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Comparison of mobile learning applications in classroom learning in vocational education technology students based on usability testing

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Abstract. The existence of mobile learning application development aims to deliver knowledge, skills and attitudes by utilizing mobile technology to learners, which are used to display images, video, and animation so that learners gain an understanding of the concept intact and meaningful representation of the results of learning science intact. The existence of various applications available online required evaluation of the usefulness and value of benefits that can be generated so that the learning process can be achieved in accordance with the expected competencies in learning. The accuracy of the educator determines the proper application of mobile learning as needed for the competency achievement in the learning process, so that in this study will be evaluated various mobile learning applications that can be used in learning on vocational technology education. This method will conduct a survey on students and also usability testing using software to some existing mobile learning applications. The purpose of this study is to find out the right mobile learning application used for learning in vocational technology education.

1. Introduction

Smartphone users today are mushrooming from child to adult. By 2015, smartphone users in Indonesia reached 55 Million, the site also mentioned e-marketer also projected that in 2016 to 2019 smartphone users in Indonesia will continue to grow. The fact that learners are carrying more smartphones than learners who bring laptops. The results of a survey conducted by the Association of Internet Service Providers Indonesia (APJII) in 2017, the number of internet users in Indonesia reached 143.26 million people. This figure increased compared to the previous year, which is recorded in 2016 reached 132.7 million people.

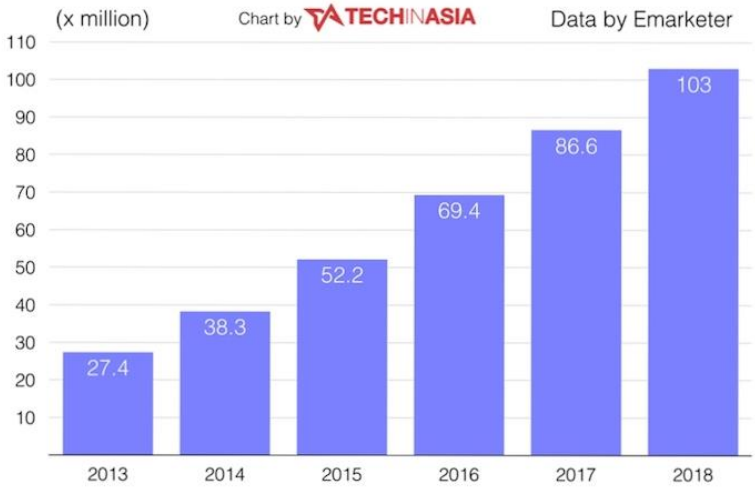

Figure 1. Monthly active smartphone users in Indonesia.

Digital marketing research institute EMarketer estimates that by 2018 the number of active smartphone users in Indonesia will reach more than 100 million people. With that amount, Indonesia will be the country with the fourth largest smartphone active users in the world after China, India, and America [1].

The stage of educational technology development, which moves through the programmed instruction stage, computer aid instruction, Internet-connected e-learning, and even wireless m-learning context [2].

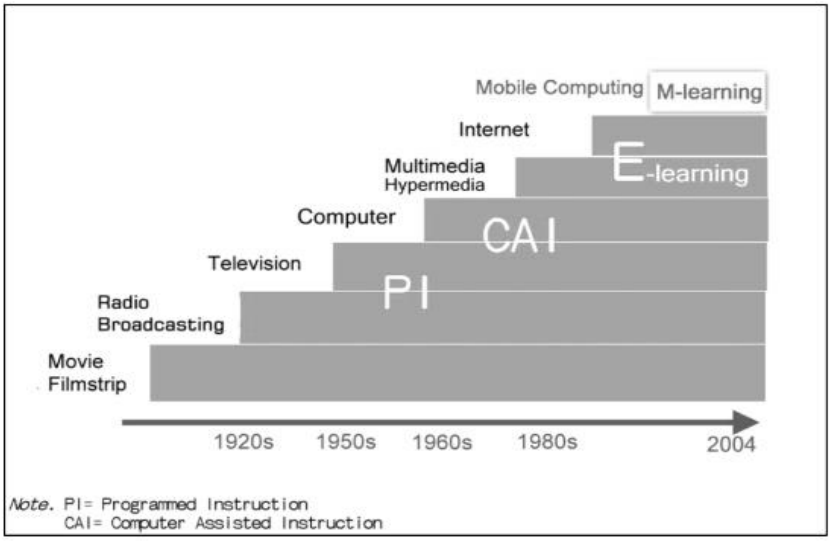

Figure 2. The stage of educational technology development.

In this study we will analyze the comparison of Mobile Learning Applications Edmodo, schoology and google classroom in classroom learning in vocational technology education based on usability testing with reference to the accessibility standard issued by Web Content Accessibility Guidelines Version 2.0 (WCAG 2.0) using MobileOk Checker and tools mobile friendly testing. And survey conducted through a poll to 100 students of Vocational High School Department of Computer Engineering and Networking based on practical perspective in implementing mobile learning written Towards Maturity about Mobile Learning in the Workplace.

2. Research method

This research takes a multi-faceted approach to data collection. This study uses quantitative techniques online using OK Checker mobile applications and mobile friendly applications, while the qualitative data to support these findings is obtained from surveys and interviews [3]

In this paper the authors use research instruments based on practical perspectives in applying mobile learning and using tools to measure the convenience of access through the MobileOK Checker v1.2.2 and mobile friendly applications.

- MobileOK Checker v1.2.2, is used to test mobile web accessibility (mobile-friendliness). A web page is considered mobileOK if through all tests performed. The standards used by mobileOK Checker are Mobile Web Best Practices 1.0 and Mobile Web Best Practices flipcard
- The Mobile-Friendly Test Tools in Search Console is a way to test whether the pages on your site are mobile-friendly or not? Test results include screenshots of page views Google sees on mobile devices, as well as a list of any mobile usability issues it finds. Mobile usability issues are issues that can affect users who visit those pages on mobile devices (with small screens), including small font sizes (which are hard to read on small screens) and Flash usage (which is not supported by most mobile devices).

3. Experimental design

The research objectives compare the appropriate mobile applications for the learning process in vocational technology education students. Testing of this mobile learning application through survey respondents 100 students of Vocational High School based on practical perspective in applying mobile learning and using tools to measure accessibility level through application of MobileOK Checker v1.2.2 and Mobile-Friendly Site in Search Console.

3.1. The survey instrument is a practical perspective in implementing mobile learning

- Identify the need, objective(s), and role. Identify the challenge, problem, or need, and clearly articulate how mLearning will help address or solve it.
- Design to support the use context. Identify how and for what the material will be used, and design accordingly.
- Tablet Learning could be a good start. Their size resembles that of desktops, so they may be more easily accepted and used. mEnabling existing eLearning gives access to familiar material on a new device.
- Responsive is the way to go! Deliver a consistent, efficient, and engaging learning experience on a wide variety of device-platform-browser combinations.
- Don't miss out on videos. Video-based content is easy to understand and can be used in multiple scenarios - and it's easily portable to mobile devices.
- Encourage sharing and collaboration. Exploit users' social media familiarity and experience as well as the unique affordances of mobile devices to capture, share, and collaborate. Align mobile to mainstream knowledge and learning. Integrate mobile as a component into your overall learning strategy.
- Have a BYOD policy. This is a quick and cost-effective way to adopt mLearning - but make sure to evaluate the associated security risks.
- Revisit and re-evaluate. Review and re-engineer to keep in line with mobile technology changes. Ensure that the technology and design allow for changes and additions.

3.2. MobileOK Checker v1.4.2 accessed through the website page http://mobile.css-validator.org/

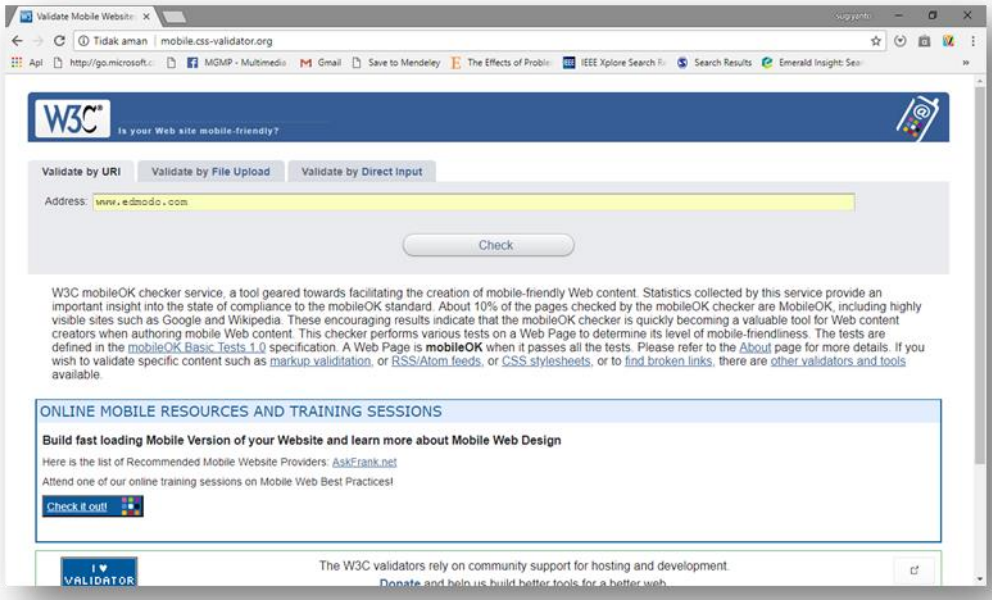

Figure 3. Website page http://mobile.css-validator.org/

MobileOK W3C checker service, a tool geared to facilitate the creation of mobile-friendly Web content. The statistics collected by this service provide important insights into the compliance status of mobileOK standards. Approximately 10% of pages checked by mobileOK inspectors are MobileOK, including highly visible sites like Google and Wikipedia. This encouraging result shows that mobileOK checkers are quickly becoming a valuable tool for Web creators when creating mobile Web content. This checker performs various tests on the Web Page to determine the level of compliance for mobile. The tests are defined in the MobileOK Basic Tests 1.0 specification. Web page is mobileOK when it passes all tests.

3.3. Mobile-Friendly Sites may be accessed through https://search.google.com/test/mobile-friendly

This site is to find out if your website is mobile-friendly. Non-mobile-friendly versions require users to shrink or enlarge a website in order to read the content. Users have trouble and tend to leave the site. Designing mobile apps appropriately for mobile-friendly will make the page work properly across all devices.

4. Evaluating process

4.1. Survey results through 100 respondents SMK students majoring in Computer Engineering and Networking

After conducting a survey of 100 respondents from the mobile learning application www.edmodo.com, www.schoology.com, https://classroom.google.com then the results obtained are as follows:

Table 1. Survey results through 100 respondents SMK students majoring in Computer Engineering and Networking

No.	Category of practical perspective in implementing mobile learning	Edmodo	Schoology	Google class room
1.	Identify the need, objective(s), and role. Identify the challenge, problem, or need, and clearly articulate how mLearning will help address or solve it.	79 %	67%	70%
2.	Design to support the use context. Identify how and for what the material will be used, and design accordingly.	86%	75%	70%
3.	Tablet Learning could be a good start. Their size resembles that of desktops, so they may be more easily accepted and used. mEnabling existing eLearning gives access to familiar material on a new device.	93%	85%	85%
4.	Responsive is the way to go! Deliver a consistent, efficient, and engaging learning experience on a wide variety of device-platform-browser combinations.	95%	80%	85%
5.	Don't miss out on videos. Video-based content is easy to understand and can be used in multiple scenarios - and it's easily portable to mobile devices.	89%	75%	70%
6.	Encourage sharing and collaboration. Exploit users' social media familiarity and experience as well as the unique affordances of mobile devices to capture, share, and collaborate. 丿 Align mobile to mainstream knowledge and learning. Integrate mobile as a component into your overall learning strategy.	97%	76%	80%
7.	Have a BYOD policy. This is a quick and cost-effective way to adopt mLearning - but make sure to evaluate the associated security risks.	90%	83%	75%
8.	Revisit and re-evaluate. Review and re-engineer to keep in line with mobile technology changes. Ensure that the technology and design allow for changes and additions.	82%	75%	75%
	Average	89%	77%	76%

From this data the respondents gave 89% recommendation for Edmodo, 77% for schoology and 76% for google class room. This means that over 75% of respondents provide recommendations for the usefulness of this mobile application, but the more prominent of these three mobile applications is Edmodo i.e. 89%.

4.2. MobileOK Checker v1.4.2

Table 2. MobileOK Checker result.

No	Failures Per Severity	Edmodo	Schoology	Google classroom
1.	Critical	1	3	0
2.	Severe	7	9	4
3.	Medium	2	3	1
4.	Low	3	2	4

Based on the Failures Per Severity of mobileOK Checker the highest critical level is in the application of schoology, the severe aspects of schoology and google classroom are more recommended from the Failures Per Severity level.

Table 3. Failures per category.

No	Failures Per Category	Edmodo	Schoology	Google classroom
1.	Rely on Web standards	3	3	2
2.	Stay away from known hazards	3	2	1
3.	Be cautious of device limitations	1	3	0
4.	Check graphics and colors	2	4	3
5.	Keep it small	2	1	2
6.	HTTP errors	2	3	1

Based on the lower recommended failures per category is google classroom which has fewer failures than the mobileOkChecker test results.

4.3. Site of mobile-friendly

Table 4. Site of mobile-friendly.

Mobile learning aplication	Page is mobile-friendly	Page partially loaded	Page Source Can not Load
www.edmodo.com	This page is easy to use on a mobile device	Not all page resources could be loaded. This can affect how Google sees and understands your page. Fix availability problems for any resources that can affect how Google understands your page.	14
www.schoology.com	This page is easy to use on a mobile device	Not all page resources could be loaded. This can affect how Google sees and understands your page. Fix availability problems for any resources that can affect how Google understands your page.	2
www.classroom.google.com/	This page is easy to use on a mobile device	Not all page resources could be loaded. This can affect how Google sees and understands your page. Fix availability problems for any resources that can affect how Google understands your page.	1

The same is also google classroom more mobile friendly than Edmodo and schoology based on Page Source Cannot Load only 1 page that cannot be loaded.

5. Conclusion

Based on findings from respondent polls and test tests using mobileOK checker and Mobile friendly that the highest mobile application usability rating level is in Edmodo applications but there is a page failure rate that is loaded as well as the level of failures per category that is still relevant for user use.
If you think of these input data, Schoology and Edmodo will be equal rivals, running neck-and-neck in all rounds. Tastes differ. Some are looking for a vibrant educator community, others are interested in new perks like gamification and motivation techniques, still others are willing to keep their workflow on mobile devices. Take a look at what the market has to offer, and judge for yourself.

It gets trickier with Google Classroom. LMS experts argue it's merely jumping on the bandwagon. Indeed, reinventing the wheel is a daunting task in this business. Something will surely go worse than in the competitors' camp, at least at the beginning. That said, Google will definitely pull a few strings to have a strong foothold in e-Learning. Many a teacher will switch to Classroom once it's feature-packed enough to cater to their routine tasks.

6. Recommendation

Development of mobile applications is still needed to adjust the need to support the learning process, specifically in vocational technology education, it is seen from the survey results through polls found from all categories that have not reached 100% of all categories of available mobile learning applications available and from surveys through online testing tools that are realized through mobile Checker and mobile friendly still found page failures that could not be loaded.

References

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