Analysis on the Types and Design Elements of Children's Smart Safety Clothing

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Abstract: With the emergence of the "golden child" phenomenon in Korean society, parents' requirements for the quality, price and function of children's products have become higher and higher. In order to meet the new needs of the consumer goods market, children's smart safety clothing has become a concern Focus, the future will become an emerging growth area for the development of children's clothing industry. In recent years, the global smart wearable product market has shown a rapid development trend, and has been widely used in child safety services, health monitoring and other industries. The purpose of this study is to analyze the types and design elements of children's intelligent safety clothing products, to grasp the characteristics of children's intelligent safety clothing, and to provide reference and reference for the development of children's intelligent safety clothing in the direction of intelligence, convenience, practicality and economy. data.

1. Introduction

With the rapid development of cloud computing, artificial intelligence, 5G networks and the Internet of Things technology, many advanced technologies continue to penetrate into people's lives, changing people's cognitive and consumption habits, people's safety awareness, health awareness, ecological awareness and fashion The sense of innovation is increasing. In the modern clothing industry, "intelligence" represented by technology has been gradually introduced into clothing design and development, especially in the design of clothing for special groups, such as smart safety children's clothing, elderly healthcare clothing, and disabled people's functional types. Clothing, etc. Various types of smart clothing can not only help special groups solve practical difficulties in life, but also improve the quality of life and ensure the safety of life.

This article mainly discusses the characteristics and functional design of intelligent safety children's clothing products. Through the analysis of the characteristics and research status of intelligent safety children's clothing products, it expands the new ideas of functional design of intelligent safety children's clothing, and provides reference for the children's clothing enterprises and designers .

2. Children's Smart Safety Clothing Concept

Product design for children is defined as "design that helps children grow and develop." In 2012, the "Research Report on the Development of Indicators for the Development of Children's Design Industry" issued by the Korea Institute of Design Promotion pointed out that children's design is targeted at the 0-14 age group. Children's smart safety clothing is a type of wearable device. It refers to the use of special thinking based on ergonomics and the protection of human safety on the premise of meeting human comfort requirements. Methods, aesthetic rules, and design procedures to achieve the intended design intent of clothing, thereby helping parents to master children's position, detect children's health, protect children's safety and other functions. Simply put, it is the combination of ordinary clothing and corresponding technology to create clothing that people need and can protect the safety needs of children.

Children's intelligent safety clothing has the characteristics of cross-disciplinary and multi-field technology fusion. It is the product of electronic information technology, human-computer

interaction technology, new material technology, bionic technology, robot exoskeleton technology, solar thermal power generation technology and clothing. It can realize the functions of information receiving, data analysis, wireless communication and physical sign monitoring. On the premise of satisfying clothing performance, it has features such as safety protection, intelligent analysis and reminder, decision support, emotional perception and feedback control.

3. Status of Children's Products Market and Smart Wearable Products Market

3.1 Development Trends of Children's Products Market.

According to South Korea's Shinsegae Department Store, the lowest birth rate was set in September 2018, but department store children's sales increased by 18.9% over the same period of the previous year. With the continuous decline in the domestic birth rate, single-child families are becoming more and more common. In order to train their children better, parents are willing to increase consumer spending on their children, especially the consumption of high-quality children's products. . Despite the decline in the proportion of newborns, with the increase in the per capita expenditure of children, the upgrading of the children's products industry, the market size is expanding, and children's products manufacturers have launched more high-quality, high-priced and safe products <Fig. 1>.
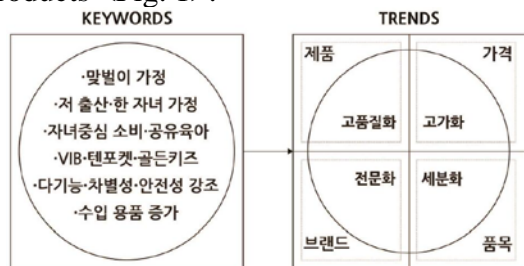

Fig.1 Ildren's Products Market Trend Keywords   Fig. 2. Smart Wearable Product Market

3.2 Types of Child Safety Clothing

There are various types of child safety clothing in the wearable device market, which can be roughly divided into three types for research: smart safety clothing, protective safety clothing and structural safety clothing.

3.3 Smart Safety Clothing

Intelligent safety clothing has developed rapidly. The combination of some safety factors and clothing achieves the purpose of protecting children's safety, and realizes the functions of physical sign monitoring and safety protection. The physical sign monitoring series is mainly used to monitor children's heart rate, ECG, blood oxygen, body temperature, breathing, sleep quality and pressure, steps and other parameters. Samsung Body Compass 2.0 smart vest can realize real-time monitoring of body data such as heart rate, exercise steps, body fat, etc., and provide feedback suggestions through smart phones, smart watches and other devices. In 2017, the company launched the Connected Care platform, which provides data analysis for the baby's growth trend based on the baby's health signs, including heart rate, oxygen content, sleep trends, and red alerts issued by previous monitors. Hong Kong's high-end children's clothing brand BeesPark's GPS positioning children's anti-lost coat, the product can be located in real time, regardless of area, regardless of time, real-time display of the child's location. When the child is lost and encounters a dangerous situation, the locator can be picked up intelligently to know the surrounding environment of the child in time. The smart baby clothing launched by Exmovere in the United States can sensitively detect any signs of slight wetness in the baby's underwear. The garment is equipped with a built-in "biosensor" that can monitor the different emotions of the baby in real time and send it to the mobile phone and computer of the guardian Real-time text and email alerts.

3.4 Protective Safety Clothing

In recent years, with the development of technologies in various fields, protective child safety clothing has also achieved unprecedented development. Based on low formaldehyde and formaldehyde-free resin anti-wrinkle finishing technology, anti-ultraviolet radiation finishing technology and antibacterial finishing technology (mainly deodorization, anti- Bacteria, mosquito, ringworm, etc.), all provide ideas for child safety clothing design. Protective safety clothing also includes children's medical protective clothing, ultraviolet monitoring clothing, tempering clothing and so on. The new children's mosquito-proof clothing uses the new technology (EULANSPA01) developed by the Dutch Tona Chemical to process and sort the clothing fabrics during the printing and dyeing process, making the clothing have mosquito-proof effects. Children's medical X-ray protective clothing can reduce and prevent damage to the human body from radiation. The Crated launched a series of clothing called "Photochromia", which is characterized by the use of variable-color stealth dyes. Under different sunlight exposure levels, the pattern will change, and the outdoor UV intensity can be monitored in real time to make protective measures in time. A temperature-adjusting garment made of a new Breath Thermo material, which absorbs human body moisture and converts it into energy, ensuring that the garment is warm and dry in the severe cold, providing heat that can resist the cold, and maintaining the heat and humidity balance between the human body and the external environment. Inhibit bacterial reproduction and achieve the effect of deodorizing and sterilizing.

3.5 Structural Safety Clothing

Structural safety clothing is mainly through structural transformation, splicing or special process design to meet children's special functional needs for clothing, protect human health and safety, and make clothing more comfortable. Posture correction clothing is a special clothing designed to protect the back of the human body and prevent spinal flexion. Children's equestrian armor, comfortable and comfortable, wear-resistant and tear-resistant, with cushioning, impact resistance, anti-fall and anti-stepping functions.

4. Design Elements of Smart Safety Children's Clothing

In the design and development of smart and safe children's clothing, designers need to understand people's consumer needs and fashion trends, grasp the latest technologies and research trends in wearable devices, and start from the perspectives of child psychology, design, materials, and ergonomics. Pay attention to the product's style and structure design, process design, functional design and intelligent design. The design elements of smart safety children's clothing products can be summarized into the following aspects.

4.1 Functionality and Safety

Safety is a key element of smart children's clothing design, which mainly includes 4 aspects: style safety, material safety, process safety and wearable technology safety. The detailed design of buttons, rivets, trip straps, etc. in the style, the choice of surface materials and electronic component materials, and the sewing process of accessories should meet safety standards. In addition, the smart safety children's clothing load has various electronic devices, circuit modules, flexible wires and lithium battery packs, and the circuit system formed must ensure no hidden safety hazards. Functionality refers to the special functions of smart safety children's clothing, such as health monitoring and treatment, GPS positioning, intelligent temperature adjustment, anti-fall, thermal storage, etc. to meet the needs of different consumers. On the basis of realizing the function of smart and safe children's clothing, more attention should be paid to the safety of the product to protect the physical and mental health of children.

4.2 Intelligence and Sustainability

Intelligentization is the focus of safe children's clothing design. Compared with traditional children's clothing design, intelligent and safe children's clothing design integrates a variety of

technologies such as electronic information, sensors, and the Internet of Things. Wearable and intelligent, it can quickly respond to potential risks to ensure the physical and mental health and safety of children. Sustainability is a strategic activity for constructing and developing products. It considers product, environment, ethics, and social issues in a balanced manner, and requires the harmonious development of people and the environment. The sustainable design of smart and safe children's clothing is mainly reflected in the sustainability of style structure, materials and intelligent technology. While catering to the rapid development of smart clothing, it follows the principles of sustainable product design.

4.3 Comfort and Economy

The design of intelligent and safe children's clothing needs to focus on the comfort of the human body. Children are naturally active and active, and the intelligent children's clothing is loaded with electronic components. The design must consider the reasonable layout of electronic components and the connection of flexible wires, without affecting motion and comfort Under the premise of gender, realize intelligent functions. In addition, smart and safe children's clothing should be made of fabrics with excellent moisture absorption, abrasion resistance and tensile properties. Economical refers to the production cost and maintenance cost of intelligent and safe children's clothing. Under the premise of ensuring the realization of various functions of intelligent children's clothing, focus on product cost control, and make its production and maintenance costs scientific and reasonable. At present, the smart children's clothing sold on the market is several times higher than the ordinary children's clothing. If you want to popularize the product, you need technical breakthroughs and improved cost management.

4.4 Aesthetic and Interesting

The design of smart and safe children's clothing is aimed at children aged 0-14 years. Children of this age have strong observation, rich imagination, and have a strong sense of curiosity about new things. The aesthetics of smart safety children's clothing include styles, patterns, colors, and fashion sense. From an aesthetic perspective, smart children's clothing design must be combined with fashion trends, and the products are both fashionable and interesting. Interest is one of the trends in smart and safe children's clothing design. It promotes the development of children's cognitive ability by incorporating interesting elements, cultivating children's sentiment, and improving aesthetic appreciation. The fun of smart and safe children's clothing can be realized from the aspects of color matching, pattern design, style modeling, intelligent functions and material application.

5. Conclusion

This study recognizes that the phenomenon of "golden children" has appeared in Korean society, but the sales of children's products market has shown a steady growth trend. By analyzing the current situation of children's products market, smart wearable products market and children's smart safety clothing design elements, children are clearly Smart safety clothing has broad development potential. With the advancement of the times and technology, the intelligence of children's clothing has been continuously improved, which not only meets the growing consumer demand, but also increases the added value of products. By analyzing the types and design elements of smart safety children's clothing, it is clear that smart children's clothing has shifted from a single function to an integrated and multifunctional, and the product has a broad market space. When apparel companies and designers carry out product development, they should fully integrate new technology and intelligent technology to improve the core competitiveness of children's clothing products in the market.

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