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7th International Ergonomics Conference ERGONOMICS 2018 – Emphasis on Wellbeing June 13- 16, 2018 Zadar, Croatia Research model in Ergonomic for Product design process in Behavioural Manipulation Erik Armayuda 1 , Oki Kurniawan 1 , Rungtai Lin 2 1 Visual Communication Design, Faculty of Creative Industries and Telematics, Trilogi University, South Jakarta, Indonesia , armayuda@trilogi.ac.id / oki-k@universitas-trilogi.ac.id 2 Graduate School of Creative Industry Design, National Taiwan University of Arts, New Taipei City, Taiwan, rtlin@mail.ntua.edu.tw Abstract Product design as an object is able to give command how to use through its interface form.

Such interfaces sometimes give no choice but to obey the way to use the product, especially those who have different segmentation background, the product design could force someone to do something according to how it works. Most of the design process already engage the evaluation process from user experience and refine it into better and suitable design. A good design could not only focus on economic purpose especially for user satisfaction, because not all of the customer has the awareness of the other aspect that may effect their behaviour in daily life.

A good design product could be a way to manipulate user behaviour to maintain a good behaviour according to the particular group or community norms and value as a segmentation. This paper aims to offer a model to consider some aspect in design process by adapting from SAD to CHEER model. Keywords : Behavioural Design, Product design, Good design, from SAD to CHEER 1. INTRODUCTION Product design has been a part of human life. Since the last few decades there is so many motive behind the product design itself, and the most basic motive of product design is to fulfil human needs, but in the changes of time, the product that use to create for its function,

changes into something related to its own century. One of few many product design is daily product design. It evolve from the product which is focus in function, than the design focus for the user friendly, fun and so on.

Lin explains the evolution of design products known as 5F, " These five F ' s are: (1) 1930 ' s - design for ' Function ' , (2) 1950 ' s -design for ' Friendly ' , (3) 1970 ' s -design for ' Fun ' , (4) 1990 ' s -design for ' Fancy ' , and (5) 2000 ' s -design for ' Feeling ' [9].. When the design tend to chase the trend of the user feeling, the awareness of designer responsibility is challenged, it's because not all of the user has the awareness of the effect of their own satisfaction. Sometimes the tend of industrial product focus on the user satisfactory which is lead to the reckless behaviour of the user.Proceedings of 7th International Ergonomics Conference – Ergonomics 2018 June 13th – 16th 2018, Zadar, Croatia 2 Figure 1: T he evolution of product (Lin, 2007) Design should not always be done solely for the sake of the industry solely oriented to the satisfaction of users to gain economic benefits.

This studies argue that product design should not only focus on commercial purpose only, but also trough product design, designer could participate in the process of creating better society, by manipulating user interface of particular product design to affect user behaviour. Papirous also said the similar thing in the field of graphic design, in an interview about visual communication design said " Science of visual communication design is not just design to fulfil the needs of the industry. But able to make a lonely city into a shining city. " [15]. Addition to that, Designers always seek to expand their roles.

Theories like human- centered design focus on physical needs of and the tasks they perform with products, another human focused design approach emerged out of an interest in how products were formed in the first place - the cultural implications and meaning of product and their form. In the field of Design for Sustainability, as in all fields of design, Ergonomics represents an innovation factor of the design culture that provides the designer with the necessary knowledge about human characteristics and capabilities, and the methodological tools for evaluating different people-needs during use and interaction with the products at work and in everyday life.

[17] Beside cognitive aspects of product design the emotional aspects is also to be considered, as suggested by Norman, Emotion result from three different levels of the brain: visceral; behavioural; reflective. Each plays a different role in the total functioning of people . Visceral design accommodates Appearance, Behavioural design accommodates The pleasure and effectiveness of use, and Reflective design accommodates Self-image, personal satisfaction, memories [4] To get a better understanding of the

studies, the research will adapt the existence model, so the new model would be a model based on previous model with specific context. To break down the research model for product design motive, the method should distinguish by its motive.

One of the method of cross cultural communication is conduct by Rt Lin as shown in the figure bellow Proceedings of 7th International Ergonomics Conference – Ergonomics 2018 June 13th – 16th 2018, Zadar, Croatia 3 Fig. 1 Cross-cultural Communication in Design Collaboration: From SAD to CHEER. In International Conference on Cross-Cultural Design. Springer, Cham. (to be publish in 2018) The figure attempt to bridge cross cultural communication, basic principle of SAD (Science, Art, and Design) divide into 3 part of inspiration, ideation, and implementation with attributes for evaluation CHEER (Collaboration, Humanity, Empathy, Ecology, and Renaissance) with 3 level of communication. The studies will begin by apply " From SAD to CHEER " method to find research model for product design process. 2.

RESEARCH FRAMEWORK The model " from SAD to CHEER " explain about 3 level of communication, design process, audience response, and also product impact. The attempt to adapt this method to distinguish product design process, the model will be adjust in the context of product design. Product design process always affect by the cultural background of particular segmentation. " Culture " plays an important role in the design field, " and cross cultural design " will be a key design evaluation point in the future. Designing " culture " into modern product will be a design trend in the global market [11].

This studies context of culture as a key of design evaluation would be define as a motive of designing product. There is various motive behind the product design, the motive can be distinguish into two kind, for economical purpose such as commercial product and social purpose as a form of design for society. Proceedings of 7th International Ergonomics Conference – Ergonomics 2018 June 13th – 16th 2018, Zadar, Croatia 4 Fig. 2 model " From SAD to CHEER " applied in product design process The Breakdown of design process of SAD; 1. Performance Inspiration (related to the design purpose as the inspiration), 2. Process Ideation (bridging the design purpose and implementation), 3. Product Implementation (implement the idea into daily product design) and product implementation as application of CHEER; 1. Aesthetic Experience (the product attract for business purpose), 2. Meaningful Experience (the product affect the efficiency of workplace), 3. Emotional Experience (elaborate norms and value for advance purpose of product design).

The other part of the model which originally discuss about three level of communication and processing information would be use as the level of product design process which is

distinguish by the design purpose. The information process part would be the way to assess each level. 3. METHODOLOGY The research based on SAD to CHEER model to break down the product design motive into three level. The method to applying from SAD to CHEER model for product design motive from the basic motive into advance motive.

There is stage of product design process and all of the process start from Performance/ inspiration as a motive of product design start to the first level of design process which is; 1. Aesthetic experience, which is focus on designing form for basic/ business purpose. 2. Meaningful Experience, which is exploring the ergonomics and efficiency in workplace. 3. Emotional Experience, which is focus the user interface manipulation to stimulate particular user behaviour. Proceedings of 7th International Ergonomics Conference – Ergonomics 2018 June 13th – 16th 2018, Zadar, Croatia 5 Fig.

3 Research work flow for traditional board game The level of research method for product design studies using SAD to CHEER will be done in 3 level of research (design process); 1.) Transforming the form In this level, design process will focus on how product attract the market, because besides its basic purpose of design which is fulfil the particular needs of market, the product orientation is focus in exploring tangible aspect of product design to attract audience with the pure business purpose. The method to achieve this design level is by using basic theory of product design focus on visual attraction. 2.)

Exploring the Ergonomics In this level, the research focus on Exploring ergonomics to adjust product design for the needs in working place. The studies to achieve this level is by combining the basic theory of product design and explore its function regarding safety, efficiency, and productivity in workplace. The focus of this level is to create a product which is not only attracting but, helpful for efficiency in workplace. 3.

) Affecting Behaviour In this level the design process involve a scenario setting for product design to manipulate the product interface that will affect the user. By manipulating the interface, user will use the product as an attempt to stimulate new behaviour for user. The goals of this level is manipulate interface that will manipulate user experience, so the user indirectly will have a new way of using product as starting point for behaviour stimulation.

The process will conduct by applying empathy which relevant to particular market segmentation. Proceedings of 7th International Ergonomics Conference – Ergonomics 2018 June 13th – 16th 2018, Zadar, Croatia 6 Design strategy is considered to be one of the pivotal component in cultural and creative design industries, and this will have a

significant impact on consumer perception of innovation [12]. By involving norms and value as basic idea to design product, the result of product design process will affect the user.

So the idea is creating product with purpose to change/manipulate user behaviour using interface manipulation. The assessment measurement will be needed to assess the impact of the product. Apply the perfect method of SAD to CHEER, all of three level should be done in the design process by passing the evaluation in every design process level. 4 . CASE STUDY OF DAILY PRODUCT DESIGN One of many product design use in daily activity is chair separate seat for one person, typically with a back and four legs.

[14] The first chair Rybczynski was able to identify in the historical record was not a physical chair but a sculpture of one from the Cycladic islands in the Aegean Sea, dated to the period 2,800 - 2,700 B.C. The figurine depicts a musician playing a harp while sitting in what looks like a typical kitchen chair, with a straight back and four legs. By the time of the ancient Egyptians, sitting was a matter of status: Everyone sat on stools or on the ground, but chairs with backs or armrests were reserved for the elite . [5] in today use, chair is an integral part of human activity.

In our modern industrial society most people spend a good deal of their lives sitting down. From a heritage of fishermen, hunters and farmers, humanity has developed into a predominantly sedentary race. Our evolution can be summarized: Homo erectus (upright man) to Homo sapiens (thinking man) to Homo sedens (sitting man). [1] To get a better understanding about how to distinguish the product design research to reach the studies about ' Research model in Ergonomic for Product design process in Behavioural Manipulation ' .

The model that distinguish the studies will help designer to focus on what matter in design process for manipulate behaviour. Fig. 4 traditional chair (dingklik) The stage of research will be distinguish into three level and each level will use the case study of chair to give an example for design process. Each level of design process will use the level of assessment measurement from recognition of attraction, realization of accuracy and reflection affection. The stage of the research will be apply in chair by following the figure bellow. Proceedings of 7th International Ergonomics Conference – Ergonomics 2018 June 13th – 16th 2018, Zadar, Croatia 7 Fig.

5 stage of manipulating behaviour in design process The chair has its original function to help a person as individual or group to rest their feet or reduce the energy to stand, but the execution process of designing chair is depend on the motive. By dividing the stage of design process by following the idea of ' From SAD to CHEER ' model, the

research will be group into 3 motives, 1) design for tangible aspect, by transforming the form, 2) design for the environment in work place, and 3) design for a behaviour in the society, by designing product which can stimulate a particular behaviour for the user. 1.1

Transforming the form The first level of design process motive is focus on tangible aspect such as physical stuff by transforming the form of traditional chair into a product design chair which is attracting by its shape and appearance. The design process of this stage using design rules of how to create an attractive product design. Fig. 6 transforming form in aesthetic (Jens chair by Jens Risom and Bloom by Kenneth Cobonpue) Relating to the adaptation model from SAD to CHEER to pass this stage there is assessment measurement that state, how much the product result by this process visually attract the audience or the user. The key factor of this stage is " visually attract " which is define by tangible aspect which can catch by visual factor. Proceedings of 7th International Ergonomics Conference – Ergonomics 2018 June 13th – 16th 2018, Zadar, Croatia 8 The aspect of visual factor in product design related to something tangible.

Search for tangible manifestations capable of projecting the desired attributes through the use of shape, material, texture and Colour. [3] 1.2 Exploring the ergonomics The second stage of the research is not only focus on tangible aspect. The exploration in the research process should be focus to another aspect of the user. In this context the case will be apply in the workplace. The studies of designing product which suitable in workplace to get the efficiency is mention in ergonomics design studies.

Ergonomics focuses on human beings and their interaction with machines, materials, information, procedures and environments used in work and everyday living [1] Ergonomics is the science of fitting the job to the worker. In a phrase, the task/job must 'fit the person' in all respects, and the work situation and environment should not compromise with human capabilities and limitations. [6] Fig. 7 design into ergonomics aspect (Herman Miller Executive Aeron Task Chair & La-Z-Boy Delano Big & Tall Executive Chair) At this stage of research designer already include the studies of ergonomics, so the research not only focus on how to create an attractive product design, but also consider the function and user, related to the workplace.

From the figure 7 above can be seen, the transformation from the traditional chair into office chair which already consider the high, the size, shape, and the other aspect which could support the comfort of the work process in the office. Product design process in this stage will be assessment by measure how the product increase the efficiency and comfort in the working environment. The studies of ergonomics involve not only studies in design field, but could involve engineering, medical, and event psychological field.

The product which is produced by these studies almost touches the matter of behavioural manipulation in purpose of creating a good environment in workplace, but the impact of this design still in particular segmentation (company or factory), and the studies about manipulate culture behaviour is focus on creating better society which will be discussed in the next stage. 1.3 Stimulate behaviour This stage of research is the goal of these studies which is focus in design process that can create a product (daily product design) that can manipulate the user behaviour into particular behaviour based on particular norms or value.

The result of the design process could be applied as a public facility product. The final product usually a product with an interface that manipulate to stimulate particular action, in some case the interface designed to prevent user doing particular behaviour. These studies also argue that the design could manipulate the user behaviour by manipulating product interface which can cause particular action expected from user. Fig.

8 product design to stimulate particular behaviour (central armrest bench & leaning bench) The figure above shown a public chair to prevent particular action that represent by anti homeless chair with central armrest. The chair usually installed in public area such park. The purpose of giving central armrest is not to give a border for each seat, but its design to prevent people using bench inefficiently but to prevent the homeless sleep there so the other people couldn't sit on the bench.

The other figure called leaning bench, ignoring its controversy, leaning bench indeed efficient for the limited public space. This bench usually installed in high mobile activity area. The purpose of this chair is to design uncomfortable to prevent people sit in those particular area. Over all this kind of product already stimulate an action to its user because the design of the interface. This product is the real example that in design process, designer could refer to particular goals (could be some purpose to manage user behaviour or achieving particular behaviour from the norms and value).

The assessment of this stage is by measuring how much the product affect the behaviour of particular user. In this case the design process following particular norms and value to manipulate user behaviour which is in line with the norms and value that follow by those particular society. The studies of this stage could be run by applying behaviour planned theory. 5 . RESUME The process in designing product is depend on its motive. Design should not always be done solely for the sake of the industry solely oriented to the satisfaction of users to gain economic benefits.

This studies argue that product design should not only focus on commercial purpose only, but also through product design, designer could participate in the process of creating better society. In the context of designing product which can manipulate user behaviour, there is three stage, the stage adapt from the model of ' from SAD to CHEER ' to get a better understanding of three stage of design with each measurement assessment. ? Transforming the form In this level, design process will focus on how product attract the market, because besides its basic purpose of design which is fulfil the particular needs of market, the product orientation is focus in exploring tangible aspect of product design to attractProceedings of 7th International Ergonomics Conference – Ergonomics 2018 June 13th – 16th 2018, Zadar, Croatia 10 audience with the pure business purpose.

The method to achieve this design level is by using basic theory of product design focus on visual attraction contain material, shape, colour, and another tangible aspect. ? Exploring the Ergonomics Human factor theory is is one of the main method. In this level, the research focus on Exploring ergonomics to adjust product design for the needs in working place. The studies to achieve this level is by combining the basic theory of product design and explore its function regarding safety, efficiency, and productivity in workplace.

The focus of this level is to create a product which is not only attracting but, helpful for efficiency in workplace. ? Affecting Behaviour Planned behaviour theory is one of the method to reach this stage of research. In this level the design process involve a scenario setting for product design to manipulate the product interface that will affect the user. By manipulating the interface, user will use the product as an attempt to stimulate new behaviour for user. The goals of this level is manipulate interface that will manipulate user experience, so the user indirectly will have a new way of using product as starting point for behaviour stimulation.

The process will conduct by applying empathy which relevant to particular market segmentation. Fig. 9 stage of design process in behavioural manipulationProceedings of 7th International Ergonomics Conference – Ergonomics 2018 June 13th – 16th 2018, Zadar, Croatia 11 The three stage of this research could be a way to distinguish the motive in product design process.

First stage of design which focus on how to create product that visually attracted is relevant to be applied in design process to create product for economical purpose, how to attract audience so they has desire to buy the product because its attraction. The second level which focus on ergonomics is relevant to semi business product with

particular segment, especially for company purpose, so the user or particular community will increase the production by its efficiency. The third stage of the studies could be focus on how to create better society, because not all of the product will bring comfort to the user, but by these kind of product the user could get a better behaviour which is relevant to their particular norms on social value. REFERENCES [1] Boro, Wiliam J., Psaromatis, Mary: Chiropractic Center , Available from <https://goo.gl/Hti7sq> , accessed : 2018/04/20 [2] Brown, Tim dan Jocelyn Wyatt (2010) Design thinking for social innovation.

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