JMI, Vol 10 (2) (2023) pp. 18-24

Published by: Institute of Computer Science (IOCS)

JMI (Jurnal Manajemen Informatika) Medicom

Journal homepage: www. journals.joninstitute.org/index.php/jmi

Android-Based Learning Style Information System Development at SMK Muhammadiyah 1 Wates

Zulfa Kurniawan Shafyanta

Engineering and Informatics Education Faculty of Engineering, Yogyakarta State University, Indoneia

ARTICLE INFO

Article history:

Received Feb 22, 2023
Revised Mar 18, 2023
Accepted Mar 25, 2023

Keywords:

Android
Learning Style
ISO/IEC 25010
Information System

ABSTRACT

This study aims to (1) develop an android-based learning style information system to find out and provide information on the learning styles of students in each class, (2) determine the quality of the software developed based on the ISO/IEC 25010 software quality testing standard on the functional suitability aspect. , compatibility and usability. The method used in this research is Research and Development using the Rational Unified Process (RUP) software development procedure which consists of 4 stages, namely inception, elaboration, construction and transition. The results of this study are 1) an android-based learning style information system to find out and provide information on the learning styles of students in each class. To find out the learning styles of students,

Corresponding Author:

Zulfa Kurniawan Shafyanta,
Engineering and Informatics Education Faculty of Engineering,
Yogyakarta State University, Indonesia
Jl. Colombo Yogyakarta No.1, Karang Malang, Caturtunggal, Kec. Depok, Kabupaten Sleman, Daerah Istimewa Yogyakarta 55281, Indonesia
Email: zulfakurniawan@gmail.com

1. INTRODUCTION

Students or students according to Law No. RI. 20 of 2003 are community members who try to develop themselves through the educational process at certain levels and types of education. The main activity of a student is learning. Learning is the obligation of students to find and instruct knowledge in the brain (Sriyanto, 2007). One of the characteristics that affect the effectiveness of learning is the learning style of students, where after the learning style is known, an easier and more enjoyable learning strategy can be determined (Mansur, 2013). While the notion of learning style is the preferred way of thinking, processing, and understanding information (Lucy, 2010). Meanwhile, according to Bobby DePorter (2010) learning style is a person's way of absorbing information easily which is then referred to as a learning modality which is grouped into three groups, namely Visual Learning, Auditory Learning, and Kinesthetic Learning. To get effective learning outcomes, one of the requirements of an individual who in this case is a student is to be able to recognize his own learning style. Recognizing one's own learning style is not a guarantee of making someone smarter, but by knowing the learning style, one can determine a more effective way of learning (Tanta, 2010). Learning according to a learning style allows a person to easily accept lessons and improve learning outcomes (Widiyanti, 2013). Therefore, recognizing the right learning style is an aspect that should not be forgotten.

There are many benefits and advantages that can be obtained by understanding one's own learning style (Meiky, 2016). Some of the benefits that can be obtained include maximizing academic potential, understanding the best way to learn, overcoming learning limitations, increasing self-confidence. Knowing the best way to use the advantages of the brain, get information on your strengths and weaknesses (Fista, 2010). On the other hand, a teacher is required to recognize the learning characteristics of students in his class as part of the realm of pedagogic competence that

must be possessed by a teacher (Mansur, 2013). A teacher is also required to have a variety of teaching that can accommodate the learning styles of their students. Variations in providing explanations according to students' learning styles make the learning process more meaningful. Students are easier to catch ongoing lessons because what is given is in accordance with the way they absorb information (Bayu, 2015). Each student has a different ability to absorb the learning material delivered by the teacher at school. Some students master everything they read or see, other students by listening or by practicing directly. Differences in learning styles are not always the same for every student, it could be a tendency in a class to only have one learning style and others with different learning styles. Some students prefer their teachers to teach by writing material on the blackboard so that it can be read and then trying to understand it. Some other students prefer their teacher to teach by conveying it orally and they listen to understand it.

There are also some students who prefer to form small groups to discuss questions related to the lesson (Meiky, 2016). In these conditions, teachers are required to be observant in providing learning in the classroom so that teaching and learning time is effective (Mira, 2015). By knowing the tendency of students' learning styles in a class, it can be determined strategies or learning methods that are more effective and efficient. There are also some students who prefer to form small groups to discuss questions related to the lesson (Meiky, 2016). In these conditions, teachers are required to be observant in providing learning in the classroom so that teaching and learning time is effective (Mira, 2015). By knowing the tendency of students' learning styles in a class, it can be determined strategies or learning methods that are more effective and efficient. There are also some students who prefer to form small groups to discuss questions related to the lesson (Meiky, 2016). In these conditions, teachers are required to be observant in providing learning in the classroom so that teaching and learning time is effective (Mira, 2015). By knowing the tendency of students' learning styles in a class, it can be determined strategies or learning methods that are more effective and efficient.

2. RESEARCH METHOD

Research Methods Research and development of an android-based learning style information system uses Research and Development (R&D) research methods. According to Sugiyono (2010) research and development (R&D) methods are research methods used to produce a particular product and test the quality of the product.

Development Procedure In practice, the development of a learning style information system uses the Rational Unified Process Model. RUP has an Iterative and Incremental principle, which means that the development process is divided into several iterations and additions. In each iteration, additions, corrections, and improvements are made to devices developed from the beginning of development until a complete system is produced according to the needs that have been analyzed (Raul, 2013). In the Rational Unified Process, software development activities are wrapped in stages or more often referred to as phases that are owned by the Rational Unified Process. The activities of developing a software are carried out in all phases from start to finish but in different portions. The Rational Unified Process consists of several stages or phases, namely inception, elaboration, construction, and transition. Each stage has an output or target from the entire development process.

a. Inception Phase This stage is the first phase of the Rational Unified Process which explains the main requirements of the system and what the system will be like. The output or target of this stage is the preliminary conceptual model, requirements document in the form of high level use cases and supplementary specifications as well as a system development schedule.
b. Elaboration Stage A more detailed needs analysis is carried out in this stage by expanding use cases, creating sequence diagrams, class diagrams and making improvements to the conceptual model with each use case in more detail.
c. Construction Stage In this stage the coding process and testing of the developed program or system is carried out. In this study, the system developed is a mobile-based application with the Android platform. Tests carried out to determine the quality of application feasibility using the ISO 25010 standard.
d. Transition Stage This stage is the last stage where final tests are carried out and distribution or distribution of the system that has been developed to the users of the system. Distribution of the system is done so that the system that has been developed can be used by its users.

Research Variables Variables in this study are aspects of software testing carried out referring to the ISO 25010 standard including functional suitability, compatibility, and usability.

a. Functional Suitability is the software developed that has the ability to run functionality properly and smoothly according to user needs.
b. Compatibility, namely the software developed has the ability to work well on operating systems of various different specifications in carrying out each functionality.
c. Usability, namely the software has the ability to meet user needs with ease and convenience in its operation or use.

3. RESULTS AND DISCUSSIONS

Learning Style Results Using SIGB Learners who are research respondents use the SIGB application, one of the application features is a learning style test that uses the VAK Learning Styles Questionnaire learning style instrument (Sarah, 2015). Student respondents took the learning style test using SIGB, then when the test was finished, the system calculated the test results based on the calculation (formula) from Sarah's (2015) learning style instrument to determine student learning styles. The results of the learning style test that have been obtained by the system from respondents in this study are as follows:

Table 1. The results of the learning style test that have been obtained by the system from respondents

No Rsp.	Pernyataan																												Total Skor	Skor Max
	Usefulness								Ease of Use											Ease of Learning				Satisfaction							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
1	3	4	4	4	3	3	3	3	4	4	4	4	3	4	4	3	4	3	3	3	4	4	3	3	3	4	4	4	3	4	106	150
2	5	4	4	4	4	3	4	4	4	4	4	4	4	4	4	2	3	4	4	4	4	4	5	4	3	4	4	5	4	4	118	150
3	5	4	4	4	4	3	4	4	5	5	4	4	4	4	4	3	4	4	4	4	5	4	4	4	3	4	4	5	4	4	122	150
4	4	4	4	5	4	3	4	4	4	5	4	5	4	4	4	3	4	4	4	4	5	4	5	4	4	3	4	4	4	5	123	150
5	4	4	4	5	4	4	4	5	5	4	4	5	4	5	4	4	4	4	4	4	4	5	4	5	4	4	4	5	4	4	128	150
6	4	4	5	4	4	4	4	4	4	4	4	5	4	5	4	4	4	4	4	4	5	4	4	4	4	4	4	4	4	4	124	150
7	4	4	4	3	3	3	3	3	3	3	3	3	4	3	4	3	3	3	3	3	3	3	3	3	3	3	3	4	4	3	97	150
8	4	5	4	4	3	4	4	4	4	4	5	4	5	5	5	3	4	3	4	4	4	4	4	4	5	4	4	4	5	4	124	150
9	5	4	5	4	3	4	4	4	4	4	4	5	4	4	4	3	4	3	4	4	4	4	4	4	4	5	4	4	5	4	122	150
10	4	4	4	5	4	3	4	4	4	4	5	5	4	4	4	3	4	4	4	4	5	4	4	5	4	4	3	4	4	4	122	150
11	5	4	5	4	4	5	4	4	4	5	5	4	4	4	5	4	5	4	4	4	5	4	4	4	5	4	4	5	4	4	130	150
12	5	4	5	4	4	5	4	4	5	5	5	4	4	5	5	4	5	4	4	4	5	5	4	4	4	4	5	5	5	5	135	150
13	4	4	4	4	3	3	3	4	4	4	4	4	3	4	3	3	3	3	3	3	4	3	4	3	3	3	3	4	3	4	104	150
14	5	4	4	4	4	5	4	4	5	5	4	5	4	5	4	4	4	4	4	5	4	4	5	4	4	4	5	4	4	4	129	150
15	5	4	4	4	4	4	4	4	5	5	5	5	4	5	4	4	4	4	4	4	5	4	4	4	4	4	4	5	4	4	128	150
16	4	5	5	4	5	3	5	3	4	4	4	4	4	5	4	3	3	4	5	4	4	4	5	4	3	4	4	3	4	5	122	150
17	4	4	5	4	5	3	4	3	4	4	4	4	4	4	4	3	3	4	4	4	4	4	4	4	3	4	4	3	5	4	117	150
18	5	4	5	4	3	4	4	5	4	4	5	5	5	4	3	3	3	4	5	4	4	3	4	4	5	5	4	4	5	4	125	150
19	5	4	4	4	3	4	3	4	4	4	4	5	4	4	3	3	3	4	4	4	4	3	4	4	4	5	4	4	4	4	117	150
20	5	4	4	4	4	3	4	4	5	5	4	5	4	4	3	2	3	4	4	3	5	3	3	5	5	4	4	5	5	4	121	150
21	5	4	4	4	3	4	3	4	4	4	4	5	4	4	3	3	3	4	4	4	4	5	4	4	4	5	4	4	4	4	119	150
22	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	2	5	5	5	5	4	4	4	5	5	4	4	4	5	5	130	150
23	5	5	4	4	3	3	4	4	4	4	4	4	3	4	3	3	3	3	4	4	4	4	3	3	3	3	4	4	3	4	110	150
24	4	4	4	3	3	4	4	4	4	4	4	4	4	4	4	4	5	4	5	4	4	4	4	4	5	5	4	4	4	4	122	150
25	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	2	5	5	5	5	4	4	4	5	5	4	4	5	4	5	130	150
26	4	4	4	3	3	4	4	4	4	4	4	4	4	4	4	4	5	4	5	4	4	4	4	4	5	5	4	4	4	4	122	150
27	4	4	4	3	2	3	3	4	4	4	4	4	3	5	4	2	3	3	3	3	4	4	4	4	3	3	3	4	3	3	104	150
28	5	4	4	4	4	3	4	4	5	5	3	5	4	4	3	2	3	4	4	3	5	3	3	5	5	4	4	5	5	4	120	150
29	4	4	4	3	3	3	3	4	4	4	4	4	3	5	4	3	3	3	3	3	4	4	4	4	3	3	3	4	4	3	107	150
30	5	4	4	4	4	3	4	4	5	5	4	5	4	4	3	2	3	4	4	3	5	3	3	5	5	4	4	5	5	4	121	150
31	4	5	4	4	3	4	3	4	4	4	4	4	4	5	4	3	3	4	4	3	4	5	4	4	4	5	4	4	3	4	118	150
32	5	4	4	4	4	3	3	4	4	4	4	4	3	5	3	3	3	4	4	4	4	4	4	4	3	4	4	4	4	4	115	150
Total																															3832	4800

3.1 Test result

Conclusion Based on the research and discussion that has been done, the following conclusions are drawn.

a. This study resulted in the SIGB application as an information system used to identify and provide information on the learning styles of students in each class. The resulting software

is developed on the Android platform and uses the Android Studio application development tool.

b. The results of the SIGB application quality analysis using the ISO 25010 quality standard and obtaining test results on the functional suitability aspect are very feasible because all functions can run 100% after being tested by 4 respondents who know about software development procedures. While in the compatibility aspect, the test results are very feasible because the application can run side by side with other applications (co-existence), can run on various versions of the Android operating system, can run on various types and screen sizes on Android devices. The last is the usability aspect which obtained a proper test result with a value of 79.83%. So in general the SIGB application is feasible as an information system for student learning styles at SMK Muhammadiyah 1 Wates.

c.

Table 2. Criteria for Interpretation of Scores

NO	Percentage	Interpretation
1	0% - 20%	Very Inappropriate
2	21% - 40%	less worthy
3	41% - 60%	Decent enough
4	61% -80%	Worthy
5	81% - 100%	Very Worthy

The test results on the functional suitability aspect get a score of 100%, this shows that the functional suitability of the SIGB application gets a very decent predicate. In the compatibility aspect, co-existence testing is carried out (applications can run side by side with other applications), testing on various operating systems, device types and various screen sizes. Testing on this aspect uses direct testing on the device and uses tools from testdroid.

In the aspect of co-existence, the test was carried out by running SIGB and 10 other applications alternately on the same device and 100% of the SIGB applications were able to run side by side with other applications. Testing on various operating systems, testing the SIGB application on the Android 4.1.2 to 6.0.1 operating system and getting 100% results that the SIGB application can run on the operating system. Testing on various types of devices in the test using 10 different types/models of devices and getting 100% results that the SIGB application can run on different types of devices.

Testing on various screen sizes is carried out by testing the SIGB application using screen size devices from 480x800 to 2048x1536 and getting 100% results that the SIGB application can run on devices with different screen sizes. The test results on the compatibility aspect get a score of 100%, these results are then correlated with the score interpretation criteria (Sudaryono, 2011). It can be concluded that the compatibility aspect of the SIGB application gets a very decent predicate. The usability aspect was tested by 27 students and 5 teachers at SMK Muhammadiyah 1 Wates. From the tests that have been carried out, the results obtained are 79.83% as the usability number of the SIGB application. These results are then correlated with the score interpretation criteria (Sudaryono, 2011). It can be concluded that the usability aspect of the SIGB application gets a proper predicate.

4. CONCLUSION

The conclusions from the information system for managing village fund assistance in the Rantau Jaya Udik Village, Sukadana Lampung Timur are as follows: a. The system built is integrated between the village head, secretarial treasurer, and the head of the farmer group, so that it can make it easier to manage aid and submit training for the farmer groups themselves. b. The system built can make it easier to manage village fund assistance and manage activities that are being planned or activities that will be carried out. c. This system also makes it easier for the head of the farmer group to see farmer group assistance, take assistance, submit training and assistance as well as in making reports on taking farmer group assistance.

REFERENCES

Anwar, A. 2014. A Review of RUP (Rational Unified Process). International Journal of Software Engineering (IJSE).

Asiatun, Captain. 2011. Development of the Self Evaluation Database of the Department of Food and Clothing Engineering, Faculty of Engineering, UNY. Journal of Technology and Vocational Education, Faculty of Engineering, UNY, Vol 20, No 2.

Brunette, Ed. 2010. Hello, Android 3rd Edition. United States: The Pragmatic Bookshelf.

David, AB 2011. Mobile Application Testing Best Practices do Ensure Quality. amdocs. Djahir, Yulia and Pratita,

Goddess. 2014. Management Information System. Yogyakarta: Depublish.

DePorter, Bobbi. 2010. Quantum Teaching (2nd Edition). Bandung: Kaifa.

Gallop Solutions. 2015. Why do you need Compatibility Testing. Accessed via http://www.gallop.net/blog/why-do-you-need-compatibility-testing/ on 09 March 2017 at 09.00 WIB.

Gliem, JA, & Gliem, RR 2003. Calculating, Interpreting, and Reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales.
Midwest Research to Practice Conference in Adult, Continuing, & Community Education.

Gruntz, Dominic. 2009. Android Application Models. Switzerland: The International Conference on Java Technology June 2009.

Guritno, S., Sudaryono, and Rahardja, U. 2011. Theory and Application of IT Research Methods Information Technology Research. Yogyakarta: Andi.

H, Nazruddin Safaat. 2014. Android Based Smartphone and Tablet PC Mobile Application Programming (Second Revision). Bandung: Informatics.

Harahap, Muhammad Reno. 2014. Development of Mobile Applications in the Modern Era. Jakarta: Binus University.

Day, Bayu Sapta. 2015. Knowing Learning Styles and Their Benefits in Learning. Accessed via http://www.kompasiana.com/bayush/menkenal-gaya-belajar-danhasil-dalam-pembelajaran_55090bfba333112a452e3b27 on December 01, 2016.

Hutahaean, Jeperson. 2014. The Concept of Information Systems. Yogyakarta: Depublish.

Kusrini. 2007. Building an Accounting Information System with Visual Basic and Microsoft SQL Servers. Yogyakarta: Andi Yogyakarta.

Kusumah, Wijaya. 2009. Understanding Student Learning Styles. Accessed via http://wijayalabs.com/2009/12/19/memahami-gaya-belajar-siswa/ on December 8, 2016 at 10.20 WIB.

Lee, Wei Meng. 2011. Beginning Android Application Development. Indiana: Wiley Publishing. Lucid Software. 2015. Activity Diagrams. Accessed via https://www.lucidc hart.com: https://www.lucidc hart.com/pages/uml/activity-diagram on March 1, 2017 at 10.00 WIB.

Lund, AM 2001. Measuring Usability with the USE Questionnaire. Usability and User Experience GIS.

Mehta, Neeraj. 2012. Mobile Client Architecture. India: TCS Ltd Meier, Reto. 2012. Professional Android Application Development 4. Indianapolis: John Wiley & Sons, Inc.

Meiky. 2016. Understanding Learning Styles To Be Smarter. Accessed via http://faculty.petra.ac.id/ido/article/memahami_gaya_belajar.htm on December 01, 2016. Mira, HYS. 2015. Understanding Children's Learning Styles, One Way to Overcome Learning Difficulties. Accessed viahttp://penulispro.net/2015/08/memahamigaya-belajar-anak-salah-cara-mengatasi-difficulty-learning/ on December 01, 2016.

Mulyana, Aina. 2015. Student Learning Style. Accessed via ainamulyana.blogspot.com/2015/04/gaya-learning-siswa.html on December 21, 2016.

Mulyanto, Agus. 2009. Information Systems Concepts & Applications. Yogyakarta: Student Library.

Mustakini, Jogiyanto Hartono. 2008. Information Systems Research Methodology. Yogyakarta: Andi Yogyakarta.

Nasution, S. 2011. Various Approaches in the Learning and Teaching Process. Jakarta: Earth Literacy. Nielsen, J. 2015. How Many Test Users in a Usability Study. Accessed from Nielsen Norman Group

http://www.nngroup.com/articles/how-many-test-users Nihayah, Fista. 2011. Profile of Learning Style and GPA. Accessed through http://lib.unnes.ac.id/7201/1/ on December 01, 2016.
Niknejad, A. 2011. A Quality Evaluation of an Android Smartphone Application. Sweden: University of Gothenburg. NLPM, Widiyanti. 2013. Implementation of Inquiry Learning Strategy on Critical Thinking Ability and Understanding of Science Concepts for Junior High School Students.
Ganesha University of Education Postgraduate Program eJournal 3. Accessed viahttp://www.undana.ac.id/jsmallfib_top/JOURNAL/EDUCATION/PEN_DIDIKAN_20013/ on 01
December 2016. Perfectomobile Team. 2016.
Functional Testing. Accessed via https://www.perfectomobile.com/learn/functional-testing on
March 8, 2017 at 15.00 WIB. Pressman, RS 2010. Software Engineering: A Practitioner's Approach. New York: McGraw-Hill. QAmentor. 2017.
Compatibility Testing. Accessed viahttp://www.qamentor.com/testing-coverage/non-functionaltesting/compatibility-testing/ on 09 March 2016 at 08.00 WIB.
Ramadhina, Syahrina. 2015. Development of Workshop Management Information System at State Vocational High School 3 Yogyakarta. Journal of Technology and Vocational Education, Faculty of Engineering, UNY, Vol 22, No
3. 324-338 Republic of Indonesia. 2003. RI Law no. 20 of 2003 concerning the National Education System.
Rijati, Nova. 2013. System Performance Measurement. Accessed viahttp://dinus.ac.id/repository/docs/ajar/
on December 6, 2016 Rosa AS, & M. Salahuddin. 2013. Software Engineering (Structured and Object Oriented). Bandung: Informatics. Rouse, Margaret. 2007. Error Handling. Accessed
via http://searchsoftwarequality.techtarget.com/definition/error-handling on December 15, 2016 at 11.00 WIB.
Santioso, Lucy Lidiawati. 2010. Educating According to Children's Interests & Talents. (2nd printing).
Jakarta: PT Tangga Pustaka. Segue Quality Control Team. 2016. Testing Mobile Apps for Functionality and Usability. Accessed viahttp://www.seguetech.com/testing-mobile-appsfunctionality-
usability/ on March 8, 2017 at 14.00 WIB. Simpsons, Sarah. 2015. New Skills Essential Study Skills. United Kingdom: Bookboon. Software Testing Class. 2013. Usability Testing: What? Why? & How?. Accessed via http://www.softwaretestingclass.com/usability-testing-what-whyhow/ on the 10th
March 2017 at 13.00 WIB. Software Testing Help. 2015. What is Software Compatibility Testing.
Accessed via http://www.softwaretestinghelp.com/software-compatibility-testing/ on 09 March 2017 at 11.00 WIB.
Sriyanto, HJ 2007. The Right Steps to Facing the Junior High School National Examination. Yogyakarta: Indonesia Tera. Subini, Nini. 2011. Overcoming Learning Difficulties in Children. Yogyakarta: Javalitera.
Sugiyono. 2013. Educational Research Methods: Quantitative, Qualitative, and RnD Approaches. Bandung: Alphabeta. Sukadi. 2008. Progressive Learning. Bandung: MSQ Publishing. Sulistiyarini,
Dewi and Sukardi. 2016. The Influence of Motivation, Learning Styles, Teacher Leadership, and Teaching Intensity on Students' Learning Outcomes. Journal of Technology and Vocational Education, Faculty of Engineering, UNY, Vol 23, No 2. 136-143 Susanto. 2015. Types of Information, Characteristics and Functions of Information. Accessed viahttp://www.seputardunia.com/2015/08/type-type-information-characteristic-and-function-information.html on December 10, 2016 at 12.30 WIB. aunty. 2010. Effect of Learning Style
Against Student Learning Outcomes in General Biology Course, Biology Education Study Program, Cenderawasih University. Journal of Basic Education, 1. Tech Research. 2008. Six Functional Tests to Ensure Software Quality. Accessed viahttp://searchsoftwarequality.techtarget.com/report/Six-functionaltests-to-ensure-software-quality on 08 March 2017 at 15.30 WIB. Wagner, S. 2013. Software Product Quality Control. New York: Springer-Verlag. Wazlawich, Raul S. 2014. Object-Oriented Analysis and Design for Information Systems. USA: Elsevier.
Widyaiswara, Mansur HR. 2013. Recognizing Learners' Learning Styles. Accessed via

http://www.lpmpsulsel.net/v2/index.php?option=com_content&view=article&
id=259:learning-style&catid=42:widyaiswara&Itemid=203 on December 8, 2016.
Yoon, H.-J. 2012. A Study on the Performance of Android Platform. International Journal on Computer
Science and Engineering (IJCSE) Vol. 4 No. 04, 532.