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Design of The Kansei Board Game to Motivate the Elementary School Student in Learning English

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Abstract. English is one of the widely used international languages for communication among the nations. Therefore people needs to master the language both in speaking as well as writing and reading. In Indonesia, the mastery of this foreign language is still poor. Thus it is imperative to teach students this language since the elementary school. But, at this time the existing methods of teaching and learning process in the school has not been able to produce the expected quality. Even many students are not interested to learn it. 64% of the students score are below standard, and 67% of the students are not motivated to study hard. The objective of this study is to develop the Kansei Board Game to improve student's motivation in learning English effectively. Kansei Engineering Type 1 method is used to determine design specification based on user's feelings and emotions. A survey was conducted to identify the words of Kansei, while a statistical analysis is used to validate the hypotheses of the proposed design. The study showed that the method for teaching and learning process by using the Kansei board games is valid to meet user criteria and can increase motivation for students in learning English.

Keywords: kansei engineering, board game, learning process, motivation.

1. Introduction

English is an international language used by various nations for ease of communication worldwide weather formally or informally in all walks of life [1]. In English there are four aspects of skills to possess by the students such as listening, speaking, reading, and writing. Listening and reading concerns with the process of receiving, whereas, writing and speaking deals with a production process, or another word, output [2]. This reality encourages people to excel at speaking, writing listening and reading in English.

Based on the regulation of the Minister of National Education no 22/2006, the objectives of teaching are: (1) Developing communication competence in limited oral form to accompany action in the school. (2) Having awareness of the nature and language to improve the nation's competitiveness in the global community [3]. Thus, it is very important to master English for Indonesian people through learning process since early stage.

However, currently in Indonesia, English is quite unpopular because many people have no English proficiency Based on the preliminary studies, it was found that 64% of students 'grade are still below standard of national grade score and 67% of students are not motivated to study hard. This fact shows that motivation of students in learning English is low.

[4] Revealed that children in elementary school prefer picture, fairy tales, and game to other media



for learning English. But a previous study also discloses that the most interesting learning method is a game [5]. Meanwhile [6] explained that game is very helpful to motivate students in expressing their opinion with English and to be more active, autonomous, and energetic. Furthermore [6] advised that games should have some characteristics such as fun, easy to use, attractive, encouraging, and easy to practice. Thus board games are the most popular tools for students to learn English effectively and efficiently as what [7] developed on the board game to increase speaking ability.

The objective of this study is to develop the Kansei board game to motivate the elementary student to learn English effectively.

2. Research Method

2.1 Survey

The survey was conducted by distributing questionnaires to 30 elementary school students of between 10- up to 12-year-old. They consist of 19 males and 11 females. This survey aims to identify the Kansei words about the attributes of board game that they are looking for.

2.2 Apparatus

Some tools are used to support the study. They are:

1. Questionnaire was developed into three parts. First part is to identification of Kansei words. Second is to determine the physical design specification. The last part is to validate the proposed design.
2. Anthropometer. This tool is to measure the body dimensions.
3. IBM SPSS software version 22 is used to process statistical data.
4. Solid work Software is used for designing a virtual prototype of the board game.

2.3 Kansei Engineering Method

Kansei Engineering (KE) is used as a Method to determine some specification based on user's feelings and emotions and to incorporate them into product design [8].

In this study, we used Kansei Engineering Type 1. This method solves product problems into more detailed concepts to several levels, and is defined into the physical design of product (see figure 1) [8].

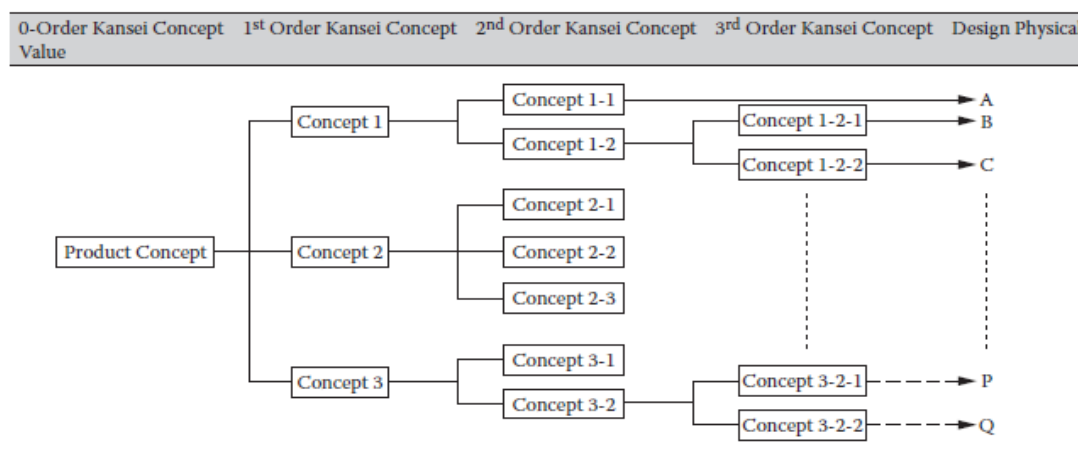


Figure 1. Conceptual map of Kansei Engineering Method Type I.

Steps KE type 1 as follow:

1. Identification of target.
2. Determination of Product Concept.
3. Breaking Down the Product Concept.

4. Deployment to Physical Design Characteristics.
5. Translation to Technical Specifications

2.4 Anthropometry

Anthropometry is the study of the dimensions and certain other physical characteristics of the human body. Anthropometry measurements are a critical element use in equipment and workplace/ work-space in their design [9].

The determination of anthropometric dimension in this study was done when Kansei process number 2 (collecting the word Kansei) was completed. Thus, designing the board game on the grip section for the board game in this study required body dimensions such as FW (finger width) and PW (palm width).

To achieve an appropriate fit between the operator and the design it requires steps in anthropometric processing as follow [9]:

1. Define the equipment's potential user population.
2. Choose the proportion of the population to be accommodated by the design.
3. Determine the body dimensions important in the design.
4. Determine the percentile values of the dimensions.
5. Determine the type of clothing and personal equipment worn by the users.

2.5 Statistic analysis

Non-parametric statistical analysis was implemented in this study. Cronbach Alpha was used to test reliability [10] while Spearman's correlation was employed to test the validity of Kansei words [11].

Furthermore, to calculate the normality in the body dimensions resulted from anthropometry Kolmogorov - Smirnov was used to know the data required and the dimensions of normal data so that it can be used.

Test of Marginal homogeneity analysis was used to validate Kansei word with board game suggestion design. Descriptive non parametric statistical evaluates usability and motivation of students [11].

3. Results and Discussion

3.1. Result of Survey

Based on the survey that was conducted in the preliminary study, it lead to 7 Kansei words that presented consumers voices. It was tested by using fault tolerance of 5% as mentioned in table 1.

Table 1. Kansei words need to break down.

Selected Kansei Words	Description	Validity Score	Reliability Score
Pull	Interesting shape.	0.640	0.805
Unique	Fiture offered that differentiates from previous product.	0.851	0.798
No Noise	Produce noisy sound when heard (dB).	0.728	0.797
Comfortable	Provides comfort when used, in model form.	0.851	0.797
Easy to carry	Models have a mild impression.	0.869	0.865
Easy to clean up	Easy to clean up after playing	0.654	0.806
Strong	Using quality materials	0.851	0.792

Appointment on r- table. Data are valid if r calculation > 0.361 and data are reliable if Cronbach's Aplha > 0.6.

3.2. Result of Mapping Process for Design

Table 2. Pull Mapping Concept.



Kansei Word	Sub Concept Level 1	Sub Concept Level 2	Sub Concept Level 3	Sub Concept Level 4	Design Specification
Pull	Have design Motif	Classic Motif	Wood	Button Part, Body case, drawer part	Classic Motif for Button Part, Body case, drawer part 
	Have design color	Classic color	Wood	Button Part, Body case, drawer part	Classic color for Button Part, Body case, drawer part.
	Have design shape	Body Case	Box	Size 30 cm x 17 cm	Bodycase shaped box size 30 cm x 17 cm. 

Table 3. Unique Mapping Concept.

Kansei Word	Sub Concept Level 1	Sub Concept Level 2	Sub Concept Level 3	Sub Concept Level 4	Design Specification
Unique	There is a place to make a sound	Speaker	Type of sound	Mezzo-soprano (Tone voice medium)	Mezzo-soprano (Tone voice medium). [12].

Table 4. No Noise Mapping Concept.

Kansei Word	Sub Concept Level 1	Sub Concept Level 2	Sub Concept Level 3	Sub Concept Level 4	Design Specification
No Noise	Decibels (medium)				1000 Hz (30 dB). [12].

Table 5. Comfortable Mapping Concept.




Kansei Word	Sub Concept Level 1	Sub Concept Level 2	Sub Concept Level 3	Sub Concept Level 4	Design Specification
Comfortable	The latest Boardgame buttons are easy to use.	Easy button pressed.	Shape	Round	Button round shape diameter size 2.2 cm and thickness 3 mm. 
	The latest Board game posts easy to read.	Font type	Times New Roman		Type Times New Roman. 
		Font Size	10		Font Size 10
	Handle design.	Shape	Box	Size Length 9 cm, Width 2 cm	Design the handle of the box shape Size Length 9 cm, Width 2 cm. 

Table 6. Easy to carry Mapping Concept.


Kansei Word	Sub Concept Level 1	Sub Concept Level 2	Sub Concept Level 3	Sub Concept Level 4	Design Specification
Easy to carry	Weight Body Case	Medium weight	500 gram - 1 Kg		500 gram - 1 Kg.
	Shape Board game	Box			Board game shaped box. 

Table 7. Easy to clean up Mapping Concept,





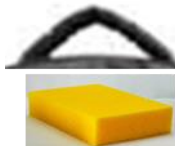
Kansei Word	Sub Concept Level 1	Sub Concept Level 2	Sub Concept Level 3	Sub Concept Level 4	Design Specification
Easy to clean up	How to Spruce Up	The latest board game can be folded.	Lots of folds	Fold 2	Board game folded. 
		The latest board game is a place to store dice (drawer)	Drawer	Easy to open and close	Size 5 x 5 cm (drawer) box shape. 

Table 8. Strong Mapping Concept.

Kansei Word	Sub Concept Level 1	Sub Concept Level 2	Sub Concept Level 3	Sub Concept Level 4	Design Specification
Strong	Body Case	Body case made of Wood material.	Plywood teak	Thick 3 mm	Body case made of plywood material with a thickness of 3 mm. 
	Button	Button made of Wood material	Plywood teak	Thick 3 mm	Buttons made of plywood material with a thickness of 3 mm. 
	Handle	The handle is made of foam material	Foam PC	Thick 2 mm	The handle is made of PC foam material with a thickness of 2 mm. 

3.3. Result of the Specification Design

1. Design specification for Pull design of board game are: having a Classic Motif and Classic color for Button Part, Body case, drawer part, Body case shaped box size 30 cm x 17 cm.
2. Design specifications for unique design are; having sound type Mezzo-soprano (Tone voice medium).
3. Design specifications for No noise design are 1000 Hz (30 dB).
4. Design specification for comfortable design are Button round shape size 2.2 cm and thickness 3 mm, Type Times New Roman Font size 10, Design the handle of the box shape Size Length 9 cm, Width 2 cm.

5. Design specification for Easy to carry design are Weight Body Case 500 gram - 1 Kg, board game shaped box. Design specifications for Easy to clean up design are Board game folded the two, Size drawer 5 x 5 cm box shapes.
6. Design specification for Strong design are Body case and Buttons made of plywood material with a thickness of 3 mm, The handle is made of PC foam material with a thickness of 2 mm.

3.4. Virtual Concept Design

The last step is constructing board game virtually, for overall design is presented on figure 2.

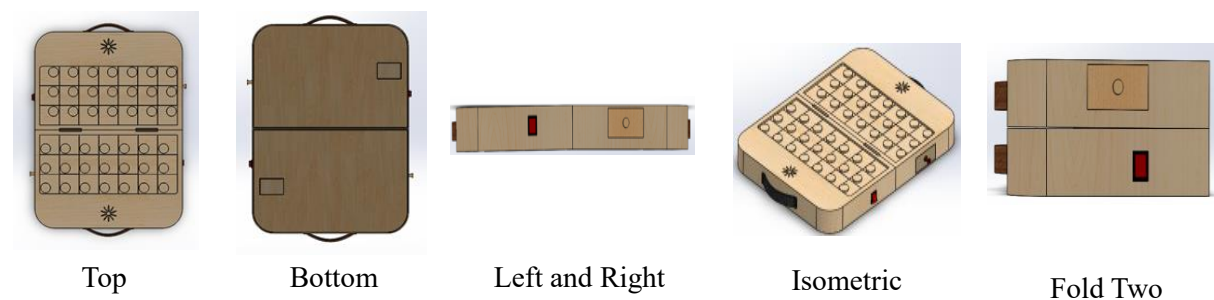


Figure 2. Board game.

3.5. Result of Statistical Analysis

Test of Marginal homogeneity was implemented to validate board game. The test was on hypotheses whether there was a significant difference between user's requirements and board game design. The hypotheses were developed as follow:

H0: There is no a significant difference between the user's requirements and board game design

H1: There is a significant difference between the user's requirements and board game design.

As shown at table 9. The z values ranged from 0.201 to 0.670. Since $z > 0.05$ the null hypothesis can be accepted. This means that the board game design meets user's requirements.

Table 9. Stuart Maxwell test of Marginal Homogeneity results

<i>Kansei Word</i>	<i>Marginal homogeneity</i>
Pull	0,456
Unique	0,201
No Noise	0,670
Comfortable	0,257
Easy to carry	0,577
Easy to clean up	0,593
Strong	0,435

As shown at table 9 the z values ranged from 0.201 to 0.670. Since $z > 0.05$ the null hypothesis can be accepted. This means that the board game design meets user's requirements.

4. Conclusion

Based on the research, it is conclusive that:

1. Kansei words' characteristics that user require from board game design are Pull, Unique, No Noise, Comfortable, Easy to Carry, Easy to clean up, Strong.
2. The physical specification board game is body case have box shape with the size 30cm x 17cm. Button round shape size 2.2 cm and thickness 3 mm, Type Times New Roman Font size 10, Design the handle of the box shape Size Length 9 cm, Width 2 cm. Board game folded the two,

Size drawer 5 x 5 cm box shapes. Body case and Buttons made of plywood material with a thickness of 3 mm, The handle is made of PC foam material with a thickness of 2 mm.

3. The board game design meets user's requirements. Because the Kansei word > 0.05 of significant level as shown at table 9.

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