UTPTUBE

by

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14370

INFORMATION COMUNICATION TECHNOLOGY

Dissertation is submitted in partial fulfillment
of the requirement for the Bachelor of Engineering (Hons)
(Information Communication Technology)

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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the

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Approved by,

(Mr. Faizal bin Ahmad Fadzil)

UNIVERSTITI TEKNOLOGI PETRONAS

TRONOH, PERAK

JANUARY 2014

CERTIFICATION OF ORGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

(NURUL FARAHIN BINTI MOHD SHUHAIMI)

ABSTRACT

Information Resource Center (IRC) in UTP has a huge collection of videos, including textbooks' tutorial videos. These videos are attached with the textbooks but for the security reasons, all the videos stored in CDs are placed in the shelves at Ground Floor, IRC. The number is huge, plus the indexing number of the CDs makes it difficult for student to locate and view the CDs. The CDs are also vulnerable to any damage and if there is any, the files may be damaged, corrupted and lost.

Therefore, to solve these problems, UTPTube is proposed. UTPTube is a website project which mainly aggregates this collection of videos under one site. The participants of this websites are students and lecturers of Universiti Teknologi PETRONAS (UTP).

The project consists of five phases which are plan, analysis, design, implementation and maintenance phases. The methodology that will be used in this project is V-Model. In order to collect the requirements and information needed for the project, interviews and questionnaires with the participants will be conducted during the analysis phase of the project.

UTPTube is seen to be as one of the learning tools that will be used by the lecturers and students during the learning process in UTP as well as it help to preserve video collection that is available in Information Resource Centre (IRC).

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ABBREVIATIONS AND NOMENCLATURES

UTP	Universiti Teknologi PETRONAS
IRC	Information Resource Centre
CD	Compact Disc
DVD	Digital Versatile Disc
CD-ROM	Read-only memory
CD-R	Recordable
CD-RW	Rewritable compact disc
DVD-RW	Rewritable Digital Versatile Disc

CHAPTER 1: INTRODUCTION

1.1 Project Background

Information Resource Centre (IRC) is a library in Universiti Teknologi PETRONAS (UTP) which contain huge number of books, journals, past year papers and also CDs collections that had been kept long time ago. There are also textbook available for the students to be borrowed which usually the textbook come with Compact Disc(CD) that is only available at the CD shelves.IRC Management has been putting these CDs under one section at the Ground Floor.

To find these materials for example Environmental Science textbook 6th edition's index number begins with ES; so to search this textbook, one must find the shelves with label ES on it. However in order to find the CD required, the student need to know the index number of the CD and find it one by one at the s helves because the index number is attached on the CD itself and not at the shelves. Therefore, it might be difficult for the students to search for these CD and it might be time consuming.

CDs that are available is prone to damage physically and vulnerable. If there is any damage on the physical of the CD, it will affect the contents in the CD itself which it might not be able to be recovered and no backup files to retrieve back the content. So the content might be damaged, corrupted or lost.

Therefore, the proposed project to solve these is called UTP-Tube. UTPTube is an online video database system that store videos and offering video streaming. It is focusing toward making UTP IRC's video accessible on-line. It is also propose as a dual backup for existing UTP IRC Video. The website only can be view via local network. UTPTube is controlled by admin to ensure security and maintenance of the system, video selection process and conversion of video data.

1.2 Problem Statement

i. Videos are stored in CD and DVD at IRCUTP and not many people know their existence.

   There a huge number of CDs available in IRC however less of the students and also the lecturer are aware of their availability and existence in IRCUTP.

ii. CDs and DVDs at IRCUTP can be easily damaged by scratched or rendered useless when the magnetic side of the disc is broken.

   CDs are easily scratched and damaged if not been taken care carefully. If the CD has some damage on it, it is impossible to retrieve back its content because it cannot be repaired to its original condition. Therefore the content might be disappearing and the CD cannot be use back.

iii. Students and lecturers have limited access of the video sources not just due to the limited units available but also most mobile computer nowadays is now removing CD DVD drives as standard accessories.

1.3 Objective and Scope of Study

1.3.1 Objectives

The objectives of UTPTube are:

i. To create an online video database system so that people will know what kind of video available at IRC UTP thus many people be able to access them.

ii. To provide backup system for CDs and DVDs that stored in huge storage digital media such as hard disk

iii. To provide easy access to lecturers and students to find video that suitable for their lesson and learning.

1.3.2 Scope of Study

For the first development of UTPTube, we will focus on the CDs within Mechanical Engineering Department. The number of videos that would be available is 30 videos with the file type .mp4.

The file converter use in this project is online-convert.com or Digital Media Converter Pro. The videos need to be converted to the same file type which has the lightest weight.

The focused file sizes for the videos are 480x480 and 320x240. The video will be available in two versions which are full videos and partitions of video of 5 minutes. For example, if the video is 60 minutes therefore it will be divided into 12 parts. For the first part, the video will only available full versions only not by part.

The main target user of the website is UTP's students and lecturers. UTPTube mainly focused to be used by Undergraduate and Postgraduate students of UTP.

1.4 Limitation

The limitation of UTPTube is copyright issue of the videos. Most of the videos might have copyright with the publishers therefore we need to confirm with the publishers whether we can have the right to upload the video in UTPTube only for educational purposes and keep the privacy and put the video only available for authorized user and cannot be downloaded. However, if the publishers do not approve the authority to publish the video, it might be problems.

Besides, the performance of the video in the website also an issue can be raised. The speed of the video depends on the internet connection of the user and bandwidth of the user. Therefore a video might take long time to be play if the internet connection is low.

CHAPTER 2: LITERATURE REVIEW AND ANALYSIS

2.1 Preserving optical disc

Records need to be reserved to ensure it is accessible and retrievable as long as it is required. These records need a careful handling, transporting and stored in a specific storage environment and need to be migrated to a suitable condition and place. The term 'optical disk' describes a range of disk types where the stored information is read by a laser. There are three types of optical disk which are CD-ROM (read-only memory), CD-R (recordable) and rewritable optical disks (CD-RW and DVD-RW)(Digital Preservation Coalition, n.d).

According to Peter Svenssion(2005), CDs is fragile in fact the scratches on top of it can easily penetrate to the aluminium layer. The pressure of pen on the label side can dent the aluminium which make the rendering CDs unreadable.

CDs and DVDs are not suitable for long term archival use. There is high possibility of information loss although there is minor damage to the CDs (National Archive of Australia,n.d.) Data is stored on Optical disks in the form of marks or pits that either absorb or reflect the light from a laser beam. The disks have a plastic and metal layered construction that makes them susceptible to damage. Information is stored very densely on optical disks and minor damage or deterioration can cause significant information loss. Optical disks are not regarded as long-term archival media.

One of the major factors that can affect the long term use of optical disk are technological obsolescence. CDs made today can sustain maximum of 30 years. However the data may be inaccessible if the hardware to play them or the software to interpret them has been superseded. The cost of to recover the data are also high and consume time. It is essential to have a timely plan to migrate data from optical disks onto newer media.

The best prospect for long-term retention of information on optical disks seems to be regular copying or data migration. Two solutions are to upgrade the data to current formats when migrating the data to new media or use open source data formats. Optical media can provide reliable back up at a reasonable cost as long as great care and attention is paid to burning them and storing them correctly.

2.2 Preserve digital heritage

According to Billy McDonald (2004), we must preserve all of the important information so that it will not be lost in the future. Preserving these digital files has always been a concern to Information Management personnel. This is because the age of digital info is at its height and how to preserve them is a big challenge nowadays.

One said that advocacy is the important factor in choosing which method is the best to preserve digital files. Technologies are changing rapidly these days and everyday there will be a new product in the market. The only difference between these products is the functionalities and price. One product can be highly efficient, and also pricey. A product also can be cheap but efficient. That is why advocacy is an important thing in choosing the best methods for digital file preservation because it is up to them to choose which one is the best.

To save these digital files, policies also must be made. There are so many articles in digital formats nowadays and one issue concerns everyone: should we save the digital files or just only the hyperlink? There are various ways to preserve digital files, one of them are:

1. Print out the materials and stored it. This is a good idea to preserve the digital files but it will consume space and time to preserve these files and if the original document in the original sites changed, it will challenge the authenticity of the printed materials.

2. ASCII format. To use ASCII format to store these digital files are a brilliant suggestion but that only applies to Western-charactered files. For other articles, such as in Chinese Language, the preserving process seems to be difficult.
3. Preserve all the software and hardware. This is a good solution whereby preserving the information in them. But it is difficult to keep them work for long time because with the new technologies, the compatibility with the old ones seems to be challenging.

Holistically here are many ways to save digital files. One must be taught of these methods and let him/her chooses which one is the best method.

2.3 Online database bring more benefits

According to James Kent(n.d), online database allow user to access the database remotely and increase the accessibility of the user. Online database also allow user to search information needed and manipulate the information in different ways to get the desired results.

Learning through video can provide an extra 55% of context to build understanding. It has been proven to better stimulate brainstorming, information acquisition and the sharing of knowledge. It allows them to actively take part in a two-way platform for communication(RecruitmentJuice,n.d.).

Effective learning can be achieved by better communication which reacts with the flexibility of the learning style. Speech and sight provide insight which is so difficult to gain with written words alone. This is also where traditional PowerPoint presentations fall down; their inability to offer tone, inflection and other auditory cues that facilitate learning. Videos provide extra context in order to build the understanding. It is one of the best educational delivery tools which are proven!

There are few benefits of learning via video such as follow:

i. Better stimulate brainstorming, information acquisition and knowledge sharing
ii. Cheaper delivery than physical teaching
iii. Improve effectiveness of teaching process

2.4 Preserve local news

Preservation of local news is an important task because through news, we will learn a lot about history. Preserving traditional news media can be tricky. This is because:

1. Film reels decay.
2. Old photos bleached/damaged.
3. Constant changing in media storage medium requires the old storage mediums destroyed.

One has suggested that using current storage medium, all the news in the world can be stored in compact discs (CDs). Unfortunately, to store all these news, a petabyte size of CDs must be required and this seems to be impossible to fulfill.

In order to preserve local news media, there are several methods:

1. Capturing the news. Capturing the news including capturing the broadcasted news, online news and stored them. Between simple newspaper and online newspaper, both can be captured but the context in the online newspaper is less than simple newspaper.
2. Storage requirement for preserving local news is large. If we managed to preserve 4% of all news media in the world today, we will need a total of 10^6 GB and this is equivalent to 1000 times of one terabyte storage medium.

Medium	Annual storage requirements per outlet	Outlets	Total
Newspaper	353 GB	50	1.2×10^5 GB
Radio	250 GB	40	1.0×10^5 GB
Television (100%)	730,000 GB	40	2.8×10^7 GB
Television (4%)	33,000 GB	40	1.0×10^6 GB

Figure 2.1: Storage requirements for each news media.

3. Selection. This involves the selection of news to be preserved. We must bear in mind that not all news can be saved because there is so many news in the world that need to be saved, and for that reason we only choose what needs to be saved for future use. As for today, news media changes and selection criteria of local news preservation need to be constantly evaluated.

Central management	$500K
Central data coordination	$500K
Software development	$500K
Five regional data centers ($300K each)	$1,500K

Figure 2.2 : Rough budget for a set of news collection center.

We cannot save all the news media in the world, but we can select which one needs to be preserved in order to make it last longer because of its rich context. Selection can be hard, that is why we must carefully choose and select.

CHAPTER 3: METHODOLOGY/PROJECT WORK

3.1 Project Background

The website is programmed and edited using notepad++. Notepad++ is used to ease the programmer to code the system and to detect any syntax error easily. The website will be available via local network only to prevent misusage of the videos and tackle copyright issue.

UTPTube focus to provide videos and audios available in IRCUTP for online streaming. The system can play and search videos available in the system. The system has three functions which are display & play all videos, display & play video based on course and search video by keyword.

Hence, UTPTube has proper way as an online medium to browse for videos and act as a backup for the CDs and VCDs available in IRCUTP.

3.2 System Development Life Cycle

Methodology used is **V-Model** method. This was chosen because each phase of the system need to be completed before another phase begins and testing would be done during development. Plus, it is easier to detect defects of the system

According to Cameron Watson (2013), V-Model Diagram can lead to applicability which guide to performing and completing projects in a consistent and repeatable manner.

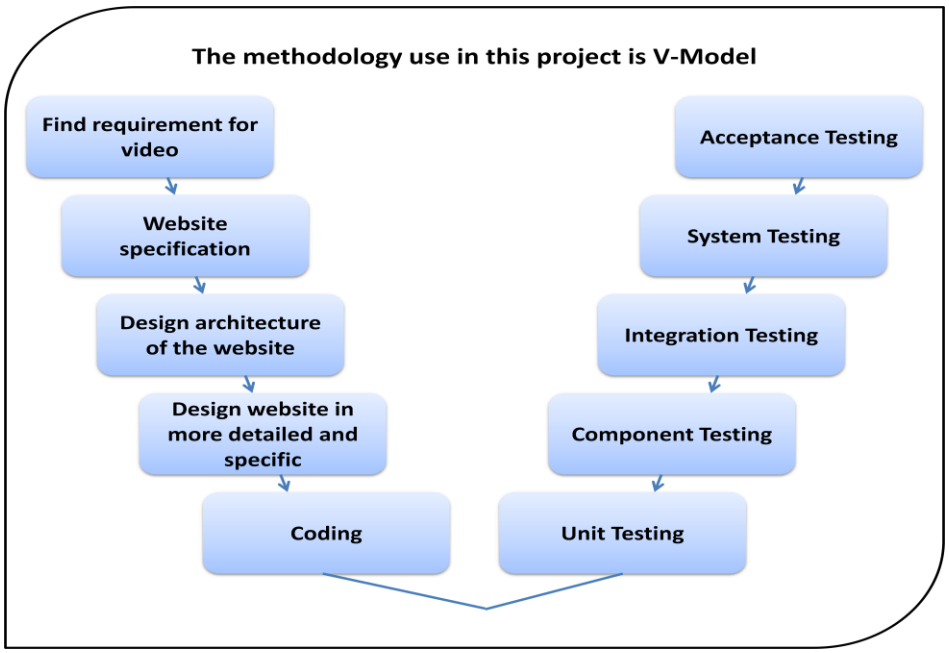


Figure 3.1 : Methodology of UTPTube

3.3 Use-case diagram

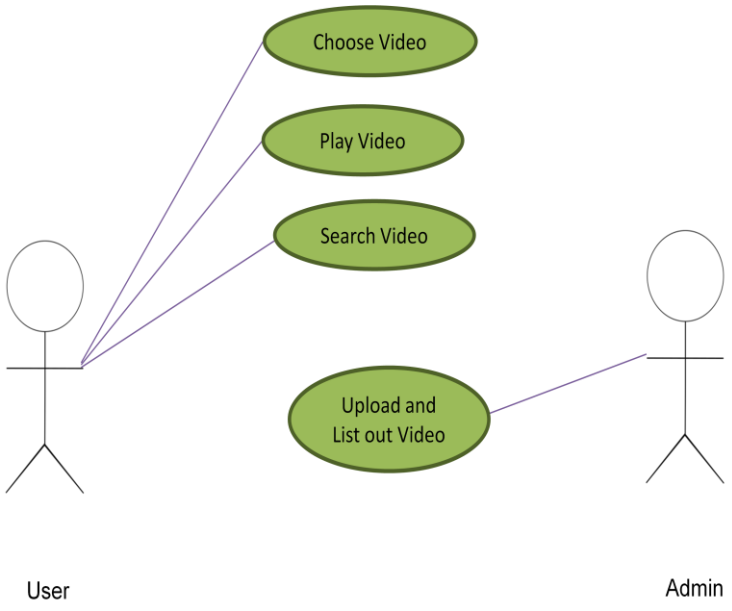


Figure 3.2 : Use Case Diagram of UTPTube

3.4 System Architecture

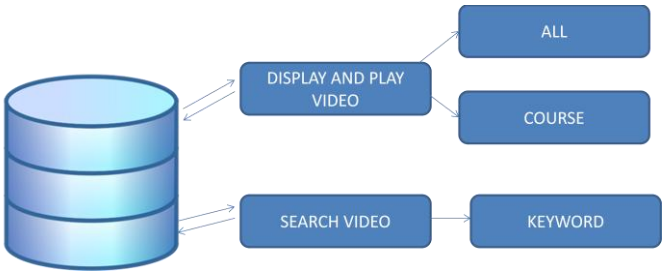


Figure 3.3 : System Architecture of UTPTube

The play all video function display all the videos available in the website. There are 30 videos available currently in UTPTube. The user can play more than once video concurrently and also it can also be play in full screen. Each page of the video display only 9 videos so there are total of 4 pages available. The user can choose the other page and it will display on the same tab. If the user want to go back to the previous page, they can do so and the video that already been played would not restart and remain as it is.

Play by course function display all videos based on the faculties or academic department available in Universiti Teknologi Petronas. There are total of 9 faculties which are: Mechanical Engineering, Chemical Engineering, Civil Engineering, Electrical & Electronic Engineering, Petroleum Engineering, Petroleum Geoscience, Information & Communication Technology, Business Information System and Management & Humanities.

The search function is able the user to search the video that they want to see by putting the keyword. The user can play the result in the same page and the video also can be seen on full screen.

3.5 Functionalities

UTPTube can perform few functions in order to achieve the objectives of the project:

i. Search video by keyword
ii. Display and Play all videos
iii. Display and Play videos by department

3.6 Tools for development

List of software & hardware

i. Adobe Photoshop CS5
ii. Any Video Converter Software
iii. Notepad++
iv. A computer
v. Harddisk

3.7 Project Activities

Data Analysis

i. Survey with students

First online survey is conducted within 30 UTP Mechanical Engineering's student. The questionnaires are in Appendix 01

ii. Usability testing

The survey is to test whether the system meet the requirement of the users.

3.8 Activity Diagram

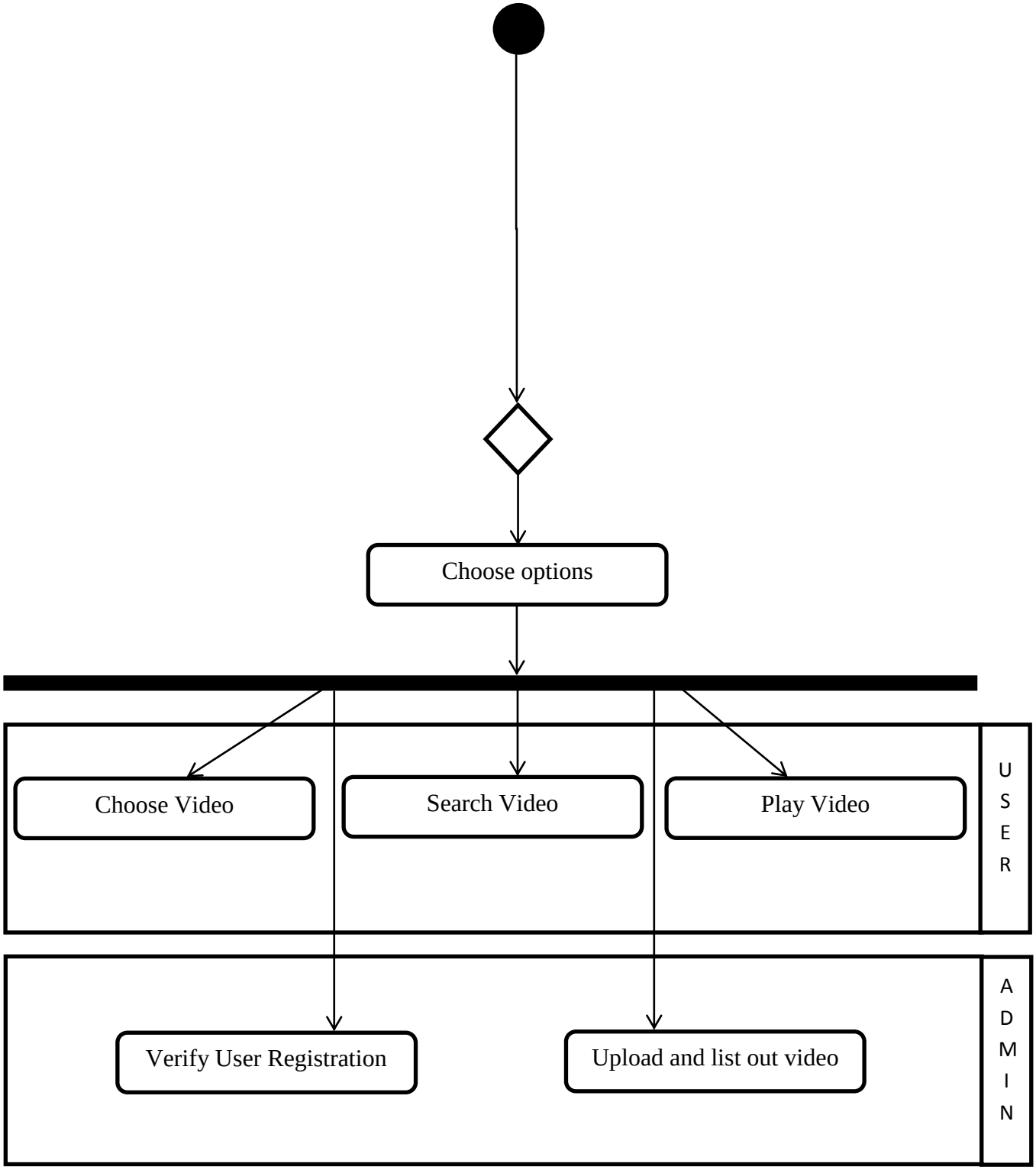


Figure 3.4 : Activity Diagram of UTPTube

3.9 Gantt Chart and Key Milestone

ACTIVITIES	MONTHS															
	Sept 2013		Oct 2013		Nov 2013		Dec 2013		Jan 2014		Feb 2014		Mar 2014		Apr 2014	
Stage 1 : Plan																
Identify business value and conduct feasibility analysis																
Manage project plan																
Stage2 : Analysis																
Collect system requirement																
Interviews																
IRC Visits																
Develop system proposal																
Stage3 : Design																
Interface of system																
Database and file collection																
Coding the system																
System Integration																
System Testing																
Stage 4 : Implement																
System installation																
User verification																
Stage 5 : Maintenance																
System maintenance																
System upgrade																

Main activities Activities Milestones

CHAPTER 4: RESULT AND DISCUSSION

4.1 Results of survey

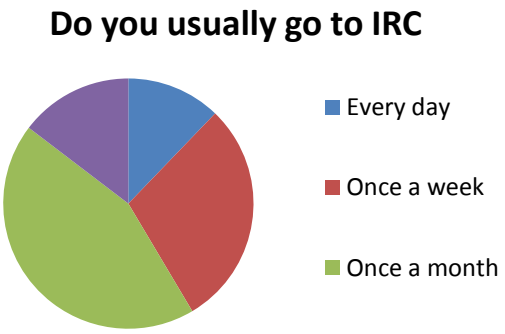


Figure 4 1

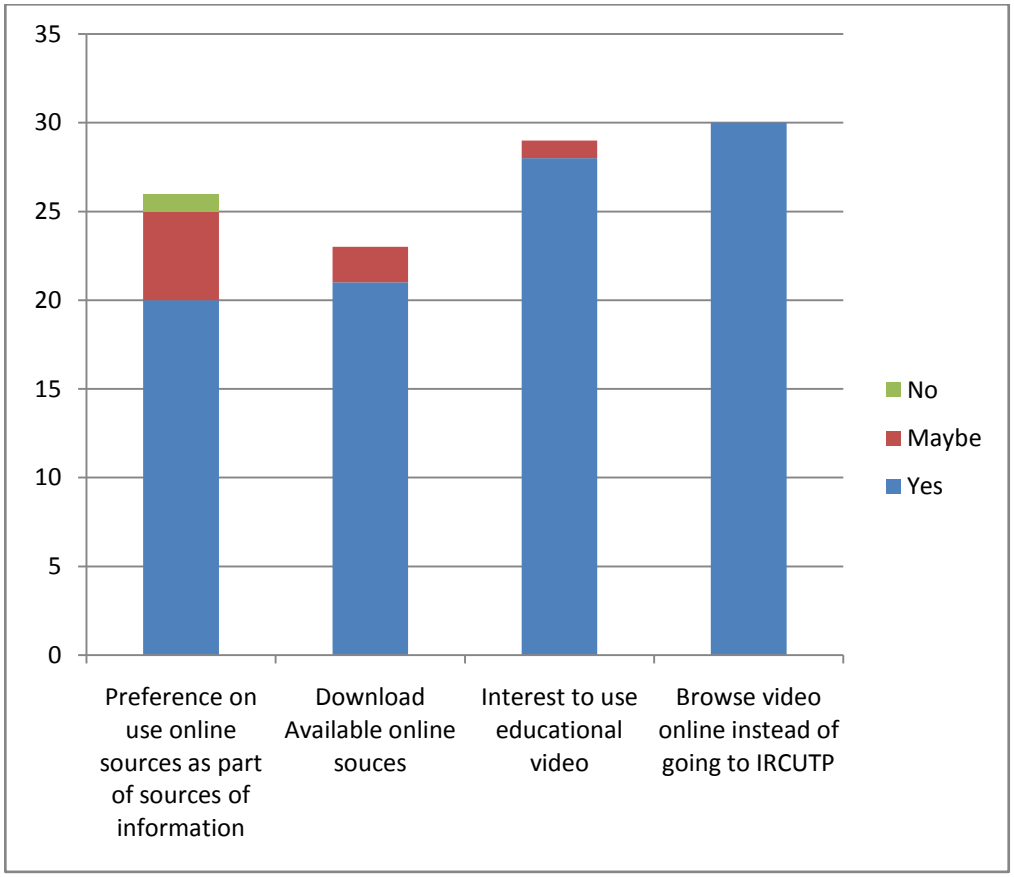


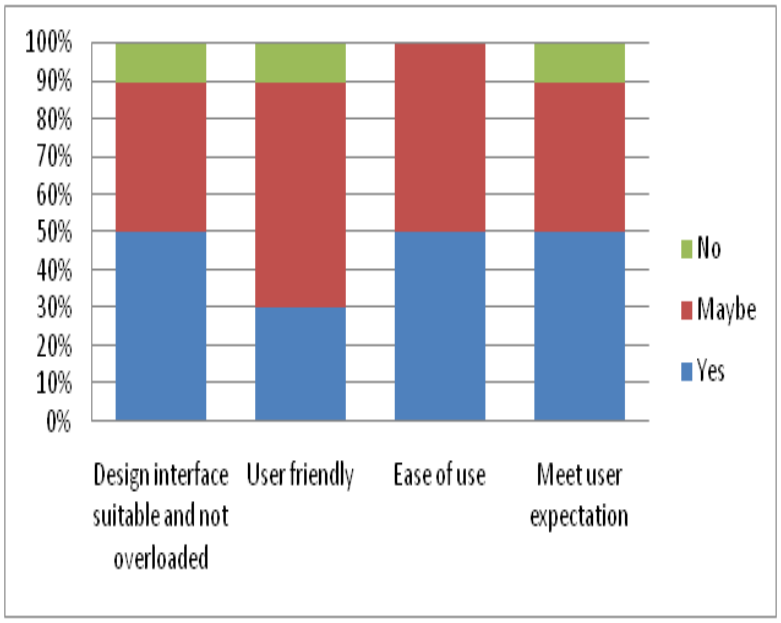
Figure 4 2

The result showed that 66.7% would like to use online sources as part of the sources of information for educational purposes. More than 80% of the students have interest to use educational videos and 100% like to browse video online rather than going to IRCUTP. The result shows that, the students are interested to use online website as one of the way to use the videos available in IRCUTP as it can be more convenient also for them to browse from their room during non-opening hours of IRCUTP.

4.2 Results of usability testing of the website

After the completion of the UTPTube, usability testing was conducted in a group of student of Universiti Teknologi PETRONAS. The test was to see whether the website satisfy the need of the students and achieve its objective. The survey was conducted with 30 students of Mechanical Engineering.

User testing result



The result shows that UTPTube less than 10% of the student did not satisfy with the website, however approximately 50% of the students satisfy with the website design and functionality of UTPTube.

4.3 First phase of development

First phase on the development is focusing on four steps for the videos which are

1. **Copy**

   The video is copy from the original CD to the internal storage.

2. **Convert**

   The video is convert using Any Video Converter

3. **Naming**

   The video is named according to the list provided by the Information Resource Centre's staff as per in Appendix iii.

4. **Coding**

   Link for each video is put manually one by one.

In the first phase, the targeted number of video is 1% of the actual videos available in the IRC which is 25 videos. However, IRC's representative requested to make around 300 videos for UTPTube.

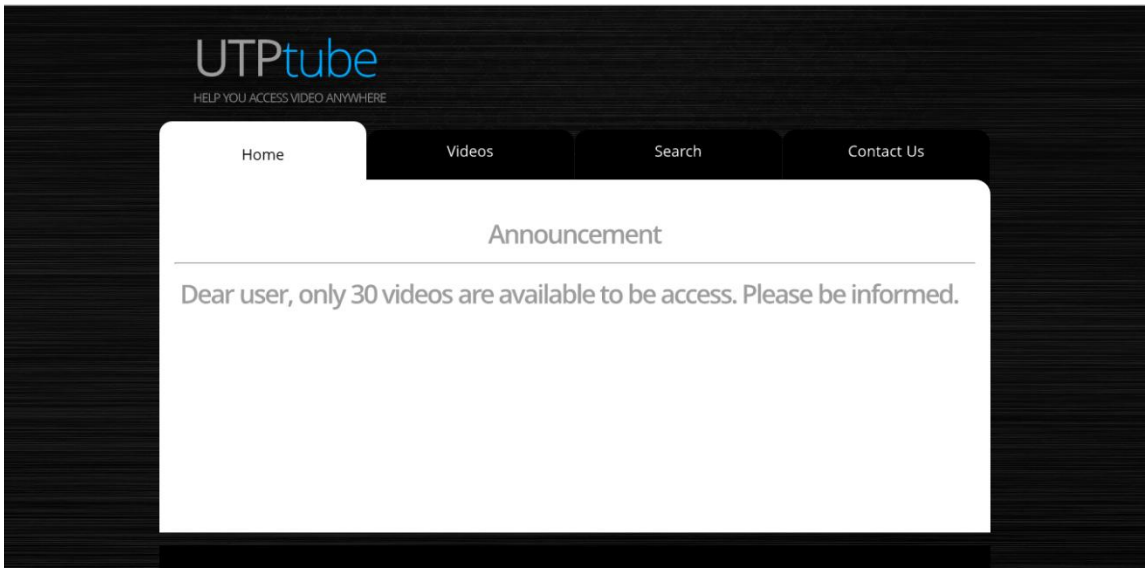
The discussion between me and IRC's representative, Ms Sharifah Fahimah Bt Saiyed Yeop to clarify the copyright of the videos. According to her, copyright will not be an issue as long as the user is only for UTP students and staffs only.

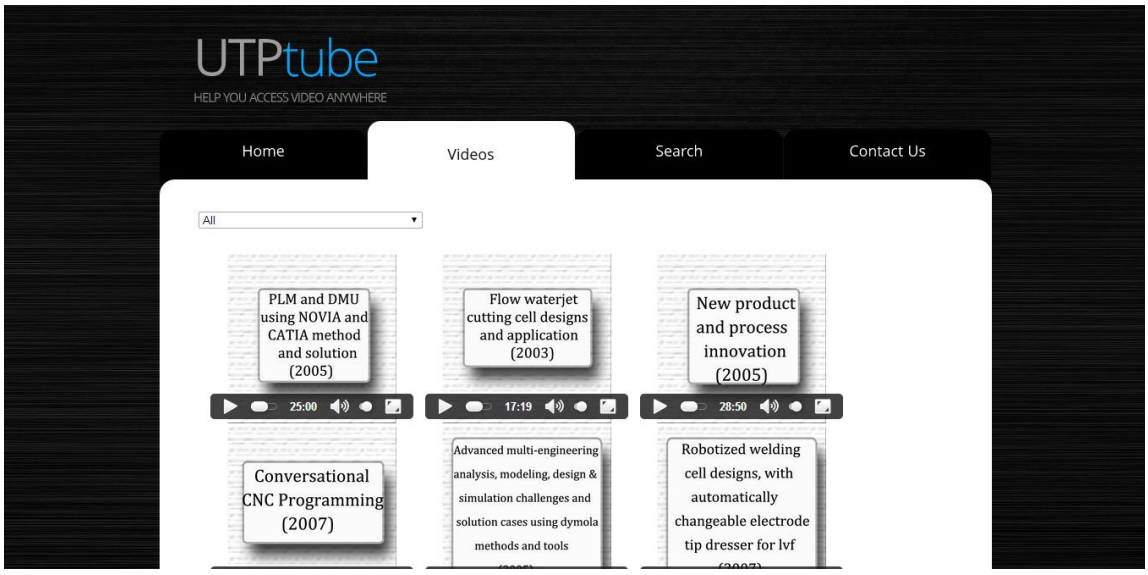
4.4 Conversion of the video

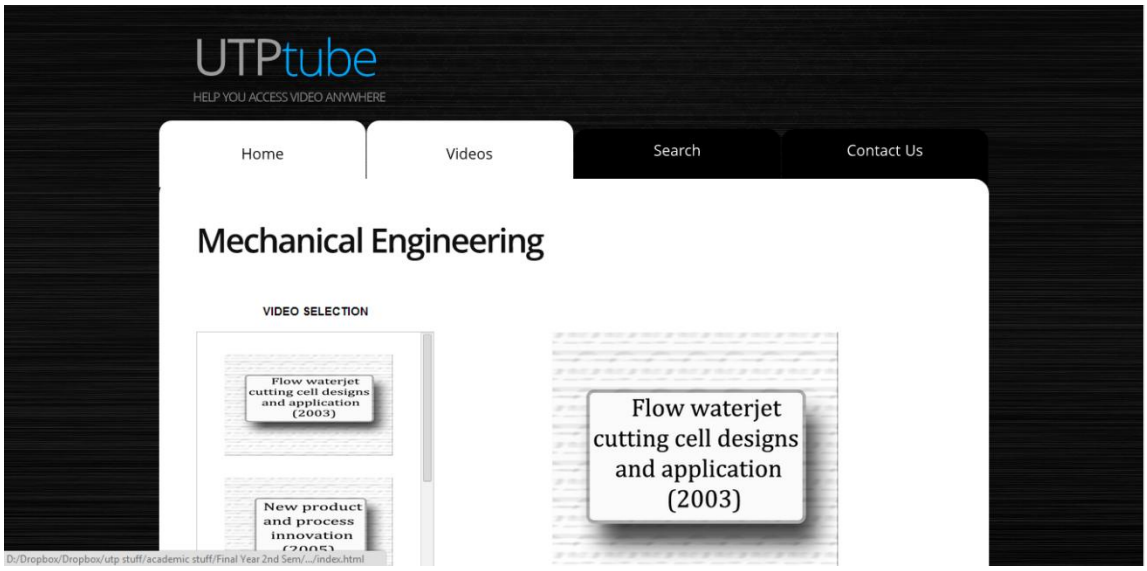
format : .mp4	**size : 480x480**
codec : x264	**quality : original**
frame rate : 25	**video bitrate : 2000**

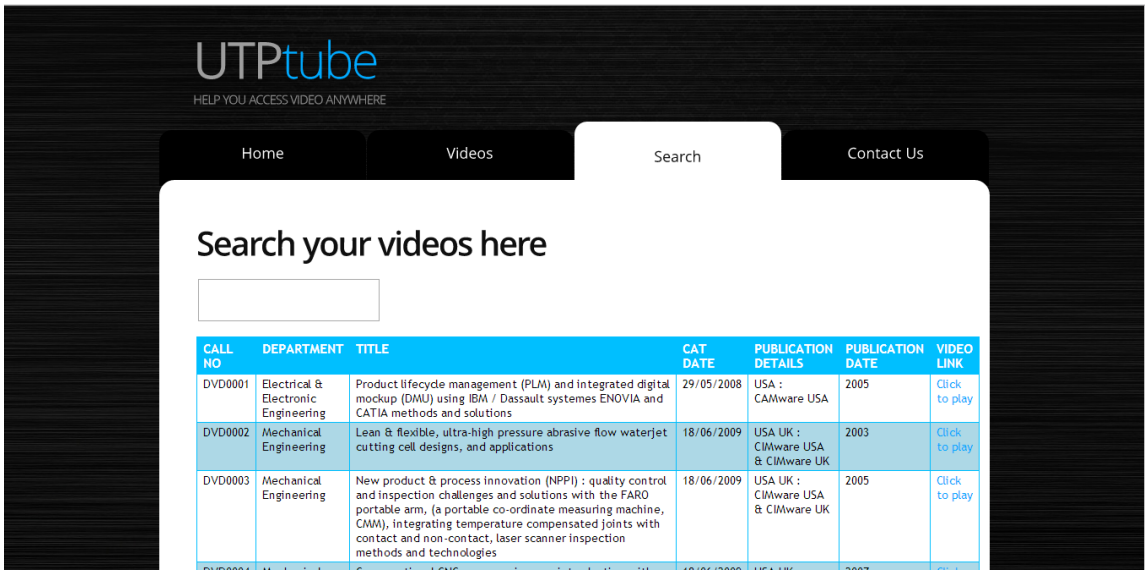
The format for the video ensures that the video has the lighter weight.

4.5 Final product

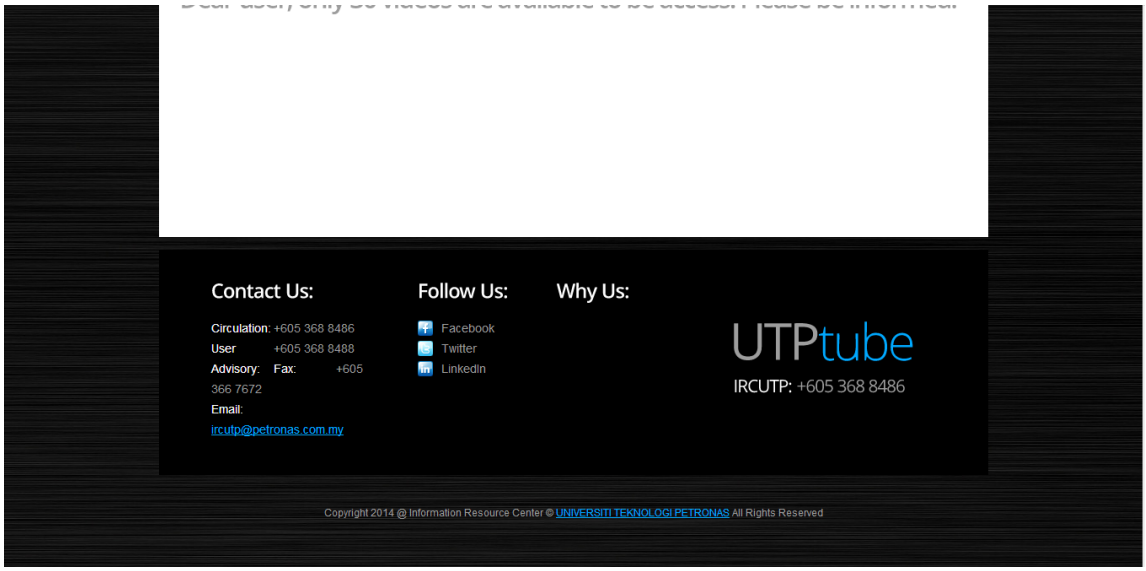








CALL NO	DEPARTMENT	TITLE	CAT DATE	PUBLICATION DETAILS	PUBLICATION DATE	VIDEO LINK
DVD0001	Electrical & Electronic Engineering	Product lifecycle management (PLM) and integrated digital mockup (DMU) using IBM / Dassault systemes ENOVIA and CATIA methods and solutions	29/05/2008	USA : CAMware USA	2005	Click to play
DVD0002	Mechanical Engineering	Lean & flexible, ultra-high pressure abrasive flow waterjet cutting cell designs, and applications	18/06/2009	USA UK : CIMware USA & CIMware UK	2003	Click to play
DVD0003	Mechanical Engineering	New product & process innovation (NPPI) : quality control and inspection challenges and solutions with the FARO portable arm, (a portable co-ordinate measuring machine, CMM), integrating temperature compensated joints with contact and non-contact, laser scanner inspection methods and technologies	18/06/2009	USA UK : CIMware USA & CIMware UK	2005	Click to play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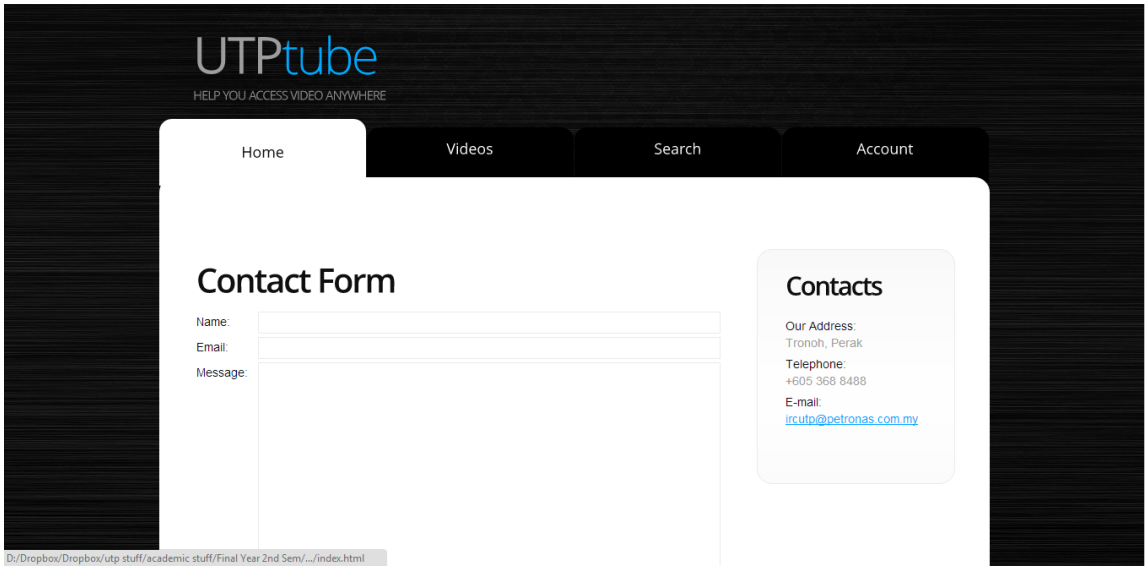
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Tronoh, Perak
Telephone:
+605 368 8488
E-mail:
ircutp@petronas.com.my
D:/Dropbox/Dropbox/utp stuff/academic stuff/Final Year 2nd Sem/.../index.html

4.6 Problems and challenges

1. *Video Copyright Issue*

   All of the videos and audios have copyright by the publisher, however after the discussion with the representative of Information Resource Centre Universiti Teknologi PETRONAS (IRCUTP), Ms Fahimah to solve this issue, we came to resolve the issue. The issue is solved by providing the website can only be accessed using local network or login system.

2. *Video List is not too accurate*

   IRC UTP has a list of DVDs and CDs available in the library level G and level 3. However, the list provided from the IRCUTP staff has incorrect info including the call number and some data is incomplete.

3. *Converting Video takes longer time than expected*

   The video need to be converted one by one and need to copy one by one manually.

4.7 Discussion

UTPTube focus on storing CDs and DVDs available at IRC into an online storage. It emphasize on its primary function; to aggregate textbooks' tutorial videos in one site. The number of videos is limit to 30 for the first phase of the website however it still display the functionality required.

The next stage of the website, the videos will be available in two forms which is full videos and parts which it is divided into 5 minutes each part. For the initial prototype, the webpage will not be able to attract many users because the only users who will be using these initial prototype users who are the test subject for testing phase. Towards the final phase of UTPTube, it can fully function well.

CHAPTER 5: CONCLUSION AND RECOMMENDATION

The project is done to store CDs and DVDs available at IRC into an online storage called UTPTube. UTPTube is a medium for the users to play videos online and can be used for educational purposes for students and lecturers

In preserving digital heritage, steps must be taken to ensure that these information and data will not be lost in the future. There is huge challenge for the generation nowadays to preserve this digital information that had been kept in CDs. Therefore, one of the best ways to do so is by store it in an online storage or database.

UTPTube is a medium for the users to discover videos from the CDs that actually available in the IRCUTP. These videos can be used for educational purposes not only for the students but also for the lecturer.

In order to increase the number of user to use this website, lecturers are encouraged to use the related videos in the UTPTube as part of their learning tools and assessment to the students. The videos are also available to be downloaded to ease the use of the users.

For future enhancement and improvement of UTPTube, the website must provide videos for all courses available in UTP and increase number of videos available in UTPTube. As for the time being, the website is best running using PCs however for future; UTPTube might be available to be access through smart phone.

Besides, the system also needs to provide system for the process of converting, naming and insert the videos automatically in the website

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APPENDICES

i. Survey form

Usage of Video available in IRCUTP and Video as Part of Learning Tools

You will be filling this evaluation for the Survey on Usage of Video Available in IRCUTP. Make sure your are completely honest when filling out the evaluations. Your evaluation will be used in part of FYP project analysis. You must be fair and accurate. While I will check your responses, your name will be removed from your responses so your feedback will be anonymous.

* Required

Your Name *

Year of Study *

- First Year Undergraduates
- Second Year Undergraduates
- Third Year Undergraduates
- Final Year Undergraduates
- Foundation
- Postgraduates

Course *

- Mechanical Engineering
- Electrical & Electronic Engineering
- Civil Engineering
- Chemical Engineering
- Petroleum and Petroleum Geoscience
- Computer Information Sciences

Do you usually go to IRCUTP? *

- Every day
- Once a week
- Once a month
- Once a semester usually during exam week
- Never

IRCUTP *

	Yes	Maybe	No
Do you aware that there is video available that can be borrowed in IRCUTP besides book			
If you are aware, will you borrow the video at least once			

Usage of Video in Learning Process *

	Yes	Not sure	No
Have you ever use video as part of sources of learning besides text book and lecture notes?			
Have you every experience that you lecturer is using video as part of learning tools during the lecture times?			
Is there any of your tutorials use video for learning?			
Do you think using video as the learning tools help you to understand more?			

Interest of Using Video Available Online *

	Yes	Maybe	No
Do you like to use online sources as part of your learning sources of information	○	○	○
Do you like to download available online sources?	○	○	○
If there is available educational video for you to use and download for free,are you interested to use?	○	○	○
If you can browse video available online instead of need to go to the IRCUTP to borrow it, do you think you might use the website available?	○	○	○

Give your opinions if there is a website that provide video in IRCUTP available online? Will you use it or not? Give your suggestion for the website. *

Comments

ii. Interview form

Name of Lecturer : _____

Course ofTeaching : _____

Questions

1. **Do you use video as part of the learning tools during the lecture or tutorial?**

_____

2. **If yes, what is the frequency of you using videos?**

_____

3. **What is your opinion on using video as part of education tools for students?**

_____

4. **Most of the textbook comes with the CDs available,have you been using them? How frequent?**

_____

5. **If there are online educational video available for UTP usage only, are you interested to use it? Do you think it can benefit you for future use and also the students?**

_____

_____

iii. List for Naming

List of DVDs

NO	TITLE	CALL NO	CAT DATE	PUBLICATION DETAILS	PUBLICATION YEAR
1	Product lifecycle management (PLM) and integrated digital mockup (DMU) using IBM / Dassault systemes ENOVIA and CATIA methods and solutions [dvd]	DVD0001	29/05/2008	USA : CAMware USA, 2005	2005
2	Lean & flexible, ultra-high pressure abrasive flow waterjet cutting cell designs, and applications [dvd]	DVD0002	18/06/2009	USA UK : CIMware USA & CIMware UK, 2003	2003
3	New product & process innovation (NPPI) : quality control and inspection challenges and solutions with the FARO portable arm, (a portable co-ordinate measuring machine, CMM), integrating temperature compensated joints with contact and non-contact, laser scanner inspection methods and technologies [dvd]	DVD0003	18/06/2009	USA UK : CIMware USA & CIMware UK, 2005	2005
4	Conversational CNC programming : an introduction with programming demonstrations using Mori Seiki multi-axis intergrated mill turn CNC machines [dvd]	DVD0004	18/06/2009	USA UK : CIMware USA & CIMware UK, 2007	2007
5	Advanced multi-engineering analysis, modeling, design and simulation challenges and solution cases, using dymola methods and tools [dvd]	DVD0005	18/06/2009	USA UK : CIMware USA & CIMware UK, 2005	2005

6	Robotized welding cell design, with automatically changeable electrode tip dresser, for lean, visual factories [dvd]	DVD0006	18/06/2009	USA UK : CIMware USA & CIMware UK, 2007	2007
7	Machine intelligent fixtureless robotic assembly & joining using real-time feedback controlled vision and force sensing FANUC robots [dvd]	DVD0007	04/05/2009	USA UK : CIMware USA & CIMware UK, 2007	2007
8	Lean & flexible FANUC robot cell designs & application [dvd]	DVD0008	- -	USA UK : CIMware USA & CIMware UK, 2003	2003
9	Machine vision systems for zero-defect-focused visual factories [dvd]	DVD0009	24/06/2008	USA : CIMware USA, 2007	2007
10	New product & process innovation (NPPI) : Massively parallel microfabrication of nanostructural materials, and nanotechnology devices with several hi-tech application examples, including the nanofabrication of the vertically aligned carbon nanofiber (VACNF) and nanofiber arrays for intracellular electrophysiology and electrochemical diagnostics, massively parallel gene and drug delivery, and other [dvd]	DVD0010	22/06/2009	USA UK : CIMware USA & CIMware UK, 2005	2005
11	Advanced automotive tyre design engineering strategies, solutions and test drives in Detroit, USA using michelin technology [dvd]	DVD0011	22/06/2009	USA UK : CIMware USA & CIMware UK, 2003	2003
12	Ducati, star, kawasaki, suzuki, and other custom motorcycle designs [dvd]	DVD0012	22/06/2009	USA UK : CIMware USA & CIMware UK, 2007	2007

13	Bentley quality design engineering [dvd]	DVD0013	22/06/2009	USA UK : CIMware USA & CIMware UK, 2005	2005
14	US national automotive center mobile research robots [dvd]	DVD0014	22/06/2009	USA UK : CIMware USA & CIMware UK, 2005	2005
15	Design engineering challenges of the corvette [dvd]	DVD0015	22/06/2009	USA UK : CIMware USA & CIMware UK, c2005	2005
16	Digital lifestyle product show : internet-enable gadgets [dvd]	DVD0016	22/06/2009	USA UK : CIMware USA & CIMware UK, c2003	2003
17	New product & process innovation (NPPI) : Toyota crossover concept, hybrid and saloon car customer focused design and product lifecycle management methods and examples [dvd]	DVD0017	22/06/2009	USA UK : CIMware USA & CIMware UK, 2005	2005
18	Toyota humanoid robot showcase : Toyota's humanoid 2-legged walking robots, music playing legged and wheeled robots, the iUnit, a single passenger reconfigured vehicle, and iFoot, the human controlled mountable transportation and walking robot [dvd]	DVD0018	22/06/2009	USA UK : CIMware USA & CIMware UK, c2005	2005
19	Rapid prototyping solutions [dvd]	DVD0019	24/06/2009	USA UK : CIMware USA & CIMware UK, 2004	2004

20	New product innovation (NPI) and product lifecycle management (PLM) challenges and solutions with AISIN automotive body components, engine, transmission, sensor, automotive navigation, telematic information systems, and other part and system designs [dvd]	DVD0020	24/06/2009	USA UK : CIMware USA & CIMware UK, 2005	2005
21	Design for safety & quality : The inspection and auditing process of bridges, and some important lessons learned [dvd]	DVD0021	24/06/2009	USA UK : CIMware USA & CIMware UK, c2005	2005
22	IMI-Norgren's lean factory & business process re-engineering project Part 1 [dvd]	DVD0022	24/06/2009	USA UK : CIMware USA & CIMware UK, c2005	2005
23	IMI-Norgren's lean factory & business process re-engineering project Part 2 [dvd]	DVD0023	24/06/2009	USA UK : CIMware USA & CIMware UK, c2005	2005
24	Engineering project planning and management Part 4 [dvd]	DVD0024	24/06/2009	USA & UK : CIMware USA & SCIMware Ltd., UK, c2005	2005
25	Engineering project planning and management Part 3 [dvd]	DVD0025	24/06/2009	USA & UK : CIMware USA & SCIMware Ltd., UK, c2005	2005

26	Engineering project planning and management Part 2 [dvd]	DVD0026	24/06/2009	USA & UK : CIMware USA & SCIMware Ltd., UK, c2005	2005
27	Engineering project planning and management Part 1 [dvd]	DVD0027	24/06/2009	USA & UK : CIMware USA & SCIMware Ltd., UK, c2005	2005
28	Marine mammals [dvd]	DVD0028	13/05/2009	USA : Walt Disney Company, c2005.	2005
29	Advanced 3D interactive computer aided manufacturing (CAM) development concepts and cases [dvd]	DVD0029	24/06/2009	USA UK : CIMware USA & CIMware UK, c2003	2003
30	Multi-CAD data exchange using ELYSIUM methods and solutions [dvd]	DVD0030	24/06/2009	USA UK : CIMware USA & CIMware UK, c2005	2005