DEVELOPMENT OF PRACTICUM INSTRUCTIONS BASED ON QR CODE
(FOR IMPROVING SCIENCE PROCESS SKILLS AND MASTERING BIOLOGICAL CONCEPTS OF CLASS VIII STUDENTS AT PUBLIC MIDDLE SCHOOL 2 SAMARINDA)

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Abstract

Low mastery of concepts and science process skills of students into the background in the development of the book practicum -based QR code. Based on the observations of the VIII grade science teachers at Public Middle School 2, Public Middle School 6, Public Middle School 4, Public Middle School 1, and Public Middle School 22 Samarinda, it was found that 75% of science practicum had not focused on biology and 62% of learning activities still tended to be conventional. In addition, the average science learning outcomes of students at this junior high school were sufficient . The purpose of this study was to determine the validity, practicality, and effectiveness of the QR code-based practical manual in improving students 'mastery of concepts and students' science process skills. The samples in this analysis were students and science teachers of Biology and students of Public Middle School 2 Samarinda . Results of research show as much as 96.17 % of validity 98.63% of material and material validity of the validator. The practicality results of the QR code-based practicum manual were 95.09%, the results of students 'mastery of concepts were 8437%, and the results of students' science process skills were 85.59%. Based on the results of the validity, practicality, and effectiveness of Biology students and teachers at Public Middle School 2 Samarinda, it can be concluded that the QR code-based practicum manual on Biology Science learning is suitable for use as a practical learning media .

Keywords: Practicum Book , QR code , Mastery of Science Process Skills Concept

Learning is a teaching and learning process in which reciprocal communication occurs between teachers and students that involves knowledge and experience. The learning process can be said to be successful if the learning objectives are well achieved. Many aspects influence the success of a learning process. That influential in the learning process, namely, the topic of the material being taught, teachers can organize learning, student reference resource, facilities and infrastructure that support the learning activities as well as the models and methods used by teachers in the learning process (Daryanto, 2012).

The learning process can be useful if the material taught is not only centered on understanding but is applied in everyday life. The 2013 curriculum emphasizes the concept of learning where the teacher acts as a facilitator who accompanies students in learning while students are expected to be more active, skilled and independent. So in the learning process, media and learning methods are needed that can help students. Media and learning methods are very important in the teaching and learning process in the classroom because they can affect student activity and learning outcomes.

The learning device is a guide or direction for a teacher. This is important because the learning process is something systematic and patterned. One of the strategies that is interesting, innovative, interactive and in accordance with technological developments that can be used as a Development of Practicum Handbooks based on QR Codes of East Kalimantan is a process of using IT in the learning process. Y ang leads directly to the student activity by providing a means for students to learn actively.

Practical activity is one of the activities suitable for increasing student interest in science learning. This is because with practicum activities students are given the opportunity to experience it themselves or do it themselves. Students will be more sure of something than just receiving from teachers and books. In addition, with practicum students can enrich their experiences, develop scientific attitudes, and learning outcomes will last longer in students' memories.

Belief in students' abilities is an important aspect to drive a continuous learning process. Belief in students self-ability will drive behavior and a series of actions in meeting the demands of various situations. Self-confidence in the abilities possessed by individuals refers to the term science process skills.

QR code is an evolution of barcode, from one dimension to two dimensions. Barcodes are only able to store information horizontally, while QR codes are capable of storing information horizontally and vertically. So QR Code has a high capacity in coding data, CR Code is able to store all types of data, such as numeric data, alphabetical data, kanji, kana, hiragana, symbols, and binary codes.

The benchmark in the research that has been carried out is the development of a QR code -based practicum book , this is a supplement (additional source) where the source is added with things that focus on science process skills , and become motivation for students to get to know more, know and understand the material presented by the teacher. The development of this QR code-based practicum book can also turn teachers into innovative and educational educators where learning uses IT in the vicinity of teaching and learning activities (gadgets).

If analyzed carefully regarding problems related to understanding, planning, implementation and efforts made by the teacher to overcome land problems related to the practicum book used by the teacher. This means that if the teacher's understanding is lacking, then the planning, implementation and efforts made by the teacher will find out the level of understanding of students which can be seen from the delivery of teaching materials. Thus, in this case, teachers are asked to introduce IT as a means of learning, so that students do not get a biased understanding of the textbooks or material presented by the teacher and also establish good communication between teachers / teachers and students.

Research on the development of QR code -based practicum books is not without reason, there are several things that underlie the development of this research , because by using it in learning students are required to better understand the conceptual understanding and process of science skills , most of the average students do not know much about the use of science. technology in learning. This is because the resources used in learning focus on general material, because other reasons are also the lack of additional sources that complement the material and also general existing resources.

This research is expected to minimize and overcome these problems. This development is also intended to make it easier for teachers or teachers to complement existing general resources or supplementary teaching materials so that teaching and learning activities become innovative and educational, and understanding that initially is biased or gray becomes clear and clear, this is what researchers refer to in do this development research. Based on this description, a study was conducted with the title " Development of a QR Code-Based Practicum Handbook to Improve Science Process Skills and Mastery of Biology Concepts for Class VIII Public Middle School 2 Samarinda".

METHOD

This type of research and Development (R & D). The model applied in this study is the development model ADIE (*Analysis, Design, Development, Implementation, Evaluation*) developed by Dick & Carry d natural (Mulyatiningsih, 2011). This research will try out the Practicum Book based on the Q R Code in increasing the mastery of concepts and critical thinking skills of class VIII students at Public Middle School 2 Samarinda which will be held for 3 months, starting from July - October 2020 . The purpose of this study was to determine the validity, practicality, and effectiveness of the QR code-based practicum book at Public Middle School 2 Samarinda, especially the material for class VI I I semester 2 and the teacher's understanding in implementing the practicum book in class. The technique in this research is percentage based on questionnaire, observation sheet, *pre-test* questions *, post-test questions,* and daily test questions filled out by the sample. The subjects in this study were students of class VIII E (10 small class trial subjects), VIII C (treatment class), VIII F (dick class) Public Middle School 2 Samarinda. The class was taken based on the IPA score from the lowest KKM standard among the 11 class VIII classes. The object of this study is the book instructions practicum QR code based on the material science biology to improve science process skills and mastery of concepts students in learning science

RESULT

The results of the research development of guide instructions practicum QR code based on the material science of Biology at Public Middle School 2 Samarinda class V I II to students and teachers da pat described as follows .
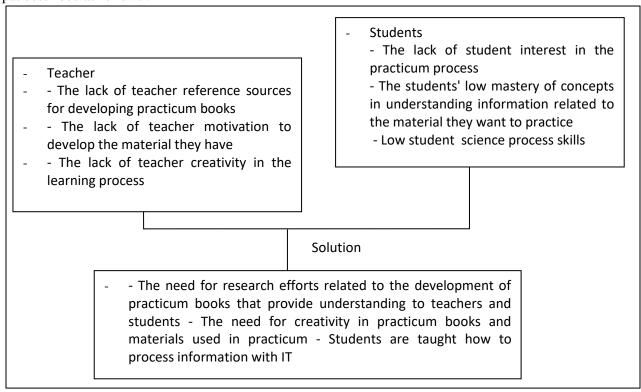

Figure 1. Related problems of teachers and students at SMPN 2 Samarinda development of a QR code -based practicum book

Table 1. Results of the Validator Design Validity Assessment

Assessment Aspects	Validator			Average	Criteria
	V1	V2	V3		
Appearance Feasibility	97.00	94.00	97.00	96.00	Very Valid
Language Eligibility	97.00	100.00	92.00	96.33	Very Valid
Average	97.00	97.00	94.50	96.17	Very Valid

Data t able 1 shows the results of the evaluation of the validity of the QR code manual design and practicum videos from media experts and practitioners giving an average value of 96, 17 % with a very valid category so that it is suitable for use in learning without revision.

Table 2 . Result of Validation Assessment of Material from the Validator

Assessment Aspects	Validator			Average	Criteria
	V1	V2	V3		
Material Quality	100 , 00	100 , 00	9 4 , 29	9 8 , 0 1	Very Valid
Contents	100 , 00	97 , 00	9 6 , 00	9 7 , 67	Very Valid
Average	100 , 00	98 , 57	9 7 , 15	9 8 , 63	Very Valid

Data table 2 shows the results of the evaluation of the validity of the QR code manual material and practicum videos from material experts and practitioners giving an average value of 98.63 % with a very valid category so that it is suitable for use in learning without revision.

Table 3. The Average Value of Student Questionnaire Responses and Teacher Responses

School	Score (%) Student Response	Category	Score (%) Teacher Response	Category
SMP NEGERI 2 Samarinda	85.20	Very practical	95.09	Very practical

Data table 3 shows the results of the average value of student responses to the QR code manual and practicum videos giving an average value of 85.20 % and the results of the average value of teacher responses of 95.09%. The two responses are categorized as very practical so that they are feasible and effective to use in learning without revision.

Table 4 . The Average Value of Students' Concept Mastery

School	Score (%)	Category
Small class (VIII E)	85.00	Effective
Large class (VIII C)	83.75	Effective
Average	84.37	Effective

Data table 4 shown percentage of the average score per grade students, with each indicator known through the mean score per student each indicator value divided by the maximum score. With an average value of 84.37% it is categorized as effective.

Table 5. The Average Score of Students' Science Process Skills

School	Score (%)	Category
Small class (VIII E)	82.22	Effective
Large class (VIII C)	88.96	Effective
Average	85.59	Effective

Data table 5 shown percentage of the average score per grade students, with each indicator known through the mean score per student each indicator value divided by the maximum score . With an average value of 85.59% it is categorized as effective.

And students because teachers teach learning style centered and focused on the sources of a general nature . Not only that, students also lack motivation to explore information related to the material being taught.

The number of obstacles in education must be minimized if the teacher has motivation in developing learning tools especially in the teaching materials used in learning.

DISCUSSION

The collection of data in conducting this research which uses questionnaire questionnaires , observation sheets, about the *pre-test,* about the *post-test* , and a matter of daily tests are carried out to the students and teachers who are competent in science subjects Biology at Public Middle School 2 Samarinda . According to research conducted by David (2009) the observation design aimed at the student and teacher objects in filling out the questionnaire aims to show the importance of research in the focus of a condition that occurs in the learning process.

This study aims to determine the validity of instructional media, the practicality of learning media, and the effectiveness of learning media in measuring students' mastery of concepts and science process skills . W Interview in school is the focus right on the importance of the ability of the teacher in the learning process , so it will find bright spots cause from root of the problem according to a statement put forward by Natsir (2016)

The basis of the problems that occur in Biology Science lessons at Public Middle School 2 Samarinda, namely problems with teachers and problems for students. Problems which often occur in the teacher namely the lack of source references to develop guiding practice, while driving teachers to develop a material that is owned, and the lack of creativity of teachers in the learning process.

The results of the interview to the students in these schools are found on issues related to students' learning process in the classroom due to the lack of interest of students in the learning process, and the lack of motivation of students to explore information related to the material being taught, and the low level of concentration of students.

Level of education or curriculum units that run at Public Middle School 2 Samarinda has been in the form of K curricula have 2013 (K 13). Taruna (2009) states that K13 is an educational unit that is structured based on the needs in the learning process and is oriented or focuses on students.

The certificate in the field regarding the existence of problems and obstacles for the teacher to the practicum book, namely the lack of reference sources and the driving force that becomes the teacher only

uses general practicum guides from time to time without following the changes, developments and problems faced by students. Results have seen with the form of learning tools that only find devices in the form of lesson plans and textbooks, from the results of questionnaires filled out by the teacher that is a statement that 68.6% of teachers have developed a learning device associated guiding practical. But teachers lacked develop creativity in teaching and learning process, so based on a percentage of 31.4% which is where the teacher only uses the learning device guiding conventional lab. From the results of interviews conducted with students, that conventional learning is still used by teachers in the teaching and learning process in the classroom.

Obstacles that arise not only from teachers but also from students that make interest of students in the learning process.H al is due to the lack of interaction between teachers learning. The criteria for good science learning in accordance with K13 do not come from books, but must come from learning devices and also from the environment around the place where the learning process occurs so that students will be encouraged to develop their skills , this statement is a modification of Widiyatmoko's statement (2013) .

From the results of the research method, it was found that the QR code-based practicum manual in science learning that was developed had very good quality and was able to improve students' science process skills and biology concept mastery with an average percentage of 91%. Based on the results of validity, practicality, and effectiveness, it can be concluded that the QR code-based practicum manual on Biology Science learning is suitable for use as a practicum learning media.

Learning activities that focus on the use of IT will be a distinct advantage for students, so that understanding and deepening of the material being taught becomes more effective and educational, and students are more confident in doing a practicum. Vasileiadou (2013) states that this activity will lead students to share experiences and rarely to ask for help to the teacher. The final stage of this research is that teachers and students will gain additional understanding of the use of IT in the learning process , as well as innovate new learning that improves science process skills which are the focus of teaching and learning activities .

CONCLUSION

From the research methods and anal i sis problems that have been carried out by the subject to the students and teachers who are competent in science subjects Biology junior high schools in New York City can be described as follows . *First, the* validity of the QR code-based practicum manual in science learning that has been developed is of very good quality and is able to improve students' science process skills and biology concept mastery with an average percentage of 98%. *Second,* practicality guide QR code-based lab work in science teaching developed has excellent practicality and able to improve process skills of science and mastery of concepts of biology students with an average percentage of 91%. *Third, the* effectiveness of the QR code-based practicum manual in science learning that was developed has very good effectiveness and is able to improve science process skills and students' mastery of biology concepts with an average percentage of 84%.

Based on the results of validity, practicality, and effectiveness, it can be concluded that the QR code-based practicum manual on Biology Science learning is suitable for use as a practicum learning media.

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