

A Study on the Effect of the Digital Nomadism on Modern Fashion

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ABSTRACT

Rapid informatization and technology advance in the 21st century has invited a new paradigm and changed many things in human life pattern. The impact of mobility seen in this digital nomadism has brought about, when it comes to clothing, a change in its unique meaning, that is, the graftage of high technology onto present nomad's life style who live moving around all the time due to the expansion of mobile environment. As the fruits of this expansion of mobile environment and technology advance in wireless telecommunication, easy-to-carry smaller sized devices such as cell phones, PDA, and MP3 players represent the present times, while the future would be an 'era of wearing' in which kinds of electronic devices and systems are integrated into clothing. Thus in this study, concept of wearable computer seen in the 21st century's digital nomadism was reviewed, and figurativeness and anesthetic value of wearable computer were discussed in association with the change in high style image resulted from technology advance and change of life style. By drawing a justice from which, value of future fashion was also prospected.

Key words : digital nomadism, digital nomad, wearable computer, mobile, future fashion image

I . Introduction

1. purpose and significance of the study

In 21th century, life style and paradigm of trend are changing along with digital age from analogue one. With construction of information and communication network indicating the development of digital technology and spacial movement, fixed residence disappears, instead, nomadic thought, a new paradigm

flitting over the boundary of area, appears. Jacques Attali predicted that future life will go back to nomads style from current settled residents one, and presented 3 kinds of nomads as the typical in future life, who will move around virtual space for leisure, hobbies, and existence as a virtual nomad[1].

Fashion is the most essential in human life, along with foods and house. Through fashion, we experience boundless imagination and contact new ideas, which again plays a role of catalyst for advance. From this view, it is anticipated that nomadic thought as the ground of design paradigm in digital

age beyond a certain time and space would give effects to the type and the function of fashion and bring about changes. The core of nomadic thought is the creation of new value by traversing the exiting area, not just a physical movement.

In fashion, nomadic thought views clothing as 'mobile environment' transformable to usage, not fixed to a certain usage, which has brought about changes in the unique function of clothing, and so clothing became to have more high tech function by combination with technologies[2]. This led to a new idea, wearable computer, meaning the combination of various information appliances including computer in digital age and clothing.

'Wearable design' is to design such materials that the user attaches to his body and use at any place and at any time. It has been extended to daily life and even fashion. 'Wearable design', originally started from scientific and engineering idea, is now being energetically studied in combination with computer in fashion circle.

Fashion has been over and over developed along with the history of mankind. In the past, it did just such functions of protecting body from cold, heat, and animal's threat, but in the present times, as a symbolic tool to express one's characteristics and beauty, it has varied its roles in accordance with the age. Fashion is now much contributing to elevating the quality of human life by becoming more scientific, high tech, and functional along with the splendid development of science culture.

Wearable computer is possibly embodied through specific functional devices, intentioned design, and user's manipulation, and comparatively easy to trace the functional changes through visual materials such as designer's collection and ready-made clothes. With these materials only, however, it is difficult to find out the generation background and the reasons

of wearable computer. Thus, this study was intended to discuss nomadic thought as one background of wearable computer phenomena in clothing, and the meaning of such fashion.

2. Methods and Scope of the Study

This study discussed the effects of present nomadic culture in digital age toward fashion design, in relation to advances in technologies. It was investigated in what concept and features of wearable computer the effects appear.

Literatures including technology history, art aesthetics, previous papers, internet, and other publications were reviewed to investigate the theories on advances in technology, social aspects of technology, related overall changes in society, culture, art, and fashion, history and aesthetic value of wearable computer image.

II . Theories

1. Idea and Background of Digital Nomad Culture

In the process of turing into digital industrial society, modern citizens are leading a nomadic life moving place to place rather than settling in one place. This means flitting over not only place but also area, and even thought and value as well. When paradigm of thought and value changes, it always puts out a new key word. Dramatic shift into information and technology society has produced this keyword, nomadism[1].

Knowledge-based society which is the foundation of digital nomad culture is such a society that in all field of industry, knowledge is put into as production elements for enhancing added value and productivity, and the cumulated culture in each

segment plays a role in knowledge production. In this knowledge based society, it is necessary to cultivate creative knowledge industry. The next information society would be such one that creation of information value by using high tech produces higher added value than ordinary materials and service do, in the aspect of economic activities, and in the aspect of social structure, stereotyped and centralized hierarchy which has led the existing industrial society is altered to a parallel and mutually cooperative network system based on plurality and dispersion.

Digital nomadic culture is characterized with information technology, a new communication technology that is a realization of two way communication to the digital nomads, similarly to the past nomads was aware exactly and in detail of the culture of outer world. New media refers to such a media that newly appeared, not existed in the past and have some new functions by properly combining or integrating the existing communication systems. The characteristics of the new communication technology, that is, new media includes, according to Roger's theory, anti-popularity that retracts public-oriented policy and emphasizes individualized message, asynchronism that allows the users to exchange messages through system without limit of time and space, and two way interactive exchange that enables to change the role of communication.

In the culture created by new communication technology - new media, existing various boundaries are breaking away, instead, fluidity, plurality, uncertainty, and anti-centrality of today are pursued. This new communication technology - new media is not the culture of outcome, but that of process. As networks are being formed, economic system is converted to the economy of process unlike the past industrial capitalism that made much importance of

material goods, thus the reconstructed goods of various sources combined under a virtual economy are quickly moving through the circuit of society[4]. In this view, the culture of new communication technology - new media is safely defined as a floating digital nomad culture.

Mobility has given much effects to not only our living in telecommunication in the present nomadic environment but also through the long history of mankind, and in the upcoming digital environment, will further enlarge the effects and change many things in human life. Even in the fashion circle that most quickly reacts to the impact of cultural things and value in the changing society than any other things, the effects of digital technology and nomad culture are clearly coming out.

Especially, development of wearable computer in which computer, telecommunication, design, and fashion are integrated together is on the rapid current, and clothes designers and communication experts are producing the clothes for modern city nomads. A new trend of 'wearable electronic appliances' and 'smart clothes' are being formed.

Considering that the meaning of clothes is determined by the situation of wearing, nomadic characteristics seen in the present fashion is magnifying its importance and size in accordance with the spread of mobile culture and the moderner's life style of always moving around.

2. Meaning and Characteristics of Digital Nomads

Advent of information society and digital world was a milestone in determining the direction of future designs. This social change has driven the moderns from the settled farmers tied to land to the nomads moving around the networked garden cities.

Digital nomads, symbolizing 21C new mankind, are referred to as such people that are equipped with high tech equipments such as cellular phone, notebook computer, and digital camera to work moving country to country[5]. They are also called as nomad or digital nomad, job nomad, modern nomads, and business gypsy. It was predicted for the first time by Marshall McLuhan, an Canadian media scholar, in the early 1970s, and occurred in Europe where people easily cross the nation. In the end of 1990s, a German futurologist, Gundula English laid down a definition of Job Nomad and a French sociologist, Jacques Attali defined 21C as the age of nomad, since then it is widely used.

The word 'Nomad' came from Latin language, but originally derived from a Greek word, nomas. Nomas is a compound word of nemein meaning 'to divide into shares' and as meaning 'to drift the assigned place'. As seen in the etymology, nomad has the meaning of such a person who lives drifting here and there for the nature God assigned to him.[2]

The past nomads moved around for information of food, holding sword and spear and on camel, while the digital nomads in the information society in 21C are traveling around the world for information, holding cellular phone and notebook PC and on the plane[7]. The latter is frequently altering their residence and work place though, they are such people of free and creative mind, forming personal relationship through network, and most of all, very accustomed to digital culture.

Jacque Attali described, in his <21C dictionary>, the new mankind who drift the cities and ceaselessly change their identity as the 'city nomads', predicting that their demands would rule the society and the market would satisfy them with all efforts. The nomads hold modern nomadic items endowing

them with mobility so as to always remain in connected status, therefore they will go ahead of the times, not be alienated.

Attali described the typical features of people in the next century as a nomad of 'lightness, freedom, hospitality and watchfulness, connection, and benevolence', especially 'lightness' is the very value that modern nomads most favor, which means leaving behind as much resources as possible at the place easy to access and holding just simple input and output devices to access the resources. For the nomads who want always fresh news, information and portable devices are those of survival.

A futurologist, Gundula English described the 'nomads drifting to one's job' as Job Nomad, a coinage. It is the existing concept of nomad plus information, knowledge, and technology, and refers to the moderns' life style that travel around the world on occasion at any time, to any place, just holding portable electronic information and a terminal. They make much of communication with the world citizens, incessantly exchange information through network, and always move to somewhere.

Job nomads don't get tied to one work place, one location, and one job category. For these job nomads, labor is to do work, without inner opposition, without coercion, at any time, and at any place, as they want. They make much of their thought and experience, cumulate knowledge and relationships, and solve spacial needs via network. They are exactly aware of their value and use it for themselves, and refuse old labor system, traditional thoughts behind the times, stiffened value, and old economy and market system which just forced passive roles only to the employees, and realize modernization[2].

The heart of nomadism lies in creating a new value across the existing realm, not just traversing

physical space. Digital nomads' important characteristics is that they utilize high tech IT technologies with mobility. They make best use of new technology, pursue new experience, and demand human emotion and stability.

3. Fashion Image in Digital Nomad Culture

1) Idea of Wearable Computer

Brisk advances in semiconductor technology has brought about revolutionary development of computer and telecommunication and accelerated high speed informatization to change telecommunication paradigm and the living pattern of mankind. And, a new computing age is being demanded, including super mini output device and storage, input mode based on sensor and vocal recognition, and mobile telecommunication.

Wearable computer is a new idea meaning the combination of various information appliances including computer in digital age and the clothing. So far, PC is available at one place or possible to move but available only in stationary status, while wearable computer is possible for men to send and receive information not only at any time and at any place but also on the move, which is an obvious merit. As advances in computer with smaller-size and lighter weight and the development of wireless communication technologies accelerate shifting into mobile environment, wearable computer is also being positively studied by the request of such information equipments that can be held without inconvenience of holding all the time, connected all the time, and with various functions.

In general, 'wearable computer' is interpreted as 'computer to wear', which considerably narrowed the meaning of word, 'wearable'. In dictionary meaning, the word, 'wear' has meanings of 'to wear something such as clothes, shoes, hat, lenses,

and jewellery, etc on the body or on part of the body.' This has confined the usage just to the meaning of 'wear something like clothes', consequently narrowing the scope of thought. Then, it is desirable to take 'computer to wear' as 'computer to put on'. From the words, 'put on', we can analogize other meanings like 'to wear clothes, shoes, hat, lenses, and tools, etc.'

This wearable computer initially began to be developed for military exercises and now being extended to information equipments and even to fashion. The wearable computer in <Fig. 1> is of future computing technology that can be accomplished only when technologies in not only computer but also other various area such as machine, physics, fashion, emotion engineering, and psychology are studied in link.

Study of wearable computer started at MIT Media Lab. and the large and heavy computer in the early days was just a 'machine' as a wearable equipment. Wearable computer with the focus on 'fashion' and pursued after improved wearing feeling and men's emotional requirement is brilliantly growing in performance with the help of brisk progress in computer engineering in the early 1990s. Advances in technologies to substantially miniaturize computer equipments, for examples, semiconductor integration technology, computer input mode based on voice and movements recognizing devices, miniaturized output device, and telecommunication advance, has accomplished such a smaller sized computer of which form is unrecognizable, and now is focusing on generating actual 'digital clothing' not much different in appearance from general clothing[2].

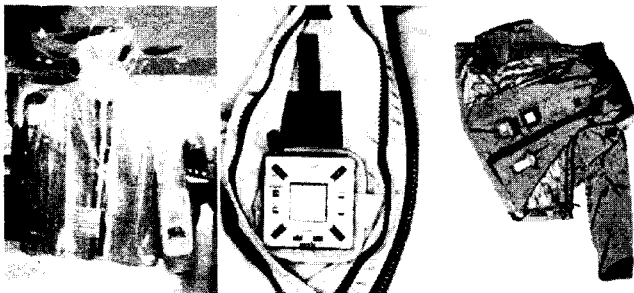
Currently, R&D in wearable computer is active in order to lead next generation technologies. US is propelling such R&Ds, based on academy-industry cooperative research institutes. Especially, MIT Media



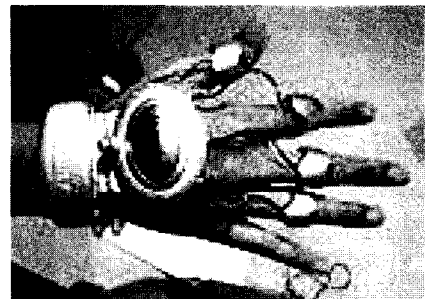
<Fig. 1> Wearable computer for the military



<Fig. 2> MIT Media Lab.



<Fig. 3> ICD+ Jacket



<Fig. 4> Scurry of Samsung CO.

Lab with funding of large conglomerates, Georgia Engineering College, and Carnegie Mellon University are those active in wearable computer R&D <Fig. 2>. In Europe, lots of multi-national corporations are performing wearable computer R&Ds. Especially, Levi's Europe in Belgium and Phillips International in Denmark are most active in the R&D <Fig. 3>. Japan is quickly developing wearable products with the advanced technology in miniaturization. Xybernaut Co. in US, which has many patents in wearable computers and released products on the market, defined wearable computer as 'all things to do computer behaviors by attaching to body'[2].

While, in our country, Korea, R&D in wearable computer is still in starting phase. A representative

wearable equipment is the 'Scurry' keyboard of Samsung Co.<Fig. 4>, and some as the application of information appliances are under development in several companies.

By about 2005, wearable computer will be advanced to commercial electronic appliances and widely used in all field of industries such as fashion, leisure, entertainment, and business, which will bring about revolutionary changes in human life and also serve in medical circle, mass media, defense industry, and the likes. By around 2010, according to experts, information appliances in the present forms will disappeared, instead, wearable computer will be used in daily life.

Upcoming information appliances will form a

body network through human body as simply a terminal and attempt to make various combination with existing all fashion tools.

2) Design Image of Wearable Computer

Birth of computer closely contacted to body to perform function as a clothes and computer means the new innovation of computer interface. The effect of digital nomadic culture to the fashion is that fashion will act as actually the secondary skin by combining modern nomad's life style on the move all the time in the spreaded mobile environment and the new materials from high tech. This can be boiled down to the change in fashion, that is, extension to the tool of multi function.

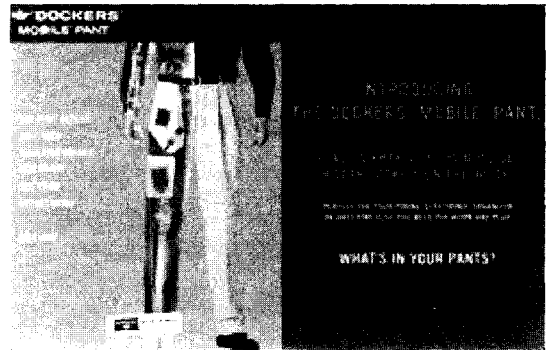
① Image of Carrying

Modern nomads hold various types and functions of materials all the time. As cellular phone, notebook PC, and palm pilot, these portable information appliances become usual, it is the pocket that is especially emphasized in fashion design[2]. Rather than altering clothes form and silhouette, it is emphasizing the pockets on a certain part of clothes to give functionality but also design element.

As the representative example, cargo pants featuring lots of pockets used zipper and patches for active and sporty design to produce functional and decorative pockets in various forms. A fashion business, Levi's Co. released the mobile pants in a brand name, 'Kahhis' in 2002, which attaches various pockets named 'Dockers' to hold kinds of mobile appliances <Fig. 5>.

Another fashion item for modern nomads is the body bag, of a 'free hand design'. These bags appeared with the concept of 'wearable bag', and are characterized with intimacy with body, easy wearing and taking off, and no need to hold in

hand. This characteristics appears in the image of clothes by high fashion designers, for a example, the body bag released by Prada showed the image of wearing a portable computer. This is the combination of belts and hip pouch, an extension of pockets.



<Fig. 5> Live's mobile pants



<Fig. 6> PRADA's body bag

Like this, design image using pockets and body bag emphasizes freedom and convenience in nomadic urban environment. Portable information appliances more and more going smaller in size is breaking down the boundary between 'machine device' and the clothes, and being combined into one to proceed to digital ware allowing telecommunication at any time and at any place [12]. In these designs, it is

important to make a natural contact to the body so that there is, most of all, no discomfort in wearing. They are going to such a direction that can satisfy not only functional requirements but also aesthetic desire.

② Combination of Technology and Clothes

Wearable computer means the combination of information appliances including computer in digital age and the clothes. It has a merit that it can send and receive information at any time and at any place, even on the move, with the help of mobile environment resulted from smaller size and lighter PC which was available only in a stationary status in the past.

Upcoming information appliances will stop just a terminal role but get fused as a clothes material so that the appearance will not be different from that of normal clothes and continue development for human being with no discomfort in wearing and using. Although electronics companies are producing computers, wearable computer is no more the monopoly of those companies. It has computer functions though, wearing itself implies the meaning of clothes or accessory so that clothing business can not help having interest. In 1999, a computer development consortium was established centering around companies. Participants of the joint development in the consortium included 7 businesses: a sports goods company, Adidas; a blue jean company, Levi's; a fashion designer's brand, Andre Courreges; a fiber company, Bekintex; a computer company, Baso data security; an electronics company Lexitel, and in December in 2000, IBM entered the market, too.

In 2000, Philips and Levi's made a joint release of the jacket named ICD+ <Fig. 3>. This was outfitted with cellular phone, head phone, remote

control, and MP3. Its weight was just 145g, and seemingly not very different from normal clothes. 'Blue Tooth Jacket' developed in French has similar performance as well. Embedded head set in the hat, embedded mike in the zipper, and slim computer on the sleeve, with these 3 devices the wearer can do what he want. 'Cyber companion' developed in Germany in the early 2001 was the combination backpack computer and headset. The user use voice to operate this computer, watching the goggle, a display unit[2].

MIT in US developed a raincoat which shines light in the rain. When water touches the sensor on the front side of the jacket, a radiation lamp connected to the sensor is lighted. The luminosity of the light varies to the intensity of rain drops so as to prevent any accident[2] <Fig. 7>.

While, in our country, research and development in wearable computer is yet in initial phase. The representative example of wearable device is 'Scurry' keyboard of Samsung, and some as the application of information appliances are under development by a couple of companies. A wearable community research team in Yonsei University showed off a casual clothes outfitted with PDA, GPS, and wireless LAN last year. Recently, a wearable computer project team of Yongin Songdam University located in Yongin put on a fashion show <Fig. 8>. Songdam Univ. established a 'computer to wear' team in 2000, and studied such a computer that can be equipped to clothes[2].

The core technology of this smart clothes lies in energy supply method. The Fraunhofer Gesellschaft developed an innovative capsule method to attach solar cell to the shoulder part. This method allows to break into more smaller size and attach smoothly. The idea of equipping an audio device into a fiber to listen to music during jogging with no

discomfort has already come out a couple of years ago. That is, MP3 player of 3cm² in size is equipped into the fibers and copper cables as thin as a hair connect the player, head phone, mike, and keyboard, then a full audio set is outfitted in the clothes.

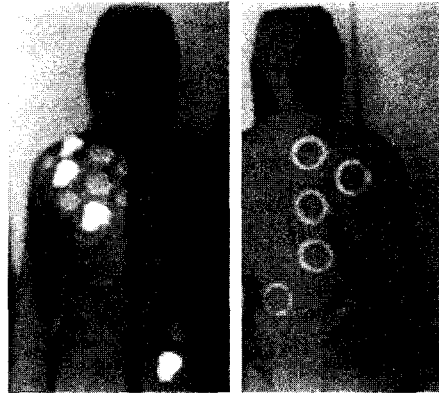
Molden Mills in US developed 'Polartec', a conductible fiber made of stainless still, and Post Miller developed electronic textile which has an antenna function to wirelessly transmit information. Inpinion Co. also showed off a jacket prototype which uses conductible fibers to connect kinds of information appliances including MP3 player <Fig. 9>.

Burton Snowboards in US developed a snow board jacket in which Sony's walkman mini-disc system is embedded. Its merit is that it allows attaching and detaching, and machine laundering as it is composed of MD player and headphone <Fig. 10>. Inpinion Technology Co., a semiconductor company in Germany, developed a snowboard jacket by joint development with Munich Design School, in which embedded are such devices with wireless antenna function as 'the HUB' Blue Tooth and MP3 player <Fig. 11> so that when the snow boarder makes a phone call, the stereo system plays a headset role. The micro phone is embedded in the jacket collar.

Nokia developed Medallion which uses metal frame or leather string to connect small display and wears like a necklace. It stores the images pictured by embedded cellular phone or digital camera, as many as maximum 8 sheets, through infrared telecommunication, and use lithium ion battery. It can display, delete files, and view the time <Fig. 12>.

A bag with thin speaker and volume control device on the shoulder strap (FPS in Japan) and a snowboard electronic jacket to which MP3 player and remote control are attached so that the wearer can enjoy snow boarding and listen to music (Button Snow Board Co. in US), they were already

commercialized long ago. Smart clothes of Inpinion Co. in UK, which embeds MP3 player and earphone, is possible to do water laundering but also dry cleaning.



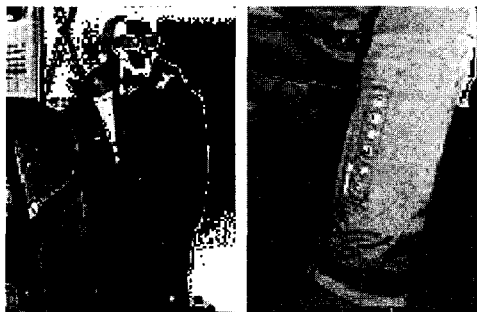
<Fig. 7> MIT's Puddle Jumper



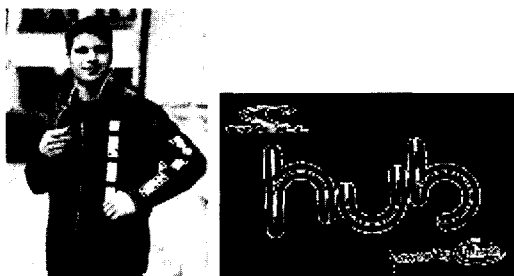
<Fig. 8> Wearable computer fashion show by Yongin Songdam University



<Fig. 9> Digital sweater of Inpinion CO.



<Fig. 10> Snowboard jacket of Burton Snowboards Co.



<Fig. 11> the HUB' of Inpinion Co.



<Fig. 12> Medallion of Nokia

4. Conclusion

Living in more and more digitalized and segmented world is acceptable in terms of efficiency, while our demands increase as we get accustomed to technologies.

In this study, putting the basis of theoretical ground on digital nomadic culture acting as the social and cultural reasons, fashion image in nomadic culture in 21C was investigated in the aspects of type, function, and implicated meaning of future wearable computer in the fashion combined with digital.

In this modern life style in which sports and leisure became usual and the distinction between leisure and labor became ambiguous, the most characteristics of design focused on 'mobility' is

flexibility for practicability and function.

New functional materials are continuously developed and introduced in order to go beyond mere easiness and practicality for activities and do functions as actually the secondary skin, and being extended as a tool of multi-functionality to flexibly cope with each situation and individual's needs in the complex and rapidly changing cities that is the most close 'space' to human body.

With respect to this functionality or practicability, design again puts the basis of forms on 'human body'. In attaching and combining of kinds of information appliances, and transforming to the secondary and the thirdly tool based on sporty and casual designs, design is developing as a tool to keep optimum environment for human body.

In wearable computer, requirements to clothes is on the nomadic trend due to mobile environment formed by the advances in technology. The background of generation of wearable computer lies in nomadic thought as clothes is transformed in structure and manipulation by combination of technology and clothes.

Modern citizens are leading a nomadic life moving place to place rather than settling in one place. This means flitting over place but also realm, and even thought and value.

Wearable computer means the combination of information appliances including computer of digital age and the clothing. It has a merit that, with which people can send and receive information at any time and at any place, and even on the move. It is obvious that wearable computer is such a technology that gets us excited, but there are still many challenges to popularization and commercialization. Addressed problems include that it is troublesome to have to shield harmful electromagnetic wave because kinds of electronic devices are to be

closely attached to body, and to use input device. Battery safety and capacity are also often problems. However, safe and high performance battery is necessary since power is to be on all the time to make a free use at any time and at any place.

Nomadism, the background of generation of wearable computer has had much influence on men's living with telecommunication in this modern digital nomadic environment but also through long history of mankind, and will increase its influence in the digital environment to alter much of human life in the future. Even in the fashion that most quickly reacts to the cultural characteristics and the impact of value than any other things, present digital technology and nomadic culture are exerting the effects very clearly. Related environmental factors and kinds of technical tools, devices, and materials also need to be continuously studied. Designs in consideration of human emotional engineering is also demanded.

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