

# Preventing Human Error on Online Transaction (A Case Study of B.com)

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## 2 Preventing Human Error on Online Transaction (A Case Study of B.com)

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**Abstract.** Buying and selling transactions using internet media has advantages related to time and costs. However, buyers often feel difficult when accessing online websites. There are several types of errors that are experienced by buyers when using online buying and selling site services. It is including mistakes in selecting display menus, difficulties in finding items needed because there are too many choices available, errors in interpreting menus used, and sometimes difficulties in knowing product specifications because no relevant information is available on the site. In this study, we discuss the application of the HTA and SHERPA method to assess one of the online buying and selling sites currently used by Indonesian people, namely B.com. There are 100 respondents participated in this study. The study methods are including error identification, analyzing the error using SHERPA, and evaluating the website design. The result of the study provides some recommendation to the online buyer such as ensuring the quality of internet network, filling the data carefully, and confirming the purpose and nominal value of the transaction before it sent to the seller.

**Keywords:** human error; online; transaction; website.

### 1 Introduction

The sale and purchase of goods through internet media are increasingly widespread. Buying and selling transactions using internet media are considered to have many advantages compared to direct buying and selling transactions such as time and money saving. Buyers and sellers do not need to meet in a certain place and take care of the problem of payment and retrieval of goods, because the payment and collection of goods can be managed by the seller through the internet as well. In addition, information about the product to be purchased can be delivered in full following the needs of the buyer so that it is as if the seller and the buyer meet directly. Literature reviews concerning the e-commerce topics have been broadly discussed including measurement of the website (quality, behavior, and other aspects), metrics used (behavioral or attitudinal), review summarizes the evaluation criteria, e-commerce design [1-7] and possible trends [8]. Recently, researches about e-commerce were dominated by supply chain finance [9], building brand loyalty [10-12], human factors and customer perception/loyalty [1, 13-21].

However, discussions regarding errors that have occurred have never been specifically discussed whereas this context has a considerable impact. Often buyers find it difficult when accessing sites selling goods online. There are several types of errors that are often experienced by buyers when they want to use the online trading site services, including errors in selecting the

display menu, difficulties in finding items needed because there are too many choices available, errors in interpreting the menu used, and sometimes difficulties in knowing product specifications because no relevant information is available on the site. To reduce human error, Systematic Human Error Reduction & Prediction Approach (SHERPA) can be used. SHERPA can analyze and evaluate a task, predict errors that might occur, and efforts that can be done to reduce task errors. To be able to use the SHERPA method, a hierarchical task analysis (HTA) is needed. HTA is a set of steps that need to be taken to achieve the goal of the task. Another method that has been used to identify errors is FMEA [22, 23].

In this study, we discuss the application of the SHERPA method to assess one of the online buying and selling sites currently used by the people of Indonesia, namely B.com. B.com is a site that serves the purchase of various items online. They started this new business in 1993 which at that time, the seller was still focused on distributing foreign products. In 1994 they succeeded in becoming the official distributor of various foreign products focusing on large printer products. The company continues to grow as a distributor of foreign products and began to expand into the IT business in 1995. The growth of B.com is increasingly significant. In 2013, customers who had shopped as many as 518,662 after previously being solid in 2012 amounted to 345,691 both individuals and companies. Likewise, also the growth of worker, from the initial formation of only about 12 people, currently it has reached more than

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500 employees. The existing development requires ongoing analysis of the website to survive and increase customer satisfaction. As B.com become more popular, it is needed to map the task related to the interaction between the customer and the seller as well as to prevent error in the website in order to improve the customer satisfaction and reduce the losses.

## 2 Methods

SHERPA is a comprehensive tool for predicting and preventing errors that were originally developed for nuclear power security [24], but it is currently used in other critical activities for 30 years. SHERPA is designed to complement the functionality of the Failure Modes and an Effect Analysis (FMEA) to provide a further range of analysis tools to help analyze human factors. SHERPA helps researchers in carrying out their duties, including:

1. Task Analysis from user interaction with the equipment using graphical images of HTA
2. Identify potential types of failures or errors and consequently use activity classifications
3. Assessing Performance Influencing Factors (PIFs), which influence the possibility of failure to help risk reduction.

In performing an error analysis using SHERPA, some steps must be taken, namely:

1. Selecting a safety-critical task first
2. Finding out how the user does the task (Task Analysis)
3. Identifying errors and consequences
4. Evaluating Performance Influencing Factors (PIFs)
5. Evaluating existing risk control measurements
6. Evaluating alternative risk reduction strategies

The third step, namely identifying errors is done by giving the label error mode based on the taxonomy of errors.

The implementation of the study included preliminary studies, data collection, and processing including the breakdown of tasks from workers/operators and being input by SHERPA using HTA and continued with the implementation of SHERPA to predict and identify potential human errors. The Sensitivity Index calculation is then performed to obtain the accuracy value of the SHERPA method in predicting errors. Data collection was carried out with a sample of 100 respondents (average age  $20 \pm 1.5$  years) who had previously never made a purchase transaction using B.com. The data collected is in the form of error recapitulation and website design analysis.

The types of errors that are detected are: the network is disconnected, incorrectly entered the site address, incorrectly filled in the data, incorrectly registered the email address, incorrectly entered the product name, wrong click, not fill out the form completely, error in choosing the product, wrong transfer, offline/inadequate transfer media, error of nominal input and error of ID input.

## 3 Result and Discussion

### 3.1 Hierarchical Task Analysis (HTA)

Performing HTA in this report is assisted by a person who has frequently made the purchase process through the B.com website so that it can be categorized as an expert in his field. Steps that must be done by the buyer in the process of purchasing products using B.com include filling out the account creation form, product search process and selecting the number of goods, destination location, and shipping media as seen in Fig. 1, 2 and 3. Fig. 4 shows the HTA from the product purchase process through the online buying and selling site B.com.



Fig. 1. Form of account creation

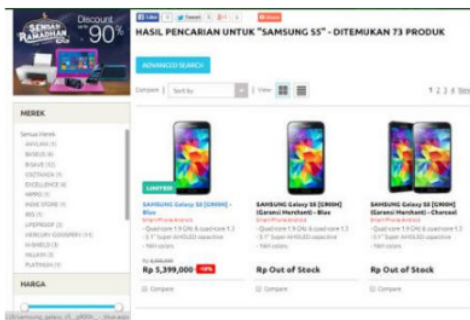


Fig. 2. Product searching

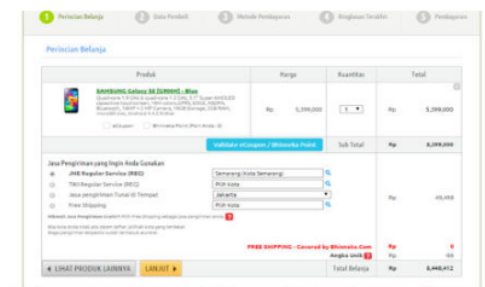


Fig. 3. Transaction data finalization

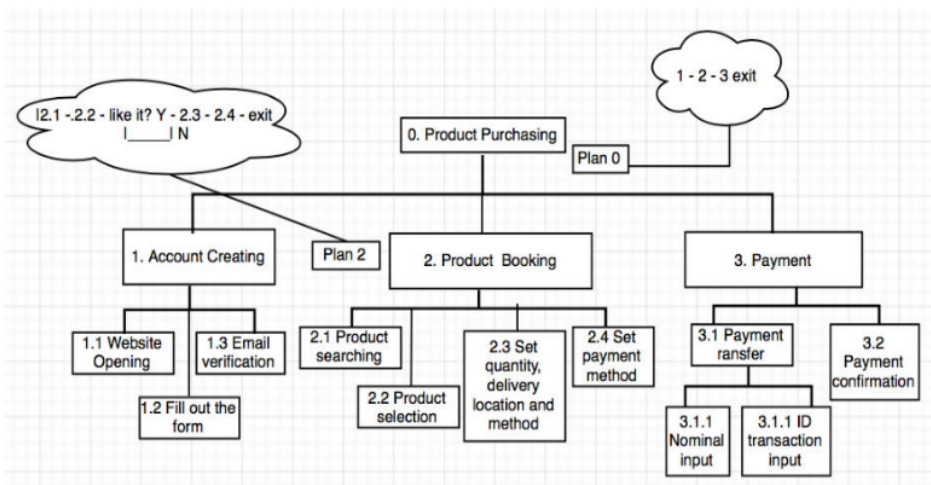


Fig. 4. HTA of product purchasing in B.com

**3.2 Systematic Human Error Reduction and Prediction Approach (SHERPA)**

The next step is to classify the tasks in their types, identify human errors, analyze the consequences of errors and their severity, and finally take precautions. The results of website design evaluation can be seen in Table 1. Table 2 shows the results of the analysis using SHERPA.

Table 1. Results of B.com's website design assessment

No.	Criteria	Mean
1	Layout	3.8
2	Access Speed	4.2
3	Access Procedures, Purchases, and Payment Confirmations	3.9
4	Color combination	3.7
5	Up to date information	4.3

The layout variable has an average value of 3.8 with the distribution of values is evenly distributed. This can be happened because of the different points of view of each respondent. They tend to judge according to their experience surfing in cyberspace related to online shopping sites.

The access speed variable has an average value of 4.2. The speed of loading a web page is relatively fast

because it doesn't use too many ad interfaces that are not important. This is also supported by the internet quality of respondents.

Access, Purchase, and Payment Confirmation Procedures have a total average value of 3.9. 80% of respondents give a score of 4 or even more, because the system and transaction flow are very clear and easy to understand, while others are less because they are unfamiliar with online buying and selling sites.

The combination of colors of this variable has a total average of 3.7. This depends on the compatibility/color combination and is still classified as a good category.

Updated information has the highest average value of the other variables which is 4.3. This is based on the dedication of the website admin to maintain the relevance of product availability with the advertisements displayed. The addition of a new product list also provides added value to the website because it increases the interest of buyers to look for products on the website.

With an average total of 3.96, the B.com website is categorized as neutral. However, the variable color combination must be considered because it has a low average value.

Error description is included as a result of an error made by the user. The type of error is listed if there is an error made by the user when completing a task. For example, task number 3 ("Wrong Transfer") is one of the errors that might occur in carrying out the "Payment" task.

Table 2. Results of Analysis of the SHERPA Method

Task Step	Error Mode	Error Description	Consequence	Recovery	P*	C*	Remedial Strategy
1	A9	Network disconnected	Can't continue	Immediate	M	!	Looking for better networks
1,1	A8	Incorrectly entered the site address	Can't continue	Immediate	M	-	Fill in the data more carefully

1,2	I3	Incorrect Data Filling	Irrelevant data	Immediate	H	-	Fill in the data more carefully
1,3	R1	Incorrectly registered e-mail address	Late verification	Immediate	L	-	Ask B.com to send the verification e-mail again
2,1	I2	Incorrect product names input	Can't continue	Immediate	M	-	Fill in the data more carefully
2,2	S2	Wrong click	Get different product information	Immediate	M	-	Return to the previous menu
2,3	S2	Incomplete form	Irrelevant transaction	Immediate	M	!	Fill in the data more carefully
2,4	S2	Error choosing	Late payment confirmation	Immediate	L	-	Refilling
3	A9	Wrong transfer	Can't continue	None	L	!	Re-ascertain the purpose and nominal of the transaction
3,1	A9	Offline / inadequate transfer media	Can't continue	Immediate	M	-	Use payment facilities in other transfer media
3.1.1	A7	Wrong nominal input	Slow payment confirmation	None	M	-	Fill in the data more carefully
3.1.2	A7	Incorrect ID input	Late payment confirmation	Immediate	M	-	Fill in the data more carefully

Error mode is an error code created by the user based on the taxonomic error table. Error mode labeling is conducted with the purpose of classification only. For example, the type of "Wrong Click" error falls into the S2 category, which is Wrong Selection Made, because in this site a click error will result in a decision-making error.

The consequence shows the consequences that arise when the tasks performed cannot be fulfilled. For example, the consequence of "Incorrectly entering the site address" is a process that cannot continue. Of course, the task cannot be done if the user is not connected to the B.com site.

Recovery indicates the possibility of immediate repair if an error occurs. It labeled "Immediate" if the error can be corrected and labeled "None" if it cannot be repaired. For example, due to failure in task number 2.2, ("Wrong click") is labeled Immediate because errors can be addressed immediately with the Back menu on the web browser.

P\* indicates the frequency of occurrence of errors which is shown with the letters L (Low), M (Medium), and H (High). In this report, the determination of P \* is based on the respondent's data. For example, the type of "Media transfer offline/inadequate" error has already occurred, thus labeled M.

C\* is the severity of the consequences that arise when failure occurs. If the error is severe, it will be labeled "!". For example, the type of error "Wrong transfer" gets the label "!" because the mistake made is severe, ie the transaction is canceled and the money that has been sent is irrevocable.

Remedial Strategy is an effort that must be made to prevent the occurrence of errors or at least reduce the

possibility of errors occurring. For example, on the type of "Media transfer is not adequate" error, it should be done "Using payment facilities in other transfer media" as a precautionary measure.

#### 4 Conclusion

The steps that must be taken to reduce the human error that might occur are use a good internet network, fill in the data more carefully, and ensure the purpose and nominal value of the transaction before doing so. The correct data input should be considered due to the mistakes made by respondents are related to errors in data collection. In terms of design evaluation, it has a mean total value of 3.96 and is categorized as neutral. There are still many other variables that need to be considered to increase this value.

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