alpha testing of the system.

1. The researcher registered to the system by providing the necessary information required.
2. Login function was performed.
3. The researcher explored the different pages of the site and tested its performance.
4. Test conditions as provided in Table 2 were observed during the said test.

Table 1. Alpha Tests Conditions Undertaken in the Study

Component/Module	Test Conditions
Registration process	<ol style="list-style-type: none"> <li>Click the “Register here” link to register. The researcher will check all the validations during registration.</li> <li>After registration, an email will be sent to trader’s email address he or she supplied. The trader must confirm to his or her email address by clicking the link sent by <i>PalitTayo</i> to finalize your registration</li> <li>After confirmation, trader will now have the permission to login.</li> </ol>
Posting of item	<ol style="list-style-type: none"> <li>The researcher will click “my-items” link then click “add new item” button to add an item.</li> <li>In the “add new item” form, the researcher will fill-up all necessary information. The researcher will check if item can have a multiple images for presentation.</li> <li>After adding an item, the trader must wait for the admin to confirm the posted item.</li> </ol>
Admin Control Panel	<ol style="list-style-type: none"> <li>The researcher will click the Administrator link in the main menu.</li> <li>The researcher will click the “members” link to display the list of members. It includes options such as promotion to admin of other member, and delete button if the member will be deleted.</li> </ol>
Trade Matching and Add to Offer List	<ol style="list-style-type: none"> <li>After the admin will confirm the item posted, the researcher will test the trade matching. Search criteria will be used like exact match, related match and wants your item criterion.</li> <li>The researcher will test the “add to offer list” button to add the item to any of the researchers uploaded item.</li> </ol>

### Evaluation Procedure

To measure system’s performance, an evaluation instrument using different criteria from the Technological University of the Philippines (TUP) evaluation instrument for software materials was used. The criteria are Functionality, Content, Reliability, Availability, Maintainability and Saleability. The following are the steps carried out during the evaluation:

- Evaluation forms was distributed to fifty (50) evaluator-participants comprised of ten (10) IT Experts, and forty (40) Traders;
- Prior to the completion of evaluation forms, the researcher demonstrated how to operate the system to the group of evaluator-participants consisting of IT professionals and traders;

- After the demonstration, the researcher asked the evaluator-participants to use and surf the online system.
- Finally, the evaluator-participants rated the system base on five Likert scales, shown in Table 2. The response was chosen from a scale of 1 to 5, 5 being the highest that means Excellent, and 1 being the lowest which means Poor.
- Data was tabulated to compute for the mean of each criterion and the overall mean computation for the given criteria.
- In interpreting the results of the evaluation. The study used the Rating Scale for Interpreting the Evaluation Result shown in Table 3.

Table 2. Rating Scale for Interpreting the Evaluation Result

Numerical Scale	Interpretation
4.51 – 5.00	Excellent
3.51 – 4.50	Very Good
2.51 – 3.50	Good
1.51 – 2.50	Fair
1.00 – 1.50	Poor

## RESULT AND DISCUSSION

### Project Description

*PalitTayo*: An Online Trading System in the Philippines was developed to provide an alternative platform in for Filipino traders who wants to trade their unused item and to those people who are fond of collecting rare items. The system basically has two levels of access, the admin and the trader account. The system developed using DevPHP, PHP, jQuery, Adobe Photoshop CS6 for the design, and MySQL for the database. It served as a bartering system to everyone who can’t afford to buy a new item. The system is designed to help traders in searching for an item to trade, and also to all collectors searching for new item to collect. It promotes products and other advertisements. The said online system also has a capability to send notifications in the member’s account.

The heart of the developed system is the provision of an online community that serves as a social networking site of Filipino Traders. Traders are capable of having a network of traders. The system provided a virtual market platform capable of allowing traders to do simple messaging, post a trade items, trade requests, contact requests and notifications.

The system also allows group customization of traders. This provides traders who have common interest to be regularly updated and aware of the latest posted item that might need their concerns.

The system also provides filtering of specific locations per region and per provinces to which the traders can post and search for specific items they want to trade. In addition, the site also provides information of the latest item and items near the location of a specific trader.

Added to this is the feature of categorizing posted items such as books and magazines, accessories, appliances, cars and automotives, clothing, collectibles, etc. This feature allows traders to have a wide variety of items to post and to trade.

Finally, the administrator on their admin account page has the capability of identifying site statistics which includes total number of members, total numbers of verified and unverified items posted, traded items. This allows the administrator to keep track of the daily activities as well as the overall performance of the site. Latest items and latest items posted are also provided on the said account page. Admin can also manage members, manage group, manage items, and manage categories of items.

### Project Structure

These are the screen shots of PalitTayo website.

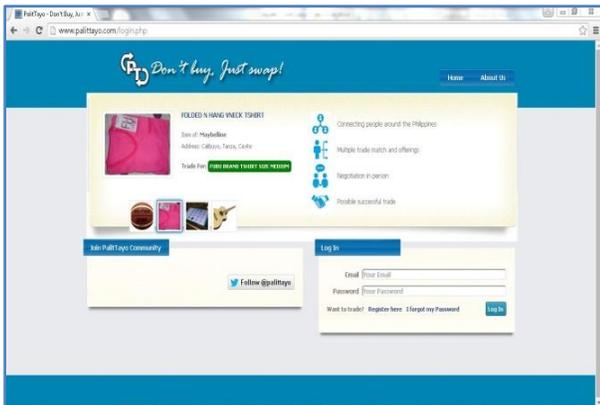


Figure 5. Homepage of PalitTayo

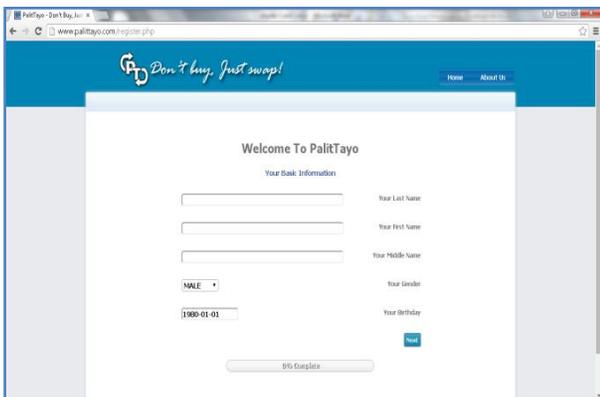


Figure 6. Registration page

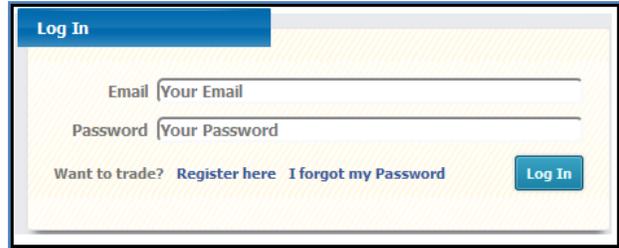


Figure 7. Login page

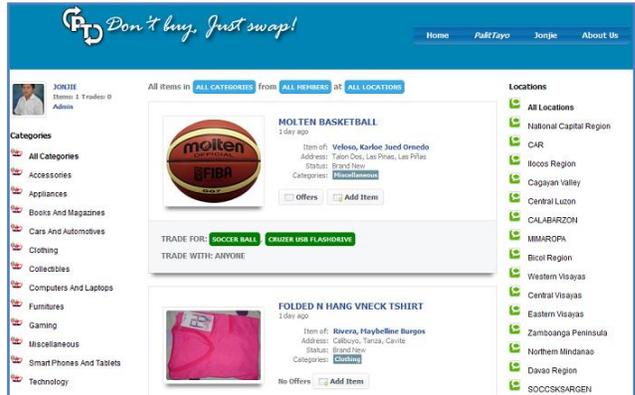


Figure 8. Trader's account page

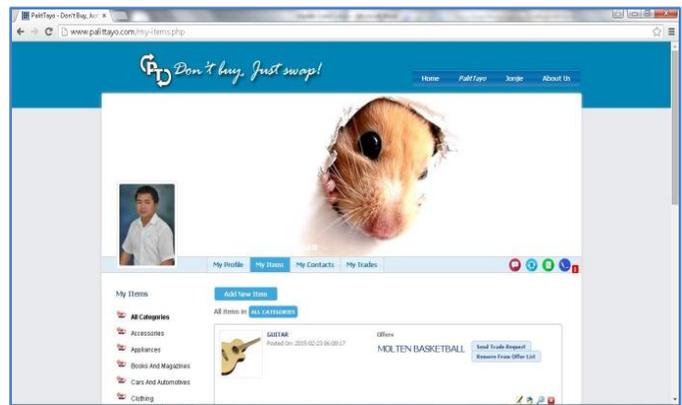


Figure 9. Add new item button located in the profile page

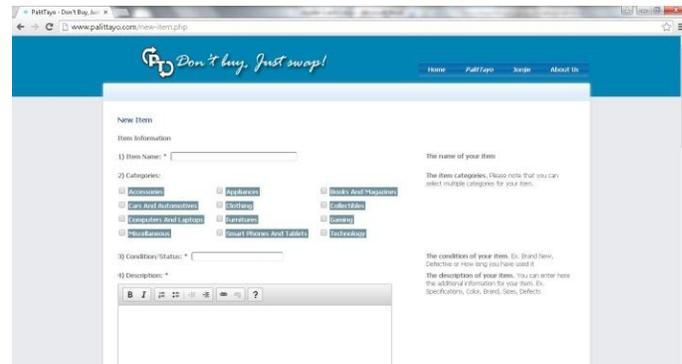


Figure 10. Post new item page

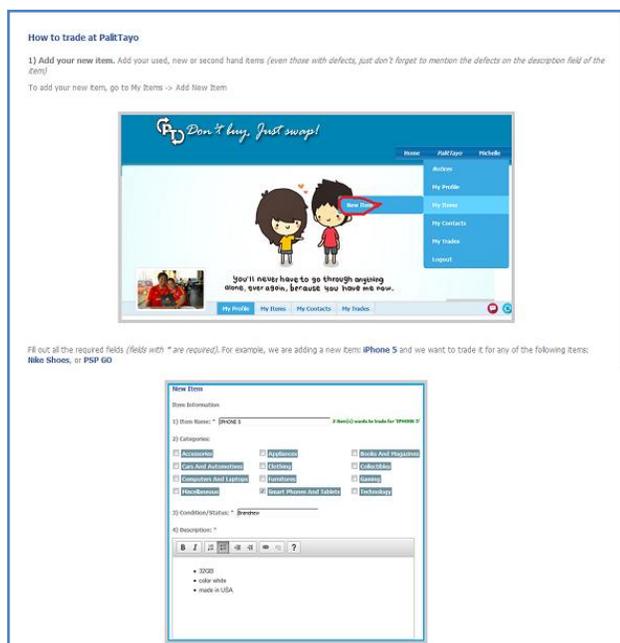


Figure 11. How to trade page

### Project Evaluation

The evaluation basically was done in different location within Cavite from February 20, 2015 to February 24, 2015. The respondents of the system were forty (40) traders and ten (10) IT experts. The respondents evaluated the system based on TUP Evaluation Instruments for Software Materials.

Prior to the evaluation, the developed study undergone system testing. The researcher used selected criteria from ISO 9126 such functionality, usability, reliability and efficiency. A testing instrument was formulated and validated by an IT expert. Ten (10) end users tested the system comprised of three (3) Admin and seven (7) registered traders. Table 6 shows the Test results of the test made.

In reference of the test conducted, the system responded accordingly and as expected based on the different test conditions set on the different components or modules provided in the developed system. Overall the system successfully passed the test made.

Table 3. Alpha Test Result

Component/Module	Test Conducted	Behavior
Registration process	<ol style="list-style-type: none"> <li>Click the “Register here” link to register. The admin checks all the validations during registration.</li> <li>After registration, an email was be sent to trader’s email through e-mail confirmation. Once verified the address he or she supplied. The trader must confirm to tohis or her email address by clicking the link sent by PalitTayo to finalize your registration</li> <li>After confirmation, trader now have the permission to login.</li> </ol>	The system behaves accordingly. Would-be traders successfully registered in the system through e-mail confirmation. Once verified the system allowed the trader to successfully log-in to the system and provided an account and profile page for the trader.
Posting of item	<ol style="list-style-type: none"> <li>The researcher clicked “my-items” link then click “add new item” button to add an item.</li> <li>In the “add new item” form, the trader filled-up all necessary information. The trader checked if item can have a multiple images for presentation.</li> <li>After adding an item, the trader must wait for the admin to confirm the posted item.</li> </ol>	The developed system responded accordingly based of the set test conditions. The trader successful posted an item with necessary details and images of the item. Once confirmed, the added item were successfully posted and seen on the latest items added.
Admin Control Panel	<ol style="list-style-type: none"> <li>The admin clicked the Administrator link in the main menu.</li> <li>The admin clicked the “members” link to display the list of members. It includes options such as promotion to admin of other member, and delete button if the member will be remove.</li> </ol>	The system acts as expected based on the set conditions made. The admin were able to verify, approve, update and even delete an item or a member as indicated in the different functional buttons and menus provided by the system.
Trade Matching and Add to Offer List	<ol style="list-style-type: none"> <li>After the admin confirm the item posted, the trader test the trade matching. Search criteria were used like exact match, related match and want your item criterion.</li> <li>The trader test the “add to offer list” button to add the item to any of the trader uploaded item.</li> </ol>	The developed system was able to successfully match the traded item and add such items in the offer list.

To certify the reliability, response time, and security of the developed system, Table 4 shows the qualitative interpretation of the Beta test made with respect the formulated test instrument verified by an IT experts on ten (10) test participants comprised of end-users, admin and traders

Table 4. Qualitative Interpretation of Participants Rating for the Testing of PalitTayo

Criteria	Mean	Qualitative Interpretation
Reliability	4.60	Excellent
Response Time	4.58	Excellent
Security	4.67	Excellent
<b>Overall Mean</b>	<b>4.61</b>	<b>Excellent</b>

To further assess the performance of the developed system. The researcher conducted an evaluation based on six (6) major criteria of the TUP Evaluation Instrument for Software Materials namely functionality, content, reliability, availability, maintainability and saleability. Table 5 presents the qualitative interpretation of evaluator-participants rating for the developed system

Table 5. Qualitative Interpretation of Participants Rating for the Performance Evaluation of PalitTayo

Criteria	Mean	Qualitative Interpretation
Functionality	4.81	Excellent
Content	4.85	Excellent
Reliability	4.83	Excellent
Availability	4.86	Excellent
Maintainability	4.85	Excellent
Saleability	4.76	Excellent
<b>Overall Mean</b>	<b>4.83</b>	<b>Excellent</b>

The system's functionality achieved an overall mean of 4.81, which is equivalent to an excellent rating. It signifies that software performs the tasks required and served its purpose. It further shows that the system is user-friendly and provides comfort and convenience to end-users.

The system's content obtained an overall mean of 4.85, which is equivalent to excellent rating. This proves that the system includes updated and accurate content; moreover, said content is properly presented.

The reliability of the system reflects a mean rating of 4.83 which is equivalent to an excellent rating. It proves that the system conformed to the desired result. Furthermore, this also shows that the system obtained the characteristics of fault-tolerance and accuracy in performance.

With respect to the availability criteria of the system, it achieved an overall mean of 4.86, which is equivalent to an excellent rating. It indicates that the system is complete and performs according to specifications. In addition, the system also provides certain provisions for security requirements.

With regards to the maintainability of the system, it got an overall mean of 4.85 which also means excellent. This only proved that the developed system can be maintained easily and provides diagnostic tools and procedures, enhancements and modification features.

Finally, in terms of software's saleability, it obtained an overall mean of 4.76, which is equivalent to an excellent rating. It only signifies that there is presence of market demand and the suggested price of the software is competitive. Moreover, it proves that software design is attractive.

Summary of system performance evaluation results is presented in Table 8 shows that Availability got the highest mean. On the contrary, saleability got the lowest mean; nevertheless, it is also excellent as construed. The overall mean for selected criteria contained in the TUP Evaluation Instrument for Software Materials yielded an average rating of 4.83 which indicates that the system is excellent. This means that the system can be an alternative platform in which local traders can use to trade their items.

## CONCLUSIONS

The study was designed provide an avenue for members to find a trade match for their item. In addition it allowed members to find a multiple trade match using search criteria. It also provided a platform for member to send message to facilitate successful transaction and finally, it send trade and contact request to other members.

The study was created using PHP as programming language, MySQL as database, JQuery as scripting language, Adobe Photoshop as image editor for the system's Graphical User Interface, DevPHP as Integrated Development Environment. The combination of the aforementioned programming languages and application software allowed the researcher to successfully develop the study.

The study got an overall rating of "Excellent" from the system test conducted on both Alpha and Beta Test, using selected criteria such as reliability, response time and security.

The study gained an overall rating of "Excellent" on the evaluation made by fifty (50) participants which means that the system served as a virtual

platform for local traders in the Philippines to trade their items.

### RECOMMENDATIONS

The Development of *PalitTayo*: An Online Trading System in the Philippines serves as a tool to help Filipino traders trade their items using the traditional concept of the barter system.

*PalitTayo* allows trading for products goods or services. Perishable goods, illegal items and services and those that are under strict government regulations and restrictions are not allowed to be posted in the site.

The study does not include online payments and shipments. It has only nine (9) possible traders in the waiting list. Trading of items is only be done from one trader to another. Negotiations made outside the confines of the developed system as well as false information or misrepresentation provided by the members on approved posted item are beyond the accountability of the admin. The study runs only on a desktop platform and is compatible with common internet browser such as Google Chrome, Mozilla Firefox, etc. The study does not include development of an application that runs on mobile platform.

According to the results of the study, the following recommendations were made: (1) That cash transaction or selling of item be included to further enhance the feature of the system; (2) That development of a mobile application to easily access the site using mobile devices; (3) That the system

provide built-in image editing feature within the system to edit images of trade item before posting; (4) That inclusion of a real-time chat feature with video capability to allow traders to see the actual look of the items being traded; (5) That the online system is highly recommended and can be used.

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