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Evaluating The User Experience of E-Commerce Platform Using Hassenzahl Framework

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Abstract

The Hassenzahl framework of UX provides an approach in measuring user experience of a product which covers such the following aspects : be goals, do goals, and motor goals. Yet the further approach for practical implementation in digital product like e-commerce platform is still insufficient. Another approach, the scenario model provides a journey mapping viewing from the user perspective. Thus, generally this method was used to portray the interaction process between user and product. Furthermore, the term of user journey is also commonly used by the UX designer in order to understand what actually the user needs, not just the user want. The solution offered to discuss within this paper is integrating three key elements of Hassenzahl method for every scenario in the e-commerce process. Hopefully the solution as presented on this paper will generate more credible properties and decent tools for developing an efficient, user friendly, and engaging e-commerce application.

Keywords: E-Commerce, User Experience, UX Evaluation, Hassenzahl Farmework

1 Introduction

Since the spread of the internet, many business models have changed a lot, especially the online business. Most company prefer to have a website or develop a mobile app to embrace the recent technology while promoting their products, even they choose not to build a physical store, rather than launch an online business only. However, many of them experience the business failures. The basic flaw is that the website do not deliver a simple, seamless and enjoyable experience for the user. The first impression of the platform was totally neglected. Therefore, there is no engagement for the user to use it multiple times and that makes them more likely to not trust the platform.

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User Interface (UI), User Experiences (UX), and User Engagement are intertwined concept in which if one of them was poorly delivered then the other also experience the same thing. The definition of User Experience is the perceptions and responses a people will get from the use of product, system or service [1] while User Engagement is described as the quality of UX underline positive aspects from the interaction between user and product which lead to motivate the user to use it continually [2]. Logically speaking, it can be considered also that poor UX could bring poor user engagement as it could stimulate a periodic use of a product.

Marks Hassenzahl's Theory highlights an experience as user' perspective of which consist of three main aspects of why, what and how. That framework provides a holistic understanding of the way experience arouse when people interact with digital technology. Although this framework is widely adopted to assess UX of various platform, but according to our literature review, the implementation of this framework in e-commerce platform still need further investigation. In particular, there is a need to provide a measurement model of ecommerce platform which is able to assess the experience of users and provide a scale of successfulness of a UX design.

Another basic yet effective methodology is by creating a scenario-based method which depict the journey of the customer to use that technology. User scenario also can help designer to understand the user' motivation to interact with the product. It is partly responsible for determining the most critical area for user experience testing. Not to mention the guidance for testing can be derived from the scenario as well. By combining these two approach, hopefully could bring a new insight in order to enhance the way for creating a good user experience.

This paper proceeds as follows. First the background where the previous literature study has been taken also the methodology. The second part is the grounded theory to identify all of the theory and tools underpinning for chaping the UX evaluation framework. This will consist theory such as user experience, Hassenzahl approach, UX testing and scenario based methodology. The relationship among them also obviously explained in this section. The third part, where the implementation will be discussed, is the synthesis between Hassenzahl method and scenario based on e-commerce platform.

Lastly, the conclusion which discuss about the weakness, future challenge and further improvement for this paper.

The notion of user experience still has ambiguous meaning and closely related with usability and user-centric design [3]. Conversely, in a general perception, UX itself can be simplified as the good or bad feeling during interaction with a product or platform. Hence to give value whether it is good or bad, Hassenzahl gives more concise dimensions on why, what, and how. However, during the literature searching we found out that there is still limited sources which turn this concept into practice. Especially on e-commerce platform. The application of conceptual model like Hassenzahl framework, should be followed by the practical implementation for certain product. By transforming the theory into an action, basically it can generate more navigation to the real world problems, help to develop more professional skills also can predict the possible challenges for the future.

Recently, some papers which discuss the implementation of Hassenzahl mostly argue about the product design process. The meaning of product here is literally an actual or physical product, such as wearable activity trackers [4] electronic products [5] or information appliances [6]. Yet the digital product has a lot of differences from physical products, even from functionality or aesthetical perspectives. Digital products are products that incorporate information and communication technology. Common examples are desktop computers and mobile phones [7]. Furthermore, as today we could see that the digital product has evolved quickly from professional environment becomes personal, social, and even spiritual activities. The e-commerce platform is an example of digital product which in the present day becomes so important as people can order products or services at their own free will. It simply grows into compulsory to use for any transaction.

The UX evaluation method also differs clearly from usability evaluation method. In UX, it needs to assess the hedonic character as well as figured out the user's feelings during the interaction with the system [8] the type of product offered, also the type of platform it used. Besides, the UX evaluation method also ranging variously from academic and industrial perspective. It gives the UX researcher a broader set of factors before conducting UX evaluation, especially if the goal for the research is leveraging the user engagement. From an e-commerce platform, the heuristic UX evaluation mostly

derived from the functional requirement based on the accessibility [9] and problem solving aspect. So that it still does not cover the emotions of the user as mentioned by Hassenzahl method. Therefore, this paper also aims to fill in this gap by combining the emotional factor during the user journey experience an e-commerce platform depicted by scenario model.

2 Theoretical Foundation

The UX Framework

This part explores all the fundamental theory and tool for UX evaluation framework. Started from the notion of user experience, the elucidation of hassenzahl theory, UX testing, and scenario based methodology. Basically, the components written in this section are the valuable material we used to create a new model of user experience assessment for an e-commerce platform.

User Experience

Actually, the user experience term has broader concept than usability. Usability measure the user friendly readiness level from an interface, while UX covers ease of use and various subjective aspect of happiness while users intend to use the technology [10]. Designing a product or technology by following user experience concept give numerous benefits. One of them is bringing the persuasion architecture principles [11]. It could influence the user in such interactive way during storytelling based on the social psychological context [12]. Which means, we should able to persuade customer to use our website multiple times.

To put it simply, we also should know how to interpret the UX evaluation result into user engagement. Since it expresses the interactivity in a positive way so that the UX evaluation should delivers a positive result, particularly three aspects of Hassenzahl theory must be achieved in a satisfactory outcome. If using scoring method, it should be average upper score [39].

The Hassenzahl Theory

According to Hassenzahl, a user experience is a story or episode of human dialogue with interactive products. It comprises of subjective aspect of user satisfaction which covers various hedonic factors and the objective aspect of user measurement. The hedonic factor is commonly named as be-goals (why), which covers the motivation, intention and emotion to do an activity. Then, the pragmatic aspects is named do-goals (what) which capture concrete, expected result of activities and plan to reach them, and motor-goals (how), which looks into operation level for activities organization [13].

For future direction, Hassenzahl thinks that there should be transformation from technology-driven innovation to human-driven innovation. It means that human and social values causing the force to innovate through technology [37]. It will help the product to be full of inspiring stories and provide meaningful experience for the user. Through the experience design, a product can offer appealing, priceless and beautiful experiences in itself [13]. Additionally, a study found that preparing educators with adequate digital literacy skills will ensure the successfull integration of technology [40]. In the context of e-commerce, applying Hassenzahl's model of user experience, which emphasize both pragmatic and hedonic qualities, highloights how digital literacy and effective UI/UX design contribute to creating meaningful, engaging, and efficient online shopping.

The UX Testing

The current key to evaluate the user experience still based on user-centered design methodology [14]. This method was emphasizing on the urgency of testing the application to reflect the needs and user goals. Several benefits of involving user iteratively during the development process are minimize the development costs, make development time short and boost the productivity [15]. However, this concept also has some limitations: complience, recognition and incorporation; scarcity of resources; project definition adjustment; and what will be highlighted on this paper is the problem arises due to multidisciplinary team of the administration [16].

User-centered design, will involve a lot of designer which have plural area and diverse ideas. In order to accommodate those conflicts. Scenario - based testing will give

assistance to synchronize all of their views. By using scenario-based testing, both the designer and tester will be directed with the flow of the scenarios during the development process, so that they will have one side of look of their application.

Scenario Based Methodology

Scenarios describe the user views about usability, functionality and behavior of a software system [17]. This method has been an effective tool for validation and verification activities. It also brings a systematics ways to develop the test cases. Yet nowadays testing is often done in an unstructured, non-systematic way. The scenario testing usually consists of five phases as described below [18] :

1. **Planning :** First of all is defining all the components involved, like the target of participant and the type of product to be tested, can be a system or module, location or even cost. This step is very crucial for determining the complexity of the system before testing.
2. **Preparation :** After planning, what we must to do is choosing the instruments such as (interviews, questionnaire, observation, checklists and etc. The outcome are the test plan and tasks for the scenario test. For example, questionnaire method with bipolar likert scale using seven distinct categories. It also more suited to use through electronic distribution of inventories, such as via Google forms.
3. **Testing:** During the testing phase, it is critical to preserve the time and do the test following the order as stated on the schedule which included on the test plan and avoid the test from meddling with each other. Perhaps, some interventions are useful, for example the reaction if a problem arises during the testing process. The main task from this phase are distribute tasks to users, observe and collect data. The documentation of all deviation from the test plan also important to be output of this phase.
4. **Analyzing:** After doing testing and all the findings has been discovered, the it comes to the analyzing phase. During this phase, we have to divide the findings so that more important findings can be securely preserved first. Using a statistic method is a good

alternative both to calculate the data and present it. While the virtualization of the results can be demonstrated using charts, tables, or graphics.

5. **Documentation:** It is essential to document all the process and result and probably there are some anomalies from the test plan This documentation has several functions such as makes testing more accurate, easy and organized. Specially for any bigger companies like Microsoft, IBM, Oracle, their testing documents also can be a proper documentation for any user to understand their product. Usually they release periodically the technical documents that say what is works with the feature and what is not. This strategy is useful to maintain the user loyalty since user get update information about the latest version of the application they used.

In case of e-commerce website, the scenario basically will test the common scenarios which should be based on the user journey. User journey or customer journey is the stages which a customer goes through when interacting with a company or service that is represented on linier and time-based journey [19]. Generally, there are three stages of scenario testing as presented at Table 1[20] . First is the onboarding stage in which users depict the process for opening the website until the user see the home page. Second is the shopping journey process. In this stage, it requires input from the user to search and select a product. Lastly, the product selection and purchase, the shopping cart management and the checkout process. This last phase is a complex process to let user go through when checking out the items in the cart. It also will include choosing the preferences such as size, color, and etc.

Table 1. The General E-Commerce Scenario

No	E-commerce Scenarios
1.	The onboarding stage.
2.	The shopping journey process stage.
3.	The product selection and purchase stage.

3 Methodology

The research methodology used must precisely help us to get the solution to the problem. As the goal of this paper was to make further improvement for hassenzahl method in specific field like e-commerce, we decided to adopt a Systematic Literature Review approach. This will analyse existing research on Hassenzahl framework implementation for user experience measurement. Moreover, exploring and investigating all the potential research related to specific topics regarding the research questions have been the function of systematic review [21]. Accordingly, this brought to the aid for identifying the literature based on the current research topics in the field of user experience, e-commerce and customer engagement.

Research Question

The research question helps to focus when the research started. Indeed it was one of the fundamental elements to show what direction the research takes and serves as the catalysts for research to uncover the important discoveries. Consequently, due to its significant contribution to the research, we decided to mark only one primary research question as follow :

“What best approach to implement Hassenzahl method into an e-commerce platform”

Searching Process

During the searching process, we applied the search strategy including: scooping, searching, and analyze. In scooping process, we took the sources from the several keywords; user experience evaluation, e-commerce design, Hassenzahl implementation. For the time range, because the e-commerce platform has been created before the millenium era thus we also need to study the old paper. As a consequence, we decided not to give time frame for the sources. So that basically we only used the keywords and quality assessment to filter the sources. The output for this process is finding all the critical components that fit to the research question.

Quality Assessment

Quality is a complex process which implemented differently according to its theme. After the search process, all the scientific resources should be undergone through quality assessment to verify the effective ness of the findings.

Technically, we define the quality as an assessment tool to sorting out the literature by using specific questions as follows [21] ;

- Are the review's criteria appropriately described?
- Is the literature search likely to have covered all relevant studies?
- Did the reviewers assess the quality and validity of the studies?
- Were the basic data/studies adequately described?

4 Results and Discussions

As explained previously, we already define three basic scenarios for e-commerce platform. Those scenarios then should be integrated with Hassenzahl Method by classifying per scenario. In each scenario, we put the measurement properties based on three Hassenzahl method; be-goals, do-goals, and motor-goals. Thus, the result obtained from the combination of these two concept can be a guidance to generate properties in order to create the test cases in a UX assesment process. During the integration process, we follow the nature of meaning from each hedonic characters and intrepret them to the which specific scenario is being performed. As classified below are the outcome of this implementation, sequenced by the general scenario process of an e-commerce platform.

The onboarding stage

This initial step of a user journey usually must delivers a smooth process for the user, since executed only simply by typing the website URL on the browser, open a mobile application or clicking the advertising campaign. After entering the site, what people see for the first time is the home page. It has role as the entrance point and guide user to get to the next page. In such a way, the optimization and experience of a home page offers a significant factor for flourishing the user engagement. So that the creation of positive and desirable impression should begin from the visual design and content of a home page. Interestingly, a home page also gets the most views. There are many digital campaign which put a direct link to the home page.

Be-goal

This aspect indicates the motivation and emotion which must be clearly expressed through the home page. Regarding that matter, the design should be convenient for the user to enjoy window shopping [22]. More importantly, the persuasive characterictics of e-commerce design needs to be applied. For example, attractively presenting products, using sales and promotion techniques, suggesting related products based on each customer profile, and simplifying the purchase mechanism [23].

Do-goal

The product information displayed should not be too complex and overload of information [24]. The basic building blocks for a homepage of e-commerce website mostly the same with the general website; Container (the frame for the page), logotype (the sites identity), navigation (how the users can use the site), content (anything from images, text or video that can be found on the webpage), footer (the bottom on the page) and white space (areas without illustrations or typing) [25]. Furthermore, four important things that must exist in an e-commerce site are navigation, search, contact us and shopping cart [26].

Motor-goal

The customer of e-commerce website tend to make sure that the image displayed resembles its concrete appearance. Thus the visualization technique to present must be accurate, consistent and comprehensive. Precise and full view of the product should be provided [27]. This can be done using high quality image and image interactivity. By clicking and moving the object around, they can interact with it and view from many angle as if they are in the real store [28]. Currently, the introduction of Augmented Reality (AR) for e-commerce website also offers a unique experience for the customers so that it can be another strategies to gain customer engagement [38].

The shopping journey process stage

The way the user discover a product reflects the valuable opportunity to raise user engagement for e-commerce platform. The biggest challenge for this process is to help them discover the product or service they need. Knowing the customer that is actually matter, because it helps to establish a guarantee that the e-commerce website is the preferred destination to shop at. But sometimes, the navigation process has poor

performances. It can be due to lots of image with minimum quality and information, lack of categorization for product collection, or difficulties or lenghty process to find the right product. Thus by enabling the Hassenzahl principle into its navigation design, it forges the supervision to prevent such inferior user experience during browsing and product discovery process.

Be-goal

User journey on this process has specific motivation and emotion to find something what they really need. There are at least two types of user during this process. Type one, the user knowing their desired product then searching though search bar the categories /subcategories menu to find out the product. Second type, the user does not have a clear picture of the product they are looking for, still full of doubts thus they have to look at the entire product display available. Of course this is risky, since it will lead the user to be bewildered and get lost in the website maze [29]. Therefore, the e-commerce website should accommodate these two types of users.

Do-goal

The product categorization, grouping, and organizing are the key technique to deliver success process for browsing product through search bar or catalogue. To that extent, the taxonomy of the product should be systematically organized. It was implied with the following rules [30]:

- Make a group for similar product
- Make sure that the categorization based on the product type instead of brand or application
- For kits, sets, components, and assortments should be created on separate categories
- Make grouping name more general at the highest level and specific at the lowest level
- The name of the product should be understandable and simple

It is possible to turn browsers into buyer once the product display page able to capture the customer’s love. The addition feature like customer ratings and reviews can

help to boost the branding of the product. Nowadays most e-commerce platform always put this feature under the product image. More advanced feature like recommendation featured product also boost the platform capability by using data analytics based on customer preserences. From the visualization of product display, it has to fit all type of mobile platform or browsers.

Motor-goal

Effective navigation is a basic technique used during this process. The essential parts to build such strong yet meaningful navigators are clear meaningful categorization, clear label, and good visual design. If the product categorization is confusing enough or ambiguous, the customers will struggle then lead them to leave the application. It will happen for stores which having such broad assortment of products [31]. The principle of effective navigation can be measured by the amount of time a user has spent to find their desirable product. If the platform let the user to scrolling and suffer through all the product page, it means that it has poor experience in term of catalogue browsing and product discovery.

The Product Selection and Purchase Stage.

The checkout process is a mandatory process and becoming standard process for e-commerce website, with clear and expected outcome. Usually this process includes choosing product, adding to cart, filling some form about detail of the order, user payment system, and shipping information. The flow of this process is the longest part compare to the previous scenario. Actually, the biggest challenge to measure user engagement is by observing this part. Not a few people who really does have intention to buy, beside they just have a desire to do window shopping, a behaviour of people who like to only looking at the product displayed without intending to buy anything. Or maybe some people at first truly has objective to buy, so they easily adding the chosen product in their cart, but still it could not be guaranteed until they finish the payment process. Even the product has been placed under the cart management system, they can anytime cancel it or maybe just ignore it until the expiration time for the payment process has passed.

Be-goal

Derived from functionality and hedonic motivations of shopping, there are several types of customer during check out process: 1) determined to do an online purchasing 2) sales, discount and price promotion hunters, 3) attained personal entertainment value of using the cart, 4) just want to organize items of interest, and 5) information-seekers [36]. To support these various intents, the e-commerce platform should provides some features such as add to cart for direct purchase or wishing list that enough to accommodate the seeking behaviour of the user.

Do-goal

In order to deliver a smooth process during the check out mechanism, the information architecture concept should come first. Following are the information architecture which can be applied for this process [32] :

1. The shopping cart must be visible, handy, accessible and rich functionality
2. Keep the ordering option clear and simple
3. Put a display about related items available during the checkout process
4. Provide features such as wishlist or favorite items then put it near the shopping cart for the future process
5. Give advance notice of what the checkout process involves
6. Simplicity and neatness is the key for creating such efficient order form
7. Secure transaction is a must for each step during the checkout process

Another general guideline which help to improve the concept of checkout is by changing the mandatory step for registration to be optional. Because it can takes more effort as well as time also create hassle for the user. If the registration form was placed in the initial stage on the checkout process, user might just drop the idea to buy.

Motor-goal

Basically, there are two types of checkout process. i) a single one-page checkout process that contains all the necessary information for performing the purchase in a single page; and ii) a guided step-by-step checkout process in which users have to fill out their information in multiple steps, usually across multiple pages [33]. There is mothing wrong with both types of checkout design. What actually matter is the optimization principle

should be carried out during this process. With all of the items like cart, whising list or basket, the key is to keep it as simple as it can. Not only by creating the attractive front end-design, but also the content should include the review of what the user has put to their cart and provide a very obvious next step as well as options to make attribute changes to the order. The platform performance must be take into consideration also. There are a lot of reports from the user experiencing the crashed platform, mostly it happen when they gone through payment process. Thus it is important to remove unnecessary items such as advertisement links.

The Evaluation Step

It is crucial to define some steps for broader view of evaluation process. This also help in organizing and managing the work before we use mix method of scenario and Hassenzahl framework. In implementing this step, we summarize what the tester' phase of work and detail of implementation in Table 2.

Table 2. The Evaluation Steps

No.	Step	How to
Step 1	Define the goal of the platform	The website should represent either informational design (for digital catalogue display only) or online/transactional design [34]
Step 2	Define the user journey	Define the steps in which user interact with the website to perform any feature
Step 3	Develop the scenario test	There are three basic scenarios for e-commerce website
Step 4	Evaluate the Hassenzahl properties	Using be-goals, do-goals, and motor-goals principle. As illustrated on the Table 3.
Step 5	Result	Summary from the overall evaluation result

In the following paragraph, we propose a model for evaluating user experience of e-commerce platform. This model is presented at Table 3 which integrate the scenario and Hassenzahl framework of user experience evaluation. Specifically, we propose a model which enable UX engineer to examine the successfulness of e-commerce platform UX design through examine three main dimension of Hassenzahl UX successfulness criteria into each stage of user journey.

Table 3. The Integration of Hassenzahl and Scenario Based

Stage 1 : The onboarding stage	
Be-goal	• Convenient for window shopping • Persuasive design
Do-goal	• Product information clear and concise (not too complex or overload) • Comply with the standard feature of e-commerce homepage
Motor-goal	• Precise and full view of the product • High quality image • Image interactivity
Stage 2 : The shopping journey process stage	
Be-goal	Accommodate two types of user : the one who already now what he is looking for, and the one who just knowing the rough idea of the product he might be interested
Do-goal	Using specific technique for product taxonomy or categorization. Addition feature like ratings and reviews or more advanced technique like recommendation and featured product drastically change the customers into buyers
Motor-goal	• Effective navigation • Meaningful product categorization • Clear labels • Good visual design
Stage 3 : The product selection and purchase stage	
Be-goal	Accommodates many types of user during check out process, whether the user really intent to purchase the product or only satisfy the information seeking behavior. For example by providing direct add to cart or wishing list

Do-goal	Using the given principles of information architecture for check out process; However do not put the registration form as mandatory step. Beside put this as optional, for example provides option for guest check out without login first.
Motor-goal	Determine the two type of user checkout process : one-page check out process or multiple-page check out process. Focused on the optimization principle by make it as simple as it can, but do not forget about the performance to prevent from platform crash during the check out process.

5 Conclusions and Future Research Directions

In this paper, we come up with a scenario based testing approach to assess the design of e commerce platform. We think that scenario based approach is fit to the description of experience as episode or story of user dialogue with an interactive product such e commerce. The scenario is developed based on the user journey when they interact with e commerce platform. The scenario-based method can be used for analysis, ideation and dealing with the collaborative innovation of user experience design [35]. It has the benefit of being easier to understand compared to other methods. Even the user can follow it without any crucial difficulties. Likewise, the involvement of end users and multidisciplinary teams in design is also important.

We used Hassenzahl's method and expand it on the conceptual level to emphasize the criteria on Why, What and How technique by using a scenario based evaluation. The scenario is divided into five steps ; define the goal of the platform, define the user journey, develop the scenario test, evaluate the Hassenzahl's properties and generating result. We defined the concept of UX for each scenario and mapping the Hassenzahl's properties into perspective dimension. Therefore, in every scenario, we explain conceptually the implementation of Be-Goal, Do-Goal, and Motor-Goal. We also provides principles and some hints for each aspect to create e-commerce application which comply with user satisfaction.

Although from our perception model can contribute to provide improvement of the design of an e-commerce platform, however we think that a further research is needed to develop the testing tools then proof the measurement model using an appropriate

methodology. We acknowledge that a conceptual model is a representation of idea which can be perceive as a way to understand a process. Although representaion of idea on Hassenzahl' concept of user experience concept was developed through a systematic way of thinking, however it need to be broadly understood as a guideline in examining user experience. This model provide a comprehensive description of implementation of Hassenzahl's method for evaluating user experience in e -commerce platform, then further study is needed to develop a measurement model which can be implemented in various e-commerce platform and context. And as the complexity of technology growing rapidly, we believe that the user experience still be a key to fascinate the user, and creating scenario-based method will be an essential part of the development process to create a product that is efficient, handy, and engaging.

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