Understanding User Preferences for Music Player Elements: *A Kansei Engineering Approach towards Designing an Optimal Music Player*

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Abstract - *This research study explores the application and best practices of Kansei Engineering (KE) when User Interface (UI) design is created for a music player, with the aim of enhancing usability, user experience, and emotional and psychological visualization on the interfaces. The target group for this study is comprised of university students aged 18 to 25. Data collection was conducted using questionnaires, where participants were asked to rate various music player interface elements using Kansei words to capture their emotional responses. The analysis identified the most significant interface elements that strongly influenced user preferences and emotional experiences. The findings emphasize the significance of KE as an invaluable tool in selecting and modifying design elements based on user feedback and other crucial factors. By including KE principles into the music player UI design process, developers are able to create interfaces that resonate with the emotional and psychological needs of the users within the target group. This study contributes to the field of music player UI design by emphasizing the importance of user-centered design approaches and the integration of KE principles. The results provide valuable insights for designers and developers to create music player interfaces that deliver enhanced user experiences and emotional engagement.*

Keywords – *Kansei Engineering (KE), User Interface (UI), User Experience (UX)*

I. INTRODUCTION

Mobile applications are a type of application software that is specially designed to execute on Mobile devices such as Smartphones, Tablets etc. These mobile applications are generally small and individual software units, with limited functions that frequently serve similar services on PCs to users.

Application development is the process of developing applications for fulfill various operations by planning, designing, creating, testing and deploying the application. Among all the processing steps of application development, User Experience & User Interface (UXUI) engineering and design were estimated as decisive elements of the final result. In the modern software market, the users expect more visual and emotional satisfaction. But most times, the developers and designers do not give more attention to user requirements and user expectations that have to reach methodologically. They follow and use their opinions and experience to develop applications instead of the product that user wants to be. (Sanja *et al.*, 2022)

There are reasons that affect the applications negatively as lose of the users of the application at first sight. Experience of the users, colors, buttons, shapes, functions, looks that not satisfying the user is the one of those reasons. The developers and designers have to study the user's decision making, perception, attention, performance and cognition to affect ease of usage and integrate emotions of the user into the design of the final product. (Naeini and Mostowfi)

A survey confirmed that people use Music as a form of expression. (Soni, 2021) Human expressions play an important role in the extraction of an individual's emotional state. When focusing on music players, these apps are widely used by people who are aged below 40 years and university students use these apps to retrieve their entertainment purposes to reduce their stress because (Álvarez *et al.*, 2019) Music is an art form that soothes and calms the human brain and body. Modern Music player applications have extended new heights with new features such as Customizable User Interface, Intelligent Recommendations, Lyrics and Sing-along, Equalizer and Audio Enhancement, Sleep Timer, Car Integration and many more.

According to the study, the objectives of this research paper are, (i) Expanding the user experience of the functions in the music player application.

(ii) Make the music player application more tempting to the user to use it. By studying and using Kansei Engineering, the above objectives will be appraised and implemented systematically.

Media Player applications are the most used applications after social media applications and system applications. There are built-in media players and music players that are installed as part of the Operating System of the devices. As examples, in Android OS use Google Play Music and YouTube Music as music players, Apple iOS and macOS use Apple music and Windows use Groove Music as the music player application. Most people who use smartphones and mobile devices use built-in music players to listen to music various ways, using various types of methods and

some people use 3rd party music player applications to listen music.

When considering opinions of the users who use music player applications, they highly considered that they expect more weight on functions and features like display lyrics, playlist creation and support, download and save options, themes and colors, music categorization, equalizer etc. according to the survey. Most users have remarked that the user interfaces and some features are not user friendly and not easy to use and deal with it. Because of the most users download and use several music player applications and use those applications without a satisfied mindset.

To overcome this problem, redesigning user interfaces, redesigning the functions and features according to the user's emotions and (Nuzzolo) mood can be considered. To evaluate this study, KE techniques are used to expand and increase user experience, user's opinions, suggestions that accompany.

II. LITERATURE REVIEW

A. *Definition of Kansei Engineering*

Kansei, which is commonly referred to as "affective engineering" in English, is the Japanese word for "sensitivity." Kansei is interpreted as a person's subjective perception of their environment as it is perceived through their five senses. (Schütte, 2005)

The Japanese word kansei is used to describe one's feelings about an object, a circumstance, or an environment. Direct translation of Kansei into another language is challenging since it is so deeply ingrained in Japanese culture. Kansei, which has been given many diverse interpretations in numerous literary works, is typically used to allude to sensitivity, sensibility, feeling, and emotion.(*(PDF) Design & Emotion: the Kansei Engineering Methodology*)

In order to include human Kansei into product design and engineer the creation of things that consumers will enjoy and be satisfied with, kansei engineering blends the kansei and engineering domains (Lokman and Noor, 2006).

B. *Kansei Engineering Techniques*

The product's functionality and design improve along with its overall quality. In-depth user interviews, the development of questionnaire questions, and market trend research can all be used to clearly convert customer happiness into design parameters for products. (Bidin and Lokman, 2018)

One of the main reasons why most programs lose users at first glance is due to their experience with the looks, colors, and design of the application being less appealing. Therefore, all applications must incorporate emotion and usability into the design of the product in order to influence a user's decision-making, perception, attention, performance, and cognition. While focusing on functionality and usability while incorporating emotion into the program. (Hadiana, Permana and Tjahjadi, 2019) "Kansei Engineering" blends Kansei with the field of engineering to create goods that satisfy customer wants and preferences. Or to put it another way,(*ExpertKanseiWeb: A Tool to Design Kansei Website | SpringerLink*) KE is a technique in the area of user-centered ergonomics for product development. KE has been developed in several analytical methodologies up till now.

They are namely:

- Category Classification
- Kansei Engineering System
- Kansei Engineering Hybrid
- Kansei Collaborative Designing
- Virtual Kansei Engineering

i). *Choice of Participant Groups :* Participants for a sample group can be chosen from a set of people with similar behaviors or lifestyles. Since KE requires a homogeneous theme (since it discusses consistent emotional qualities and attributes), to perform the implementation, the business or the company has to research the market along with some segmentation principle to get the needed details on the specific criterion (specific emotional qualities desired by different customer segments) The gathered information can then be used to give insights to the design and development process, which ensures that the product or service resonates with the desired emotional experience and expectations of the target market. Participants can also be segmented using their age like it is done in this research, since age groups can have many different needs in comparison with other groups.

ii). *Selecting Kansei words :* Kansei words are a set of words that characterize the attributes of a certain product. These words are commonly in adjective form and can be gathered from any reputable source including books, periodicals, specialists, user guides and studies linked to Kansei. Otherwise, the developers can simply brainstorm to select a sufficient set of Kansei words. (Sanja *et al.*, 2022)

iii). *Rating-scale Types :* Visual Analogue Scale (VAS) and Likert scale are the two types of methods that are frequently used in KE. The Likert scale is more simpler and more widely used.[1] There are several types of Likert scales and it can be divided as Odd and Even. The most used type is Odd Likert scale. The most used types of Likert scales are Five-Likert scales, Seven-Likert scales and Nine-Likert scales.

iv). *Connecting the Kansei Words to product properties :* The identification of product attributes associated with each Kansei Word is a critical stage in KE, as it serves as the foundation for further research. There are two

methods commonly employed in this process: qualitative and quantitative. In KE Type 1, the qualitative approach is often used, where the connection between Kansei Words and product attributes is established based on intuitive understanding. Unlike Quality Function Deployment (QFD), which allows for explicit communication of such connections, the qualitative method relies on subjective interpretation. On the other hand, the quantitative approach utilizes statistical techniques such as fuzzy logic, neural networks algorithms, rough set analysis, and other tools to establish the linkages. These quantitative methods provide a more objective and structured approach to mapping Kansei Words to product attributes.

III. METHODOLOGY

This study was carried out in order to propose methods on how to use the UI elements can enhance the overall emotional experience of the users of a Music Player app. The team members used a brainstorming approach to determine the Kansei Words. Then a Questionnaire was prepared to gather the necessary information. The questions were formed in a manner such that they capture the emotional and sensory responses of the participants. The questionnaire included Likert scale questions, semantic differential scales, and open-ended questions to gather both quantitative and qualitative data. The targeted group was a group of 100 university students. The sampling method used in the study was convenient sampling.

- Age : 18-21 years - 25%
  21-25 years - 75%
- Gender : Male - 61%
  Female - 39%

Then testing for validity and reliability was done on the collected Kansei Words. The Kansei words were clustered and then further processed to create the product concept. Some current mobile music applications were chosen as specimens for the Kansei evaluation session. In the first stage of this research (based on the influence they make to create an ideal music player app) The Kansei words are rated against the psychological reactions the users experience with the specimens.

i). *Kansei Words used in the study :* The research created a Semantic Differential (SD) Scale for each Kansei Word that ranged from 1 to 5 points to be utilized as a measurement tool during the Kansei evaluation session. For the purpose of providing their Kansei answers to the specimens into the Kansei measuring apparatus, more than 100 consumers were chosen. So, after analyzing the Kansei engineering techniques created the suggested User Interface design for the music application.

Kansei Words used in the study are,

- Energetic
- Exuberant
- Joyful
- Relaxing
- Intimate
- Romantic
- Nostalgic
- Playful

IV. RESULTS AND DISCUSSION

The study's analysis and synthesis of the observations have been employed to assess various aspects of the music player user interface (UI) by applying the concepts and methodologies of KE. Through the implementation of KE principles, the groundwork has been laid for a customer-centric experience in the interfaces developed as a result of this study. This approach has allowed for the integration of user-desired emotional and psychological elements into the music player UI, enhancing the user experience and creating personalized and engaging interfaces.

The users were asked to rate their ideal music player against the Kansei words and here are the results obtained are indicated in Table 1.

i). *Importance of the Color Schemes :* The users were asked to rate the importance of the color schemes in conveying the intensity of the feeling reflected by the Kansei words. We used sample figures of UIs to test the emotional response of the users. The average results on how important the users think each color scheme conveys the corresponding feeling are indicated in table 1.

Table 1 - Responses recorded for Kansei Words

Kansei Word	Rating	Response	Kansei Word	Rating	Response
Energetic	1	11%	**Romantic**	1	10%
	2	16%		2	20%
	3	**29%**		3	**32%**
	4	22%		4	22%
	5	22%		5	16%
Exuberant	1	9%	**Nostalgic**	1	13%
	2	16%		2	19%
	3	**30%**		3	**32%**
	4	23%		4	16%
	5	22%		5	20%
Relaxing	1	13%	**Playful**	1	10%
	2	9%		2	18%
	3	23%		3	**36%**
	4	11%		4	11%
	5	**45%**		5	25%

ii). *The Quick Access Bar :* A music player app's quick access bar is critical since it gives consumers quick and easy access to key functions. It acts as a central control point that enables users to easily browse their music library, manage playlists, and manage playing. The fast access bar improves user experience and speeds up music listening by putting frequently used features like play, pause, skip, and volume control within easy reach. Users no longer need to shift through menus or screens because it offers a simple and clear interface. The fast access bar enhances the app's general usability, making music lovers find it easier to use and more pleasurable. The results obtained are indicated in Chart 1.

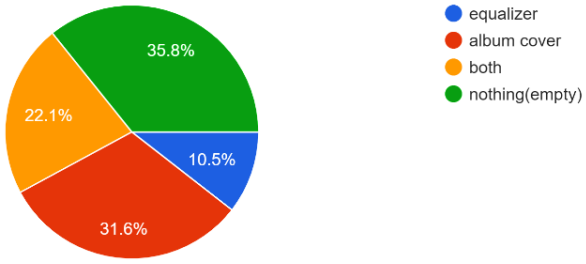

Chart 1 – Preferences of the Quick Access Bar

According to the data a majority of the users have accepted that they prefer the quick access bar to be located at the bottom of the screen. The results obtained are indicated in Chart 2. When the iconography is considered a majority of users have indicated that they are convenient with simple rounded buttons. The results obtained are indicated in Chart 3.

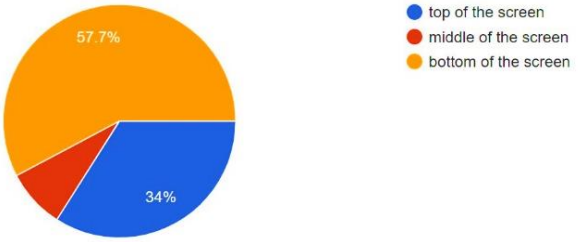

Chart 2 – Location of the Quick Access Bar

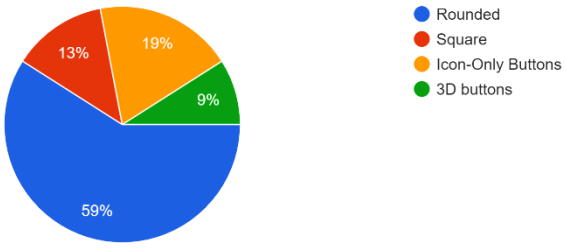

Chart 3 – Preferred button type of the Quick Access Bar & the application

According to the data a majority of the users prefer Play/Pause button and the Skip Forward button to be located at the quick access bar. Play/Pause button is the most used button of the music players by the users. The results obtained are indicated in Chart 4.

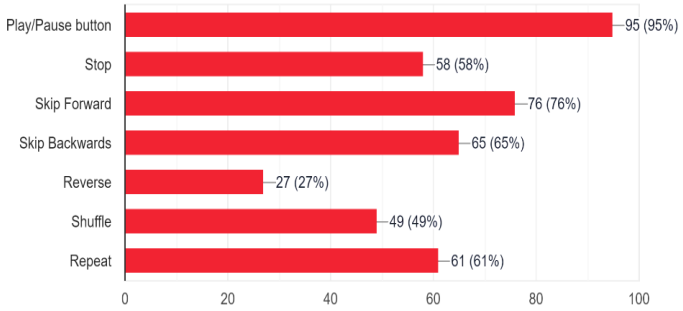

Chart 4 – Most used and preferred buttons for the Quick Access Bar

iii). *Features :* According to the data collected, the majority of the users prefer features such as playlist creation and support, Lyrics, Download and Save option, Music categorization and etc. Chart 5 depicts the data that users are highly recommend and expect to a music player application.

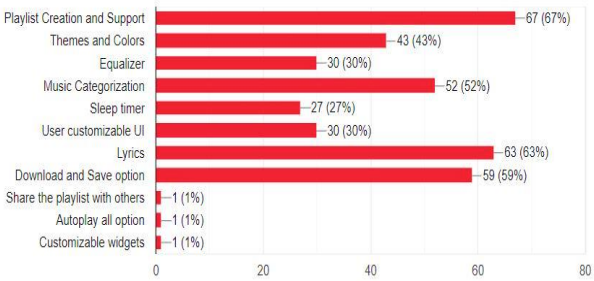

Chart 5 – Features that users prefer for the Music Player Application

iv). *Music Player Applications :* People have used several music players for fulfill their entertainment purposes according to the chart 6. According to the collected data, Spotify is the most used Music player application. According to the data, we have discovered that Spotify have contain the most preferred features that the users

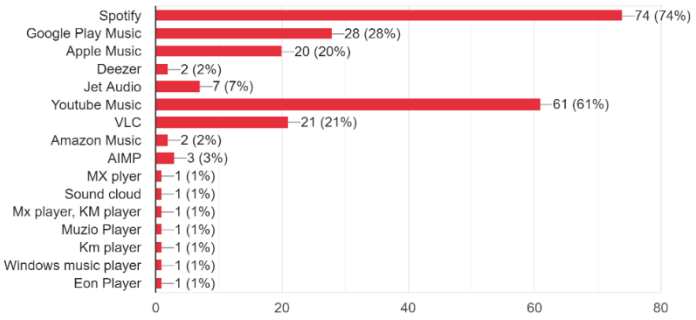

Chart 6 – Most used Music Player Applications

expected in Music Player Applications. Spotify have focused on the features that most users prefer when they are developing the application to became highly using Music Application in the world.

V. CONCLUSION

Based on an exploratory study investigating the use of Kansei Engineering (KE) and best practices in the context of user interface (UI) design for music players, the findings reveal valuable insights into its use, user experience, and emotional engagement in interactions have been improved The study specifically targeted university students aged 18 to 25, while measuring their use of music programs greater in their daily lives.

Through data collection using questionnaires, participants were asked to rate various aspects of musicians' interactions using Kansei terms, their emotional responses were captured. The study identified interface elements that significantly influenced user preferences and emotional experiences. These findings highlight the importance of KE as a valuable tool for selecting and modifying design features based on user feedback and other important factors.

By incorporating KE principles into the music from the UI design process, designers can create interfaces that match the emotional and psychological needs of the target user group this user-centered design approach this helps to enhance the user experience, and the emotional engagement of music product interactions.

The study highlights the importance of considering the user interface and incorporating KE principles into music player UI design, providing practical guidance for designers and developers to create interfaces that provide a flowing experience the use of faces gets emphasized. By incorporating these findings, designers can create music player interfaces that not only meet functional requirements but also provide users with positive emotional and cognitive responses

Overall, this study highlights the importance of user-centered design methods and their application to KE principles.

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