

Design E-Learning User Interface On Website-Based Edspert.Id With Kansei Engineering Methods

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Abstract: The development of information technology has encouraged people to rely on information systems, especially through websites. Websites provide easy access to information and learning with various educational materials. Although e-learning has been implemented in many educational websites, Edspert. id, a company in the education sector, has not implemented it yet. User interface design development is one of the important processes in e-learning website development. A user interface that is easy to use will improve the learning experience of learners. This research proposes a solution to design the user interface of Edspert.id e-learning website by using the Kansei Engineering method. This approach has been done before for web-based e-learning based on users' emotions. Principal component analysis (PCA) is used to reduce Kansei Word variables that are relevant to users' emotions. The e-learning website element design was then designed based on the PCA results. The next step is to determine the design elements in the e-learning design. Then, partial Least Square (PLS) was used to analyze the relationship between Kansei Word and element design. The results show that there multiuser interface design has two concepts whose element designs are in accordance with user needs.

Keywords: *E-learning, User Interface, Kansei Engineering, Principal Component Analysis. Partial Least Square*

INTRODUCTION

Most contemporary societal activities are inseparable from the advancements in information technology, which align with society's growing demand for information systems. Websites are an excellent source of information z (Achmad et al., 2021). Websites have emerged as a crucial platform in the contemporary digital age due to their ability to facilitate the dissemination of information and connect with a diverse user base (Puji & Engraini, 2021). This phenomenon is also observed in Indonesia, where the utilization of websites has become a crucial component in all domains. According to the data from 2022-2023, the total number of website users in Indonesia was 215.63 million (Puji & Engraini, 2021). In the digital age, using educational websites is crucial for the learning process, particularly for generations X, Millennials, and Z, who have extensively used website resources. The user's text is (Geasela et al., 2018).

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The majority of the current education websites have incorporated an e-learning system. *E-learning* is a technique that utilizes information technology to offer educational content, facilitate training, or acquire knowledge (Geasela et al., 2018). Nevertheless, there are still numerous instructional websites that still need to incorporate it. Edspert. id is a corporation in the education industry that still needs to incorporate an e-learning system. The Edspert. id website showcases a range of service alternatives. Nevertheless, the Edspert.id website now lacks the implementation of an e-learning system. Currently, users are required to access multiple Edspert platforms. id. Among the platforms mentioned are WhatsApp, Zoom, and Google Drive.

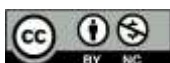
Moreover, engaging in design development is imperative to enhance the services provided by the Edspert.id website for its visitors. *User interface development* is the initial procedure utilized to create a design on the Edspert.id website. The user interface creation incorporates the user's emotions by employing the Kansei Engineering technique (Mud'Is et al., 2019). The Kansei Engineering technique is a systematic method used to determine users' emotional responses toward a product and establish the correlation between these responses and the product's attributes (Ishak, 2022). In addition, to create a systematic and user-centric design, one can utilize a customer journey map to gain insights into how new users become acquainted with and utilize a product. This tool aids in understanding user requirements and identifying creative solutions to interface challenges on educational websites (Athallah Puteri et al., 2022). Hence, Kansei Engineering is a suitable approach for product creation as it provides a means to integrate user emotions into the product (Zhafira et al., 2018).

Previous studies have implemented the Kansei engineering technique to build user interfaces for e-learning websites based on user emotions. This research has been conducted during the past decade (Ramadhan, 2018). This study implemented The Kansei Engineering process using the partial least squares method. It seeks to offer a comprehensive overview of the subjective evaluation of the efficacy of a system. Hence, this study aims to develop a user-friendly web-based e-learning user interface design that is user-friendly while promoting sound effects on users. This study aims to find Kansei words and utilize them to develop design elements for a website-based e-learning user interface design. This will be done by applying the Kansei Engineering approach and utilizing design thinking as a framework. This study also presents the findings of a partial least squares test to identify the design aspects that will be utilized in selecting the user interface design for website-based e-learning.

LITERATURE REVIEW

Human-computer interaction and Kansei Engineering are crucial in creating compelling website designs catering to user requirements. The text is referenced by the number nine. Human-Computer Interaction (HCI) is a field that emphasizes the design and utilization of computer technology, specifically user interfaces, to facilitate effective interaction between users and systems, ultimately enhancing the quality of user service (Saqr et al., 2024). Meanwhile, Kansei Engineering utilizes human emotions to inform crucial elements in website design, creating more visually appealing and gratifying designs for users (Rahma P.F, Dandi Y, 2023). As per the ShinMeikai dictionary, authored by Kindaichi Kyousuke et al., Kansei refers to the intuitive cognitive process of perceiving the impression caused by external stimuli (Putra & Suzianti, 2023). In psychology, "Kansei" refers to a mental state characterized by the harmonious coordination of information, feelings, and wants. This state is characterized by intense emotions and the ability to respond adaptively and sensitively to many stimuli (Nagamachi & Lokman, 2016). A *Customer Journey Map* is a graphical representation that outlines the complete user or customer experience during their interaction with a product (Kusuma & Tricahyono, 2020). *Empathy mapping* is a technique that aids in comprehending the target consumers by gaining insights into their wants, aspirations, ambitions, and emotions. It also helps align corporate strategies and value propositions accordingly (Cairns et al., 2021).

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METHOD

Figure 1: Flowchart of Research Systematics

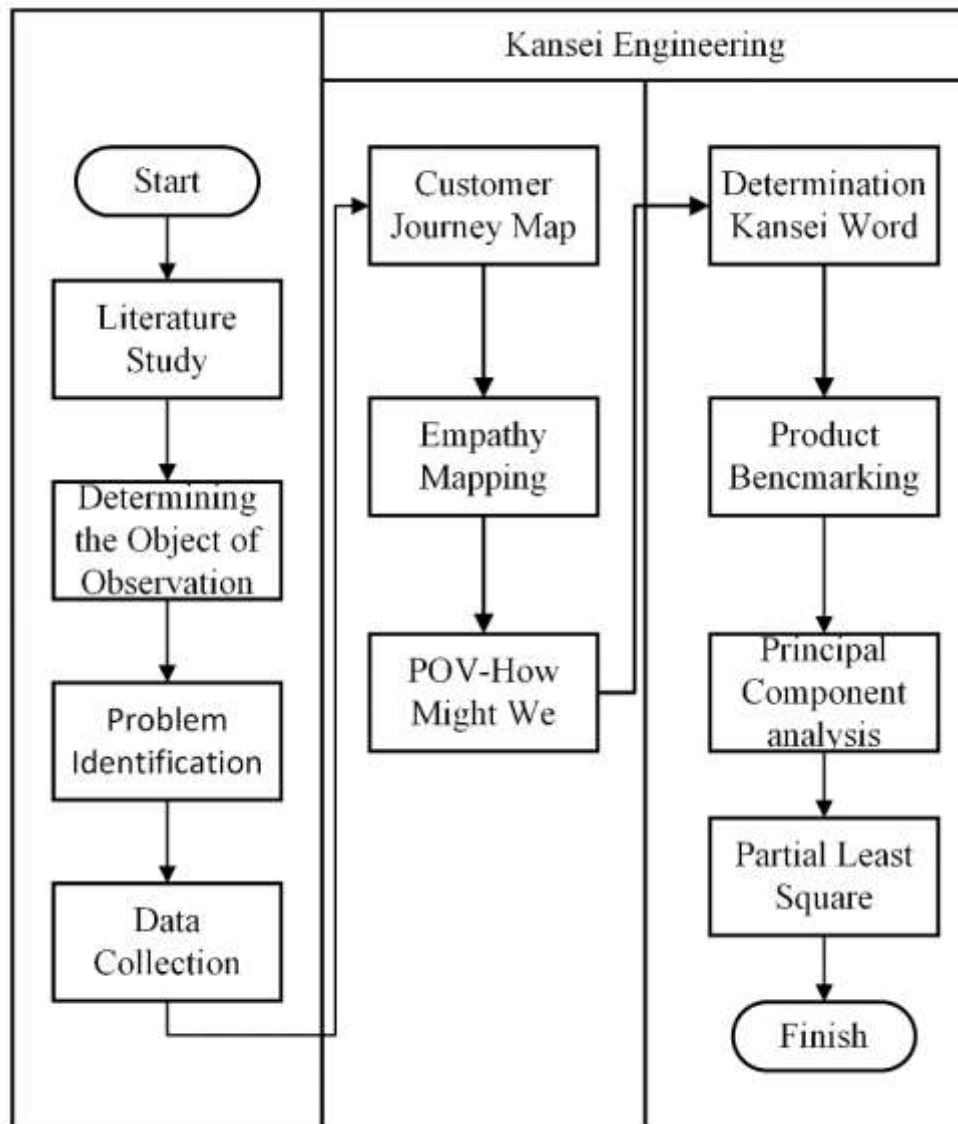


Figure 3.1 depicts the data processing method of Kansei Engineering. It will commence with a comprehensive literature review to identify pertinent information and theories, followed by an examination of the Edspert.id website to ascertain the absence of web-based e-learning. The subsequent step involves generating a customer journey map derived from a focus group discourse with ten users in order to comprehend user requirements (Nasution & Nusa, 2021). During the empathy mapping stage, it is created using data gathered from surveys or observations. Subsequently, the HowMight We statement was formulated with the aim of expanding the perspective when addressing problem-solving (Dei, 2023). Next, the Kansei Engineering approach is employed to analyze Kansei Word data. It involves gathering Kansei words from 205 participants and subsequently verifying them using a semantic differential questionnaire. Subsequently, a collection of benchmarking goods was obtained, and two semantic differential questionnaires were issued to a total of 156 respondents. Perform statistical tests, conduct principal component analysis to cluster words, ascertain element design, and execute partial least squares. The design features derived from analyzing Kansei Engineering data are subsequently utilized to create an e-learning user experience that is both visually appealing and highly gratifying for users.

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RESULT

Customer Journey Map

During the customer journey map stage, the map is developed from the perspective of the Edspert.id user, starting with their initial interaction with the website and continuing until they utilize the available learning capabilities. Visible in Figure 2.

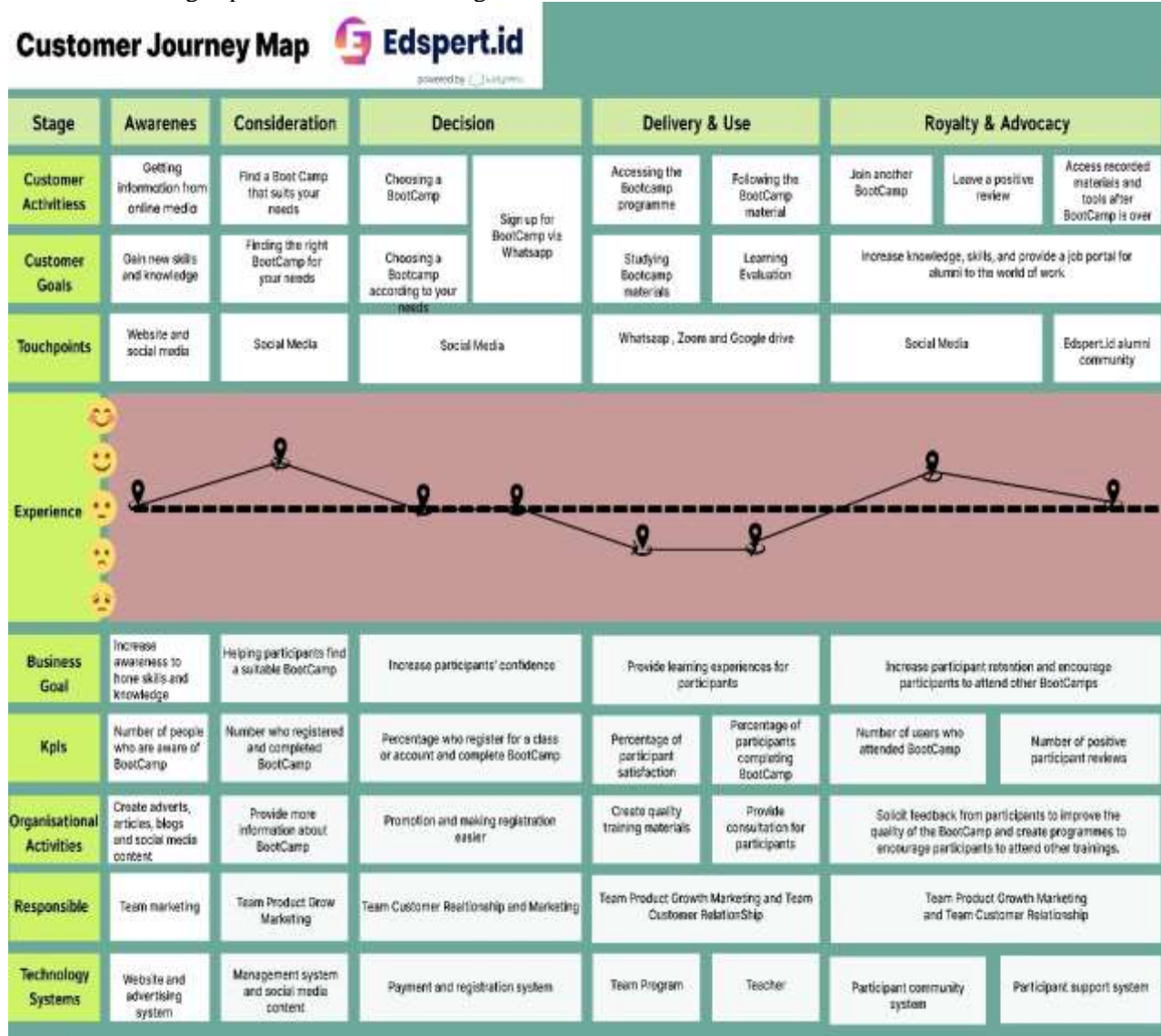


Figure 2. Customer Journey Map

According to Figure 2, which was derived from interviews with edspert.id users, it can be inferred that the overall experience of edspert.id users are positive. Users are highly pleased with the boot camp material provided, as well as the exceptional support and guidance from the expert.id team. However, there are still a few areas that could use some enhancements: 1) Developing an e-learning system on the Edspert.id website to enhance user accessibility to the delivered materials and videos. 2) Create a user interface design that is visually appealing and enhances the accessibility of e-learning for users.

Empathy Mapping

Empathy mapping is a valuable tool for gathering insights from focus group discussions to gain a deeper understanding of a product from the user's point of view (Cairns et al., 2021). Figure 3 displays the information:

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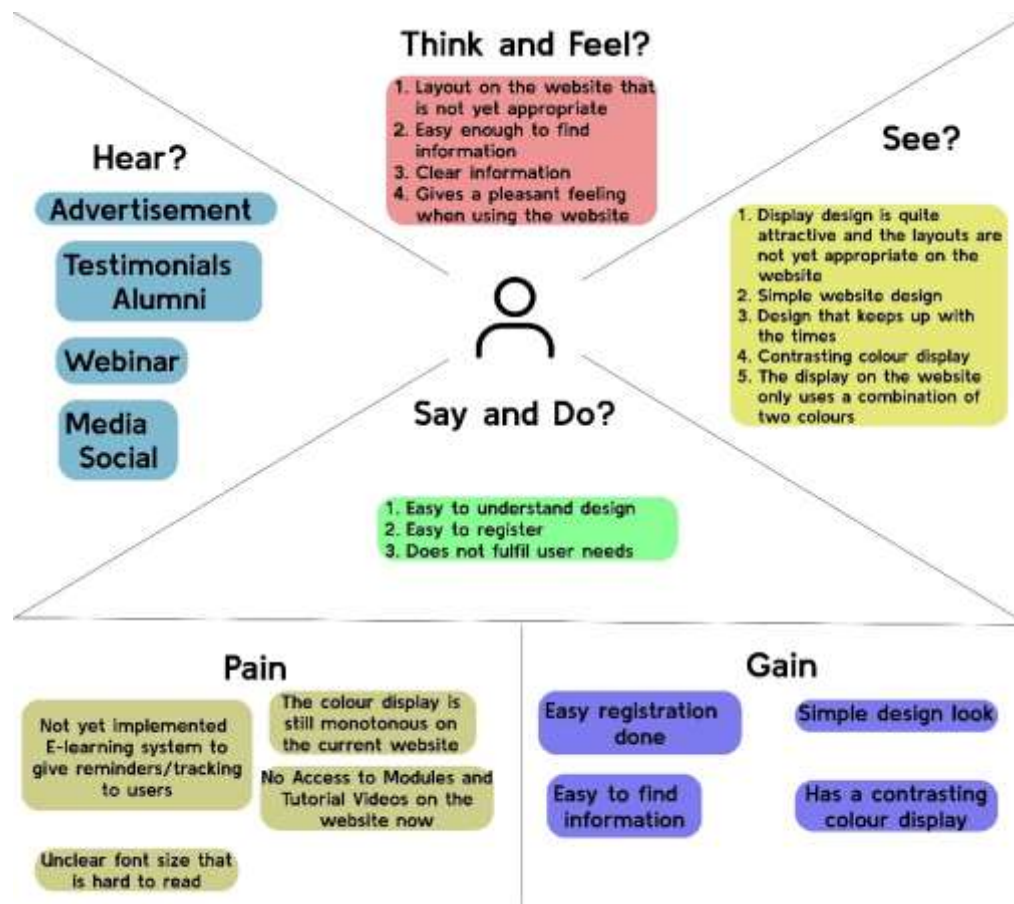


Figure 3. Empathy Mapping

From Figure 3 above, it is evident that the needs and desires of e-learning users are diverse. Users desire a learning experience that is engaging, comprehensible, and tailored to their needs.

POV How Might We

During the POV, how might we stage it? It is crucial to approach the problem from the user's perspective and clearly define the problem statement (Hampshire et al., 2022). It is done to gain a better understanding of the needs and issues that users encounter while accessing the Edspert.id learning media platform. Through a deep understanding of user needs and challenges, we can develop practical solutions to address these issues. In a manner similar to that of a software engineer, How does Edspert.id offer website-based E-learning with module access features and video tutorials? Just like a software engineer, How does Edspert.id enhance website-based E-learning to attract users with a vibrant color scheme? How does Edspert.id offer reminder or tracking features to users? What is the ideal font size for website-based E-learning to ensure readability for all users? How can Edspert.id design a website-based E-learning user interface that is visually appealing and fulfills user preferences? How does Edspert.id streamline the registration process to make it more practical? How does Edspert.id create a user-friendly interface for website-based E-learning that is intuitive and easy to navigate? How does Edspert.id develop user-friendly and easily accessible website-based E-learning?

Result Kansei Word

In order to identify the Kansei words that capture user perceptions when selecting an e-learning user interface design, it is necessary to administer a questionnaire to gather feedback on the desired features of a website-based e-learning user interface. Empathy mapping results are compared with Kansei word terms from journal literature to gauge the user's emotions towards the available specimens in e-

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learning. The total count of kansei words utilized is ten kansei words. Once ten Kansei words were obtained, a semantic differential test was conducted to assess the relevance of these words in the design of e-learning user interfaces. The test utilized a scale ranging from one, indicating disagreement, to five, indicating substantial agreement with the use of these words in e-learning interface design. After conducting statistical tests, we were able to generate the ten Kansei words needed from respondents who provided sufficient, valid, and reliable data, as indicated in Table 1.

Tabel 1. Kansei Word

No	Kansei Word	Explanation
1	Modern	Seems to be up-to-date with current trends.
2	Explicit	Offer explanations that are straightforward and simple to understand
3	Simple	Provides a glimpse into its nature
4	Easy	Seems user-friendly
5	Informative	Ensure that the information you provide is clear, complete, and relevant
6	Interesting	Captivate or ignite the interest to be attentive.
7	Colourful	Gives a colorful impression
8	Tidy	Structured, organized
9	Balanced	Creates a harmonious blend of colors
10	Fun	Gives a pleasant impression

Once Kansei Word was acquired through the Semantic Differential One questionnaire, a statistical analysis was conducted to assess its validity and reliability. This study included a total of 205 participants, with a minimum of 135 respondents' data being used for the adequacy test. Thus, the study has an adequate number of respondents. Based on the reliability and validity test results, it can be concluded that the data is reliable and valid. The calculated r values are all greater than the r table value of 0.137, as indicated in Table 2.

Table 2. Recapitulation of Reliability Test Results and Semantic Differential Validity Test One

Kanseiword	Rcount (Reliability)	Rcount (Validity)	Rtable	Explanation
Modern	0,719	0,346	0,1371	Reliable and Valid
Explicit	0,693	0,520	0,1371	Reliable and Valid
Simple	0,665	0,640	0,1371	Reliable and Valid
Easy	0,670	0,616	0,1371	Reliable and Valid
Informative	0,690	0,513	0,1371	Reliable and Valid
Interesting	0,701	0,493	0,1371	Reliable and Valid
Colourful	0,696	0,495	0,1371	Reliable and Valid
Tidy	0,676	0,584	0,1371	Reliable and Valid
Balanced	0,686	0,537	0,1371	Reliable and Valid
Fun	0,686	0,558	0,1371	Reliable and Valid

Product Benchmarking

These ten words were tested using a benchmarking product and a semantic differential questionnaire in the form of a Likert scale, with the lowest value representing negative words and the highest value positive. When benchmarking products in this research, we consider similar products that have a substantial user base of over 5,000 users. Additionally, these products have themes that align with the colors of various company logos. There are three e-learning options available for you to consider: RevoU, Binar Academy, and Menbimbing. The second semantic differential questionnaire was distributed to 156 respondents in order to calculate the average value for each Kansei word from the three benchmarking products displayed in Table 3. According to the adequacy test, 156 were deemed satisfactory, along with the reliability and validity test (r table 0.157), indicating the data's accuracy. Table 4 displays the reliable and valid information.

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Table 3. Average Kansei Word Value

Kanseiword	Revou	Binar	Guided
Modern	4,08	4	3,75
Explicit	4,16	4,1	3,92
Simple	3,64	3,9	4,25
Easy	3,8	4,24	3,74
Informative	4	4,03	3,85
Interesting	3,85	4	3,42
Colourful	3,99	3,91	3,44
Tidy	3,9	4,06	3,97
Balanced	4,2	4,12	3,95
Fun	3,96	4,07	3,35

Table 4. Reliability Test Recapitulation Results and SematicDifferential Validity Test two

Kanseiword	Rcount (Reliability)	Rcount (Validity)	Rtable	Explanation
Modern	0,754	0,783	0,1572	Reliable and Valid
Explicit	0,767	0,778	0,1572	Reliable and Valid
Simple	0,931	0,641	0,1572	Reliable and Valid
Easy	0,748	0,877	0,1572	Reliable and Valid
Informative	0,768	0,961	0,1572	Reliable and Valid
Interesting	0,698	0,983	0,1572	Reliable and Valid
Colourful	0,723	0,841	0,1572	Reliable and Valid
Tidy	0,800	0,483	0,1572	Reliable and Valid
Balanced	0,769	0,728	0,1572	Reliable and Valid
Fun	0,691	0,957	0,1572	Reliable and Valid

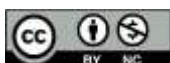
Principal Component Analysis

Principal Component AnalysisThe analysis aims to identify the most significant Kansei Words that have a profound impact on users' emotions when using e-learning. This analysis was conducted by examining the relationship between specimens to minimize Kansei word variables and concluded with varimax rotation in Kansei Words (Megasyah, 2019). The average recapitulation data of the participants were analyzed using IBM SPSS Statistics V.26 for principal component analysis. Several factors, referred to as principal components, can be derived from the calculations of principal component analysis, as shown in Table 5.

Table 5. Results of Principal Component Analysis

Rotated Component Matrixa		
Kansei Word	Componens	
	Concept 1	Concept 2
Modern	0,123	0,617
Explicit	-0,169	0,721
Simple	0,437	0,101
Easy	0,502	0,124
Informative	0,434	0,409
Interesting	0,499	0,335
Colourful	0,138	0,535
Tidy	0,66	0,037
Balanced	0,625	-0,173
Fun	0,368	0,354

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Based on the findings of the fundamental component analysis, it is inferred that there are two design concepts. The first concept is characterized by simplicity, ease of use, informative content, attractive visuals, neatness, balance, and a touch of fun. On the other hand, the second concept is more modern, clear, and vibrant in its color palette.

Design Elements and Partial Least Square

Using Google Materials, we will determine the element design to create user interfaces for websites. Table 6 displays the results of the partial least square (PLS) category obtained from two design concepts. These results were derived from the correlation analysis between Kansei Word and design elements, which were evaluated using Google Materials. The primary objective of this partial least square (PLS) analysis is to identify the design elements that have a significant impact on user emotions (Ramadhan, 2018). The outcome of this process will serve as a guide for suggesting suitable design elements based on the Kansei word selected by the user. Therefore, the resulting user interface learning design aims to deliver an optimal and enjoyable learning experience for users.

Table 6. Design Concept Results

Sub Kategori	Concept 1		Concept 2	
	<i>Average</i>	0,0208	<i>Average</i>	0,0299
	<i>Range</i>	Elemeny Design	<i>Rage</i>	Elemeny Design
<i>Header Bar - Profile</i>	0,0021	NS	0,0262	NS
<i>Header Bar - Banner</i>	0,0021	NS	0,0262	NS
<i>Header Bar - FontStyle</i>	0,027	<i>Poppins</i>	0,0346	<i>Ubuntu</i>
<i>Header Bar - Font Main Color</i>	0,0281	Following the Logo Theme	0,0169	NS
<i>Header - Navigation</i>	0,0259	<i>Search-Yes</i>	0,0431	<i>Search-No</i>
<i>Header - NavigationIcon</i>	0,0021	NS	0,0262	NS
<i>Body Font Style</i>	0,027	<i>Poppins</i>	0,0346	Red Hat Display
<i>Body Font Main Color</i>	0,0281	Following the Logo Theme	0,0169	NS
<i>Menu Drawer Navigation – Icon Font Style</i>	0,0259	Icon Style Standard-No	0,0431	Icon Style Standard-No
<i>Main Page – Buy Bootcamp</i>	0,027	Item, Video, dan Sertificate	0,0346	Free Trial Class and Item
<i>Setings - Edit Profile</i>	0,0021	NS	0,0262	NS
<i>Settings - Language</i>	0,0281	Indonesia-English	0,0169	NS
<i>Setting – Account</i>	0,027	Account Google Apple ID	0,0346	Account Google

CONCLUSION

Ultimately, the user interface for the website-based e-learning platform is designed with 10 Kansei words in mind: modern, clear, simple, easy, informative, attractive, colorful, neat, balanced, and fun. E-learning design encompasses two key concepts that incorporate various design elements derived from the Kansei word. According to the findings from partial least square (PLS) analysis, concept one has an average value of 0.0208. It indicates that there are ten significant design elements derived from the word Kansei: simple, easy, informative, interesting, balanced, and fun. Moving on to concept two, it has an average value. 0.0299 to obtain seven significant design elements from the term Kansei: modern, clear, and colorful.

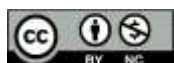
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