

Using an Ontology to Develop the Learning Outcomes in Library

Chai Meenorngwar,
Valaya Alongkorn Rajabhat University under the Royal patronage, Thailand

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Abstract

Recently, Learning Outcomes(LO) are relevance feedback information from learning activities in the university. Library is a centre of the resource services to support these activities. However, stakeholders are student, teacher, department, faculty and university which have different activities and goals. In this study, Valaya Alongkorn Rajabhat University Library is used as case study, it provides the services such as borrowing and returning materials, reference, wireless access, interlibrary loan, etc. based on the learning activities monitoring. It captured all the goals from each stakeholder and found that the matching between goals and services will improve the Library development.

An ontology is the methodology to capture , describe and represent the matching tables as ontological strategic framework via common understanding formats. Finally, it helps library to develop a strategy and present the evaluation criteria such authority, accuracy, concurrency, and ownership from this framework.

Keywords: learning outcomes, library services, library strategy, ontological framework, semantic web

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Introduction

Library are the centre of knowledge that provided the learning and teaching materials to people in the university. People are teachers, students, researchers and staffs. It serves them for 24 hours and 7 days a week which called member services. Librarian has special duty to support the relevant information. In other meaning, library is the storehouse of knowledge (7).

However, the technology has been rapidly changed. Especially, Internet technology connected the people together. Students can access their learning materials from anywhere with any time. Whereas teachers can also prepare their courses or teaching materials easily with the various formats. Place and time are less important than before. For example, students can send their feedbacks to the teachers in a second. Social networking such Facebook application can use to create the social activities in a minute. This is a good reason for a library can also change their services to support their members.

In this study, it introduce the ways to describe their services by using an ontology to construct the core concepts and represent it with the well-formed information. Library services will change as tree of services which use to develop the strategic planning. It concerns on the Learning Outcomes in the university as particular domain. In (7) they are the feedback information in the learning and teaching domain. This information present the knowledge from students and teachers. These are also the relevant information to apply in their strategies plan. With an ontology approach, it help to share and reuse the common understanding in the domain environment (6).

Literature Review

Library Services

The regular library services can divide in physical services, and logical services. Physical services are the place, resources and materials. For examples, the self study room, newspaper zone, reading area, comfort zone, movies and entertainment, resources area, and etc. are need place or area. Logical services will provided the services via the technology with the digital format. For examples, Internet services, online database, electronic books, electronic journal, and etc. are all services without place or area. However, the help desk or counter librarians will supports all these services through borrow and return services, asking and retrieve services.

Internet technology roles the library services to the new environment. Students, teachers and staffs are connected via this technology. It extends the library services with the convenient and easily access. For examples, online documents, online reference will allow the members to access from any where via any time.

In (9) introduced level of services from the users that access the digital format or services in the library. It improves their learning and teaching activities. The assessment present with the matching between the infrastructure comments and library services. Therefore, in this study also use this method to assess the Learning Outcomes.

Learning Outcomes

Learning Outcomes are the information feedback from the stakeholders such students, teachers, researchers, and staffs in the learning and teaching environment of university. This information also present their knowledge from the university services (2). For examples, skills, course evaluation, teaching and learning efficient are the assessment information(3) from these people goals.

For this study, Learning Outcomes(LOs) are the information that collect from faculty(departments and courses) and support units (such Computer Centre, Library, Student Affairs, Academic Affairs, Dean offices, etc.) in the university. It consists with Physical, Equipments, Technology, and Services that serve the stakeholders in the university. Information will be separated in two kind of data: qualitative and quantitative data. It presents as the properties in the ontological framework of LOs from particular units. The clearly picture of the LOs university will finally understand.

An Ontological framework

Ontology is the formal specification. It categories information and represent it as tree of information (10). However, it describes sub-classes with formal and sub-concepts with informal hierarchical ontologies. Finally, knowledge will be developed from this information.

For this study, an ontology of the learning outcomes will be develop as tree or hierarchy of LOs. Each faculty to support units members add and share their particular information as common understanding. Finally, the clearly and accurate picture also present from the triangulating data (11) both working independently or collaboratively.

Domain of Learning

In Thailand, the quality assurance that is the minimal quality of the education system. It called Thailand Qualification Framework(TQF) and consists with five directs characteristics: level of Education, credit and period of study,degree of study, domain of learning, and Program and Course specification.

In this study, it concerns the learning outcomes on Domain of Learning(DoL). It five dimensions. It consists of moral and ethics, knowledge, intelligence, relationships and responsibility, numerical analysis, communication and Information Technology usages.

Research Methodology

Information is the knowledge descriptions. It uses to solve the problem. In this study, it proposes the way to capture the information which related to the library services. It provides in five steps to develop an ontological framework. It use LiMe (1) methodology to develop this framework as following.

- Step 1: Capture the library services as information concept.
- Step 2: Define the relation between the concepts and learning outcomes.
- Step 3: Describe the service activities with these concepts.
- Step 4: Map the concepts with learning outcomes
- Step 5: Develop the strategies framework with this mapping tables.

Step 1 Information Concept

Library is a place where students, teachers and staffs in the university. They provide all the concepts from their experiences and facilities. For examples, students use the computer lab, study room and internet access, and learning resources from the library. Teachers access the teaching materials such research and journal papers from the library services. Others activities are reading, searching, and even relaxing in the university.

<concept>Information</concept>

Concepts help the library to classify the information. According to the different definition, it is difficult to manage.

Step 2 Define the relation between the concepts

In this study, the services will be defined as concept to describe the information and activities. Teacher activities describe with teaching concepts, whereas student activities will also describe with learning concepts. Finally, the learning outcomes also describe with the goal concepts. Finally, it constructs the taxonomy of learning outcome framework.

Activity	Teaching	Learning	Learning Outcomes
borrow and return resources	use in the teaching materials	support their homework or assignments	library support their classroom
reading areas	reading course materials	study and share with their friends	Discussion about their homework
internet access	post and upload teaching materials	search for the additional topics	communication and IT usages
use the computer lab	present workshop on the courses	submit and work on their assignments	create and practise learning skills
book the study room	make up the class to work on particular topics	discuss with friends	Discussion about their homework

Figure 1: Example of Information describing with the concepts

Step 3 Describe the library services

Library Services is the activities that serve both teachers and students in university. Mostly, they use the library for supporting their academic environment. This environment is very important for the university. It presents the clearly picture of the relationship between academic activities and library services. The stake holders in this environment are department, faculty and university members.

Library services	Department	Faculty	University
borrow-return	54	4	12
Searching	50	3	3
Reading	203	5	4
Study room	15	2	5
Reserve	3	12	2
Online resources	77	3	2
E-Books	45	6	5
E-Magazine	56	2	3
Computer	147	4	8
Internet	218	2	2
Movies and Media	86	6	9

Figure 2: Number of services that described from the ontological framework.

Step 4 Map the Library services to the learning outcomes

This process presents the services map to the domain of learning. It is an useful information. University understand how to produce the students based on their courses. Activities could represent in particular domain of learning. However, all activities will finally places on every domain.

Services/Doma in of learning	Moral and Ethics	Knowledge	Intelligenc e	relation ship and respons ability	Numerical analysis/communication/ IT
borrow-return	X			X	
Searching		X	X		X
Reading				X	
Study room				X	X
Reserve	X				
Online resources		X			X
E-Books		X			X
E-Magazine		X			X
Computer			X	X	X
Internet	X	X			X
Movies and Media	X	X			

Figure 3: Mapping between the Library services and Domain of Learning

Step 5 Develop the strategic plan

The strategic plan is the way of the library can improve their services. In order to improve the services, ARIT classifies the information between activities and services. It contributes the weak and strength information about services. Therefore, they can apply the new services to improve their services.

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Figure 4: Strategic plan Development Screen

Conclusion

Building an ontology is not easily for the librarians. According to the descriptions and the time, they requires a lot of effort and time for the new environment such library. However, Learning Outcomes from different stakeholders contribute their different goals. Therefore, the library services need the accurate data to construct the ontological framework. The common understanding between various support units also help this situation.

Finally the strategic plan are use the matching between information services and LOs from each particular user in the university domain represent as ontological framework. It uses an ontology approach to describe this information and present with well-formed structure. Activities in the particular projects of the strategic plan will fulfil the stakeholder goals.

For the future work, the image of the library require the marketing approach to increase their services performance. Library has to open the opportunities to share their service with the commercial vendors and technology specialists.

References

- Chai Meenorngwar. (2013). A Methodology to Develop Ontologies for Emerging Domains. The IAFOR Journal of Education. Volume 1 - Issue 1 - Spring 2013.
- (2) Sandi Osters.(2014) Writing Measurable Learning Outcomes.
website:<http://www.gavilan.edu/research/spd/Writing-Measurable-Learning-Outcomes.pdf>
- (3) Ascough, R.S. (2011). Learning (about) outcomes: How the focus on assessment can help overall course design. Canadian Journal of Higher Education, 4(1/2) 44-61.
website:<http://guides.library.queensu.ca/teaching-learning-library/learning-outcomes>
- (4) (2014) Library Value in the Classroom: Assessing Student Learning Outcomes from Instruction and Collections. Website:
<http://www.sciencedirect.com/science/article/pii/S0099133314000652>
- (5) Ramona Lile, Camelia. (2014).The Assessment of Learning Outcomes. Pages 125–131. Website:
<http://www.sciencedirect.com/science/article/pii/S1877042814063988>
- (6) Sharifullah Khan,, Muhammad Safyan. (2014). Semantic matching in hierarchical ontologies. Journal of King Saud University - Computer and Information Sciences Volume 26, Issue 3, September 2014, Pages 247–257. Website:
[http://www.sciencedirect.com/science/article/pii/S1319157814000111\](http://www.sciencedirect.com/science/article/pii/S1319157814000111)
- (7) S.K. Patil and Pranita Pradhan. (2014) Library Promotion Practices and Marketing of Library Services: A Role of Library Professionals. Procedia - Social and Behavioral Sciences 133 (2014) 249 – 254
Website: <http://www.sciencedirect.com/science/article/pii/S1877042814031012>
- (8) Masitah Ahmad and Jemal H. Abawajy. (2014) Digital Library Service Quality Assessment Model. Procedia - Social and Behavioral Sciences 129 (2014) 571 – 580
Website: <http://www.sciencedirect.com/science/article/pii/S1877042814028973>
- (9) Masitah Ahmad and Jemal H. Abawajy. (2014). Service Level Agreements for the Digital Library. Procedia - Social and Behavioral Sciences 147 (2014) 237 – 243
- (10) Vandana Dhingra, Komal Kumar Bhatia. (2015). *Development of Ontology in Laptop Domain for Knowledge Representation*. Procedia Computer Science, Volume 46, 2015, Pages 249-256.
- (11) Lori Breslow. (2007). *Methods of Measuring Learning Outcomes and Value Added*. Website:<https://tll.mit.edu/sites/default/files/guidelines/a-e-tools-methods-of-measuring-learning-outcomes-grid-2.pdf>

Contact email: chai@vru.ac.th