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Lecture Video Capture solutions in the Smart Classrooms

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# Lecture Video Capture solutions in the Smart Classrooms

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Lecture Video Capture solutions in the Smart Classrooms

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The Lecture Video Capture is a very important tool to develop the high education reform and distance learning, and universal USA high education to the world. The Smart Classrooms on campus have provided the services about Lecture Video Capture in the San Jose State University. The members of faculty can record their lecture video, and broadcast on the web side or save the video files in the video server for Video Show and Share. The Students can be in the classroom to listen the faculty’s lecture or watch the faculty’s lecture video on web site in real time outside of classroom. Also, the students can be repeat to watch the lecture video until they understand the faculty’s lecture.

Many companies have provided Lecture Video Capture solutions in the Smart Classrooms. Cisco products included TelePresence Codec, TelePresence Content Server, Show and Share and so on. San Jose State University (SJSU) teamed up with Vyopta Incorporated to design and create 51 learning spaces across campus. Built around the integration of Cisco® Lecture Vision and Vyopta vPublish, these spaces are tightly integrated with advanced technologies for managing the entire lecture-capture process. Panopto is the only lecture capture system built with the flexibility to record any combination of video sources, in any configuration, in classrooms of any size. Many schools have used Camtasia software for Lecture Video Capture. Mediasite by Sonic Foundry is a good solution for Lecture Video Capture solutions on campus. There are many Lecture Video Capture solutions in open sources and Linux system. Vyopta vPublish is Cisco partner, and provides Lecture Video Capture. Moodle for Lecture Video Capture with iSpring and VideoJS is open sources without any license fee. Many schools have developed Moodle for Lecture Video Capture and distance learning.

The Lecture Video Capture is a good project for our education. It also will provide a new teaching and learning method to the education reform, and let faculties and student get the benefits from next generation Internet technology on campus.

1. General Concept of Lecture Video Capture in the Smart Classroom

Lecture Video Capture is one of the important next generation technologies for Smart Classroom in Academic Technology. The members of Faculty can record their lectures in the smart classroom, and live video streaming web broadcast. Through the Video Content Server and Sharing, students can watch the lecture repeatedly with the permit from the lectures. These Lecture Video Captures can be applied to eCampus and distance learning too.

There are three important sections for Lecturing Video Capture in the smart classrooms. The three sections included Endpoint with Camera and Microphone, and Video Content Server for capture, Transform and show and share. Cisco has developed the equipment and hardware with software that included Video Codec, Content Server, Media Experience Engine, and show and share for Video Capture in the classrooms.

The general concept of Lecturing Video Capture is the following:
• Endpoint: The Endpoint included Camera and Microphone, and Video Content Server for capture. The video capture can be recording to Content Server in Windows, Mac and Linux computer servers. Cisco has provided Cisco codec C40 and C90 for Endpoint.

• Transform: We need a Media Experience Engine that can be built in Windows, Mac and Linux computer servers, can be integrated content server together. The Web Server and Database in the Media Experience Engine will be used to Live Web Video Broadcasting and Show and Share. Cisco can provide Media Experience Engine: Cisco MXE 3500.

• Show and Share: The Show and Share is a Web software application. Cisco has developed this Show and Share Software for much equipment that also can be integrated to Cisco MXE 3500. We can also use Youtube, Vimeo, 56.com and so on to video Show and Share.
Fig. 1 General Concept of Lecture Video Capture in the Smart Classroom
2. Camtasia software for Lecture Video Capture

TechSmith has provided Camtasia software for Lecture Video Capture. Camtasia makes amazing videos and screen recordings. Camtasia makes it easy to record your screen or import your own camera footage. Edit videos in no-time, and easily add professional-quality titles, animations, music, translations, and more. You don’t have to spend thousands of dollars to outsource your videos or spend months learning a complicated system.

Camtasia helps us create professional videos without having to be a video pro. Camtasia has been applied to Lecture Capture on CSU Northridge, San Bernardino, Bakersfield, Fresno and most campuses. We have applied Camtasia to Lecture Capture and Video Production for several years. We would like to introduce the Applications and Essential Step-by-Step Operations in Camtasia.

2.1 Installation of Camtasia

You can got TechSmith Webpage http://www.techsmith.com/camtasia.html to download Camtasia.

Fig. 2 TechSmith Webpage to download Camtasia

Click Free Trial, and get Download Camtasia page
Fig. 3 Download Camtasia page

Click download Trial for Window or Mac

Fig. 4 View and track your download
Click next in the installation wizard

![Installation Wizard for Camtasia Studio]

**Fig. 5** Installation Wizard for Camtasia Studio

Mark I accept the Licensee Agreement, and click next

![Licensee Agreement]

**Fig. 6** Licensee Agreement
Typing your name and key number, click next

Fig. 7 Name and key number for License

Click next to agree the installation folder

Fig. 8 Installation folder
Click next, and Enable Camtasia Studio add-in for Microsoft PowerPoint

Fig. 9 Enable Camtasia Studio add-in for Microsoft PowerPoint

Click next, ready to install the Application

Fig. 10 ready to install the Application
Click next, and Update System

Fig. 11 Update System

Click next, Camtasia has been successfully installed

Fig. 12 Camtasia has been successfully installed
Click next, Thanks for installing Camtasia Studio

Fig. 13 Thanks for installing Camtasia Studio
Click Start Learning, and get main Camtasia home page

Fig. 14 Camtasia home page
2.2 Methods of Video Recording in Camtasia

First we need to launch the Camtasia Studio Recorder. There are multiple ways to open the Recorder and start recording.

Multiple methods for launching the Camtasia Studio Recorder as follows

- **Record the Screen** — a button that opens a dropdown menu option within the Editor

Click Record the Screen button, Open the record screen. The following figure showed the record the screen menu.

![Record the Screen menu](image)

**Fig. 15** Record the Screen menu

- **Menu options** — a Menu option dropdown within the Editor

Click Tools -> record the screen, you will get recorder menu.
Fig. 16 Tools menu included record the screen

- Welcome Window — a dialog box that opens once the Editor is launched

Click Help button, the pop down Help menu will be showed. The show Welcome Window will be included.

Fig. 17 Help menu that included the Show Welcome Window
Also, you can create an icon and use Hotkey Command—a key stroke within the Editor to launch record.

2.3 Recording Screen Capturing

After you launch the screen record, you can begin to record. The Camtasia Recorder like as a video camera to record full or selected area of the computer screen. The recording area will be captured with the Recorder.

Once you’ve prepared your project and checked your settings, you are ready to record your screen. Think of Camtasia Recorder as a video camera that is recording the full or selected area of your screen. Every action within the recording area will be captured with the Recorder while everything outside will not be recorded.

2.3.1 Open Camtasia Studio Recorder

Open the Recorder when you are ready to capture the screen by clicking the record the screen button from the Record the Screen, welcome dialog box or from launch options.
Fig. 19 Open Camtasia Studio Recorder

2.3.2 Select the area of the screen to capture (Full or Custom)

Fig. 20 Select the area of the screen to capture (Full or Custom)
2.3.3 Click the Audio button to activate audio recording

Fig. 21 Audio configuration for recording

2.3.4 Audio Input

Fig. 22 Audio Input
2.3.5 Click Tools > Recording Toolbars to add recording tool options

Fig. 23 Tools menu in the Camtasia Recorder

Click options, the Tools Options will be showed.

Fig. 24 Tools Options in the Camtasia recorder
2.3.6 Hit the F9 (default) hotkey or the Record button to start recording

Fig. 25 Record Button or Hit the F9 (default) hotkey

2.3.7 Record the screen project, Hit F10 (default) hotkey or the Stop button to end recording, and Preview the recording in the Recorder Preview Window

Fig. 26 Recorder Preview Window
Click the Save and edit button to save the file as a .camrec file and open the recording within the Editor for editing.

2.3.8 Open record video file in the Camtasia for editing.

![Video Recording in Camtasia](image)

Fig. 27 Record video file in the Camtasia for editing

2.4 Video Editing

Once you finished recording video, you need to edit and develop the video files. We induce Step-by-Step operations for Video Editing. The Step-by-Step operations for Video Editing will be included Clip Bin and Library, Preview Window and Timeline, and Task Tab Enhancing.

i. Editor Overview

The Camtasia Studio Editor can work as a stand-alone program or in conjunction with the Camtasia Recorder and PowerPoint Add-in. When using the Editor, you can combine, cut, arrange, and add special effects, and other features to video, audio, and image clips. By combining them together, you can produce your own video project.

Like the Recorder, the Editor uses its own file format to save files. The .amproj format is a native editor format that can only be opened and used with the Camtasia Editor. The recorder’s .camrec files are used within the Editor.

ii. Importing Video Files into the Clip Bin
The editor interface is split into three main sections. They are the media and task tabs, preview area, and the timeline.

- Media and Task Tabs — tabs that hold media and tools to create and perform selected features
- Preview Window — previews the selected area of the timeline where the playhead is positioned
- Timeline — shows all of the frames, tracks, and features of your project including videos, images, audio, special effects, and other features

The preview area and timeline work in direct correlation with each other (See Fig. 3.50).

![Camtasia editor interface](image)

**Fig. 28 Camtasia editor interface**

The clip bin lists all media that was involved in the current project. It is like a catalog of selectable media that organizes media files to make it easy to find and to select the files that you would like to use in the current project.

The media is not embedded into the project yet but there’s a link to that media where it is located on the computer. You can use the same media clip multiple times throughout the timeline and cut, slip, or add effects to them individually.

All imported media files are imported into the Clip Bin. A screen recording is automatically imported into the clip bin if the Save and Edit option is selected when saving the recording.

The clip bin organizes the files by the type of media they contain, such as Camtasia recording, image, audio, or video files. You can constantly add, delete and import media files to the clip bin.

a. Click Camtasia Studio icon, and open the Editor
Fig. 29 Open the Editor

b. Click File, and click Import Media menu

Fig. 30 Click Import media in File men
c. An open file navigation window will pop up after click Import media

Fig. 31 open file navigation window

d. Select the files to be imported

Fig. 32 Video file to be imported and media files appear in the Clip B
e. Pull Video to Track 1 for editing

Fig.33 Editing import video

2.5 Adding Media to Library

We can use the Library tab and Clip Bin tab for your project editing. They have most of the same functions. The differences is that the media added to the clip bin is only for the current project, media added to the library will be available for all projects using the Editor.

The Library starts loaded with royalty free media from TechSmith that are available to use in your projects. These files are also useful as test media for practice projects.

The Library can store an array of media including video, image, audio, effects, and timeline groups. Double click on a file listed in the Library to preview the media in the Preview Window.

2.5.1 Click Library button, and get the contents in the Library
Fig. 34 Contents in the library from TechSmith

2.5.2 Creating new folder to the Import media to Library selection

Fig. 35 creating a new folder in the Library

2.5.3 Type my media on the new folder
Fig. 36 named folder my record

2.5.4 Click Import media to folder, and get explore window

Fig. 37 Import media to folder that you created

You can add music, video, images and audio to the library for the future project.
2.6 Working with the Preview Windows for Canvas, Cropping media, Dimensions and Playback Options

We can work with the Preview Windows for Canvas, Cropping media, Dimensions and Playback Options. The detail work steps are the following:

2.6.1 Working with the Canvas

The most of the work we will be doing will take place on the Canvas area. This area is not just a playback window, but a work area where we can select clips and adjust them to fit your project needs.

The Preview Window contains Canvas, playback controls, and view options area.

Fig. 38 Preview window, view options, canvas, and playback controls area

After the media is placed into the timeline, the Canvas will be the work area to arrange, rotate, resize, and move the media.

There are two main ways to select media on canvas. You can select media on the canvas itself or in the timeline. Multiple clips can be selected on multiple tracks to move or arrange at the same time. These multiple selections can be grouped together to be saved to the library, copied, arranged, or moved as a one.

Selecting Single Media

Click on a media clip with the mouse button in the timeline or on the canvas. The media box will highlight in the canvas and the clip will turn blue in the timeline.
Selecting Multiple Media Objects

Click on the first clip, then press and hold the Shift key down while clicking on additional clips. This will highlight the multiple clips in the timeline and on the canvas. You can also select multiple clips by clicking on an empty portion of the timeline and click and hold the mouse button down over the clips then release the mouse button when all the clips are highlighted.
Fig. 40 Selecting Multiple Media Objects on the canvas

In both the single and multiple clip selection, if the playhead moves away from the clip in the timeline, a dotted outline of the selected clip will still show on the canvas. This is useful when you are working on positioning or transforming clips that are located on different sections of the timeline.

We also can do Grouping Media Selections.

After selecting multiple clips, right click over one of the selections and click on the Group listing in the context menu.
Fig. 41 Group is highlighted in the context menu

The files will collapse into a new grouped clip in the timeline. This grouped clip can be expanded to show all the clips enclosed within by clicking the plus sign in the upper left corner of the grouped. The clips inside the group can be edited and adjusted the same as clips outside the group.

Groups can be selected and combined with new clips to form a new group. Transitions and animations can also be selected to be grouped with the clip files. Group clips can be renamed to identify them on the timeline and then the groups are collapsed.

To ungroup the grouped clips, select the group and right-click. To open the context menu, click on Ungroup from the list.

2.6.2 Cropping Media

Media from the clip bin or library are not always cropped to fit your project. To crop the media in the timeline, select the Crop button in the View Options panel in the upper right hand side of the preview window.
Fig. 42 Information about Crop in the view options

When the Crop button is activated, the selected media outline box will turn blue. Video and image clips can be cropped to match or trim the media.

2.6.3 Editing Dimensions

In the upper-left hand side of the Preview Window is the Editing Dimension button that launches the Editing Dimension dialog box.
Fig. 43 what size do you want your video to be?

The dropdown menu can change the dimensions of the overall video project. There are preset sizes along with the recording video size. You can add custom sizes and types into the Width and Height fields. It is recommended to keep the aspect ratio box checked. The dimensions can be changed anytime throughout the editing process, however it is recommended to keep the project at the recording dimensions or at the size of the end use of the video project.

2.6.4 View and Playback Options

The last three icons in the View Options panel except cropping changes the view of the previews but does not change the dimension of the video project.

- The hand icon is the pan toggle. When activated, it will grab and move the canvas view window but not the media clips within the timeline. This is useful to navigate around the view area when zoomed into the canvas.
- The Full Screen button will launch the preview window to Full Screen mode. Hit the ESC button to exit the mode.
- The Video Detachment button will release the View Preview from the interface to float in a movable and adjustable window over the interface. Select the button again to attach the window back into the interface.
Fig. 44 Cropping, hand, hand, full screen and Detachment

Playback

Select the Play button in the Preview Window to start the playback of your project. The spacebar toggles the playback between start and stop. From the Menu Options

> Play are more controls for the project playback including Play from the Beginning selection.
Camtasia record Camera

2.7 Record Camera

The record camera feature will record the activity displayed through the Web camera, like it would be when using the Recorder. This feature can be used to add missing video recordings or fix errors.

To start recording make sure your Web camera is plugged in and working. Then click the Record Camera tab.
Fig. 46 Camera Record

A live action preview of the camera will appear in the tab along with the audio input. Click the Start recording button to begin.

If you just need to add a recording, you can start the capture at any time. If you want to try and match any part of the project, place the playhead at the location of where you would like to start
Fig. 47 Start recording and Stop recording
2.8 Share and embed Camtasia video to YouTube and Web page

2.8.1 Open Camtasia Video Editor with your video

Fig. 48 Open Camtasia Video Editor with your video
2.8.2 Click Produce and Share

![Fig. 49 Produce and share](image)

2.8.3 Click Share to YouTube in Produce and Share

![Fig. 50 Production wizard for Share to YouTube](image)
Click next in the wizard, sign in with your Google Account

Fig. 51 Sign in with your Google Account

2.8.4 Sign in to Youtube.com

Fig. 52 Sign in to Youtube.com
2.8.5 Click Accept the applications agreement

Fig. 53 Produce and upload video to YouTube

2.8.6 Click Finish, upload the video

Fig. 54 Upload video to YouTube
2.8.7 Processing the video in YouTube

Fig. 55 Processing the video in YouTube

2.8.8 The Video is working in YouTube

Fig. 56 Upload Video in the YouTube
2.8.9 Getting Web Address in YouTube

Fig. 57 Web Address in YouTube http://youtu.be/zX9iD-LkyfQ?list=UUSVTEhsO9jyCEDE8eMBoEWQ

Playing your video in YouTube

Fig. 58 Playing our video in YouTube
2.8.10 Getting source code to embed YouTube video in your Web page

Fig. 59 getting source code to embed YouTube video in your Web page

<iframe width="560" height="315" src="//www.youtube.com/embed/zX9iD-LkyfQ?list=UUSVTEhsO9jyCEDE8eMBoEWQ" frameborder="0" allowfullscreen></iframe>

Lecture video capture becomes a very interesting and important project in CSU system. We can begin to set up the smart classroom for Lecture Video classroom by cheaper camera, microphone, monitor, and computer server following the requirement of Endpoint, content server and media experience engine, and show and share. Of course we can use Cisco equipment directly for lecture video capture in the smart classroom. We believe the classical education system will be changed and reformed quickly by lecture video capture in the smart classroom and through Internet development.

We believe that the Video Capture Technology will be wide to use in the classrooms and distance learning for High Education in the future, and create and provide new and advanced reforms of High Education. Video Capture Applications for High Education is a great challenge to the current education systems. Video Lecture Capture will be important topic and project in Academic Technology, and applied to our education.
3. Adobe Flash Media Live Encoder for Lecture Video Capture

Adobe Flash Media Live Encoder (FMLE) is a powerful free encoder that allows you to broadcast directly. Adobe Flash Media Live Encoder 3.2 live audio and video capture software provided media encoder that streams audio and video in real time to Adobe Media Server software or Flash Video Streaming Service (FVSS). This software can enable the broadcast of live events such as sporting events, webcasts, or concerts. It supports for Adobe Media Server 5 features, and encode up to three streams at multiple bitrates simultaneously to take advantage of Dynamic Streaming. Additionally, get enhanced control over live streams with new DVR functionality. We can be free to use it to Lecture Video Capture in Classroom immediately, and allows us to broadcast in the Website. The start work steps are the following:

3.1 Download and Installation of Adobe Media Live Encoder 3.2


Fig. 60 Download Adobe Media Live Encoder 3.2 from Adobe website

There are two versions for Adobe Media Live Encoder 3.2: Windows and Mac OS X.

We can begin to install Adobe Media Live Encoder 3.2.
Begin to install Adobe Media Live Encoder 3.2

Click the Next, we will get the following screen.

License Agreement

Click Next
Fig. 63 Choose Destination Folder

Click Next

Fig. 64 Ready to install the program

Click Install
Fig. 65 Installing Adobe Media Live Encoder 3.2

Fig. 66 Finished installing Adobe Media Live Encoder 3.2

3.2 Using Adobe Media Live Encoder 3.2

After installation of Adobe Media Live Encoder 3.2, we can begin to use Adobe Media Live Encoder.
Fig. 67 Launch Adobe Media Live Encoder 3.2
Now we can see Adobe Media Live Encoder.

Fig. 68 Adobe Media Live Encoder
Adobe Media Live Encoder contained Video and Audio input and output and Encoding Option. The Encoding Option included Video, Audio and Panel Options sections.

We also can save the video capture files to the computers.
Click Start, we can begin to record the video and audio, and save the video capture files to the computers.
Fig. 70 Begin to record the video and audio.

3.3 Brief overview of all the options in FMLE for the Configuration

The brief overview of all the options in FMLE can be found in Fig. 71 Options in FMLE for the Configuration.
Fig. 71 Options in FMLE for the Configuration

Where

1. **Video Device**: Select the video device you want to use to stream
2. **Encoding Format**: Select H.264 over VP6 if possible
3. **Frame Rate**: Standard 30 fps
4. **Input Size**: Choose an input size that is equal to your output size below. Note that the ratio of your input size should be the same.
5. **Output Size and Video Bit Rate**: Make the output size equal or less than the input size. For larger output sizes, you will need a higher bit-rate.

**Recommended encoding settings**

Note: encoding at a higher bit rate will require more CPU resources and bandwidth.

6. **Audio Device**: The audio device you want to use for the stream. This does not need to be the built in mic to your camera. You can select an alternate audio input.
7. **Format**: Choose AAC if possible. If you are on a PC and do not have a license from Main Concept choose Mp3.
8. **Channels**: Stereo is preferred over mono.
9. **Sample Rate**: 44100 Hz or 44.1 kHz is a good starting point unless you have audio gear that requires something else.
10. Audio Bit Rate: You could start at 96 kbps and go up from there.
11. RTMP URL and Stream Key: Your RTMP will be populated automatically when you open up the XML file you download from the Remote Console of your Channel Dashboard.
12. Save to File: You can save a local copy of the broadcast to your computer. Having a local copy is always a good idea.

4. Red5 Pro Media Server for Lecture Video Capture

Red5 Media Server [http://www.red5.org/](http://www.red5.org/) is a powerful video streaming server worked on RTMP (Real-Time Messaging Protocol) protocol. Linux Red5 Media Server is open free sources Flash Server based on Java and other open source frameworks. It provides a good solution to business of all sizes including Enterprises. Red5 includes support for the latest multi-users. Red5 supports Streaming Video (FLV, F4V, MP4, 3GP), Streaming Audio (MP3, F4A, M4A, AAC), Recording Client Streams (FLV and AVC+AAC in FLV container), Shared Objects, Live Stream Publishing, Remoting and Protocols: RTMP, RTMPT, RTMPS, and RTMPE. Red5 Media Server can be installed on Linux Ubuntu, Debian, CentOS and RHEL.

Red5 Pro is built on the open sources Red5 Media Server. Red5 Pro allows us to build scalable live streaming and second screen applications. Live streaming leverages WebRTC for two way live audio, video and data streaming to the app with just a few lines of code using the SDKs (iOS, Android and HTML 5). Second Screen creates cross-platform second screen experiences similar to Google’s Chromecast, and enable install control of digital signs, smart TV and more through the easy to use SDKs.

Red5 Pro provides the developer account is free.

4.1 Download the Red5 Pro Server

Red5 Pro server acts as a hub enabling connections between various end-points including the mobile SDKs, iOS and Android, and browser-based clients via HLS or Flash. WebRTC.

First you need to sign up in [https://www.red5pro.com/](https://www.red5pro.com/). After sign up, you can get a user account to login.
After login, you can begin to download Red5 Pro Server

Before you install Red5 Pro Server, you need to install Java JDK 1.7+. 
4.3 Install Red5 Pro Server

After installing Java, you can install Red5 Pro Server. You can open terminal, cd into the Red5 Pro directory and issue: ./red5.sh.
Fig. 75 Install Red5 Pro Server
After the server has started, open a web browser and point to http://localhost:5080.

Fig. 76 Red5 Pro Server Website

4.4 Start Broadcasting

- Taking note of the server IP address shown in the upper-right. Example: 192.168.1.101.
- Allow the Flash Player and Browser to access the Camera and Microphone of the local system.
- Enter a stream name in the top field (e.g., XustreamBroadcast).
- You will use the stream name value when subscribing to the broadcast.
- Click Start Broadcast.
- Watch the output. Once you see NetStream.Publish.Start, it’s time to start subscribing to your broadcast.
Fig. 77 Streaming in Red5 Pro Server

We can continue to develop this Red5 Pro programs, and create the better Lecture Video Capture applications.

5. Panoptic software for Lecture Video Capture

Panopto is the most flexible, easy-to-use Lecture Video Capture solution for members of faculty, staff and student on campus and in the classrooms. The software for Windows and Mac is easy to install and easy to use. You can start with lecture video recording, and save the video to my folder. The video content management system provides video uploading, managing and sharing with faculties and students. The Panopto supports for multi-camera video capture makes it easy to capture the instructor, the content of their screen, a document camera, a digital whiteboard, and more.

The content management system centralized, secure place for recorded lectures, flipped classroom videos, campus events, and more. It comes with built-in video analytics, a web-based video editor, automatic encoding to ensure your videos play efficiently on any device, and a unique search engine that helps your students review material mentioned or shown in their course videos.

The capture software for Windows and Mac is easy to install and easy to use. The remote recording capability makes it easy to schedule lecture recordings in advance. The support for multi-camera video capture makes it easy to capture the instructor, the content of their screen, a document camera, a digital whiteboard, and more.

The video platform can integrates with Instructure Canvas, Moodle, Blackboard, Brightspace (Desire2Learn), WebCT, Sakai, and Angel.

5.1 Log in Panopto Server

First, we need to login Panopto at [https://sjsu-ischool.hosted.panopto.com/Panopto](https://sjsu-ischool.hosted.panopto.com/Panopto) to begin using Panopto.
5.2 Panopto Website Homepage

After you login Panopto, you will get Panopto Website Homepage as follows.
5.3 Using Panopto Software

There are seven sections, Home, My Folder, Share with Me, Everything, In Progress, Browse and System in Panopto.

1) Home

We can see Home at Fig. Home in Panopto. The home can be shared the Video for everybody, public. It is showed and shared.

2) My Folder

My Folder is your private storage for the video files. You can up load the video files to My Folder after recording video.
Fig. 80 My Folder in Panopto

3) Share with Me

The users can share the videos each other.

Fig. 81 Share with Me in Panopto
4) Everything
Everything in Panopto contains every video files.

Fig. 82 Everything in Panopto

5) In Progress

Fig. 83 Progress in Panopto
6) Browse in Panopto
You can browse your video files.

Fig. 84 Browse in Panopto

7) System in Panopto
The System can create the User Group. You can work with students together.

Fig. 85 System in Panopto
5.4 Lecture Video Capture in Panopto

5.4.1 Download Panopto recording software and Installation

a) You can Download Panopto to begin creating content:

   Windows: [https://sjsu-ischool.hosted.panopto.com/Panopto/Cache/5.3.0.33782/Software/PanoptoRecorder.exe?arch=X86&useCustomBinary=True](https://sjsu-ischool.hosted.panopto.com/Panopto/Cache/5.3.0.33782/Software/PanoptoRecorder.exe?arch=X86&useCustomBinary=True)

   Mac: [https://sjsu-ischool.hosted.panopto.com/Panopto/Cache/5.3.0.33782/Software/Panopto%20Recorder.pkg?arch=none&useCustomBinary=True](https://sjsu-ischool.hosted.panopto.com/Panopto/Cache/5.3.0.33782/Software/Panopto%20Recorder.pkg?arch=none&useCustomBinary=True)

b) Installation of Panopto recording software

![Installation of Panopto Recording software](image)

Fig. 86 Installation of Panopto Recording software
5.4.2 Lecture Video Capture

a. Login in Panopto Recording
Fig. 89 Login in Panopto Recording

b) Creating a new recording

Click Create a New Recording

Fig. 90 Creating a new recording
Fig. 91 Recording Video

Fig. 92 Begin to record the video

Click Stop, the Video recording is stopping.
Fig. 93 Stop recording video

Fig. 94 Video recording complete

c) Upload and save video in My Folder
Fig. 95 Saving Video File in My Folder

You also can the video file in your Panopto account

Fig. 96 Video File in My Folder
6. Mediasite for Lecture Video Capture

Mediasite by Sonic Foundry is a good solution for Lecture Video Capture solutions. Faculty can use video to take courses to the next level, increasing engagement and student achievement. Administrators facilitate staff development, preserve campus knowledge and events and offer competitive programs. Mediasite provided the Desktop Recorder, My Mediasite Editor, upload a video to Mediasite, and video content management.

6.1 Introduction to Mediasite RL830 Recorder

The Mediasite RL830 Recorder provides the most reliable, integrated video capture for high-volume content spaces like lecture halls, training facilities, board rooms and auditoriums. With support for any pro AV or educational technology, it’s easy to capture multi-source video that transforms complex concepts, demonstrations and simulations into engaging content. Together with Mediasite Enterprise Video Platform, RL830 Recorders provide the most complete video platform to record, publish, manage, search, analyze and secure all your video.

![Fig. 97 Mediasite RL830 Recorder](image)

The Mediasite RL830 Recorder also provided MULTIVIEW FOR MULTI-SOURCE CAPTURE, EXCEPTIONAL STREAMING QUALITY, AUTOMATED ERROR-FREE RECORDING, WEB MONITORING AND MANAGEMENT, COLLABORATIVE WEB EDITING and INTERACTIVE VIDEO.

6.2 Mediasite Login

First, we need to login Mediasite webpage. You can get account from administrator of Mediasite.
Fig. 98 Login Mediasite
After login, we get My Mediasite as follows:

Fig. 99 My Mediasite

6.3 Using the Desktop Recorder

Using the Mediasite Desktop Recorder we can record, Demos and Trainings, Lectures, Flipped Classroom Lessons and Assignments.

After login, we can click Create Presentation.
Click Record desktop, and get the following screen.
Fig. 102 Get Desktop Recorder
Click record, begin to record a new recording.

Fig. 103 Begin a new recording
After recording, you can test the recording and setup share with somebody.

Fig. 104 Share with others

6.4 Using the My Mediasite Video Editor

Mediasite allows us to edit recordings in “My mediaSite”. You can crop and cut video incorporating fades or transitions, Add video intros, outros, chapters and watermarks and update or replace slides. We can use MediaSite Editor to edit mistake, breaks or update recordings quickly and easily.

Finding recording that you want to edit.

Fig. 105 Finding recording that you want to edit.

Selecting edit button
Using time line to edit the video

Click Time line, we can choose the video, and cut or crop video, incorporate transitions, add, delete, or replace slides, then we can use commend Butten to edit the video.

The following example is for Cut.
6.5 Upload a Video to Mediasite

We can upload video from your phone or tablet, video recorded from other programs. MediaSite supports over 100 formats.

The work steps of upload the video is the following:

- Log in to the My Mediasite management portal
- Click on Create Presentation
- Choose the Upload Media option. On the Desk Recorder, click on the “Upload Existing” icon.
Fig. 109 Upload the video

- Select the file from your computer that you would like to upload. Once selected, the file will upload. After the file is uploaded you will see a message stating “This upload is being processed”. The processing time depends on the size of the video, but should be finished within a few minutes.
- Close the upload window.
- Your presentation should appear on the My Presentations page with a green play button above it once it is ready to view.

You also can use Recording Management to upload the video. The following figure shows the upload in the Recording Management.
Fig. 110 Upload in Recording Management

Most instructional media content on campus is delivered by the Mediasite system. Mediasite is a media delivery hub that allows efficient delivery of video and audio content to pretty much any modern device - like our own private YouTube. Note the word "private". Access control using campus credentials means that only the students in a particular section can view content during the course, protecting your content and allowing us to use copyrighted content under Fair Use.

Mediasite works entirely behind the scenes, managing recording schedules, equipment, cataloging and publication. And that’s true when they’re recording a lecture in class, at home, or in the field. Mediasite can be multi source capture that included slide shows, smartboards, document annotations and a range of other sources. You can capture them separately from the live lecture video, and then publish all the captures, perfectly synchronized, side by side. Mediasite can Stream and record lectures from anywhere—classroom, campus lawn or in the field. The My Mediasite application lets you record from any device: desktop, laptop, smartphones, tablets and more. Study after study has shown that Mediasite lecture capture is a key factor in increased student retention and graduation: both big factors for public and private funding. Mediasite also can Embed links to presentation materials, secondary sources, enhanced quizzes, exam prep materials—all the knowledge that improves critical thinking and enhances results.
7. Linux Video Captures Solutions

Linux Video Capture will be included Linux view endpoint (Cameras, Video output and input, and recording), codec, live streaming web broadcast, streaming video server, video content server, video format convert and transfer, and video show and sharing.

7.1 View EndPoint (Cameras, Video output, and Video recording)

A. Linux WebCam

A webcam is a video camera. A webcam is generally connected by a USB cable, FireWire cable, or similar cable, or built into computer hardware. Many laptops, tablets and smart Cell phones have been built the WebCam. WebCam is e lowest cost.

Linux WebCam has been used and applied to video links for video output, video phone, videoconference and video recording. There are a lot of software and Linux drivers to support WebCam applications for Videoconference, Video Chat, Video Live Web broadcast and Video Recording. The Videos by using WebCam has been showed and sharing in Facebook and youtub web sites very well.

B. Linux Android Camera in Smart Cell phones

Smart Cell phones are special mobile phones. The operation system of Smart Cell phones was using Android that based on Linux kernel. It has some computer applications that included Wi-Fi, Web browsing, media player, GPS navigation and digital cameras for photo and video. The digital cameras on Smart phones are easy to use, and record the video. The video recording can be saved to the memory in the Smart Phone or external SD memory cards. These video records can be transferred to the Video Server or publish on the Web site, Facebook and YouTube.

C. Linux IP Camera

The Linux IP camera is used to connect to Internet by using Ethernet or Wi-Fi. The typical Linux IP camera included varifocal lens, Microphone, Video Output, Micro SD slot, Ethernet port and terminal block for external input and output devices.
Fig. 112 The Ethernet port connections of Linux IP Camera in the network system

Many Linux HD IP Cameras as view endpoint have been used and applied to Linux video capture. The computer servers or clients can control and manage Linux IP Camera in the network system. Now the Linux IP Camera also can provide live streaming web broadcast.

D. Linux CCD color digital camera

Both CCD (charge-coupled device) and CMOS (complementary metal-oxide semiconductor) Technology have applied to digital cameras. The most digital Webcam and IP Camera are using CMOS Technology, because CMOS sensors are much less expensive to manufacture than CCD sensors. The CMOS Technology has been developed very well to Webcam and IP Camera.

The CCD cameras create high-quality, low-noise images. The CMOS cameras, traditionally, are more susceptible to noise. The expensive CCD cameras still are applied to astronomy and science researches.

We can see that CCD Cameras tend to be used in cameras that focus on high-quality images with lots of pixels and excellent light sensitivity. The CMOS cameras are usually less expensive and have great battery life. CMOS cameras traditionally have lower quality, lower resolution and lower sensitivity.

The CCD color digital camera has been used in the Linux operation system. Linux CCD color digital cameras have been applied to view endpoint for High Resolution Video.
A codec is a device or computer program capable of encoding or decoding a digital data stream or signal. Linux video codec is a program for video encoding and decoding. These codecs are made available through libraries such as the libav/ffmpeg libraries. Media players available such as VLC and Mplayer make use of these libraries in order to provide support for playback of files encoded through these many different codecs.

FFmpeg, http://www.ffmpeg.org/ is a complete, cross-platform solution to record, convert and stream audio and video. It includes libavcodec - the leading audio/video codec library. libavcodec is a library containing decoders and encoders for audio/video codecs. FFmpeg is able to decode, encode, transcode, mux, demux, stream, filter and play pretty much anything in the Linux operation system.

Example for ffmpeg2theora and oggfwd for Icecast2 Streaming Media Server:

**Command of Encode Videos:**

ffmpeg2theora videoclip.avi (will write output to videoclip.ogv)

**Command of Live encoding from a DV camcorder (needs a fast machine):**

dvgrab - | ffmpeg2theora -f dv -x 352 -y 288 -o output.ogv -o

**Command of Live encoding and streaming to icecast server:**

dvgrab --format raw - \

| ffmpeg2theora -f dv -x 160 -y 128 -o /dev/stdout - \

| oggfwd iccast2server 8000 password /theora.ogv
Fig. 114 Video ogv format playing in the Website

MPlayer, [http://www.mplayerhq.hu/](http://www.mplayerhq.hu/) is a free software and open source media player. Mplayer is a movie player in the Linux OS. It supported most important video codecs, MPEG-4 ASP in all variants including DivX, OpenDivX (DivX4), DivX 5 (Pro), Xvid, MPEG-4 AVC aka H.264, and so on. You can watch VideoCD, SVCD, DVD, 3ivx, DivX 3/4/5, WMV and even H.264 movies by codecs.
There are many good other video players, VLC Media Player, Xine, Kaffeine, and Totem for Linux OS.

You can install the ubuntu-restricted-extras package in Ubuntu Linux. You also can install the extra codecs provided by the libavcodec-extra-54 package in Debian Linux. The most useful codecs can be installed on Fedora Linux. This package contains a lot of the codecs you would usually need. Also if you try playing a media file that you don't have the codec for then you should get asked if you want to download it automatically.

The Linux video codecs are easy to use. Many media players are free and open sources.

7.3 Linux Live Streaming Web Broadcast

Live video retransmission on the internet, often called live video streaming. The several work steps are processing for Linux Live Streaming Web Broadcast.

First, a video source is needed, which can be either digital such as webcams or analog, which requires digitizing through an AD capture converter before it can be streamed.

The second step is encoding. All encoders can output in RTMP live streaming (Flash). This includes broadcasting video software encoders such as Wirecast, Discover Video and also Adobe Flash Media Live Encoder, which is a free download. Professional hardware encoders can also be used, such as the Niagara line, TriCaster, VBrick and TouchStream.

In the final step, the stream is sent to streaming video servers. The live streaming video is then
distributed web server to any viewer with an internet connected device that included Laptop and mobile phone.

Fig. 116 Linux Live Streaming Web Broadcast

Many free open resources of software are developing and solving for Linux Live Streaming Web Broadcast.

(A) VideoLAN (VLC) Media Player: http://www.videolan.org/index.html

VLC is a free and open source cross-platform multimedia player, and provide the live stream video from webcam on Linux. Once a streaming server starts running, the webcam live feed is available at http://<ip_address_of_webcam_host>:8080/stream.wmv.
Nex Gen Media Server Lite (NGMS-Lite) is a completely free and versatile media streaming server. The Lite version of NGMS is able to deliver real-time video streams in the same variety of formats and protocols available in the full version. The features of NGMS will provide recording, https/SSL, SIP Video Calling, Vide Conferencing, Web Media Sharing and WebRTC interop.

(C) Flumotion: http://www.flumotion.net/

Flumotion Streaming Software allows broadcasters and companies to stream content live and on demand in all the leading formats from a single server. Flumotion also offers a Streaming Platform and WebTV which reduce workflow and costs by covering the entire streaming value chain.
7.4 Linux Streaming Video Server


I am interested in free open sources applications for Linux Operation System. Two reasons are why I love to free open sources applications. First, I don’t need to cost any money to use software applications. Secondly, as IT consultant and software engineer I can more understand the applications’ design and concepts with based on sources codes, so that I will be easy to develop the software applications.

Here I would like to introduce Experimental Video Server: haxevideo. It is not actively supported or developed, and not production-ready. However, HaxeVideo is a multithread FLV streaming server entirely written using the Haxe programming language. The source code is very small and the server is lightweight (both CPU and memory) but very scalable. FLV is the format used by Flash. HaxeVideo support FLV video streaming, Webcam/Microphone recording and live streaming (for chat/web conferences). It is however a very small and extensible codebase to start building your own RTMP server.

7.5 Linux Video Content Server

(A) Streaming Video Content from VLC http://www.videolan.org/vlc/index.html

Linux VLC enables you to setup a simple, cost effective video storage and streaming
The server in the network system. Using Linux as a video storage server can also allow you to stream videos over the network. Using the open source, multiplatform media player, it is quite easy to stream video content from your Linux server.

We can use VLC to create a simple video server in Linux OS. The installation of VLC in Linux OS will be easy. Once VLC is installed and working we will be able to begin creating a live video stream from Linux server. VLC is a very versatile application, and is prepared to playback almost any video format we can find. With VLC, we will be able to watch the video content from any computer with VLC installed, and control the playlist and playback settings from an intuitive web interface.

![VLC Content Server](image)

Fig.119 VLC Content Server

(B) MediaTomb [http://mediatomb.cc/](http://mediatomb.cc/)

MediaTomb is an open source (GPL) UPnP MediaServer with a nice web user interface. It allows you to stream the digital media through the home network and listen to/watch it on a variety of UPnP compatible devices.
Linux has MythTV (which can also work as a server), VLC (Video LAN Client) and even an UPnP filesystem so that the contents of media servers appear as local files. You can also use Windows Media Player or even a web browser to browse and play your media.

MediaTomb is not only useful in a home environment - any organization that needs to make a number of multimedia files available over its network, such as educational videos for college, would be a prime candidate for using this software.
Fig. 122 MediaTomb's web interface for administration
7.6 Linux Video Format converts and transfers

(A) HandBrake http://handbrake.fr/

HandBrake is Free and Open Source, a tool for converting video from nearly any format to a selection of modern, widely supported codecs for Multi-Platform that included Linux OS.

Get started with HandBrake in seconds by choosing a profile optimized for the device, or choose a universal profile for standard or high quality conversions, simple, Easy, Fast. For those that want more choice, tweak many basic and advanced options to improve encodes.

![HandBrake User Screen](image)

Fig. 123 User Screen in HandBrake

(B) MiroVideoConverter http://www.mirovideoconverter.com/

The MiroVideoConverter convert almost any video to MP4, WebM (vp8), Ogg Theora, or for Android, iPhone, and iPad. Batch conversion, custom sizing, and more!

(C) ff multi converter

FF Multi Converter is a simple graphical application which enables you to convert audio, video, image and document files between all popular formats, using and combining other programs. It uses ffmpeg for audio/video files, unoconv for document files and PythonMagick library for image file conversions. The application is written in python and PyQt.

The goal of FF Multi Converter is to gather all multimedia types in one application and provide conversions for them easily through a user-friendly interface. Extra options will be gradually added.
Fig. 124 FF Multi Converter

(D) Avidemux: Linux Ubuntu repository

Avidemux is a free video editor designed for simple cutting, filtering and encoding tasks. It supports many file types, including AVI, DVD compatible MPEG files, MP4 and ASF, using a variety of codecs. Tasks can be automated using projects, job queue and powerful scripting capabilities.
Fig. 125 Avidemux in Linux Ubuntu

7.7 Linux Video show and sharing

(A) Jinzora Media Server

Jinzora Media Server is an open source web-based media streaming and management system, written in PHP and licensed under the GNU General Public License (GPL). It can install on web servers supporting PHP in Linux. It can also be embedded in a content management system (CMS) or in another PHP-based application. Its Groupware feature even lets you create a social network or community to discuss, request, and rate content.

Jinzora's web interface doesn't only let you play or stream your media. It serves as an online media library, letting you create play lists and organize, search, and rate content. Content can be played directly from the web interface. It can also be accessed via an external software or hardware player using the Streaming mode or pushed out to a player with the Jukebox mode. Content can be transcoded or resampled to a media format or bit rate supported by the player.
Fig. 126 The browser in Jinzora Media Server

(B) Wizd Media Server

Wizd Media Server is an open source media server for Syabas-based media players and is released under Public Domain license. It runs on Linux, requiring less than 10 MB of disk space.

It streams to most media players:

Fig. 127 The Browser in Wizd Media Server

(C) PHPmotion: FREE Video Sharing Software (Youtube Clone)
There is lots of paid software for Video Sharing out there: ClipShare, Video Share, VideoScript and more ... We can find a free video share site, PHP Motion. PHPmotion is a free video sharing script application that will allow you to create and own video sharing website.

We can now have website just like youtube.com and dailymotion.com, its 100% free to download and use. We can have a funny video share websites. We don’t have big budget, now it will be come true with own video sharing website.

PHP Motion is template based so it will be make easier to us to change the look and feel. It have solid forum where you can get tips and ideas from other members. Easy uploading of Videos directly from the user computer, Support for many formats including (mpg, avi, divx and more), View upload process as it happens, Edit video at anytime, change the title, description and tags, Delete Video at anytime allowing management of files, Make video public or private for those who don’t like to share, Allow or disallow video comments and also video embedding, and Allow or disallow embedding.

Fig. 128 PHPmotion login

8. Others Solutions for Lecture Video Capture

There are many solutions for Lecture Video Capture. Cisco, Adobe, Amazon, IBM, Oracle and HP have provided lecture video capture. We will list others Solutions for Lecture Video Capture.

Many companies have provided Lecture Video Capture solutions in the Smart Classrooms. Cisco products included TelePresence Codec, TelePresence Content Server, Show and Share and so on. San Jose State University (SJSU) teamed up with Vyopta Incorporated to design and create 51 learning spaces across campus. Built around the integration of Cisco® Lecture Vision and Vyopta vPublish, these spaces are tightly integrated with advanced technologies for managing the entire lecture-capture process. Panopto is the only lecture capture system built with the flexibility to record any combination of video sources, in any configuration, in classrooms of any size. Matrox Video offers three affordable H.264 encoders—Monarch HD, Monarch HDX, and Monarch LCS—that are
ideal for lecture capture, lecture streaming, and lecture recording. Sonicfoundry has provided Lecture capture systems. Mediasite lecture capture is completely non-disruptive: there’s nothing they have to change about how they teach. Mediasite works entirely behind the scenes, managing recording schedules, equipment, cataloging and publication. And that’s true when they’re recording a lecture in class, at home, or in the field. Kaltura provide CaptureSpace and Video Capture Tools. Kaltura has experience integrating with additional lecture capture partners.

8.1 Vyopta vPublish for Lecture Video Capture

Vyopta’s vPublish is an integrated video content management system to automate video content recording, management, publishing, and sharing with those authorized to access the content. It allows educators and students to connect and collaborate remotely. Content can be captured by recording from a room, desktop, or mobile TelePresence endpoint in the organization. The content can be organized and presented from an organization’s IT application system or internal knowledge management portal.

San Jose State University (SJSU) teamed up with Vyopta Incorporated to design and create 51 learning spaces across campus. Built around the integration of Cisco® Lecture Vision and Vyopta vPublish, these spaces are tightly integrated with advanced technologies for managing the entire lecture-capture process.

Vyopta vPublish Includes vControl for iPad (used with Cisco TelePresence endpoints) and vWidget (used with Cisco Jabber video).

Fig. 129 Smart Classroom (Next Generation classroom) for Video Lecture Capture in San Jose State University
Vyopta vPublish and Cisco Lecture Vision enable you to deliver even the most demanding content capture and sharing applications, from distance learning to continuing healthcare education, corporate town hall meetings, and more.

8.2 Moodle for Lecture Video Capture

Moodle is the open source platform that lets you build the perfect education solution for your needs. Moodle is a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalized learning environments. The Moodle can be onto your own web server. Moodle designed to support both teaching and learning, easy to use, free with no licensing fees, highly flexible and fully customizable, Use anytime, anywhere, on any device, Robust, secure and private and extensive resources available. The developers can create plugins and integrate external applications to achieve specific functionalities that included media capture.

This is a Moodle repository plugin to record audio/video content using the filepicker. The plugin currently comes with 3 recorders built in viz Nanogong (Java Audio recorder), Red5Recorder (Flash Red5 Video recorder) and Flash Audio Recorder.

VideoJS is the default media player in Moodle 3.2.
Fig. 131 VideoJS player in Moodle 3.2

iSpring Free Cam is a great media recording solution that allows you to record any part of your screen, edit recorded video, and upload it directly to YouTube or save as WMV.

iSpring Free Cam can solve a number of screen sharing issues.

iSpring Free Cam lets you create high quality video recordings, providing you with all the tools you need to capture screen actions and edit the output in order to prepare it for online sharing.
We can upload the video from iSpring free to Moodle’s E-learning course design.

Over 450,000 companies trust Zoom and 94% of their IT organizations would recommend Zoom. It is easy to use Zoom. Zoom provide Video conference, Meeting invitation, Zoom Rooms, Video Chat and video recording.
a. Login Zoom

You can login to Zoom by your account from Zoom.

Fig. 134 Login Zoom

b. Zoom Menu

After login Zoom, you can see the menu in the following figure.

Fig. 135 Zoom menu
The Zoom menu included Start with Video, Start without Video, Join, Schedule and Share screen.

c. Click Start with Video, you can get the following figure:

![Fig. 136 Begin Video conference](image1)

Fig. 136 Begin Video conference

d. Click Invitation, you can invite person to attend the meeting.

![Fig. 137 Invitation in the Zoom](image2)

Fig. 137 Invitation in the Zoom
e. You can click Manage Participants, and get Manage Participants screen as follow:

Fig. 138 Manage Participants in the Zoom

f. Click Share Screen, and get the Share Screen as follows:

Fig. 139 Share Screen in Zoom

g. Click Chat, you can get Chat screen as follows:
Click Record, you can begin to record the video conference.

After stop recording and end meeting, you can see recording file.
9. Conclusion

There are many Lecture Video Capture solutions in the open sources and commercial market. Matrox Video offers three affordable H.264 encoders—Monarch HD, Monarch HDX, and Monarch LCS—that are ideal for lecture capture, lecture streaming, and lecture recording. Sonicfoundry has provided Lecture capture systems. Mediasite lecture capture is completely non-disruptive: there’s nothing they have to change about how they teach. Mediasite works entirely behind the scenes, managing recording schedules, equipment, cataloging and publication. And that’s true when they’re recording a lecture in class, at home, or in the field. Kaltura provide CaptureSpace and Video Capture Tools. Kaltura has experience integrating with additional lecture capture partners.

We need to according to our budget and education environment, and choose the best solutions for your Lecture Video Capture. The basic main work procedure of Lecture Video Capture included Camera setup, Video recording, and saving video files. These video files can be easy to upload to YouTube and others providers. You also will be easy to upload to your own website. We can develop the Lecture Video Capture Solutions that included content management and database applications for video files and show and sharing. The Lecture Video Capture solutions will be bring the reform of the classical education methods. The members of faculty and student will be happy to get benefits from next generation Internet technology.