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MODERNIZATION OF EDUCATION AND OPTIMIZATION OF COMMUNICATION

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Abstract

In this article we wanted to clarify that in the process of education reform, traditional laboratories are rapidly evolving towards smart laboratory concepts, integrated with state-of-the-art equipment.

We applied the method: project-based learning, inquiry-based learning, adaptive and personalized learning, simulations and virtual reality.

We have come to the conclusion that smart laboratories not only facilitate the teaching process, but also facilitate the development of an environment conducive to interaction between teacher and student.

Keywords: interactive whiteboard, 3D printer, 3D pencil, 3D scanner

Introduction

Smart lab activities can be designed to integrate knowledge and skills from multiple disciplines (e.g., science, technology, engineering, art, and mathematics). Students can work on projects that combine elements from different fields. The smart lab allows the collection and analysis of data on student progress in real time. Teachers can provide immediate feedback and adjust learning activities according to students' individual needs. Essential equipment, which plays an important role in adapting to new teaching and learning trends in such a laboratory are: interactive whiteboard, 3D printer, 3D pencil, 3D scanner.

Facilities offered by smart equipment

The interactive whiteboard offers numerous facilities and significantly improves the learning and collaboration process in the educational environment. These facilities make the interactive whiteboard an essential tool in modernizing education and optimizing communication and collaboration in various environments. Some of these can be:

High interactivity: this allows writing, drawing and manipulating objects on the screen; Users can interact directly with the featured material, either by touch or using a stylus.

Integration with other technologies: it can be connected to computers, tablets or smartphones, thus facilitating content sharing and collaboration in real time;

Access to online resources: teachers can access and integrate online resources directly into lessons or presentations, providing richer and more up-to-date content;

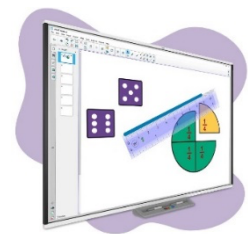
Saving and sharing content: everything written or presented on the interactive whiteboard can be saved and shared later, allowing students to review the material;

Animations and simulations: Facilities such as animations or interactive simulations help to illustrate complex concepts in a clearer and more engaging way;

Remote collaboration support: In the context of hybrid education, the interactive whiteboard can be used for real-time collaboration with students in different locations.

Adaptability: can be used in various disciplines;

Improved active learning: Students are more engaged when they can interact directly with the material, which can improve information retention and understanding of the topic.



The 3D printer offers a number of facilities that revolutionize various industries and create innovative opportunities in many areas. The main advantages and facilities of this equipment:

Sharebot Kiwi-3D Professional 3D Printer, Made in Italy

Customization and flexibility: 3D printing allows products to be customized according to the specific requirements of each user, from medical items to design objects and industrial parts;

Cost reduction: production costs are significantly reduced, especially for small runs or for customized products, as they do not require specialized tools or molds;

Free complexity: the 3D printer can create complex shapes and geometries that would be difficult or impossible to achieve by traditional manufacturing methods, without adding additional costs;

Diverse materials: 3D printers can use a wide range of materials, including plastic, metal, ceramics, resins, and even biocompatibles, opening up possibilities in numerous industrial and medical applications;

Efficiency in the use of materials: 3D printing is an additive technology, which means that material is added only where necessary, thus reducing material waste compared to traditional processing methods;

Localized production: this allows objects to be manufactured directly at the point of use, eliminating the need for transportation and helping to reduce the carbon footprint.

Improved research and development: Researchers and engineers can experiment with new materials and designs, accelerating innovation in fields ranging from medicine to aeronautical engineering;

Repair and maintenance: instead of replacing entire parts, users can print specific components for repairs, thus extending the life of products and reducing maintenance costs;

Education and training: 3D printers are used in education to provide students with hands-on experiences in design, engineering, and manufacturing, developing their skills and creativity.

These facilities make the 3D printer a particularly valuable tool in multiple fields, transforming the way industrial or consumer objects and components are conceived, developed and produced.

The 3D pencil is an innovative tool that offers a number of unique features, different from those of the 3D printer, but complementary. Main advantages and uses of 3D pencil:

Drawing in three-dimensional space: the 3D pencil allows direct drawing in the air, giving the user the opportunity to create three-dimensional objects manually, without the need for modeling software or a 3D printer;

Creativity and artistic expression: it is an excellent tool for artists and designers, who can experiment with complex shapes and structures in real time, bringing their ideas to life in an immediate and intuitive way;

Simplicity and accessibility: Compared to 3D printers, the 3D pencil is easier to use and does not require advanced technical knowledge, anyone can start drawing in 3D, making it accessible for all ages.

Rapid prototyping and repair: The 3D pen can be used to quickly make small prototypes or add details or repairs to existing objects without requiring a complex preparation step.

Education and learning: it is an excellent educational tool, helping students understand concepts such as geometry, design and engineering through practical experimentation; learning thus becomes more interactive and engaging;

Varied materials: they can use different types of filaments, such as PLA, ABS or even special filaments, which offer varied textures and finishes, opening up more creative possibilities.

Portability: it is compact and easy to carry, which allows users to use it anywhere and anytime, without being limited by space or complex equipment;

Adaptability: The 3D pencil can be used for a wide range of projects, from art and design to hobbies or home repairs, making it a versatile tool for different needs and interests;

Development of fine motor skills: the use of the 3D pencil involves precision and control, which can help develop fine motor skills, especially in the case of children or people who want to improve their dexterity;

Low cost: 3D pencils are more affordable than 3D printers, making 3D printing technology more accessible to a wider audience.

These facilities make the 3D pencil a creative, educational and practical tool, suitable for users of all ages and experience levels.

A 3D scanner offers a number of essential facilities that transform the way real-world objects are captured and used digitally. The main advantages and uses of the 3D scanner:



Scanner Shining 3D EinScan-SP - IRIS Robotics | irisrobotics.ro

Digitization of physical objects: allows the transformation of real-world objects into digital 3D models, which can be edited, analyzed, or used in various applications, such as design, engineering, architecture, or art;

Reverse prototyping: the 3D scanner is useful in the reverse prototyping process, where an existing object is scanned to create a digital model that can later be modified and reproduced;

Customization and adaptation: in industries such as medical, the 3D scanner is used to create personalized medical devices, such as prosthetics, orthoses or implants, tailored to the specific needs of each patient;

Archiving and restoration of objects: allows the digitization of valuable objects, such as historical artifacts or works of art, to preserve them and facilitate their restoration in case of damage;

Compatibility with 3D printers: digital models obtained by 3D scanning can be directly used for 3D printing, allowing exact replication of scanned objects;

Efficiency and time savings: they can capture complex data in minutes, thus saving time compared to traditional manual measurement and modeling methods;

Use in quality analysis and control: in production and engineering, the 3D scanner is used to compare a manufactured object with its initial digital model, identifying any deviations and ensuring the quality of the final product;

Redesign and modification: Existing objects can be scanned to create digital models that can later be modified, redesigned and improved, before being manufactured again;

Education and research: it is a valuable tool in education and research, allowing students to study and analyze complex objects in digital format, facilitating learning and innovation;

Applicability in various industries: they are used in a variety of fields, including automotive, aeronautics, healthcare, fashion, archaeology, and more, due to their versatility and accuracy;

Faithful reproduction of complex surfaces: it is capable of capturing intricate and organic surfaces, such as human faces or sculptures, providing digital models that preserve all the original details.

These facilities make the 3D scanner an essential tool for capturing, analyzing, and reproducing real-world objects, bringing innovation and efficiency in numerous fields.



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