



Usability of komeksepeti.com E-Commerce Website That Sells Handmade Products

Ahmet Akcakaya^{1,*}, Suhap Sahin², Erdal Mustafa Yegin³

^{1,*} Kocaeli University, Computer Research and Application Center, Kocaeli, Turkey

² Kocaeli University, Faculty of Engineering, Computer Engineering, Kocaeli, Turkey

³ Kocaeli University, Faculty of Engineering, Electrical Engineering, Kocaeli, Turkey

Accepted 26 May 2024

Abstract

The goal of every commercial online store is to increase the number of customers and engagement in order to boost sales. An attractive interface is crucial for online stores to achieve their objectives. One type of online store is e-commerce sites where people showcase and sell handmade products. To evaluate the usability of these sites, Nielsen's heuristic evaluation and the heuristic evaluation method are widely used in the literature. In this article, the usability of the e-commerce site komeksepeti.com, where handmade products are showcased and sold, is evaluated using Nielsen's heuristics and the heuristic items for e-commerce sites. Additionally, a heuristic study was conducted by categorizing the stages of the processes from product examination to sales and delivery on e-commerce sites. These two studies were combined to evaluate the usability of the e-commerce site. The study found that the komeksepeti.com e-commerce site has an adequate level of usability; however, certain findings, such as the absence of a site map and the lack of clear labeling of seller names, were identified as areas for improvement. The result of this research provides a heuristic evaluation guideline for e-commerce marketplace sites to conduct a cost-effective usability assessment. Therefore, it is important for the development of highly usable website designs that meet the needs of both users (sellers) and customers (buyers).

Keywords: *Usability, E-Commerce, Handicrafts*

1. Introduction

Nowadays, the amount of time people spend on the internet is increasing day by day, and this situation has also increased the interest in e-commerce sites. With the rapid development of information and communication technologies, e-commerce has started to play a significant role in almost every aspect of life. E-commerce sites are becoming more and more preferred because they offer customers easier access to the products they want [1]. However, users can quickly leave these sites if they do not find what they are looking for [2,3]. Among the reasons for this are users' personal characteristics (gender, education level), experiences, and physical barriers. It is expected that there will be common features that will keep every user on the e-commerce site. Therefore, it is of great importance that the developed systems are tested in a way that encompasses these features. As a result of the tests conducted, the usability level of the systems becomes notably apparent.

One of the most important factors determining the quality of a product or system is its usability. Systems or products that are difficult to use can lead to decreased efficiency and effectiveness, making it harder for end-users to adopt them [4]. Usability studies are widely conducted in various fields of industry and for different purposes. A review of the literature shows that the majority of usability studies focus on websites [5]. In particular, many e-commerce sites have placed significant emphasis on usability in recent years. Usability improvements on e-commerce websites not only increase sales but also provide these sites with survival and competitive advantages [6].

E-commerce sites for selling handmade products allow users to open virtual stores where they can showcase and sell their self-produced handmade items. The design of these e-commerce sites, expected to be usable, is extremely important. In one of the studies related to this topic, an analysis of research on traditional handicrafts is presented. This study,

conducted by Liu and colleagues between 2002 and 2022, emphasizes the importance of cultural heritage along with advancements in branding and e-commerce [7]. On the other hand, Jiun and colleagues state that since online shopping systems need to be suitable for shopping at any time of the day, these platforms are more complex than traditional ones, making user interface usability issues significant [8]. Sara Ahmed, in her work proposing new ways to enhance usability on e-commerce sites, mentions that the decision-making phase for the architectural structure begins with identifying personal desires, expectations, and problem areas. He also recommends that the menu layouts within the site map should be consistent with the font, colors, and overall design to ensure visual consistency [9].

Numerous studies have been conducted to understand how an e-commerce site can influence customer behavior in the context of usability. One such study investigates how the colors inside an e-commerce site affect consumers' purchasing intentions [10]. Another significant study evaluates the consistent application of the Gestalt Principle and Fitts' Law on e-commerce websites, addressing an important issue [11]. These studies explored the differences between e-commerce sites and traditional shopping centers. In 2006, Oppenheim and Ward identified several shortcomings in the usability of e-commerce sites: poor website design, lack of consideration for design accessible to users with disabilities, absence of multilingual options, absence or poor performance of search and help functions, low-quality error messages on pages providing feedback about user input, and a lack of security certificates and privacy policies [12]. Gabriel developed a system that allows the usability of e-commerce sites to be measured at low cost and with minimal or no usability engineering skills. The system's usability factors include navigation support, product search mechanism, product listings, product comparison mechanism, presentation of product information and product selection, shopping cart, registration and account login, account information, payment process, security, privacy, reliability and trust, error handling and system feedback features, help mechanism, and customer services [13]. In a study evaluating 10 selected e-commerce sites based on user density, site navigation was identified as the most important factor affecting usability performance [14]. In 2013, Goh and colleagues evaluated the usability of an e-commerce site selling gifts. In their study, they used methods such as receiving feedback after a task, thinking out loud, and eye movement tracking. As a result of the evaluation, they stated that language and content, user guidance and support,

visual clarity, and flexibility and control elements need to be improved [15]. In 2019, Shi and Yuan examined the usability of e-commerce sites in line with Microsoft's usability principles. In their study, they offered suggestions for enhancing e-commerce websites [6].

Reviews in the literature emphasize the importance of cultural heritage in evaluating the usability of e-commerce sites, the need for sites to be accessible 24 hours a day, the identification of areas where users can express their personal preferences and problems, and the impact of the colors used in site design. In addition, attention is drawn to the importance of navigation on e-commerce sites. This article examines the usability analyses of e-commerce sites and the results of these analyses by providing an example involving the application of these written in the literature. Findings from various studies demonstrating how theoretical knowledge is implemented in practice identify the necessary strategies and areas of improvement to make e-commerce sites both user-friendly and competitive. In this context, our work is the first study in Turkey that shows cultural heritage is effective in usability. The study also comprehensively evaluates important stages of e-commerce sites such as user account management, product search, product information, stock status, adding to cart, ordering and payment, and delivery. Obtaining qualitative opinions about usability from experts and real users and identifying common points add value to the study by leading to more accurate results in terms of usability.

2. Methodology of the study

The usability of a website plays a critical role in determining a company's success [16]. To create a successful e-commerce site, the usability of websites must be evaluated. E-commerce sites that do not conduct usability studies fail to meet the expectations of customers [17, 18]. Usability assessment methods are classified as user-based, expert-based, and model-based [19, 20]. User testing and heuristic evaluation methods are among the methods used to evaluate the usability of e-commerce sites [5]. The results of these two methods identify major or minor issues with websites [21].

The study aimed at evaluating the usability of the e-commerce site www.komeksepeti.com, shown in Figure-1, consists of three sections. The first section involves 'obtaining expert opinions using Nielsen's heuristics,' the second section involves 'obtaining opinions from actual users about e-commerce usability' and the final section matches the findings

obtained in the first two sections. Separate opinions were obtained from experts and real users within the scope of the study. Experts were asked to evaluate the usability of the "Komek Sepeti" website using Nielsen's heuristics. Usability-related information was extracted from the received replies and incorporated into the findings. Expert and user opinions were grouped according to the usability evaluation

framework in the final section of the study, and recommendations were made. This study dealt with information excluding user experience (UX), thus the data obtained were evaluated solely within the scope of usability. Data obtained from experts and real users were interpreted collectively to perform a user-based assessment.



Figure 1. KomekSepeti Home Page

2.1. Nielsen's Heuristics

Usability issues on a website can be identified using heuristic evaluation, conducted by a small team of expert evaluators, to determine whether the products meet usability principles [22]. Heuristic evaluation is a method that has a series of usability principles or guidelines introduced by Nielsen and Molich in 1990, and it helps to quickly identify the majority of usability problems in product interfaces [21, 23].

Many researchers in the literature use various heuristic evaluation methods [24, 25].

In this study, three usability experts with experience in usability evaluation and postgraduate education were engaged. The study utilized Nielsen's Heuristics (NS) as specified in Table 1. Expert evaluators assessed the komeksepeti.com site according to NS.

Table 1: Nielsen's Heuristics

Heuristic Name	Heuristic Code
Visibility of system status	NS1
Matching between the system and the real world	NS2
User control and freedom	NS3
Consistencies and standards	NS4
Error prevention	NS5
Recognition rather than recall	NS6
Flexibility and efficiency of use	NS7
Aesthetic and minimalist design	NS8
Recognize, diagnose and recover from errors	NS9
Help and documentation	NS10

2.2. Stages for usability testing of e-commerce sites

E-commerce site usability steps include steps such as user account management, product search, product information, stock status, adding to cart, placing an order, making a payment, and delivery. Each step is a

significant factor that directly affects the user experience and should be carefully evaluated. Real users (customers) were used in the assessment of the usability steps of the e-commerce system. These studies done with users are referred to as the user-

based method. In this method, a user sample tests the application by performing a predetermined set of tasks. Yıldız and others have noted in the literature that the user-based method generally provides reliable and valid results in usability evaluation, reveals deep-seated usability problems, and is effective in exploring various interface options in the early stages of system design [20, 26, 27].

Seven main tasks were identified for the evaluation of Komeksepeti.com with real users. These steps (ECU), which define the stages of the shopping process in e-commerce sites, are presented in Table 2 [13]. Users were asked to complete the steps specified in Table 2 and note the problems they encountered. Data were collected via Google Drive.

Table 2: Control Steps for the Usability of E-Commerce Sites [13]

Name of the Process to be Controlled	Process Description	Process Code
User Account Management	Both buyers and sellers can open accounts. Update their accounts.	ECU1
Product Search	Buyers can search for the handicraft product they want to buy.	ECU2
Product Information	Buyers can access information such as the name, price, size, etc. of handicraft products.	ECU3
Information about Product Stock Status	Buyers can get information about the availability of products on my site.	ECU4
Add to Basket	Buyers can add their desired handicraft products to the basket and purchase them.	ECU5
Ordering and Payment Information	The buyer can update their address information, credit card information during the order placement phase.	ECU6
Cargo Delivery	Buyers can access the details of the cargo status information of the products they have ordered.	ECU7

2.2. Matching e-commerce website shopping steps with Nielsen's Heuristics

'Nielsen's Heuristics (Table-1)' feedback from experts and 'Control Steps for Usability of E-Commerce Sites (Table-2)' feedback from real users were matched. The answers were coded with Nielsen's heuristics. The answers in Table-1 and Table-2 are mapped and shown in Table-5. The matching process is based on a common denominator between Nielsen's heuristics and user comments corresponding to e-commerce site shopping steps. In Table-5, expert evaluations and real users' comments are shown together and presented to evaluate the results. In addition, the matched

information in Table-5 will show the strengths and weaknesses of komeksepeti.com e-commerce site.

3. Findings

The findings obtained are explained under the headings of 'summaries of expert evaluations', 'positive feedback of experts', 'user evaluations' and 'positive feedback of users' in this section.

3.1. Experts' evaluation summaries

In Table-4, the heuristic evaluations made by the experts are classified in accordance with Nielsen's heuristic headings.

Table 3: Expert Evaluation Summaries

Heuristic Name	Evaluation Findings
Visibility of system status (NS1)	Users cannot clearly see the system status and stock information. Users are not informed about the availability of products. Users are not informed about the waiting time (delay of the e-mail) during the password reset process. Brand names do not appear when users click on brands. Although users are shown text boxes, they are not given the necessary information about what to write.

	<p>The right and left scroll bars on the banner are not visible.</p> <p>There are broken links on the pages. Broken links cause users to be unable to access the information they expect and do not inform the user about the status of the system.</p>
Mapping between the system and the real world (NS2)	<p>The meanings of the logos do not match the expectations of the users and contradict their meanings in the real world.</p> <p>Size measurements that are not in accordance with the country standards are used. Letter system is used instead of the number system that users are used to.</p> <p>The icons do not match the button functionality. Drop-down menus behave differently than expected. This does not meet the expectations of users and creates confusion.</p> <p>Product descriptions are not written in accordance with the language of the users. This makes it difficult for users to understand the product.</p> <p>Product categories and nomenclature are not correct. This makes it difficult for users to find the products they are looking for.</p>
User control and freedom (NS3)	<p>Users are not given the opportunity to return to the shopping basket from the checkout.</p> <p>Users cannot create personal profiles.</p> <p>The content is not presented in an organised and understandable way for users to easily understand the information. Clear indication of time periods helps to orientate users.</p> <p>The feature of becoming a member of the site with membership information in different systems (Facebook, etc.) can be added. This allows users to complete the registration process faster and more smoothly.</p> <p>The menu changes along with the top menu. The My Account button is not included in the relevant screens. This situation causes users to go back and lose control.</p> <p>The slider takes up the entire screen. This may prevent the user from feeling in control and makes it difficult for users to access other content.</p> <p>The user is not directed to the login page after resetting their password.</p>
Consistencies and standards (NS4)	<p>The menu changes completely when a new page is opened. This is contrary to the principle of consistency and may cause confusion for users.</p> <p>Different fonts are used. Different icons are assigned to articles with similar functions.</p> <p>Buttons with the same name have different content.</p> <p>There is no child category in the menu, but there are child filter options in the search filters.</p> <p>The options under the 'Material' heading in the search filters seem inconsistent:</p> <p>Inconsistent options under the 'Material' heading make it difficult for users to filter correctly and cause inconsistency.</p> <p>Category naming and organisation is not consistent. For the solution, arrangements should be made to help users quickly recognise and select product categories.</p> <p>The use of different expressions on similar screens caused inconsistency. This makes it difficult for users to remember what they have learnt from previous experiences.</p> <p>Different brands were allowed to create their own identities. This ensures consistency and brand differentiation.</p> <p>Blog and new products logos are the same. This makes it difficult for users to understand what these logos stand for.</p> <p>When the language of currencies is not changed in the language change process, users may experience confusion. Therefore, the language and currency change should be consistent.</p> <p>If the placeholder expression on the search screen does not change when the language is changed, users may think that the system does not work in accordance with the language change.</p>
Error prevention (NS5)	<p>Activation of the purchase button without entering all credit card information is contrary to the principle of error prevention and may cause users to make incorrect transactions.</p> <p>There are typography errors. For example, there is no yellow colour on pink colour.</p>
Recognition rather than recall (NS6)	<p>The fact that users cannot quickly find the information they are looking for contradicts a design principle that is not based on recall.</p> <p>Listing products similar to the products users have looked at before reduces the users' recall burden and facilitates the shopping experience.</p> <p>The menu that comes after logging in is recommended to be moved from the right to the left side of the screen due to user visual limits.</p>

Flexibility and efficiency of use (NS7)	Offering flexible options for users with different skill levels allows users to carry out their transactions according to their needs. There are multiple language options on the site. However, it is not possible to access all pages in every language.
Aesthetic and minimalist design (NS8)	Eye-straining icons and poorly designed search bar create unnecessary complexity that negatively impacts the user experience. Displaying unnecessary information directs the user to unnecessary information and wastes time. Unnecessary and repeated elements increase the complexity of the page and prevent minimalist design. Having too many elements on the screen unnecessarily prevents minimalist design. Reducing complexity by creating a simpler design allows users to reach the products they are looking for faster. The size of the images and the organisation of the content on the page add aesthetics and usability to the site.
Recognising, diagnosing and recovering from faults (NS9)	Not providing information that users do not need or seek is in line with the principle of identifying errors and improving the user experience. It is important to provide clear and understandable feedback on user errors. Clear information should be provided on how the format of the Turkish ID number should be or how the user should proceed in case of a format error. It is important that warning messages are communicated to the user in a clear and recognisable way, both in terms of content and visual design. Factors such as the use of colour, size and positioning can help users to quickly notice errors. User-friendliness of form entries and clear indication of format requirements reduce the likelihood of users making mistakes.
Help and documentation (NS10)	The absence of a site map brings a user who does not know how to navigate by drawing a path through the site.

As seen in Table-3, there are deficiencies in the usability of komeksepeti.com. Experts observed more negative situations in the topics such as ‘visibility of system status’, ‘matching with the real world’ and ‘consistency and standards’ than others. These are issues that can be addressed during the design of e-commerce sites. It was stated by the experts that providing information on the screens where the waiting time of the users increases will increase the visibility of the system status. In addition, it was stated that the writing language and format used on the pages should be attentive, the logo should be used in accordance with the purpose, search/filtering options should be organised, information consistency on the pages should be increased, and concepts and visuals should be used in a language that users can understand.

3.2. Summaries of experts' positive evaluations

In addition to the assessments in Table-4, the experts also emphasised the positive aspects that caught their attention. The positive assessments are summarised according to Nielsen's heuristics as follows:

System Status Visibility (NS1): User redirections are successful. When an e-mail address that is not in the

system is entered, the user is given the message ‘e-Mail address is not registered in the system’.

Consistency and Standards (NS4): The system is highly compatible for use on different platforms (web or mobile). Screens, language and visuals show a certain consistency and standard.

Recognition rather than recall (NS6): The fact that automatic entry can be made, the parts of the form that were previously filled in while filling in the person profile are filled in again, and when the different language option is selected, it is possible to log out and log in again with the selected language option shows that the system is suitable for the definition of recognition instead of remembering.

Flexibility and Efficiency of Use (NS7): The user interface provides flexibility for users to work on different devices or screen sizes without distortion. The system is flexible and easy to use. The possibility of purchasing without requiring membership has relieved users from the obligation to register and thus prevented the problems that inexperienced or older users may experience during registration.

Help and Documentation (NS10): A page called ‘List of Prohibited Products’ has been prepared within the site. The existence of this page is beneficial for the

seller and the buyer; because it contributes to the prevention of negative situations that may occur by including legal information.

3.3. User evaluation summaries

The real users were asked the questions in Table-2, which includes the control steps of the e-commerce system in electronic environment. Then, the users were asked to test the system and answer the questions. The answers of the real users are given in Table-4.

As seen in Table-4, real users indicated some deficiencies in the usability of komeksepeti.com. Many users drew attention to the lack of sufficient information about product stock status. They stated that the size information of the product is missing on the product information pages. They also emphasised the importance of the description text when hovering over the product. At the user account management stage, they expressed the inadequacy of the controls related to the e-mail address. At the stage of ordering and payment information, demands such as updating credit card information and making shopping instalment options visible were put forward.

Table 4 User Feedback

Name of the Process to be Controlled	Process Description	Process Code
User Account Management	<p>When you want to log in after becoming a member, it gives a warning message when the password is entered incorrectly. However, when the e-mail address is missing or incorrect, it does not give an error message to the user.</p> <p>I could not use some of the operators I wanted to use in encryption when creating an account. Again, it did not accept my personal e-mail address when creating an account (I registered with a different e-mail address)</p> <p>Buyers and sellers can open accounts, but the update process is quite problematic.</p> <p>In addition, the option to become a member with facebook or google accounts can be added.</p> <p>I made my membership without any problems. However, I set a simple password when creating a password and did not receive any warning.</p>	ECU1
Product Search	<p>When the name is searched specifically or the type is searched, many products appear. However, the menus being automatically open and selected is visually eye straining.</p> <p>The autocomplete option in the search works after 3-4 characters, I think it would be better if it brings results earlier. Also, clicking on the product in the autocomplete in the search does not go to the product. The search for the product opens and only that product is listed. Instead, it may be a more effective solution to access the product page directly.</p>	ECU2
Product Information	<p>Name price information and detailed description of the products can be accessed. However, since this is a situation related to the selling organisation, it should be requested to enter detailed information when entering the product.</p> <p>When hovering over the product, it may be more useful to have 'review' or 'add to basket' instead of 'buy' on the cards. Again, when we hover over the card, the seller name cannot be selected. The customer may want to go to the seller's page.</p> <p>If the product information is entered by the seller, it is possible to access the information, but information is missing in many products.</p> <p>Some products do not include size information. Size information entry can be made mandatory for the seller.</p>	ECU3

Information About Product Stock Status	<p>There is no direct information about the stock status. However, when you want to buy the product, it allows up to a certain number. However, there is no feedback (informing the user) here again. When another user wants to buy this product when you buy the whole product, it does not give the user a warning message such as this product is in someone else's basket.</p> <p>I could not see any information about the stock status of the products on the site.</p> <p>I did not see a field related to the stock exactly, but when adding in quantity, if it is not in stock, no addition is made.</p> <p>Stock information is not visible, even if there is no stock, the add to basket button is active, but 0 product added warning is given for products without stock.</p> <p>Although there is no stock information, considering that it is a website where handicraft products are sold, it does not make sense to have a serious stock. For this reason, I think that products without stock are removed from the publication. In addition, it may be possible to solve this problem with the feature of asking questions to the seller.</p> <p>In some products, for example, up to 5 can be added in the add to basket option, but it is not clear whether this number is determined according to the stock status or according to the maximum sales policy.</p>	ECU4
Add to Basket	<p>There is no problem in this regard. Only the maximum number of products that can be purchased and stock information should be shown to the user. This information is not shown to the user.</p> <p>The minimum shopping limit for shopping in some stores is an action that repels users. Instead, a minimum amount can be set for free shipping.</p>	ECU5
Ordering and Payment Information	<p>Address and credit card information is entered. However, it does not allow updating this information at the order placement stage.</p> <p>Although I entered my credit card information, I cannot see my instalment options. The credit card filling field freezes and I cannot write my information. Adding/selecting the address can be done, but the address information is not updated on the order screen, only the card information can be updated.</p>	ECU6
Cargo Delivery	<p>If the cargo tracking number is shared, it can be tracked from the PTT Cargo tracking application.</p>	ECU7

Table 5: Matching Expert and User Evaluations

Usability Problem	Heuristic Evaluation Code (Expert Evaluation)	(User Feedback)
Stock information does not appear.	NS1	ECU4, ECU5
No information is given about the waiting time (late arrival of the e-mail) during the password reset process.	NS1	ECU1
The feature of becoming a member of the site with membership information in different systems (Facebook, etc.) can be added.	NS3	ECU1
Credit card information cannot be edited, and the purchase option is active without entering all the information.	NS5	ECU6

When the expert and user evaluations are analysed together, it is seen that there are important requirements for improving the usability of the site. A usability problem frequently mentioned by real users and experts is that the stock information of the products does not appear. Since this situation is

evaluated negatively by many users, it has become evident as a usability improvement that should be addressed as a priority. Another usability problem is the long waiting times encountered by users during the password reset process. This problem causes users to be unable to log in to their accounts and complete their

shopping. Although the absence of membership information on different platforms is not considered a direct usability problem, it is seen as a feature that can increase the number of members of the site. In the ordering and payment information step, the inability to edit credit card information is an error prevention problem that may cause users to abandon the shopping process. Improving this situation may positively affect the user experience.

4. Conclusion

A well-designed user interface is important for ease of access and navigation. A well-designed interface allows the user to spend more time on the site. Therefore, great importance should be given to the user interface when creating e-commerce sites [28]. An easy-to-use e-commerce site should be considered by employers in terms of increasing the profitability of the company. This study deals with the usability of komeksepeti.com e-commerce site where handcrafted products are exhibited. The common points of the expert and user opinions are 'stock information is not

visible', 'the e-mail is late in the password reset phase', 'easy creation of membership from other sites with API integration' and 'organisation of credit card information'. In terms of improving the visibility of the system status, it is expected to improve the display options for product stock status and product detail information. In addition, reminders should be given about waiting times during the password renewal phase. The use of user information from platforms such as Google and Facebook to perform membership transactions is another important usability improvement emphasised by users and experts. This can be solved with application programming interfaces (APIs). When these improvements are technically realised, it can be said that successful results can be achieved for komeksepeti.com in particular and all e-commerce sites in general. In addition, the solutions to the usability problems experienced in the komeksepeti example can also be applied to other e-commerce sites.

References

- [1] Ülger, Y. T., Toksarı, M. (2020). E-Ticaret Sitelerinin Kullanılabilirliği ve Başarısını Etkileyen Faktörlerin Belirlenmesi. *Giresun Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 6(2), 116-128. <https://doi.org/10.46849/guiibd.823445>
- [2] Ersoy, H. (2004). Bir Çevrimiçi Öğrenim Destek Sisteminin Kullanılabilirlik Testi: Planlama, Uygulama, Değerlendirme. *The Turkish Online Journal of Educational Technology*, 3(1).
- [3] KAMİS Rehberi. (t.y.). Kamu İnternet Siteleri Rehberi-Kullanılabilirlik ve Erişilebilirlik. Tübitak Bilgem. 26 Mayıs 2024, gönderen <https://bilgem.tubitak.gov.tr/yayinlar/yte-yayinlar/>
- [4] Sagar, K., & Saha, A. (2017). A Systematic Review of Software Usability Studies. *International Journal of Information Technology*. <https://doi.org/10.1007/s41870-017-0048-1>
- [5] Hasan, L., Morris, A., & Proberts, S. (2013). E-Commerce Websites for Developing Countries – A Usability Evaluation Framework. *Online Information Review*, 37(2), 231-251. <https://doi.org/10.1108/OIR-10-2011-0166>
- [6] Impact of E-Commerce Website Usability on User Satisfaction. *Journal of Advanced Computational Intelligence and Intelligent Informatics*, 23(1), 91-96. <https://doi.org/10.20965/jaciii.2019.p0091>
- [7] Liu, H., Alli, H., & Yusoff, I. S. M. (2024). A thematic review on traditional handicraft from design perspective publications from 2002–2022: analysis of trends for future studies. *Cogent Arts & Humanities*, 11(1). <https://doi.org/10.1080/23311983.2023.2298084>
- [8] Hu, H.-J., Yen, J., & Guan, S.-S. (2008). A Study on the Interface Usability of B2C Hypermarket E-commerce Website. 2008 IEEE Asia-Pacific Services Computing Conference, 1202-1207. <https://doi.org/10.1109/APSCC.2008.64>
- [9] Ali, S. (2024). A New Design Strategy to Increase Usability in E-Commerce Web Sites. *International Design Journal*, 14(3), 375-386. <https://doi.org/10.21608/idj.2024.348739>
- [10] Pelet, J.-E., Papadopoulou, P. (Ed.). (2014). User Behavior in Ubiquitous Online Environments: IGI Global. <https://doi.org/10.4018/978-1-4666-4566-0>
- [11] Sivaji, A., Downe, A. G., Muhammad Fahmi Mazlan, Soo, S.-T., & Abdullah, A. (2011). Importance of incorporating fundamental usability with social & trust elements for E-Commerce website. 2011 International Conference on Business, Engineering and Industrial Applications, 221-226. <https://doi.org/10.1109/ICBEIA.2011.5994248>
- [12] Oppenheim, C., & Ward, L. (2006). Evaluation of web sites for B2C e-commerce. *Aslib Proceedings*, 58(3), 237-260. <https://doi.org/10.1108/00012530610701022>
- [13] Gabriel, I.J. (2007). Usability Metrics for Measuring Usability of Business-to-Consumer (B2C) E-Commerce Sites.
- [14] Bulak, M. E., Kozanoğlu, O., Aydoğduoğlu, Ş. N., Göçer, F., & Algül, R. (2021). E-Ticaret Sitelerinin Kullanılabilirliğinin AHP ve TOPSİS

- Yöntemleriyle Karşılaştırılması. *European Journal of Science and Technology*.
<https://doi.org/10.31590/ejosat.963658>
- [15] Goh, K. N., Chen, Y. Y., Lai, F. W., Daud, S. C., Sivaji, A., & Soo, S. T. (2013). A Comparison of Usability Testing Methods for an E-Commerce Website: A Case Study on a Malaysia Online Gift Shop. 2013 10th International Conference on Information Technology: New Generations, 143-150.
<https://doi.org/10.1109/ITNG.2013.129>
- [16] Tezza, R., Bornia, A. C., & Andrade, D. F. D. (2011). Measuring web usability using item response theory: Principles, features and opportunities. *Interacting with Computers*, 23(2), 167-175.
<https://doi.org/10.1016/j.intcom.2011.02.004>
- [17] Li, F., & Li, Y. (2011). Usability evaluation of e-commerce on B2C websites in China. *Procedia Engineering*, 15, 5299-5304.
<https://doi.org/10.1016/j.proeng.2011.08.982>
- [18] Offutt, J. (2002). Quality attributes of Web software applications. *IEEE Software*, 19(2), 25-32.
<https://doi.org/10.1109/52.991329>
- [19] Venkatesh, Morris, Davis, & Davis. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, 27(3), 425.
<https://doi.org/10.2307/30036540>
- [20] Yıldız, M., Berigel, M., Kalyoncu, F., & Özgenç Keleş, Ö. (2022). Usability Evaluation of the Online Skill Assessment Tool. *Acta Infologica*, 0(0), 0-0.
<https://doi.org/10.26650/acin.1077400>
- [21] Jimenez, C., Lozada, P., & Rosas, P. (2016). Usability Heuristics: A Systematic Review. 2016 IEEE 11th Colombian Computing Conference (CCC), 1-8.
<https://doi.org/10.1109/ColumbianCC.2016.7750805>
- [22] Nielsen, J. (1994). *Usability Engineering*. Morgan Kaufmann Publishers.
<https://dl.acm.org/doi/pdf/10.5555/2821575>
- [23] Nielsen, J., and Molich, R. (1990). Heuristic Evaluation of User Interfaces, *Proc. ACM CHI'90 Conf.* (Seattle, WA, 1-5 April), 249-256.
- [24] Hamid, S., Bawany, N. Z., & Zahoor, K. (2020). Assessing Ecommerce Websites: Usability and Accessibility Study. 2020 International Conference on Advanced Computer Science and Information Systems (ICACSIS), 199-204.
<https://doi.org/10.1109/ICACSIS51025.2020.9263162>
- [25] Fernandez, A., Insfran, E., & Abrahão, S. (2011). Usability evaluation methods for the web: A systematic mapping study. *Information and Software Technology*, 53(8), 789-817.
<https://doi.org/10.1016/j.infsof.2011.02.007>
- [26] Dillon, A. (2006). Evaluation of Software Usability. İçinde W. Karwowski (Ed.), *International Encyclopedia of Ergonomics and Human Factors*, Second Edition—3 Volume Set. CRC Press.
<https://doi.org/10.1201/9780849375477.ch381>
- [27] Lyzara, R., Purwandari, B., Zulfikar, M. F., Santoso, H. B., & Solichah, I. (2019). E-Government Usability Evaluation: Insights from A Systematic Literature Review. *Proceedings of the 2nd International Conference on Software Engineering and Information Management*, 249-253.
<https://doi.org/10.1145/3305160.3305178>
- [28] Akrajindanon, R., Anupong Avirutha, Treepala, N., & McAfee, A. (2017). The Elements of Marketing Mix Affecting The Repurchase Electronic Marketplace (E-Marketplace) In Thailand. http://dspace.spu.ac.th/bitstream/123456789/5977/1/1_SPUCON2017 (Dr. Ravipa Akrajindanon).pdf