An Indonesian Adaptation of the E-Learning Usability Scale

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Abstract. This paper investigates how the instruments of E-Learning Usability Scale adapted in the Indonesian context. The need for adapting the original version arises while assessing the usability of e-learning in a higher degree in Indonesia, namely Student-Centered e-Learning Environment or (SCELE). In the process of usability evaluation, a questionnaire is needed. E-learning Usability Scale (EUS), which is created by Sandoval (2016) will be used as the usability scale. However, the EUS was originally built in the English version and it has not been developed in the Indonesian version. Overall, there are five steps to adapt the usability scale to Indonesian culture which are forward translation, synthesis of the translation from the first step, back translation, consulting to the experts, and reliability testing. The results show that Cronbach’s Alpha of the adaptation Indonesian of EUS was 0.922. It can be concluded that the proposed version is reliable to be used by usability researchers. In the future, the adapted version that is proposed in this study is beneficial to help usability researchers, academicians and practitioners in Indonesia while conducting usability testing for e-Learning applications.

1. Introduction

SCELE is a moodle-based open-source learning management system (LMS) that has been modified to strengthen collaborative learning since 2005 in the Faculty of Computer Science, Universitas Indonesia. However, with the advancement of mobile technology along with the shifting of learner behavior as millennials, an information system can not only deliver the required function to support learning. The need for better usability emerges because learning becomes more seamless and integrated into student's daily activities. Thus, SCELE should also offer a better user experience so that it may enhance the quality of teaching and learning. Moreover, students learning outcomes are also improved. The underpinning concept for this issue is usability.

Usability testing refers to a method to evaluate how easy users can learn and use the system to achieve their goals [1]. In a product development cycle, usability testing is essential to gain user's feedback on our product. By then, all the evaluation results would be applied in the next development cycle for the product. Since usability testing is considered vital to the development of products, the preparation of a reliable questionnaire to assess the users would be essential. The most widely used tool for usability evaluation is the System Usability Scale (SUS) [2]. In recent work, the researchers have translated SUS into other languages, including Bahasa Indonesia [4].

Fortunately, there is also a similar standardized tool, specifically designed to assess e-learning system usability, known as E-learning Usability Scale (EUS) [3]. However, EUS has not been applied to fit requirements for assessing LMS in the Indonesian culture environment. Therefore, this study aims to apply the original version of EUS suited for evaluating SCELE. The objective is that SCELE usability can be improved based on the evaluation result using adapted EUS. This research explanation...
is delivered as follows. Section two describes the review of kinds of literature about usability testing, EUS, and cross-cultural adaptation. The next section explains how this research is conducted. Finally, the results and conclusion will be described in the last sections, respectively.

2. Literature review
This section describes the three main keywords in this study: usability testing, EUS, and cross-cultural adaptation.

2.1. Usability testing
The term usability testing shows how to gather feedback about a product from the potential users or people who have the same characteristics, to help the developers build an application more effectively as well as meet the needs and the desires of users [3]. During the evaluation period, users that evaluate the products would complete several tasks or instructions. Simultaneously, there is an observer that observes and makes a note regarding what users proceed when doing the instructions. According to [1] there are three stages to do an evaluation as listed below.

- **Test Plan**: preparing evaluation materials including scope, meeting session, recording tools, scenarios, metrics, and others.
- **Recruiting Participant**: search and recruit participant which fit into our target persons or requirement to do an evaluation. In searching this usability testing participant, we need to ensure that each participant represents each potential group that will use the products
- **Analysis and Report**: At the end of usability testing we will collect several types of data depending on the metrics identified in the test plan. After reviewing the data, we need to report in severity level of problems. In reporting, several items of information that need to be considered are background summaries, methodologies, test results, findings, and recommendations.

2.2. E-Learning usability scale
Usability in an e-Learning system is enriched by several aspects, which are the concept of interaction design, the effectiveness of pedagogical aspects, learning contents, and supports for learners [5]. Due to the complexity of e-Learning, it is not sufficient to adopt SUS as the standardized instrument for usability testing in e-Learning. To measure the usability in higher education online courses, E-learning Usability Scale for Higher Education was proposed [3]. The background why EUS is proposed because online students might feel frustrated and unsatisfied when they use the designated web interface during the entire course, which is depending on the interface, course design, and organization. Hence, taking usability can help the instructional designer and online faculty to create courses that enhance the learners’ experience and help reduce learners’ frustration.

The study focuses on how to determine the validity and reliability of an instrument designed to evaluate usability in fully online higher education courses. There are twenty-seven (27) instruments as a result and divided into four (4) categories: content, interactivity, instructor presence, and course design. Each instrument using a Likert scale from zero (0) to seven (7) with range value zero (0) for N/A, one (1) for strongly disagree until seven (7) for strongly agree. Table 1 shows the list of instruments from EUS.

| Code | Instrument |
|------|------------|
| C01  | Learning objectives are clear to me from the beginning of the course. |
| C02  | Content on each module/unit is organized a logical sequence |
Content on each module/unit is presented in small sections (chunks), so I don’t have to scroll through long pages

The material in the course is accurate and current

Difficult concepts are illustrated or explained using concrete, specific examples

Each module/unit clearly explains what I will accomplish

The terminology is used consistently throughout the course

Feedback is tailored to the content being studied, the problem being solved, or the task being completed

Graded course assignments have clear instructions

The course provides opportunities for self-assessment through non-graded activities

The course uses interactive tools and strategies to gain my attention and maintain my interest

I have access to a range of resources (i.e. web-links, case studies, simulations, problems, examples) throughout the course

The course provides meaningful interactions (i.e. embedded quizzes, reflection or self-check activities).

Through the course, the media (illustrations, graphics, videos, etc.) aid in the understanding of concepts

New knowledge and skills can be practiced within the course/course assignments

Instructor’s contact information (email, phone number) is easy to find and available in different parts of the course

I am encouraged to contact the instructor if I have a question.

Responses and feedback are received in a reasonable period of time

Text style and color are easy to read both on-screen and in printed versions.

All the links and buttons in the course work properly (not broken)

The pages and other components of the course download quickly

I can easily access all course resources through a minimum number of clicks

The links and buttons used in the course are clearly labeled and described so I can predict the result of clicking on them

The course is easy to find and access.

Graphics used in the course are of high quality (not blurry)

The navigation structure allows me to always know where I am within the course.

The most important information is placed where I can easily see it.

2.3. Cross-Cultural adoption

Basically, the general objective of cross-cultural adoption is to develop self-report measures to use in a new country, new culture, and/or new language to reach equivalence between the original and new versions of instruments [10]. The process of cross-cultural adaption tries to produce equivalency between source and target based on content. Several scenarios of cross-cultural adaption should be applied in another country and another language. Below are the cross-cultural guidelines used in this study.

The first step is doing forward translation that requires a translator. The translator will be translating the questionnaire from the original translation to the country version of the translation. In this study, the researchers recommend at least two forward translations with different profiles and backgrounds so we will have a different translation from a translator who is aware of the concepts and not well-informed of the concepts. Secondly, we need to synthesize the translation from the first step
to get the translation result. The next step is doing back translation to the original version who has been working by the different translators. This is a process of validity checking to make sure that the translated version is reflecting the same item content as the original versions.

To achieve the cross-cultural equivalent, we need to have an expert judgment about the questionnaire. The minimum composition for the committee is expertise-professionals, translators (forward and back translators) and language professionals. These expert committees’ roles are to consolidate all the versions of the questionnaire and develop what would be considered as the prefinal version of the questionnaire for the field testing. Decisions from all experts are so critical to achieving semantic equivalence, experiential equivalence, conceptual equivalence, and idiomatic equivalence.

After we have the prefinal version which is the result from the previous step, we need to do testing for this version. This ensures the adapted version is still retaining its equivalence in an applied situation. Ideally, there should be between 30 – 40 persons who should be tested. Submission of documentation to the coordination committee for the appraisal and adaption process. This step will give the result if the process of translation is reasonable or not.

3. Method

In this section, we present the details of the whole process to translate the e-Learning usability scale to the adapted versions. From the previous section about cross-cultural adoption, the forward translation was done by a researcher and a translator. The researcher picks a translator who has an English certificate for teaching and has been a teacher in intonation English courses in Indonesia for seven months. In this phase, the translator has a role to translate without any knowledge about the concepts. The original version of EUS is translated from the English version to the Indonesian version.

In the back translation phase, the researcher already has the synthesis of the translated version from the previous step. In the back-translation phase, after synthesizing the translated version would be translated back to the English version. The translation is done by another translator who hired by a researcher for doing this job. The translator for this version has an English certificate for teaching. The synthesis process is doing again for this phase to make sure that the back-translation result has the same result as the original version from concepts and language factors. If there are much different from the original version, researcher and the translator from back translation phase, we will have a discussion to decide which meaning or language that is relatively close to the concepts of the original version by measurement [6]. The next process is content validity, which is a process of giving measurements that have been synthesized and already evaluated by experts in the field of learning. This process will validate the synthesis and evaluation step. The two experts are involved in this study: the first one is with the expertise of e-Learning and the second expert is with the background of English Literature.

Furthermore, the face validity process is conducted. The objective of this process is to check if the measurement that we use is quite understandable for respondents. The face validity process involved ten (10) people from the Faculty of Computer Science, Universitas Indonesia. They should have experience in an e-Learning system. This process is started by giving the result of synthesis and evaluation measurement to them and they can correct the content or word if they don’t understand. Reliability testing is intended to ensure every instrument in the measurement is consistent if we distribute it to the respondents. We do reliability testing with 119 respondents consisting of college students from Universitas Indonesia majoring in Computer Science and Information System. Then, we distribute the measurement by online survey using Google Form. It can be viewed on the survey questions from this link (https://goo.gl/forms/UnVtqmlzYlcIInsi2). The last step from reliability testing is an analysis using SPSS software to get the Cronbach’s Alpha to check the reliability of instruments.

Before we distribute the questions or instruments, the face and content validity testing are conducted. Validity testing is the process to test whether every translated instrument is valid or not in order to measure the e-Learning system in higher education. Validity is necessary to enhance the accuracy of assessments and evaluations [7].
4. Results
The result of the cross-cultural adoption is represented in 27 Indonesian items of the E-Learning Usability Scale. (See Table 2)

Table 2. The Indonesian version of EUS.

| Code | Instrument |
|------|------------|
| **Content** | |
| C01  | Tujuan pembelajaran sudah jelas bagi saya sejak awal perkuliahan |
| C02  | Konten di setiap bab tersusun secara logis |
| C03  | Konten dalam setiap bab ditampilkan dalam bagian-bagian kecil (potongan-potongan), sehingga saya tidak perlu menggulir di laman yang panjang |
| C04  | Materi yang diberikan akurat dan terkini |
| C05  | Konsep-konsep yang sulit, dijelaskan menggunakan contoh konkret dan spesifik |
| C06  | Setiap bab menjelaskan dengan jelas tujuan yang akan saya capai |
| C07  | Istilah yang ada dalam perkuliahan digunakan secara konsisten |
| C08  | Umparn balik disesuaikan dengan konten yang dipelajari, masalah yang sedang dipecahkan, atau tugas yang diselesaikan. |
| C09  | Tugas-tugas pada mata kuliah dinilai memiliki instruksi yang jelas |
| **Interactivity** | |
| I01  | Mata kuliah yang diberikan menyediakan kesempatan untuk melakukan penilaian mandiri melalui aktivitas yang tidak diberikan penilaian. |
| I02  | Mata kuliah yang diberikan menggunakan fitur-fitur interaktif dan strategi untuk memperoleh perhatian dan mempertahankan minat saya |
| I03  | Saya memiliki akses untuk jajaran sumber-sumber (contoh: tautan situs, studi kasus, simulasi, masalah, contoh) selama perkuliahan) |
| I04  | Mata kuliah yang diberikan menyediakan interaksi yang bermakna (contoh: kuis yang terkait, refleksi diri atau kegiatan evaluasi mandiri) |
| I05  | Selama mata kuliah, medianya (ilustrasi, grafik, video, dll) membantu saya dalam memahami konsep-konsep. |
| I06  | Pengetahuan dan keterampilan baru dapat dilatih selama pembelajaran atau melalui tugas-tugas. |
| **Instructor presence** | |
| IP01 | Kontak para pengajar (email, nomor telepon) mudah ditemukan di berbagai bagian dalam mata pelajaran |
| IP02 | Saya termotivasi untuk menghubungi pengajar bila saya memiliki pertanyaan |
| IP03 | Respon-respon dan umpan balik diterima dalam rentang waktu yang relatif pendek |
| **Course Design** | |
| CD01 | Jenis dan warna tulisan mudah dibaca dalam layar dan bentuk cetak |
| CD02 | Semua tautan dan tombol dalam mata kuliah berfungsi dengan baik (tidak rusak) |
| CD03 | Laman-laman dan komponen-komponen lain di dalam mata kuliah dapat diunduh dengan cepat |
| CD04 | Saya dapat dengan mudah mengakses semua sumber mata kuliah dalam jumlah klik yang minim |
| CD05 | Tautan dan tombol yang digunakan di dalam mata kuliah dilabeli dan dideskripsikan dengan jelas sehingga saya dapat memprediksi hasilnya |
| CD06 | Mata kuliah ini mudah ditemukan dan diakses |
| CD07 | Gambar dan video yang digunakan dalam mata kuliah berkualitas tinggi (tidak buram) |
| CD08 | Struktur navigasi memungkinkan saya untuk selalu tahu di mana posisi saya dalam halaman mata kuliah tersebut |
| CD09 | Informasi yang paling penting diletakkan di tempat yang mudah terlihat |

The validation of EUS items has been validated with ten (10) respondents and two (2) experts as explained in the previous section. In addition, the result of Cronbach’s Alpha involving 119 students
from higher education level which have age between 19 – 22 years old and more than 1-year using SCELE. The result shows that the Indonesian version of EUS is reliable, the score is above 0.85 (see Table III). Each instrument is also reliable because if one item of the instruments is deleted, the Cronbach’s Alpha score remains consistent and is not significantly changed.

Table 3. EUS Cronbach’s Alpha Result for Indonesian Version.

| Reliability Statistics | Cronbach’s Alpha | Cronbach’s Alpha Based on Standardized Items | N of Items |
|------------------------|------------------|---------------------------------------------|------------|
|                        | 0.922            | 0.926                                       | 27         |

| Item-Total Statistics | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item Total Correlation | Cronbach's Alpha if Item Deleted |
|-----------------------|---------------------------|-------------------------------|---------------------------------|---------------------------------|
| EUS_1                 | 139.40                    | 347.734                       | 0.518                            | 0.920                            |
| EUS_2                 | 139.40                    | 345.921                       | 0.557                            | 0.919                            |
| EUS_3                 | 139.86                    | 346.801                       | 0.417                            | 0.921                            |
| EUS_4                 | 139.64                    | 339.945                       | 0.628                            | 0.918                            |
| EUS_5                 | 140.22                    | 341.325                       | 0.550                            | 0.919                            |
| EUS_6                 | 139.89                    | 338.403                       | 0.636                            | 0.918                            |
| EUS_7                 | 139.40                    | 347.361                       | 0.596                            | 0.919                            |
| EUS_8                 | 139.67                    | 343.493                       | 0.607                            | 0.919                            |
| EUS_9                 | 139.47                    | 348.828                       | 0.462                            | 0.921                            |
| EUS_10                | 140.56                    | 341.604                       | 0.415                            | 0.922                            |
| EUS_11                | 140.56                    | 330.672                       | 0.686                            | 0.917                            |
| EUS_12                | 139.97                    | 331.143                       | 0.662                            | 0.917                            |
| EUS_13                | 140.11                    | 336.844                       | 0.550                            | 0.919                            |
| EUS_14                | 140.13                    | 338.331                       | 0.574                            | 0.919                            |
| EUS_15                | 139.65                    | 340.196                       | 0.658                            | 0.918                            |
| EUS_16                | 140.16                    | 339.406                       | 0.501                            | 0.920                            |
| EUS_17                | 141.05                    | 340.896                       | 0.420                            | 0.922                            |
| EUS_18                | 140.64                    | 337.911                       | 0.528                            | 0.920                            |
| EUS_19                | 139.50                    | 346.727                       | 0.566                            | 0.919                            |
| EUS_20                | 139.29                    | 350.138                       | 0.467                            | 0.921                            |
| EUS_21                | 139.27                    | 352.571                       | 0.479                            | 0.921                            |
| EUS_22                | 139.67                    | 346.222                       | 0.446                            | 0.921                            |
| EUS_23                | 139.65                    | 345.993                       | 0.556                            | 0.919                            |
| EUS_24                | 139.39                    | 343.104                       | 0.574                            | 0.919                            |
| EUS_25                | 139.99                    | 344.466                       | 0.450                            | 0.921                            |
| EUS_26                | 139.63                    | 344.371                       | 0.508                            | 0.920                            |
| EUS_27                | 139.73                    | 339.436                       | 0.571                            | 0.919                            |
5. Conclusion

This research purposes to translate and adapt the original E-Learning Usability Scale from Sandoval into an Indonesian version. The original EUS was processed by face validity, statistical validity, and cross-cultural adoption to ensure that the Indonesian version is valid and can be used by different cultures and populations. The statistical analysis in the reliability test was analyzed to get the Cronbach’s Alpha score. The result shows that the Indonesian version of EUS is reliable as the Cronbach’s Alpha score is around 0.922. Moreover, the score remains constant if one of the items is deleted.

The instruments can be used by usability practitioners across different cultures to evaluate the usability of e-Learning, mainly for research purposes. Further improvement for this research is to mix the student respondents from a different culture and level education. By evaluating different e-Learning system for different level education, it will enhance the quality of linguistics aspects of the adapted version of EUS because the instruments will be distributed to people with different knowledge and linguistics level.

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