Bring Digital into Every Classroom

— Smart Classroom Solution

HUAWEI

Digital Technologies Drive Education Development and Foster a Nation with a Strong Foundation in Education

UNICEF and ITU Giga Project (2019): Connecting Every School to the Internet

By 2030, all schools in 42 countries/regions, with over 1 million schools, will have internet connectivity. This initiative will benefit more than 900,000 teachers and students across more than 3,200 schools.

Global education policies

United Kingdom

In 2019, a ten-year plan for school and college funding was unveiled to ensure that 90% of primary school graduates meet the expected standards in reading, writing, and mathematics by 2030. The GCSE score increased from 4.5 points to 5 points.

European Union

The EU released the *Digital Education Action Plan (2021-2027)* in 2021, aiming to support the education and training systems of EU member states to adapt to the digital transformation in a sustainable and effective manner.

Mexico

In 2018, the "Internet for All" campaign was launched to bring together internet and mobile phone technologies across the country. The goal was to provide broadband services to approximately 130,000 locations, including schools.

China

Education Informatization 1.0: Information Digitalization 2012–2018
Education Informatization 2.0: Service Digitalization 2018–2022
Education Informatization 3.0: Digital Transformation 2022–2025

South Korea

The Ministry of Education has created the Education Informatization Plan 2022, which outlines a comprehensive solution for the digital transformation of education in the future. The plan focuses on utilizing emerging technologies to establish a digital education framework that incorporates AI and ICBM (IoT, cloud computing, big data, and mobile technologies).

Brazil

In 2014, the "National Education Plan for 2014-2024" was launched with the aim of enhancing the quality of education across the country by coordinating and stabilizing the allocation of financial resources.

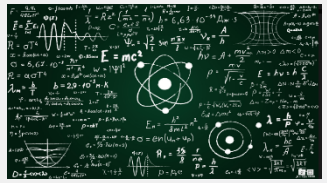
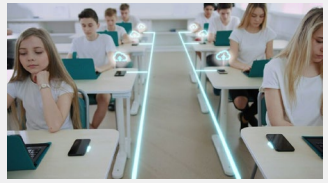
Singapore

ICT-in-Education Masterplan 4 (MP4) (2015–2020): The goal of MP4 is to develop future-ready and responsible digital learners.

New Technologies Drive Innovation in Teaching Modes, Accelerating Transformation in Teaching Paradigm

Innovative teaching methods based on new technologies

Network | Video communications | Voice communications | Cloud computing | AI | Big data

Blackboard + courseware	Fixed location	Passive learning
		
		
Multimedia teaching	Learning anytime, anywhere	Interactive and heuristic teaching

Future-proof teaching paradigm

Learner-centered hybrid elastic teaching:
Multiple scenarios are provided at the same time for teachers and students to achieve three shifts:

- From teaching-centered to learning-centered
- From single-mode teaching to online/offline hybrid teaching
- From fixed-mode teaching to flexible teaching

Offline teaching

Face-to-face teaching

- Offline teaching
- In-classroom
- Low percentage of technology use

Shifting to

Hybrid teaching

Online + offline

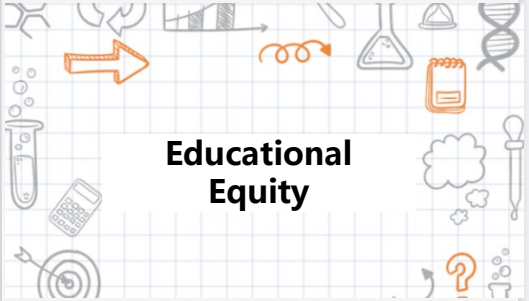
- Online/offline, synchronous/asynchronous
- Remote + face-to-face
- Multiple learning modes

Challenges Faced by Traditional Education

Blackboard-based teaching
Passive learning

- Traditional teaching focuses on unidirectional knowledge output from teachers.
- A lack of interactive teaching methods lowers students' enthusiasm for learning.
- The presentation of knowledge is dull and lacks vividness.

Limited teaching methods
Unbalanced teaching resources

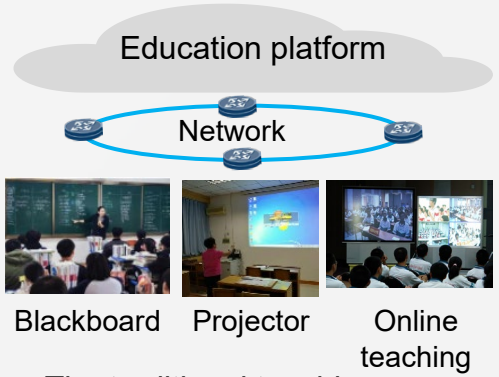


- There is an imbalance in teacher resources in basic education, with a shortage of teachers in rural areas leading to a lack of available courses. Additionally, 80% of high-quality teaching resources are concentrated in only 20% of areas.

Lack of digital tools
Difficult to evaluate teaching results

- Difficult to quantify and evaluate students' performance in classes
- Difficult to supervise and evaluate classes
- Lack of teaching data collection and analysis for decision-making

Outdated teaching facilities
Inefficient management



- The traditional teaching method is outdated.
- There are many devices in classrooms, resulting in heavy workload for administrators.
- The network bandwidth is insufficient, resulting in poor audio and video quality for remote teaching.

Overall Architecture of Smart Classroom

Teaching applications

Multimedia interactive teaching
- Multimedia courseware
- Writing/Annotation on whiteboard
- Massive teaching resources
- Rich interactive tools

Multiple teaching modes
- Distance class
- Live class
- Course recording
- Group discussion and teaching

Precise analysis of teaching results
- Online class observation and supervision
- Supervisor & evaluation
- Class behavior analysis
- Intelligent analysis of class data

Efficient remote O&M
- Low failure rate
- Remote management and control
- Device usage statistics
- Information push

Teaching scenarios

Digital classroom

Remote interaction classroom

Self paced learning

Cloud & platform

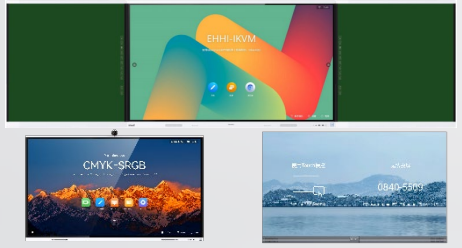
- Huawei Cloud Meeting
- Intelligent classroom interaction system
- Course recording system
- Device management system

Network facilities

- 4G/5G
- Wireless access point (Wi-Fi 6)
- Education network — Education private network
- Internet — Internet

Intelligent endpoints

IdeaHub Board + electronic blackboard



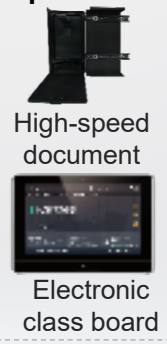
IdeaHub — LED all-in-one device

Audiovisual endpoints

Speaker — Microphone — Recorder — Camera

Audio processor — Recording & streaming host — Box series endpoints

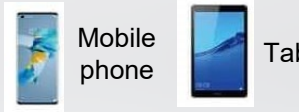
Peripheral products



High-speed document — Electronic class board

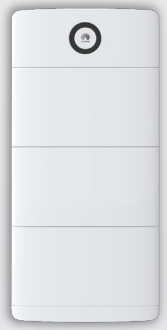
Endpoints used by teachers and students

PC



Mobile phone — Tablet

Hybrid Power



Grid — Solar Power — DG (reuse)

Digital Classroom: Digitalize Teaching Techniques with Interactive Local Teaching to Improve Quality

Application scenarios

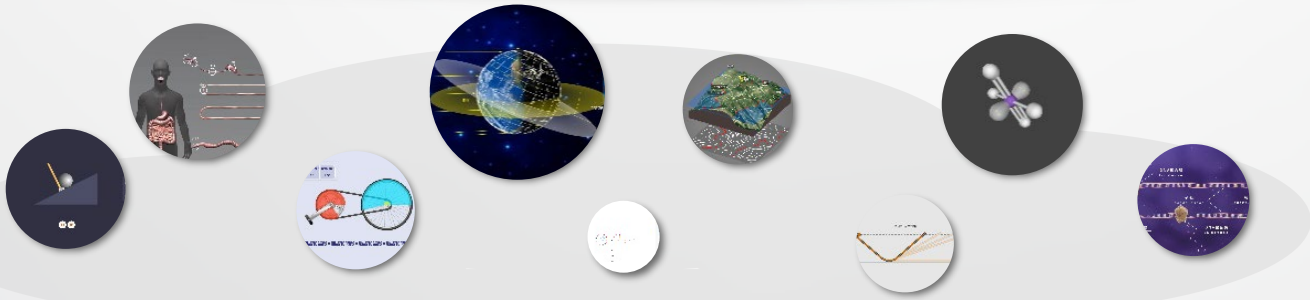
Course preparation

Efficient review

Multi-form teaching

Interactive teaching

Resource platforms

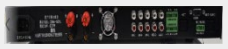


Hard endpoints

HUAWEI IdeaHub Board + Electronic blackboard

High-speed document scanner

Speaker



Audio processor

Microphone

Safe and healthy teaching environment

- Optical anti-blue light to protect eye health
- CCRC certification for information security

Simple and efficient teaching applications

- Effortless sharing of blackboard content
- Courseware saving for after-class review
- Rich tools for more efficient teaching

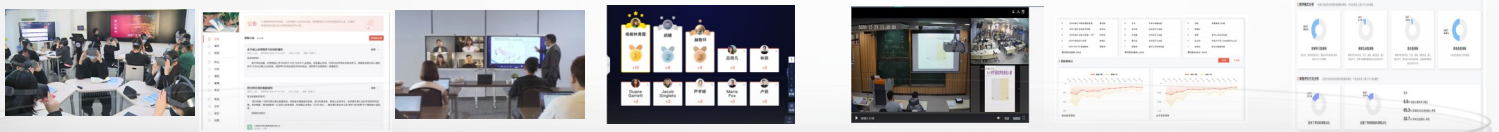
Combination of traditional and IT-based teaching methods

- Combination of traditional blackboard and digital presentation
- Synchronized notes from the side boards to the digital screen
- Synchronous erasing and interactive teaching

Remote Interaction Classroom (Online Teaching): All-Scenario Remote Interaction, Supporting Multiple Online and Offline Teaching Modes

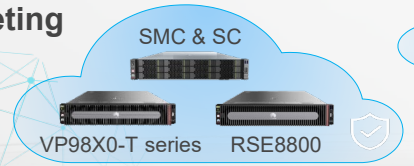
Application scenarios

Face-to-face teaching | Online teaching | Distance learning | Interactive teaching | Online class supervision | Big data analytics | Multi-dimensional evaluation

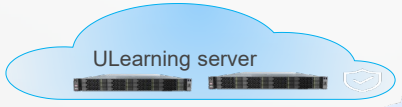


Platforms

Professional video meeting

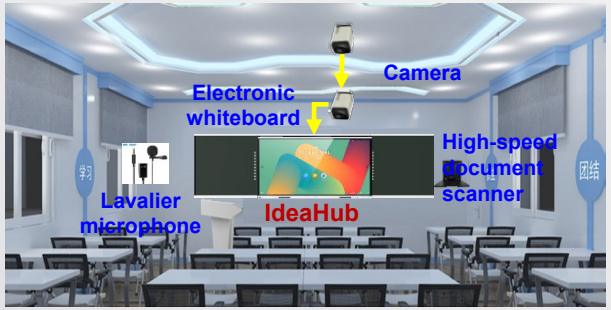


ULearning system

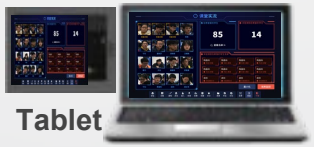


Huawei Cloud Meeting

Endpoints



Classroom



Tablet

PC

Teacher

Tablet

PC

Student

Seamless access to teaching activities

- Remote interactive/Live teaching
- Regular recording
- Online class observation and supervision

Upgraded teaching experience

- Seamless online and offline convergence
- Smooth connection between multiple endpoints
- Interactive courseware making
- Scenario-based intelligent environment control

Comprehensive control of the teaching process

- Video-based classroom situation analysis
- Teaching big data analysis based on full data

Remote Interaction Classroom (Cloud-based Teaching): Connect Schools and Classrooms to Build a 1 + *N* Education Community

Application scenarios

Course scheduling

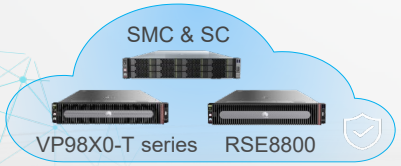
Automatic inspection

Single-screen teaching

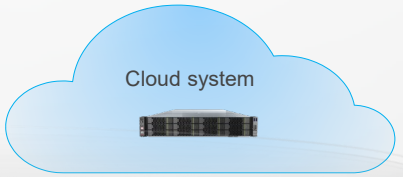
Dual-screen teaching

Platforms

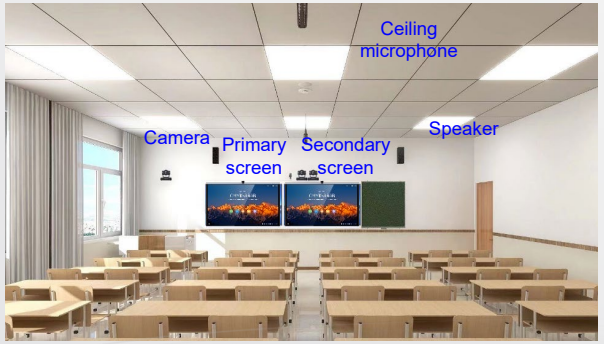
Professional video meeting



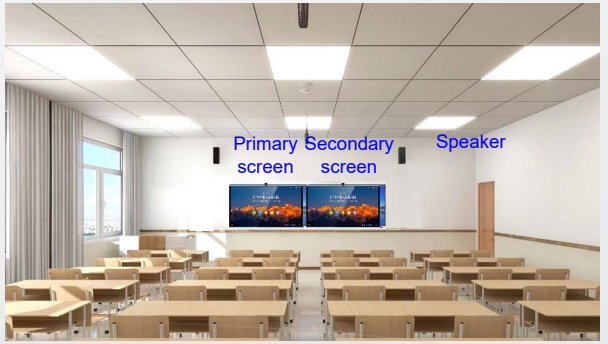
Cloud classroom system



Endpoints



One lecture classroom



N remote classrooms

Innovative teaching forms

- 1 + *N* teaching mode, breaking geographical restrictions and sharing high-quality teaching resources
- Integration of online interactive teaching and traditional offline teaching

High-fidelity experience

- Full HD and immersive audio and video experience
- HD and low bit rate, real-time video

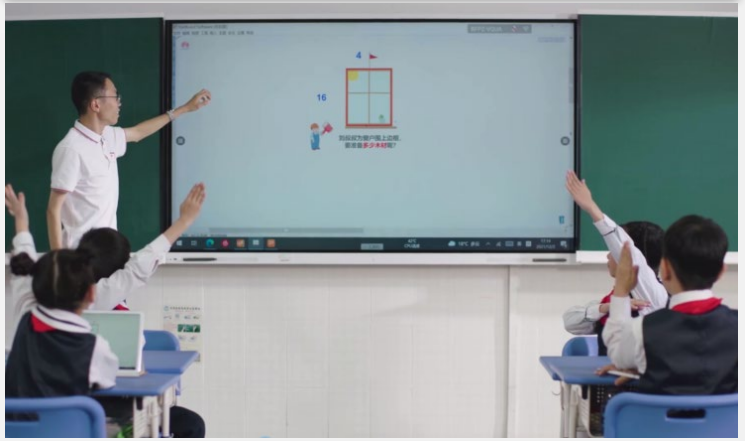
Classroom interaction and collaboration

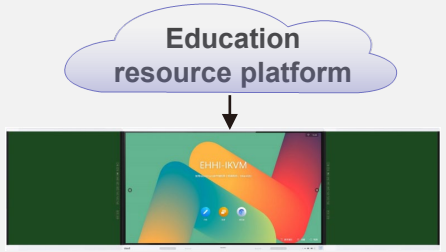
- Remote interaction between teachers and students
- Real-time collaboration among multiple teachers, improving teaching quality

Highlight 1: Multimedia Teaching Improves Class Interaction and Learning Experience

Traditional teaching

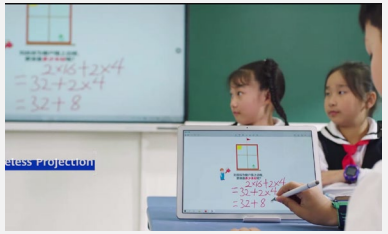
Multimedia teaching





Innovation in interaction

Courseware projection | Writing and annotation | Extensive tools for interaction



- Wireless courseware projection

Interaction between teachers and students

- Smooth and natural writing experience

Courseware commenting/Student interaction

- Extensive tools for interaction

Enhanced interaction and quick feedback collection

Highlight 2: Enable Students to Learn and Collaborate Anytime, Anywhere

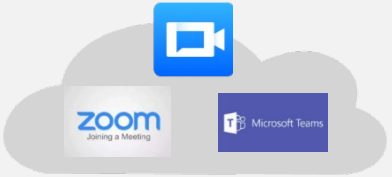
Fixed learning location

Learning anywhere

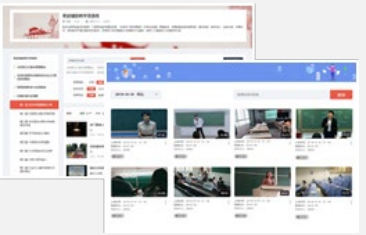
Seamless access from mobile devices for learning anytime, anywhere

Audio and video interaction | Mainstream cloud meeting apps | Course recording

- Supports audio and video interaction and two-way data collaboration for an immersive experience.



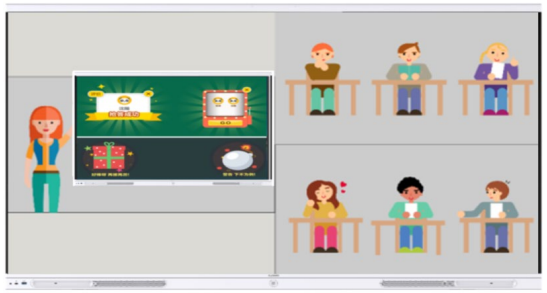
- Supports multiple mainstream cloud meeting apps to meet various requirements of users.



- Course recording for review after class anytime

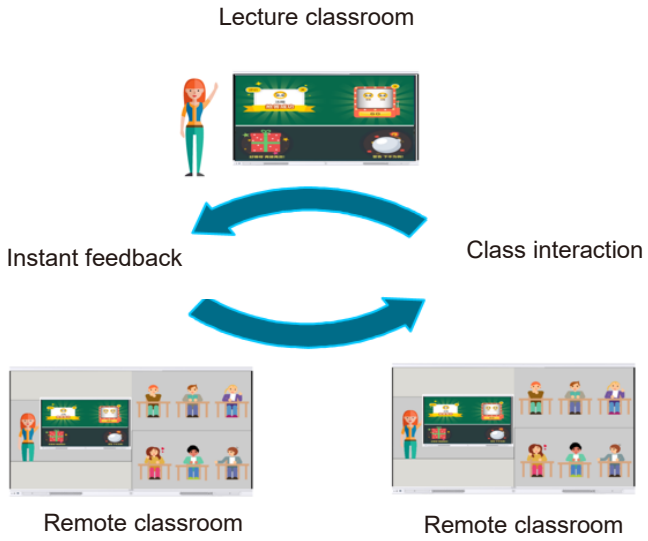
Highlight 3: Teaching Resource Sharing Across Schools Promotes Balanced Education

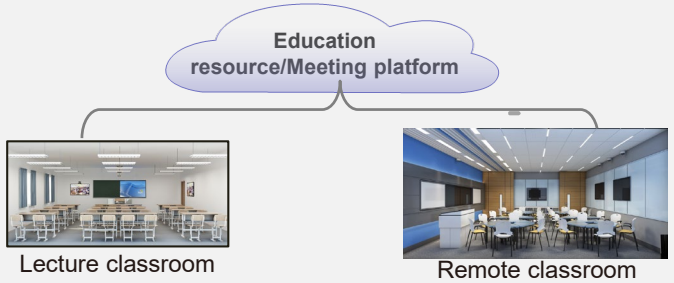
Limited teaching resources in a single school



One teacher in one classroom

Teaching resource sharing across multiple schools





Cloud-based teaching as the new normal

Cloud-based teaching | Converged teaching | Remote training and research

- Cloud-based teaching, breaking geographical restrictions and sharing high-quality teaching resources

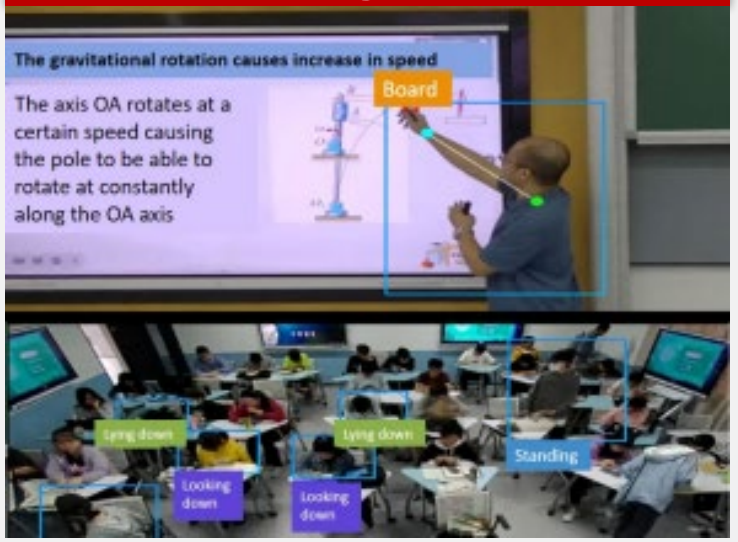
- Integration of online interactive teaching and traditional offline teaching, enhancing the overall teaching quality

- Cross-school and cross-regional teacher training, improving teachers' teaching skills

Highlight 4: Intelligent Collection and Analysis of Teaching Data, Facilitating Scientific Decision-Making

Difficult to evaluate teaching results

Intelligent analysis of teaching results

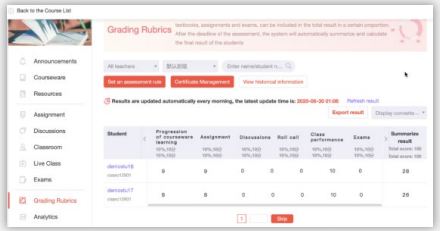


Intelligent analysis and evaluation of teaching results

Intelligent behavior analysis | Intelligent evaluation of class data | Data-driven teaching

- Intelligent behavior analysis, improving the overall teaching and learning quality

- Intelligent evaluation of class data, and precise feedback and quantification of teaching results



- Factor in class behaviors when calculating course grades, promoting data-driven teaching

Highlight 5: All-in-One IdeaHub Supports Fast Deployment and Simplified O&M

Complex O&M of multiple devices

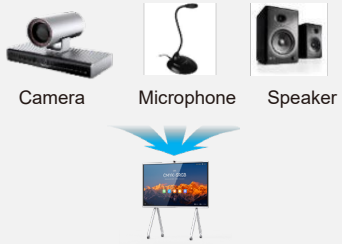
All-in-one, easy to use

IdeaHub

+ IdeaManger

Easy-to-use for optimal teaching experience

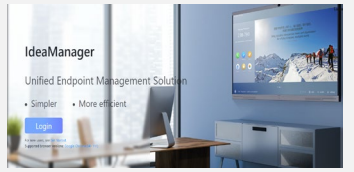
Low failure rate | Unified experience | Remote endpoint management



Camera Microphone Speaker

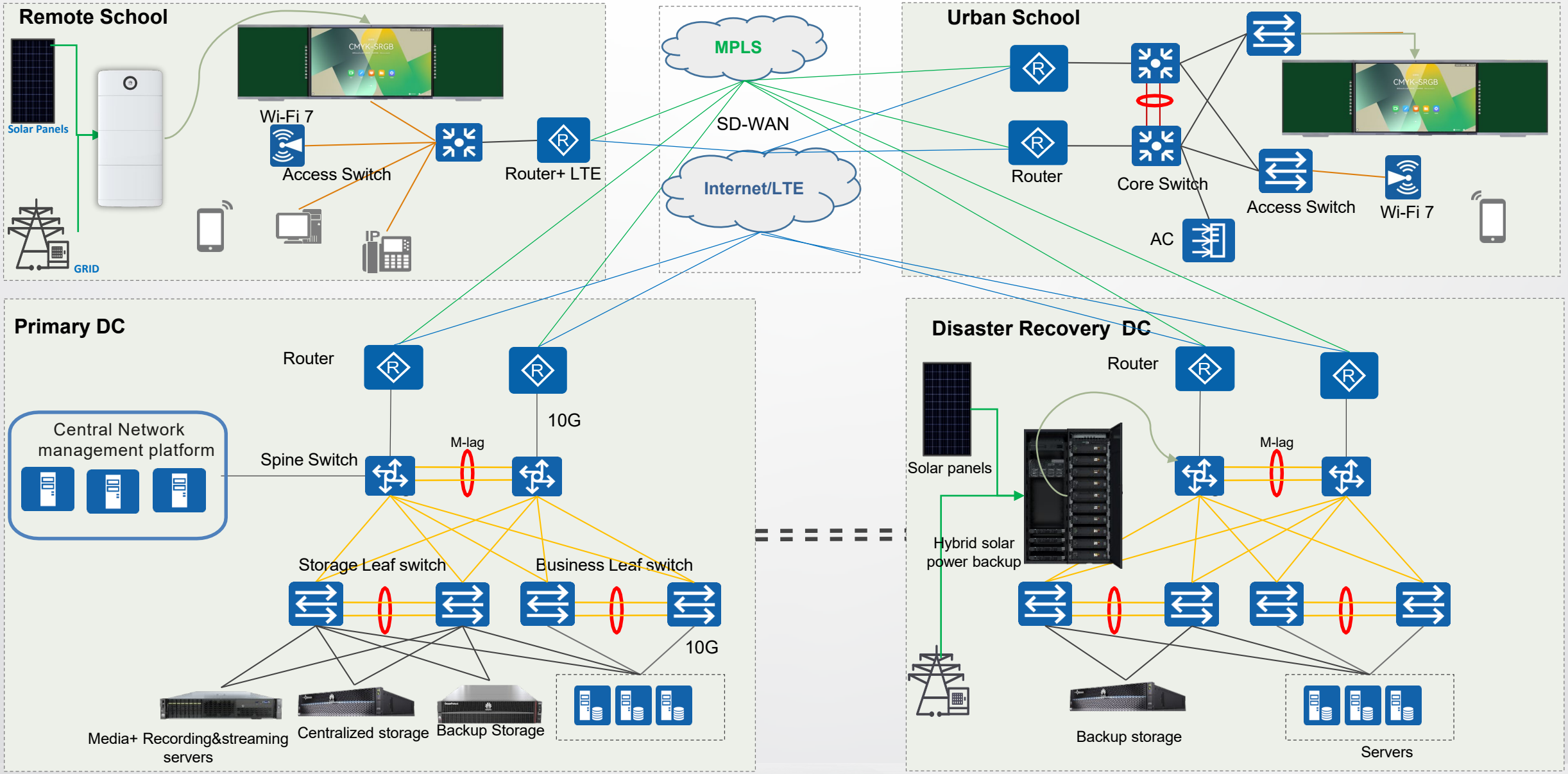
- All-in-one, simple and elegant

- Easy to install and deploy, plug-and-play



- Remote endpoint management in batches, simple and efficient

Target Network topology



Daytime power supply from solar, Night from battery,

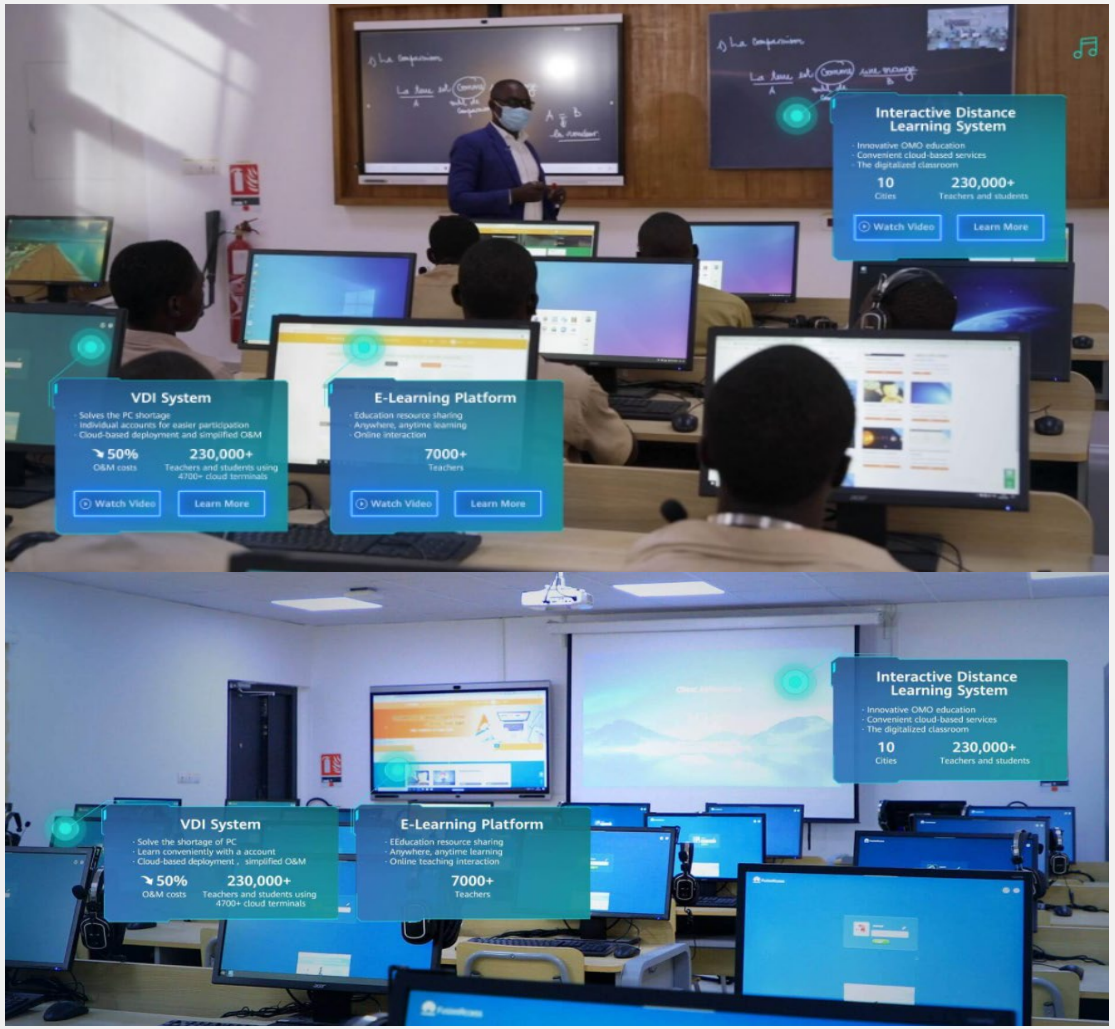
Minimize the use of grid power

Solar Power + Intelligent Power Mate Supplementary power supply

Replacing the “Grid +D.G.” power supply mode

1. Daytime power supply prior to solar power while supply power through battery at night
2. Grid（& reuse DG）as backup power

Cote d'Ivoire Starts a New Journey of Intelligent Education with IdeaHub



Project background

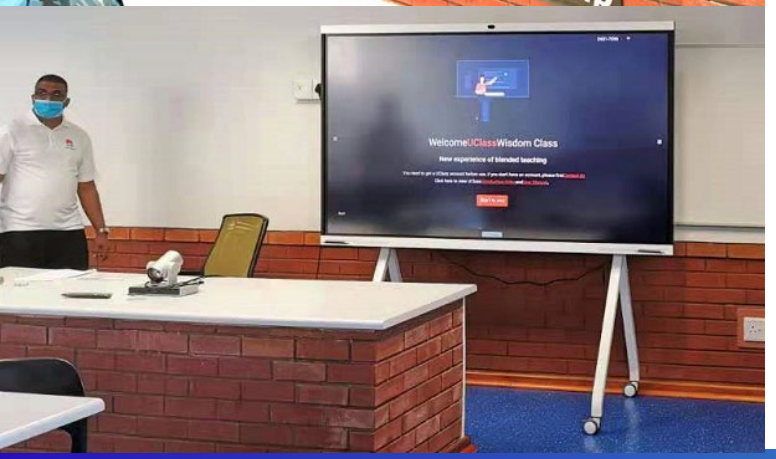
Informatization of education has been identified as a key national strategy in the Republic of Cote d'Ivoire (Côte d'Ivoire). In most cases, the distribution of urban and rural education resources in schools, education bureaus, and preschool education institutions is uneven, and high-quality resources cannot be shared. .

Huawei solution

- HUAWEI IdeaHub integrates the whiteboard, projection, and HD video conferencing functions to drive local and distance learning.
- Huawei provides ICT infrastructure such as data centers and Wi-Fi campus networks.
- The first phase of the project covers more than 70 schools and more than 50 educational administrative institutions.

Customer benefits

- **The system enables teachers to obtain quality experience** through remote and online self-learning, improving teaching in remote areas.
- **Intelligent class supports distance education and hybrid education**. Learners in less developed and remote areas can enjoy high-quality teaching resources immediately by connecting to the Internet.



IdeaHub in Action: A Digitalizing Education Journey Has Begun at the Anton Lembede MST Academy in KZN Province, South Africa

KwaZulu-Natal (KZN) is one of the nine provinces in South Africa, which have over 6000 primary and secondary schools and 38 teacher development centers. However, many schools in KZN lack digital devices and rely on traditional teaching methods. The Anton Lembede MST Academy broke the mold by purchasing HUAWEI IdeaHub for their classrooms, signaling the first step toward smart teaching for the Academy and others in KZN.

This case has been published. Click here to learn more.

Challenges

- Conventional teaching methods are insufficient and do not display multimedia teaching materials.
- There was no real-time evaluation or feedback, making it difficult to evaluate student performance.

Solution

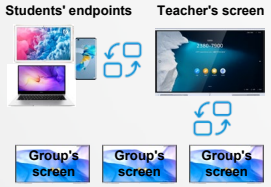
- HUAWEI IdeaHub is embedded with the U-Class smart classroom software and implements local multimedia, remote, and hybrid teaching.

Benefits

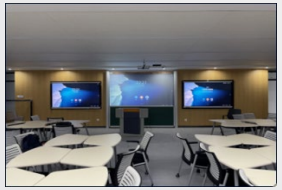
- IdeaHub allows teachers to present multimedia materials in the classroom
- U-Class provides abundant classroom interaction tools, support comprehensive teaching evaluation, Effectively improve teaching quality

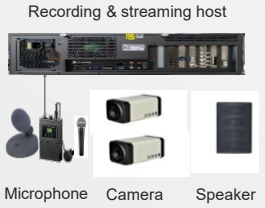
Dongguan University of Technology: Digital Transformation in Classrooms for a Smart Teaching Experience

Discussion-oriented smart classroom



Fully converged classroom





VR-based smart classroom

Multi-screen interaction
Efficient teaching

Group interactive teaching
Brainstorming

ULearning online enablement
Co-creation and sharing of teaching resources

Big data collection
Teaching quality supervision and analysis

Project background

Dongguan University of Technology was founded in 1990 and is the first general undergraduate university in Dongguan. The demand for a group teaching mode and young teacher training poses new challenges to the current teaching environment in the school.

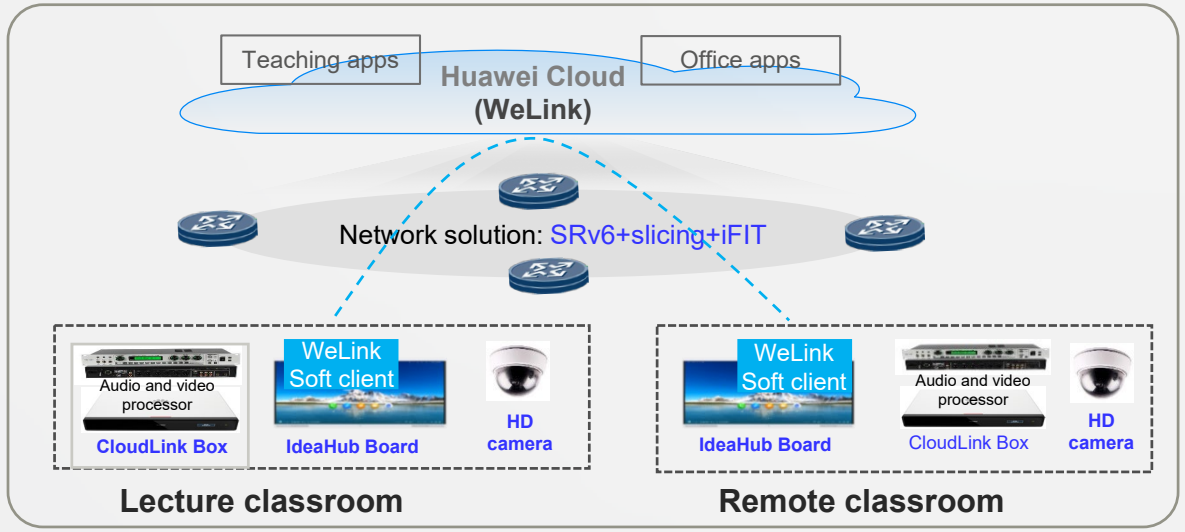
Huawei solution

- We have constructed three types of smart classrooms that utilize facilities such as collaborative whiteboards, AP network intensifiers, and VR glasses. These classrooms provide group teaching, interactive teaching, and remote teaching capabilities. In addition, we work with ULearning utilizing to provide online courses and data analysis, which effectively improve teaching quality and research efficiency.

Customer benefits

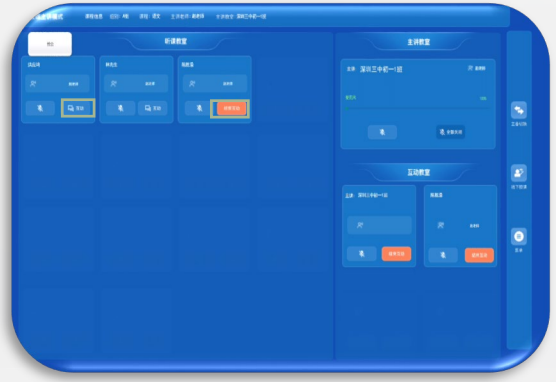
- **Teachers**: Real-time interaction and feedback facilitate precise teaching. Data records throughout classes are provided to quantify students' daily performance.
- **Students**: Seamless integration of online and offline learning can help students deepen their mastery of knowledge. A smart classroom with strong interaction can improve students' attention and participation during class.
- **Administrators**: Real-time online supervision and observation can save management labor resources. By analyzing big data, administrators can gain insight into the teaching and learning status and provide precise evaluations.

Shenzhen Welkin School: Break Geographical Restrictions of Education Resources to Enable More Students to Access High-Quality Teaching Resources



Smart management, simplified operations, and ultimate experience

Automatic device management and one-click switchover between online and offline modes



Teachers initiate interactions and assistants perform control operations

Project background

Shenzhen Welkin School is a new platform-based school managed directly by the Shenzhen Education Bureau. It aims to break the geographical restrictions by integrating online and offline teaching, so as to create new teaching modes and build a community for teacher enablement.

Huawei solution

- We utilize the Huawei WeLink video conferencing system, as well as third-party O&M and interactive classroom management platforms, to implement functions such as remote interactive teaching, intelligent management, and data analysis.

Customer benefits

- **Cloud teaching**: Breaks geographical restrictions and shares high-quality teaching resources to facilitate school selection.
- **High-fidelity experience**: Delivers full HD, low bit rate, and immersive audiovisual experience.
- **Interaction and collaboration**: Enables remote interaction and collaboration between teachers and students and among teachers, improving the overall teaching quality.

Thank you.

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每个组织，构建万物互联的智能世界。

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Digital Classroom: Smart Blackboard + Smart Projection + Sound System