Implementation of ICT in education at JAIST

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Overviews

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- **What is DL Unit @ RCACI**
- **Asynchronous DLS**
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- **Synchronous DLS**
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- **Conclusion**

My Background

Interdisciplinary Research Field

- **Learning/Educational Technology**:
  - Designing & Improving Education & Learning
- Cognitive Science (**Theoretical**):
  - Modelling for Human Learning Process as Target
- Information Technology (**Technological**):
  - By Using ICT with AI/Media/Software Tech.
- **To Realize "Open" Education & Learning Env.**

## Today's talks for JAIST Education Env.

- **Asynchronous Distance Learning Env.**
- **Synchronous Distance Learning Evn.**

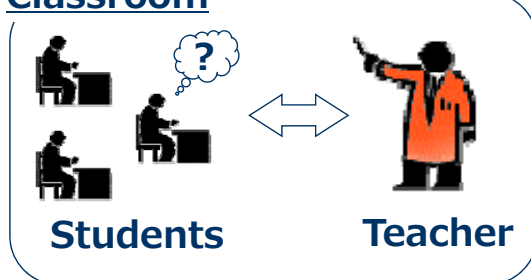---

What is DL Unit @ RCACI?

Distance Learning Unit

- **Promoting Diversification and enhancement of Graduate Education through using ICT**
  - Research with respect to ICT in Learning/Education
  - Planning & Implementing ICT in Education
  - Developing & Maintaining ICT System for Education
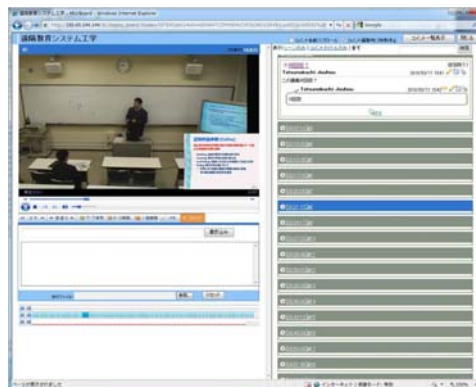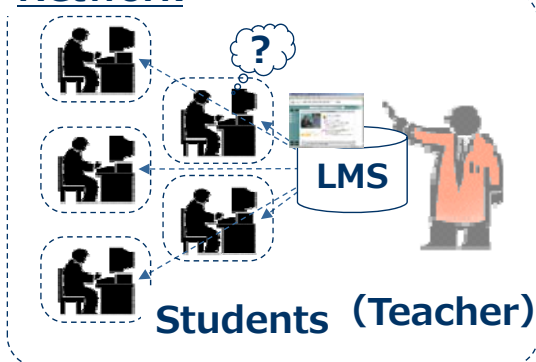
What is Asynchronous DLS?

Classroom

Students   Teacher

Face-to-face Lecture

- Interaction between teacher & students.
- Geographical & time restrictions.

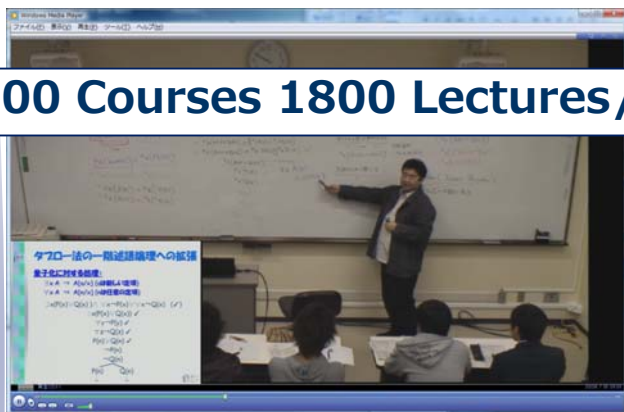## Network

LMS

Students （Teacher）

Asynchronous DLS

- Less geographical & time restrictions.
- Much learning chances.
- Difficulties in following students
  - One-direction, massive online

Lecture Archiving System

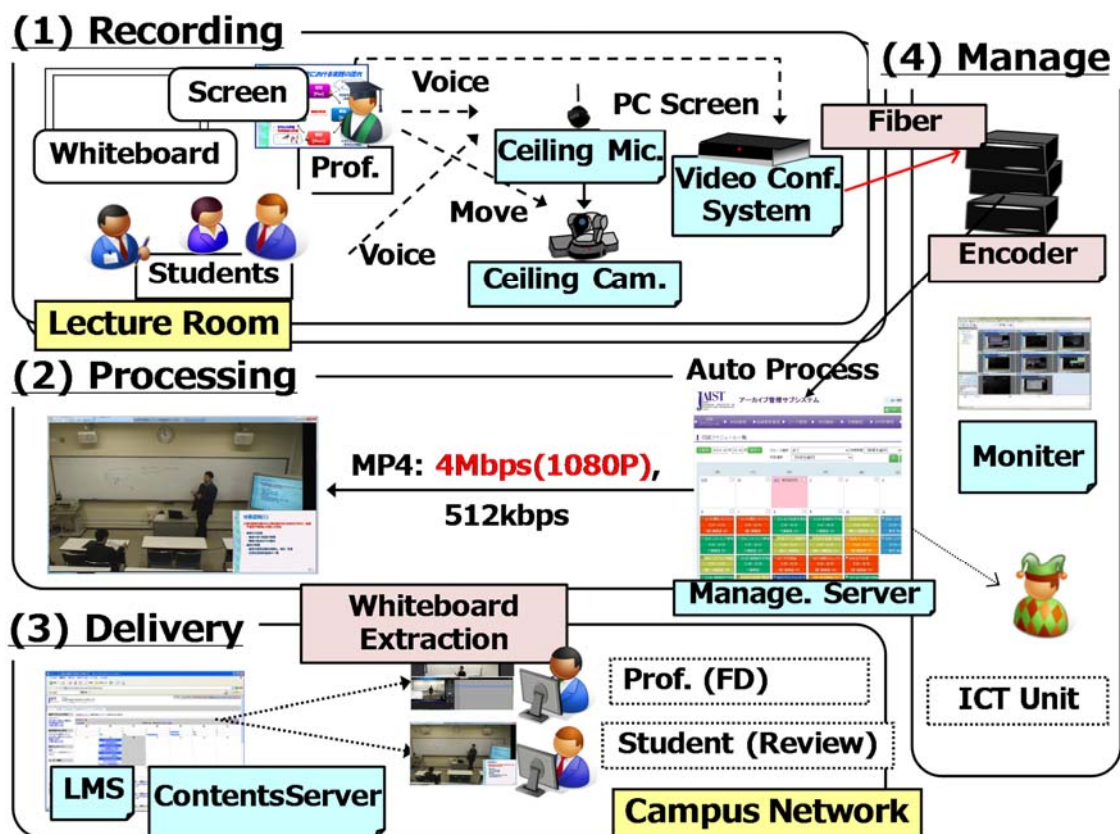**100 Courses 1800 Lectures/Y**

1080p HD Lecture Archives   Encoders & Severs

JAIST Full HD Lecture Archiving System : (2014-)

(1) Recoding : Ceiling HD Cam. & Mic. + PC Screen
                 Automatic Recording (15 Lecture Room)

(2) Processing : Automatic Assign, Recording, Transcoding

(3) Delivery : Single **MP4(4M Full HD**/512Kbps), **WB Ext.**

(4) Manage : Central/Remote Control

System Architecture

(1) Recording
- Screen
- Whiteboard
- Prof.
- Students
- **Lecture Room**
- Voice
- PC Screen
- Ceiling Mic.
- Move
- Voice
- Ceiling Cam.
- Video Conf. System

(2) Processing
- MP4: **4Mbps(1080P)**, 512kbps
- Auto Process
- Manage. Server

(3) Delivery
- Whiteboard Extraction
- LMS
- ContentsServer
- **Campus Network**
- Prof. (FD)
- Student (Review)

(4) Manage
- Fiber
- Encoder
- Moniter
- ICT Unit

Learning Support Functions

- Automatic segmentation by slide change timing
- Whiteboard Capturing
- Comment & search with timeline

Distance Lecture
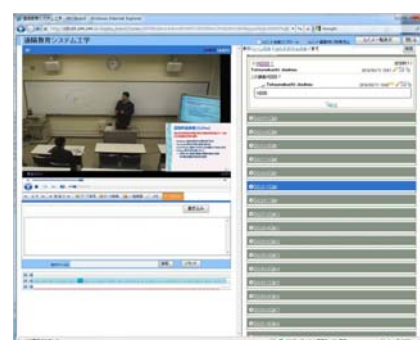
Archive Forum

- Ready for lecture room
- Distance Lecture is archived at the same time
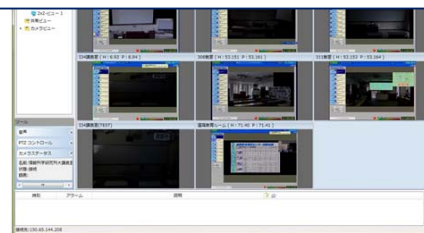
Administrative Functions

Admin Server

- Setting for recoding schedule
- Confirming encoder status
- Monitoring whole system

Centralized Monitoring

- Monitoring for difference types of encoder
- Monitoring image & sound

- Controlling room camera from web browser (I1xx)
- Remote restart / update

Remote Management

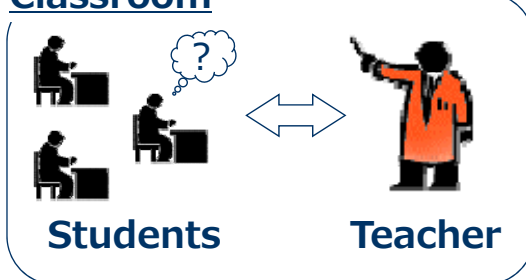# WBT Authoring System

DLC Studio

Mediasite

DLC Studio

- ・SL Contents with Video, Slide, Etc.
- ・High Quality Recoding by Studio Facilities
  - HD Camera, Prompter, Light…
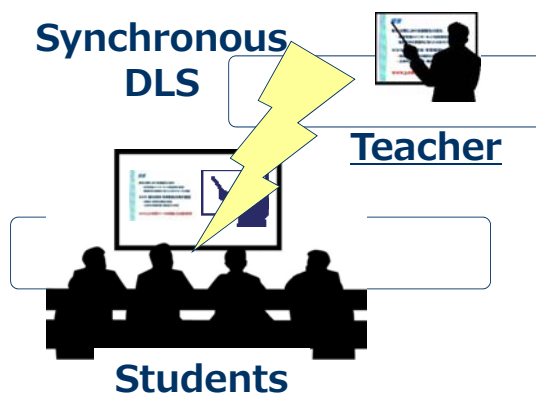
What is Synchronous DLS?

Classroom

Students　　　Teacher

Face-to-face Lecture

- Interaction between teacher & students
- Time & geographical restrictions.

Synchronous DLS

Teacher

Students

Synchronous DLS

- Less Geographical restrictions
- Difficulties in interaction
    - by lecture style
    - by lecture media

Example for Distance Lecture

Backward in Teacher's Room

Front in Students' Room

- Teacher (with Whiteboard) ← Students
    - Readable whiteboards by HD quality
- Teacher ← Students (with Q&A Voice)
    - Volume depends on their seat positions
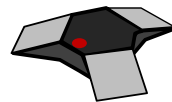- Remote management by administrator

Typical SDL System

Video Conference System

- **- Exclusive solution for video conference**
- **- Max HD(1080p) quality video**
- **- High quality voice without echo & noise**
- **- Dual stream (video & PC screen)**
- **- Interoperability with standards**
- **- Multi connection unit (option)**

Microphone

Camera

Codec

Example for Distance Meeting

Laptop PC for Meeting   **Meeting on Meeting Plaza**

- Diverse points meeting with Web browser
  - If requested, user can share file, show & control other PC screen remotely.
- Voice quality is limited
  - User should use headset so that they cannot face echo problem.

Browser-based System

MeetingPlaza

- **Web browser plug-in**
- **SXGA video & FM quality voice**
- **Application sharing, file sharing, whiteboard**
- **Max 32 clients in a conference**
- **Auto quality control**
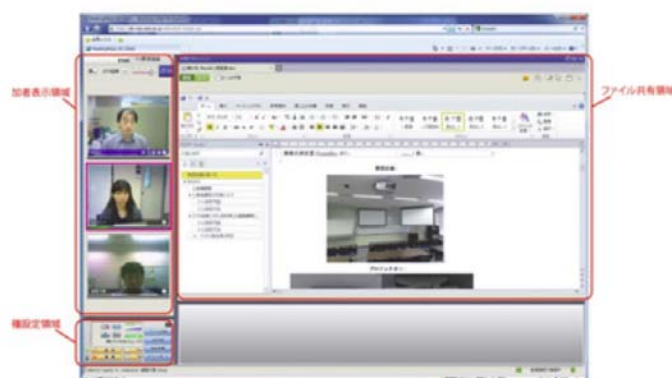
Comparison

	VC System	Browser-based
Place	Installed Room	Any PC with NW
Scene	Rooms Connection	Individuals Connection
Connection	1-3 (built-in MCU)	1-31
Media	Video, Voice, & PC Screen	Video, Voice, Chat & Application Sharing
Quality	High	Low (NW depending)
Bandwidth	128K-6Mbps	32K-6Mbps
Operation	Remote Controller	Web Browser
Notes	Immersive presence may depend on room layout.	Echo is often caused. Using headset is recommended.

Conclusion

How to increase opportunity for learning

- **Asynchronous System:**
    - **Reducing time/space barriers.**
    - **Less interactivity**
- **Synchronous System:**
    - **Reducing space barrier**
    - **Less immersive presence.**

Future directions

- **More immersive environment**
    - **4K/VR/Wall screen**
- **Analysis from Bigdata**
    - **Provide optimal supports**

Summary of Access

10,149 Accesses/214 days

Display term: 2014 / 4 / 1 - 2014 / 10 / 31 Display

All access count by hour(Sum in selected term:10149)