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ML-BASED USABILITY EVALUATION OF EDUCATIONAL MOBILE APPS FOR GROWN-UPS AND ADULTS

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Abstract

To assist children in developing efficient learning and writing abilities, there have been produced writing apps for children. These apps assist children in learning more quickly and improving basic skills including reading comprehension, orthographic coding, limited memory, and math issues. Children's mobile apps must meet three requirements to be developmentally meaningful as Apps must be well-designed to suit the educational learning needs of young children. Materials for the development of young children's cognitive, educational skills, socio-emotional skills, and physical development should be designed. Children are engaged in activities and behavior that promote the best developmental assets through digital contact. The utilization of the app decreases as the number of functionalities increases. Writing learning applications for kids still has a long way to go in terms of improving the user experience. The accelerated headway of advancement, particularly on the versatile application has extended portable clients, instructors, financial specialists, and understudies' liability as learning facilitators. Since development is improving, various mobiles and their applications keep on coming into the market to fulfill client demands by customization through versatile elements. Portable transformation is outstandingly useful in propelling versatile learning and an open door for the development of children, adults, and seniors moreover. Savvy cells give numerous natural highlights to perform numerous tasks and participate in your recreation time and occupied plan. Therefore, various affiliations made versatile applications as demonstrated by client interest. These applications give incorporate anyway the market is

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changing so people's solicitations are moreover changing with time. Applications depend on a modified mark of connection that isn't being facilitated with continuous time. Thus there is a hole between clients and cell phone applications and utilities. All people are not content with the usage of a similar connection point; they need different assortments, such as customization or variation. The review developed a couple of flexible features with a change application according to client necessities. In this paper, the review presents a flexible component that gives a decision in applications to change the association point according to client necessities by applying another proposed model for the assessment of supportive elements of savvy mobile phones. The Response Surface Strategy (RSM) plan is utilized to foresee the genuine qualities of usability in a setting with versatile highlights. These versatile highlights are assessed by ANOVA-based analysis and after analysis gives a supported condition for the assessment of versatile elements of brilliant PDAs. This analysis and reasoned results engaged the usability of shrewd cells in setting to users.

1. INTRODUCTION

The use of mobile devices for educational purposes is becoming more popular. Aside from traditional education, religious education applications are being produced in a variety of ways. Pakistan has a Muslim population of approximately 98 percent. As a result, non-formal Islamic education is critical for the development of Muslim youngsters. Mobile applications, on the other hand, can have challenges with usage that diminish consumer acceptance. These challenges come as a result of developers' failure to consider various factors. Features visibility, consistency, and feedback are all design principles. Furthermore, they may employ technical and complicated language that obstructs the application's use, rather than mapping with real concepts, which obstructs the application's use. The greatest applications for consumers are those that are usable and simple to comprehend, rather than those that include all of the capabilities. Some applications have a higher use rating than others because they allow the user to use the system more efficiently. (Bibi et al. 2020) The use of mobile learning applications can considerably increase children's mobile learning experiences. Some applications, on the other hand, fail to support and extend kids' knowledge of the subject they are studying. Furthermore, due to concerns such as a bad user interface, some youngsters are uninterested in mobile applications. As technology advances, a growing number of applications are released to satisfy the needs of consumers. Performance, effectiveness, learning ability, and user pleasure are the top four useable quality attributes. Children's mobile learning apps should be simple to use, learnable, intelligible, and appealing, as well as ensure that young users have a good time. In every unique interaction between the user and the smartphone application, the user interface is the most important factor, so meeting user criteria for mobile learning applications is critical. The useability measurement is regarded to be a crucial manual for developers in ensuring that the users can easily complete activities. (Mkpojiogu, Hussain, and Hassan 2018) With the advancement of mobile technology in education, there is a greater need to establish acceptable usage models to stay up with mobile learning apps. The application (ICT) was created for children with speech impediments and autism spectrum disorders. The software is a mobile/tablet-based tool that adapts mobile usage stages to assist children with autism in developing their optimum learning skills and talents. It is tailored to meet the needs of children based on their age groups

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and abilities. The autism spectrum encompasses a wide range of severe and mild problems. The app uses both graphics and voice to help children feel at ease and connect objects to their underlying meaning and connection. People on the autistic spectrum, as well as children with speech difficulties or disabilities, have benefited from this application's ability to interact and connect swiftly and simply. The software is unique in that it is designed to serve Arabic learners in their language since most other autistic apps cater to English speakers [1-3].

Nowadays in the field of technology, many challenges occur. Because of their ease of use and accessibility, some internet technologies have increased learning activities. Because the use of portable devices is on the rise, there is a huge opportunity to use them for educational reasons. Malaysia has a 61.3 percent Muslim population. As a result, informal Islamic learning for youngsters is an important aspect of any Muslim child's growth. Rather than Hadiths, the vast majority of parents think that educating their children about Dua supplication and remembering is very important. Teachers at preschools, on the other hand, use animated movies to teach children about Hadiths [4].

The goal of educational mobile computing applications is to facilitate learning. A major problem for designers and Human-Computer Interaction (HCI) engineers and researchers is to create software programs that include and support learners who are extremely new to computers. Users will tolerate the widespread usage of app services only if they are understandable. As a result, being worth guessing or anticipating the usability elements of a system under observation is of great interest. The focus should be placed on usability with learning material to make educational applications beneficial for learning and to boost the progress and market of these apps [5].

2. LITERATURE REVIEW

The invention of smartphones and other handheld devices increased their availability to the general public; from students to teachers and businessmen to employees almost everyone is using mobile phones according to his need. The purpose of developing mobile applications is not to just deploy them to market but to provide an efficient environment to the users. To make sure the developing applications are easy to use by their intended users. Usability is defined as maximizing the comfort level of the users while using the application, specifically while using an application for learning purposes [6].

Multiple mobile devices are a big part of our lives. From personal to business purposes, education to banks, health to shopping almost in all fields mobile devices are widely used. Here we are going to talk about the usability of mobile applications in the education field. Mobile-aided learning is helping us to learn anything, anywhere in the world and at any time of the day. It has proved such an amazing tool for learning that is why almost every institute is using this technology to enhance the learning capabilities of their students. Alongside its so many advantages, there are also some difficulties the learner face while using mobile applications for their learning. Some improperly designed applications like small screen sizes, not being able to take input, audio video

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mismatched problems, and not keeping a record of learners' progress are some major drawbacks of mobile applications [7].

Usability is an essential element of mobile learning applications, properly developed applications can prevent them from being difficult to use. Usability is one of the key factors that determine the success of many applications. The technical hindrance of mobile devices and attaining an excessive level of user satisfaction is crucial for the success of mobile applications and this reason usability evaluation of the mobile application is very important to make sure that the application is effective and easy to use [8].

There are many features of usability attributes that are used to measure the quality of mobile learning applications. Here we will discuss some basic usability attributes efficiency, learnability, memorability, errors free, effectiveness, user satisfaction, simplicity, comprehensibility, and learning performance Using mobile phones for learning purposes we have a very large educational material available online which decreased the cost and increased the flexibility of learning. Mobile phone learning has various advantages, one of them is that learning as well as teaching does not require a specific place and a specific time, rather it can occur anytime and anywhere according to learners' schedules [9].

In literature, there are many varied definitions of mobile application learning but all of them narrow down to learning supported by mobile and hand-carry devices which are independent of any specified location and time. Some benefits of adopting mobile learning technologies include (a) developing a self-centered learning methodology in students, (b) providing a better communication environment between learners and instructors for a better outcome, (c) no barrier to geographical constraints because learning can be done at any time and any place. There are also a few challenges the learners face in mobile learning, (a) it draws a gap between the students who are technically good and skilled with the latest technologies and those students who are technically non-efficient in terms of the latest technology, (b) learners and instructors are highly dependent on network resources like they must have a good internet connection to participate in the online class, (c) as the students and teachers are far away from each other so it can create some sort of isolation sense amongst them [10].

Mobile learning application developers also face different challenges while designing and developing mobile applications due to these reasons, device capability and context of use. A device capability--- Physical constraint of mobile devices like small screen size and less resolution affects the usability of mobile learning applications. As students do not like reading course material from very small screen sizes. Small touch screens and small buttons are major causes of students' unpleasant experiences with mobile learning applications. Context of use--- Learners often use different mobile devices for accessing the application so a well-defined model of mobile application is very difficult to design and implement which will apply to all kinds of mobile devices [11].

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With the increase of mobile phones and other wireless hand-carry devices, the trend of mobile learning or self-learning is widely spreading amongst the young generation who has grown up with mobile phones in their hands. That is why mobile application developers are trying to develop such applications that will enhance the experience of self-learning and be accepted by learners. But the problem here is that mobile learning applications are way much different from web-based applications or desktop applications because mobile applications are designed for small screen sizes. Developing a good and effective mobile learning application is not an easy task because there are some major inherited limitations of different mobile devices like small screen sizes, lack of taking input from learners, and less processing power. To completely overcome such difficulties the usability of newly developed applications must be evaluated [12].

Human-Computer Interaction (HCI) is an area of study that determines the ways and aspects in which a human interacts with a computer. Usability of application is the core area of Human-Computer Interaction because when an application is too difficult to use by its users then that application will not facilitate users and become useless. Therefore, we can say that the usability evaluation of any mobile education application is the core area in the field of Human-Computer Interaction (HCI). So before developing any mobile application for education purposes, the first thing we need to consider is its usability, we need to consider that our application must have a user-friendly interface and a nice and fancy environment for learning because it has been observed that if students don't have a good environment of learning whether it is their classroom or their mobile application they fed up and cannot achieve their goals so it is very essential to provide them their desired environment of learning [13].

Mobile learning applications are being created for different purposes. One of them would be for helping students in reexamining their illustrations. Correction is a sort of review that includes checking out notes and other course materials in anticipation of an assessment or a test. To that end, mobile learning applications can be created as one of the compelling amendment approaches in setting up the understudies for assessments. The understudies accept that mobile learning is more successful as a learning device when contrasted with the past correction approach which is utilizing reading material and notes. Digital recording is one of the new mobile innovations that offer understudies a chance to do a deliberate update for their assessments [14].

3. METHODOLOGY

In user-centered and interactive design, end users' expertise in the creation of new applications is valued. Similarly, children's experiences with what they love and how they learn may be a significant source of inspiration for product designers working with them. Based on three projects and three needs-gathering methodologies, we share experiences learned from collaborating with high school children in the design of learning environments in this article. We also talk about how the kids felt about participating. In terms of the user interface and contents of the learning environments

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under development, the children's contributions provided valuable, both expected and unexpected, effects. Furthermore, we discuss design-related difficulties. Partnership with children, specifically in terms of the children's sense of ownership of the result. To test the usability assessment of portable applications different reviews are finished on numerous instructive, persuasive, gaming, and Islamic children applications to work on their efficiency, unwavering quality, and client satisfaction. A group is separated into 7 gatherings to encounter the working and criticism of various applications as per various ages 40 participants participated in usability testing for each gathering. As per activity, at least eight to ten people are important to give solid appraisals to uncover the usability issues of a connection point. The members were a blend of young men and young ladies with fluctuating degrees of involvement, going from fledgling to progress. The young people were all in higher education, 21 to 40 years of age, and were chosen from universities. For the trial of usability, every member was permitted to give a shot at both educational and entertainment applications. Every one of the members needed to follow through with 7 jobs. Both applications have their arrangements of highlights. Individuals that went to were permitted a wide opportunity to research before playing out the exercises; you should initially introduce the projects. Equivalent time is given for various applications to satisfy the errands. In the wake of finishing the job Following Questionnaire and assignment list are expected to finish closing the usability assessment given in the annexure [15-23].

3.1 Efficiency

Efficiency alludes to the quantity of consumption made concerning the accuracy and culmination with which clients satisfy their goals. The overall usability of mobile learning applications for youngsters is a basic issue since kids would rather not try hard with the applications because the UI isn't intriguing to them. Under the efficiency aspect, three sub-aspects were recognized (Compatibility, Time Loading, and Accuracy) [24].

$$\text{Time Based Efficiency} = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{n_{ij}}{t_{ij}}\right) \qquad \textbf{(1)}$$

N= Number of Jobs

R= Number of Contestants

nij = Job I result by contestants j (For successful nij= 1 and unsuccessful nij = 0)

tij = Time to complete job j by contestant i (in case of unsuccessful contestant time taken till the quitting of a job)

Eq. (1) represents the formula of time-based efficiency to calculate the efficiency of different tasks performed by participants.

3.2 Effectiveness

The exactness and consistency with which clients accomplish given objectives are characterized as effectiveness. In most examinations, it is calculated by the number of

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right responses. These two sub-factors were joined to assess the efficiency of the application interface: (Navigation and Presentation) [25].

$$\text{Effectiveness} = \frac{\text{Total Number of Successful Participants}}{\text{Total Number of Participants}} * 100 \quad (2)$$

Eq. (2) represents the effectiveness of the adaptive features of smart cellular phones in terms of easiness and successfulness behavior of the features adopted.

3.3 Operability

Operability is defined as how much an item or framework has features that simplify it to utilize and control. It's Error insurance for clients. [26].

3.4 User Satisfaction

The degree to which an item can be used by unambiguous clients to accomplish explicit objectives in a particular setting with viability, efficiency and satisfaction, so User Satisfaction is only one of the significant components of usability, as per the ISO definition [27].

3.5 Adaptive Features of Educational Mobile Apps selection

As of now, cell phones furnish an assortment of Apps alongside different versatile elements. The adaptivity gives critical convenience to beat the different existing issues with the end goal that effectiveness, data over-burdening, screen jumble, task fruition backing, and restricted association component. The definite investigation of 100 for the most part utilized Applications to give us the specific vision to achieve the objective, some of them are mentioned in Annex 1. These Apps are reassembled into seven classes for example (i) correspondence (ii) long-range interpersonal communication (iii) diversion (iv) news and data (v) utility, (vi) specialist organization (vii) perusing. In any case, inaccessible, difficult to reach, work area and windows portable based 45 Apps avoided. Just 55 Apps chose which are uninhibitedly accessible, available, and most often utilized among students. Moreover, 22 elements are chosen cautiously and cross-coordinated with supporting versatile OS to figure out amazing examples. Various examples are chosen based on accessible, not accessible, somewhat accessible, and not pertinent. At last, five highlights including Multi-Language Support; Mock Text, Screen Sharing, Session Recording, and Login are chosen because of their rich example capacity [28].

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3.6 Usability Model

Figure 1: Proposed usability model for adaptive features of smart cellular phones

4. EXPERIMENTATION AND SAMPLING

Data that is used for the methodology is primary data that is gathered during and after the activity performed that can be used by anyone. In this review, members were cell phone users with no less than one year of involvement. A per-questionnaire was created to figure out the significant members for the best client trial and error. At first, 300 members were found through a questionnaire in which 50 users were disposed of in the initial step due to the short of one year of involvement in cell phone use. A few members were rejected because of different reasons, explicitly 29 users were willfully not willing, 11 with vision issues, and 10 were incapable to figure out the versatile elements. The excess 200 members were chosen for the trial and partitioned into five gatherings. Each gathering was relegated to a particular undertaking that contained 40 members in equivalent orientation proportion. Besides, all undertakings were acted in four meetings with and without versatile highlights. The members went to a basic exhibition in the lab for the two meetings independently for each undertaking. They exhibited the importance and proportions of doled-out errands momentarily. The period of members for the initial three gatherings went from 08 to 20 years [29].

4.1 Group A: Task (Mock Text)

Users were coordinated to play out these mock texts by empowering and crippling their cell phone highlights. The distributed time was six minutes and determined by the idea of the errands including looking for and choice of items from the gadget. All the users are given the same task. The total number of participants that participate in this is 40

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and the time allowed is 6 minutes. The undertaking finish time is noted regarding the execution of each task. The typical undertaking finish time was 4.50 minutes [30].

4.2 Group B: Task (Session Recording)

In this assignment, users are asked to use their mobile phones for Session Recording. The point was to analyze whether the action of turning the session recording on and off may influence the effectiveness, efficiency, and satisfaction of the user. The greatest time distributed for this undertaking was thirty minutes considering the normal and most pessimistic scenario. The investigation was noticed cautiously by keeping up with their record [31].

4.3 Group C: Task (Screen Sharing)

Chosen members were mentioned to turn off their warnings for four hours sequentially with their assent. The users were evaluated to share screens especially about missing significant, earnest, deferred, and crisis notices. The got perusing from the members gave a critical understanding concerning Screen Sharing.

4.4 Group D: Task (Multi Language Support)

Chosen members were mentioned to turn on their Multi-Language Support and use their mobile with other languages. The users were evaluated to enroll their sentiments, especially about how they feel to use mobile other than the English language. Also asked the members are the features of the multi-language support are helpful for them or not.

4.5 Group G: Task (Login)

Very much busy users or users with an adult Login need this type of action. The study finds some grown-up users and a few users with a high workload. The study performed tasks from these users for the evaluation of usability with given attributes.

4.6 Activity Table for the Given Data

Table 1: Activity Table with Adaptive Features

Group	Task	Total Participants	Total Time (minutes)	Post Task Evaluation
Group A	Mock Text	40	06	ASQ
Group B	Session Recording	40	30	ASQ
Group C	Screen Sharing	40	60	ASQ
Group D	Multi-Language Support	40	60	ASQ
Group G	Login	40	60	ASQ

5. RESULTS AND DISCUSSION

5.1 Effectiveness

Effectiveness =81.94% (According to Response Surface Method)

Given results represent the overall effectiveness of all the selected adaptive features of smart cellular phones evaluated after the performance of tasks by participants.

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5.2 Efficiency

Efficiency = 64.92% (According to Response Surface Method)

Given results represent the overall effectiveness of all the selected adaptive features of smart cellular phones evaluated after the performance of tasks by participants. In this study's validation of usability, the model is carried out by the RSM approach.

5.3 ANOVA for Quadratic model

5.4 Response 1: Usability

Source	Sum of Squares	df	Mean Square	F-value	p-value	
Model	473.14	14	33.80	29.31	< 0.0001	significant
A-Effectiveness	0.0882	1	0.0882	0.0765	0.7859	
B-Efficiency	18.72	1	18.72	16.24	0.0011	
C-Satisfaction	0.0616	1	0.0616	0.0534	0.8204	
D-Operability	15.36	1	15.36	13.32	0.0024	
AB	26.91	1	26.91	23.33	0.0002	
AC	0.2152	1	0.2152	0.1866	0.6719	
AD	3.45	1	3.45	2.99	0.1043	
BC	0.0330	1	0.0330	0.0286	0.8679	
BD	19.77	1	19.77	17.15	0.0009	
CD	0.0732	1	0.0732	0.0635	0.8045	
A^2	9.21	1	9.21	7.99	0.0128	
B^2	7.18	1	7.18	6.23	0.0247	
C^2	0.0760	1	0.0760	0.0659	0.8008	
D^2	7.48	1	7.48	6.48	0.0224	
Residual	17.30	15	1.15			
Cor Total	490.43	29				

Factor coding is **Coded**.

The Sum of squares is **Type III - Partial**

The Model F-value of 29.31 infers the model is significant. There is just a 0.01% opportunity that an F-value this huge could happen because of clamor. P-esteems under 0.0500 demonstrate model terms are significant. For this situation, B, D, Stomach muscle, BD, A^2, B^2, D^2 are significant model terms. Values more prominent than 0.1000 demonstrate the model terms are not significant.

5.5 Fit Statistics

Std. Dev.	**1.07**	**R^2**	**0.9647**
Mean	72.43	**Adjusted R^2**	0.9318
C.V. %	1.48	**Predicted R^2**	0.7461
		Adeq Precision	19.7124

The Predicted R^2 of 0.7461 is in sensible concurrence with the Changed R^2 of 0.9318; for example, the thing that matters is under 0.2. Adeq Accuracy estimates the sign-to-clamor proportion. A proportion more noteworthy than 4 is alluring. Your proportion of 19.712 demonstrates a sufficient sign. This model can be utilized to explore the planned space.

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5.6 Coefficients in Terms of Coded Factors

Factor	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High	VIF
Intercept	-0.9870	1	16.90	-37.00	35.03	
A-Effectiveness	-4.15	1	15.00	-36.12	27.82	499.27
B-Efficiency	96.11	1	23.85	45.27	146.95	356.32
C-Satisfaction	-5.10	1	22.09	-52.19	41.98	114.01
D-Operability	198.02	1	54.25	82.39	313.64	430.12
AB	36.72	1	7.60	20.52	52.92	29.90
AC	3.27	1	7.58	-12.88	19.43	7.78
AD	-34.42	1	19.90	-76.84	8.01	374.71
BC	4.46	1	26.37	-51.74	60.66	33.26
BD	-165.16	1	39.89	-250.17	-80.14	327.54
CD	8.66	1	34.38	-64.61	81.93	94.82
A^2	18.81	1	6.66	4.62	33.01	157.06
B^2	-20.10	1	8.06	-37.28	-2.93	16.55
C^2	7.44	1	28.97	-54.31	69.19	17.12
D^2	-118.86	1	46.68	-218.36	-19.36	400.03

The coefficient gauge addresses the normal change in response per unit change in factor esteem while all excess variables are held steady. The capture in a symmetrical plan is the general typical response of the multitude of runs. The coefficients are changes around that typical in light of the component settings. At the point when the elements are symmetrical the VIFs are 1; VIFs more noteworthy than 1 show multi-linearity, the higher the VIF the more extreme the relationship of variables. As a harsh rule, VIFs under 10 are decent [24-26].

5.7 Factors

Factor	Name	Units	Type	Sub Type	Minimum	Maximum	Coded Low	Coded High	Mean	Std. Dev.
A	Effectiveness		Numeric	Continuous	60.00	100.00	-1 ↔ 1.00	+1 ↔ 100.00	81.94	14.70
B	Efficiency		Numeric	Continuous	50.00	83.33	-1 ↔ 1.00	+1 ↔ 100.00	64.92	7.81
C	Satisfaction		Numeric	Continuous	49.55	65.00	-1 ↔ 1.00	+1 ↔ 100.00	58.80	4.77
D	Operability		Numeric	Continuous	70.00	85.00	-1 ↔ 1.00	+1 ↔ 100.00	78.79	3.77

5.8 Build Information

File Version	**13.0.5.0**		
sStudy Type	Response Surface	**Subtype**	Randomized
Design Type	Central Composite	**Runs**	30.00
Design Model	Quadratic	**Blocks**	No Blocks
Build Time (ms)	390.00		

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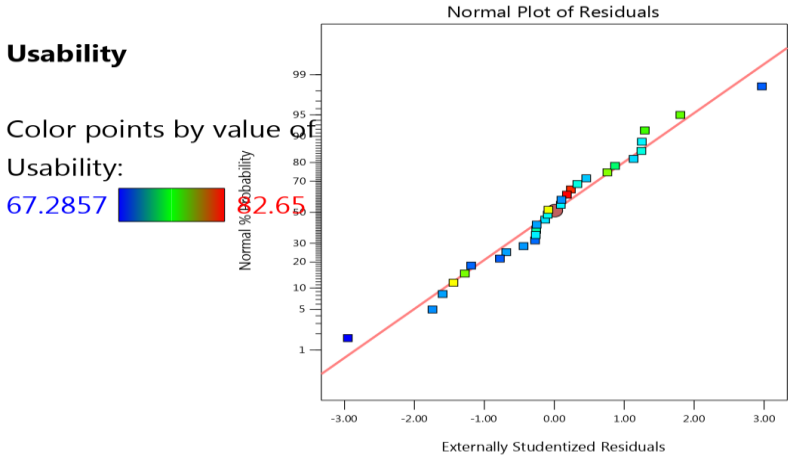

Figure 2: Normal Plot for the Accuracy of Results

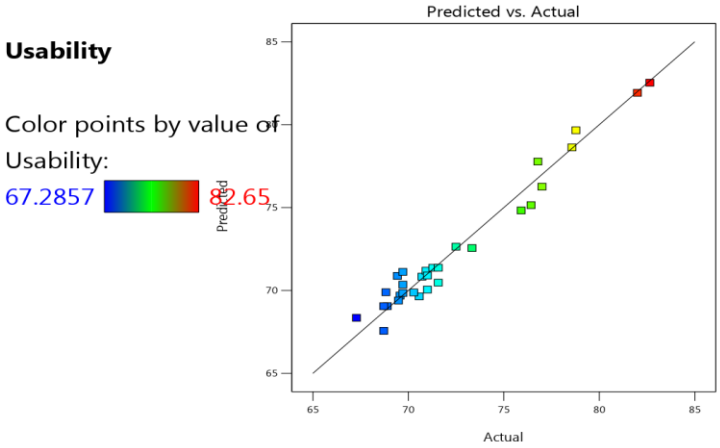

Figure 3: Residual Plot for Residual Values

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Vol: 41 Issue: 12-2022
DOI 10.17605/OSF.IO/YJ2E5

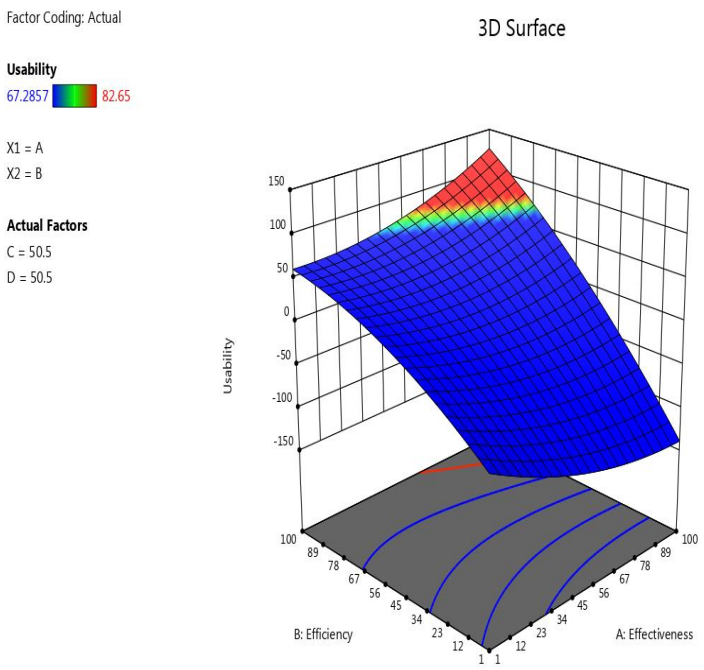

Figure 4: Relation and Effect of Efficiency and Effectiveness on Usability

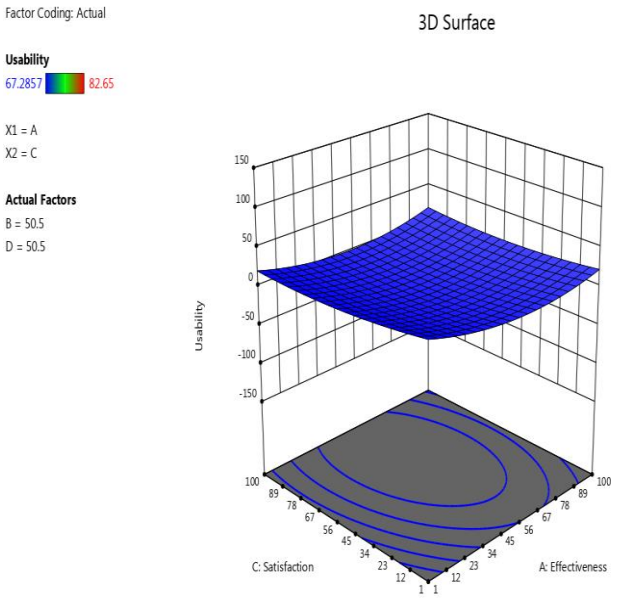

Figure 5: Relation and Effect of Satisfaction and Effectiveness on Usability

Jilin Daxue Xuebao (Gongxueban)/Journal of Jilin University (Engineering and Technology Edition)
ISSN: 1671-5497
E-Publication: Online Open Access
Vol: 41 Issue: 12-2022
DOI 10.17605/OSF.IO/YJ2E5

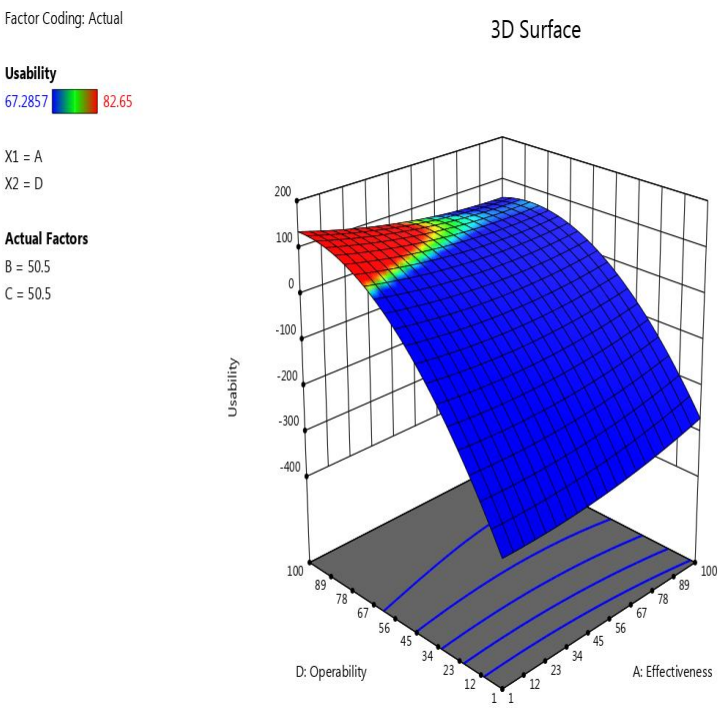

Figure 6: Relation and Effect of Operability and Effectiveness on Usability

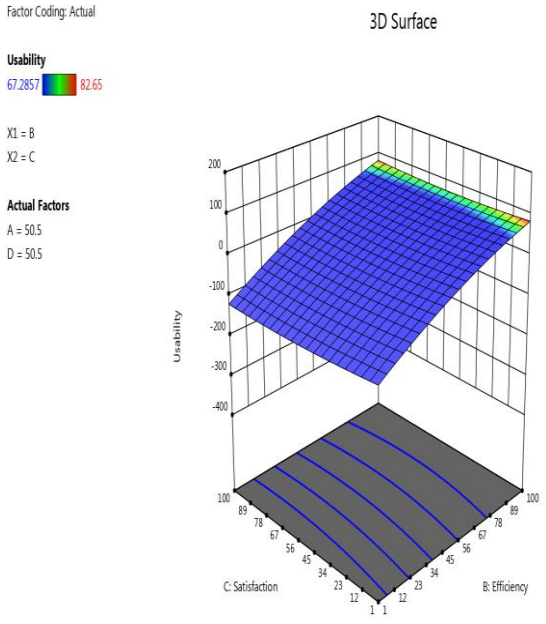

Figure 7: Relation and Effect of Satisfaction and Efficiency on Usability

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Vol: 41 Issue: 12-2022
DOI 10.17605/OSF.IO/YJ2E5

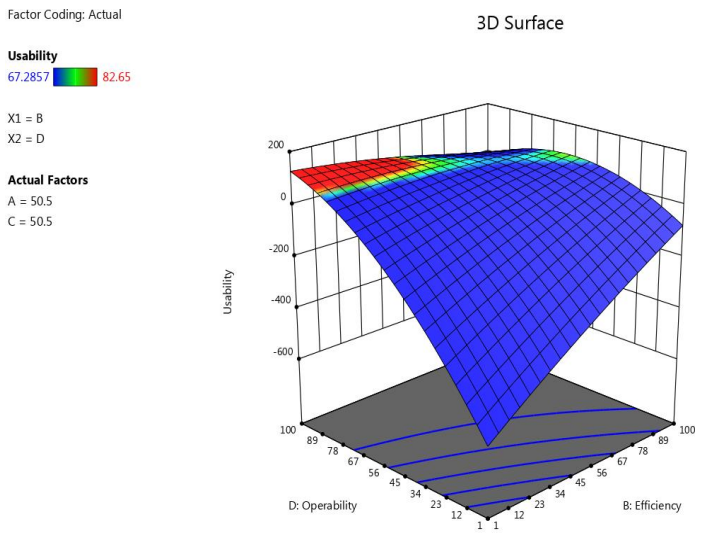

Figure 8: Relation and Effect of Operability and Efficiency on Usability

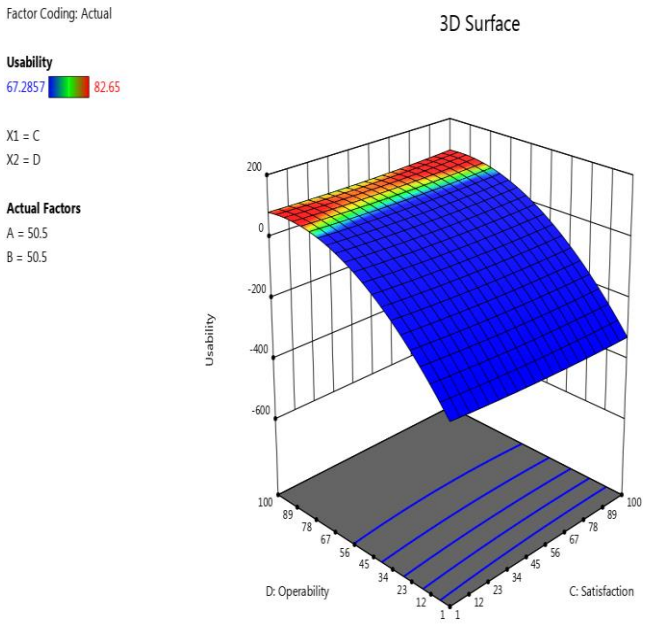

Figure 9: Relation and Effect of Operability and Satisfaction on Usability

The coded equation for the calculation of the Usability of Educational Mobile Apps for grown-ups and adults

$$Usability=0.987013+0.7859A+0.0011B+0.8204C+0.0024D+0.0002AB+0.6719AC+0.1043AD+0.8679BC+0.0009BD+0.8045CD+0.0128A^2+0.0247B^2+0.8008C^2+0.0224D^2$$

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CONCLUSION

The ANOVA-based analysis opens gaps to improve the usability of adaptive features for effective use and find the relationships between different attributes with usability. The ANOVA model applied is more appropriate and significant shown in Table. Further exploration should be on the awareness (interestingness), attractiveness satisfaction, and some extent to efficiency in a few cases of the parts of adaptive features; limit the gap between users (like children and understudies those for whom these applications are created) and specialists (like IT specialists and developers) to improve interfaces and adaptive features. It is suggested that usability evaluation of adaptive features of smart cellular phones and their applications be led sub-task-wise in each interaction to further develop the satisfaction level of users because some users can't focus on tasks the same as others.

In this paper, the study took a look at the convenience of adaptive features given by sellers in smartphones. The study assessed these adaptive features because of efficiency, productivity, and fulfillment. We have followed the User Centered Design (UCD) to break down the Usability of adaptive mobile features. It is observed that the purpose for less efficiency is trouble in acknowledgment of the emphasis of most clients. The LED notifications adaptive feature is predominantly driving better usability with practically 64.92% efficiency and 81.91 % effectiveness.

In the case of children's mode, the adaptive feature is 10% more successful and effective than the ordinary mode. However, the computation of fulfillment level in kids was impractical because of their restricted comprehension of ASQ yet they finished their responsibilities effectively and productively. Subsequently, the versatile climate (Kid mode) for explicit client bunch (kids) showed preferable ease of use over the adaptive environment for nonexclusive clients.

We distinguished that usability issues of adaptivity still exist because of uniform adaptive features given by the smartphone developers paying little mind to client capacity and task context. Right now, the user decides to turn on or off any adaptive features while performing any specific task. The trial result infers that the adaptivity in the client interface has a more noteworthy capacity to build the convenience of smartphones whenever applied in a reasonable context. Finally, I would like to recommend that the interface of smartphones should be more adaptive, easy to use by everyone, and customizable.

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Annexure

Mobile App features	Chat Admin	Multi Language Support	Dash Board	Mock Text	Provide offline content	Screen Sharing	Session Recording	File Sharing	In session chat	Live streaming	Login	Upload video	Write Text	User Friendly Interface	Push Notification	Backup	Personalization	Gamification	Search Option	Free Access	24/7 Services	Customized Avatar	Privacy	Editing	History	Add Pictures	Record Saving	Audiable	Progress Tracking	Strong DataBase	Availbility	Personalized Learning	Selection	Gravity	Feed Back
Google Class Room	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
Book Creator	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y	N	Y
Hellosaurus	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	Y	Y	Y	N	Y
ABCmouse.com	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
Khan Academy	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
EDmodo	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
Kahoot!	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
Socrative Student	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
Near Pod	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
Remind	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
Quizlet	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
New-O-Matic EDU	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
EverNte	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
WolframAlpha	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
Piaza	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
NASA	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
Star Walk 2	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
Google Earth	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y
Duolingo	Y	Y	Y	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y