Evaluation of Mobile Learning Framework

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Abstract: **This paper presents the effectiveness of using the GUMSA framework in developing a Malay language mobile learning system (M-Lang) using Near Field Communication (NFC) technology as an additional tool to traditional Malay language learning. A quantitative analysis was carried out to test its effectiveness with stratified random sampling as the method. Experts with research interests in e-learning and mobile learning at both Sultan Zainal Abidin University and University Malaysia Terengganu are considered the target populations. In both universities, seven respondents were considered the sample size. An evaluation form was used as the research instrument, and IBM SPSS version 22 as the tool for data analysis. The analysis yielded a positive result: 7 respondents believed that the added feature to the lifelong mobile learning framework was relevant to the development of the M-Lang system. 6 Respondents believe that all the connections and flows of the elements are logical and that the framework may be usable and practicable for the development of mobile learning systems.**

Keywords: **GUMSA Framework, Respondents, Mobile Learning, Evaluation.**

I. INTRODUCTION

Frameworks are conceptual structures that serve as supporting factors that assist in building a useful thing. In terms of computers, the Framework can be viewed as a layered structure that highlights the built programs and how they are interconnected. Most computer frameworks and mobile frameworks include actual programs and programming interfaces. Mobile applications are created through some frameworks for purposes such as education, health systems, online booking, banking systems, and forensic investigation. The present study focuses more on education and learning systems. In 2017, [7] developed the Ego SENSE framework, which was used to build a personal health monitoring android application to detect the health conditions of a mobile user. Similarly, [25] proposed a framework that would lead to investigation by achieving the target with evidence classification. Furthermore, much research based on mobile learning frameworks is already in existence [5, 4, and 27]. These frameworks are used in the development of mobile learning applications, allowing users to learn from their mobile devices regardless of location or time.

In 2015, [27] developed a mobile learning framework that used contactless technology known as Near Field Communication (NFC). In addition, [26] revealed that the use of NFC technology would encourage teaching and learning procedures as it appears to be a game like environment. The proposed framework was generated by modifying the two joined existing frameworks produced by [9, 22]. Despite the fact that Nordin's system was produced by modifying the framework developed by [3]. In 2010, [22] suggested four components of a framework generated by [9] that needed to be incorporated into mobile learning frameworks. However, [27] thought that altering Nordin's Framework by incorporating the four components stated earlier would produce a standard mobile learning framework. These added components are: requirement and constraint analysis; technological environment design; mobile learning scenarios; and learning support services. The researcher thought that it was a good idea to validate or evaluate the proposed framework known as GUMSA, which was illustrated in Figure 1.

Evaluation is a systematic determination of a subject's merit, worth, and significance using criteria governed by a set of standards. It assists the designer or programmer to assess any aim and helps in decision making. The present study aims to evaluate the GUMSA Mobile Learning Framework based on expert perception. A survey was carried out by the two (2) universities in Terengganu, Malaysia. The researcher searched for experts in the field of mobile learning and e-learning at both the University Sultan Zainal Abidin (UNISZA) and the University Malaysia Terengganu (UMT) at the Faculty of Mathematics and Computing. An expert evaluation form was developed and distributed to the generated sample size. The respondents were given enough time to study the framework, and they gave their perception by ticking the right options in the evaluation form or research instruments. In 2010, [22] mentioned that the use of structured questions and predetermined response options should be involved in quantitative research. The generated data was further analyzed with IBM SPSS version 23 software. The result further explained the effectiveness of added features to the Lifelong mobile learning framework, which yields the proposed GUMSA mobile learning framework.

Paper Organization: The research is classified into a series of sections. Most of these sections are embedded with corresponding sub-sections. The introduction was the first section that was presented with no sub-section under it. Section 2 discussed related works, which explained the previous related research and also highlighted the drawbacks of the respective research works. Section 3 presents the research method with at least six (6) sub-sections, namely:

Target Population; Sample Size; Research Instrument; Pilot Study; Procedure of Data Collection; Method of Data Analysis. Section 4 explains the result and discusses the outcome of the research by challenging the previous results of some research publications in the same area. Section 5 summarizes the overall paper, the contribution of the present research, and makes recommendations for future work. Finally, references and researcher (s) bio-data were presented.

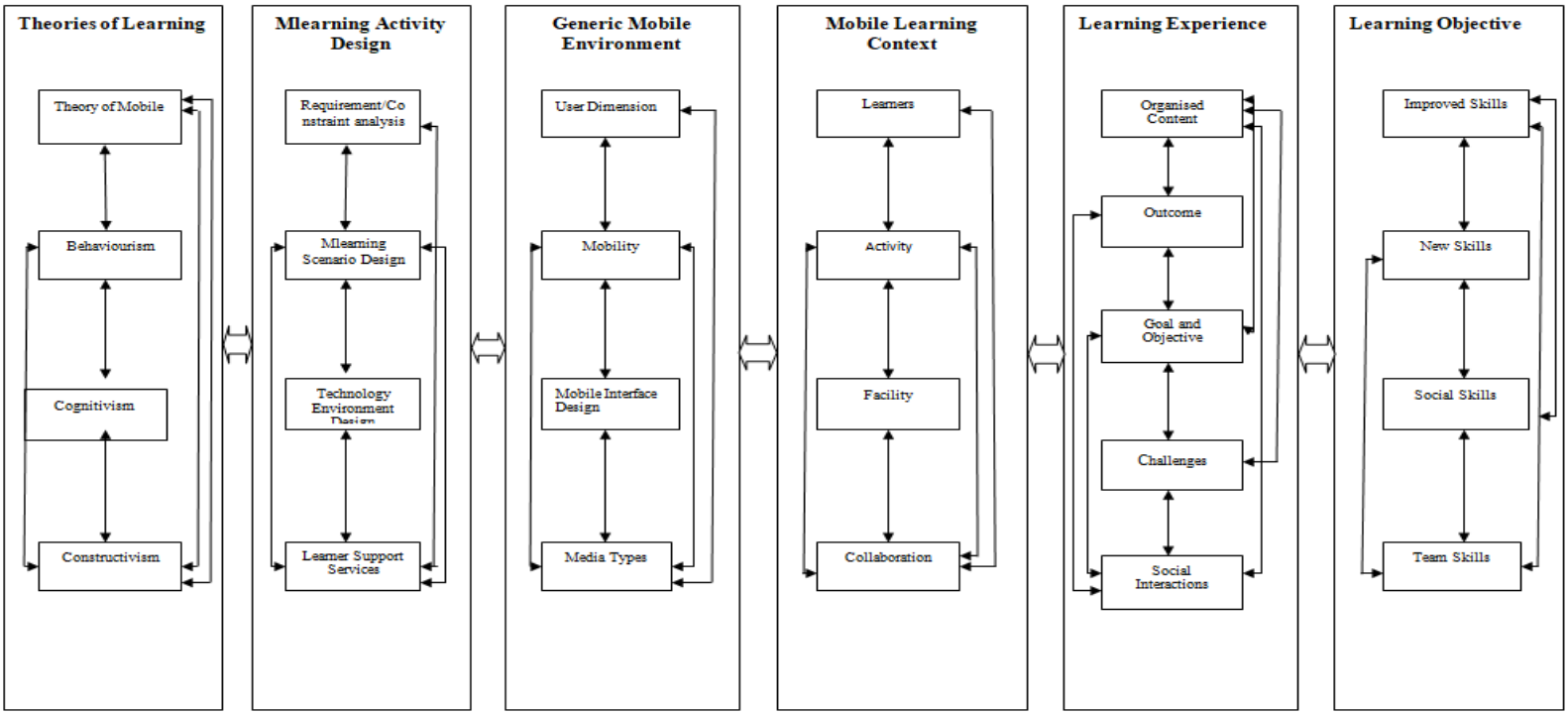

Figure 1: GUMSA Mobile Learning Framework

Related Work

In 2015 [10], the researcher employed quantitative analysis with 13 teachers as a sample, developed a questionnaire based on acceptability and usability, and distributed it to the respondents as the research instrument. The result claims that the technology used meets the demand of the teachers as the participants find it easy to use software regardless of their technical background. But, the sample size used for the data collection was considered to be weak as part of the drawback. Similarly, [12] evaluates user perception in mobile learning environments using a system usability scale based on 10 items (questions) concerning a 5-Likert scale, considering 33 participants, which are divided into 3 groups (11 for each group). Duolingo outperforms Lingio and Sprakkraft with mean values of 78.4 compared to 43.3 and 64.5, respectively. It was discovered that there was no statistical analysis tool used for the research work, while the sample size used was very weak, to mention a few drawbacks of the research. In addition, [11] assessed the mobile learning usability with 28 voluntary Pre-Kindergarten (VPK) students divided into two groups (Experimental and Control Groups) at Rural Public Character in Florida using developed assessment questions with a period (API). Results show that mobile learning had no significant effect on oral language vocabulary skills, and increased phonological awareness and mathematical skills. But, the researcher used a smaller sample size with a very weak questionnaire.

Moreover, [6] used a few samples for the research (1 Geology lecture & Zoology Professor at the Federal University of Cera in Brazil, 2 Geography & 1 Biology school teacher, and 7 students) with a 5-Likert scale questionnaire. The field trip teachers record standard deviation values between 0.45 and 0.71, while a selected group presents SD values between 0.5 and 0.7. The limitation of the research was that the application lacked content presentation and captured information, while the internet of things needed to be incorporated. The sample size used for the evaluations was very weak. In addition, [24] used 30 respondents with the 5-Likert Questionnaire for the data generation. The result of the research was presented in percentages (70-90) and the average (2.90–3.37) was computed to give the mean values. But, the research instruments were developed based on nine questions. In 2018, [18] used a larger number of samples to address the aforementioned challenges than in the earlier research papers. The researcher carried out usability testing of a mobile learning application with 105 students from the cooperating

state university Manheim who responded to the questionnaire online with IBM SPSS 23.0 as the research tool. The result reveals that 0.83 believed that the application was simple, 0.85 revealed that the application was user-friendly, 1.15 was satisfied with the colour, and 1.19 also agreed that the application was optically appealing. A drawback, the respondents are all from the business administration department and the researcher did not engage PhD students in the sample.

In 2016, [15] addressed the sample size limitation of the earlier research by considering 158 students (undergraduate and postgraduate) as the research sample. The research aimed to evaluate influential factors of the mobile learning adoption model (MLAM) based on learner perspectives. The researcher used online data collection, and AMOS20 software was adopted for the data analysis. The findings of the research show that the model can be used as a guide for mobile learning systems implementation in Pakistan. Moreover, [1] used a more powerful sample than earlier research, using 623 students and 132 instructors from various higher institutions in Kuwait. The questionnaires were distributed online (1 for students, while the other was for instructors, respectively). SPSS software was utilized for the analysis. The result interpretation reveals a positive opinion on the use of mobile devices in the learning environment, with a frequency of between 45.5% and 72% and 49.1% to 76.40% for students and instructors. But, the researcher failed to discuss the respondent's selection procedure and online distributions. In 2020, [8] presented a larger sample than the previous one, with an estimated 200 students from Dammam Community College, Imam Abdurrahman Bin Faisal University, and King Khalid University's College of Art and Science responding to two sets of questionnaires. The mean value lies between 3.4 and 4.7, which explains the research outcome. But the research failed to state the procedure of sample selection. There is a need for the engagement of PhD students in the sample to make it strong. In 2017, [20] used the 5-Likert Scale questionnaire for the data collection with both under-graduate and post-graduate students as the respondents from central university; research institute; Open University; and State University of India. The result shows that 42% of participants considered mobile devices effective learning tools. The drawback of the research was the online distribution of questionnaires; Sample size generation was not discussed. The analysis used in the research was very general.

To address the drawback of the online distribution of the research questionnaires as stated in the previous research papers, the researcher consulted recent research that physically distributed the research instruments (questionnaires). In 2018, [21] developed a framework for evaluating the usability of mobile learning applications by adopting the PACMAD model. The Second Year Diploma Students of Computer Science at the University of Kuala Lumpur, Malaysia were the target participants (35 students in the control group and 32 students in the experimental group). Questionnaires were assigned to the experimental group after training; the control group took the same training in the traditional model. Findings reveal that the participants agreed with the framework's usability. Even though the research contributed to the field of mobile learning, the researcher's result was not compared with existing work that may validate the result. In addition, the evaluation procedure used diploma students as the sample. Why not undergraduate or postgraduate students from the university. The drawback of previous research was addressed by [19] using the Technology Acceptance Model (TAM) to test the kindergarten teacher's skills in information and communication technologies (ICT). In the study, 75 senior students from the department of pre-school education at the University of Crete were considered participants. An open-ended questionnaire (five Likert scales) written in Greek was used as the research instrument. Performed by IBM SPSS Statistics and AMOS, the study was designed to analyze the impact of skills on perceived ease of use and behavioural intention. Findings reveal that pre-service teachers have the strongest influence on their intention to adopt mobile learning due to mobile learning's usefulness in the teaching process and perceived ease of use. There is a need for more research on pre-service kindergarten teachers who will attend specialized mobile learning.

The outcome of the review signifies that most of the literature evaluates mobile learning acceptance in academic environments. It was observed that no research was recorded on either the framework or model evaluation in existence in most of the publications database. The researcher believes that evaluating any developed framework or model before implementing it in the development of mobile learning applications is critical. The researcher aims to address the gap by evaluating the GUMSA framework, which was utilized in the development of a Malay language learning tool known as M-Lang, which can be used as an additive tool for learning the Malay language for international students. Despite the fact that some of the literature used small samples, existing research has addressed the issue [10, 6, 21, 12, and 24].In a similar case, the present research used 7 academic staff with research interests in e-learning and mobile learning from both UNISZA and UMT. One may say the sample is not effective due to the limited number of participants, but it was discovered that a very limited number of the academic staff of the afore-mentioned universities have undergone research in the field of mobile learning. The sample was estimated by taking a survey by visiting the departments of computer science of both universities for the genuity of the data. The researcher gathered the estimated number of respondents and distributed the evaluation form to affected participants physically, which addressed the problems of online distribution as seen by some of the related articles [15, 1]. Some of the consulted literature failed to use statistical totals in carrying out their analysis [11, 12]. The present research made use of IBM SPSS version 23 software and an Intel

Celeron quad core processor (2M cache, 2.0GHz), 4RAM, and 500 HDD hardware components for the data simulations, which addressed the above limitations. Moreover, the research instrument used was validated based on a reliability test, which solved some drawbacks of some research with weak questionnaires [11, 24].

II. METHODOLOGY

The methodology discussed the method that assists research findings regarding framework evaluation based on expert review feedback. The researcher adopted quantative analysis, with a structured expert evaluation form as the tool for data collection. The data collected by the researcher was simulated with IBM SPSS version 23 software and an Intel Celeron quad core processor (2M cache, 2.0GHz), 4RAM, and 500 HDD hardware components. Experts with research interests in the fields of mobile learning and e-learning were considered the target population. The research sample was generated from part of the target populace. The target population, sample size, research instrument, procedure of data collection, and method of data analysis were discussed in this section below.

Target Population

The target population for the present research were the academic staff of both Universiti Sultan Zainal Abidin and Universiti Malaysia Terengganu, faculty of informatics and computing, with a research interest in e-learning and mobile learning, respectively. According to [16], researchers must draw possible collections for the intended element of the study. The researcher visited all the computer science departments of both universities to take the estimated populace of the academic staff with the abovementioned area of research field before knowing the estimated number of samples to be utilized for the research.

Sample Size

According to [14], the table with 95% confidence states that "if the target population is 10, therefore the sample will automatically be taken as 10". The present research recorded six (6) for the University Sultan Zainal Abidin and one (1) for the University of Malaysia Terengganu, which made a total of seven (7) respondents as the target. Therefore, the researchers are expected to utilize the seven (7) respondents as the research sample size by considering the theory of the table earlier stated.

Research Instrument

An expert evaluation form was developed for the data collection in the present research. The form was designed based on two (2) sections. The first section collected the demography of the expert, which included name, age, gender, affiliation, working experience, and position of the respondents. The second part collected data based on the added features to the Nordin‘s framework using three (3) scales. The main elements of Nordin et al.'s framework were also evaluated with the giving instrument. The respondents also give their view on the applicability of the framework in developing mobile learning applications. In addition, another section also generated data on the relevance of the added features to Nordin’s framework. Similarly, data on connections, flow, and usability of the GUMSA framework to the development of the M-Lang System was also generated. Finally, a section was presented for an expert to make recommendations and suggestions. The respondents were given a chance to give their response by clicking on either one (1) of the alternatives.

Procedure of Data Collection

The present research used experts in the fields of mobile learning and e-learning as the target population of the study. The researcher visited the departments of computing at both Sultan Zainal Abidin and University Malaysia Terengganu to physically meet with the respondents and issue the evaluation form to them. Those respondents that were not in their various offices were visited again at another stipulated time. The researcher made sure that all respondents were met physically due to some additional explanation before the forms were filled up. A letter of introduction was given to the researcher by the graduate school of Sultan Zainal Abidin, which consisted of the researcher's name, matric-no, nationality, faculty, mode of study, and year of the current semester, which really identified the researcher to the respondents of the University of Malaysia Terengganu. A highly motivated student accompanied the researcher to the department of computing at the University of Malaysia Terengganu to meet with those experts. After distribution of the form, an appointment was given for the day and time that the researcher needed to be back for the expert review.

III. RESULT AND DISCUSSION

Framework analysis of socio demography information

Table 1: Respondent’s age distribution

Age	Frequency	Percentage
28-36	1	14.3%
37-46	5	71.4%
47-56	1	14.3%
Total	7	100%

The researcher grouped the age distribution of the respondents into three, as shown in Table 1 above. One (1) respondent is between 28 and 36 years old, out of seven (7) respondents, which constitutes 14.3%. Five (5) respondents are between 37 and 46 years old, with 71.4%. The last distribution was between 47 and 56 years old, which constitutes 14.3%. Therefore, from the above data, 71.4% has the highest percentage that constitutes age 37–46 years. Observations reveal that the majority of the respondents are within a satisfied age range at work, so they can be expected to provide effective responses.

Gender & Affiliation

Table 2: Respondent's Gender & Affiliation

Gender	Frequency	Percentage	Affiliation	Frequency	Percentage
Male	1	14.3%	UNISZA	6	85.7%
Female	6	85.7%	UMT	1	14.3%
Total	7	100%	Total	7	100%

Table 2 shows the respondents' gender distribution, which shows one (1) respondent with a percentage of 14.3% was considered a male, the other being a female respondent, which constitutes a percentage of 85.7%. In addition, respondents' affiliation distribution was presented in the same table, which showed one (1) respondent with a percentage of 14.3% was considered from UNISZA, and the other respondents were from UMT, which constituted a percentage of 85.7%.

Working experience

Table 4: Respondent's working experience

Working Experience	Frequency	Percentage
1-5	1	14.3%
6-11	1	14.3%
12-17	1	14.3%
18-23	3	42.9%
30-35	1	14.3%
Total	7	100%

Regarding the working experience of the respondents, the distribution is given in Table 4. One (1) respondent out of seven (7) respondents has working experience within the range of 1–5 years, which constitutes 14.3%. Similarly, 12–17 years of working experience constituted 14.3%, and 1 respondent was within that range. In addition, ages 6–11 years, with an approximate percentage of 14.3%, had 1 respondent. Three (3) respondents were within the range of 18–23 years, with an approximate percentage of 42.9%. The remaining 1 respondent constituted 14.3% and was within 30–35 years. Observation has revealed that five (5) out of seven (7) respondents have more than 18 years of working experience. Therefore, feedback from the respondent should be considered effective due to their working experience.

Analysis of Review items

Table 5: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.848	.867	11

Table 5 presents the reliability test of the expert review form. In quantitative analysis, research is said to be valid, if the researcher has checked the reliability or validity of the research instruments, such as questionnaires. In the present research, the reliability of the expert evaluation form was tested by testing the specified questions. For the questionnaire to be reliable, one has to get a Cronbatch alpha of more or equal to 0.7. If the reliability test result is less than 0.7, the researcher needs to re-develop a new questionnaire for the research again. In the present research, the reliability test yielded a Cronbach's Alpha of (0.848) and a Cronbach's Alpha Based on Standardized Items of (0.868). A research paper by [10] presented a cronbatch of 0.746, while [15] recorded a cronbatch of 0.8. Compared with the existing results, the Cronbatch Alpha showed that the results produced by the present research were better. Therefore, the researcher can move to the field for data collection since the result of the cronbatch Alpha satisfied the earlier stated condition.

Table 6: Review item

Main Element	Need very detail explanation	Need some explanation	Is easy to understand	Total
Theories of learning	2 (28.6%)	4 (57.1%)	1 (14.3%)	7 (100%)
M learning activity design	2 (28.6%)	5 (71.4%)	-	7 (100%)
Generic Mobile learning	2 (28.6%)	5 (71.4%)	-	7 (100%)
Mobile learning context	1 (14.4%)	6 (85.7%)	-	7 (100%)
Learning experience	3 (42.9%)	4 (57.1%)	-	7 (100%)
Learning objectives	2 (28.6%)	4 (57.1%)	1 (14.35)	7 (100%)

Experts responded in Table 6 to the framework's main items. Both the frequency and percentage were specified. Two (2) respondents, which constituted 28.6%, believed that the learning theories needed to be explained in detail. Four (4) respondents, with 57.1%, specified that the item needed some explanation, but one (1) respondent, with 14.3, suggested that the item was easy to understand. Regarding Mlearning Activity design, 2 respondents, or 28.6%, believed that the item needed a detailed explanation, while five (5) respondents, or 71.4 percent, needed some explanation. Moreover, 2 respondents (28.6%) need a very detailed explanation of generic mobile learning, while 5 respondents (71.4%) need some explanation as well. In addition, 1 respondent suggested a detailed explanation of the mobile learning context, and 6 respondents, with 85.7%, suggested more explanation. Mobile learning context. 3 respondents said that the learning experience items need very detail explanation, 4 respondents suggest for some detail explanation. Finally, 2 respondents (28.6%) suggested a detailed explanation of the learning objectives, 4 respondents

believed that there was a need for some explanation, and 1 respondent believed that the learning objectives were easy to understand. The experts evaluate the items as supporting material for the development of the framework, but most of the respondents agree that the items need some explanation for ease of understanding.

Table 7: Added framework features

Item	Is definitely not relevant	May be not relevant	Is relevant	Total
Requirement and constraint analysis	-	-	7 (100%)	7 (100%)
Mlearning scenario design	-	-	7 (100)	7 (100%)
Technology environment design	-	-	7 (100)	7 (100%)
Learners support services	-	-	7 (100)	7 (100%)

Table 7 shows the response of the expert on the features added to the framework by [22], to make it more efficient in the development of the M-Lang system. The percentage and frequency of each item are specified in the above table. The analysis was conducted using 7 respondents' responses, for a total of 100 percent. The evaluators considered requirement and constraint analysis, and seven of the respondents indicated (100%) that the item was relevant to be included in the framework. In addition, the 7 respondents' support all the added items that constitute the design of the GUMSA FRAMEWORK, such as Mlearning scenario design, technology environment design, and learner support services as presented in figure 1. According to the responses, all of the items were relevant to the framework's design.

Table 8: Added framework features std-Deviation

Item	Min	Max	Mean	Std-Deviation
Requirement and constraint analysis	3	3	3.0000	0.0000
Mlearning scenario design	3	3	3.0000	0.0000
Technology environment design	2	3	2.8571	0.37796
Learners support services	2	3	2.8571	0.37796

Table 8 shows the minimum and maximum selected options within the respective questions in the expert evaluation form. The table also describes the mean value and standard deviation. Taking into account the minimum value in Table 8's second column, the mean value in column 4, and the standard deviation in column 5, the lowest expected feedback of each reviewer and the moderate value are calculated in equations 1 and 2 below. The higher expected value was rounded to the nearest significant figure.

$$Lowest = Mean - Standard\ Deviation \quad (1)$$

$$Moderate = Mean + Standard\ Deviation \quad (2).$$

$$High = Rounding\ to\ the\ Nearest\ Significant\ Figure \quad (3)$$

After calculating the lowest value, the minimum value and the lowest value are all positive and equal to each other. While in some cases, minimum values are expected to be greater than the lowest value. However, the minimum value should not be less than the lowest value as shown in Table 9.

Table 9: Lowest expected feedback

Lowest	Moderate	High
3.0000	3.0000	3.000
3.0000	3.000	3.000
2.4792	3.2351	3.000.
2.4792	3.2351	3.000

Finally, according to the findings, it was concluded that the outcome of the analysis was effective. The calculated values of the lowest value, moderate value, and high value are shown in Table 9.

Table 10: Connection and flows framework element

Item	Yes	Not sure	No	Total
Connection and flows of all element are logical	6 (85.7%)	1 (14.3%)	-	7 (100%)
Framework is usable in M-Lang system development	6 (85.7%)	1 (14.3%)	-	7 (100%)
Framework design is practicable	6 (85.7%)	1 (14.3%)	-	7 (100%)

Table 10 shows the expert's response to the connection and flow of the elements, the usability of the framework in M-Lang system development, and the practicability of the framework design. The percentage and frequency of each are specified in the above table. The analysis was conducted using seven respondents' responses, for a total of (100%). (6) Out of the seven respondents, with a percentage of (85.7%) believing that the connection of the elements in the framework is logical, one respondent reveals the uncertainty of the connection and flow. Regarding the usability of the framework in M-Lang development, six respondents, which were constituted by (85.7%, believed that the framework was usable for the M-Lang system development, while one respondent, with (14.3%, was uncertain about usability. Six (6) out of seven (7) respondents think the framework design is workable. Therefore, due to the observations revealed in this analysis, the framework was usable for the development of the

M-Lang system. It is also practicable, and both the connections and flows are logical.

Table 11: Framework Connection and flow std-Deviation

Item	Min	Max	Mean	Std-Deviation
Connection and flows of all element are logical	1	2	1.1429	0.37796
Framework is usable in M-Lang system development	1	2	1.1429	0.37796
Framework design is practicable	1	2	1.1429	0.37796

Table 11 presents the mean value and standard deviation of the last section of the evaluation form. The calculated values of the lowest expected feedback, moderate, and high values of each respective item within Table 10 are collected using equations 1 and 2 and tabulated in 12 below. According to the findings of the analysis, it is assumed that the minimum value was greater than the lowest expected feedback values calculated in Table 12. Comparing the standard deviation of Table 8 and Table 11 with that of the results presented by [10, 15, 20, 18, 24, 8], the researcher obtained a better result. However, since the standard deviation of Table 8 and Table 11 is within the range of 0.0000-0.37796, the compared results are better than those of the present research, which yields better results. As the condition was fully satisfied

Table 12: Framework Connection and flow Lowest expected feedback

Lowest	Moderate	High
0.7649	1.5209	2.000
0.7649	1.5209	2.000
0.7649	1.5209	2.000

Finally, according to the findings, it was concluded that the outcome of the analysis was effective, as the minimum value was greater than the lowest value. The calculated values of the lowest value, moderate value, and high value are shown in Table 12.

IV. DISCUSSIONS

The researcher adopted a mobile learning framework by Nordin et al., which was presented in the year 2010. The framework was studied carefully. It was observed that the framework lacks some features that may enable the development of a mobile learning tool. In 2015, Shawai et al. modified the Nordin's framework by adding features such as requirement and constraint analysis, Mlearning scenario design, technology environment design, and learner support services that will assist mobile learning developers to develop efficient learning tools. In 2018, the GUMSA framework was utilized to develop the M-Lang system that will be frequently used in learning the Malay language by international students at both UNISZA and UMT. In an academic environment, anything that is initiated has to be validated and evaluated for acceptance by some experts in the relevant field. This motivated the researcher to evaluate the GUMSA mobile learning framework. Even though the researcher did not find any related papers that were published based on the relevant topic, the researcher argued with some published papers based on usability and functionality analysis of mobile learning applications. Some of the drawbacks of the analysis are addressed by the present research. It is observed that some research papers had issues with their research tools (Questionaire), collection of data, and the result of the data analysis was not effective when compared with the present research. Although the evaluation form in this research replaced the questionnaire and is not the same as those for usability analysis, some of the usability questions are very weak, while some researchers did not use them [1, 2, 11, 22]. However, [24] distributed their questionnaires to the respondents online, but this online distribution may affect the researcher in the data collection process as some of the respondents may not respond on time, and some may even ignore it due to commitments and other engagements. Therefore, the problem of online distribution was addressed by the present research, as the evaluation forms were distributed

The result of any analysis should be compared with the previous research results for acceptability. The researcher made a comparison with the analysis of some research papers based on the evaluation of usability analysis of mobile learning. [1, 24] presented mobile learning usability analysis results with a giving percentage of between 42% - 98% and 70% to 90%, respectively. In a 2019 study [13] on user satisfaction with mobile learning, respondents believed that students who used mobile devices performed better academically. Similarly, [8] presented a percentage of 60%–95% user effectiveness of mobile learning techniques. However, earlier reviewed results were effective for mobile learning usability, but the present research records better results with 100% relevance for the added features in the Nordin et al., framework. Therefore, the researcher believed that the added features were relevant to the development of the GUMSA Framework. In addition, 85.7% of the respondents believed that the connections and flows of the framework were logical and that the framework was usable for the M_Lang system. The standard deviation for the added features was between 0 and 0.37796, while the standard deviation of the connection and flow of the framework yielded a result of 0.37796, which is better than that of [10, 15, 6, and 18]. The lower the standard deviation, the more efficient the result becomes. Therefore, this comparison revealed that the standard deviation of the present research gives better results, and the results can be accepted. Moreover, the researcher came up with a simple and straight-forward theory that validated the evaluation in the present research. The minimum selected option should not be less than the lowest expected feedback from the reviewer. The calculations of the lowest, moderate, and highest were presented using

equations 1, 2, and 3. The added features analysis presented minimum values in Table 8 that were not less than the lowest value in Table 9. Similarly, the connection and flow of the element yield a minimum value in Table 11, which is greater than the lowest value in Table 12. Therefore, the analysis can be considered valid and accepted that the GUMSA Framework is a mobile learning framework that can be used in the development of the M-Lang system.

V. CONCLUSION

This paper discussed the evaluation process of the GUMSA mobile learning framework. The evaluation used quantative and stratified random sampling methods with IBM SPSS version 23 software and an Intel Celeron quad core processor (2M cache, 2.0GHz), 4RAM, and 500 HDD hardware components as a tool. An expert evaluation form was used as a research instrument. The researcher searched for an expert with a research interest in e-learning within Universiti Sultan Zainal Abidin and Universiti Malaysia Terengganu. The analysis's findings demonstrated that the GUMSA framework was usable and practicable, and that the framework's connections and flows were logical. In addition, the added features to the Lifelong mobile learning framework were relevant. In 2018, [26] developed the M-Lang system using the GUMSA framework, which helps international students learn Malay language learning using mobile devices with the assistance of technology known as NFC to achieve several learning theories such as Ubiquitous, Immerse Learning, Context, and Tangible Interface. Users learn the language using their mobile devices to enrich their learning process. In the future, the application will be evaluated to test the usability and functionality of the system. The evaluation will be carried out by international postgraduate students at Universiti Sultan Zainal Abidin and Universiti Malaysia Terengganu. The contribution of the present research was to show experts' views on the newly developed mobile learning framework known as the GUMSA Mobile Learning Framework and its effectiveness in the development of Malay language learning tool (M-Lang). Most of the consulted experts agreed that the framework would be highly beneficial in the development of mobile learning tools or applications. The Framework also utilizes contactless technology known as Near Field Communication Technology, which is one of the most newly used technologies in the world. The present research utilized two universities as the case study. If there were no experts on e-learning in both universities, the research work would have had a series of problems. As such, these could be the limitations of the research. For future work, the GUMSA Framework can be modified to cope with the latest technological developments and inventions. To gain more insight, the validation will be extended to more e-learning experts from various universities.

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