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Self-Evaluation of E-Learning Platform: Based on Learners' Feedback

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***Abstract*—This study implements e-learning evaluation for an online learning platform, 'tend.mn'. The evaluation is based on learners' perspective and utilizes Structure-Oriented Model (SURE) which is an e-learning evaluation model**[1]**. Established in 2019, tend.mn is an online learning platform where the classes mainly on content of educational tools and computer literacy as well as online teaching pedagogy** [2]**. Having learners from all over the world, it offers 11 courses in Mongolian as language and registered more than 800 users who are mainly from educational sector. The courses are designed in both fully online and blended course type. Many of the users already started their interested courses on the system; however, 220 of them successfully completed their learning progress at least for a single course which means approximately 27 percent of all users. For educators and learning platform providers, it is always essential to keep the platform consistent and efficient. Therefore, we proposed to evaluate the system and understand how it fulfills user's requirement. With processing of mathematical equations** [3] **at the background, SURE model was developed to evaluate e-learning and consists of evaluation steps including 1) goal definition, 2) data collection or survey, 3) data analysis through online tool** [3] **and 4) evaluation results. For this study, four key goals defined including evaluation of course content, course materials, learning system design, and platform attraction where each goal has up to five sub-goals. Data collection survey designed in google form with rating between 0 and 10. In total 68 learners responded to the questionnaire voluntarily during two months. As a user assessment of each key and sub goals, SURE model's background formulas produced rating between 0.0 lowest and 1.0 highest on required factors which are the evaluation scores. The overall evaluation score is 0.68 (68%) averaging the scores of key goals. It is considered as positive result if the evaluation score is above 50% by the selected evaluation model. In individual sub-goals, minimum score is on A11-gained skill/knowledge quality. In contrast, the higher evaluation scores (more than 0.70) were put on several sub-goals. From learners' point, they still intend to continue their learning activity and enjoyed to use additional tools on tend.mn. In one hand, considering the evaluation scores on all key goals which are above 50%, the online platform is serving well from the learners' perspective. On the other hand, since none of the key goals rated over 80%, there are still rooms to improve the system to enhance the learning quality to meet learners' expectation. The SURE model also produces respondents' individual evaluation scores, where 30% of respondent gave highest score of 1.0 and 2.9% gave lowest of 0.0.**

***Keywords*—** *e-learning evaluation, SURE model, online learning platform*

I. Introduction

Beside formal education, the short term and self-mannered learning courses are taking essential part on life-long learning progress among all ages of people. E-learning platforms have been taking main focus of learners as their default choice to gain knowledge [4]. Due to pandemic, many training activities pushed to shift into a none social contactable learning environment which was an unpredicted situation for all[5]. The positive impact of above period is that accelerated the online education growth in many ways including the learners' perspective, developers' motivation as well as infrastructure enhancement [6].

Online learning platform would be stable and successful once its' quality is standard. As part of system life cycle, evaluation is an essential part to be considered. With this intention, stakeholders of e-learning providers have interest to implement assessments on their systems for further improvement. For example, with 4 dimensional criteria of learner interface, learning community, system content, and

personalization, Lee et al. [7] implemented performance evaluation matrix on their study to improve their learning system. Focusing more on e-learning quality during period of Covid 19, Delone and McLean information systems success model was updated and used to evaluate the distance learning key actors including teacher and student capability and social influence [8]. In addition, adopting social-cognitive model into e-learning context, the study [9] highlighted influence of socio-emotional support for online learners; while, through combination of cloud model and fuzzy TOPSIS [10], the study conducted satisfactory survey among vast number of students from various colleges and suggests an evaluation indicator system of four dimensions. Moreover, utilizing learning analytics method, the researchers [11] tested online course structure and quality aiming to automatize the evaluation process. Similar with above study on usage of artificial intelligence method, another project [12] evaluated whole e-learning system with survey and predicting phases. In [13] questionnaire and structural equation modeling analysis method are used to assess e-learning benefit, satisfaction, and impact to engineering students. In case of secondary school, [14] two applications were considered if its usage meaningful for the students. By evaluating online training design quality, interaction and feedback, content availability, and ethical issues, Rupere et al. [15] study was implemented.

For e-learning evaluation, there are variety of theories including Kirkpatrick's Model [18] which measures learners' satisfaction, knowledge and skills, application of learning, and impact of e-learning to the organization through its' four levels. Bloom's Taxonomy [16] emphasizes on assessing altered levels of cognitive learning, including knowledge, comprehension, application, analysis, synthesis, and evaluation. E-learning evaluations widely uses the aspect of cognitive domains to measure learning outcomes. Kaplan and Norton's Balanced Scorecard [19] provides a structure for measuring e-learning effectiveness in various dimensions. Comparatively with those evaluation theories, researchers have been suggesting novel method for implementation of e-learning evaluation. Also, in a systematic literature review of e-learning evaluation, it [5] found 8 different evaluation models from 38 scientific studies. One of the current and self-evaluation models is SURE [20], which we adopted on this study.

E-learning evaluation studies have been implemented for various educational frameworks including formal education institutions mainly on universities [7], [8], [9], [10], [11], [12], [13], [15], [16], [17] and high schools [14]. As selected study object, tend.mn e-learning platform is one of the non-formal education systems in Mongolia. Its online and blended courses are mainly covering educational content development tools, online instruction pedagogy and technology literacy. During and since pandemic situation, educators in higher and secondary education sector are strongly required to be confident to run the alternative training methods. That requirement challenged them having lake of prior experience and knowledge in online training, especially in secondary and pre-school. That timely event impacted positively to 'tend.mn' platform to stabilize and enrich its' online courses and attract learners. We proposed to evaluate the system on post-course stage by summarizing the learners' feedback.

II. METHODOLOGY

A. Structure-Oriented (SURE) Model

To figure out the study's main purpose, structure-oriented evaluation model (SURE model) is utilized which designed for self-evaluation of e-learning system. SURE model is developed and introduced in 2014. And similar with common evaluation processes [5], [9], [10], it consists of eight steps as evaluation process. Table 1. shows SURE model eight steps.

The evaluation to be planned, implemented and summarized by evaluation team including all stakeholders; system developer, owner, course content developer, instructor, evaluator etc. Then, above steps need to be discussed and agreed among the stakeholders. The process itself enhances quality of evaluation since it provides active engagement of the system stakeholders.

SURE model provides online tool [3] for evaluators which simplify their evaluation process and analysis. On the tool, user can harvest the evaluation report with scores on several types of charts and graphics. Fig 2. illustrates architecture of the SURE model online tool.

TABLE I. EIGHT STEPS OF SURE MODEL

1	Key goals definition	To be decided by evaluators. Evaluation result would be positive only if all defined key goals are reaching its target
2	Sub-goals definition	To be defined supporting key goals. If any of sub-goal reaches its target, then the corresponding key goal is considered as successful.
3	Goal Structure Confirmation	Both key and sub goals to be discussed among all stakeholders of the evaluation process. Next steps can be taken only after confirmation of goals; otherwise, above steps to be repeated.
4	Questionnaire preparation	To be prepared based on confirmed goal structure as guidance.
5	Questionnaire confirmation	To be checked and confirmed by all stakeholders. Until full acceptance of all questions, previous steps should be repeated.
6	Data collection	To be collected by objective ways. Online survey is suggested to collect objective data.
7	Data processing	To be processed by mathematical rules of the SURE model. An online calculator exists for the evaluation.
8	Result reporting	To be shown in form of table from the online calculator. Four main evaluation scores are available from the table: overall, key goals, sub-goals, and each participant.

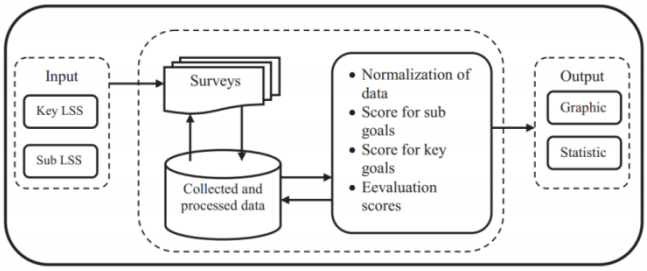

Fig. 1. The architecture of tool for SURE model [1]

B. Definition of goals and data collection

The evaluation criteria (key goals in SURE model) defined based on our main purpose which we want to know how the tend.mn fulfills learners' satisfaction. We defined the four key goals to be evaluated by learners. Those are B1-course content, B2-course materials, B3-learning system design, and B4-platform attraction. Each key goal includes sub goals (A11, A12, …A41, A42…) which is more specified for the respondents' feedback.

For B1-course content, four sub goals defined including A11-gained skill/knowledge quality, A12-supporting content quality, A13-assignment and exercise quality, and A14-gained skill. For B2- course materials, also four sub goals defined including A21-understandable of learning material, A22-screen design of learning material, A23-readability of screen texts, and A24-duration of video content. For B3-learning system design, five sub goals defined including A31-enrollment process, A32-login process, A33-display menu functioning, A34- transition among lessons, and A35-able to learn in various display sizes. For B4- platform attraction evaluation, three sub goals defined including A41-entend to continue learning, A42-suggest to others, and A43-usefullness of additional tools at platform. See key and sub goals in Fig 2.

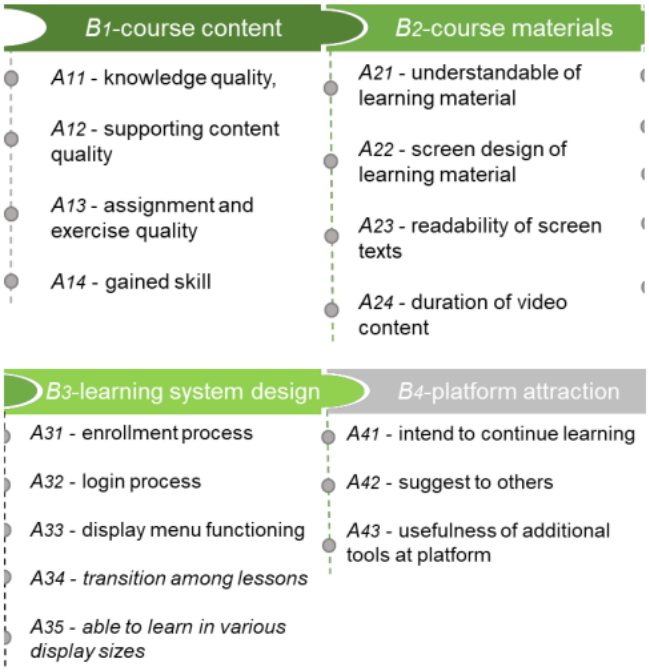

Fig 2. Definition of key and sub goals

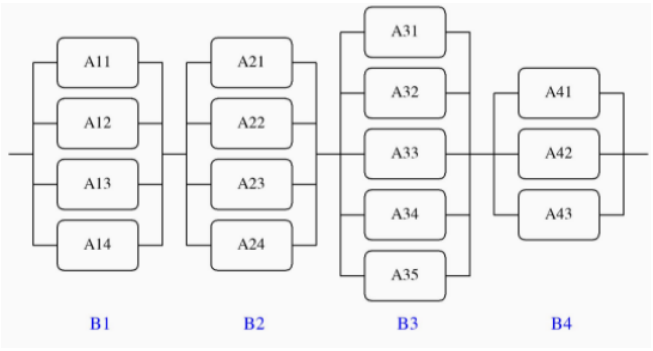

Fig 3. Evaluation structure

Number of key goals:	4
Numbers of sub goals:	4, 4, 5, 3
Evaluation interval:	[0,10]
Number of data records:	68

Fig 4. Summary of evaluation

And all the sub goals transferred into checklist for data collection with rating between 0 and 10 (Agree level: 0-0%, 1-10%, …, 10-100%). The checklist is converted into survey form. We designed the survey in google form and collected the feedback voluntarily. In total 68 users gave their feedback to the survey and the data was collected during two months.

The collected data processed by mathematical rules of SURE model and harvested evaluation scores using its online tool. It processes evaluation scores by background formulas and produces the rating between 0.0 lowest and 1.0 highest on required factors. Evaluation structure is shown in Fig 3. and evaluation result is summarized in Fig 4.

III. RESULTS

The general evaluation score is 0.68 (68%) and key goal scores are B1=0.66 (66%), B2=0.7 (70%), B3=0.71 (71%) and B4=0.72 (72%). Course content (B1) was evaluated least, course materials (B2), learning system design (B3) and tend.mn attraction (B4) have similar ratings. It can be summarized as course content scope couldn't meet learners' expectation even the system provided better learning materials and user-friendly design. There is comparably good chance that users would take another course from the platform and to suggest others. In individual sub goals, least score is on A11-gained skill/knowledge quality, which reminds to enrich the content especially the skill or knowledge given. In contrast, highest evaluation score put on A24, A35, A41 and A43 with score of 70% and higher. The video lessons got quite suitable time duration and learning management system tool which having option to watch the lessons on various display gives comfort to the learners. From learners' side they still intend to continue their learning activity on tend.mn and they were quite happy to use additional tools on the system.

SURE model also produces respondents' individual evaluation scores, where 30% (21) of respondent gave highest score of 1.0 and 2.9% (2) gave lowest 0.0 rates. Table 2. shows the result of evaluation score summary.

And it is used in e-learning platforms' evaluation in several studies. For instance, in [17] the overall score was 0.70 with 4 goals, in [21] 0.76 with 3 goals, in [22] 0.86 overall evaluation score with 3 goals.

TABLE II. EVALUATION RESULT SCORE (EMPIRICAL EVALUATION SCORES)

	k	$\mathbf{Q}^*(\mathbf{A_{ij}})$	$Q_e^*(B_i)$
B_1	A_{11}	*0.63*	*0.66*
	A_{12}	*0.63*	
	A_{13}	*0.64*	
	A_{14}	*0.59*	
B_2	A_{21}	*0.66*	*0.70*
	A_{22}	*0.68*	
	A_{23}	*0.68*	
	A_{24}	*0.70*	
B_3	A_{31}	*0.69*	*0.71*
	A_{32}	*0.65*	
	A_{33}	*0.67*	
	A_{34}	*0.68*	
	A_{35}	*0.70*	
B_4	A_{41}	*0.70*	*0.72*
	A_{42}	*0.69*	
	A_{43}	*0.71*	
$Q_{e,k}^*(C)$		$Q_e^*(C)$=**0.6768**	

IV. CONCLUSIONS

[a.]

Based on the survey feedback, we able to conclude and compare the defined goals which scored between 0.66 and 0.72. However, none of the key goals rated over 80%. Also, it is comparable with studies which utilized SURE model. Our evaluation scored slightly below from the above-mentioned similar studies. It means the system developers and content providers should take proper improvement on the platform. If required, detailed investigation on each key goal can be done to understand the system weakened sections. Based on above evaluation result, the tend.mn developer is currently working on the system's design enhancement. Also, the system's user friendliness a part of the improvement.

The evaluation report through SURE model gave us chance to measure the platform and existing course aspects from perspective of learners. With the model's formalized rating rule, the evaluation score normalizes the result with simple and comparable values. Moreover, it enables the developers for further analysis and define required actions. The advantage of self-evaluation application is its transparent steps of whole evaluation process which improves acceptance of final evaluation resulted by system developers.

As continues improvement demand, tend.mn planning to apply permanent survey hooking from the platform. It can be answered by learners at the end of a single course voluntarily and enriches the evaluation database. The data would be used for the further study purpose as well as required improvement. At that time, we will be able to compare the results with this evaluation using SURE model. Moreover, this study gave us motivation to use same evaluation structure to predict expectations of future learners for better education service.

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