Factors affecting re-usability of learning objects across national boundaries:
an exploratory study of information organization and knowledge management

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Abstract:

This paper reports an exploratory study of the factors likely to affect the re-usability of lecture slides across different library and information science/studies (LIS) schools. The study was carried out in the context of a collaborative project to develop a regional repository of learning objects in LIS. Existing lecture slides on topics in Information Organization and Knowledge Management from four schools were compared to identify common content that suggest reusability of the content, as well as unusual, innovative or well-developed content that can be reused to enhance another instructor's lecture presentation.

Lecture content on practical topics or that cover international standards and specifications tend to be similar across LIS schools and are likely to reusable with little modification, except for language translation. Lectures that provide a general introduction to a topic or address an abstract topic tend to be quite different because the instructor can address the topic from different perspectives and select different types of information. Introductory/superficial treatments of a topic are more likely to reused across different courses. The type of information on a lecture slide may affect its reusability. Core concepts and frameworks, and quotes from experts tend to recur across the schools. Well-developed examples, illustrations, diagrams and images can be reused

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by other instructors to enhance their lectures. Different countries have different strengths, and lecture material from a particular country may have more in-depth treatment of particular topics. A repository of lecture slides from different countries will be enormously useful both for instructors teaching a course for the first time, as well as instructors seeking to improve a lecture presentation.

Introduction

There are active efforts in the Asia-Pacific region to forge regional collaborations in LIS education and research. One example is the *Consortium of iSchools Asia Pacific (CiSAP)* (url: http://dis.sci.ntu.edu.sg/cisap/). Smaller regional groups are also being formed such as the *Taiwan-Singapore-Thailand Workshop on Library & Information Research*. One kind of educational collaboration is the sharing of teaching materials. We have embarked on a project to develop a repository of "learning objects" to facilitate sharing and reuse of digital content to enhance the quality of teaching in Asia. Developing a repository of learning objects takes a lot of effort and resources. A question we are faced with is how useful such a repository is likely to be, what kind of content is likely to be reused by different instructors, and whether it will be worth the effort?

This paper reports an exploratory study of the factors likely to affect the re-usability of learning objects (particularly lecture slides), across different LIS schools, countries, and languages. The main approach adopted in the study is to compare existing lecture slides on the same topics developed by instructors in different schools. Slides from different instructors having similar content suggest high likelihood of reuse of the content. The basic logic is this: if the lecture slides from instructor A has *n* slides having the same content as *n* slides in instructor B's lecture slides, this suggests that instructor A would have been able to reuse the content in instructor B's slides if they had been available in the learning objects repository.

Although recurring content suggests high level of reusability, they might not be the most useful material to a particular instructor. Recurring content may be readily available on the Web, and furthermore may not be useful to an instructor seeking to improve an existing set of lecture slides. Unusual, innovative treatments or examples may be more useful to such an instructor. So the study will also seek to identify the types of unusual or innovative content that may be useful to enhance other instructor's lecture slides.

Two subject areas were selected as the domains for the study:
1. *Information/knowledge organization*—a well-established subject area in LIS
2. *Knowledge management*—an emerging area.

Information/knowledge organization is interesting in that in addition to standalone courses devoted to the subject, some aspects of information organization may be embedded in other courses. For example, an *Online Information Searching* course might cover the use of thesauri and classification schemes for the purposes of online searching. *Digital Libraries* and *Information Architecture* courses might cover metadata, XML encoding standards, taxonomies, classification schemes and ontology. The second subject, *Knowledge Management*, is an emerging and developing subject area, and there will be substantial interest among the LIS community in Asia to find out what other schools are teaching and to adopt some of the lecture materials.

The study was carried out as a collaborative project involving four LIS educators from Singapore, Taiwan, Thailand and Kuwait—the authors of this paper. This collaborative approach is necessary to gain access to teaching materials used in different schools across the region. Furthermore, as the materials will be in English, Chinese and Thai, collaborators who are fluent in these languages are needed to provide translations. As a side-effect of the study, we shall also learn the differences in the way Information Organization and Knowledge Management are taught in different LIS programmes, in terms of content and teaching approach.

Previous Work

A major development in e-learning has been the notion of reuse of digital resources. Resources created for one particular context have the potential to be reused and repurposed in another context. A basic concept in the reuse approach is the smallest learning unit, a discrete block of educational content that can stand alone. This unit is referred to as a *learning object*. There are different perspectives of what a learning object is and what size it should be to maximize reuse. Wiley (2002) defined a learning object as any digital resource that can be reused to support learning. The IEEE Standard for Learning Object Metadata (IEEE/LTSC, 2002) considers a learning object as any entity, digital or non-digital, which can be used, reused or referenced during technology supported learning.

Defining the term *learning object* and *reusability* continues to be an issue in the e-learning community. Currier and Campbell (2005) stated that the spectrum of approaches with regard to reusability (breaking resources into smaller units to facilitate reuse) ranges from course down through modules (sections) to learning objects and information objects. The Learning Object Metadata standard specifies four aggregation levels: raw media data, a lesson, a course, and a set of courses. Currier and Campbell's DNER & LO evaluation criteria refines the concept of granularity and aggregation into seven levels: information object, information resource, learning object, unit of study, module, course, and collection. They distinguished between learning objects that have an educational objective or focuses on a specific educational concept, and information objects that are simply presenting information.

In this study, we consider a lecture presentation (Microsoft Powerpoint file) as a learning object at the level of a lesson. A lecture presentation consists of a set of lecture slides. If a lecture slide can stand alone as a self-contained treatment of a topic, we consider it an atomic learning object. Sometimes, material on a topic is presented over two or more slides, in which case a slide is no longer a learning object but an information object. Diagrams and images within a slide can be considered digital objects or assets.

Previous writers have focused on the following types of factors that affect the reusability of learning objects:
- technical factors, e.g. technical standards followed
- physical factors, e.g. granularity or size of learning object
- dependency factors, e.g. physical and content dependency
- system features, e.g. search facilities and metadata
- contextual and environment factors.

Quinn (2000) suggested that the smaller the learning object, the more applicable it will be to a range of users. Hiddink (2001) proposed three main factors that determine usability:
- accessibility, which is determined by the metadata tagging, search feature, user interface, etc.
- generality, which is determined by how specific the learning object is to a subject, context (educational setting, teacher), and the number of references to the context
- opportunities for reuse that exist in the institution.

Currier and Campbell (2005) specified the following factors of reusability:
- technical format: whether the resource is tied to a particular delivery platform or technology
- contextual dependency: whether the content of the resource references other related but external resources (e.g. the next module in a sequence)
- technical dependency: whether the delivery of the content technically depends on other resources (e.g. interactive content that resides in server-side scripts.
A reusable learning object is one that can be delivered via a wide variety of platforms or technologies, do not reference related external content and are not technically dependent on other external resources.

Currier and Campbell (2005) distinguished between horizontal and vertical reusability. Horizontal reusability focuses on how subject-specific the learning object is. The following levels of reusability were identified:
1. generic objects can be used in any subject field or discipline
2. interdisciplinary objects are applicable to more than one discipline or subject
3. subject-specific objects are for use only within a specific subject
4. resource-specific objects are designed for use in a specific context.

On the other hand, vertical reusability focuses on whether the learning object may be used at more than one educational level, and whether there is support for use at different levels of study.

Rodriguez, Dodero and Sanchez-Alonso (2009) divided reusability factors into structural and contextual issues. The structural issues are:
- Self-contained – minimal references to other resources
- Modular – combinable with other objects to form lessons
- Properly grained – proper size and proper learning objective
- Traceable – have correct metadata
- Modifiable – can be reformulated in a different context
- Usable – easy to use
- Standardized – compliant to a shared standard.

Contextual factors include technological context (e.g. platform dependencies, and software needed to run the learning object), and social and educational contexts.

Drawing from the field of software engineering, Rodriguez, Dodero & Sanchez-Alonso (2009) adapted the criteria for reusable software code into the following criteria for reusable learning objects:
- Cohesion: a learning object must be concise and cover a single concept or objective. It is less cohesive if it addresses multiple concepts and objectives
- Coupling: a learning object must communicate with the minimum number of other objects and exchange minimal information
- Size and complexity: fine-grained objects are more reusable
- Portability: it must be context independent at the technological and socio-educational levels
- Difficulty of comprehension: it must be easy to understand.

In our study, the focus is on the content of the learning object and the characteristics of the content that are associated with reusability. In an earlier paper, Chaudhry and Khoo (2008) have suggested the following factors that may affect reuse:
- Topic/Subtopic of the slide
- Treatment type: technical, management, procedural
- Treatment level: introductory, intermediate, advanced
- Level of detail: superficial treatment, in-depth treatment
- Style: text bullet points, text boxes, graphics, etc.
- Information type: overview, definition, concepts, typology, etc.

Some of the research in learning objects is focused on the automatic aggregation of small chunks of material and small learning objects into aggregated lessons (e.g. Schreurs, Vanhove & Al-Zoubi, 2008). In our study, we assume that the instructor plays a significant role in customizing and repurposing lectures slides from the learning objects repository into a coherent lesson that fits the instructors educational objective, framework and style. Elliott and Sweeney (2008) carried out a case study which quantified the amount of savings in reusing learning objects to develop an e-learning resource on diabetes. The proportion of reused learning objects was 95%. 97% of the pre-existing learning objects had to be modified to match the context of the resource.

Data Collection

The lecture presentations (Microsoft Powerpoint files) examined were from programs at the following LIS schools in Asia:

- Nanyang Technological University (Singapore) – English materials
- Kuwait University (Kuwait) – English materials
- Mahasarakham University (Thailand) – Thai, with some English materials
- National Taiwan Normal University (Taiwan) – Chinese and English.

The course outlines for courses on Information Organization and Knowledge Management were compared, and are listed in the Appendix. Lecture slides for the following topics were obtained and examined:

- Introduction to information organization
- Subject analysis (including use of Library of Congress Subject Headings)
- Metadata
- Introduction to knowledge management.

Lecture slides from other courses that cover aspects of Information Organization and Metadata, e.g. Digital Libraries and Information Architecture, were also examined.

The situation in Singapore and Kuwait requires some explanation. The second author (Chaudhry) was teaching Information Organization in Singapore but moved to Kuwait in 2009. In Kuwait, he had to modify the examples used in the course materials to local names, sources and institutions because of cultural and linguistic considerations. Since the university semester in Kuwait is longer than in Singapore, additional material on new developments were added to the course. Meanwhile, in Singapore, the first author (Khoo) took over the Information Organization course and adapted the teaching materials to his own perspective and replaced some topics in the course.

Lecture slides in Chinese and Thai were translated by graduate students who were competent in English as well as Chinese or Thai. It was later found that the *Translate* utility provided by Google did an adequate job of translating slides in Thai into English, and some slides were examined using Google translation. The Google translation was less successful for Chinese slides.

Lecture slides for similar topics were compared to identify similarities and differences. Possible reasons for the similarities and differences were hypothesized. We also attempted to identify the types of slides that are likely to be reused by other instructors to enhance their current lecture presentations. We conjecture that different types of information are associated with different levels of reuse. Examples, illustrations, diagrams and images may be more reusable than other types of content, and indexing these information types will help instructors to identify material to include in their lectures. We analyzed the slides to identify the different types of information they contain. A set of 33 information types were identified and they are listed in Table 1.

Table 1. Types of information found in lecture slides

1. Overview (Outline/Summary)	17. Equations & Formulas
2. Objectives (of the lesson)	18. Application
3. Context & Purpose (Significance of the topic)	19. Example
4. Definition (What is …?)	a. Simple example
a. Simple definition	b. Complex example
b. Advanced definition	c. Graphical example (image)
5. Concepts (Terms)	20. Illustration (image)
6. Principles (Approach & its rationale)	21. Exercise
7. Typology (Types of)	22. Quote
8. Characteristics (Features)	23. Competencies (Skills/Attributes)
9. Description	24. Strengths
10. Framework & Model	25. Usefulness
11. Structure & Components	26. Comparison
12. Standards/Specifications	27. Issues (Problems)
13. Procedure (Steps/Functions/Process/Method)	28. Organizations
14. Rules & Guidelines	29. Tools
15. Best practice	30. Products
16. Policies	31. History
	32. Trends
	33. Readings & References (URLs)

Findings

It was found that slides tend to be either very similar or very different. Lectures on practical topics tend to be similar in content, whereas lectures that provide a general introduction to a topic or address an abstract topic tend to be quite different. Some of the factors we observed that may affect reusability are:
- Practical versus theoretical (abstract) topics
- Types of information presented
- Superficial versus in-depth treatment (introductory versus advanced treatment)
- Country bias.

Practical versus theoretical topics

Lecture content on practical topics tend to be similar across the schools. Practical topics include those that:
- focus on competencies for accomplishing particular tasks (e.g. constructing subject headings, Dewey class numbers, creating bibliographic records)
- teach particular standards or specifications (e.g. MARC21, AACR2R, Dublin Core).

Such lecture slides can be adopted almost wholesale by new instructors teaching a course for the first time. For current instructors seeking to improve their lecture slides, they will be seeking materials on newer developments and newer specifications (e.g. FRBR, RDA).

Lecture content focusing on theoretical issues tend to be less similar across the schools. In Information Organization courses, lectures with a theoretical focus tend to be introductory lectures, e.g. introduction to information organization and introduction to subject analysis. Such lectures focus on the significance and usefulness of the topic, definitions, concepts, principles and theories

underlying the topic. The instructor has greater discretion to select material and types of information to include in the lecture. The instructor can also treat the topic from different perspectives or frameworks, and use different applications to motivate the topic.

Most of the Information Organization courses in the four schools focus on teaching practical skills and are quite similar in the topics covered. Information Organization can also be taught from a theoretical perspective (e.g. classification theory, and theories of ontology and semantic web). Such treatments are found in courses at the advanced Master's or PhD level, e.g. the PhD-level Knowledge Organization course in Taiwan. The Knowledge Organization course in the KM program in Singapore also takes a more theoretical perspective. We were not able to compare theoretical courses in Information Organization as they are not common in the four schools, and existing courses cover different topics.

Knowledge Management (KM) as a subject is quite different from Information Organization. KM focuses on tacit and intangible knowledge, often residing in people's heads and not recorded in a storage medium. It also places more emphasis on the *organization*. The subject is more conceptual and management oriented, and there are not many standards and specifications. Specifications tend to be for quality management, strategic management and performance management systems (such as Six Sigma, and Balanced Scorecard). KM is a fuzzy area and borrows heavily from a number of fields, particularly management, information systems and information science.

It was difficult to compare KM courses across the schools because of the different weights given to these perspectives, and different depth of treatment. The course in Thailand is a combination of Information Management and Knowledge Management, and gives equal weight to Information Management, Information Systems and Management perspectives. Singapore has a whole Master's program in KM., and thus the topics are treated in more depth. Its KM program has a management orientation. Our analysis of the lecture slides focused on management-oriented KM topics.

Our analysis found that the KM field has converged on certain core concepts, methods and frameworks. The following types of content tend to recur in the lecture slides across the schools:
- Core concepts, e.g. DIKW (data-information-knowledge-wisdom) hierarchy
- KM methods and approaches, e.g. Communities of Practice
- Theoretical frameworks, e.g. Nonaka's SECI model
- Quotations from KM or management gurus, especially on the definitions of KM, importance of KM, and KM concepts.

Introductions to these topics tend to be similar across the schools, though more in-depth treatment differ. The concepts and frameworks adopted from the management and information science fields may be similar to lecture slides in management and information science courses, but this was not examined.

Examples, illustrations, diagrams, photos and screenshots

Examples, illustrations, diagrams, photos and screenshots are the most obviously reusable objects in a repository. Examples and illustrations may be in text or image form. Diagrams may in image form or constructed using diagramming or graphics tools. These objects help to clarify concepts, illustrate procedures, stimulate discussion and present content in a non-linear way.

How do these differ across schools? Photos and screenshots of systems naturally tend to be quite different. Examples, such as example bibliographic records, tend to focus on the language materials of the country. Illustrations and diagrams of common concepts tend to be similar in content but differ in visual design. For example, lectures on KM tend to present the same DIKW hierarchy and Nonaka's SECI model, but with differences in visual design.

These objects are useful to instructors in the following ways:
- They take time to design and construct, and thus save other instructors the effort of developing them.
- Some examples, illustrations, etc. are better or more developed than others, in content or visual design. Instructors can search for better objects to use in their presentations.
- Diagrams and images are useful for teaching complex concepts or frameworks with multiple components. They also help to illustrate processes.
- Examples, illustrations, etc. from different countries are useful for illustrating how concepts are applied in different environments and applications.

Superficial versus in-depth treatment (introductory versus advanced treatment)

Chaudhry and Khoo (2008) had conjectured that the level of treatment (introductory, intermediate and advanced), which implies different depth or level of detail, is an important factor of reusability. Introductory/overview materials are shorter and have less detail, and are more likely to be reused in several courses. Advanced materials are likely to be covered only in one course within a program. Technical or mathematical treatments are also accessible to a smaller number of students.

Information Organization is a pervasive issue in the LIS field, and many courses in an LIS program contain treatments of some aspects of information organization:
- Information Storage & Retrieval—controlled vocabulary, thesauri and indexing
- Online Information Searching—controlled vocabulary, thesauri and classification schemes
- Digital Libraries—metadata standards, XML encoding schemes, semantic web technologies and ontologies
- Archives and Digital Preservation—metadata standards for heritage materials
- Information Architecture—taxonomies and metadata
- Web-Based Information Systems—metadata, XML encoding schemes, semantic web technologies
- Knowledge Organization (in the KM program in Singapore)—taxonomies, metadata and ontologies.

There is overlap between the courses in the coverage of Information Organization—some topics are covered in greater depth in one course but at an introductory level in another course. Examining the lecture slides of these courses in Singapore, introductory slides on a topic are reused in different courses. Whereas the *Information Organization* and *Cataloging and Classification* courses cover Dewey Decimal Classification (DDC) in some depth, the *Knowledge Organization* course in the KM program and the *Information Architecture* course in the Information Systems program have only a superficial, introductory treatment of classification schemes and DDC. The lecture slides in the latter two courses were adapted from the slides used in the former courses. The *Web-Based Information Systems, Knowledge Organization, Information Architecture* and *Digital Library* courses cover metadata and encoding schemes in some depth, using similar slides. However, only introductory material for metadata standards are presented in the *Information Organization* course

Country bias and strengths

There is some language and culture bias in the lecture content from the different countries. Information Organization courses in Taiwan devote a substantial proportion of the time on the cataloging of Chinese language materials, including cataloging standards (e.g. Chinese Cataloging Rules and Chinese MARC Format for Bibliographic Records) as well as cataloging tools (e.g. List of Chinese Subject Terms, and Classification Scheme for Chinese Libraries) developed for the language materials of the country. The examples provided are also focused on language materials of the country.

It was observed that for the established cataloging standards and procedures (e.g. AACR2 and MARC21), the lecture slides are usually in the language of the country. For newer standards (e.g. XML encoding schemes, semantic web related specifications and FRBR), the lecture materials have a higher proportion of English text, especially in terminology. It probably takes some years for new terms and concepts to be translated into the language of a particular country. So lecture materials on new developments tend to be in English.

Teaching materials from different countries have different strengths, with richer, more in-depth treatment of different aspects of Information Organization. Taiwan has a particular strength in digital libraries and organization of heritage materials. The lecture slides contain more in-depth treatment and more developed diagrams and illustrations of metadata for digital libraries and heritage materials. Thailand also has a bias to the organization of Thai language materials, and a growing interest in digital libraries of heritage materials. Singapore has a whole Master's program in KM, and thus has more in-depth content on KM issues and methods.

The lecture slides from the different countries also contain screenshots of various types of information systems and digital library systems in the country, illustrating various aspects of information organization. These materials provide opportunities for the internationalization of LIS courses and for teaching the application of LIS principles in different environments, languages and cultures. Such materials, which may be considered basic content in the country of origin, can be reused as advanced material in other countries.

Conclusion

Lecture slides for Information Organization, Knowledge Management and related courses in four Asian countries were examined and compared to identify common content that suggest reusability of the content, as well as unusual, innovative or well-developed content that can be reused to enhance another instructor's lecture presentation. What is clear is that there is a lot of "good stuff" and reusable content, despite language and national biases. An international repository of lecture slides from different countries will be enormously useful both for an instructor teaching a course for the first time, as well as for an instructor seeking to improve a current lecture presentation.

Lecture slides on practical topics or that cover international standards and specifications are more easily reusable with little modification. In a more conceptual subject such as Knowledge Management, lecture slides on core concepts, core frameworks and quotes from experts in the field are also easily reusable. Introductory treatments of a topic can be reused in other courses where students need only a superficial acquaintance with the topic. For more conceptual or theoretical topics, the plethora of perspectives available in a repository will allow the instructor to choose content that fits his or her perspective.

An international repository of lecture slides will also be useful to help an instructor to enhance a lecture presentation with better examples, illustrations, diagrams and images from the repository. Different countries have different strengths, and lecture material from different countries may have more in-depth treatment of particular topics, which can be reused in other countries. Applications in different environments and cultures can be used to give students an insight into how basic principles and techniques can be adapted to new situations.

The findings reported in this paper can be considered as hypotheses to be investigated further. The next step in the project is to develop an actual repository of lecture slides for Information Organization and Knowledge Management, and to index the lecture slides with the reusability factors and information types identified in this paper. A metadata application profile and taxonomies for indexing the learning objects are being developed. After populating the repository, LIS educators will be invited to use the repository, and user studies and transaction log analysis will be carried out to validate the factors that contribute to reusability and usefulness of the repository.

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Appendix. Outline of Courses on Information Organization and Knowledge Management

Thailand

Organization of Information 1
- The meaning and importance of information organization
- Content analysis of materials, free words, controlled vocabulary, related terms, keywords, subject headings rules
- Subject headings
- Information organization and indexing concepts, popular indexing systems, DDC, LCC
- DDC 000-499
- DDC 500-900
- Author indexing, call number labeling
- Creating bibliographic records
- Creating main entry and additional entry
- Writing bibliographic records onto a database

Organization of Information 2
- Importance of information organization, search history
- AACR2 rules, creating bibliographic records, subject headings, author index, MARC
- LCC concepts
- Information classification and subject heading assignment for electronic materials
- Information classification and subject heading assignment for non-print materials
- Using IT for analysis and classification of network information

Information and Knowledge Management
- Part1
  1. Basic concepts of information and knowledge
       1.1 Meaning, importance, type of information and knowledge
       1.2 Cycle and benefit of information and knowledge
       1.3 Information and knowledge resources and services
  2. Information and knowledge management
       2.1 Meaning and significance
       2.2 Steps and procedures
            2.2.1 Storage and retrieval
            2.2.2 Evaluation of information
            2.2.3 Classification of information and knowledge
       2.3 Different characteristic of information management
            2.3.1 Electronic data management
            2.3.2 E-commerce
            2.3.3 Information systems
            2.3.4 Database systems
       2.4 Tools for information management
            2.4.1 IT and internet
            2.4.2 Metadata
            2.4.3 Information and Knowledge Management technology
- Part2
  1. Learning society and learning organization
       1.1 Learning society
            1.1.1 Characteristic of learning society
            1.1.2 Characteristic of people in learning society
            1.1.3 Information literacy
         1.2 Importance of information and knowledge to society

2. Knowledge management and learning organization
   2.1 Knowledge management
   2.2 Learning organization
      2.2.1 Characteristic and component of learning organization
      2.2.2 Benefits of learning organization
3. Information and knowledge management in organization
   3.1 Information and knowledge management
   3.2 Electronic information management
   3.3 Document management
   3.4 Managing automated office
4. Information and knowledge management professionals
   4.1 Skills and competency of information and knowledge management professionals
   4.2 Ethics and professionalism of information and knowledge management professionals
5. Related laws
   5.1 Copyright and intellectual properties
   5.2 Legislation act: Rights to receive information
   5.3 Legislation act: Computer systems crime

Taiwan

Information Organization (Undergraduate)
- Information Organisation introduction
- Bibliographic control and related standards
- Cataloging practice/implementation
- Information: Types and Features
- AACR2 Cataloging: Chinese cataloging rules, titles, authors, editions
- AACR2 cataloging: publisher, physical description (books)
- AACR2 cataloging: notes, ISBN
- Machine-readable format
- Establishing access points
- Cataloging practice
- Authority control
- Cataloging practice
- Machine-readable format and ISO 2709
- Bibliographic database
- Collaborative cataloging and Resource sharing

Subject Analysis
- Information organization and thematic analysis
- Subject analysis introduction and classification theories
- Chinese books classification – development and structure/architecture
- Chinese books classification – main table
- Chinese books categorization – standards subdivision
- Chinese books categorization – time and geography/space
- Author number and subject number
- Dewey classification
- Library of Congress classification
- Title heading, Chinese theme word list

Information Organization (Master's)
- Information organization development trends
- Social tagging

- Taxonomy evaluation for Web search
- Important developments: FRBR, FRAD
- Important developments: OCLC Dublin Core, WorldCat and WorldCat Local
- Information organizations important development topics: folksonomy, ontology
- Archives organization: EAD, MARC AMC
- Text tagging
- Electronic books text tagging and other applications
- Digital publishing: OeBF
- Electronic books text tagging and other applications
- E-learning LOM and SCORM
- E-learning TWLOM
- Film and news data exchange standards

Knowledge Organization (PhD course)
- Ancient China knowledge organisation theory and practice
- Recent Western knowledge organisation theory and practice
- Contemporary knowledge organisation theory and practice
- Web knowledge organisation research topic

Knowledge Management
- What is Knowledge Management
- Knowledge management and knowledge economics
- Information and knowledge management
- Measuring the value of knowledge
- Determining the rewards of knowledge
- Industry: Information needs
- Sources of industry information
- KM: categorisation and expected outcomes
- KM: design and introduction
- Applying knowledge organizations to knowledge management
- Knowledge acquisition: summary
- KM systems
- Industry visit
- KM technologies

Singapore

Information Organization
- Information organization framework and guidelines
- Bibliographic description. ISBD, FRBR, AACR2R
- Bibliographic description: AACR2R
- Selection of Access Points (AACR2R)
- Encoding bibliographic information: MARC21
- MARC leader and control fields
- Authority control
- FRBR & RDA
- Subject analysis. Library of Congress Subject Headings (LCSH)
- MARC encoding for subject fields
- FAST
- Classification schemes. Dewey Decimal Classification (DDC). Library of Congress Classification
- Metadata and metadata schema. Dublin Core

- Metadata encoding standards
- Resource Description & Access (RDA)
- Cataloguing resources

Cataloging & Classification
- Cataloguing theory 1 - bibliographic control: objectives and requirements
- Cataloguing theory 2 - Resource Description and Access
- Cataloguing theory 3 - authority control systems
- Cataloguing practices 1- continuing resources
- Cataloguing practices 2 – audio visual resources
- Cataloguing practices 3 - digital information resources
- Subject analysis theory 1 – principles of LCSH
- Subject analysis practices 1 – application of LCSH
- Subject analysis practices 2 – using LCSH for subject analysis
- Subject analysis theory 2 – classification Schemes
- Subject analysis practice 3 – LCCS

Foundations of Knowledge Management
- Introductory concepts
- Defining Knowledge Management; The knowledge market
- Knowledge management processes
- Theory of knowledge creation
- Knowledge management: other frameworks
- Knowledge sharing
- Knowledge sharing: Dixon's Model
- Culture
- Culture and knowledge sharing
- Technology as an enabler for knowledge management
- Infrastructure for knowledge management: Communities of Practice
- Introducing knowledge management in the enterprise

Knowledge Management Applications & Practices
- Introduction to KM applications
- Overview of techniques of connecting People to Information, and connecting People to People
- People, Process and Technology issues in knowledge management
- Knowledge portals. Design of intranets and Internet websites. Principles of web page design
- Use of Blogs, EDMS, CMS, WCMS for knowledge sharing
- Communities of Practice – theory and practical tips on how to start and sustain CoP's.
- After Action Reviews – learning while doing. Methodology and practice of AAR
- Storytelling – the use of narrative in sharing knowledge
- Organization learning. Building a learning organization. Peter Senge's Fifth Discipline
- Knowledge sharing – role of organization culture, rules of engagement and incentives.
- Benchmarking & best practices. KM processes.
- KM roles, responsibilities and competencies. CKO and knowledge manager roles. Overview of KM-related jobs.
- Knowledge mapping, knowledge audit. Linking KM strategy to business strategy. APQC KM Implementation Roadmap.

Kuwait

Organization of Recorded Knowledge

- Introduction to knowledge organization
- Frameworks for bibliographic control (ISBD & FRBR)
- Guidelines for describing documents – Anglo American Cataloging Rules
- Standards for encoding bibliographic information (MARC21)
- Access points and forms of headings
- Bibliographic records
- Dublin Core metadata format
- Subject analysis and indexing languages
- Library of Congress Subject Headings (LCSH)
- Use of LCSH for subject analysis
- Classification and categorization schemes
- Classifying documents using DDC
- Using DDC for number building
- Bibliographic support systems (utilities and automation systems for MARC records)

Knowledge Management
- Conceptual framework
    1. Key concepts and definitions
    2. KM cycle
    3. KM models
- Knowledge management processes
    1. Knowledge acquisition
    2. Knowledge transfer
    3. Knowledge application
- KM enablers
    1. Organizational culture
    2. KM tools and technologies
    3. KM strategies and metrics
- KM strategies and practices
    1. Issues and challenges
    2. Practices
    3. Implementation of knowledge management initiatives