

Analysis on the Fashion Cultural Product Design Applying on an Optical Fiber⁺

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Abstract

This study aimed to seek character and design of fashion cultural product using an optical fiber, and inquire element to be able to apply when an optic-fiber design differentiation develop into craft art and design.

At present, optical fibers are commercialized with the brands of Luminex, Lumitex, Lumigram, etc., and the products are developed diversely in cloths, fashion articles, and interior products.

When electronic technology becomes confused not visually in the technology of textile, the characteristics of fashion designs applied with optical fiber can be approximately classified for amusement, sensitivity direction, interaction, and protective performances.

Sensitive design is taken a serious view as a new expression method to be interesting and attractive as well as a kind of amusement method to make people feel fortuity they do not experience in normal fashion. Also, it pursues function of body protection as a medium of communication to convey message to wearer and observer on the basis of reciprocal action between clothes and wearer.

Fashion cultural product using an optical fiber is a kind of amusement to be interesting and attractive as well as it pursues function of body protection as a medium of communication to convey message and sensitive design which is attractive.

Key Words : optical fiber, fashion cultural product, luminous fashion

I . Introduction

Along technological and scientific advance of the 21 century, the light is not only natural

phenomena or medium having physical properties, but also the source of inspiration and magnified as a major trend in fashion and culture.

The optical electronics industry is emerging as

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an base industry of the 21 century 「a superhigh speed information-oriented society」 as well as a national strategic industry in next generation. Thus, the importance about cultural value of fashion cultural product based on optical industry which is local specialized industry of Gwangju is embossed.

However, basic data is not various for development of cultural goods grafted onto part of design · art using an optical fiber. A related research is not enough as well, so new try in part of an optical electronics industry has been required to develop a variety of goods using an optical fiber and inform this.

Thus, the recognition has been rising recently about an aesthetic value of optical fiber and usage as the formative element. The optical fiber which can sublimate to esthetic design is sure to be made good use as new material on developing fashion goods.

On the other hand, in internal researches related to optical fiber, there are a lot of researches of an experiment part which is inspected in an aspect of technology and science such as part of chemistry and electricity. But, there are not many researches about development of cultural goods in fashion area.

This study was aimed to suggest a transition of thinking way for the aesthetic values of fashion cultural commodities which are more created uniquely and distinguished by connecting with optical fiber as a new material.

In order to attain the objectives, the concept of optical fibers was identified, the technical types and applications of optical fibers were analyzed through the survey for designs of fashion commodities, and the factors that will be applicable in design development of fashion cultural commodities applied with optical fiber in future were collected together. This study, also,

was aimed to prove a possibility of the design of fashion cultural commodities newly confused with science and arts, to realize an access to art aspect.

The study results will make a basis that will be utilized in basic data and research and development activities for developing a design of optical fiber fashion cultural commodities that are distinguished and connected with arts and design together and give an idea to develop fashion cultural commodities applied with optical fiber so that it will give an opportunity to promote and advertise the optical industry, specialized industry in Gwangju.

With studying fashion or cultural product using with optic-fiber, this study aimed to understand relation among appearance of new technology, art and design. This also aimed to make clearly range of modern fashion using with optic-fiber, and use this.

This will find the direction fashion have to advance for the future, and suggest development potential of new fashion cultural product combined with art and science.

II. Theological Backgrounds

1. Concept and development of optical fibers

1) Concept and characteristics of optical fibers

An optical fiber is generally produced by spinning glass with thickness 0.1 mm to fiber phase thinly, when a light is irradiated to the end, it transmits a light output, which is equal as a current transmits through a copper wire. It is an optical fiber which is made of glass or plastic and it transmits through an inner part of glass.

An optical fiber aiming to transfer a light is

composed of core and cladding surrounding the center<Fig. 1>.

The most important characteristic of an optical fiber is the core which has a small reflection surrounded with glass on which a light is transmitted by blocking with the structure. The basic principles of a optical fiber is made of a transparent material with high reflection rate and the cladding has a relatively smaller reflection rate than the core. Such difference of reflection rates make to transfer a light by reflecting on the surface from end to the other end.¹⁾ In the characteristics, when a luminous source is supplied to a cross section, it transmits a light to the other cross section, in optical fiber clothes use the principle that a light is emitted not only from a cross section of optical fiber but also from LED connected to a scratched clad layer of optical fiber <Fig. 2>, and the principle that it emits light by reflections of an optical fiber<Fig. 3>.²⁾ Fashion commodities utilized with optical fiber are used for entertainment that makes digital colors by combining optical fiber, that is transmitting medium of light, and LED, that is luminous source.

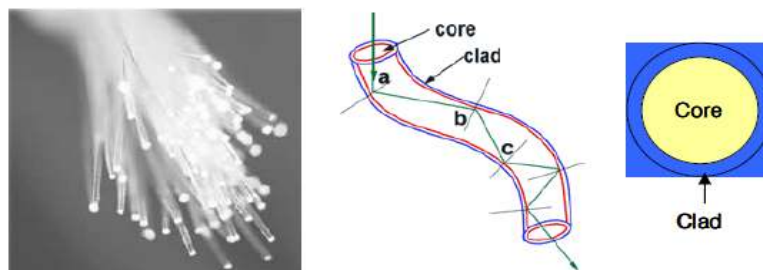
A distribution of reflection rates on the cross sectional structure of optical fiber is made to transmit a light which makes available to transfer a large information speedy as well.

And also an optical fiber is light that it is easy to use, has a smaller cross section as an insulator that it is durable in a high temperature, chemical compound, and water, so that it is widely utilized taking account into such merits.

Optical fibers are classified by the used materials : glass optical fiber mainly made of quartz and plastic optical fiber made of polymer.

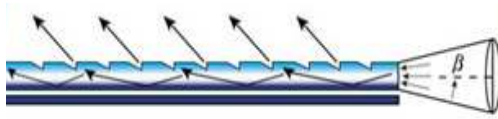
Optical fibers are applied in telecommunication and special illumination taking advantages of fast transmission speed and lower optical loss. Plastic optical fiber is light in weight and flexible, that is strong against curving shock so that it is utilized in illumination device and data transmission.³⁾

Applications of optical fibers are classified by electronic utilization, illumination, and arts. And optical fibers are applied in computer data processing, public communication, power generation, and nuclear power according to the characteristics and also utilized in illumination in medical field, automobile industry, maritime, pollution monitoring, and broadcasting. And optical fibers are applied to create a variety of artistic atmospheres so that they are utilized in interiors, sign board, and illumination decoration as well.⁴⁾



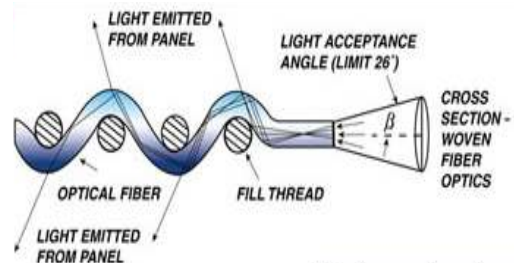
<Fig. 1> An optical fiber and its principle and structure

– <http://www.toplon.hyosung.co.kr>



<Fig. 2> Luminous through scratch of side of an optical fiber

-www.lumitex.com/technologies.html



<Fig. 3> Luminous through refraction of an optical fiber

- www.lumitex.com/technologies.html

2) Development of optical fibers

In ancient times, glass technicians understood the fact that it made complex reflections in the glass when they emitted a light to it that they applied it to manufacture of glass articles.

Such reflection phenomena by light and glass were proved scientifically by John Tyndall in 1870 first, in 1927 Hansell obtained a patent right for the technique that it transmits a video to TV by using optical fiber, and in 1950 an optical fiber was started to utilize commercially by Kapany since then.

As they have increased in commercialization of optical fiber which was initiated from development of optical fiber display rather than optical telecommunication, they have stabilized the system by integrating optical elements being emitted from a variety of luminous sources.

In 1966, K. C. Kao and Hockham presented firstly an optical fiber applied with silica glass that has contributed in development of optical fiber telecommunication technology.

In 1970s, an optical fiber applied with quartz series that was developed by Corning Glass Company in USA that has contributed to develop an optical fiber communication method with a low loss and large capacity.

And the application has been expanded to entertainment field as its role has been increased to fashion materials that makes digital colors by combining LED or laser diode module

And also an optical fiber is utilized for testing in production of smart clothes that transmit and record a variety of physical signals.⁵⁾

2. A brief history of fashions utilized with luminescence

In summary of a brief history of fashions utilized with luminescence, it was utilized in accessories mainly in the end part of 1870s, it was also utilized in 1960 when the light art was popularized, 1980 when emerged cyber culture, and the techno fashion in the beginning part of 1990s.

A glow lamp which was emerged as an innovation of artificial lamp in 1897, was utilized its function offering a convenience to living and then was continued to apply in clothes by utilization of current popularity. As a result, at the end part of 1870s and in 1880s, in France and England personal ornaments such as brooch, hatpin, hair band, etc. that emitted light by supplying electric power from battery was already started to popularize. In 1881, L¹Illustration

introduced with title of 'Electric Jewels a dancer who wore personal ornaments emitting light on the head, breast, and arm'⁶<Fig. 4>. The clothing designed by Trouvé was ornamented with glass gem stones in hair band, necklace, and brooch, which was designed to emit light by manipulating battery and switch of 2 - 4 volts hidden in the pocket.

In 1883, Charles Frederick Worth, creator of Haute Couture, presented 'Sprit of Electricity' which he combined gen decoration and artificial light in the head together with diamonds'⁷<Fig. 5>.

Arts also pursued an expansion of new materials while appearing the era of technopia which is abundant and convenient causing by development of science and technology in the early part of 20th century.

A new invent reflected curiosity and creativity in which artificial light and fashion were combined together in 1930s, in the title of 'Electric Jewelry for Milady' of Modern Mechanix and Inventions in edition of 1932 introduced the

earring'⁸<Fig. 6> utilized with electric lamps emitting light instead of pearls and the hand bag'⁹ utilized with electric lamps that was introduced Jodiac Collection of F/W Elsa Schiaparelli in 1938.

A series of tries to connect an artificial light, a new technique, into clothes during the first half of 20th century were concentrated in personal ornaments and fashion articles, whereas, since 1960s when it popularized light art utilizing neon and fluorescent lamps, it started to emerge examples on which it was utilized in clothes. Atsuko Tanaka presented 'Electric Dress' in which he tried to connect traditional kimono and modern industrial technology with lamps and fluorescent lamp in 1956, as an another aspect of avangarde art'¹⁰ <Fig. 7>.

Vinyl dress presented by Diana Dew in 1966, as shown in <Fig. 8>, in which EL(electro-luminescence) film was inserted and manipulated by a small battery that flickering speed of 1 to 12 per second that was adopted as a typical interactive disco fashion currently.¹¹



<Fig. 4> Monsieur Trouvé, Electric Jewels, 1881, -Fashioning The Future, p.99.



<Fig. 5> Charles Frederick Worth, Sprit of Electricity, 1883,-Fashioning The Future, p.99.



<Fig. 6> Electric Jewelry, 1932, -http://blog.modernmechanix.com



<Fig. 7> Atsuko Tanaka, Electric Dress, 1956
-Fashion The Future, p.105.



<Fig. 8> Diana Dew,
Electro-luminescent Dress, 1966
-Radical Rags, p.100.

As it became the latter half of 20th century, as invent of advanced artificial luminescence as equal as laser and LED(light emitting diode) regulating color and brightness by digital was emerged, it populated techno cyber fashion.

Paco Rabanne in 1993 presented the article with imaginable image as like as new material is radiated for slight light streams by taking a new formative creation in order to create a fashion design in which light exists actually<Fig. 19>.

In 2007 Hussein Chalayan firstly presented 'Airbone' as shown in <Fig. 10>, in which the clothing was formed for a screen by shaping the membrane with about 15,000 LEDs on the surface, and 'Crystal hat' as shown in <Fig. 11>, that emits light by using rod LEDs brightening a view in darkness.

In his 'Readings' collection presented in 2008 S/S, the clothing attached with luminescent sources together with crystal ornaments, which was designed to be operated by servo motor<Fig. 12>.

Phillips Design presented in 2006 'Frison', a body suit, expressing an emotion to clothing, as shown in <Fig. 13>, attached with LEDs that emit light according to a degree of excitement.



<Fig. 9> Paco Rabanne, 1993,
-Paco Rabanne, p.151.



<Fig. 10> Hussein Chalayan, Airbone,
-2007 F/W



<Fig. 11> Hussein Chalayan, Crystal hat,
-2007 F/W



<Fig. 12> Hussein Chalayan, Redings,
-2008 S/S

'Bubelle Dress', as shown in <Fig. 14>, adopted the design that electronic technology was integrated into fabric so that it emits discriminated luminescence effect by a sensor detecting a change of emotions of wearer.¹²⁾



<Fig. 13> Frison, Phillips Design, 2006
– <http://www.design.phillips.com>



<Fig. 14> Bubelle, Phillips Design, 2006
– <http://www.design.phillips.com>

History of the fashions applied with luminescence sources are summarized below <Table. 1>.

3. Concept of fashion cultural product in the aspect of cultural industry

Peter Drucker, father of modern business administration and worldwide famous futurologist, inserts “Each of countries will decide a victory

or defeat in cultural industry in 21st century and the final victory place will become just cultural industry.” in order to focus on the importance of cultural industry.¹³⁾

Cultural industry is cultural phenomena being generated in the process of combination of culture, economy, and techniques in the modern society and upbringing of cultural commodities is directly connected to cultural identity of a country, indirect national image transfer and promotion, and national competent improvement.¹⁴⁾

As a demand for cultural consumption has been increased continually, a demand for cultural commodities, that are experiencing materials, has been increased as well, which is recognized as an industry with big impact on culture and economy that can produces a high value added.¹⁵⁾

A cultural commodity is the final production result being produced in industrial activity by utilizing cultural materials in which idea with high cultural value added, high technology, and creative invent are combined together, which are commonly possessed to cosmopolitan in the world by expanding markets in the information and which are characterized by its variety, diversity, non similarity, and high value added.

Therefore, an integral satisfaction to customers that is intended to harmonize techniques representing science and technology and esthetic forms representing formative arts in a development of new commodities.¹⁶⁾

It could be a fashion cultural commodity that has a fashion characteristic among cultural commodities and that could be identified as high value added cultural commodity which is sold by its own image.

Fashion cultural commodities are those with fashion characteristics among cultural commodities include clothes, scarf, necktie, handkerchief, various kinds of accessories, but the concept

<Table. 1> Development process of fashion applied luminescence

Period	Development of luminescence	Fashion types applied with luminescence	Famous designers
End of 19th century	Glow lamp	Electric jewelry such as brooch, head pin, and hair band, applied with electric lamp	Monsieur Trov�, Charles Frederick Worth
Early part of 20th century	Neon, fluorescent lamp	Necktie, handbag, earring, etc. attached with electric lamp	Giacomo Balla, Elsa Schiaparelli
Middle part of 20th century	Laser, EL, LED	Dress attached with electric lamp. Interactive fashion that is available to adjust flickering of light by using EL plate and gauge	Atsuko Tanaka, Diana Dew, Joan Tiger Morse, Yves Saint Laurent
Since the end of 20th century	Optical fiber, Development of LED, OLED	Techno cyber fashion by using fluorescence, noctilucent material, LED, etc. Fashion combined with laser, optical fiber, and digital video techniques and textile techniques	Hussein Chalayan, Paco Rabanne, Thierry Mugler, Alexandre Herchcovitch, Anke Roh, Meggie Orth.

should be accessed to a wide range including clothes, sundries, accessories, interiors, and cosmetic products.¹⁷⁾

III. Designs of fashion cultural product applied with optical fiber.

Fashion design has been reflected with an esthetic paradigm that changes a value this era directs from something fixed into changing, from tangible into intangible, clear into ambiguous and surfaced the interaction that adopts a dual direction as well.¹⁸⁾

An optical fiber was utilized in communication and transmission of video in the first development stage and now is utilized in bag, interior products, and club ware requiring a notice taking advantage of its characteristics emitting more detail and mysterious lights than LED electric lamp.

At present, optical fibers are commercialized

with the brands of Luminex, Lumitex, Lumigram, etc., according that is has been increased of flexibility and textile production with other fabrics, the products are developed diversely in cloths, accessories, fashion articles, and interior products by weaving optical fiber and other fabrics in centering on recent designers collection as well.

Luminex Company in Italy has developed "Luminex" a functional fabric that makes possible to realize variety of colors by using the principle of light emission that they made scratches on the clad layers in plastic optical fiber, weaved with ordinary fabric, and then connected to LED.

Luminex is light in weight, flexible, needling, and washable that could be utilized in clothes, interior articles, curtains, and sofas diversely.¹⁹⁾

Luminex Company is producing clothes for club or dancing party such as stoll, shirts, trousers, etc., as well as wedding dress utilized with Luminex, clothing in stage

Club clothing produced by utilizing Luminex



<Fig. 15> Club clothing of luminex
- www.luminex.it



<Fig. 16> Stage clothing of luminex
- www.luminex.it



<Fig. 17> Wedding dress of luminex
- www.luminex.it

<Fig. 15> can be used as an ordinary clothing when turned off the power and as club clothing when turned on the power so that it is an item of dual uses.

The stage clothing produced with Liminex <Fig. 16> emits light by itself so that their eyes are concentrated the wearer even without an illumination that it is possible to create a luxury and mysterious atmosphere. Solo Sposa Company has presented firstly a wedding dress collection <Fig. 17> named as 'LUCE', and they could realize mysterious and luxury appearance of bride taking advantage of mysterious lights from optical fiber.

Anke Loh, Belgium designer, in 2006 tried a job that weaves black cotton and optical fiber together and then integrates the fabric and lights in one piece dress <Fig. 18> in an exhibition held in Chicago, and Sabin Münch presented the design <Fig. 19> applied with optical fiber in a 2007 fashion show. The Luminexes they utilized then are available in trimming and needling so that can be mainly utilized in ordinary clothes.²⁰⁾

And it can be applied in neck tie, a variety of fashion item <Fig. 20>, in living article that can

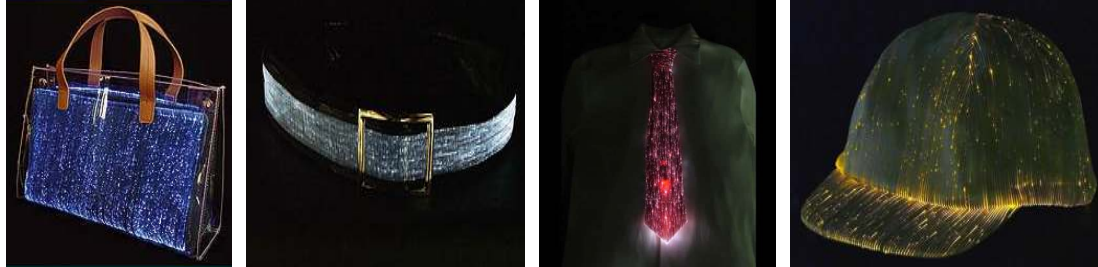


<Fig. 18> Anke Loh, 2006
-<http://www.aneloh.net>



<Fig. 19> Sabin Münch, 2007
-*Jung Hyun*, p.101.

be produced with home ornaments, cushion <Fig. 21> and other fabrics.



<Fig. 20> Fashion item of luminex - www.luminex.it

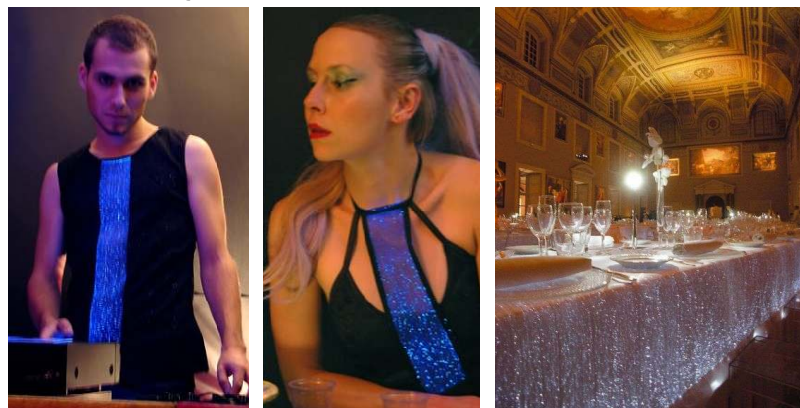


<Fig. 21> Living item of luminex
- www.luminex.it

<Fig. 22> Safety device of luminex
- www.luminex.it



<Fig. 23> Product of lumitex - www.lumitex.com



<Fig. 24> Party clothing and table linen of Lumigram - www.Luxurylaunches.com

When the technical function are reinforced, it is possible to develop the safety device <Fig. 22> that is used to rescue personnel in a place where it is very dark causing by a deep mist, or smoke.

Besides, the products from Luminex Company are mainly applied in luminescent parts in backlighting of cellular phone button and remote control button, ornament of shoes, bags, game jacket<Fig. 23> and the like and those have a simpler structure than other products and merit that can realize a high brightness as well.²¹⁾

'Luminous Fiber Optic Tablecloth' from Lumigram Company, it emits light in the stripes composed of lamps or semimetal candle when it is connected to the power generator. The table curtain<Fig. 24> composed of optical fiber, woven throughout, surface frame, and euro plug main adopter, it is most available when it darks and it is utilized as a central beautiful ornament in a meeting.²²⁾

Decoray Company, a domestic company, started to develop optical fiber weaving technique since 2000, and completed to develop an optical fiber weaving machine 'Osero : Optical fiber Sewing Robot'. They also have completed to develop a luminescent character patch that can realize five color lights by combining optical fiber, LED, and CPU using a high tech and Osero, an automation continuous device.²³⁾ And this luminescent character patch weaved with various and a lot of optical fibers on the surface such as leather, denim and so on according to a computer graphic programming that is designed to be displayed, that can be connected to in applications <Fig. 25> of hats, bags, clothes, accessories, shoes, idols, and commemoration plates, etc..²⁴⁾

The products are attached with power stitch with one touch function that it is used

conveniently without electronic waves and is has a water proof function that the optical fiber can not be separated.

Besides, 'Smart Clothes Commercialization' Team, an development project organized by the Ministry of Industries and Resources, in Yonsei University has developed smart clothes with new concept including optical fiber clothes <Fig. 26> with party ware concept, optical clothes responding to a sound, optical clothes changing different colors, etc.. A piping of bundles of optical fibers is utilized in the detail of the clothes which was applied in ribbon type, fabric type, and a variety of fabric kinds as well. In case of optical fiber clothes responding to a sound, a light is entered into optical fiber when a strength of sound becomes large by adopting a mike into the module of optical fiber.²⁵⁾

IV. Design characteristics of fashion cultural product utilized with optical fiber

As the application of optical fiber LED: light emitting diode, which is called as luminous source for next generation, it is anticipated that a connection of light in design will be increase to put on a sensitivity and to improve an artistic value even by jumping up colors and patterns.

When electronic technology becomes confused not visually in the technology of textile, the characteristics of fashion designs applied with optical fiber can be approximately classified for amusement, sensitivity direction, interaction, and protective performances.

1. Amusement

As Andrew Daley has paid attention to the trend



<Fig. 25> Luminous products and application goods

- www.decoray.co.kr



<Fig. 26> Clothing of shiny function, clothing to change colors,
a one-piece to respond to sound, -Park Haeyoung, p.28.

the present digital media are changing from an experience on interpretation and analysis of existent video art into that on sensitivity and amusement, fashion design applied with optical fiber directly gives with a interesting and pleasure as more active and experiencing clothes on which the principle of light emission is used for being adjust able by itself through advice. And it act as a medium that presents an interesting and pleasure causing by accidental result by interacting with the creator by utilizing artificial light and technical device as well.

Fashion design applied with optical fiber becomes

an object being contemplated that makes people to experience an incidental effect giving by light and an amusement causing by visual interesting converts the clothing to become a space where a wearer experiences an amusement by introducing the creator in the clothing through light by jumping up a negative position so that it is given with more active and creative meaning as well. Since it emits light when a clothing and a wearer interact mutually such as contact or movement, it has the characteristics that give a visual interesting and pleasure for all of a wearer and observer.

2. Sensitive direction

A combination of digital technique and fashion design has been developed in the direction that focuses on aesthetic appearance or sensitivity for consumers.

Light is utilized as a significant formative element in the fashion design connected with textile technology, as a measure to make visualize the technology connected with it not visually, and also it suggests the fashion for more sensitive direction.

The fashion design adopted with a luminescent device makes possible to coexist with something realistic and unrealistic provides an image that are likely emerged into an ambiguous and unconscious world while being combined with a strange element. Some of attractive visual phenomena such as light effect being flicked, irregular movement of light, color changing light, and the like makes an observer to be dazzled.

Fashion design applied with optical fiber has been utilized as a visual medium that irritates and transmits a sensitivity by visualizing a non-lingual communication that it has been developed for sensitivity direction.

3. Interaction

Fashion design has been reflected with an esthetic paradigm that changes a value this era

directs from something fixed into changing, from tangible into intangible, clear into ambiguous and surfaced the interaction that adopts a dual direction as well.

And also the clothing takes a role of communicator who makes possible to do functions from a display device, protects the wearer against environment by emitting visual lights and changeable videos, and transmits an information or inform a emotional state of the wearer.

Communicating Clothes developed in France Telecom as shown in <Fig. 27>, those are the clothes applied with flexible fiber optic screen that emit light by weaving with optical fiber and act as a unit of pixel, so that those can transmit data using a mobile device, change images the wearer desires, and demonstrates a possibility for a flexible display as well.

4. Protective performances

The fashion design applied with optical fiber, LED, etc. makes the clothes to take a role emitting defensive or protective signals by using textile display available to do a programming.

And also it has the performance protecting a wearer to focus or disguise him from ambient environment by combining videos from high visual light emission or textile display device.



<Fig. 27> 'Communicating Clothes' of France Telecom
- www.francetelecom.com



<Fig. 28> Reima Robotec of Clothing+ overalls - www.clothingplus.fi

Child winter clothes of Clothing+ Company in Finland as shown in <Fig. 28>²⁶⁾, the optical fiber emitting a red light is piped in the shoulder and that can be switched on or off by the power button put up on the breast part so that child wearer can prevent from traffic accident

It emphasized functional characteristics which induce physical body protection and psychological stability through embossing or camouflaging wearer from external condition with expansion limited human sense by attention and changeable function of the light.

V. Conclusion

Industrialization and development of scientific technique affected much society, culture and art of the same age. Invention and spread of optic-fiber, which is one of them, make expression of design expand.

Development of industrialization and scientific technique had a big effect on society, culture and art of the same age. Especially, invention and propagation of an optical fiber, which is one of them, expanded expression area of design.

An optic-fiber is made active use at development of smart clothes as well as clothes for party, fashion item and interior which is available daily, because it is able to cut and sew. Fashion design using an optical fiber, also, suggested possibility of mutual combination between technology of light and textile technology as grafting sensory technology and holding 'LED' in textile.

Analyzing fashion cultural product using an optical fiber found design characteristic of amusement, sensitivity, mutuality and protection.

Character of playing induce diversity of visual and tactual experience through phenomenon of

colorful light so that it was affording deviation of clothes which have never experienced in fashion, pleasure and interest of playing way which reflect play.

Sensitive directivity was fully utilized for visual medium which stimulate wearer's sensibility and say emotion through the light so that it was affording potential of sensitive communication between wearer and observer.

Interaction make fashion be possible to be a communication medium through the light which can communicate and stimulate sensibility so that it was reflecting volition about communication and interchange of modern men.

Protective functionality express visual image which can prevent accident in advance or camouflage on clothes with the light which is noticeable so that it was emphasizing functional characteristic to induce physical body protection and psychological stability.

Limitation of this study is to select photos not the actual things as literature research at selection of design using an optical fiber. Therefore, it seems to need steady research and active design development on a functional and aesthetic basis.

If it is developed fashion cultural product using optical in Gwangju where is developing optical electronics industry as specialized industry on the basis of this study, it will make good use from the point of view of local value as part of effort of local industry to promote. It is also possible to settle as local specialized fashion cultural product, and make a contribution to activity of a related research. it pursues function of body protection as a medium of communication to convey message.

An optic-fiber is made active use at development of smart clothes as well as clothes for party, fashion item and interior which is available daily, because it is able to cut and sew. Fashion

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