

Digital Library Evaluation Application Based on Combination of CSE-UCLA with Weighted Product

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Abstract: This evaluation model could be used to evaluate digital library services in universities. This model was a fusion of evaluation model of education, CSE-UCLA Model with method of decision supporting system in the field of informatics, weighted product. Through the use of the both models combination, we could obtain a comprehensive evaluation result gained from 5 evaluation components of CSE-UCLA Model such as: system assessment, program planning, program implementation, program improvement and program certification, also it was obtained accurate calculation results showed the highest down to the lowest value on any CSE-UCLA evaluation component through a calculation process using a weighted product method involving 10 evaluators in conducting a test/simulation of the method.

Key words: Digital library, evaluation, application, CSE-UCLA, weighted product, improvement

INTRODUCTION

The role of digital libraries as one of the educational services that facilitate the learning process at a university was very important. This was because all the learning activities in this era of information technology require materials/teaching resources in digital format that was easily accessible from anywhere and not limited by time. The statement was in accordance with the opinion of (Hikmawan, 2015) which stated that the digital library gives facility for users to search the source of information whenever they want without requiring too much time.

Specifically, the existence of digital library in a university also helps library management to organize all matters related to digital collections management in libraries from collecting the collections, collecting inventory, cataloging collections until tracing the collection by users. This was related to Ruslan's statement (Ruslan, 2016) that digital libraries will facilitate all digital format collections, management of library membership data inventorying and cataloging collection in digital format, checking the user statistics, circulation services and tracking the digital collections. The importance of digital library role in supporting learning process in a university, then in general all universities needed to provide digital library services. In particular, some universities in Bali Province had also, provided digital library services but there were some universities that were still not optimal in implementing the management of digital library services. As proof that the

digital library services was not optimal in universities in Bali could be shown from the results of research conducted by Divayana (2016) related to the evaluation of the quality of digital library services in terms of the program implementation components which generated the result of 57.40% and it was categorized in enough category. This percentage indicated that the implementation of digital libraries was not optimal yet in the university, especially on the aspects of socialization/introduction of applications and tools supporting digital libraries. It made the users did not understand in operating the system.

Sometimes, digital library services unoptimally was often caused by difficulties in accessing or downloading digital collections. This was in accordance with the opinion offered by Hendro Wicaksono summarized in research conducted by Supsilani (2006) stated that most university digital library management in Indonesia were still afraid or not willing to give/share for free digital collection to the users/public, so that, digital collections available online at digital libraries were becoming more difficult to be accessed/retrieved when compared to printed-collections that were physically presented in the library. Another problem that was also found in the implementation of digital library services in universities was related to the expensive cost in providing the supporting device for managing digital libraries. This was also in accordance with the statement proposed by Supsilani (2006) which stated that in the implementation of digital libraries in the university library, it required high

technology with a relatively expensive price. From some problems in the implementation of digital library services in a university, it was necessary to do an evaluation in order to know the constraints that occurred, so, it was easier to determine the recommendation or solutions to the constraints. These recommendations could be used as a consideration in decision making in order to sustain digital library in universities. Supsilani (2006) which stated that in the implementation of digital libraries in the university library, it required high technology with a relatively expensive price. From some problems in the implementation of digital library services in a university, it was necessary to do an evaluation in order to know the constraints that occurred, so, it was easier to determine the recommendation or solutions to the constraints. These recommendations could be used as a consideration in decision making in order to sustain digital library in universities.

In general evaluation is an activity to obtain recommendations based on the results of accurate data processing, so that, it can be used as a consideration in generating a right decision for the implementation of an object/program/service. From the definition of the evaluation in essence also related to some definitions from previous researchers including: Divayana (2017a-c), Arnyana *et al.* (2017a-f), Suandi *et al.* (2017), Divayana *et al.* (2017), Mahayukti *et al.* (2018), Janga and Malaji (2016), Issicaba and Coelho (2016), Saeh *et al.* (2016), Salman *et al.*, 2017), Divayana and Sanjaya (2017) who conducted research related to the evaluation which states that an evaluation is the activity of collecting, processing and analyzing the data into an information used as a recommendation in making the right decision on the object/program studied.

Evaluation models that generally could be used to evaluate digital library services in universities include: CIPP evaluation model, goal oriented evaluation model, free goal oriented model and CSE-UCLA evaluation model. The most suitable model used to evaluate digital library as one of service program in university that was CSE-UCLA evaluation model because the model had one unique characteristic that was not exist in other evaluation model, in the terms of program implementation component which able to give initial knowledge/socialization to users of digital libraries related to the introduction about available features and supporting facilities in establishing digital libraries. This was related to the statement of Divayana (2017a-c) which essentially stated that the CSE-UCLA Model was well-suited to evaluate services program, one of them was digital library. Divayana and Sugiharni (2016) stated that "the CSE-UCLA Model is an evaluation model that has five evaluation dimensions including system assessment that provides information about the system condition, program planning that helps the selection of particular programs

to fulfill the program requirement, the program implementation that provides information to introduce the programs, program improvement that provides information about program functions/performance, program certification that provides information about the benefits of the programs". CSE-UCLA evaluation model is an evaluation model that has 5 dimensions of evaluation including: system assessment, program planning, program implementation, program improvement and program certification which are very appropriate to be used to evaluate service programs that help human life (Ardana *et al.*, 2017). Suryanto *et al.*, (2013) stated that the evaluation model of CSE-UCLA developed by Alkin has 5 evaluation stages, among others: system assessment, program planning, program implementation, program improvement and program certification. According to Kurniawan (2013), "CSE-UCLA Model evaluation was accomplished in several phases, namely: system assessment, program planning, program implementation, program improvement and program certification". CSE-UCLA is one evaluation model that has five evaluation components: system assessment, program planning, program implementation, program improvement and program certification that is suitable to evaluate service programs both generally in education fields or specifically on other fields, so that, the quality/effectiveness of these programs can run optimally (Divayana *et al.*, 2017a-f; Jampel *et al.*, 2017). From those some opinions, it could be concluded that CSE-UCLA is a very suitable evaluation model used to evaluate education service programs such as: digital libraries, e-Learning, blended learning, e-Teaching and others based on review of 5 evaluation components including: system assessment, program planning, program implementation, program improvement and program certification.

However, the weaknesses that were still found in this CSE-UCLA Model was this model was not able to show the evaluation results ranging from the highest down to the lowest value of evaluation component, it made difficulties occurred to determine the actual aspects precisely and accurately that needed to get recommendations for improvement. Based on the weaknesses found in the CSE-UCLA Model, a breakthrough was found to use a combination of CSE-UCLA Model concepts with the weighted product method. This combination could perform accurate calculations in obtaining the highest value to the lowest for each component of the evaluation, making it easier to determine the evaluation aspects that need to be recommended to get the focus of attention to establish optimal digital library service.

This research was developed based on the weaknesses shown in the research roadmap that had been conducted by Divayana, since, 2016 until 2017 in which in

Divayana (2016) the results of research conducted by Divayana and Sanjaya (2017) only limited to display the percentage of quality of the implementation of digital library services in terms of components evaluation of the CSE-UCLA Model but had not been able to show the highest down to lowest values in each component of its evaluation. Similar weaknesses were also, found by Divayana (2017a-c)'s research which was only able to show the percentage of digital library service quality in terms of system assessment, program planning, program implementation, program improvement and program certification component.

This research was also related to several researches including: research conducted by Sasongko and Hartanto (2015) had similarities to the research in this study in terms of utilization of CSE-UCLA Model to evaluate a program. The difference lied in the object being evaluated in which the object of evaluation performed by Jampel *et al.* (2017) was related to computer learning and program certification, meanwhile the evaluation object that was focussed on this research study was related to digital library service; research conducted by Divayana *et al.* (2017) had similarities to this study related to the objects evaluated, i.e., digital libraries, while the difference lied in the evaluation model used; The research conducted by Ardana *et al.* (2017) had similarities with this study related to the use of CSE-UCLA Model in evaluating the object being studied whereas the difference lied in the object being evaluated in which in this study the object evaluated was digital library while in research conducted by Ardana, Ariawan and Divayana the object studied was BLCS Model (Bruner, Local Culture, Scaffolding) in mathematics teaching; The research undertaken by Divayana *et al.* had similarities with the study concerning the CSE-UCLA Model in evaluating the object being studied whereas the difference lied in the object being evaluated in which the object evaluated in the research was related to the library digital, meanwhile in research conducted by Divayana *et al.* (2017a-c) related to blended learning.

Based on the existing problems, background research and related research, the main objectives of this study were: to display of user interface design of evaluation application based on CSE-UCLA modification with weighted product, to explain the design of digital library service evaluation model based on CSE-UCLA-weighted product to explain the simulation of the calculation process of weighted product method in determining the highest to the lowest value on each evaluation component.

MATERIALS AND METHODS

Explaining research chronological including research design, research procedure (in the form of algorithms,

Table 1: Converting percentage of quality into five scales

Level of effectiveness (%)	Category
90-100	Excellent
80-89	Good
65-79	Moderate
55-64	Less
0-54	Poor

pseudocode or other), how to test and data acquisition (Hikmawan, 2015; Ruslan, 2016; Divayana, 2016). The description of the course of research should be supported references, so, the explanation can be accepted scientifically (Ruslan, 2016; Supsilioni, 2006).

The research method that could be used to conduct this evaluation research was evaluative study. The research design that could be used was the design of CSE-UCLA evaluation model. Subjects involved in simulating the calculation of weighted product method was 10 evaluators. The technique used in determining the subject of the research was purposive sampling, because this technique was very appropriate in getting accurate information from parties having interests, experience and knowledge about the object being evaluated (in this case about digital library). The method used in data collection was through the questionnaires and interviews. Data analysis techniques that could be used were quantitative descriptive analysis techniques by analyzing the percentage of the quality of each evaluation component such as: percentage of system assessment quality, percentage of program planning quality, percentage of program implementation quality, percentage of program improvement quality and percentage of program certification quality. The formula used to calculate the percentage of quality for each component was as follows.

$$\text{Percentage} = \frac{\sum \left(\frac{\text{Answer} \times \text{weight}}{\text{of each answer}} \right)}{n \times \text{Highest weight}} \times 100\% \quad (1)$$

Where:

Σ = Amount

n = Total number of items

In facilitating the understanding of the quality percentage of each component, the results can be converted to the scale shown in Table 1.

RESULTS AND DISCUSSION

Referring to the main objectives of this study, there were several outcomes that could be showed including: user interface design of evaluation application based on CSE-UCLA modification with weighted product design of CSE-UCLA based evaluation model for digital library



The login form is a window titled "Login" with a blue header bar. It contains two input fields: "Username" and "Password". Below the password field is a "Login" button. The window has standard Windows-style window controls (minimize, maximize, close) in the top right corner.

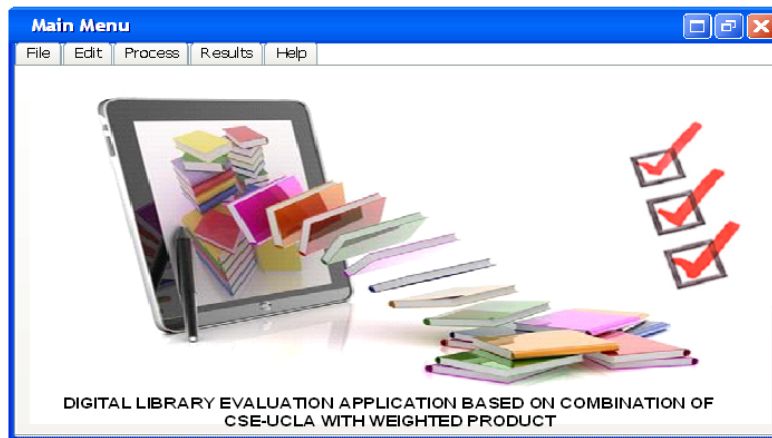
Fig. 1: Design of login form

service which was combined with weighted product; and trial/simulation of weighted product method calculation (Fig. 1 and 2).

User interface design of evaluation application. Design of evaluation model of digital library services based On cse-ucla modification with weighted product (Fig. 3 and 4). The design form of CSE-UCLA Model modified/combined with weighted product could be seen in Fig. 5 (Divayana and Sugiharni, 2016).

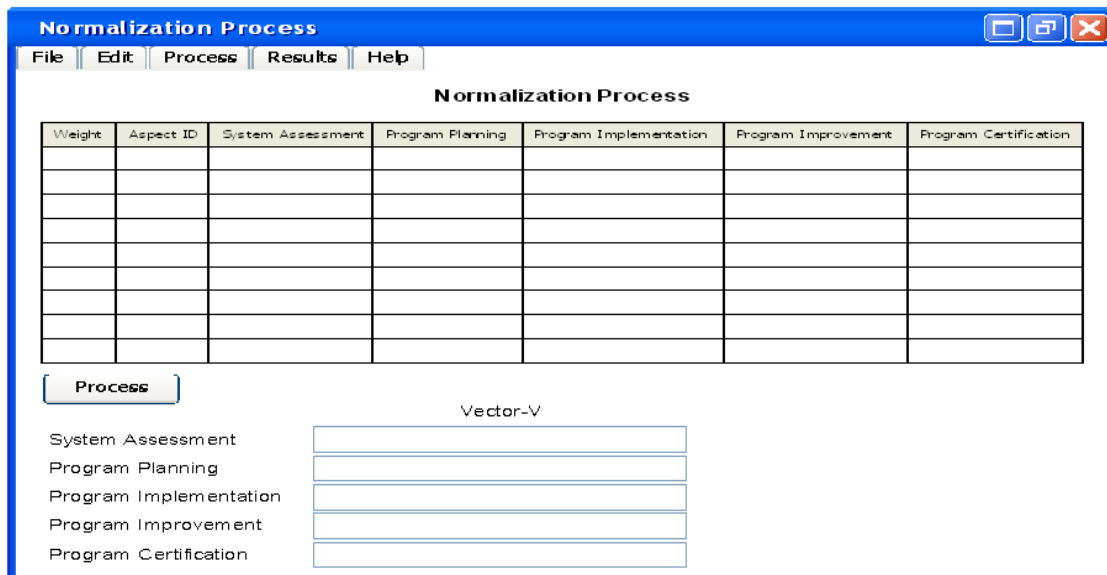
Simulation of weighted product calculation method:

Simulation of the utilization of weighted product method to determine the result of highest to lowest score on each evaluation component involving 10 respondents,



The main menu form is a window titled "Main Menu" with a blue header bar. It has a menu bar with "File", "Edit", "Process", "Results", and "Help". The main area features a graphic of a tablet displaying a stack of colorful books, with several checkmarks floating to the right. Below the graphic, the text reads: "DIGITAL LIBRARY EVALUATION APPLICATION BASED ON COMBINATION OF CSE-UCLA WITH WEIGHTED PRODUCT".

Fig. 2: Design of main menu form



The normalization process form is a window titled "Normalization Process" with a blue header bar. It has a menu bar with "File", "Edit", "Process", "Results", and "Help". The main area contains a table with the following columns: "Weight", "Aspect ID", "System Assessment", "Program Planning", "Program Implementation", "Program Improvement", and "Program Certification". Below the table, there is a "Process" button and a section labeled "Vector-V" with five input fields corresponding to the aspects: "System Assessment", "Program Planning", "Program Implementation", "Program Improvement", and "Program Certification".

Weight	Aspect ID	System Assessment	Program Planning	Program Implementation	Program Improvement	Program Certification

Fig. 3: Design of normalization form

Fig. 4: Design of evaluation results form

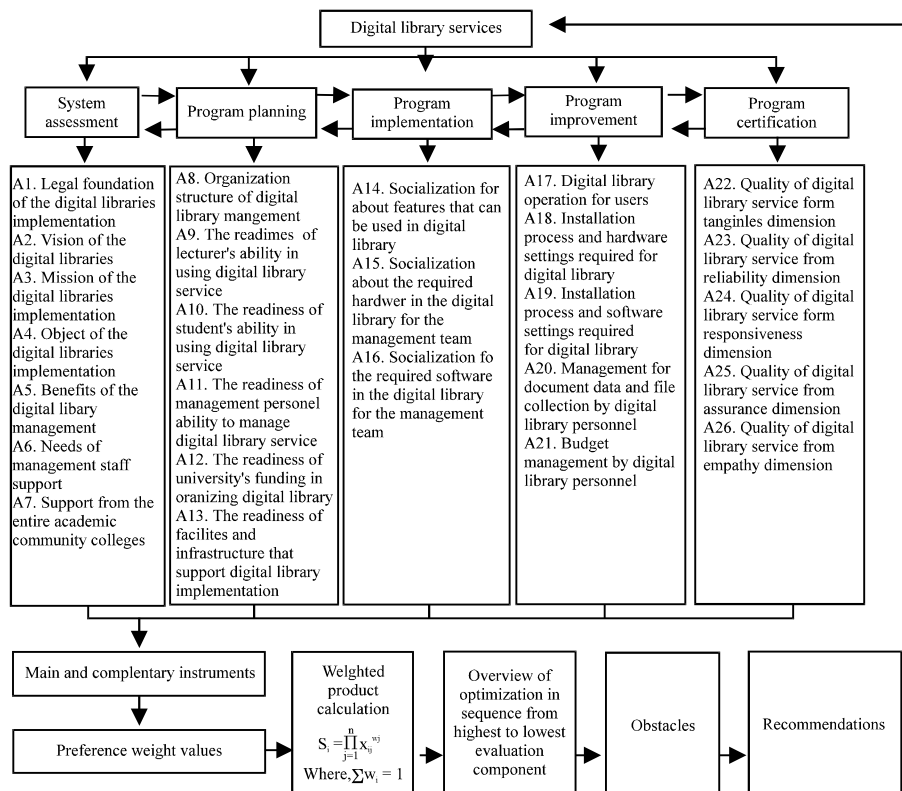


Fig. 5: Design of evaluation model of digital library services based on CSE-UCLA modification with weighted product

i.e., 5 education evaluators and 5 informatics evaluators. The steps taken in this simulation process were.

Considering the quality standard of digital library service: The quality standard of digital library services in universities was determined by educational experts,

Table 2: Quality Standard of Digital Library Service at Computer Universities in Bali

Evaluation components/ evaluation aspects code	Quality standard (%)
System assessment	
A1	90.00
A2	88.00
A3	88.00
A4	88.00
A5	88.00
A6	88.00
A7	88.00
Program planning	
A8	90.00
A9	82.00
A10	84.00
A11	86.00
A12	84.00
A13	84.00
Program implementation	
A14	82.00
A15	82.00
A16	82.00
Program improvement	
A17	84.00
A18	84.00
A19	86.00
A20	88.00
A21	88.00
Program certification	
A22	86.00
A23	86.00
A24	86.00
A25	86.00
A26	86.00

librarians and informatics experts. The quality standard of digital library services, especially in computer universities in Bali was shown in Table 2.

Filling the questionnaire: The data result of filling the questionnaire conducted by 10 evaluators could be presented in following Table 3.

Determining the weight of decision makers: Every aspect of evaluation needed to be given the weight of the decision maker. The total weight of all aspects if must sum to 1. To obtain the value of 1, it was necessary process to improve the weight by dividing the weight of decision-makers on one aspect with the total weight of all aspects given by decision makers. The weight of the decision maker of each aspect and the result of weight improvement could be presented in Table 4.

Normalization process: The normalization process was conducted to obtain the preference value on each evaluation component. Based on the data presented in Table 3, it could be created data recapitulation for the normalization process which could be presented in Table 5.

Table 3: Results data of filling questionnaire by respondents

Evaluation components/ Aspect code		Respondents										Σ	Evaluation aspect	Average of quality (%)
		Education evaluators					Informatics evaluators							
		E1	E2	E3	E4	E5	E6	E7	E8	E9	E10			
System assessment														
A1	1	4	5	5	4	5	4	5	4	5	4	45	45.50	91.00
	2	4	4	5	5	4	5	4	5	5	5	46		
A2	3	4	5	4	5	4	4	5	4	4	4	43	45.67	91.34
	4	5	5	5	4	5	5	5	4	5	4	47		
A3	5	5	5	5	5	5	4	5	4	4	5	47	45.00	90.00
	6	4	4	5	5	4	4	4	5	4	4	43		
A4	7	5	4	5	4	5	4	5	5	5	4	46	44.67	89.34
	8	5	4	5	4	5	5	5	4	5	4	46		
A5	9	4	5	5	4	5	4	4	5	4	5	45	45.67	91.34
	10	4	5	5	5	4	5	5	4	5	4	46		
A6	11	4	5	4	4	4	4	4	5	4	5	43	44.50	89.00
	12	5	4	5	5	5	5	5	5	4	4	47		
A7	13	5	5	4	4	5	4	4	5	5	5	46	45.00	90.00
	14	4	4	5	5	4	5	4	4	5	4	44		
A8	15	4	5	4	4	4	4	5	5	4	5	44	46.00	92.00
	16	4	4	5	5	4	5	4	5	5	4	45		
A9	17	5	5	4	4	5	5	5	4	4	4	45	42.50	85.00
	18	5	4	5	4	5	5	4	5	4	4	45		
A10	19	5	5	5	5	4	4	5	4	5	4	46	45.00	90.00
	20	5	4	5	4	4	5	5	5	5	4	46		
A11	21	4	4	4	4	4	5	4	4	4	5	42	43.00	86.00
	22	3	4	5	4	5	5	4	4	5	4	43		
A12	23	5	5	4	4	5	4	4	5	4	5	45	43.56	87.12
	24	4	5	5	5	4	5	5	4	4	4	45		
Program planning														
A13	25	5	5	4	4	4	4	5	5	4	5	45	43.00	86.00
	26	4	5	4	4	4	5	5	4	5	5	45		
A14	27	4	3	4	4	5	4	4	5	4	4	41	43.56	87.12
	28	4	3	5	4	4	5	4	5	4	5	43		
A15	29	5	4	4	4	5	5	5	4	5	4	45	43.56	87.12
	30	3	4	4	5	4	4	4	5	4	4	41		
A16	31	5	5	5	4	4	5	5	4	5	5	47	43.56	87.12
	32	4	5	5	5	4	5	5	4	5	5	47		

Table 3: Continue 3:

Evaluation components/ Aspect code		Respondents										Σ	Evaluation aspect	Average of quality (%)
		Education evaluators					Informatics evaluators							
		Items	E1	E2	E3	E4	E5	E6	E7	E8	E9			
A14	32	4	3	5	4	4	4	4	4	5	4	41	35.00	70.00
	33	4	5	4	5	5	5	5	5	5	4	47		
	34	4	3	5	4	4	5	5	4	4	4	42		
	35	4	4	4	4	4	4	4	5	5	5	43		
	36	3	4	4	5	4	5	5	5	4	4	43		
	37	5	4	5	4	5	5	4	5	4	5	46		
	38	4	4	4	5	4	4	4	5	4	4	42		
	39	4	3	4	3	4	3	3	4	4	4	36		
	40	3	4	3	3	4	4	4	3	3	3	34		
	Program implementation													
A15	41	3	3	4	3	4	4	4	4	4	3	36	36.50	73.00
A16	42	4	3	3	4	4	4	4	3	4	4	37	36.00	72.00
	43	3	4	4	4	3	4	3	4	3	3	35		
A17	44	3	3	4	3	4	4	4	4	4	4	37	44.40	88.80
	45	4	5	4	5	4	5	5	4	4	4	44		
A18	46	5	5	5	4	4	4	4	5	5	4	45	44.00	88.00
	47	5	5	4	4	5	5	4	4	4	5	45		
	48	4	4	4	5	4	4	4	5	4	4	42		
	49	5	4	5	5	4	5	4	5	5	4	46		
	50	5	5	4	4	4	4	4	4	4	4	42		
	51	5	4	4	4	4	5	5	5	5	5	46		
	Program improvement													
A19	52	5	4	4	4	4	4	5	5	4	5	44	44.50	89.00
A20	53	5	5	4	4	4	5	5	5	4	4	45	46.00	92.00
	54	5	5	4	4	5	5	5	4	5	5	47		
A21	55	4	4	5	5	5	4	5	5	4	4	45	45.50	91.00
	56	5	5	4	4	5	5	5	5	4	5	47		
	57	5	4	5	5	4	5	4	4	4	5	45		
	58	5	5	4	5	4	4	5	5	5	4	46		
	59	4	5	5	4	5	5	4	5	4	5	46		
	60	5	5	4	5	4	5	5	4	4	4	45		
	Program certification													
A22	61	4	4	5	4	4	4	4	5	5	5	44	45.00	90.00
A23	62	5	4	4	4	5	5	5	5	4	4	45	44.50	89.00
	63	4	5	5	5	4	4	4	5	5	5	46		
	64	4	4	4	4	4	5	5	4	4	4	42		
A24	65	5	5	5	5	5	4	4	5	5	4	47	46.00	92.00
	66	5	5	5	4	4	5	5	5	5	4	47		
A25	67	5	5	4	5	5	4	4	4	4	5	45	46.00	92.00
	68	5	4	5	4	5	5	5	5	5	4	47		
A26	69	4	4	4	5	5	5	4	4	5	5	45	45.00	90.00
	70	4	5	4	4	5	5	5	5	4	5	46		
	71	5	4	5	5	4	4	4	4	5	4	44		

Table 4: Weighted decision makers for each evaluation model aspect of digital library service based on CSE-UCLA modification with weighted product

Aspects code	The weight of the decision maker	Results of improvement weight
A1	4	0.034
A2	4	0.034
A3	4	0.034
A4	4	0.034
A5	4	0.034
A6	5	0.043
A7	5	0.043
A8	5	0.043
A9	4	0.034
A10	4	0.034
A11	4	0.034
A12	4	0.034
A13	4	0.034
A14	5	0.043
A15	4	0.034
A16	4	0.034

Continue 4:

Aspects code	The weight of the decision maker	Results of improvement weight
A17	4	0.034
A18	5	0.043
A19	4	0.034
A20	5	0.043
A21	5	0.043
A22	5	0.043
A23	5	0.043
A24	5	0.043
A25	5	0.043
A26	5	0.043
Total	116	1

For example: to get the result of weight improvement on aspect code A1 aspect, it was: $4/116 = 0.034$ and so on the same calculation was conducted to the aspect code A26 that obtained the result of weight improvement 0.043

Referring to Table 4 and 5 which had been presented above, it could be generated normalization

Table 5: Data recapitulation for normalization process

Evaluation components/ Evaluation aspects code	System assessment	Program planning	Program implementation	Program improvement	Program certification
A1	45.50	10.00	10.00	10.00	10.00
A2	45.67	10.00	10.00	10.00	10.00
A3	45.00	10.00	10.00	10.00	10.00
A4	44.67	10.00	10.00	10.00	10.00
A5	45.67	10.00	10.00	10.00	10.00
A6	44.50	10.00	10.00	10.00	10.00
A7	45.00	10.00	10.00	10.00	10.00
A8	10.00	46.00	10.00	10.00	10.00
A9	10.00	42.50	10.00	10.00	10.00
A10	10.00	45.00	10.00	10.00	10.00
A11	10.00	45.00	10.00	10.00	10.00
A12	10.00	43.00	10.00	10.00	10.00
A13	10.00	43.56	10.00	10.00	10.00
A14	10.00	10.00	35.00	10.00	10.00
A15	10.00	10.00	36.50	10.00	10.00
A16	10.00	10.00	36.00	10.00	10.00
A17	10.00	10.00	44.40	10.00	10.00
A18	10.00	10.00	10.00	44.00	10.00
A19	10.00	10.00	10.00	44.50	10.00
A20	10.00	10.00	10.00	46.00	10.00
A21	10.00	10.00	10.00	45.50	10.00
A22	10.00	10.00	10.00	10.00	45.00
A23	10.00	10.00	10.00	10.00	44.50
A24	10.00	10.00	10.00	10.00	46.00
A25	10.00	10.00	10.00	10.00	46.00
A26	10.00	10.00	10.00	10.00	45.00

All values of 10.00 were sourced from the average number of respondents who did not provide answers on each evaluation aspect while the other values were derived from the average evaluation aspect presented earlier in Table 3

Process with calculation using formula in Eq. 1. The calculation of the normalization process could be explained as follows:

$$S_1 = (45.50^{0.034}) * (45.67^{0.034}) * (45.00^{0.034}) * (44.67^{0.034}) * (45.67^{0.034}) * (44.50^{0.043}) * (45.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.043}) * (10.00^{0.034}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) = 14.438$$

$$S_2 = (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) = 13.476$$

$$S_3 = (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) = 11.897$$

$$S_4 = (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) = 12.546$$

$$S_5 = (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.043}) = 13.476$$

$$\begin{aligned}
 & (10.00^{0.043}) * (10.00^{0.043}) * (10.00^{0.034}) * \\
 & (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.034}) * \\
 & (10.00^{0.034}) * (10.00^{0.043}) * (10.00^{0.034}) * \\
 & (10.00^{0.034}) * (10.00^{0.034}) * (10.00^{0.043}) * \\
 & (10.00^{0.034}) * (10.00^{0.043}) * (10.00^{0.043}) * \\
 & (45.00^{0.043}) * (44.50^{0.043}) * (46.00^{0.043}) * \\
 & (46.00^{0.043}) * (45.00^{0.043}) = 13.585
 \end{aligned}$$

Ranking process each evaluation components: The calculation of the ranking process could be explained as follows:

$$\begin{aligned}
 V_1 &= \frac{S_1}{S_1 + S_2 + S_3 + S_4 + S_5} \\
 V_1 &= \frac{14.438}{14.438 + 13.476 + 11.897 + 12.546 + 13.585} = 0.219 \\
 V_2 &= \frac{S_2}{S_1 + S_2 + S_3 + S_4 + S_5} \\
 V_2 &= \frac{13.476}{14.438 + 13.476 + 11.897 + 12.546 + 13.585} = 0.204 \\
 V_3 &= \frac{S_3}{S_1 + S_2 + S_3 + S_4 + S_5} \\
 V_3 &= \frac{11.897}{14.438 + 13.476 + 11.897 + 12.546 + 13.585} = 0.180 \\
 V_4 &= \frac{S_4}{S_1 + S_2 + S_3 + S_4 + S_5} \\
 V_4 &= \frac{12.546}{14.438 + 13.476 + 11.897 + 12.546 + 13.585} = 0.190 \\
 V_5 &= \frac{S_5}{S_1 + S_2 + S_3 + S_4 + S_5} \\
 V_5 &= \frac{13.585}{14.438 + 13.476 + 11.897 + 12.546 + 13.585} = 0.206
 \end{aligned}$$

From the result of the Vector-V value mentioned above, it could be determined the ranking of each evaluation component from the highest to the lowest value which could be presented in Table 6.

Referring to the results of this study, then there were several things that needed to be discussed in detail related to the design of the model and the simulation results of the calculation of weighted product method. The design of evaluation model for digital library service as shown in Fig. 1 was used as a general description in evaluating digital library services in universities, especially in this study focused at the computer universities in Bali. The evaluation model of digital library service based on CSE-UCLA-weighted product consisted of 5 evaluation components that must be passed step by step. The five components of the

Table 6: Ranking for each evaluation component

Evaluation components	Vector-V values	Rank
System assessment	0.219	1
Program planning	0.204	3
Program implementation	0.180	5
Program improvement	0.190	4
Program certification	0.206	2

evaluation, among others: system assessment, program planning, program implementation, program improvement and program certification. Each evaluation component had evaluation aspects. In the system assessment component there were 7 evaluation aspects with codes A1-A7. In program planning component there were 6 evaluation aspects with codes A8-A13. In the program implementation components there were 3 aspects of evaluation with the code A14-A16. In the program improvement component there were 5 evaluation aspects with codes A17-A21. Last in the program certification component there were 5 evaluation aspects with codes A22-A26. All aspects of the evaluation were proposed into the main and complementary instruments as a tool for measuring the quality of digital library services. The main instruments were questionnaires and complementary instruments in the form of interview guidelines. The results of the measurement of the questionnaire were used as data for the process of calculating the weighted product method in determining the highest to the lowest value on each evaluation component. By obtaining the lowest value on each evaluation component using weighted product method, it could be determined the aspects that become obstacle in digital library service. The interview results was used as a basis in providing recommendations to overcome obstacles, so that, later digital library services could be implemented more optimally.

Based on the percentage result of the quality for each evaluation aspect shown in Table 3 and compared with Table 2, it could be explained that in aspect with code A1 (legality basis for the digital libraries implementation) with value 91.00% had exceeded standard value predetermined in Table 2 that was of 90.00%, so that, aspect was still maintained its quality. On the aspect with the code of A2 (vision of the digital libraries implementation) with value of 91.34% had exceeded the predefined standard value of 88.00%, so that, aspect was still maintained its quality. In aspect with the code of A3 (mission of the digital libraries implementation) with value 90.00% had exceeded the standard value that had been set at 88.00%, so that, aspect was still maintained its quality. In aspect of the code A4 (objectives of the digital libraries implementation)

with value 89.34% had exceeded the predefined standard value of 88.00%, so that, aspect was still maintained its quality. In aspect with code A5 (benefits of the digital libraries implementation), the value of 91.34% had exceeded the predetermined standard value of 88.00%, so that, aspect was maintained quality. In aspect with code A6 (needs of digital library management staff support) with value 89.00% had exceeded the standard value that had been set at 88.00%, so that, aspect was still maintained its quality. In the aspect with the A7 code (support from the academic community in the universities) with a value of 90.00% had exceeded the predefined standard value of 88.00%, so that, aspect was still maintained its quality. In the aspect with the code A8 (organization structure of digital library management) with a value of 92.00% had exceeded the standard value set by 90.00%, so that, aspect was still maintained its quality. In aspect with the code A9 (the readiness of lecturers' ability in using digital library service) with value 85.00% had exceeded the standard value set at 82.00%, so that, aspect was still maintained its quality. In aspect with code A10 (the readiness of students' ability in using digital library service) with value 90.00% had exceeded standard value which had been set equal to 84.00%, so that, aspect was still maintained its quality. In aspect with code A11 (the readiness of management of personnel ability to manage digital library service) with value 90.00% had exceeded standard value which had been set equal to 86.00%, so that, aspect was still maintained its quality. In aspect with code A12 (the readiness of university's funding in organizing digital library) with value of 86.00% had exceeded the standard value set at 84.00%, so that, aspect was still maintained its quality. In the aspect with the code A13 (the readiness of facilities and infrastructure that support digital library implementation) with the value of 87.12% had exceeded the standard value set at 84.00%, so that, aspect was still maintained its quality.

In the aspect with the code A14 (socialization for users about features that can be used in digital library) with value of 70.00% was less than the predefined standard value of 82.00%, so that, aspect needed to be given improvement recommendation to improve the quality of digital library service. In the aspect with the code A15 (socialization about the required hardware in the digital library for the management team) with a value of 73.00% was less than the predefined standard value of 82.00%, so that, aspect needed to be given improvement recommendations to improve the quality of digital library services. In the aspect with the code A16

(socialization of the required software in the digital library for the management team) with a value of 72.00% was less than the predefined standard value of 82.00%, so that, aspect needed to be given improvement recommendations to improve the quality of digital library services. In the aspect with code A17 (digital library operation for users) with 88.80% value had exceeded the standard value set by 84.00%, so that, aspect was still maintained its quality. In aspect with code A18 (installation process and hardware settings required for digital library) the value of 88.00% had exceeded the standard value set at 84.00%, so that, aspect was still maintained its quality. In aspect with code A19 (installation process and software settings required for digital library) with value 89.00% had exceeded standard value which had been set equal to 86.00%, so that, aspect was still maintained its quality. In the aspect with the code A20 (management for document data and collection files by digital library personnel) with a value of 92.00% had exceeded the predefined standard value of 88.00%, so that, aspect was still maintained its quality. In the aspect with code A21 (budget management by digital library personnel) with a value of 91.00% had exceeded the predefined standard value of 88.00%, so that, aspect was still maintained its quality.

In aspect with code A22 (quality of digital library service of tangibles dimension) with value 90.00% had exceeded standard value which had been set equal to 86.00%, so that, aspect was still maintained its quality. In aspect with code A23 (quality of digital library service of reliability dimension) with value 89.00% had exceeded standard value which had been set equal to 86.00%, so that, aspect was still maintained its quality. In aspect with code A24 (quality of digital library service from responsiveness dimension) with value 92.00% had exceeded standard value which had been set equal to 86.00%, so that, aspect was still maintained its quality. In aspect with code A25 (quality of digital library service of assurance dimension) with value 92.00% had exceeded standard value which had been set equal to 86.00%, so that, aspect was still maintained its quality. In aspect with code A26 (quality of digital library service from empathy dimension) with value 90.00% had exceeded standard value which had been set equal to 86.00%, so that, aspect was still maintained its quality.

Based on the results of the vector-V ranking that had been shown in Table 6 it could be explained that the evaluation component that got the highest score was the system assessment. This could be interpreted that the aspects contained in the assessment system components

were running well and should still be maintained its quality. On the other hand, the quality of each aspect was feasible to be maintained because it was strengthened by the percentage of quality of each aspect on the assessment component getting the value exceeding the predefined quality standard presented in Table 2.

The evaluation component that got the lowest score was the program implementation component. This was because the result of vector-V ranking showed the smallest value and the percentage of quality of each aspect of the program implementation component still got smaller value than the predefined quality standard in Table 2. Therefore, the aspects of the program implementation components needed to be improved in accordance with the recommendations given in order to improve the quality of digital library services. Based on the result of the percentage of quality of each aspect of the program implementation components shown in Table 3, it was shown that the aspect which got the lowest score was the aspect A 14 with the value 70% (socialization for users about features that can be used in digital library). Based on this result, there were some points on the aspect that became the focus of improvement including: the availability of clear information for users about the features/facilities in the digital library program by conducting socialization through the university web, the availability of clear information for users about features/facilities in the digital library program by socializing through university library guidance books.

This research was the answer/solution to the weaknesses shown in research conducted by Divayana until Issicaba and Coelho (2016) which were only able to show the percentage of quality for digital library service implementation and it was not able to show the highest to the lowest value in terms of each CSE-UCLA Model component evaluation. Through this study, the problem had been resolved successfully by showing the highest to the lowest value on each evaluation component of CSE-UCLA Model using the weighted product method calculation.

The obstacles found in this research study were the model had not been able to provide a recommendation facility in order to automatically answer the constraints obtained based on the lowest value shown in each aspect of the evaluation. This model was only limited to provide recommendation data with manual input made by librarians based on the lowest score on each evaluation aspect.

CONCLUSION

Evaluation model based on CSE-UCLA-weighted product was very suitable to evaluate digital library service in university, especially on computer field. This was because this model was able to evaluate digital library service in university of computer field in terms of system assessment, program planning, program implementation, program improvement and program certification component accurately combined with calculation using weighted product method to obtain evaluation result from the highest to the lowest value on each the evaluation component and able to provide appropriate recommendations for evaluation aspects that got the lowest value. The solution proposed in order to solve the constraints found in this study was to find the appropriate method/algorithm, so as to realize the automatic recommendation facility for the weaknesses found in digital library services.

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