Research on Design of Multimedia Platform Based on Digital Campus

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Abstract. This research is designed for the future campus multimedia platform design, starting from the existing multimedia platform situation and the problems in daily teaching life, such as: multimedia platform materials are mostly made of alloy and heavy materials; the multimedia platform is inflexible, mostly square and single in form. The use of partitions is not clear enough, or the partitions do not conform to the usage habits, and chalk mouse boards are often rubbed together. The control panel buttons are scattered, inconvenient to operate and difficult to open under unfamiliar conditions. Observe users' usage habits and make suggestions and investigations on users and surrounding personnel, and record the problems. After listing the problems, carefully analyze, select the most suitable one, analyze from the angle of man-machine design, and then proceed to design the solution. In the early research stage of this topic, the necessity of redefining the design of the campus multimedia platform was demonstrated. Through the analysis and positioning of the crowd, the analysis of the use environment and the use habits, problems were found. After analysis and synthesis, different sketch plans were put forward, and finally my own design plan was determined. According to the analysis of the existing multimedia platform, aiming at the problems of unclear division of the existing multimedia platform and the frequent mixing of chalk and the like, a future campus multimedia platform is redefined and designed. This multimedia platform is mainly based on the human-computer relationship. The main idea of the design is to try to be concise and easy to operate without affecting the work needs.

1. Introduction
With the continuous progress of modern society and the continuous arrival of information society, the relationship between people and products is getting closer and closer. The requirements for products are not only to realize basic functions, but also to make products more humanized through design, thus making our life more convenient. This is exactly the goal pursued by industrial design. Multimedia classrooms have gradually replaced the traditional blackboard model and will increasingly become an indispensable part of our teaching. However, it is against this background of fast pace of life, large amount of information and more convenient operation that we have to pursue higher quality of study and life. We often see dust all over the sky and the desk is very messy.

2. design survey

2.1. verview of Multimedia Podium
Multimedia platform is an integrated platform that effectively integrates, manages, prevents theft and damages multimedia teaching equipment, and is an important tool for multimedia teaching.
2.1.1. Classification of Multimedia Podium. (1) Left and right horizontal push type multimedia platform: this type of multimedia platform is mainly made of high quality cold rolled steel plate. The main feature is that the desktop is opened by left and right horizontal push. The main types are double-layer horizontal push and single-layer horizontal push. The most common specifications are 1400mm×690 mm×950mm in length, width and height and 1200 mm× 690 mm× 950 mm. This type of multimedia platform has a long history and a high market share. It is a classic multimedia platform. The main advantage is that the tabletop is flat and convenient for teachers to carry out physical and chemical experiments and place articles on the tabletop.

(2) Upward-turned and backward-pushed multimedia platforms: The materials used for such multimedia platforms are mostly high-quality cold-rolled steel plates, and they are also made of iron plates. The main feature is that the desktop is opened by turning the top cover up and pushing it back, which requires a lot of effort and causes some troubles to female teachers with weak physical strength. The common specifications of this kind of multimedia platform are 1400mm×750mm×1000mm, 1200 mm × 750 mm × 1000 mm. The push-up multimedia platform has always played an important role in the development of multimedia platform, and is the earliest type of multimedia platform.

(3) Flip-type multimedia platform: This kind of multimedia platform has not appeared for a long time, but it is also very popular in the market. This kind of multimedia platform is mainly characterized by its small size. The desktop is designed as a flip cover. The keyboard, mouse and central control are directly locked on the desktop. After unlocking, the multimedia platform can be used by opening the cover. The main specifications are 920mm x 680 mm x 1020 mm in length, width and height. This kind of multimedia platform is simple in shape and uses less materials. It is mainly made of high-quality cold rolled steel plates and is simple and practical.

(4) Other types of multimedia platforms: In addition to the above types of multimedia platforms, with the development of the times, various new types of multimedia platforms emerge one after another in the market with varied shapes and materials. There is no uniform classification for specific names.

Fig 1. Up and Down Lifting Blackboard

2.1.2. Basic Structure of Multimedia Podium. Lifting blackboard up and down: lifting blackboard is a teaching application equipment. Its purpose is to provide a teaching method suitable for anyone with any height. The blackboard used for teaching. It mainly consists of dual-purpose wheels, transmission belts, spiral wheel, lifting belt, glass or magnetic board, blackboard frame and black Plate assembly. Turn the dual-purpose wheel by hand, and through the transmission belt, screw wheel and lifting belt drive blackboard assembly. On the blackboard assembly, he posts rise and fall in the two vertical slots of the blackboard frame, so that the blackboard is always kept by the teacher.

At the required height, the transmission belt is cross-drive, so the blackboard assembly will not slide down by itself.
Electronic whiteboard: the projector is placed behind the electronic whiteboard to project only computer images from behind the whiteboard so that users can

Very natural operation, will not block the projection light to produce any shadow. System of rear projection type electronic whiteboard

The composition is the same as that of the front projection. It integrates the projector into the projector, leaving room for the PC.

Projector: Projector is also called projector, which can project images or videos onto Equipment on the curtain can be connected to computers, VCD, DVD, BD, game console, DV, etc. are connected to play corresponding video signals. Projectors are commonly used in homes, offices, schools and entertainment venues. According to different working methods, there are CRT, LCD, DLP and other types.

Multimedia console: in modern production, in order to facilitate operation and control, displays and controllers are often integrated in. On the panel of the workbench [1], namely the console, the console is a modern workbench, its application scope. It is gradually expanding to environments other than production, such as teaching. The multimedia teaching console is multimedia, A special platform used in a classroom.

Central controller: The central controller is the centralized controller. Mainly used in automatic factory, Chemical control, building automation control, automotive electronics, multimedia classrooms. And other fields have corresponding applications. Central control is a multimedia conference room and many, Media video teaching system equipment, its main function is through RS232, RS485, infrared, network and other protocols to control peripheral equipment, such as Projector, large screen TV, stereo, camera, electric hanger, Lights, curtains, etc. The general control terminals are digital signal control wireless touch screen and digital signal control wired touch

Screen, control panel, wall panel, computer software and remote control.

Simple classification:

(1) Simple central control (mainly for places with less control equipment, commonly used in primary school multimedia classrooms)

(2) Intelligent central control (mainly used in multimedia classrooms in universities and middle schools where there are many control devices)

(3) network central control: (mainly in place convenient for management and control, often used in school where multiple central control units are installed)

(4) Conference central control: (mainly used for wireless touch screen control, commonly used in multi-function conference rooms)
(5) Programmable central control: (mainly refers to the place where there are more control equipment and can provide programming interface. Often used in large conference rooms)

![Fig 4. Video Display Desk](image)

Video Display Desk: Visual Presenter is popular both at home and abroad. An official name, in the Chinese market, is sometimes called physical display. In Taiwan, physical demonstration instrument, physical projector, physical projector, etc. are abroad. The market is also called a Document Camera. Slave function. The video display table can be defined as follows: the video display table is through a CCD camera based on photoelectric conversion technology, the physical, cultural, and other information are converted into image signals and output to the projector. A demonstration device displayed on a display device such as a monitor.

Teaching computer: computer, commonly known as computer, is used for high-speed computing. The computer can be used for both numerical calculation and logic calculation. Logic calculation, but also has the function of storage and memory. Is able to run according to the program. Modern intelligent electronic equipment for automatic and high-speed processing of massive data. It consists of a hardware system and a software system. Can be divided into supercomputers, workers. Industry control computer, network computer, personal computer, embedded computer, five categories, more advanced meter. Computers include biological computers, photon computers, quantum computers, etc. Computers have had an extremely important impact on human production and social activities, and have made great contributions to the development of human society. Life force is developing rapidly. Its application field has expanded from the initial military scientific research application to all fields of society. A large-scale computer industry has been formed, which has led to technological progress on a global scale, thus triggering. With profound social changes, computers have spread all over schools, enterprises and institutions and entered the homes of ordinary people. Become an indispensable tool in the information society.

Multimedia electronic platform: multimedia platform, also known as electronic platform, is a kind of platform to talk about...
Taiwan and computer integrated products. As a platform, electricity. The sub-platform completely requires the standard design of the daily platform. And the principle of ergonomics is adopted, which accords with the teaching of teachers. The need to learn. In addition to its role as a common platform, a computer is also integrated inside it. There is a monitor on its desktop. Due to the adoption of brand-new integration. The overall design, electronic platform, clean and beautiful appearance, from the previous PC behind all kinds of connections. The restraint of the wire, its unique safety and stability, make teachers easy to operate in the application process, Safe.

Sound System: Speaker System, which is the number of channels supported by the sound box. It is one of the important indexes to measure the sound box grade, from mono to the latest Surround sound. The system includes mono, stereo, quasi-stereo, Four-channel surround, 5.1 channel, etc.

2.1.3. Materials for Multimedia Podium. Injection molding multi-media platform: the main materials are ABS engineering plastics and high quality cold rolled steel plates, and solid wood is sometimes installed during design. Handrails are on both sides of the platform, and solid wood desktop is inlaid on the desktop.

Steel multimedia platform: the main materials are high quality cold rolled steel plates, such as 1.0-1.5 hardcover cold rolled steel plates and 1.2-1.5 hardcover cold rolled steel plates steel rolling plate.

3. design requirements
Through consulting data and analyzing users' usage, find out the breakthrough point of design; In the design, the user's usage habits and functional requirements are fully considered, and then further conception is carried out.

I. Modeling
Make it form a unity with the surrounding environment of the classroom.

II. Materials
To meet the requirement that multimedia equipment can dissipate heat well;

Iii. technical aspects
Combined with the existing multimedia projection technology, virtual keyboard and other technologies to achieve a more convenient and humane teaching environment design.
3.1. Multimedia Platform Design Analysis

From primary school to university, the lectern is divided into ordinary lectern for ordinary classrooms and multimedia lectern for multimedia classrooms. In terms of design, there are various forms of multimedia platform design. Multimedia platform design basically meets the human-computer relationship and will have more and more functions and become better and better.

Fig 8. Multimedia Usage Configuration in

3.1.1. Analysis of the Use Environment of Multimedia Podium. Multimedia teaching environment is the core content of teaching infrastructure construction, and is also an important part of the current information campus construction.
With the development of modern educational technology, the use environment of multimedia platform is no longer a narrow spatial scope, but a concept of a community of information systems. It is based on modern education and information technology and focuses on the coordinated control of a variety of modern audio-visual equipment, lighting curtains and other environmental equipment to create a teaching system environment of live demonstration and real-time interaction. Multimedia teaching environment is mainly divided into multimedia classroom teaching environment and non-classroom multimedia teaching environment (such as academic report hall, multi-function hall, concert hall, auditorium, etc.). The multimedia teaching environment discussed in this paper is mainly elaborated from multimedia classroom teaching environment [1]. Educational ecology is a marginal discipline of education that emerged in the west in the 1970s. It is the result of mutual infiltration between pedagogy and ecology. Educational ecology is a science that studies the law and mechanism of interaction between education and its surrounding ecological environment (including natural, social, normative, physiological and psychological). Its main characteristic is to apply ecological theories and methods to study educational phenomena and problems and explore educational laws. This paper regards the multimedia teaching environment as an organic, complex and unified ecological system, and puts forward balanced, dynamic and sustainable development construction countermeasures from the perspective of educational ecology, hoping to provide some reference opinions for the standardized construction, scientific management and future development of the multimedia teaching environment, and further promote the development of educational informatization.

Fig 9. Multimedia Usage Configuration
Environment 1: Large classrooms such as amphitheatre require, in the basis of the configuration of ordinary classrooms, an hour sound system, when the teacher lectures can be an ear wireless collar clip. The blackboard is raised up and down. Two sets of descending combined blackboards are installed on the two whiteboards. The teacher is convenient to use and the students can see clearly. The audience in the hall can clearly see the performance. In terms of content, the electronic whiteboard can be moved anywhere in a bracket type or can be conveniently used in a fixed mural type.

Environment 2: The multi-functional report hall uses an electronic whiteboard to operate and multiple projection screens to display, so that the audience in the hall can clearly see the contents of the speech. The electronic whiteboard can be moved anywhere in a bracket type or can be conveniently used in a fixed mural type.
Environment 3: ordinary classrooms with tens of square meters are low in cost and easy to transform. They can be used in both old and new classrooms and meet the basic requirements of multimedia teaching, making teaching more convenient for teachers. This scheme is also actively popularized by the national Ministry of education at present. Plan.

Environment 4: small conference rooms, offices, kindergartens and other small rooms are combined into a simple electronic whiteboard teaching system by using brackets, projectors, notebook computers and electronic whiteboards, which is simple to use and does not occupy space.

3.1.2. Analysis of Usage Habits of Multimedia Podium

During use, the multi-media platform can be divided into two areas, one is the storage area and the other is the operation desk. The storage table mainly contains chalk, blackboard eraser and other teaching tools. The console mainly houses the teaching computer, mouse, mouse pad, keyboard, data line, etc.

When the teacher walks into the classroom, he can divide the following operations into three steps. The first step is to put down the documents and teaching materials, the second step is to turn on the computer for class, and the third step is to use chalk, blackboard eraser, etc. in the course of class.

4. Design Orientation

4.1. Product Population Positioning

Through detailed market research and analysis and specific data analysis, the breakthrough point of this topic design is determined: the design of campus multimedia platform, the future design trend, clearer distinction of platform and more convenient use.

Market positioning: high grade;
Target group: high-quality talents with certain cultural literacy, higher education background and ability to use the latest technology;
Age: 18-50 years old educators and students
Education: University or above

4.2. product modeling positioning
Through the analysis of the operating habits of the multimedia platform, the shape of the product should be concise, such as geometry, etc. The structure is combined and spliced. Secondly, it is necessary to satisfy the clear feasibility of the platform partition function. Avoid sharp edges and corners of the product and require all end faces to be chamfered.

Fig. 14 schematic diagram of virtual keyboard

4.3. Product Materials and Technologies
The product material needs to meet the requirements of heat dissipation, durability and good tactile sensation. Therefore, the main material is determined to be ABS engineering plastic.
In order to save more space and use the multimedia platform more conveniently. Other technologies needed by the product include: virtual laser keyboard and infinite mouse.
Virtual Laser Keyboard: produced by Hutchison Harbouring Limited-HRR. It is a virtual keyboard similar in size to a small mobile phone (90 x 34 x 24 mm), allowing users to type articles or e-mails as easily as a normal keyboard. The I-Tech virtual keyboard adopts light projection technology and can project a full-size computer keyboard on almost any plane. When the virtual keyboard is used on PDA and smart phone, it can be used for e-mail, word processing, spreadsheet making, etc. The applicability technology of virtual keyboard studies the user's finger movement, decodes and records the keyboard hitting action. Since the virtual keyboard is an image formed by light projection, it will disappear completely when not in use.

Working Principle of Virtual Laser Keyboard;
Step 1: Template Creation (Projection Module) Project the required interface template to the adjacent interface surface. The module is generated by specially designed high-efficiency holographic optical element illumination, and the element is provided with a red diode laser.
Step 2: The previous step of reference surface illumination (micro-illumination module TM) has been generated.
The infrared ray illuminates the plane and is parallel to the interface surface. The light shines a few millimeters on the surface and cannot be seen by the user. When the user touches the key position on the interface surface, the plane on the edge of the key will reflect light and directly transmit it to the sensor module.
Step 3: The light reflected by the interaction between the user mapping the corresponding coordinates (sensor module) and the interface surface is transmitted to the infrared filter and reflected to the CMOS image sensor in the sensor module. The sensor chip (virtual interface processing core TM) contains customized hardware, which can determine the position of reflected light in real time. The processing core can synchronously track multiple reflections, thus being able to simultaneously process multiple keys and overlap cursor control inputs.
Fig 15. Instructions for Using Wireless Mouse

**Wireless mouse:** Refers to a mouse with no cable directly connected to the host. Generally, 27M, 2.4G and bluetooth technologies are adopted to realize wireless communication with the host. The wireless mouse uses wireless technology to communicate with the computer, thus eliminating the restriction of wires. The commonly used wireless communication methods include Bluetooth, Wi-Fi (IEEE 802.11), Infrastructured (IrDA), ZigBee (IEEE 802.15.4) and other wireless technical standards. However, for the current mainstream wireless mice, there are only 27Mhz, 2.4G and Bluetooth wireless mice.

5. Design Demonstration

6. Conclusion

This design is for the future campus multimedia platform design. My abilities have been improved from the process of determining the topic, designing research, designing orientation to the final design.

During the design process, I got a full understanding of the concept of multimedia platform design through comprehensive research. Market research has enabled me to gradually open up my design ideas and form a perfect system, which will be continuously changed and improved in the future design. At the same time, I found my own advantages and disadvantages, so I gave myself a correct position, which is conducive to better development in the future.

Many problems were encountered in the design. Through searching some data, the problems were analyzed and summarized, and finally the problems were solved. At the same time, I have combed the knowledge I have learned in the past four years, and found out the gaps and filled the gaps, so that I have fully understood my own advantages and disadvantages. The process of graduation design is the
process of using my knowledge in an all-round way, dredging up the professional knowledge for four years and consolidating my knowledge structure once again.

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