

Comparative Analysis on Shoelaces Tools Type Magnetic Shoelaces and Silicone Shoelaces

(Case Study: Urban Societies In Early Adult Stages Of Development)

Hamman Faqieh Azzuhdy¹, Muchlis²

¹Producy Design, Telkom University, Bandung, Indonesia

²Producy Design, Telkom University, Bandung, Indonesia

hammamfaqieh@gmail.com (Hamman Faqieh Azzuhdy), muchlis@dp.stisitelkom.ac.id (Muchlis)

Abstract The type of strappy/lace-up shoes have a quite large market range up to nowadays. Along with its high mobility as well as supported by the convenience that it is offered to users, sometimes users enforce or modify the usefulness of shoes itself. Usually this occurs frequently on users within the age of 18-25 years old, or usually called an early adulthood phase. Mostly unaware, if it is done repeatedly, it can cause trauma to the foot, even to waist and shoulders. Some of the innovations that are already on the market, such as magnetic Shoelaces and silicone Shoelaces still lacks of its endurance and strength. The purpose of this analysis to the both of those types of tools is to provide a standard in designing tools in which can simplify the process of wearing strappy/lace-up shoes becomes faster with not forgetting the fitting shoes to the foot itself. The analysis is done using quantitative methods in order to find out the problem in greater depth. On the other hand, this research is analyzed by using comparative method against both types of tools products in order that the result of the products can achieve the function that users has expected. The final outcome of this analysis is to produce a guide or term-of-references in designing tools products that can be applied on Shoelaces, which can simplify the process of using a strappy/lace-up shoes.

Keywords Analysis, tools, Shoelaces, Facilitate

1. Introduction

There are so many product innovations that can facilitate users in using the strappy shoes, is intended for users who is keen to even more convenience in using strappy shoes. Some strappy shoes manufacturers add additional features in order to simplify its use, like a strappy shoe which use zipper and elastic material on one of the sides, on the other hand there have been several product innovations in the form of a tool that can facilitate the users in using the strappy shoes. The existence of these tools can relieve the users in terms of budget and its portability.

There are several types of strappy shoes fasteners tools that can be found on the market, including magnetic Shoelaces like SHUFIT and ZUBIT, silicone Shoelaces like HICKIES, and type of heel/wrist strap. Looking at some markets in Indonesia itself, there are only two types of products named magnetic Shoelaces and silicone Shoelaces. Those products,

however, are still judged to have some weaknesses from the side of strength and durability.

Therefore, there is a need to assess the author's analysis of the second tool Shoelaces, so retrieved a concept design tools a Shoelaces can cover the shortfall on previous products

2. The Study of Literature and Research Methods

2.1. Definition of Shoes

The shoe is a kind of footwear that is basically composed part of the sole, and the upper. According to Kamus Besar Bahasa Indonesia (KBBI) shoes is interpret as "Lapik" or legs-wrapping which are normally made of leather (rubber, and others), and in soles of the foot part and heels parts are thick and hard. From this explanation, it is understood that shoes has a very important function, starting from protecting the whole part of the soles of the feet, toes to the heel.

2.2. Shoes Anatomy

Shoe is made of several components assembled into one. In general, the part of the shoe can be categorized into two parts, the upper or exterior and interior or inner part. According to Tyrel and Carter (2009:40) shoes are formed from a whole of separate pieces of material that are cut and sewn individually, or combined together. Those pieces which are needed to make the shoe are including: the upper, linings, stiffeners, midsole, outsole, and heel components.

Further explanation from the authors throughout this design will specifically focusing on some of the components on the shoes that are related with the process of use and fastening strappy shoes, such as tongue, eyelet and laces.

2.2.1. Eyelet and Laces

Eyelet shoe is the part of the shoes formed as holes to put in the laces. Its function is to help tighten the laces, while the Shoelaces are the components to fasten shoes with feet. According to Katie Kubesh et al (2007:11), strap on the shoe can be tightened or helps to keep the shoe to stay right on the feet.

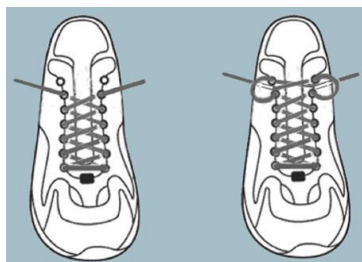


Figure 1. Laces Application on the Shoe

2.2.2. Tongue

Tongue is a separate strip in the center of the top part of the shoe. This section is used to facilitate in using or re-moving the shoes. Tongue is usually made from materials that are tender or at least can protect the instep of the laces. According to Katie Kubesh et al (2007:11), some shoes such as sneakers or casual shoes, have a flap like the tongue under the lace. Tongue can also protect the instep from the strap.



Figure 2. Example of Tongue

2.2.3 Shoelaces

Shoelaces is literally interpreted as incorporation of the word "shoe" which means footwear and "lace" which means the rope, so that it can easily be defined as Shoelaces. Laces is one component of the shoes that is functioned as media to fit in or to secure the shoes to stay right on the feet. According

to Burkard Polster (2006:2), there are six models of shoe-laces which very frequently used for various purposes, such as crisscross, zigzag, star, bowtie, serpent, zigsag and lacings.

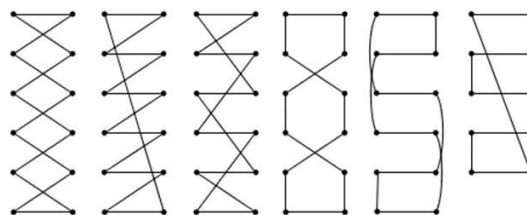


Figure 3. Crisscross, Zigzag, Star, Bowtie, Serpent, and Zigsag lacings

2.3. Definition of Tool

The tool is a device or product that can facilitate or assist the work of man. In Indonesia, the tool is a combination of two words: "tool" and "help". According to Kamus Besar Bahasa Indonesia (KBBI) the word 'tool' itself is defined as object that can be used to do something, whereas the word 'help' means helpful or handy. In conclusion, the tool is a device or product which can be used to help or to simplify a matter. In other words, it is a product that has a value of utilities.

Utility is referring to any goods and services in the form of a tool that meets human needs. The goods or services must be able to provide satisfaction to mankind.

(Yudie, 2012, Pengertian Utilitas, <http://blog.umy.ac.id/opissen/2012/04/30/pengertian-utilitas/>, diakses tanggal 10 oktober 2016).

2.4. TAM and TPB

One of many theories about useness of technology that is often used to describe the process of acceptance of the individual to the use of technology is the Technology Acceptance Model (TAM). TAM explains that there are two factors that affects the acceptability of individual use towards technology, including the ease of use perception and the perception of the benefits of technology. TAM first introduced by Davis in 1989. TAM made specifically for modeling user information systems. According to Jogiyanto in Harlan (2014:21), there were five construction TAM, the fifth of this construction are as follows:

1. the perception of usefulness
2. perception of ease of use
3. Attitude towards the behaviour or attitude of using technology
4. Interest behavior to use technology
5. The use of actual technology

TPB is a theory that is widely used to explain the usage behavior in the use of information technology. TPB can be used to explain that the trust and the perception of products risk affects the interests or the desire to use technology. One of the advantages of TPB is the ability to analyze a situation where individuals do not have his/her own control of his behavior (Jogiyanto, 2007:86). The authors also take one of the variables of TAM (Technology Acceptable Model) theory, users convenience to support the theory of the TPB (Theory of Planned Behavior).

2.5. Early Adult Development Stage

Every stage of development has its own way of thinking. In early adult stage of development, its way of thinking is called postformal thought. According to Labouvie-vief in Diane e. Papalia et al (2014:436), "the postformal thought" is performed in more expansive and more complex way of thinking in early adult stage of development. It is characterized by the ability to handle inconsistencies, contradictions, imperfections, and to compromise. The same thing goes with personality. Everyone has different ways in making themselves comfortable with uncertainty. The highest stages of cognition in adult circles is called postformal thought, which is generally begin in early adulthood, and is often seen in college. According to Diane e. Papalia et al (2014:436) postformal thought is a flexible, open, adaptive and individualistic. It is based on intuition and emotion as well as logic to assist in addressing some of the things which seem to be chaotic.

Postformal thought has its characteristic of relativistic. According to Labouvie-vief in Diane e. Papalia et al (2014:436), relativistic thought is the same as reflective thought, and this allows an adult to think logically and choose between conflict, ideas, or expectations. Each of those form the perspective that have the value of truth. From previous statements can be conclude that when someone in the early adult stage is faced with one problem, they tend to see the problem from multiple perspective to ultimately take decisions that have a value of their own righteousness.

2.6. Shoe Fitting

The word 'shoes-fitting' has a meaning of matching the right foot with shoes that will be used. It aims are to adjust the feet to keep it comfortable and minimize injuries while or after using the shoes. According to the article issued by Kansas City Foot Specialist, P.A. (2016), it is explained that by correctly doing the shoes-fitting, it will reduce the pain in feet, and also improve the bio-mechanical impact on the recovery of leg pain and back. The fact is, shoes-fitting is used as an early step for the recovery of chronic foot pain.

Based on the article issued by Kansas City Foot Specialist, P.A. (2016) we must evaluate the potential suitability of the shoes on the toes, heels, and wide of the feet. The level of conformity of the shoes should fit well and should feel comfortable in all three of these areas:

1. The toes of the shoes should be allowed to have empty space around one finger between the tip of the shoe with your longest toe.
2. The heel should be pretty comfortable for the heels remain on his position, without slipping from side to side or up and down.
3. Your shoes should be wide enough for a sense of comfort. The width of the quarter should cover your legs without squeezing it too strong. Your feet should not slip from side to side or forward or backward in the use of shoes.

2.7. The Method of Approach

The authors analyze this featured design using descriptive qualitative approach. The method is used to describe or explain phenomena that occur at this time. Descriptive

studies do not require a manipulation or a change to existing variables, but representing or describing a condition.

2.7. Methods of Data Collection

Method of collecting data is done with field observation and the study of the literature regarding the related data. The observation is done with participatory observation type.

2.8. Analysis Method

The techniques used in analyzing is the comparison study. According to Poerwodarminto (in Wiji Hastuti 2009:8), comparison study, which the word 'study' comes from English means 'to learn'. To study means that one is driven by particular curiosity to something that has not been studied and known. While the word 'comparison' also comes from English means 'comparing at least two problems and there are two factors of similarity and difference factors'.

3. Explanation

3.1. Empirical Data

Observation aims to directly see and observe both advantages and disadvantages of the existing tools. The following assessment of the silicone Shoelaces products:

1. The product has a unique shape, but not a really good choice for men's shoes because somehow it distracts man's performance?
2. The installation procedure of the product is easy to understand.
3. This product is not really helpful when it is used in shoes, because users have to open two to three top studs, resulting in less suitable conditions if users are in a hurry.
4. The product is including six straps for one shoe and all of the straps has only one size, so there are some parts that are looser than the others.



Figure 4. Shoe with Silicone Shoelaces

5. If only the elasticity of this product is better, using shoes is probably much easier for users do not have to unbutton the tools, which can also raise fears of a broken product when in the forced stretchable since its small size.

6. This product comes in a fixed size, with no fitting-in, therefore not all shoes or foot size can use it.

These following points are the results of the author's observations of product magnetic Shoelaces product:



Figure 5. Shoe with Magnetic Shoelaces

1. The product comes in very simple shape, so it can be applied on many shoes.
2. Applying magnetic Shoelaces is not as easy as applying silicone Shoelaces, since its strengthen piece of the product is using a magnet that is often detached at a time when the process of fitting.
3. Some users are keen to have shoes that fit the feet perfectly tight. As mentioned before, this tool products have difficulty at the time of fitting, so in case of using short-necked shoes, it should be made a little loose so that the products are not easily detached.
4. The magnet strength of this product is quite good and strong. However, unfortunately, this product is easily detached from one piece to another not because the pull is too powerful, but because of the urge that comes from muscle contraction on the back foot at the base of the product.



Figure 6. Magnetic Shoelaces is easily detached when it is pushed from under.

3.2. Analisis Aspek Desain

Analysis of design aspects is the stage in which the draft will be analysed deeper, that could answer the problems discussed earlier. There are some important aspects that will be discussed in this analysis. According to Palgunandi and Bram (2008), design aspect analysis is the kind of analysis that will be performed in something that is designed to the product, to resolve the problem that is discussed in the study. There are three aspects that need to be noticed in the design aspect, including, primary, secondary, and tertiary aspect. First, these aspects are specified by weighting, and the next step is determining which category is appropriate for these aspects.

Table 1. Problem Analysis

No	Issues	Design Aspect
1	Ease of deployment process and use of tools products when installed in shoes	Function, Technology
2	Tools products that have not facilitated users in the process of fitting the foot inside the shoe.	Health, Function
3	Durability of the product if it is used in the long term, continuously, and repeatedly.	Material, Technology

The author is also putting in aspects of form on the tertiary group. Form aspect is taken into consideration because one kind of form is a standard aspect in designing a product, especially in the major of product design. According to Commissioner & Bram (2008), aspect of the form in the process of designing is an aspect that is classified as very important and absolute. In other word, form aspect in de-signing has become a necessity.

Table 2. Design Aspect Weighting

Primary	Secondary	Tertiary
Function & Technology	Health & Material	Form

3.2.1. Primary Aspects

1. Function Aspect

To meet the need of consumers for a tool that can facilitate in using strappy shoes, comparisons are made with the comparison methods by comparing both types of the existing tools products in Indonesia market to see all the advantages based on its main function, which is to make users easier to use strappy shoes.

Analysis of functions of similar products will be divided into two parts, primary and secondary functions aspects. The primary function is to discuss the main function in the product, and secondary function is to describe the features contained in similar products.

Table 3. Product Analysis on Function Aspects

Product	Advantage	Disadvantage
Silicone Shoelaces, HICKIES	<ul style="list-style-type: none"> - The product can replace Shoelaces in facilitating users to use the shoes. - It is easily applied to the shoes - Add an aesthetic value on the shoes. 	<ul style="list-style-type: none"> - The product is still considered less practical. Users have to open two to three top studs, so it is not really simplified the process of using the shoes. - The same size of each straps, for the product is not facilitated for fittings.
Magnetic shoelace, SHUFIT	<ul style="list-style-type: none"> - The product can fasten the process of using strappy shoes into two or three processes. 	<ul style="list-style-type: none"> - The product is still considered less practical when installed to the shoes. - Magnetic system makes this product does not facilitate fitting - Not quite facilitating for exercise purposes

According to Mathieson in Harlan (2014:23), ease of use is defined as the individual belief when he/she uses a particular system which could take a less effort. Based on analysis of function aspects of these two types of tools on products, here are a few conclusions that can be adopted and developed in designing a product in order to resolve the problem:

A. One good function of the tool is a kind that fully help users in performing certain activities. As on the results of the analysis, the two products are leaving few process behind while using the shoes. This way, the product is expected to be able to fasten the process of using strappy shoes.

B. The deployment process of the tools should be easy to understand and not ambiguous for the users. Many users find the difficulties in applying the product. It would be better if the tool is not so much of modification, to make it easier and faster in the application.

Secondary function is a function that will be added on the design, which will support the primary function. Based on the results of the analysis, the product tool should be able to facilitate users in using the shoes that is already installed with product tools, even for a shoe that support light sport activities.

2. Technology Aspects

Technological aspect is an inseparable aspect of designing a product. According to Commissioner & Bram (2008), the technology is a knowledge or science-related of 'how to', which is an application of certain ways that scaled back from a science, in order to apply it on a product or system.

Table 4. Product Analysis on Technology Aspects

Product	Advantage	Disadvantage
Silicone Shoelaces, HICKIES	- This product is using the buttons systems for locks on the product.	- Complicated process of unifying one button and another, because there is a procedure to place a part of the product into the hole on the other side before starting to unify the buttons. - The products shape and its button system makes it unmanageable to tighten the product.
Magnetic Shoelaces, SHUFIT	- The product is using magnetic locks system consists of three planted magnets on each side. - The product is using criss-cross and zig-zag method to connect each strap which has a level of density and high strength and also support to maintain neatness of the shoes	-Magnetic locks on the product is considered quite strong, but extremely fragile when it is bent. - Magnetic system makes the product has no elasticity. - The product is not facilitated for fitting process, due to the urge from muscles in the feet which makes the magnetic system easily detached. - The magnetic function will slowly decreasing as time goes by.

Both products tools will substitute the function of shoelaces, hence the connection system of the product itself will be used constantly and intensively, either when a user is using the shoes or doing activities, which can impact on the durability of the product. According to Smadi in Harlan (2014:28), perception of risk is assumed as customer perception towards the existence of uncertainty and the negative consequences when purchasing products or services. In other word, the technology that contained in the product must be able to make it easy for users to do product maintenance, so that besides the product has a good strength, it is also mini-mize the risk of damage to the product. The following are some of the technology considerations that will be used in the design:

A. The product must be able to facilitate users in maintenance of tools easily.

B. The product must be able to provide strength for any kind of movement or contraction of the muscles of the back legs.

C. The product should be able to be applied with zigzag or criss-cross system to tie the Shoelaces, in order to have a good level of density and strength.

D. The product must be able to facilitate users in the process of fitting the strappy shoes.

3.2.2. Secondary Aspects

1. Health Aspects

Health is one aspect that cannot be ruled out in designing the product, because the product will ultimately get in touch directly with both user and environment. According to Palgunadi & Bram (2008), the design of the product was supposed to understand the various issues related to health regarding to the design of the products, which in this case may be reviewed from the use of the product and the health of the environment.

On this design, the health aspect as discussed is including the ability of the Shoelaces tool to replace the function of the Shoelaces, not only in terms of function but it is also must be able to facilitate the fitting process of the feet inside the shoe. This health aspect is considered crucial for that several factors of stress on the feet are mostly caused by using shoes with bad fittings. According to the article issued by Kansas City Foot Specialist, P.A. (2016), it is explained that although there is a history of injury, structural abnormalities, or other causes for foot pain and back pain, it is important to consider that your shoes can also be part of the problem.

Table 5. Product Analysis on Health Aspects

Product	Advantage	Disadvantage
Silicone Shoelaces, HICKIES	The product can support the curve of the foot parts, since the product has a good level of elasticity, making it easier to adjust in fitting the feet with the shoes.	Each piece of the product has the same size, so in some part of the shoes, the eyelet will be loose than the other part, especially on last three bottom straps. In the end, it can cause the strain of the toes.
Magnetic Shoelaces, SHUFIT	The product is only convert three shoes eyelets on the top, so the laces on the remaining eyelet can still do the fitting on the foot well.	The product has a problem in terms of the strength of the magnet when it gets the pressure from back muscles of the legs, resulting another problem for it is intentionally made slightly loose for fitting, and less supportive on on the curve and the heel of the feet

From the results of the analysis above, the following are some of the points related to fittings or health that would make a good consideration for the design:

A. Shoelaces tools product should have a high elasticity in order to maximize the fitting on the curve and keep the fit-tings perfectly on the heel.

B. Shoelaces tools product should be able to facilitate fit-ting, or in other word, shoes should be able to set its density ranging from bottom lacing up to the very top.

2. Material Aspects

The following is a table of product analysis based on material aspects.

Table 6. Product Analysis on Material Aspects

Product	Advantage	Disadvantage
Silicone Shoelaces, HICKIES	The product is using silicone as a material, which has good elasticity, and using plastic as a material in the form of buttons as a locking systems at the bottom of the product	Along with the products shape, which is long and thin, the product looks fragile. The product can not be used in the long term, considering the age of the material.
Magnetic Shoelaces, SHUFIT	The product is using plastic as a material, which has a good strength, and the magnet is planted inside the product. shape, and organist. It uses striking and neutral colors and seems like more suitable for women.	Magnet is one kind of material that will weaken along with the intensity of its use. too flashy

Table 6, cont.

Magnetic Shoelaces,SHUFIT	The product has dimensions of 42 x 25 mm for adult category. It has a minimalist form, with variants of a neutral and basic color (blue, red,yellow).	The product should have a more geometric line power to offset the impression of feminine, because the segment of the product is unisex.
---------------------------	---	---

Based on the criteria of the materials usage, recommendations are obtained for material to be used in the design of Shoelacesd tools.

A. ABS or Acrylonitrile Butadiene Stiren is an organic polymer, a plastic shaper that has quite enough power. Under certain conditions, the ABS plastic can be recycled, but not recommended and are rarely done. There are many products made from this type of plastic, such as frame/chassis electronics (computer monitor, printer, keyboard, phonoecase), automotive products, medical equipment, toys, pipes, instruments. ABS is characterized as its hardness and sturdi-ness.

According to Imam Mujiarto (2005), Acrylonitrile Buta-diene Styrene (ABS) is one of the engineering thermoplastic group that contains three monomer shaper of acrylonitrile that are resistant to chemicals and is stable against heat. Butadiene give influence on the nature of the colli-sion-resistant, and the nature of the toughness. While styrene insures the stiffness or rigidity and is easily processed.

B. Nylon is a condensation of copolymer formed by reacting the equal parts of a diamine and a dicarboxylic acid, so the amide formed at both ends of each monomer in a process analogous to polypeptide biopolymers. Chemical elements included are carbon, hydrogen, nitrogen, and oxygen. The example of daily application is for industrial yarns, textiles, home equipment, industrial equipment.

According to Imam Mujiarto (2005), Nylon is a term used for polyamides that can be formed form fiber, film and plastic. Nylon structure is indicated by amide functional groups related to the hydrocarbon unit of Deuteronomy that is different in a polymer.

C. Resin is the exudate (SAP) released by many types of plants, especially by the kinds of conifers trees. Sooner or later the SAP is usually frozen, hardened, and become slightly transparent. The resin is often used as a varnish, adhesives, coating the shiny effect. Resin is characterized for its hardness and transparency. (Kaw in Gilang, 2014, Resin Epoksi,<http://purnama-bgp.blogspot.co.id/2014/08/resin-epoksi.html>, accessed on June 11th, 2017).

Table 7. Material Needs Analysis

Material Criteria	ABS	Nylon	Resin
Strength	7	8	7
Durabiity	7	8	8
Production	7	6	4
Expenses	8	8	5
Availability	7	7	7

The recapitulation of material needs analysis (in a scale of one to ten):

Nylon: 37, ABS: 36, Resin: 31.

3.2.3. Tertiary Aspects

1. Form Aspects

The following is a table of product analysis.

Table 8. Product Analysis of Form Aspects

Product	Advantage	Disadvantage
Silicone Shoelaces, HICKIES	The product has dimensions of length 12 cm, has a minimalist	The product should be applied with a simpler design, so that it is not

In designing process this time, because of the tools that is designed will be applied along with the shoe itself, then the product will be designed with simple and minimalist concept. Those concept is chosen by considering that the tools has to blend well with the design of shoes that is used.

Table 9. Simple Concept Analysis

Form	Color	Texture	Composition
Geometric shapes can represent simple concepts on the product. According to Imelda Akmal (2007), basic geometric shapes is including squares, rectangles, and oval, which is a form often used for simple and minimalist style object.	As for the suitable color that is applied to create the impression of humble and simple are neutral colors, i.e brown, grey, white and black (Wirania Swasty, 2010)	It does not use a lot of colors. According to Goet Puspo (2000) restrictions in the application of the colour combinations with a maximum color using three piled up, is to keep the texture object and to keep it simple.	Based on the number of components, components with an odd amount give the impression of unity in accordance with the simple concept. According to Sarwo Nugroho (2015), an even-numbered amount of order can feel less of a unity, because the amount of feel fullness is easier to rate.

A. Form will be applied with a combination of basic or geometric forms,

B. Color will be applied in neutral colors, and following the last trending of sneakers colors.

C. Texture will be exposed from the less combination of color,

D. Composition will be reviewed from the number of components of the product that will not be too much, and the number of odd components will be prioritized.

3.3. T.O.R (Term of References)

3.3.1. Design Consideration

1. The product is designed to facilitate strappy shoes user with its high mobility level.

2. The product is designed to easily put the feet into the shoe.

3. The product is designed to keep your feet perfectly fit inside the shoes.

4. The product is designed to be applied in both casual and casual-sport shoes.

5. The product is designed for most of the sneakers products in the last two years.

6. The product is designed to fasten the process in using a strappy shoe.

7. The product is designed to have a high elasticity.

8. The product is designed to facilitate users in changing the elastic component of the product.

3.3.2. Design Constrain

1. The research of the design is focused on Shoelaces tools.

2. The shape of the designed product is not having many design alternatives, because the form design based on their function (form follow function).

3. Material consideration that is used is either nylon or ABS plastic due to a good durability that can support the function of the product design.

4. Technology applied on products is focused on how the product can facilitate the replacement of elastic component of the product in order to have a good resistance in terms of the age of the product.

3.3.3. Design Requirement

1. The product is designed to use the netral colors, so it will not interfere with the overall design of the shoe when it is applied.

2. The product is equipped with three elastic sockets in every part of the product.

3. The product must be completed three eyelace on the right and left part.

4. The product should be stretchable up to at least three cm radius.

5. The product is designed to use strong materials, such as plastic or nylon.

4. Conclusion

Strappy shoe is the kind of shoes that are still taking the highest number of interest in the market. However, there are tiny problems related to this type of shoes, including the difficulties of using the straps. Several products have been made as a solution to this difficulty, but still, some of these products have their shortcomings in terms of strength and durability of the product. Comparison analysis on these Shoelaces aims to analyze the standard design needs, in designing the Shoelaces tools.

These followings points are some of the users needs that are considered a must in designing the product tools shoe laced: This product can help the user to easily put the feet into the strappy shoes.

1. This product can fasten the process of using the strappy shoes.

2. This product can make the feet perfectly fit in the shoes.

3. This product have both better durability and simplicity compared to its competitors.

4. This product can be used for light sports needs.

5. This product is easy for users to do maintenance or to replace the elastic part as a renewal of the product.

REFERENCES

- [1] Tyrel, & Carter. 2009. *Therapeutic Footwear: A Comprehensive Guide*. 6th ed, United States of America: CHURCHILL LIVINGSTONE ELSEVIER.
- [2] Polster, Burkard. 2006. *The Shoelaces Book: A Mathematical Guide to the Best (and Worst) Ways to Lace Your Shoes*. United States of America: American Mathematical Society
- [3] Katie Kubesh et al. 2007. *The History of Footwear*. Coloma: In the Hand of Child
- [4] Diane E Papalia et al. 2014. *EXPERIENCE HUMAN DEVELOPMENT*. McGraw Hill Higher Education
- [5] David B. Laha et al. 2016. *Proper Shoe Fit: For Support and Foot Pain Prevention*. Kansas: Kansas City Foot Specialist, P.A.
- [6] Palgunadi, Bram. 2008. *Desain Produk 2: Analisis dan Konsep Desain*. Bandung: Penerbit ITB
- [7] Palgunadi, Bram. 2008. *Desain Produk 3: Aspek-aspek desain*. Bandung: Penerbit ITB
- [8] Swasty, Wirania. (2010). *99 Inspirasi Warna Interior*. Depok: Swadaya Group.
- [9] Nugroho, Sarwo. 2015. *Manajemen Warna dan Desain*. Yogyakarta: Andi.
- [10] Poespo, Goet. (2000). *Dresses*. Jakarta: Gramedia E-Jurnal.
- [11] Harlan, Dwimastia. 2014. *Pengaruh Kemudahan Penggunaan, Kepercayaan dan Risiko Persepsian Terhadap Minat Bertransaksi Menggunakan E-Banking Pada UMKM di Kota Yogyakarta*. Yogyakarta: Universitas Negeri Yogyakarta.
- [12] Meikalyan, Rizzal. 2016. *Studi Komparasi Standar Pelayanan Minimal (SPM) Bus Trans Jogja*. S2 thesis: Yogyakarta. Universitas Atma Jaya Yogyakarta.
- [13] Mujiarto, Imam. 2005. *Sifat dan Karakteristik Material Plastik dan Bahan Aditif*. Semarang: AMNI Semarang
- [14] Hastuti, Wiji. 2009. *Studi Komparasi penggunaan metode STAD dilengkapi modul dengan LKS terhadap Prestasi Belajar siswa sub Pokok Bahasan Konsep mol semester I SMA Negeri 1 Manyaran Tahun Ajaran 2008/2009*. Surakarta: Universitas Sebelas Maret
- [15] Gilang, 2014, Resin Epoksi, <http://purnama-bgp.blogspot.co.id/2014/08/resin-epoksi.html>, diakses tanggal 11 juni 2017
- [16] Yudie, 2012, Pengertian Utilitas, <http://blog.umy.ac.id/opissen/2012/04/30/pengertian-utilitas/>, diakses tanggal 10 oktober 2016
- [17] Kamus Bahasa Indonesia Online, kbbi.web.id