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Design and Validation of *e-mon*Prakerin Based on Android Technology for Monitoring the Internship of Vocational High School Students

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Abstract: The implementation of internships so far has been in a location that is quite far from the school, and there are obstacles related to monitoring vocational students' internships because many schools monitor the program conventionally. This study, aims to design, construct and validate an Android technology-based *e-mon*Prakerin for monitoring internships for vocational school students. This research is the type of research and development. The draft was in the form of an *e-mon*Prakerin model, prepared and then given to model, media, language, vocational, and practitioner experts. The process of validating the *e-mon*Prakerin draft contents was assessed by expert judgment. The validators consisted of lecturers, school supervisors, principals, teachers, and practitioners according to their fields to provide criticism and suggestions based on experience. The research results revealed that Android technology-based *e-mon*Prakerin had been successfully designed, developed, and validated. The validation results uncovered that the *e-mon*Prakerin model was considered to have conformity in the aspects of (1) usability, (2) ease of use, (3) ease of learning, (4) updating, (5) stimulating performance, (7) containing contextual insight, (8) general appearance, (9) presentation, and (10) presentation support.

Keywords: Design, Construct, Test Validity, e-monPrakerin, SMK

Abstrak: *Pelaksanaan magang selama ini berada pada lokasi yang cukup jauh dari sekolah, terdapat kendala terkait pemantauan magang siswa SMK karena banyak sekolah yang memantau program secara konvensional. Penelitian ini bertujuan untuk merancang, membangun dan memvalidasi e-monPrakerin Berbasis Teknologi Android untuk Monitoring Praktik Kerja Lapangan Siswa Sekolah Menengah Kejuruan. Draft berupa model e-monPrakerin yang telah disusun kemudian diberikan kepada ahli model, media, bahasa, kejuruan, dan praktisi. Proses validasi isi draft e-mon Prakerin dinilai oleh forum ahli dengan teknik expert judgment. Validator terdiri dari dosen, pengawas sekolah, kepala sekolah, guru dan praktisi sesuai bidangnya sehingga dapat memberikan kritik dan saran berdasarkan pengalaman. Hasil penelitian telah berhasil dalam perancangan, pengembangan, dan validasi e-monPrakerin Berbasis Teknologi Android. Hasil validasi menunjukkan bahwa model e-monPrakerin dinilai telah memiliki kesesuaian pada aspek (1) kegunaan, (2) kemudahan penggunaan, (3) kemudahan mempelajari, (4) kemutakhiran, (5) merangsang kinerja, (7) mengandung wawasan kontekstual, (8) tampilan umum, (9) penyajian, dan (10) pendukung penyajian.*

Kata Kunci: *Rancang, Bangun, Uji Validitas, e-monPrakerin, SMK*

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INTRODUCTION

The development of talented and highly competitive human resources is a priority in the global competition during the industrial era 4.0. In this case, the national manufacturing sector must be ready to make significant changes in the face of the fourth industrial revolution or industry 4.0. Consequently, new approaches and capabilities are needed to build innovative and sustainable production systems (Kemenperin, 2018).

Industrial development began with the industrial era 1.0, marked by the development and use of steam engines to replace human and animal power. Then, the industrial era 2.0 development as the second generation of the industry was through the application of the concept of mass production and the use of electric power. The development continued with the industrial era 3.0, the third generation in the industry, marked using automation technology in production. Lastly, the fourth generation, known as the industrial era 4.0, is a system that integrates online systems with industrial production processes (Garbie, 2016:2). The advantages obtained are high efficiency, reduced production time and costs, minimized work errors, and increased product accuracy and quality (Bartodziej, 2017: 28). Moreover, the influence of the industrial revolution 4.0 is an increase in production efficiency since it uses digital technology and automation, as well as changes in the composition of work (Ustundag & Cevikcan, 2018: 5). In Indonesia, the government emphasizes five industrial areas that focus on the implementation of industry 4.0: food and beverage, textile, automotive, electronics, and chemical industry (Kemenperin, 2017). In this case, implementing quality education is conducted by preparing an innovative workforce capable of competing in industrial revolution 4.0.

Furthermore, the Human Development Report 2019 ranked the quality of Indonesia's human resources (Human Development Index, HDI) at 111th out of 189 countries worldwide. Indonesia's HDI value of = 0.707 was in the high category but still needs to encourage an increase in the average length of schooling for adults in Indonesia as an indicator of the human development index (IPM) (*United Nations Development Programme*, 2019:301). Departing from these indicators, it is necessary to improve the quality of human resources through education at elementary, secondary, and high levels. In addition, educational pathways can be carried out through formal, non-formal, and informal pathways (Sistem Pendidikan Nasional, 2003).

Formal education consists of elementary, secondary, and higher education levels. The secondary education level comprises senior high school (SMA) and Madrasah Aliyah (MA) for general education and vocational high school (SMK) and Vocational Madrasah Aliyah (MAK) for specific skill education fields (Sistem Pendidikan Nasional, 2003). Specifically, skills education carried out by vocational high schools must be able to prepare human resources who are ready to enter the world of work, have high leadership, discipline, professionalism, reliability in their field, and are productive. The ideal result is that vocational senior high alums are middle-class workers ready to work in the business and industrial world (Muhammad, 2016).

In addition, vocational high school has expertise in technology and engineering, energy and mining, information and communication technology, health and social workers, agribusiness and agrotechnology, maritime, business and management, tourism, and arts and creative industries. However, the quality of vocational high school graduates in some areas of expertise is still a gap with the workforce needs in the industry. It happens generally related to the limitations of the learning environment that is unsuitable for the world of work. This gap is also associated with (1) conceptual problems which are supply-oriented, not demand-oriented; vocational programs are only school-based;

there is no recognition of previous learning experiences; career deadlocks for vocational high school graduates; vocational teachers lack experience in the industry; the assumption that education is only the responsibility of the government; vocational education is more formally oriented; vocational high school dependence on government subsidies. Then, (2) program problems include education that tends to be oriented toward teaching subjects; students' vocational bases are not strong; competency content is not strong; hours are limited. Besides, (3) operational problems encompass basic practices that are not taught fundamentally; students are often left to practice work in the wrong way; leaving students with "fake" quality results; learning principles do not follow mastery learning principles; students often work without the guidance and supervision of teachers; students often practice irresponsibly; there are still many teachers who are only in school during teaching hours; vocational schools lack economic insight; school care to shape the work ethic of teachers and students is still lacking (Pakpahan, 2002).

For those reasons, internships can be done to support the suitability of graduates' competencies with the needs of workers in the industry. Internships or PKLs are essential for vocational learning in SMK/MAK, while the vocational core is obtained in the business/industry (Kemendikbud RI, 2018). The government has initiated appropriate vocational education linking and matching vocational high schools and industry. The development of this program also prepares skilled workers ready to be used in the industry. The internship program in industry as a student competency improvement program is carried out according to their field of expertise (Kemendikbud RI, 1997). This program is also conducted to familiarize students with the industry first and become a stimulus for students to study harder. Students will also experience more real activities in the industry (Shin et al., 2013). In general, students consider the internship program to be a good thing. It happens because students perceive internships as practical learning activities and produce positive experiences. In addition, the factor determining the success of the internship program is the involvement of all parties in managing and carrying out their respective roles (Renganathan et al., 2012).

Internships are also part of the vocational engineering education curriculum to facilitate prospective graduates entering the job market. In the process, there are still obstacles in terms of management and assessment. Accordingly, new concepts require new methods and applications in potential management processes (Calvo & D'Amato, 2015). However, the impediment to implementing internships is expertise programs in vocational schools that do not get a place in the industry closest to the school environment. Thus, to increase students' willingness to intern in the industry, appropriate solutions are also needed in managing internships, especially monitoring. It occurs due to various obstacles in the evaluation of internship activities. On the one hand, it is only additional knowledge, but on the other hand, it has value (Liviu & Ana-Andreea, 2013).

Nevertheless, with the implementation of internships in locations quite far from the school, there are obstacles related to monitoring internships at vocational high schools, and many schools still monitor the program conventionally. Monitoring activities are carried out by visiting each industry where students conduct internships. Hence, management of monitoring internships requires changes in line with the development of internet users, showing a very drastic change. Monitoring internships must also be more effective and efficient by utilizing technological developments.

Generally, the implementation of internships is regulated in the curriculum for three or six months (Kemendikbud, 2014). In a preliminary study in the Sragen Regency, there were 56 vocational schools, in which 53% of vocational high schools carried out internships for three months, 27% conducted internships for six months, and the remaining 20% carried out internships at different times (Sutikno et al., 2020a). Data in Sragen Regency for the 2016/2017 academic year also showed that all vocational high schools did internships to synchronize vocational subject matter with industry (Sutikno et al., 2020b). Meanwhile, management and monitoring were performed by conventional processes, by direct monitoring and paper-based reports, which required time, energy, and costs (Sutikno et al., 2019). In

fact, monitoring is an activity aimed at providing information about an activity's causes and effects. Monitoring is also done when an activity is being implemented.

To answer the ineffectiveness of monitoring internships, an electronic application is needed that can support these activities; as in the research *"A collaborative method of enhancing internships evaluation through stakeholders' alignment* (Calvo & D'Amato, 2015)," a new concept is required in the use of methods and potential applications in the management of internships. Another study, *"e-Internships: prevalence, characteristics, and role of student perspectives"* (Jeske & Axtell, 2014), stated that electronic internships with technology are the first step toward the right internship. Therefore, further research is needed in virtual work and personnel management, electronic collaboration, communication, and multimedia studies. It is also asserted that information and communication technology is indispensable in two-way training between industry and the world of education, as in the research: *"A Two-way Knowledge Interaction in Manufacturing Education: the Teaching Factory"* (Rentzos et al., 2015).

With the support of the development of smartphones using Android technology, the development of an electronic application for monitoring internships based on Android can be carried out. Developing an electronic monitoring model is the solution for conventional monitoring. With the background and data support and a preliminary survey of managers of internships at vocational high schools, this research aims to design, build, and validate an Android technology-based *e-mon*Prakerin for monitoring vocational high school students internships.

METHOD

This research belongs to the type of research and development. Research and development are used in developing products or validating an educational model (Akker, Bannan, Kelly, Plomp, & Nieveen, 2013: 13-15). Development research is also carried out to improve speed, quality, and financing to be more effective and efficient. Besides, it is done to meet the needs in accordance with the initial analysis identified so that performance is better and has high competitiveness (Hamel et al., 2018).

In this phase, the researcher formulated the product development objectives: (1) the monitoring model developed was in the form of an Android-based online monitoring model; (2) the model was developed based on the industrial 4.0 paradigm and the internet of things; (3) the monitoring model was developed with the hope of increasing the effectiveness of monitoring internships; (4) the model was developed by referring to the 2013 vocational high school curriculum according to Permendikbud No. 37 of 2018; (5) the monitoring model is used for vocational high schools referring to Kepmedikbud No. 323/U/1997 and Permendikbud No. 34 of 2018.

After analyzing and studying the literature, the preparation of product prototypes began with model development. The existing product prototypes were then validated by experts for assessment. The draft in the form of an *e-mon*Prakerin model compiled was then given to the model, media, language experts, vocational, and practitioners. In addition, the process of validating the *e-mon*Prakerin draft contents was assessed by an expert forum using an expert judgment technique. The validators consisted of lecturers, school supervisors, principals, teachers, and practitioners according to their fields to provide criticism and suggestions based on experience. The areas of expertise of experts and practitioners were media experts (3), linguists (3), vocational experts (3), and evaluation experts (4).

Then, the expert validation data analysis technique was adapted based on the opinion (Widoyoko, 2019). The assessment results given by the expert were converted into five categories with the criteria presented in Table 1.

Table 1. Five-Scale Conversion of Expert Assessment Results (Widoyoko, 2019: 238)

Equation	Category
$X > X_{mean} + 1.8\ x\ SB_i$	Very good
$X_{mean} + 0.6\ x\ SB_i < X \leq X_{mean} + 1.8\ x\ SB_i$	Good
$X_{mean} - 0.6\ x\ SB_i < X \leq X_{mean} + 0.6\ x\ SB_i$	Enough
$X_{mean} - 1.8\ x\ SB_i < X \leq X_{mean} - 0.6\ x\ SB_i$	Less
$X \leq X_{mean} - 1.8\ x\ SB_i$	Very less

The expert provided input and suggestions as research material for further revision of the individual trial stage. Aside from assessing the *e-mon*Prakerin model and the Android-based *e-mon*Prakerin application, the expert forum also evaluated the instruments' quality. The instrument used was a non-test in the form of a questionnaire to determine the practicality of using an Android-based *e-mon*Prakerin application.

RESULTS AND DISCUSSION

This research produced the main product, i.e., the *e-mon*Prakerin model based on Android technology, for monitoring the implementation of vocational students' internships. The *e-mon*Prakerin model was developed in accordance with the paradigm of the needs of the industrial revolution era 4.0. *e-mon*Prakerin was also created so that students and supervising teachers can take advantage of developments in information technology in monitoring internships. It is then to improve student discipline in work, have good digital literacy in the industrial revolution 4.0 era, and have good industrial targets and culture.

Another goal is to develop an *e-mon*Prakerin model based on Android technology to increase effectiveness and efficiency in monitoring. The development of the *e-mon*Prakerin model is also a breakthrough in the implementation of monitoring internships for vocational students. This model that integrates applications with Android-based smartphones can increase monitoring effectiveness and be more economical, effective, and efficient. In addition, the effectiveness of this study is related to the practicality of the *e-mon*Prakerin model, including cost-effective targets, ease of preparation, speed of supervision of internship participants, the accuracy of participant information, and smooth communication with internship participants. Meanwhile, user satisfaction includes usefulness, ease of use, ease of learning, and user assessment. It is done to meet the needs in accordance with the initial analysis identified so that performance is getting better and has high competitiveness (Hamel et al., 2018).

In the research and development of *e-mon*Prakerin, the first step was the needs analysis stage. At this stage, the researcher looked for current conditions and compared them with ideal ones. After analyzing the research results, the next step was to develop the needs that should be in accordance with the needs in the community field to produce the ideal product (Akker et al., 2013: 14).

The preparation of product prototypes was the beginning of model development. Experts then validated existing product prototypes for assessment. The draft in the form of an *e-mon*Prakerin model prepared was then given to model, media, language, vocational, and practitioner experts. The validity of the *e-mon*Prakerin was assessed by an expert forum using an expert judgment technique. Besides, the e-monPrakerin model product consisted of several phases: identifying, plotting, converting, designing, assigning, using, and correcting.

Then, identifying phase was a preliminary activity intended to identify the focus of monitoring activities with only a few indicators. In this case, *e-mon*Prakerin focused on the attendance and

progress of the work of internship participants. After that, the plotting phase was the stage of developing performance indicators and targets. In this case, internship performance indicators have monitoring targets that students attend every day, and work progress targets can be monitored every day. Then, the converting phase was the stage of transferring external environmental information into the system. At the converting step, the administrator created a barcode for each company where the internships were. The administrator continued to print the company barcode card.

Further, the designing phase was the stage of identifying the basic data collection processes and tools. Here, internship participants downloaded and installed the *e-mon*Prakerin application as a basic data collection tool. Participants also received an explanation of how to operate the *e-mon*Prakerin application.

Next, the assigning phase was determining the responsibilities and time frame. Participants received an explanation from the internship supervisor regarding using the *e-mon*Prakerin application. The supervisor then submitted the internship participants to the company where the internship was located. The supervisor also offered a barcode card to the company and/or attached it to a special place in the company where the internships were. The supervisor explained the use of barcodes to companies related to *e-mon*Prakerin.

Afterward, the using phase was the stage of implementing activities using the *e-mon*Prakerin application by participants. Participants made a sign-in attendance using the *e-mon*Prakerin application. Participants attended at home and submitted daily activity and work reports. If the participant did not participate in the internship, the participant submitted a permit through the *e-mon*Prakerin application. All participant activities could be monitored by internships, supervisors, and administrators. Then, the correcting phase was the data monitoring phase and guidance by the supervisor in the event of a discrepancy. Here, the administrators downloaded data on the *e-mon*Prakerin application. The supervisor then reviewed the participant's report and guided if the internship participant students had problems. By checking the report data, the supervisor could immediately offer recommendations if needed to adjust the competencies obtained by internships.

Using the *e-mon*Prakerin model is as follows: (1) Administrator creates a username and password and inputs student, placement, and supervisor data into the system, then prints the company's barcode where the internship is held. (2) The supervisor logs into the system to enter the username and password and resets the password if needed. (3) Company data, username, and password are submitted to all students participating in internships. (4) Students log in to the system by entering their username and password to input data on attendance and progress of internship activities. (5) The supervisor monitors the attendance and progress of student work. (6) The administrator, through the system, administers the data to be submitted to the parties who need it. (7) Managers receive information on the progress of internship activities and take corrective actions.

In the application created, each user has a display according to their needs: 1) the administrator has a page to create a username and password and print barcodes. 2) Students have a page to log in to enter attendance, leave, and work reports, as well as permission not to attend. 3) The supervisor has a page to enter the username and password, reset the student password, view and download the attendance recap and return recap, student reports, and permission. 4) The management manager receives the reports downloaded by the administrator.

The *e-mon*Prakerin model can be seen in the following data flow chart in Figure 1.

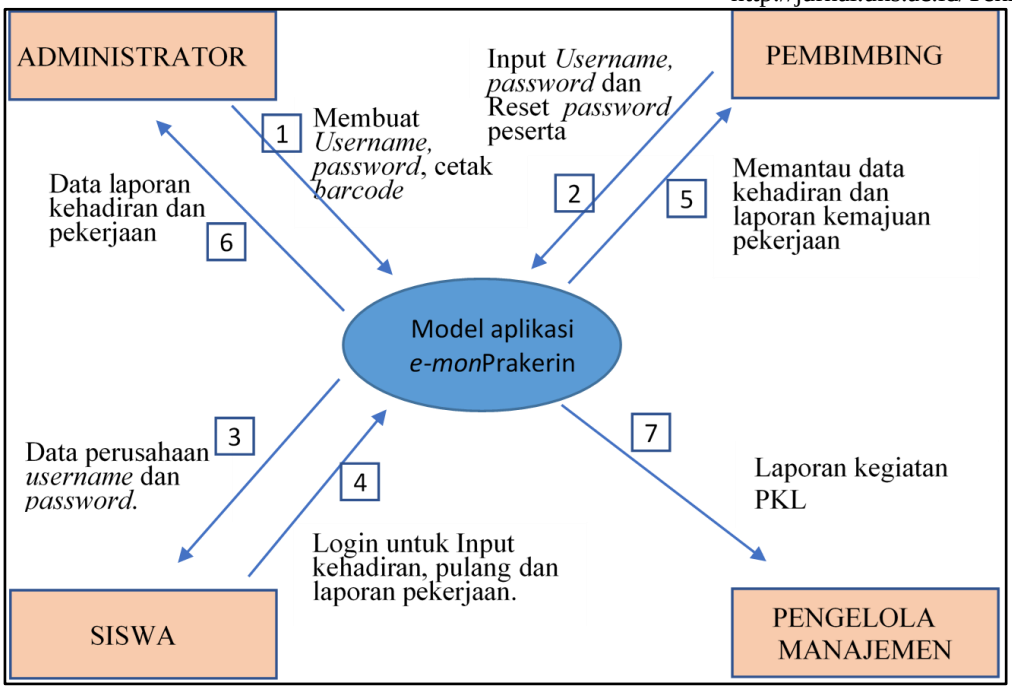

Figure 1. Data Flow Chart of The Use of *e-mon*Prakerin

In the monitoring process, students must be active in submitting the entry and return attendance and daily activity reports. In this case, the ultimate goal of the *e-mon*Prakerin model is the existence of student attendance reports and the progress of internship implementation, which can be accessed online and at any time by administrators and supervisors. Thus, it is necessary to ensure that the internship process takes place according to the target and helps make quick and appropriate decisions in case of deviations or problems.

The validation of the *e-mon*Prakerin model by the expert was with *expert judgment* technique. The model validation consisted of two aspects: (1) supporting theory and (2) the structure of the *e-mon*Prakerin model. The grading scale ranged from the lowest to the highest: (1) invalid, (2) less valid, (3) sufficiently valid, (4) valid, and (5) very valid. The highest score on the model validation instrument was 11 indicators/question item *x* 5 = 55, while the lowest score was 11 indicators/question item *x* 1 = 11. Thus, using the five scale intervals in Table 1, the data analysis technique of expert validation results adapted based on Widoyoko (2019) was obtained, a five scale category based on the monitoring model development expert. The validation model expert was then carried out by a monitoring model expert. The expert validation results are presented in Table 2.

Table 2. *e-mon*Prakerin Model Validation Results

Aspects	Number of Indicators	Assessment Score	Criterion
Supporting theories	**3**	**11**	
Model structure of *e-mon*Prakerin	8	29	Good
Total	11	40	

The model expert validation results obtained a score of 40, indicating that the monitoring model developed was in a good category. Meanwhile, the suggestion for improvement for the *e-mon*Prakerin model was to make the syntactic model more focused on the internship monitoring process. Syntax improvement could be made by developing syntax from existing models. Based on the

expert validation results on the theoretical aspects supporting the *e-mon*Prakerin model, the e-monPrakerin model's structure was declared suitable for monitoring student internships.

Then, the validation process of the *e-mon*Prakerin application draft was assessed by a linguist forum with *expert judgment* techniques, which consisted of aspects of (1) language suitability, (2) language clarity, and (3) accuracy using language. Based on these three aspects, it was then compiled into six indicators with five levels of the assessment scale.

The grading scale ranged from the lowest to the highest: (1) invalid, (2) less valid, (3) sufficiently valid, (4) valid, and (5) very valid. The highest score was six indicators/question item *x* 5 = 30, whereas the lowest score was six indicators/question item *x* 1 = 6. Thus, using the five scale intervals, the data analysis technique of expert validation results was adapted based on the opinion of (Widoyoko, 2019). The linguist validators involved were as many as three experts. The validation results of the linguist are displayed in Table 3.

Table 3. Validation Results by Linguist Forum

Aspects	Number of indicators	Number of Validator Assessment scores			Mean Rating
		1	2	3	
Language suitability	2	9	9	10	28
Clarity of language	1	5	4	5	
Accuracy using the language	3	13	15	14	

The validation results of the linguistics expert forum obtained a mean of 28, meaning that the draft of the *e-mon*Prakerin model was very good. Then, suggestions for improvements to the draft of the *e-mon*Prakerin model were to pay more attention to the use of the word standard. The use of the word should be clearer in meaning so that it does not give rise to different interpretations. A word of foreign origin should be in italics. In addition, conjunctions should be noticed so as not to double point or how charge using a Bahasa, which is easier to understand. However, in general, *e-mon*Prakerin was considered to have conformity in aspects of (1) language suitability, (2) language clarity, and (3) accuracy in using language.

Next, the validation process of the *e-mon*Prakerin application draft was assessed by a form of media and vocational content experts with *expert judgment* techniques, consisting of aspects of (1) usability, (2) ease of use, (3) ease of learning, (4) up to date, (5) stimulating performance, (7) containing contextual insights, (8) general appearance, (9) presentation, and (10) presentation supporting. Based on these ten aspects, it was then compiled into 27 indicators with five levels of the assessment scale.

The grading scale ranged from the lowest to the highest: (1) invalid, (2) less valid, (3) sufficiently valid, (4) valid, and (5) very valid. The highest score was 27 indicators/question item *x* 5 = 135, while the lowest score was 27 indicators/question item *x* 1 = 27. Thus, using the five scale intervals, the data analysis technique of expert validation results was adapted based on the opinion of (Widoyoko, 2019). The media expert validators involved were as many as three experts and practitioners. The validation results of the media expert are revealed in Table 4.

Table 4. Validation Results by Media Experts Forum

Aspects	Number of indicators	Number of Validator Assessment scores			Mean Rating
		1	2	3	

Aspects	Number of indicators	Number of Validator Assessment scores			Mean Rating
		1	2	3	
Uses	4	17	19	18	
Ease of use	2	8	10	8	
Ease of learning	2	10	7	8	
Up to date	3	13	14	11	
Stimulating performance	3	12	14	10	114.66
Contains contextual insights	2	6	9	8	
General view	5	20	21	23	
Serving	3	13	13	13	
Presentation supporting	3	13	13	13	

The validation results of the media expert forum obtained a mean of 114.66, denoting that the draft of the *e-mon*Prakerin model was very good. Meanwhile, suggestions for improvement by media experts included a menu entering the *username* and *password* of participants and a separate supervisor. The supervisor could enter the *participant's username* and set the *participant's password*. The recap menu could also be selected for a specific sort, closing the application with the *home* button. The display color should be more attractive, and the menu should be fixed so it can be used on a smartphone by removing the menu icon. In addition, the send data menu is lost; the data is sent so as not to send repeatedly, plus the internet connection check menu. However, in general, the *e-mon*Prakerin was deemed to have conformity in aspects of (1) usability, (2) ease of use, (3) ease of learning, (4) up-to-datedness, (5) stimulating performance, (7) containing contextual insights, (8) general appearance, (9) presentation, and (10) presentation support.

Meanwhile, the vocational content expert validators involved were as many as three experts and practitioners. The validation results of the vocational content expert forum are shown in Table 5.

Table 5. Validation Results by the Vocational Content Expert Forum

Aspects	Number of indicators	Number of Validator Assessment scores			Mean Rating
		1	2	3	
Uses	4	16	15	17	
Ease of use	2	8	10	8	
Ease of learning	2	10	7	9	
Up to date	3	13	14	14	
Stimulating performance	3	12	14	14	118.33
Contains contextual insights	2	6	9	8	
General view	5	20	25	24	
Serving	3	13	15	13	
Presentation supporting	3	13	15	13	

The validation results of the vocational content expert forum obtained a mean of 118.33, signifying that the draft of the *e-mon*Prakerin model was very good. *e-mon*Prakerin was also considered to have conformity in aspects of (1) usability, (2) ease of use, (3) ease of learning, (4) up-to-datedness, (5) stimulating performance, (7) containing contextual insights, (8) general appearance, (9) presentation, and (10) presentation supporting. Besides, the vocational expert's advice for the *e-mon*Prakerin model is that for the presentation of the application report to be wider so that it can report

on some activities, and the application can immediately be widely implemented for vocational high schools.

Then, the feasibility of the *e-mon*Prakerin model was reviewed based on the model expert's assessment results. The *emon*Prakerin model evaluation was also assessed by model experts with expert judgment techniques, comprising aspects of (1) supporting theory and (2) the structure of the *e-mon*Prakerin model. The assessment results showed that the *e-mon*Prakerin monitoring model developed was in a good category.

After that, improvements were made based on criticism and suggestions from several internship supervisors. The improvements made included several components: (1) instructions for filling out, (2) design, (3) presentation techniques, and (4) design of the *e-mon*Prakerin application. Improvements were also made to the things accompanying the presentation of the monitoring model, such as pictures, graphics, and the like, which should be presented clearly and legibly so as not to cause differences in perceptions between software designers, supervisors, and students.

Moreover, the software used in monitoring student internships utilized the Android operating system. It is because the price is very affordable for all people. Android also carries an open (open source) operating system based on the Linux operating system. Besides, the advantages of using the Android operating system are open operating system (open source), support from the internet service provider of Google, available external storage system, and lower smartphone prices. Meanwhile, the disadvantages of using the Android operating system are that it requires ample storage space on specific devices, and the system can crash (because software and hardware are made separately; in contrast to Apple, which specifically makes iOS for its devices), as well as must have a Gmail account and be connected to the internet, and there is malware/virus considering how easy it is to get this OS online (DiMarzio, 2008: 6; Safaat, 2012:3).

In this case, developing applications that become software in learning with multimedia is made by creating from an existing operating system. The application development in this study used the Android operating system. The software was developed by considering the effectiveness of using applications in implementing learning. Smartphone users also operate more on the Android operating system. Considering the advantages and disadvantages of the existing operating system on smartphones, developing applications from the Android operating system is more profitable to create in this application.

Before, Kleinwort, Semm, Falger, & Zaeh's (2018) research revealed that the Android application LOZ (Learning Factory for Optimized Machining) was developed to support operators by detecting programs, determining program frequencies, and selecting spindle speeds for stable machining processes. Meanwhile, Abildinovaa et al. (2016) stated that teachers and students expressed interest in learning to operate and use Android applications. Android applications could also help teachers and students learn and organize. The main feature of the developed application was the synchronization of user information with the database, processing, and provision of it to other users.

Furthermore, research results by Renganathan, Karim, & Li (2012) showed that students assessed the internship program well. Generally, students viewed learning through practical experiences during internships positively. In addition, factors related to the operation and administration of the organizers and the role played by the host company were also identified as important in determining the internship program’s success. In line with the research, Jeske & Axtell (2014) confirmed the emergence of electronic internships in several countries. They also explained this new internship's characteristics and how electronic internships are compared to traditional internships, thereby providing insight for practitioners and managers.

Further, the implications of the research results can be reviewed both theoretically and practically. Theoretically, the research results have implications for increasing the development of quality information and communication technology-based internship monitoring models that align with the industrial revolution 4.0. Meanwhile, the practical implications of research results impact expanding information and communication technology use in monitoring vocational student internships.

CONCLUSION AND SUGGESTION

In this study, the *e-mon*Prakerin model was developed in accordance with the paradigm of the needs of the industrial revolution era 4.0. *e-mon*Prakerin was also designed so that students and guidance teachers can take advantage of the development of information technology in monitoring internships. It is intended to improve student discipline at work, have good digital literacy in the era of the industrial revolution 4.0, and have good targets and industrial culture. The validation results of the vocational content expert forum obtained a mean of 118.33, meaning that the draft of the *e-mon*Prakerin model was very good. *e-mon*Prakerin was also considered to have conformity in aspects of (1) usability, (2) ease of use, (3) ease of learning, (4) up-to-datedness, (5) stimulating performance, (7) containing contextual insights, (8) general appearance, (9) presentation, and (10) presentation supporting.

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