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A Study on the Development of Evaluation Model for Undergraduate Students' Information Literacy

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ABSTRACT

This study is aimed to evaluate the undergraduate students' information literacy, examine the current level of their capability of using information, and make a evaluation model to develop information literacy. Information literacy consists of six fields: information resources, information needs, information search, information analysis, information technology and presentation, and information ethics. Based on the result of statistic factor analysis, the integrated evaluation model of information literacy, evaluation factor, and evaluation procedure can be suggested based on the educational and evaluation guideline.

Introduction

The establishment of a general standard and system on information literacy is essential because a more refined and efficient information application ability is demanded at the university level. This systematic standard on information literacy deals with methods in approaching academic information, methods used to analyze various information, information search application, and attitude towards information ethics on the basis of innovative information technology. Consequently, many countries have renewed their understanding of the term information literacy. These countries are attempting to develop evaluation standards and criteria emphasizing the importance of the research ability of students and the effects that information literacy has on the entire research process in the university.

The current situation in Korea puts emphasis only on the development of information technology and thus provides an inadequate system for the evaluation of information literacy levels of undergraduate students. Also education guidelines and programs based on the personal evaluation of information literacy competency are rarely provided. In addition, the necessity and justification of information literacy education such as bibliographic instruction, library usage, and information search method education conducted in university libraries and liberal arts courses is under question.

Therefore the objective of the research is to first create a standard for information literacy and then develop evaluation models for all fields and factors of information literacy which will provide the means to evaluate information literacy levels of undergraduate students. The results will contribute to the development of an integrated information literacy evaluation model based on the development of detailed areas and level-oriented evaluation guidelines allowing comprehensive education in all fields.

First of all, new standards of information literacy, evaluation objective, evaluation contents, evaluation factors, and evaluation method were analyzed through document research. The results were applied as basic data for the detailed evaluation factor design in all fields.

Second, an on-line information literacy evaluation model was designed and tested on undergraduate students. The model measured information literacy and produced scores in each field and a final combined score for the students experimented. The validity of the fields and reliability of the questions were

verified by statistic factor analysis and fundamental environmental factors, self-evaluation factors, and information literacy field factor scores were also considered in the analysis.

Third, based on the results, the study attempted to develop detailed evaluation design factors, evaluation models for each field, level-oriented education guidelines, and an integrated evaluation model.

The research is based on the general information literacy of undergraduate students and therefore excludes the subject specialized areas of information literacy available to particular college majors.

Theoretical Research of Information Literacy

Concept and Standard of Information Literacy

The term information literacy, sometimes referred to as information competency or information use competency, is generally defined as the ability to access, evaluate, organize, and use information from a variety of sources. Information literacy and information competency are both commonly used concepts but this study will use the term information literacy(ACRL 2000).

In order to set the scope of information literacy, this study analyzes the standard of information literacy in the United States, Australia, England, and Korea.

The United States ALA expanded on Doyle's theory(Doyle 1992) and announced "Information Literacy Competency Standards for Higher Education"(ACRL 2000), and College Library Association of Australia announced "Information Literacy Standard" in 2001 and published a second edition in 2004(Australian and New Zealand Institute for Information Literacy 2004). England's Society of College and National & University Libraries provided a standard on "Information Skills in Higher Education" in 1999. Japan Library Association drew up a guideline for information literacy for all types of libraries and published the standard for college libraries in 2001(Japan Library Association's Library Usage Education Committee 2001).

Korea does not have a standard for information literacy created by library organization but the Education and Human Resource Department(2002; 2002b; 2002c) announced three researches: "Research on the Standardization of ICT(Information Communication and Technology) Competency and Detailed

Educational Process of the General Public, Teachers, and Students." Of the three, this study focused on the "ICT Competency Standard of the General Public."

<Table 1> below shows the result of whether or not each country had a set of standards for information literacy fields such as information resources, information needs, information search, information analysis, information management, information technology, and information ethics.

United States and Australia mentioned all 7 areas, England presented standards on information search, information management, and information ethics only partially, and Korea and Japan did not refer to information needs.

Korea especially lacked content in information needs and information analysis which requires perception and consideration of basic information sources and information literacy is seen as just information management, information technology, and information ethics.

<Table 1> Standardization of the 7 Fields in each Nation

Field	U.S.	Australia	England	Japan	Korea
Information Resources	0	0	0	0	x
Information Needs	0	0	0	X	x
Information Search	0	0		0	
Information Analysis	0	0	0		x
Information Management	0	0		0	0
Information Technology	0	0	0	0	0
Information Ethics	0	0			0

* 0: Included, : Partly Included, x: Not Included

This shows that Korea does not have a readily available standard of information literacy for the university level. The difference therefore is attributable to the referencing of data on the information literacy of the general public. Therefore, the provision of a national information literacy standard for Korean undergraduate students including not only information management, information technology, and information ethics but also information resources, information needs, and information analysis is urgent.

Information Literacy Evaluation Case

The study attempted to analyze evaluation questions by making observations of universities performing evaluation of information literacy educational programs. Sites linked to England's JISC operated Big Blue(Bigblue 2002) and ALA's LIRT(LIRT 2003) and LOEX(LOEX 2003) were examined for this purpose. Information literacy programs providing online education and applying information literacy standards were chosen for each country.

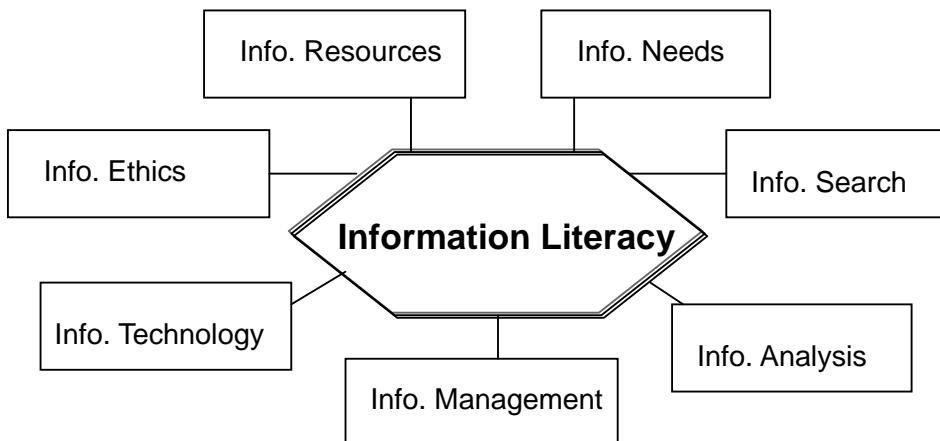
CSU, QUT, and UL all primarily had evaluation questions regarding defining the subject matter and finding the keyword, boolean operator and other restricted operation dealing with information search. The evaluation method adopted by CSU used subjective discussion problems while QUT and UL used an objective test which called for the answerer to choose one or multiple answers from the given choices according to the type of question. Application problems required multiple answers while simple concept comprehension questions asked for single answers.

Therefore this study referred to all three evaluation programs and their methods and designed an information literacy evaluation program based on the analysis.

Designing the Information Literacy Evaluation Model

Standard used in Designing the Evaluation Model

Based on the analysis of information literacy standards, educational contents, and evaluation factors of each country, <Picture 1> displays information literacy standards for each relative field.



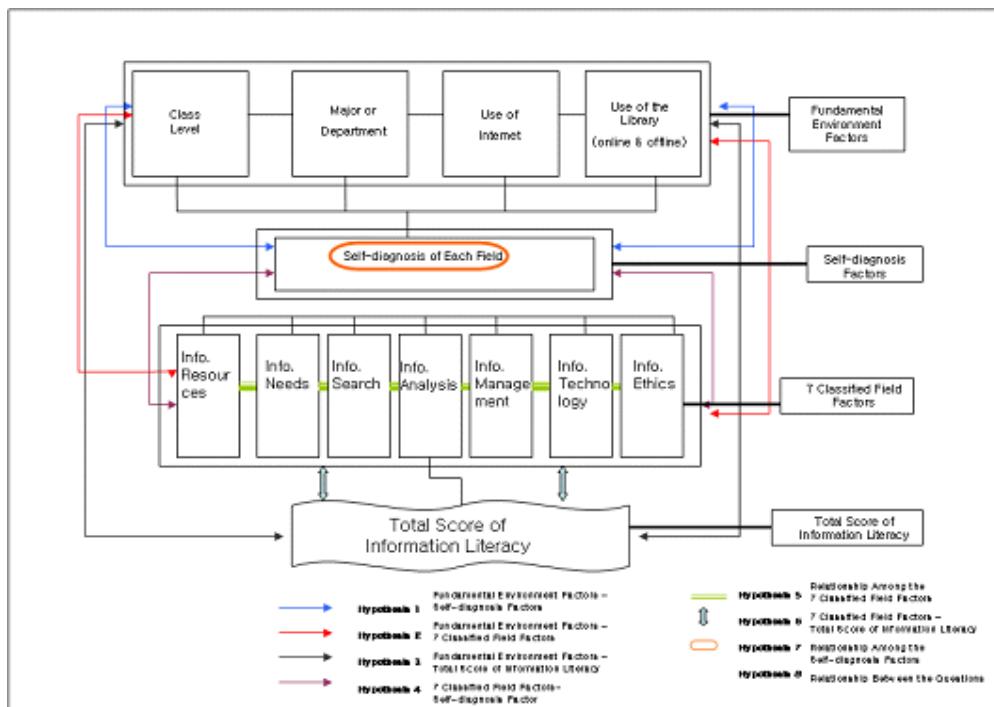
<Picture 1> The Fields of Information Literacy

Information literacy consists of seven fields. Information resources deals with library references and web information sources while information needs is related to recognizing needed information and requesting the information in an adequate manner. The field of information search requires one to properly approach information and to collect it in an effective way whereas information analysis and information management deals with the ability to analyze and administer the collected information. Information technology handles application and expression of information using technological media and information ethics is the understanding of the social and ethical aspects of using information.

Practical Evaluation Model Design

The evaluation model was designed such that the validity of the representing fields and the reliability of the result could be checked through the analysis of the classified fields of information literacy. The study evaluated a group of undergraduate students of Ewha Woman's University. The information literacy of the group was measured and the relationship between various environmental factors and information literacy was analyzed.

As shown in <Picture 2>, fundamental environment factors, self-diagnosis factors, 7 classified field factors, and information literacy score factor were decided primary factors in the research.



<Picture 2> Information Literacy Research Hypothesis

Gathering Data

Evaluation design for information literacy was produced online based on evaluation notice, time consumption, procedure, and scoring method (the <http://www.eshampoo.net>). Evaluation questions consisted of 4 questions per field for all 7 fields of information literacy which added up to 28 questions in total. The evaluation was performed twice, the first of which was conducted on 25 students who were available for an interview.

The evaluation was prepared and revised before its final performance and the study posted a public notice on the Ewha Portal Information System for random selection of the test group. Students of Ewha were given preferential chance to participate in the test because people who are not students of Ewha Woman's University are unable to login to the Ewha Portal Information System.

A self-diagnosis of the student's own information literacy was conducted before starting the final evaluation questions. The self-diagnosis was conducted by reading a short explanation of each field of information literacy and marking the level of the student's competency in that particular area. The information literacy evaluation test was designed to be finished in 30 minutes and would not

conclude if any of the questions were left incomplete.

The first experiment was conducted from October 5th to October 25th of the year 2004 on 25 students, and the second experiment was conducted in the same year from December 10th to December 14th on a total of 115 students.

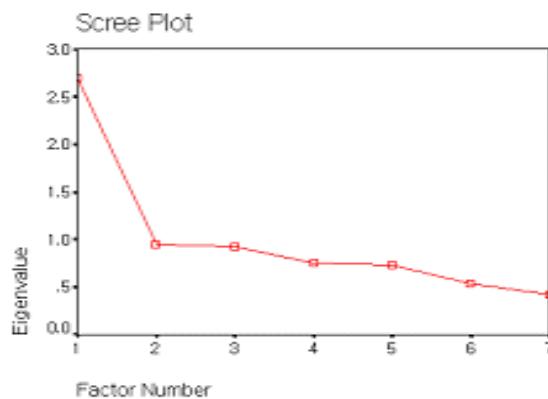
Questions and comments regarding the evaluation were posted on the bulletin board.

Analysis of the Information Literacy Evaluation Model

Validity

In order to find out whether information literacy is properly represented by the 7 classified fields, the study calculated the correlation matrix of each factor and verified the validity through factor analysis. KMO's(Kaiser-Meyer-Olkin) MSA(Measure of Sampling Adequacy) was employed in examining the application potential of factor analysis. Upon verification, a positive value of .781 was given as an outcome validating the possibility of applying factor analysis. Also the scores of the seven classified fields, which showed a scattered value ranging from 0 to 4, were verified as null hypothesis by using the Prelis Program to find dual normal distribution between two factors.

To determine the primary factors, the polychoric correlation matrix of each factor was calculated and factor analysis was performed using the SPSS. As seen in the scree plot in <Picture 3>, this factor is conspicuously larger than the other factors. More specifically, it was the only factor with a singular value larger than 1 and showed an initial eigen value of 2. 691. This factor can be seen as the information literacy factor and a positive conclusion of the model's construct validity can be drawn from this result.



<Picture 3> Scree Plot

The factor matrix shown in <Table 2> reveals the correlation coefficient of information literacy and its 7 subclassified fields. Information technology, information ethics, information management, information resource, information search, information analysis, and information needs all can be explained in relation to the information literacy factor. The information literacy factor is interrelated to 7 observation factors of which information technology, information ethics, information management, information resource, information search, and information analysis having the highest factor loading and information needs the lowest.

<Table 2> Factor Matrix

Field	Factor
Info. Technology	.731
Info. Ethics	.707
Info. Management	.570
Info. Resources	.538
Info. Search	.468
Info. Analysis	.331
Info. Needs	.295

Reliability

Reliability deals with the stability, consistency, and accuracy of the evaluation process. Methods used in measuring the reliability and accordance of the questions can be inspected by content evaluation and quantitative evaluation.

The study used a table of specification for evaluating the contents of the questions. For a quantitative evaluation, this study applied the classical test theory which measured the internal consistency, difficulty, discrimination, and appeal of the problems. The study calculated the internal consistency index or the cronbach of each factor for reliability analysis.

As seen in <Table 3>, the total reliability value is shown as .724 which implies a high reliability rate. Also a rise in average reliability value, average difficulty, and discrimination value can be observed after the questions were modified in

the second evaluation process as compared to the first pre-evaluation phase.

<Table 3> Analysis of Evaluation Results

Evaluation	First	Second
Participants	25	115
Number of Questions	28	28
Average	17(60.73)	19(67.8)
Alpha Value	.651	.724
Mean Deviation	3.196	4.299
Variance	10.218	18.484
Lowest Score	4	2
Highest Score	22	25
Median	18	20
Average Difficulty	.619	.680
Average Discrimination	.388	.394

N= 140

Verification of Research Hypothesis

The frequency analysis of the 115 participants in the second evaluation of information literacy is as follows. Distribution by class showed great diversity: 23.5% freshmen, 31% sophomores, 34% juniors, and 23% seniors. Major and department distribution also showed variety: 25.2% Liberal Arts, 47.8% Social Science, 22.6% Natural Science, Engineering, and Medical Science, and 4.3% Arts. All those tested showed a similar frequency in using the library or visiting the library homepage once or twice a week.

The following sections will deal with the analysis and results of <Research Hypothesis 1> to <Research Hypothesis 8>.

Fundamental Environment Factors and Self-diagnosis Factors

<Research Hypothesis 1> attempted to reveal whether or not the fundamental environment factors and self-diagnosis factors had meaning to the research.

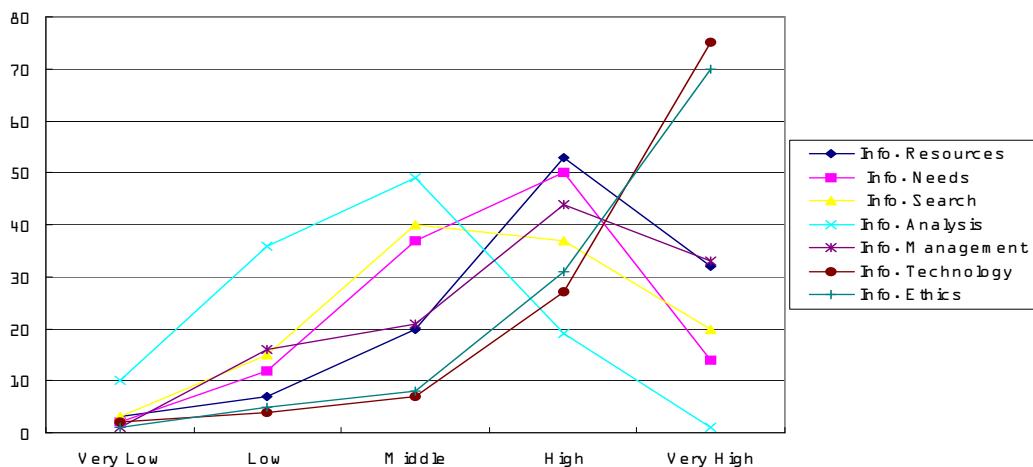
Class and information literacy education factors did not show any relationship with the self-diagnosed scores. Students majoring Medical Science and Natural

Science judged that their information technology levels were higher than others. Also students who spend more time on the internet considered their information search, information needs, and information resources skills were excellent. Furthermore, participants considered frequency of visits to the library and use of the library web site a definitive factor in information literacy competency. The students on the whole, made evaluations of themselves in all 7 fields in an equal manner.

Fundamental Environment Factors and 7 Classified Field Factors

<Research Hypothesis 2> attempted to reveal the relationship between fundamental environment factors and classified field factors through variance analysis of individual factor average difference. However, a meaningful relationship between fundamental environment factors and the 7 classified field scores could not be found. This is contrary to <Research Hypothesis 1> and reveals that the scores in each field is unaffected by fundamental environment factors.

<Picture 4> shows the distribution of the actual scores in each field. The highest scored areas were information technology and information ethics whereas the lowest field was information analysis.



<Picture 4> Actual Scores of the 7 Fields

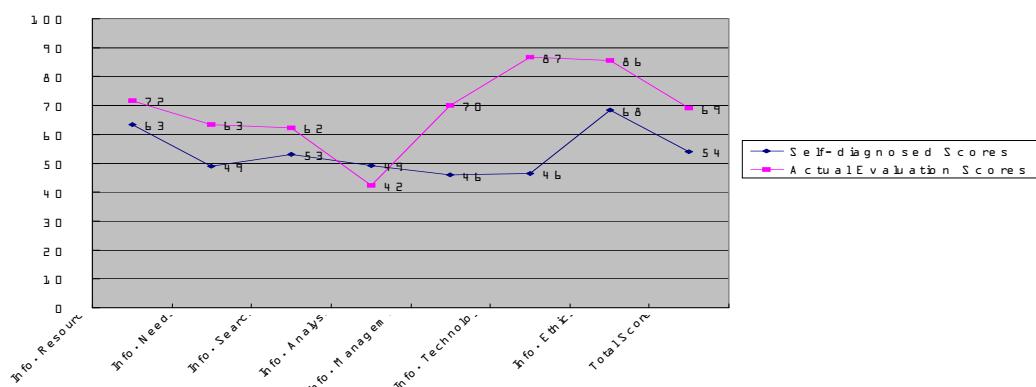
Relationship Between Fundamental Environment Factors and Information Literacy Total Score

<Research Hypothesis 3> analyzed the relationship between fundamental environment factors and the total score of information literacy through variance analysis and correlation analysis but the results revealed no relevant connection. This goes in accordance with <Research Hypothesis 2> which showed that the class of the student and their major, frequency of visits to the library and library web site, average usage of the internet, and information literacy education does not affect the total score of information literacy. This result indicated that when designing an information literacy education course, fundamental environment factors should not be put under consideration. The program should be designed based solely on the competency of the student and the contents of the education.

Classified Field Factors and Self-diagnosis Factors

<Research Hypothesis 4> performed a correlation analysis in order to find out whether or not the student self-diagnosed scores affected the actual scores of the 7 fields of information literacy.

As seen in <Picture 5>, student self-diagnosed scores were lower than the actual scores of the participants in all areas except the information analysis field. This is a result directly opposite to that of other research cases. Students in other countries show overcredulity by giving themselves higher self-diagnosed scores compared to the actual information literacy scores. However students of Korea seem to underestimate their information literacy competency.



<Picture 5> Self-diagnosed Scores and Actual Evaluation Scores

Relationship Between 7 Classified Field Factors and Information Literacy Total Score

<Research Hypothesis 5> performed a correlation analysis in order to reveal the relationship between the total score of information literacy and the 7 classified field scores.

The total score of information literacy and the 7 field factor showed a close relationship proving the accuracy of <Research Hypothesis 5>. In other words, the evaluation demonstrated that information literacy consists of information resource, information needs, information search, information analysis, information management, information technology and expression, and information ethics.

Relationship Among the Self-diagnosis Factors

<Research Hypothesis 6> analyzed the interrelationship of the self-diagnosed scores in the 7 fields of information literacy. The results showed that students who awarded themselves high scores in any one area considered themselves competent in all areas. For example, students who gave high scores in information needs also graded themselves excellent in information resources.

Self-diagnosed information ethics and information technology scores showed no interrelationship. However in <Research Hypothesis 7>, the interrelationship between actual scores of information ethics and information technology showed the highest value. This result proposes that information ethics and information technology are actually closely related fields and yet students perceive them as different unrelated areas. In other words, the students seem to have an unclear and inaccurate concept of the fields which makes them unable to correctly classify the areas.

Relationship Among the 7 Classified Field Factors

<Research Hypothesis 7> attempted to discover the correlation among the scores of the 7 classified fields by applying Pearson's correlation as seen in <Table 4>. With the exception of information analysis, most fields show a close relationship.

<Table 4> Relationship Among the 7 Classified Field Factors

Field	Info. Resources	Info. Needs	Info. Search	Info. Analysis	Info. Manage.	Info. Techn.	Info. Ethics
Info. Resources	1						
Info. Needs	.242**	1					
Info. Search	.273**	.191*	1				
Info. Analysis	-	-	-	1			
Info. Manag.	.244**	-	.219*	.231*	1		
Info. Tech.	.397**	.239*	.386**	.251**	.397**	1	
Info. Ethics	.426**	.197*	.281**	-	.436**	.554**	1

* p<.05

** p<.01

The study can draw conclusions as shown below based on the correlation of the fields.

First, information resources, information ethics, and information search fields show a correlation with all other fields with the exception of information analysis. Therefore these fields should be separated into an area apart from the field of information analysis. The field of information analysis shows no correlation with many fields and only a weak relationship with information management and information technology. Thus information analysis should be separately isolated for a more systematic and concentrated educational approach.

Second, information technology is the basis of information literacy because it shows correlation with all fields. Thus fields closely related should be integrated centering around information technology. The highest correlation value was shown between information technology and presentation and information ethics with a value of .554. Then comes the information ethics and information management fields with a correlation showing values of up to .436. Information technology and information management show a result of .397 which is a relatively high value. Therefore, the results indicate that these three fields can be integrated most effectively.

Third, the information management field is correlated to information resources, information search, information technology, and information ethics but has no connections to information needs. Therefore, information management and

information needs should be separated into different fields.

Fourth, the field of information needs showed a slight correlation with information resources, information search, information technology, and information ethics and no relationship with information management. Thus information needs and information management should be designed into two different fields.

Relationship Between the Questions

<Research Hypothesis 8> performed an overview of the correlation of the evaluation questions in order to integrate like questions and exclude invalid questions. Most of the questions showed correlation. The questions were lined up in the order of high to low correlation coefficient and a question analysis was performed to find points in common.

Information technology, information ethics, and information management showed a high level of correlation. Also information resources distribution(information resources 3), a sub-classification of the information resources field, revealed a high correlation level with information ethics, information technology, and information management and therefore should be integrated into these fields.

Therefore the fundamental field of information technology was integrated into the comprehensive field of information technology and presentation to included information technology(technology 1, 2, 3, 4), information management(management 1, 3, 4), information ethics(ethics 1, 4), and information resources distribution(information resources 3). The field of information management was divided into information technology and information ethics areas and integrated. Information management 1, 3, 4 was integrated into the field of information technology and the part of information management 2 was integrated to the information ethics field. Information society(information ethics 1) and ‘netiquette’(information ethics 4) of the information ethics field were classified into the information technology field and data transmission(information ethics 2) and intellectual property rights(information ethics 3) became integrated with citing bibliography(information management 2).

According to the analysis above, the initial 7 fields in the evaluation model design were revised to a total of 6 fields: information resources, information

needs, information search, information analysis, information technology and presentation, and information ethics.

Developing the Information Literacy Evaluation Model

Factors and Procedure in Designing Information Literacy Evaluation

Based on the information literacy evaluation performed so far, the study can present the following evaluation design factors and procedures.

The study presented the evaluation procedure, an integrated process of evaluating information literacy factors. This procedure includes the factor for establishing the object of the study and evaluation factors such as evaluation planning, evaluation object, evaluation content and scope, evaluation method, and evaluation result and application.

Evaluation Guideline for all Competency Levels of Information Literacy

Through the analysis of each area and the questions, the study classified information literacy into 6 fields and established an evaluation guideline for each competency level. Henceforth, this standard can be used as a guideline for information literacy education. The evaluation guideline for all competency levels of information literacy presents both basic and advanced evaluation guidelines for all levels based on the results of the response rate and difficulty of the questions. The study applied two standards in classifying basic and advanced areas. Questions which had a correct answer ratio under 50% and questions which students answered incorrectly and selected the same wrong given choice were classified into the advanced area.

First, the field of information resources can be subdivided into areas such as forms of information sources, application of information sources, and the function of information centers. The basic area includes understanding the characteristics of information sources, comprehending the type of assignment, and basic understanding of the functions of the information center. The advanced area presents topics such as directory characteristics, selecting the appropriate information source for a given assignment, and utilizing the services and education provided by information centers.

Second, the subdirectory of the field of information needs includes required

concept expression, accurate understanding of the required topic, systemization of the information concept, and information request procedure. The basic area requires finding the main theme, classifying required information, understanding the relationship between concepts, and requesting information. Advanced education includes expressing key words with accuracy, requesting the opinion of professionals, understanding upper and lower related concepts, and applying key word search from a given sentence.

Third, information search consists of information access tools, searching a table of contents, web searching, and searching methods. Knowing the proper information access tool, searching table of contents, searching the web using a search engine and bullion search is basically required. Advanced users are expected to understand bibliographical information of foreign sources and overseas database usage, have the ability to run advanced searches, understand how to access foreign gates and find original texts, and apply synonyms, abbreviations, limited fields, and other advanced operations.

Fourth, information analysis deals with evaluation standard of information sources, comparison of old and new knowledge, evaluation of information resources expense and access, and information interpretation. The basic area requires understanding the concept of information reliability, validity, and accuracy, and timeliness evaluation, ability to find the core of the matter through analysis, ability to set a plan for analysis of required information, and get a general understanding of the information given. On the other hand, the advanced sector requires application of evaluation standards in both printed information and web sources, comprehension of the innovative and nonlinear nature of the information analysis process, and understanding of its inefficient aspects, and ability to interpret linked information.

Fifth, information technology and presentation field consists of information society and distribution, information technology access and presentation, information management. The basic area requires knowing the formal and informal distribution channels of information, ability to use fundamental computer programs, and effectively classify and manage information sources. The advanced course includes understanding the difference of information distribution in various fields of study, applying different expressions for the various fields, and knowing how to keep a record of a log on information search and evaluation procedure.

Sixth, the information ethics field requires familiarity with data transmission,

intellectual property rights, and citing bibliography. Basic knowledge requires a clear understanding of data reproduction, comprehension of the problem of plagiarism, and knowledge of bibliographic methods and formulas. Advanced studies consist of understanding the original text transmission rights within the organization, plagiarism on the network, and accurate citation of bibliography.

Integrated Information Literacy Evaluation Model

The study presents a comprehensive program for the systematic improvement of information literacy by designing an evaluation model for information literacy of students and programs that are currently in use and by suggesting information literacy evaluation guidelines.

For this purpose, the study designed an integrated information literacy evaluation model based on the CIPP evaluation model which is a decision-making model commonly applied in the field of education evaluation.

First, a comprehensive and systematic education program on information literacy requires analysis of the demands and needs of information users. The study presents a need analyzing evaluation model which will analyze the demands and requests of information users for the purpose of establishing an information literacy standard appropriate for each organization.

Second, environment evaluation is essential in order to decide on the acceptable conditions and circumstances required in the development of information literacy. Thus the study presents an effective efficiency evaluation model. This evaluation model analyzes the current equipment, status of human resources, and installed related programs in order to shed light on the optimal conditions required in achieving information literacy competency.

Third, the development of an evaluation model for analyzing evaluation programs is essential for the inspection and improvement of current programs.

Fourth, an effectiveness evaluation model is mandatory for the evaluation of achievements made by students in information literacy competency. Achievement concerns not only class work accomplishments but also self-diagnosed development and the satisfaction that students experienced from the improvements made in their information literacy competency.

The four evaluation models above can be summarized according to type of evaluation, purpose, content and scope, method, time span, subject, standard, and result as seen in <Table 5>.

These models can be applied separately in corresponding situations or together as an integrated information literacy evaluation model.

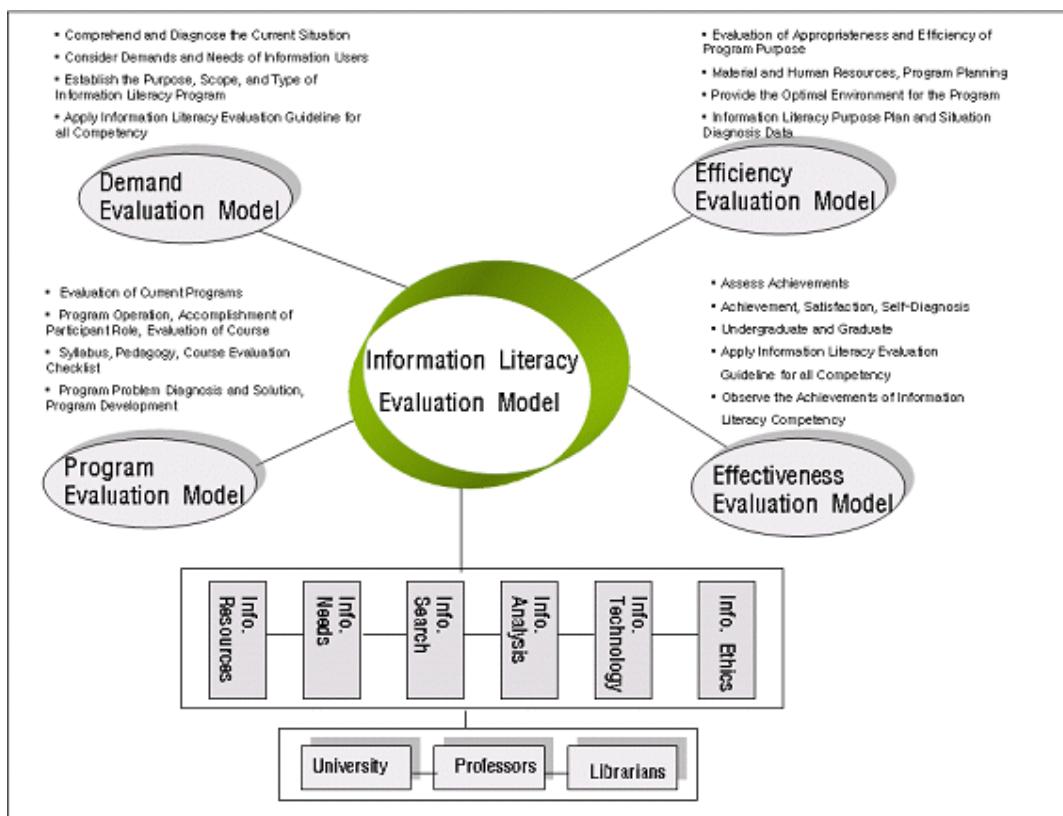
<Table 5> Evaluation Model Analysis

Topic	Demand Evaluation Model	Efficiency Evaluation Model	Program Evaluation Model	Effectiveness Evaluation Model
Evaluation Type	Evaluation of Situation	Evaluation of Input	Evaluation of Procedure	Evaluation of Output
Evaluation Purpose	Evaluation of the Present Situation	Effective Program Goal and Planning	Evaluation of Program	Analyze Achievements
Evaluation Scope and Contents	<p>Realizing the Necessity of Information Literacy Education Program</p> <p>Analyzing the Problems of Information Literacy</p> <p>Understand the Demands of Object Group</p> <p>Compare Current Situation and Necessities</p>	<p>Appropriateness of Program Goal</p> <p>Effectiveness of Strategy</p> <p>Material Resources (Computer, Environment of Classroom, Tools)</p> <p>Human Resources (Qualification and Number of Lecturer)</p> <p>Budget</p> <p>Schedule Plan</p>	<p>Progress of Program</p> <p>Observance of Program</p> <p>Inspection of Program</p> <p>Participant's Role</p> <p>Compare Progress of Class Objective</p> <p>Evaluation of Class</p>	<p>Compare Specific Goals</p> <p>Satisfaction Evaluation</p> <p>Self-evaluation</p> <p>Examination</p> <p>Evaluate Positive and Negative Aspects</p>
Evaluation Method	<p>Discussion Among those Concerned</p> <p>Demand Evaluation Survey</p>	<p>Checklist</p> <p>Classify According to Importance</p>	<p>Outside Observer</p> <p>Observation</p> <p>Interview</p> <p>Survey</p>	<p>Achievement Evaluation</p> <p>Satisfaction Evaluation</p> <p>Survey and Interview</p> <p>Self-evaluation Survey</p> <p>Comparison of Control Group and Experiment Group</p>
Time of Evaluation	Whenever Needed	After Program Planning	<p>Middle of Program</p> <p>After the Program</p>	<p>Before Program</p> <p>Middle of Program</p> <p>After the Program</p> <p>After Graduation</p>
Subject of	University Administrators	Information Literacy Goal	Program	Undergraduates

Evaluation	Professors Librarians Students	Human Resources Material Resources	Pedagogy Comparison with Similar Programs	and Graduates
Evaluation Standard	Evaluation Guideline for all Levels of Information Literacy	Information Literacy Objective Plan Compare the Current Situation and Requirements of Material, Human, and Budget Resources	Syllabus Syllabus of Similar Programs Education Contents and Pedagogy, Satisfaction and Improvement Checklist of Education Evaluation	Evaluation Guideline for all Levels of Information Literacy
Evaluation Result	Establish Information Literacy Program Goal Setting Information Literacy Program Scope Information Literacy Program Type	Budget Support from Finance Department Organize Cooperative Activity Between Groups Create the Optimal Environment for the Program	Diagnose and Solve Problems in the Program Program Development Data for the Future	Achievement of Information Literacy

This study proposes an integrated information literacy evaluation model as shown in <Picture 6>. It requires the cooperation and agreement of the university, professors, and librarians in evaluation design, evaluation tool production, evaluation data collection, evaluation result analysis based on the demands evaluation model, efficiency evaluation model, program evaluation model, and effectiveness evaluation model utilizing the information literacy evaluation guidelines for all competency levels.

Continual demands and needs evaluation, efficiency evaluation, programs evaluation, and effectiveness evaluation will pave the foundation for information literacy in obtaining the status as an independent educational field in the university curriculum and act as an effective means to improve and develop information literacy of undergraduate students.



<Picture 6> Integrated Information Literacy Evaluation Model

Conclusion and Proposal

This study aimed to create a standard and scope for information literacy, develop a model of all fields of information literacy, evaluate the information literacy of undergraduates, and design an integrated evaluation model for information literacy.

The study revealed that the six fields information resources, information needs, information search, information analysis, information technology and presentation, and information ethics constitute information literacy and presented an evaluation guideline for all competency levels by analyzing the correlation between these fields. Based on these results, an integrated information literacy evaluation model was proposed employing demands and needs evaluation, efficiency evaluation, programs evaluation, and effectiveness evaluation used for drawing out a conclusive agreement among those concerned.

This study revealed the fact that information literacy is not just a simple

application of information technology or the ability to use the library but rather the fundamentals of university education. It also paved the foundation for the systematic education and evaluation system for all fields. The following applications are also proposed.

First, students should be able to personally evaluate their information literacy competency, comprehend their shortcomings in each field, and improve their competency by following the education program recommended by the evaluation guideline.

Second, professors and librarians are able to apply a comprehensive evaluation standard and procedure in the development of information literacy programs based on the information literacy standards and evaluation model.

Third, the university should perceive the information literacy competency of their students and thus thoroughly examine the demands of the departments and students for information literacy education. Thus 'accessing library information' courses and 'library education and use' programs promoted by the university library should be examined and provided.

This way, the university will be able to realize the importance of information literacy in the research and teaching process and will hereby develop educational programs based on the continual evaluation of the competency of their students in the effort to create information knowledgeable intellectuals in the information society.

The study proposes that in the future, library and information studies research on information literacy education and evaluation should continue based on theory regarding evaluation theory, evaluation methods, and evaluation tools. Also the scope and concept of information literacy needs to be established in all subject areas and at the same time continual evaluation research needs to be performed. Finally, the researches on information literacy should be performed not only in the university and educational sectors but should also be pursued in a manner applicable to the industrial field and business practices.

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