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The Design Analysis of Product Animation Appearance Towards Psychological Measurement: Dragon Design

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ABSTRACT

This is the study of the psychological effects on customers in relation towards the design of products. The product selected was in the animation industry, that should be measured is the design of the appearances of the dragon. By using the approach of Emotional Words (EW), which helps in determining the people's feelings towards the designs, the study is delivered through a set of questionnaires in perspective of span semantic differential. The collection of data from the questionnaire had been tested and analysed in the statistical analysis to see the validity and reliability. The results were used to determine the most preferable designs for dragon's appearances in the movie "How to Train Your Dragon". The mathematical approach, Row Geometric Mean Method (RGMM) showed the values gained for each part in Emotional words. As a result, the new dragon design was proposed based on the combining of the most preferable designs for each part of the dragon's body. This new design of dragon was the most desired feeling by the customer (audience) that shall be created.

1. Introduction

The appearance of an object is the result of a complex interaction of the light incident on the object, the optical characteristics of the object, and human perception. Given that manufacturing products are meant to fulfil an intended purpose, their appearance is one of their most important commercial attributes. Appearance often determines the acceptability of a product to its seller, and ultimately to the consumer or end-user. The quality of a product's appearance is psychologically related to its expected performance and useful life. It therefore determines its reception (or rejection) by potential purchasers. All the manufacturing industries are concerned with the appearance of their products. Appearance involves all visual phenomena such as colour, gloss, shape, texture, shininess, haze, and translucency that characterise objects. All other things being equal, when consumers have a choice, they buy what looks best. Appearance is the foremost and most impressive product message [1]. Product of the animation industry is one of the focus in this research.

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There are so many animated films, movies and television series that present dragons as one of the characters in it. An example of the kind of movie that demonstrated dragons as one of their leading characters is a movie entitled "How To Train Your Dragon". The dragons in the movie are designed with many shapes and styles, and all the designs tend to catch people's attention and they kind of remember the characters because of their appearances.

Most of the dragon characters have gained a place in people's hearts. As for the manufacturing sector, this looks like an opportunity for them to gain profit, which then they turn the characters into figures that can be touched. Some dragons are designed with monstrous, demonic aspects to show that they belong to the evil side. Some are designed with bulky, fierce, and muscular aspects to show that they are fighters and strong. From the visible appearances, people can tell the characteristics of the models based on the feelings generated from observing. personality is manifested through both static and expressive channels of appearances, and observers use this information to form accurate judgments for a variety of traits [2]. This is some sort of psychological respond from humans. Psychology is a scientific study of mind and behaviour. Psychology is a multifaceted discipline and includes many sub-fields of study such as human development, sports, health, clinical, social behaviour and cognitive processes [3]. The appearances of the designs will lead to some effects on human behaviour, mental processes and attitude. This research will generate a better understanding about the correlation between the selections of designs for dragons' appearances and the effects it will bring towards human psychology.

2. Literature Review

2.1 Design Development

Design and development of a product is a product development phase where there is a need to find the proper product's measurements, specifications, attributes and composition [4]. Product development may also involve modification of an existing product or its presentation, or formulation of an entirely new product that satisfies a newly defined customer want or market niche [5]. In simple words, product development is usually being extracted into two main sections. The first section focuses on generic models of product development, beginning with a discussion of stage and activity-based models, which includes a summary of some key and widely recognized models in the literature [6]. Weaknesses of these types of models are then examined, followed by a discussion of alternative models. The second part of the product development is narrowing down in focus. This section examines models generated from research based on benchmarking or other methods from industries [7]. These are critically reviewed in the context of producing a new product or developing an already made product [8]. There are many sorts of ways of designing that can be applied by different designers [9] [10] [11] [12] but based on the study of designing process leading companies, there are common approaches that are being practised by the designers. There are four stages of process that act as the key activities for the designing and thus developing the product. The four processes are discovering, defining, developing and delivering [13].

2.2 Psychology: Emotional Words

Various researchers had their own ways of defining emotion. Back to the 80's and 90's era, where emotion research gets started, the researcher, Damasio [14] for example, in differentiating between emotion and feeling, indicated emotion as a body state. and feeling as a mental state. While Gardner [15] on the other hand defined emotion as feelings linked to a specific behaviour. Moreover, after a critical review of the research related to emotion done by Plutchik [16], he than stated that there is

little consistency that exists among the meanings of emotions and due to that situation, considerable most of the researcher were not adequately clearly to come out with an unmistakable thought of what an emotion really is. Since there is a lack of a clear definition, some researchers have struggled to develop and improve their understanding of emotions by identifying characteristics of their own. Clore, Ortony, and Foss [17] managed to propose a definition of emotion, which can be considered as one of the clearest explanations. According to them, “an emotion is a valence affective reaction to perceptions of situations”.

The descriptors from the domain of emotion that refer to non-valence cognition (such as interest and surprise), bodily states (such as sleepy and droopy), and subjective evaluations of people (such as self-confidence or feeling abandoned) were excluded [18]. The term “valence” is used in the sense of positive or negative, and therefore the definition implies that an emotion involves a positive or negative feeling. There is a developing proof that utilisation of emotion that has significant effects on satisfaction [19]. Lately, various researchers have discovered that a direct succession of occasions happens when customers encounter changes in emotion related to consumption and right after that they tend to make the judgement due to their satisfaction [20]. Despite the fact that useful theory of the procedure has become effective in foreseeing satisfaction [19]. The mounting proves on the effect of emotion and consumption onto satisfaction is usually difficult to discredit. Emotions help illuminate satisfaction reactions to consumption [20].

3. Methodology

3.1 Identification Attributes (Design Selection+ Emotional Words)

Related to the dragon’s appearance, there must be a guideline on what to be tested while carrying the investigation. Thus, it has been decided that there are four main parts of the dragon body that will be tested in this study. The parts are faces, wings, legs and also tails. After determining the parts that should be focused on, the next step is to compile as many of the designs as possible for the extraction of the best designs. Out of many of the designs compiled, every part will be extruded until we get the best six designs for each part of the dragon’s body. The results of these finalise six designs for all parts of the dragons are as shown in the figures. All these parts were selected and will be attached to an already selected body of the dragon. By means, the body of the dragon had already been identified so that it can be generalised with the expected outcome of the study conducted later. All these selected designs for each part of the dragon’s appearance had been drawn neglecting the colours. The reason for this is because colours will cause bias to the selection of the designs by the respondents. Thus, it is important to eliminate the causes that can cause biased judgement by the respondents, so that the data collected will be reliable and valid to be used as the results of the study. The design details can be seen in Figures 1, 2 and 3.

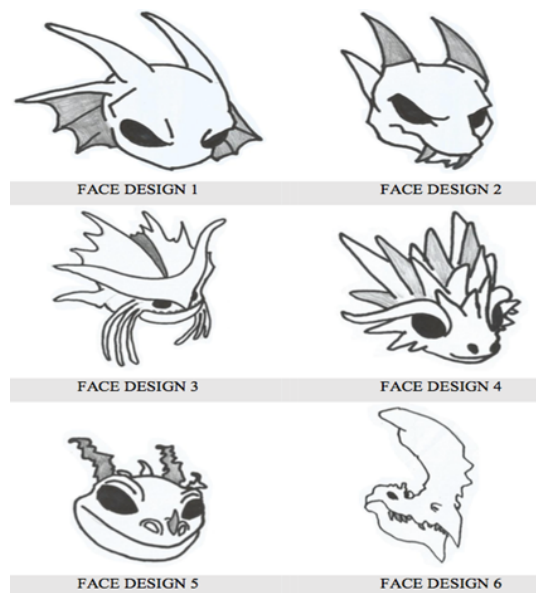


Fig. 1. Example of Dragons' Faces

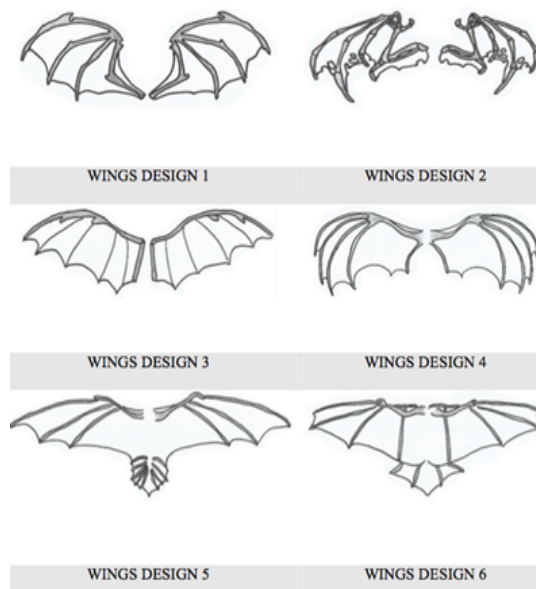


Fig. 2. Example of Wing's Designs

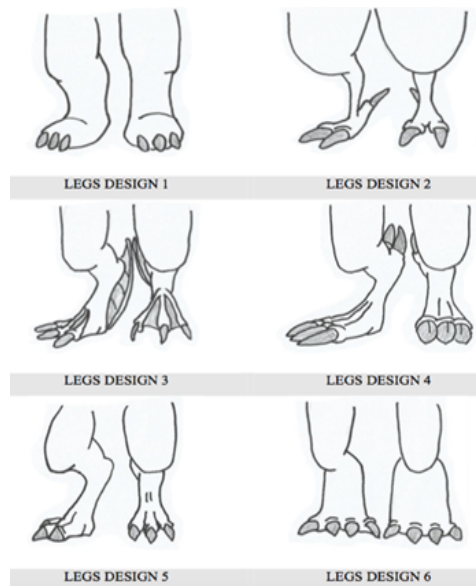


Fig. 3. Example of Leg's Designs

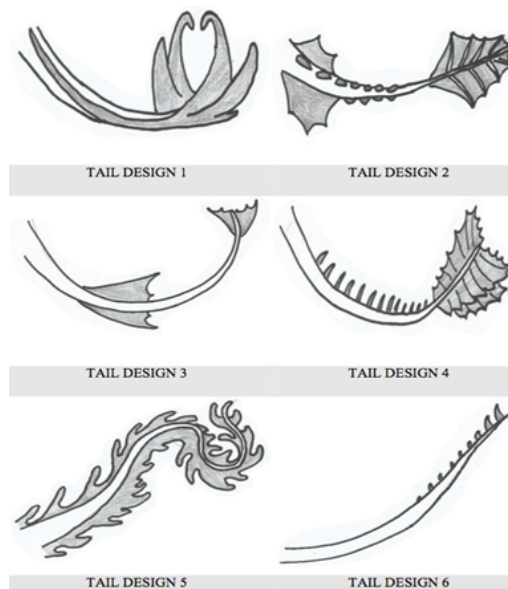


Fig. 4. Example of Tail's Designs

Thus, in order to translate feelings of the respondents onto the designs that had been selected, Emotional Words (EW) can be utilised. Begins with collecting those words and expressing them. The emotional feeling of human beings towards something that they see, and in this situation, the dragon cartoon. There must be a lot to say about the physical appearances of the dragons, so by using this EW method, the words were divided into groups of similar meaning and EW Database can be seen in Table 1.

Table 1
EW Database

Angry	Dangerous	Feminine	Healthy	Mysterious
Artistic	Dark	Fine	Hot	Natural
Attractive	Decorative	Flashy	Intellectual	Oval
Beautiful	Dark	Fluffy	Joyous	Painted
Blunt	Digestible	Funny	Large	Pale

Table 1
EW Database

Angry	Dangerous	Feminine	Healthy	Mysterious
Bold	Delicate	Futuristic	Light	Patterned
Bright	Designer	Gimmicky	Long	Plain
Casual	Dull	Glamorous	Lovely	Polished
Cheerful	Dynamic	Gleaming	Mad	Powerful
Chubby	Edgy	Glowing	Magnificent	Practical
Classic	Elegant	Good shape	Masculine	Premium
Clean	Erratic	Gorgeous	Massive	Romantic
Colorful	Exciting	Graceful	Merry	Round
Comfortable	Fair	Handsome	Misty	Sad
Cool	Familiar	Happy	Modern	Sensual
Creepy	Fast	Hard	Muddy	Sharp
Cute	Fat	Harsh	Muscular	Shiny
Skinny	Slim	Soft	Special	Square
Sleek	Small	Sophisticated	Sporty	Strong

The five main words that had been extracted for the final survey are Attractive, Massive, Angular, Powerful and Exciting. Questionnaires or surveys conducted were developed into two sections. The first section was the pilot test. The unnecessary designs were eliminated to get the best four out of six designs. The second section represents the seven-point Likerts survey based on the five Emotional Words and one question of respondents' preferable designs (Figure 5). This questionnaire was distributed to at least 70 respondents based on the calculation of sample size.

Design 1

Offensive 1 2 3 4 5 6 7 Attractive

Tiny 1 2 3 4 5 6 7 Massive

Simple 1 2 3 4 5 6 7 Stylish

Weak 1 2 3 4 5 6 7 Powerful

Boring 1 2 3 4 5 6 7 Exciting

How much do you like this design?

Strongly dislike 1 2 3 4 5 6 7 Strongly like

Fig. 5. Questionnaire

4. Results and Discussion

3.1 Pre-Results and Reliability

The final top four designs for each part, which are face, wings, legs and tail, can be seen in Table 2. This is the final design chosen by the respondents and Table II includes the lists of the following designs that managed to be selected and proceed to the next step of the study. Selected designs for faces are Face Design 1, Face Design 2, Face Design 3 and Face Design 4. For wings, Wings Design 1, 3, 4 and 6 were selected. While for legs, respondents agreed that Legs Design 1, 3, 4, and 5 should be the new design of the dragon appearance. Lastly for tail designs, Tail Design 1, 2, 4 and 5 were preferred. All of these selected designs can be referring to Figure 1, Figure 2, Figure 3 and Figure 4.

Table 2
Table Pre-Results Selected

Parts	Selected Designs			
	First	Second	Third	Fourth
Faces	Face Design 4	Face Design 1	Face Design 3	Face Design 2
Wings	Wings Design 6	Wings Design 3	Wings Design 1	Wings Design 4
Legs	Legs Design 5	Legs Design 3	Legs Design 4	Legs Design 1
Tails	Tail Design 2	Tail Design 5	Tail Design 1	Tail Design 4

After the final four designs of each part had been determined, the designs were then being translated into CREO software in 2D drawing without colour. The purpose is to demonstrate the uniformity in the drawing so that the people will have a better assessment and judgement of the designs themselves without colour distraction. All the illustrated designs had been shown in Figure 6, Figure 7, Figure 8 and Figure 9. All these four final designs were rated based on the Emotional Words (EW), Offensive–Attractive, Tiny–Massive, Simple–Stylish, Weak–Powerful, Boring–Exciting, and the preferable design chosen, from the scale of one to seven. They were given the rating of one to seven, which is seven (7) represents Emotional Words, such as Attractive, while one (1) represents the antonym of the EW, Offensive.

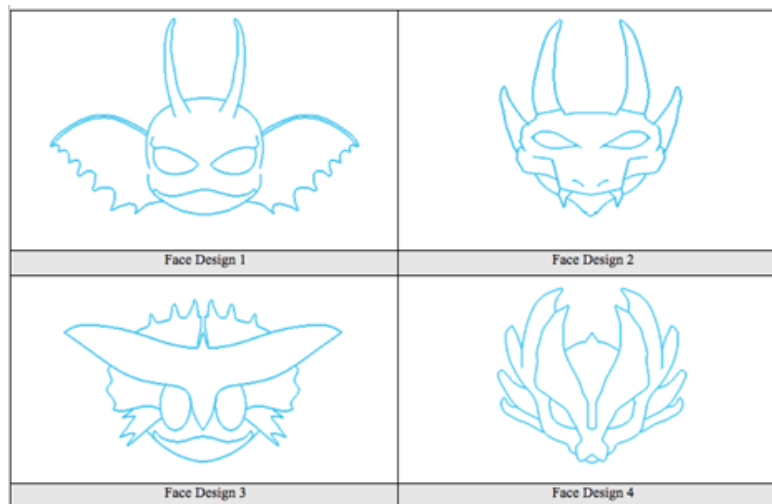


Fig. 6. Final design chosen for Faces

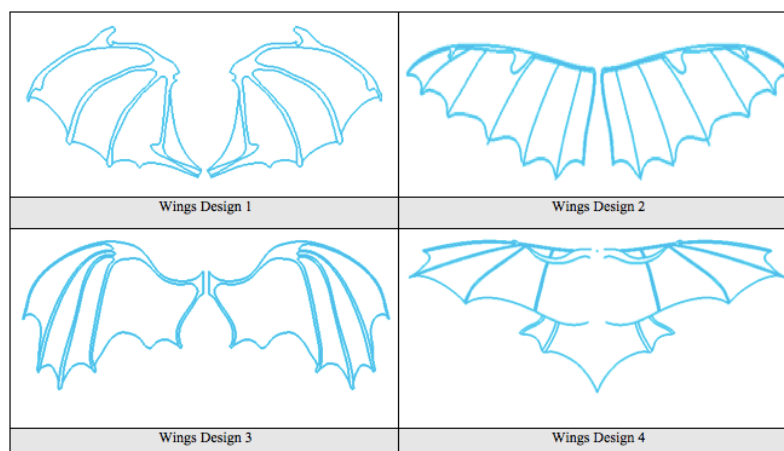


Fig. 7. Final design chosen for Wings

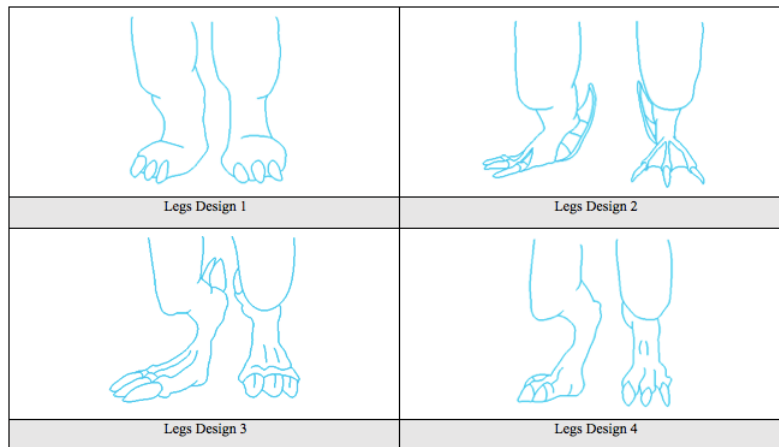


Fig. 8. Final design chosen for Legs

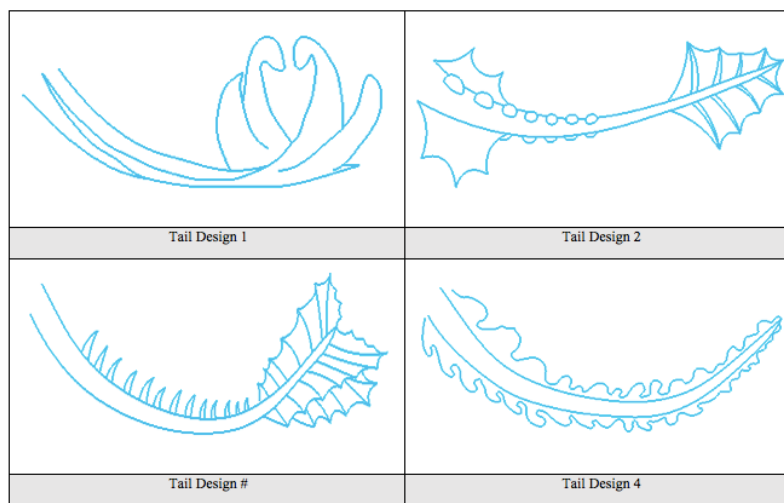


Fig. 9. Final design chosen for Tails

The reliability test was done in order to identify the level of trust towards the results gained from the data collection. In this scenario, this process is important to assess the degree to which the respondents agree or disagree with all the specifications given to them. This is because humans observe things and they may not have the same interpretation with the others. By using Cronbach's Alpha (CA) analysis, the results show that the whole parts of the dragon's body are reliable. Thus, looking at the results obtained for faces, wings, legs and also tails, the value of CA for all of them are exceed 0.90. Thus, all the data lies under the very high reliability group of data. Thus, all the parts can be considered reliable and acceptable.

Table 3

Cronbach's Alpha Reliability Test

Part	Cronbach's Alpha (CA)	Description
Faces	0.935	Very high reliability
Wings	0.946	Very high reliability
Legs	0.963	Very high reliability
Tails	0.960	Very high reliability

3.2 Final Result

The data are interpreted by using the Row Geometric Mean Method (RGMM), considering the mean value for each EW in every design of every part of the dragon's body. The highest mean among all the designs for each part will be the most preferable one. As can be seen in the Table 4, final combination of designs for each part were determined. The results show the respondents chose Design 2 to be the design for the face of the dragon, while for the wings, they preferred also Design 2. While for legs, respondents agreed that Design 1 will be the perfect one to match up with the combination of the dragon's appearances, while they also selected Design 3 to be a new design for the dragon's tail.

Table 4
Preferable Results Chosen

Part	Design 1	Design 2	Design 3	Design 4
Faces	4.067	5.067	4.258	4.831
Wings	4.607	5.202	4.371	5.000
Legs	5.250	4.562	4.674	3.798
Tails	4.607	4.978	5.202	4.112

As a final result, the Figures 10, 11, 12, and 13 show the preferable design and the emotional words represent.

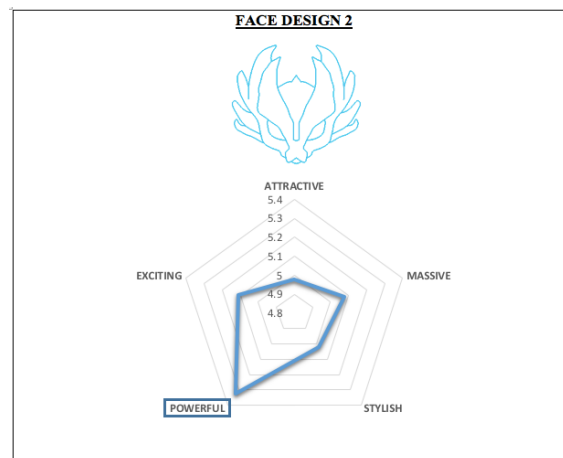


Fig. 10. Powerful EW for face design selected

Face Design 2 had been selected by most of the respondents. According to the data collected, Face Design 2 depicted Powerful character with an average score of 5.33. It shows that the respondents felt that this design tends to produce a powerful appearance. The second highest EW goes to Exciting with an average score of 5.11. Thus, it can be said that even though people see this design as a powerful character, they still feel excited when looking at the face of the dragon. The lowest average score somehow goes to the Attractive. Despite this, people are less agreed that the design seems attractive. Anyhow, to conclude the design, people think of this face design to be Powerful and Exciting yet less Attractive.

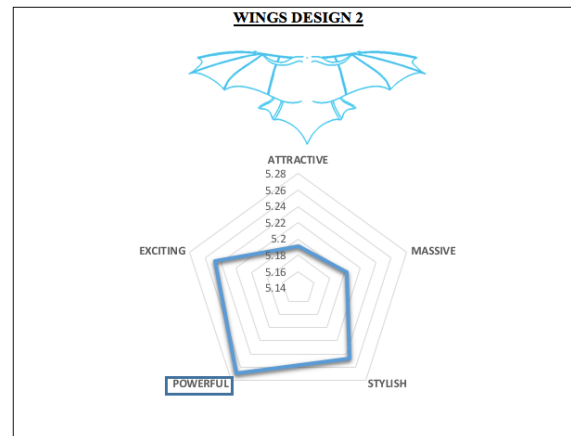


Fig. 11. Powerful EW for wing design selected

To interpret the result for wings selected design 2, the highest average score compared to all other EW goes to Powerful with 5.27. Respondents agreed that the design seems to be great in power rather than looking weak. There are two attributes that gained second highest votes from the respondents that are Stylish and Exciting, sharing the same score that is 5.25. The difference between the highest score and the second highest score are not so big thus it can be said that respondents agreed that they feel the design seems so Powerful, and also looks Stylish and Exciting. The least votes for this wing's design go to Attractive with a score of 5.19. Thus, despite all, respondents might feel that the design seems least attractive for them.

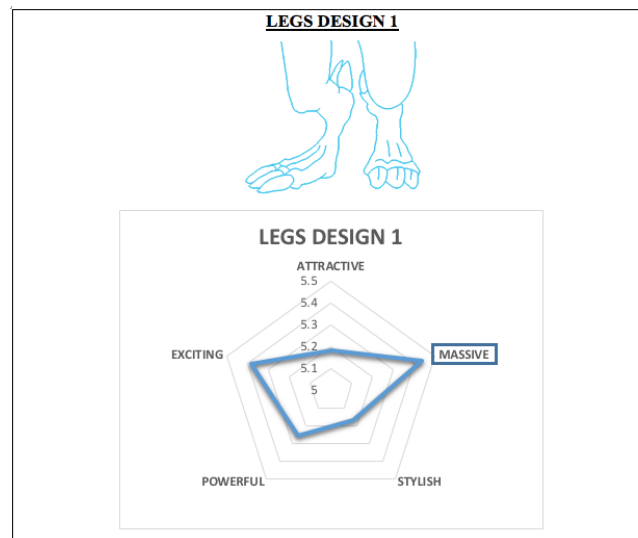


Fig. 12. Massive EW for face design selected

Most of the respondents said that legs design 1 to be Massive. They feel that somehow the legs, if attached onto the body of the dragon, will create a massive effect based on the looking of the legs. Respondents had decided to give an average score of 5.44 for Massive. The second highest average score for this design goes to Exciting with 5.38, while the third highest average score goes to Powerful with 5.26, while the least average score goes to Stylish with 5.17 score. To conclude this design, it creates a feeling of Massiveness in people's emotion, and the respondents thought that this design is least Stylish.

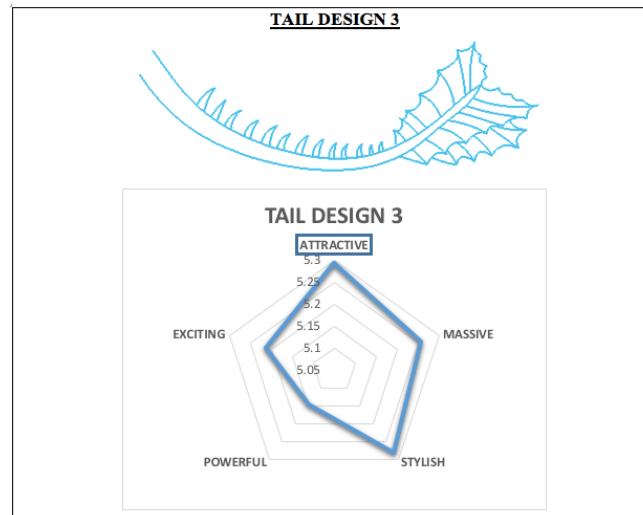


Fig. 13. Attractive EW for face design selected

Lastly for the tail design, the respondents feel that the design shows the highest score for Attractive, with an average score of 5.29. The second highest score for this design is Stylish with a 5.28 average score. The third highest average score belongs to Massive with 5.26, followed by Exciting with a score of 5.21. The least average score for this design is Powerful with 5.15 average score. To conclude this design, these designs produce a wide area of pentagon illustrated in the figure above. Meaning to say, they are more positive towards the EW rather than their antonym. Despite that, most of the respondents did not agree that the design creates a Powerful characteristic.

Based on the highest score for RGMM mathematical approach, the new proposed design of the dragon had been illustrated as shown in Figure 14. This new dragon character was translated from the audience's emotional feeling. This new look of the dragon is the combination of powerful, massive and attractive while looking at and the perfect experience will be felt while watching and the feeling of 'excitement' will appear.

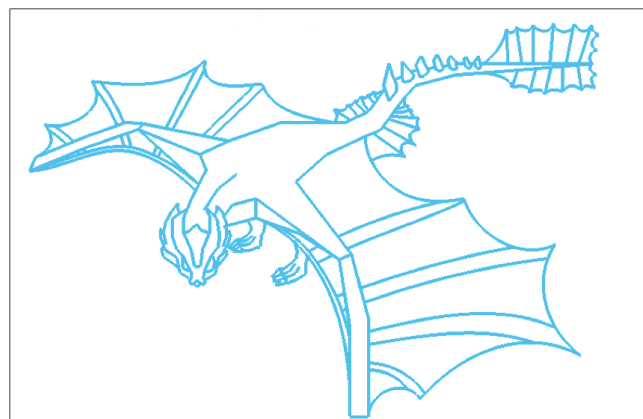


Fig. 14. The new proposed design of the dragon

4. Conclusions

This research investigated the effects of the dragon's appearance design that bring towards human psychology and this study helps to measure them. Aims to find the effects of the dragon appearances designed towards human's psychology by using the EW technique. This new dragon design can benefit both sides, the movie industry and also human psychology. Design is a very

important aspect that can help in achieving customer's satisfaction. Thus, the relationship of the design, the dragon appearances and also the human emotions, could bring satisfaction to the people, when they see the proposed dragon. Dragons are usually illustrated in the movies or cartoons, and even into products such as toys. In order for the dragon design to be accepted by the people, be it in the films or in terms of products, the customers' satisfaction is a very important aspect to be achieved. Related to the customers' satisfaction, it is important to know what the feelings are involved when people see things. Thus, the importance of Emotional Words (EW) in this part is to identify all the related terms onto the designs of the dragon's appearances. The combination of the designs for face, wings, legs and also tail are combined together to develop a new design of the dragon. This new dragon should generate the impression of the people.

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