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Service room design for improving service quality of Utsman bin Affan library Universitas Muslim Indonesia with Kansei Engineering approach

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Abstract

A student can study well if there is a good place to study as well. Likewise with reading, a person needs concentration to read. Service room design is necessitated in the reading room because it affects one's reading comfort. Utsman bin Affan library UMI Makassar is a place for students to study. Students' complaints and problems that are experienced when using the library service room are in the form of uncomfortable facilities, no closed rooms, and other complaints. In reference to these problems, a study was carried out in accordance with the students' complaints by employing Kansei Engineering approach. Kansei Engineering is a consumer-oriented ergonomic technology which enables the consumer's image or feeling to unite with the service design process of a product. By utilizing this method, product strategy and concept creation in the design of a product or service can be determined. The final results of Utsman bin Affan UMI Makassar library service room which was obtained based on the Kansei Engineering method are an open service room, large display, reading room, multimedia room, collection room, green and white colors, 3D motif and glossy texture. In addition to the main specifications of the library, there is also an additional item supporting the service room, which is a partition made of glass that gives the impression of being open to the room although it is still divided into different spaces.

Keywords: Kansei Engineering; Kansei Word; Service Design; Factor Analysis

1. Introduction

In facilitating education, there are many ways that we can do, one of which is reading more books in the library [1]. Information and communication technology-based libraries with library development are the demands of libraries in meeting the needs of the times. Libraries must have changed their physical form into non-physical or digital forms that can be accessed anywhere and anytime by the public. One thing that must be considered in the library is the reading room [2]. Performance measurement indicators for the customer perspective are required to measure library performance. Identification of performance indicators is an important factor in performance management because KPI (Key Performance Indicator) is a measure to periodically review the progress of an organization towards their goals and can be used to measure performance on an ongoing basis [3]. In this respect, a study will be conducted to develop a service room design at the Utsman bin Affan library that is in accordance with the complaints of students using Kansei Engineering approach. [4].

The complaints include seating comfort, table comfort, no closed room, and many others [5]. Therefore, facilities are demanded to support the continuity of the teaching and learning process such as study desks and study chairs. However, when writing activities are carried out using study desks and chairs, students tend to lean forward, bend down and dangle their feet. Ergonomic product evaluation must be adjusted to sequential use [6].

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In order to produce an optimal arrangement of library service spaces and to support the smooth functioning of the library as a service provider institution, librarians should pay attention to several aspects, which include functional aspects, psychological aspects, and aesthetic aspects [7]. In addition to the objectives of the library layout that must be achieved, it is also necessary to pay attention to spatial factors so that the arrangement and utilization of the spaces can be well organized, which cover the distance factor, the service space connection factor, and the service space utilization factor [8]. Basically, even the simplest library must have a number of rooms that have different functions. In other words, a library has a basic space, which is the minimum requirement of every library. Without space separation, the library will not be able to run properly. The minimum spaces that a library must have include a library building, collection room, reading room, staff room, and technical workspace. [8].

Since the establishment of Universitas Muslim Indonesia on June 23, 1954 as a private university, it has been under the coordination of Kopertis Region IX and Kopertis Region VIII. Universitas Muslim Indonesia is located on campus I Jalan Kakatua No. 27 Ujung Pandang. With the inauguration of the three-floor library building by the Director of Private Higher Education, Prof. Dr. Yuhara Sukra, the library was later given the name "Utsman Bin Affan Library, Universitas Muslim Indonesia." In 1994, UMI library utilized an automated computerized system with Sipisis program which aims to facilitate its service to the library users. In 2014, UMI Library implemented a new program as an automation system in the library, i.e., SLiMS (Senayan Library Management System) program, which was modified to suit the needs of the library. In the article entitled "Factors influencing users' satisfaction and loyalty to digital libraries in Chinese Universities", it was emphasized that a librarian must strengthen the communication (interaction) with users and manage user experience data as an evaluation material to improve service quality [9].

Kansei engineering refers to the expression of a product or circle, in which the emotions and images of the product have been stored in one's mind. For example, the expression that "the product is special" or "the product has a youthful style" is a Kansei Engineering impression in the form of an adjective, although it can also be a noun. In the field of design, Kansei is one of the most important elements that bring the will or power to create something [10].

One of the databases owned by Kansei Engineering is the Kansei database (Kansei word database). Kansei Words used in new product domain are collected from related system magazines. The products developed using Kansei Engineering or what commonly called Kansei products do not have to be expensive or have high technology because the desires and emotions of consumers are translated both in the form of functions and in the form of products. Kansei words are obtained from the results of a questionnaire [11]. For the service room design of the Ustman bin Affan library UMI Makassar, a software that can help and facilitate the validation of the implementation data is SPSS (Statistical Package for the Social Sciences) 25.0. SPSS (Statistical Package for the Social Sciences) 25.0 is a program that is used for processing statistical data on Kansei Word data from library users.

2. Methodology

2.1. Time and Place of Research

The research was carried out in September - November 2020 at Utsman bin Affan library of UMI Makassar at Campus II UMI Jl. Urip Sumoharjo KM 5 Makassar City, South Sulawesi Province.

2.2. Data Processing

The data processing in this research used Kansei Engineering type-I method or the method of determining a person's image which is translated into a product by:

- Identifying the target, i.e., for whom this product will be given. The target can be determined by several experts of a product or from the results of a marketing survey.
- Determining the product concept, which will be made for further development by observing the existing conditions or asking directly to those who will use the product.
- Dividing the product concept into several levels to identify the characteristics of a design that will be made. The characteristics of a product can be in the form of function, shape, and size.
- Mapping the physical design characteristics in the form of a tree diagram that has many branches at the bottom. At this step, the product characteristics start to be visible, for example light weight, easy to carry, and bright in color.

- Translating the specifications, i.e., physical design characteristics into technical specifications. This step is useful to help users perform things easier with the product that is created.

3. Results and discussion

3.1. Kansei words

Table 1 Collection of Kansei Words

No.	*Kansei* Words	No.	*Kansei* Words
1	Comfortable	74	Minimalist
2	Beautiful	75	Tranquil
3	Natural	76	Colored
4	Warm	77	Interesting
5	Tranquil	78	Fragrant
6	Minimalist	79	Bright
7	Cool	80	Cool
8	Accessible	81	Complete
9	Comfortable	82	Cool
10	Minimalist	83	Tranquil
11	Bright	84	Safe
12	Quiet	85	Comfortable
13	Comfortable	86	Fragrant
14	Clean	87	Tranquil
15	Neat	88	Cool
16	Elegant	89	No queue
17	Organized	90	Accessible
18	Neat	91	Pretty
19	Cool	92	Comfortable
20	Minimalist	93	Comfortable
21	Comfortable	94	No student card
22	Tranquil	95	Versatile
23	Cool	96	Clean
24	Bright	97	Neat
25	Multifunctional	98	Tranquil
26	Tranquil	99	Flexible
27	Patterned	100	Cool
28	Interesting	101	Magnificent
29	Painting	102	Fragrant
30	Tranquil	103	Comfortable
31	Cold	104	Fragrant
32	Comfortable	105	Comfortable
33	Many rooms	106	Clean
34	Warm	107	Fragrant
35	Cool	108	Tranquil
36	Gratis	109	Comfortable
37	Tranquil	110	Cool

38	Lack of books	111	Gratis
39	Comfortable	112	Natural feel
40	Wide	113	Sunny
41	Fresh	114	No queue
42	Natural	115	Livelier
43	Modern	116	Neat
44	Tranquil	117	Clean
45	Cool	118	Colored
46	Complete literature	119	Renewable
47	Comfortable	120	Elegant
48	Multifunctional	121	Not much garbage
49	Modern	122	Neat
50	Tranquil	123	Lack of literature
51	Clean	124	Queue
52	Neat	125	Must use library card
53	Cool	126	Fresh
54	Tranquil	127	Interesting
55	Friendly	128	Colorful
56	Fragrant	129	Multifunctional
57	Minimalist	130	Beautiful to see
58	Free in and out	131	Open
59	Insulated	132	Hot
60	Not noisy	133	Informative
61	Bright	134	Quiet
62	Warm	135	Magnificent
63	Clean	136	Resting place
64	Clean	137	With ID card
65	Comfortable	138	Livelier
66	Cool	139	Neat
67	Fragrant	140	Fast
68	Simple	141	No queue
69	Gratis	142	Hot
70	With lamp	143	Must pay
71	Cool	144	Informative
72	Open	145	Colored
73	With special room	146	Fragrant

The identification of Kansei words was carried out by distributing questionnaires to 60 respondents who had visited the Utsman bin Affan Library. Based on the questionnaires filled out by 60 subjects, 146 kansei words were obtained. Those one hundred and forty-six (146) kansei words obtained from respondents online were then selected by conducting a frequency test in which they will be grouped with the same repeated words. After that, the kansei words were eliminated by selecting the highest number of frequencies of Kansei words based on the selection of respondents. However, in this elimination stage, the researcher had the right to input the kansei word which was less chosen by the respondents, but was deemed more suitable for designing the service room design of the Utsman bin Affan Library.

Table 2 Selected Kansei Words with the Same Meaning

No	Selected *Kansei* Words with the Same Meaning
1	Comfortable
2	Tranquil
3	Multifunctional
4	Cold
5	Bright
6	Neat
7	Colored
8	Magnificent
9	Natural
10	Livelier
11	Free
12	Beautiful

One of the databases owned by *Kansei* Engineering is the *Kansei* database (*Kansei* word database). *Kansei* Words used in the new product domain are collected from the related system magazines.

Table 3 Kansei Word Pairs

No	Opposite *Kansei* Words	
1	Comfortable	Uncomfortable
2	Tranquil	Noisy
3	Multifunctional	Monofunctional
4	Cold	Hot
5	Bright	Dark
6	Neat	Messy
7	Colored	Plain
8	Magnificent	Simple
9	Natural	Artificial
10	Livelier	Boring
11	Free	Not free
12	Beautiful	Common

After collecting the *Kansei* words obtained based on field observations and interviews, the next step was making Semantic Differential I which was used as a Kansei questionnaire and then implemented into product design.

Table 4 Semantic Differential Questionnaire

Words	Differential Semantic Scale							Words
	1	2	3	4	5	6	7	
Comfortable								Uncomfortable
Tranquil								Noisy
Multifunctional								Monofunctional
Cold								Hot
Bright								Dark
Neat								Messy
Colored								Plain
Magnificent								Simple
Natural								Artificial
Livelier								Boring
Free								Not free
Beautiful								Common

Semantic differential data collection was carried out in 2 stages, i.e., semantic differential I data collection and semantic differential data collection II. The first semantic differential data collection was carried out to test Kansei words by means of validity and reliability tests. Meanwhile, the second semantic differential data collection was carried out to select the product designs based on conjoint analysis and factor analysis.

3.2. Validity and Reliability Tests

The data is declared valid if the kansei word tested in the questionnaire can describe the product image. The data processing was caried out by using SPSS 25.0 software.

Table 5 First Validation Test

No	Kansei Words	Value	Note
1	Comfortable	0.748	Valid
2	Tranquil	0.647	Valid
3	Multifunctional	0.602	Valid
4	Cold	0.665	Valid
5	Bright	0.776	Valid
6	Neat	0.810	Valid
7	Colored	0.635	Valid
8	Magnificent	0.652	Valid
9	Natural	-0.089	Not Valid
10	Free	0.757	Valid

In the first validation test stage, 1 kansei word which was declared invalid was then removed. The other 11 kansei words that were previously declared valid were then tested for their validity again.

Table 6 Second Validation Test

No	Kansei Words	Value	Note
1	Comfortable	0.743	Valid
2	Tranquil	0.646	Valid
3	Multifunctional	0.587	Valid
4	Cold	0.657	Valid
5	Bright	0.790	Valid
6	Neat	0.832	Valid
7	Colored	0.663	Valid
8	Magnificent	0.679	Valid
9	Free	0.762	Valid
10	Livelier	0.486	Valid
11	Beautiful	0.592	Valid

The results of the second validity analysis above show that the 11 selected kansei words have met the validity standard, which was > 0.30. This shows that the 11 kansei words have uniformity of data and can be used in this study. The next stage was reliability analysis to see the adequacy of research data.

Table 7 Reliability Test Result

Reliability Statistics	
Cronbach's Alpha	**N of Items**
0.879	11

The result of the reliability test showed the Cronbach's Alpha value of 0.879 which means that this data is reliable because it was > 0.7.

Before carrying out further data processing, the data first had to be checked to determine the adequacy of the data. Knowing whether the data is sufficient or not can be carried out through the data adequacy test. The data is considered sufficient if the result of the adequacy test shows N' < N. If the data is sufficient, then there is no need to add other data anymore. However, if the result of the data adequacy test is N' > N, it means that the data is not sufficient. In order for the data to be sufficient, additional data are added because the existing data are not sufficient to be used as a population sample.

Based on the data processing above, the result showed that N' was 28.09. Therefore, the data is declared sufficient because the value of N' (28.09) < N (60).

3.3. *Kansei* Words Based on KBBI (The Great Dictionary of the Indonesian Language)

Table 8 Kansei Words Based on KBBI

No	Kansei Words	Definition
1	Comfortable	Fresh, healthy, pleasant, cool, good
2	Tranquil	Not nervous, not anxious, not messy, not noisy, safe and calm (feeling, situation)
3	Multifunctional	Having many tasks/functions
4	Cold	Low temperature, not hot, cool
5	Bright	Emitting light, shining (lamp, sun)

6	Neat	Good, organized, clean, nice
7	Colored	Impression to eyes from light, pattern
8	Magnificent	Impressive (because of the hugeness or beauty)
9	Free	Not disturbed, can move, do, etc.
10	Livelier	Still existing, moving, and working as it should
11	Beautiful	Nice to see, pretty, lovely

3.4. Initial Design

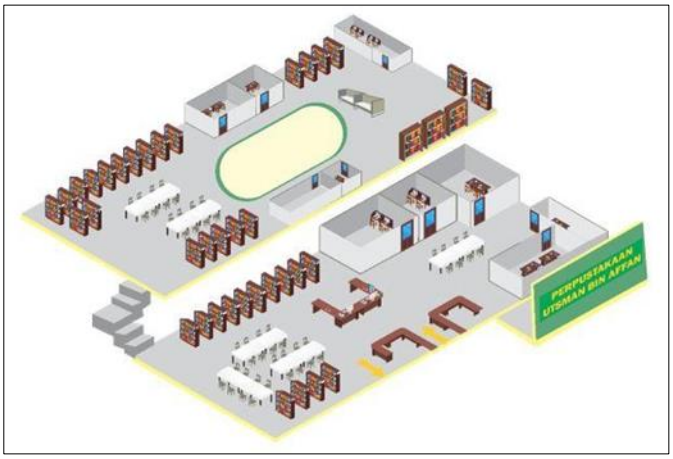

Figure 1 Initial Layout of the Library

Table 9 Area of space required

Number of Students	Space Area (m2)
+ 1,000	200
1,000 – 2,500	500
2,501 – 5,000	1,000
5,001 – 7,500	1,500
7,501 – 10,000	2,000
10,001 – 20,000	4,000

The number of Indonesian Muslim University Campus II students for the 2020/2021 academic year was 4500 students (berita umi.ac.id).

3.5. Rooms

The library room is based on national library standards, which are:

- Collection Area (information literacy, writings, journals, etc.) 45%
- User Collection Area (reading and studying) 25%
- Work Areas (administration, circulation services) 10%
- Other Areas (discussion area, creative activity area, etc.) 20%

3.6. Items and Categories

The determination of items and categories served to form a combination of product samples that were used in the Semantic Differential II questionnaire. There were several processes in determining the formation of product designs in this study, i.e., by using the morphological chart method.

Table 10 Initial Layout of the Library

Items and Categories			
No	Item	No	Category
1	Shape	1	Opened
		2	Closed
2	Appearance	1	Big
		2	Small
3	Rooms	1	Reading room, resting room, collection room
		2	Reading room, multimedia room, collection room
		3	Reading room, discussion room, collection room
4	Colors	1	Dark green and white
		2	Yellow and white
5	Motifs	1	3 Dimension
		2	2 Dimension
6	Texture	1	Glossy
		2	Soft

The determination of combinations and stimuli was carried out on each design element that had been grouped. The aim was to provide an assessment of the suitability or relationship between designs that had been formed in the combination of stimuli. The determination of the combination of these design elements utilized orthogonal design in the latest SPSS 25.0 software.

The product samples given to the respondents were 16 samples. The product samples were displayed in the form of images that were suitable with the specifications of each sample. The second questionnaire also used 7-point Semantic scale with the same order as the first questionnaire.

3.7. Proposed Space Design

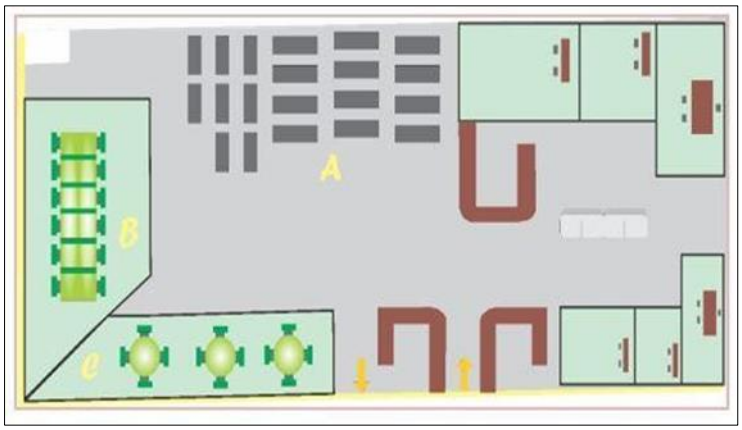

Figure 2 First Floor Room Design

According to the picture above, then the concept obtained was to make a service room design with a total of 3 rooms based on the expectation of students and visitors.

3.8. Space Design Specifications

The library reading space is designed in a room with a composition of 25%.

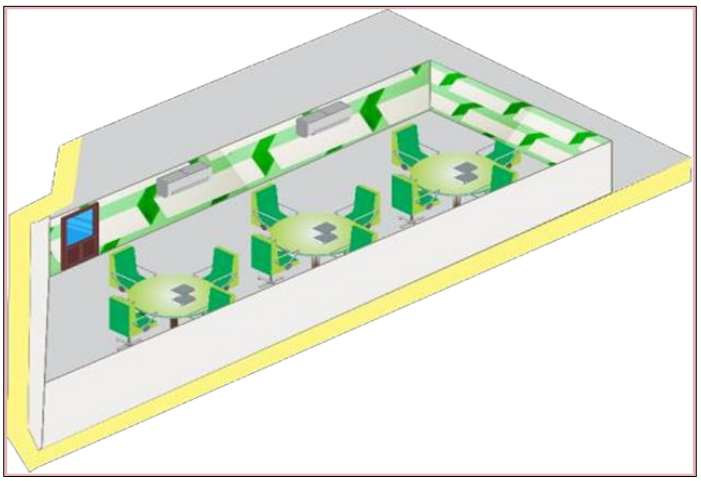

Figure 3 Reading Room

The multimedia room that supports the learning process is designed with a composition of 20%.

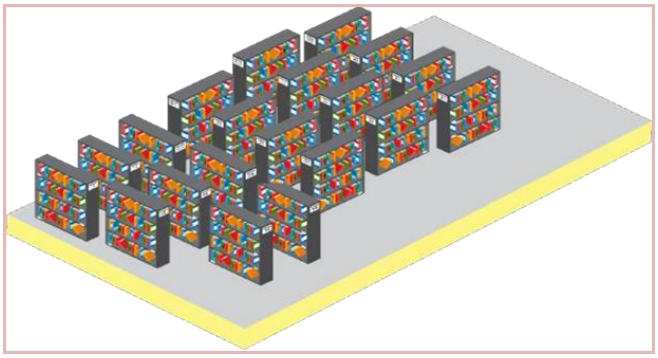

Figure 4 Collection Room

Library material collection room that has been managed with a composition of 45%.

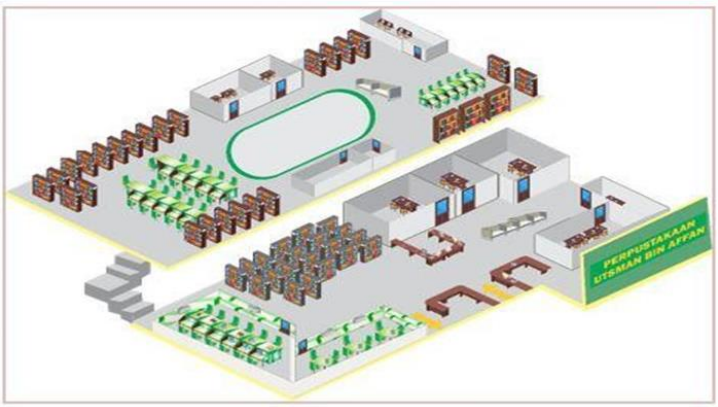

Figure 5 Overall Design

The design specifications are based on conjoint analysis of the open-shaped design of the building with a large display in the room. In addition, the room has 3 rooms (reading, multimedia and collections) with green color combined with white and 3D motifs. Therefore, the impression is livelier and the added glossy texture gives shiny and bright effect.

4. Conclusion

- Based on the results of the identification of Kansei words, the expectation of students or visitors to the Utsman bin Affan library service room are comfortable (0.743), quiet (0.743), multifunctional (0.587), cold (0.657), bright (0.790), neat (0.832), colorful (0.663), magnificent (0.679), free (0.762), livelier (0.486), and beautiful (0.592).
- Based on the results of the Kansei engineering analysis, the shape design for the chair is to have a height of 45 cm, a width of 45 cm and a depth of 45 cm, for the typing table is to have a height of 75 cm, a width of 230 cm and a depth of 100 cm, for the reading table is to have a height of 75 cm, a width of 100 cm and a depth of 50 cm, and for collection shelves is to have a height of 130 cm, a width of 100 cm, a depth of 20-21 cm and a thickness of 2 cm. The service room, which consists of 25% reading room, 20% multimedia room and 45% collection room, has specific colors with a combination of green and white, 3 dimensional patterned walls, and glossy (shiny) color texture.

Recommendations

- It is expected that the library management can better understand the needs of students or library visitors on the service room side in order to improve the quality of service. It is also expected that the library management can use the service room design that has been proposed in this study.
- Students, visitors and readers are expected to maintain the room and use it according to their needs to maintain cleanliness and tidiness. It is expected that the next research regarding the application of Kansei engineering method can add other supporting methods for the perfection of the research and find more sources.

Compliance with ethical standards

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Disclosure of conflict of interest

All authors in the making of this scientific article have no conflict of interest.

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