

***DEVELOPMENT OF QUICK RESPONSE CODE BASED LEARNING MODULE
ON HUMAN REPRODUCTIVE SYSTEM MATERIALS TO INCREASE
STUDENT LEARNING OUTCOMES.***

Qothrinnida Anta Bella¹, Yula Miranda², Siti Sunariyati³
Master of Biology Education, Universitas Palangka Raya
¹nidabella1509@gmail.com

ABSTRACT

The objective of this research is to create a Quick Response Code equipped learning module on the human reproductive system that is applicable, doable, and efficient in enhancing student learning results. Students class XI from SMAN 3 Dusun Selatan served as the research subjects. research method Learning modules are created utilizing the ASSURE paradigm, which includes the following steps: (1) Analyze the Learner; (2) State Standards and Objectives; (3) Choose Methods; Media or Materials; (4) Utilize Media and Materials; (5) Require Learner Participation; and (6) Evaluate and Revise. The effectiveness of the instructional module and the students' cognitive learning results are both included in the observed data. Student learning outcomes were determined using the methods of observation, product assessment questionnaires, and tests. The results reveal that the module developed during this learning process received module assessments of 4.28 and 4.68 (feasible criteria were used) from material experts and media experts, respectively. It is possible to increase the module's effectiveness by The learning results for the experimental class's students were computed using the effectiveness formula, and they came out at (74.15%) in the very good effectiveness category. While students' learning results in the experimental class gain a score of 0.67 (medium category), those in the control class receive a score of 0.24. (low category). As a result, it can be said that the learning module created can effectively and practically increase student learning results.

Keywords: Human Reproductive System, Learning Module, QR Code, Learning Outcomes

INTRODUCTION

Results from the introduction play a crucial part in the learning process, particularly with regard to learning outcomes that teachers use to assess the development and success of their students after the learning process (Kunandar, 2013). In order to support students in the learning activities, learning systems are required. The combination of these factors becomes a success factor in learning and influences one another; if one part is missing, the learning process will be

impacted learning results. In addition to internal factors that are more influenced by physical factors and psychological factors like attention, activity, intelligence, desire, talent, and others, external factors that have an impact on learning outcomes include teaching staff, facilities and infrastructure, curriculum, learning media, and teaching materials. others (Slameto, 2003). Change the teacher center to the student center so that students are more active and the learning process is led, with

learning assisted by multimedia teaching materials, are some activities that can be implemented to improve student learning outcomes (Rosdianwinata, 2022).

Learning at home will help student understand the content to be studied, but online or distant learning actually needs technology in the learning process (Firmansyah & Hariyanto, 2019) It's a printed module with a QR Code that contains a YouTube video, and this module was developed to contain an explanation of the material that is summarized in such a way that it is easier for students to understand the material being studied. The use of QR Codes for module development in the 21st century era is very influential in the learning process. Teachers will also more quickly accomplish learning outcomes.

Technology in education must be used effectively and efficiently because the advancement of modern technology has an impact on improving educational standards. Rapidly evolving technology can be used to aid in the teaching and learning process. Learning materials are one of the aids that technology must assist. According to the principles of effectiveness, efficiency, and attractiveness to pique students' interest in learning, learning resources can act as a stimulant for the educational process.

Fatimah & Mufti (2014) claimed that because students can learn science material in

various methods, including by using mobile phones as a learning resource, smartphones are able to produce one of the interesting learning media. In addition to making studying more exciting, using smartphones as a learning tool will benefit the students because they can study outside of scheduled class times and acquire the content without being constrained by time constraints.

The application of ICT development is accomplished through the implementation of multimedia. This multimedia project adheres to the principles of 21st century learning, including the reliability of technology as a tool for learning and the usage of modules with a Quick Response Code as one such skill (QR Code). A QR Code is a barcode picture that stores data or information in the form of text or video, and whose content is encoded in two dimensions (horizontally and vertically), making it faster to read than a manual technique and storing a lot more data. The education sector is where QR Code is being implemented.

The findings of the observations revealed that, specifically in biology lectures including reproductive system information, students' learning outcomes in the cognitive aspect were remained low and below the KKM. According to the teacher's data, the daily test scores of the students on the subject of the human reproductive system have not been maximized, because of a variety of

factors including:

1. The teacher has never created a module, and learning does not use modules.
2. A lack of conceptual instructional materials for explaining abstract concepts
3. The prevalence of misunderstandings and a lack of knowledge about the reproductive system among students.
4. Students have utilized supporting media in the form of smartphones to access the internet; but, the teacher has not been able to direct and control the material that students have learnt through the usage of the internet as an information resource.

A combination of learning experiences that are planned and created to aid students in mastering particular learning objectives make up a learning module, which is a type of teaching material that is packaged in a thorough and scientific method. The decision to choose modules as instructional materials was made because they had the advantages of being adaptable, self-contained, stand-alone self-instructional, and user-friendly over other teaching materials (Ataji, 2020).

Lee, et al. (2011) conducted a module QR Code in biology and demonstrated how utilizing a smartphone to scan a QR Code can effectively motivate students to learn. Although it has limited use in the learning process, educators use QR codes as a source of information. When employed in biology lessons, however, QR codes can increase

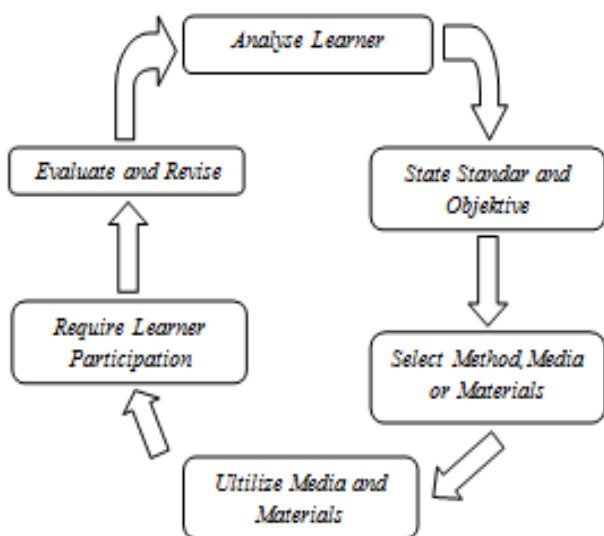
student interest and motivation (Saenab, 2017).

Ahdhianto (2015) asserts that because adopting modules will require students to become more actively involved in problem-solving, learning will be more dynamic, creative, and successful for them. The accessibility of a module with a QR Code that contains videos as a learning tool for pupils can stimulate both the senses of sight and sound simultaneously. Students who previously found this content difficult can impact from watching videos that discuss it. Based modules is QR Code developed so that the application of knowledge may be modified, allowing students to freely study to adapt to the speed and opportunity they have without being constrained by time and place.

The effect of the learning module is that students' learning independence when utilizing it would be more formed than it was with previous teaching materials. Thus, the teacher's function is limited to that of a facilitator, assisting students in easily understanding the content being studied (Adjie, 2018). This research investigates the effectiveness of developing a QR Code for the human reproductive system lesson plan at SMAN 3 Dusun Selatan to enhance student learning outcomes.

RESEARCH METHODS

This research focuses on the study of the human reproductive system and the development of modules for teaching that system. The ASSURE picture development model was used for the modules.



Picture 1. Model ASSURE

The Control Group Pretest and Posttest Design is the methodology employed in the study. In order to compare the learning results of students, data collection techniques include observation, questionnaires, and tests (pretest before treatment, and posttest after treatment). The studies were carried out between February and June of 2022 during the second semester of the academic year 2021–2022, using a system that was 50% offline and 50% online, as well as technologies to collect data from mobile phones using Google Form, Google Classroom, and Whatsapp messaging. The validity of the module assessment, the effectiveness of the module, and the student

learning outcomes were evaluated by data analysis technique used by material and media specialists to analyze the module validation questionnaire results using the formula:

$$X = \frac{\sum X}{N}$$

Description :

- X : Average value of validator
- $\sum X$: Total number of answer scores
- N : Number of questions

The next step is to identify the explanation behind the choice to modify the learning module's assessment criteria that were taken from Sugiyono's book (2018) and are shown in Table 1.

Tabel 1. Validator Criteria

Evaluation	Criteria
$4,2 \leq X \leq 5,0$	Very decent
$3,4 \leq X \leq 4,2$	Decent
$2,6 \leq X \leq 3,4$	Enough Decent
$1,8 \leq X \leq 2,6$	Less Feasible
$1,0 \leq X \leq 1,8$	Very Less

After accumulating the results from the pretest and posttest, data analysis for normality, homogeneity, and the T-test were performed to determine whether there was a significantly different average between the experimental class and the control class. To determine the students' learning outcomes, the N-Gain formula was used.

$$N\text{-Gain} = \frac{(\text{Skor Posttest} - \text{Skor Pretest})}{(\text{Skor Ideal} - \text{Skor Pretest})}$$

According to Melzer in Syahfitri (2008), the normalized gain score rather than the posttest shows the degree of treatment success. Normalized gain scores fall into one of three categories:

- g-high : value ($\langle g \rangle$) > 0.7
- g-medium : value 0.3 ($\langle g \rangle$) > 0.7
- g-low : value ($\langle g \rangle$) < 0.3

According to Subagyo (2010), the effectiveness formula is based on the student learning outcomes for the human reproductive system material module QR Code :

$$Efektivitas = \frac{Realisasi}{Target} \times 100\%$$

- Realization : The number of increases in the experimental class or control
- Target : The number of increases in the experimental class and control

Table 2. Interpretation of the effectiveness of using the module

Percentage (%)	Category
0,00 – 10%	Very Less
10.10 – 20%	Not Enough
20.10 – 30%	Currently
30.10 – 40%	Pretty Good
40.10 – 50%	Well
>50%	Very Good

RESULTS AND DISCUSSION

RESULT

The study's final outcome is a learning module for the human reproductive system that includes a QR Code. Three learning activities are included in this module, which contains three topics: male reproductive organs, female reproductive organs, and

abnormalities of the human reproductive system. This learning module's development and design have been modified to meet the requirements of the 2013 curriculum and basic competency standards. The steps of the module development's design flow are carried out in accordance with the ASSURE development model's flow, specifically (Analyzes Learner, State the standard and the objective, Select method, media or materials, Utilize media and materials, Require learner participation, and Evaluate).

1. Analyze Learner Characteristics

This study's initial phase includes character analysis of the participants using data on the human reproductive system. The characteristics of common difficulties are included in the assessment performed during this phase. As shown in table 3 below, various competences, learning styles, and information are collected through field observations, literature reviews, and interviews with subject teachers. These resources are used to improve the information collected and add it to an analysis of teacher needs.

Table 3. Results of the Needs Analysis for Students and Teachers

No.	Aspects analyzed	Analysis Results
1.	Characteristics of general difficulties faced by students	a. Student age range at risk: 15 to 17 years b. The ability to understanding the subject matter and remember scientific terms c. The fact that some students have misconceptions about the information about the human reproductive system d. A focus on textbooks for education e. After learning about the reproductive system, there aren't enough practice questions or chances for material evaluation.
2.	Student needs	f. Although they have utilized the internet as a resource for learning, students struggle to focus their searching on relevant and expected information by teachers.
3.	Learner's learning style	g. Most of the students in the experimental and control classes have audiovisual and kinesthetic types of learners.
4.	Teacher needs	h. Even if extbooks on the subject of the human reproductive system are excellent, aspects of learning activities are still limited by students' lack of independence, especially in the context of online and offline learning. i. There are a variety of subsections in the reproductive system content section that lack pictures, making it difficult for participants to understand the significance of the theoretical description in these subsections. j. The human reproductive system chapter does not yet provide worksheets or time for reflection.

According to the results of the analysis of students' and teachers' needs, there is a requirement for supporting teaching materials for the human reproductive system in the form of learning modules. The results of the analysis of the design and development of learning module products are shown in table 4 below:

Table 4. Results of the analysis of design and development of modules

No.	Before Development	Module Design	Development Module
1.	Book Components: Concept maps, materials, pictures, practice questions, summary	The module contains: Basic competency formulations, concept maps, as well as instructions for using modules, materials, qr code, practice questions for independent assignments, summaries, self-test questions, answer keys, student worksheets	Module Components: KD, concept maps, instructions for using modules, activity topics, objectives, the material presented is equipped with a barcode containing videos and explanatory articles, pictures, summaries, independent exercises , answer keys, self-reflection, final evaluation questions, student worksheets, bibliography, glossary
2.	Tujuan pada buku : untuk mempelajari dan mengetahui tentang sistem reproduksi manusia.	The designed objectives are in the form of several cognitive and psychomotor aspects	<p>Cognitive:</p> <p>C1: Students are able to explain the relationship between reproductive organs and their functions in the human reproductive system.</p> <p>C2: Students are able to identify the process of the formation of sex cells</p> <p>C3: Students are able to distinguish diseases of the human reproductive system and their prevention</p> <p>C4: Students are able to analyze the structure of reproductive organs in humans</p> <p>C5: Students are able to conclude the impact of promiscuity</p> <p>C6: Students are able to present a report on the results of a study on abnormalities or disorders in the reproductive system</p> <p>P3: Students are able to show and present the results of an analysis of the impact of promiscuity on health and its relationship to the human reproductive system.</p>
3.	Student worksheets are sourced from textbooks that only contain instructions for working on final multiple choice questions. Student	Worksheets are made coherently to contain each activity topic in the module and are equipped with a final evaluation of multiple choice questions. Student	Worksheets contain each level of knowledge. cognitive level from C1 to C6 and contains steps that lead to psychomotor learners such as field observations coming to the puskesmas, asking questions, collecting data and concluding until presenting the results.

2. State the Student Objective

The preparation of standards and objectives is adjusted to the fundamental competencies and curriculum applicable at SMAN 3 Dusun Selatan, which can be seen in Table 4 based on the outcomes of the analysis of the characteristics of students, the media used, and the demands of competence on the fundamental competencies of the human reproductive system.

3. Selected Methods, Media, and Materials

The selection of the media must be relevant and interactive in order to improve student interest, focus, and independence, which will speed up their understanding of the material. Learning methods are adjusted during the module development process to the demands of competency on the material. The medium used is the QR Code, which is shown and contains material on the human reproductive system from YouTube in the form of articles and videos. Communication and information technology tools that will be used in the learning process, such as mobile phones, laptops, QR and Barcode as well as the Google Classroom, Google Form, and WhatsApp, are required for the technology to support the create a strategic, methods, media, and materials. The technology, media, and content needed to create learning module products were chosen

through the product development process. These products then go through expert review, including media and content validation, revisions, and testing before being used in the learning process for students.

a) Construct and Validate Content

Construct and Validate Content Material assessment considers factors such as material coverage, material accuracy, and up-to-dateness, as well as contextual, stimulating, exploratory, and life-skills development insights. While cover design is taken into account when instructors in educational technology evaluate media constructs.

Design of the module's content, adaptability (flexibility), user-friendliness or appropriateness of language use, and information exposure to the user The outcomes of the content validation of each aspect were evaluated and calculated; the average of the two experts' combined validation scores, which fell into the practicable category, was 4.28. It is deemed to be very practicable despite the construct's average score of 4.68 when applied to the learning module on the human reproductive system from Sugiono's book (2018).

The assessment criteria for expert validation are based on the Likert scale criteria, namely very good = 5, good = 4, sufficient = 3, less = 2, very poor = 1.

4. Utilize media and materials

The use of media at this stage is a QR Code on the human reproductive system which is implemented by the teacher in the learning process, students use this reproductive system module with the help of an explanatory video for each submaterial contained in the QR Code which must be scanned with the application. QR Code scanner in the teaching and learning process to help understand the material and achieve learning objectives.

5. Require Learner Participant

The involvement of students' participation in learning aims to make students gain knowledge and direct learning experience. At this stage the researchers involved 47 students who were divided into experimental classes and control classes, students were directly involved by applying learning using a QR Code, this stage went well and smoothly. The learning process is divided into face-to-face in class and online via Google Classroom.

6. Evaluate and Revise

A critical and essential step in creating high-quality modules for students' projected achievement of learning competencies and goal-oriented learning is evaluation and improvement. Improvements were made once the module validation evaluation, which was conducted by three expert lecturers—2 material experts and 1 learning media specialist been completed. Table 3 provides a summary of the evaluations and advancements that were made. In order to gain a full picture of the effectiveness and learning results following the implementation of the QR Code for the human reproductive system, researchers are also evaluating by giving final multiple-choice exam questions (Posttest). The next step is product implementation after the product has gone through the development, validation, and improvement stages evaluate to see if the QR Code helps students learn more effectively during the learning process. The following is in Table 4 the results of the N-Gain Score from student learning outcomes, and Table 5 the effectiveness of the use of the QR Code-based human reproductive system module, as follows:

Table 5. Recapitulation of expert advice on module product content and improvements to the module

Appraiser's Advice	Repair
1) The module design is simplified as needed, from the color of the writing, the type of font used and the frame of the module sheet	1) Revise the module design according to the validator's suggestion from the cover page to the last page of the module
2) The mandatory parts of the module are completed according to the provisions	2) Complete module sections
3) Concept maps are sorted according to the flow of sub-materials and are equipped with connecting words.	3) Create a more complete concept map
4) Add independent assignments The images entered must be clear according to the concept of the material	4) Enter each independent task at the end of the activity as a student evaluation material for learning achievement.
5) The QR Code used must be chosen properly, according to needs and which can help clarify the material	5) Choose a clear image
6) Bibliography, enter the reference of the selected article or video and make it a QR Code.	6) Sorting and choosing from videos that are adapted to the material, basic competence, and considering the age level of students
7) Campus logo added on front cover	7) Complete bibliography
8) Image QR Code same type	8) Added campus logo on front cover
	9) Fixed barcode image type to 1 type

Table 6. N-Gain Score Test Results From Student Learning Outcomes

Class	Average Value		N-Gain	Category
	Pretest	Posttest		
Experiments	65.74	88.70	0.67	Sedang
Controls	65.55	75.05	0.24	Rendah

Table 7. Results of Calculation of the Effectiveness of Using a QR Code

Class	N-Gain Learning Outcomes	% Effectiveness Learning Outcomes	% Difference in Effectiveness Experiments and Controls
Experiments	0,66	0.67	48.31
Controls	0,23	0.24	
Amount	0,89		

Based on the findings in Table 4, it is known that using a QR Code to study in the experimental class results in improved learning outcomes. The average difference between the pretest and posttest has grown by 22.96. As a result, the medium category's N-gain is 0.67 for the class. While the N-gain in the control class was

0.24 in the low category, the average value of the pretest to posttest also increased with a difference of 9.5. While Table 5 above shows the effectiveness of the experimental class's learning outcomes in terms of percentages, with the experimental class's learning outcomes in terms of percentage, with the experimental

class scoring 74.15% in the very good effectiveness category and the control class scoring 25.84% in the moderate effectiveness category, while the difference in effectiveness between the two is 48.31%.

DISCUSSION

Learning modules with QR Codes that are based on information about the human reproductive system are designed to enhance student learning. The ASSURE is used in this study's module development process. According to Molanda in Nur Rahmah (2016), Heinich's theory is that the "ASSURE model is at the solutions of the problems using the technology efficiently and systematizing the steps of a lesson plan." The ASSURE was selected since it was developed with the value of media and technology and the role of students in learning in mind (Guest, DS, 2020).

The developed module's objective is to improve student learning outcomes by using cognitive elements C1 to C6. Based on research by Purwandar (2022), who claims that using QR Codes in the teaching and learning process is very beneficial because they make it easier for teachers to teach and allow them to place learning centers on students so that students are more interactive because the displayed material is simpler to understand, the QR Code guides students to be able to learn independently in the material of the human reproductive system.

This is also consistent with the findings of earlier research by Ataji (2019), which observed that QR codes can enhance student learning outcomes. Ataji's research utilized information in the form of videos and text articles to accommodate it in a single code that was sourced from YouTube and the internet. The results of Bahri's (2016) analysis reveal that the benefits of the module can boost students' knowledge both individually and in groups, are entertaining, and can improve comprehension and learning outcomes.

1. Human Reproductive System QR Code Material for Improving Student Learning Outcomes in a Module-Based Student Learning

The objective of the analysis of the comprehensiveness of students' cognitive learning outcomes is to track the development of students' knowledge of the human reproductive system, knowledge that was imparted through the use of a QR Code. N-gain is categorized as being in the medium range based on the average learning outcomes from the pretest and posttest. According to the control class's average pretest and posttest results, it was determined that the N-gain fell into the low category.

According to this, the experimental class's use of QR Codes to study about the human reproductive system has improved students' learning

outcomes. The findings of research by Aghnia (2021), which claim that the QR Code is an excellent learning assistance since it can enhance student learning outcomes, support this.

Astuti & Bhakti (2018) in Badriana (2021), learning materials with video capabilities might help students convert their abstract ideas into concrete ones. The module's benefit is that it has a QR Code that can link directly to a computer or smartphone using the program (Hartoto et al, 2021). Pratiwi (2019) also claimed that the module that includes a QR Code closely adheres to modern technology advancements so that kids like using it for studying. The existence of supporting media, specifically the QR Code, which increases student engagement in the subject matter, has an impact on the improvement in learning outcomes as well. Additionally, the creation of modules using the QR Code as a variety for distributing resources, tasks, and even assessments to students outside and inside of the classroom (Candra, 2020). This is consistent with research by Tauhid (2022), which found that the E-use LKPD's of QR Codes greatly improved student comprehension of the ideas being taught.

The effectiveness of the learning time being met, the students' attention being concentrated and focused on the material contained in the module, and the students' individual cognitive ability all contribute to the elements that determine student learning outcomes. Meanwhile, the presence of a variety of factors during the learning process, such as a lack of attendance and less active students in participating in learning properly, as well as the level of intellect, can all contribute to incomplete learning.

2. Based on the Human Reproductive System Module QR Code, Student Learning Outcomes are Improved.

The effectiveness of the designed module is demonstrated by the learning results of students both before and after using the module. A module's efficacy can be judged by a variety of factors, but one in particular is the learning outcomes of students who meet the required minimum standards (Rizqi, 2013).

The teacher can create a theme out of a variety of basic competencies by using the module. The teacher's chosen theme can be modified to fit the students' cognitive levels and the surrounding environment. Students are expected to be able to complete their learning through complete understanding of the material due to the module's well-organized content (Sugiyono, 2011).

Complete learning is made possible by QR Codes, which are useful for facilitating and supporting learning activities. Videos, articles, and QR Codes can collaborate to help students learn anywhere, both inside and outside of the classroom (Yahya, 2018), so this module was effectively used in both the online and offline learning process during the Covid-19 pandemic. based educational modules An earlier study by Sianipar et al. (2021) found that the use of QR Code in the education sector significantly improved students' higher order thinking skills (HOTS) in statistical material as well as a variety of other materials. 2017, Nurafandi One of them was also created based on the idea of a virus, and according to the results of his study, the module can enhance student learning outcomes.

The analysis's results demonstrated that the experimental class's large-scale student learning outcomes are very effective, whereas the control class falls into the medium group. The experimental class is more effective than the control class because the learning process is guided and structured with the use of QR Code on reproductive system materials, making it easier for students to understand challenging ideas

and materials and enhancing student learning outcomes.

The evaluation of the product results that have been used reveals some limitations or product weaknesses that can still be developed by research. The limitations include the use of videos explaining the reproductive system material and articles contained in the QR Code still referring to websites/links that already exist on the internet, which indicates that researchers have not created or made separate explanatory videos. Another weakness in the development of this product is that it still uses the same reproductive system terminology as that used in the original product.

CONCLUSIONS

The development of the human reproductive system module that is equipped with a QR Code has a positive influence in the learning process of reproductive system material, which is effective in improving student learning outcomes. It is known that the average posttest the experimental class is 88.70 and a significant increase in N gain is 0.67 in the moderate category, when compared to the control class. The results of the test of the effectiveness of the QR Code on the material of the human reproductive

system, it is known that 74.15% for the experimental class is in the very good category. This states that the effectiveness of the implementation of the module can improve student learning outcomes on the material of the human reproductive system.

REFERENCE

- Aghnia, R. B. 2021. Pengembangan Modul Relasi dan Fungsi dengan Pendekatan *Realistic Mathematics Education* (RME) Berbasis *QR Code* untuk Siswa SMP (Bachelor's thesis, Jakarta: FITK UIN Syarif Hidayatullah Jakarta).
- Ataji, Hafis M. K. 2019. Pengembangan Modul Berbasis *QR Code* Technology pada Materi Sistem Reproduksi Manusia dengan Terintegrasi Kepada Al-quran dan Hadits sebagai Sumber Belajar Biologi Kelas XI Sman 1 Punggur. *Bioedusiana*, 4(1), 17-24.
- Badriana, S., Apriani, H., & Marito, M. 2021. Pengembangan Modul Fisika Berbasis *QR-CODE* pada Pokok Bahasan Fisika Inti Kelas XII SMA. *Schrodinger Jurnal Ilmiah Mahasiswa Pendidikan Fisika*, 2(2), 124-132.
- Bahri, S., Syamsuri, I., & Mahanal, S. 2016. Pengembangan modul keanekaragaman hayati dan virus berbasis model inkuiri terbimbing untuk siswa kelas X MAN 1 Malang. *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan*, 1(2), 127-136.
- Candra, E. N., & Mufliharsi, R. 2020. Sosialisasi Penggunaan *QR Code* Sebagai Upaya Pengembangan Bahan Ajar Untuk Siswa SMK. *JPPM (Jurnal Pengabdian dan Pemberdayaan Masyarakat)*, 4(2), 311-316.
- Fatimah. S, Mufti. Y. (2014). Pengembangan media pembelajaran IPA-fisika *smartphone* berbasis android sebagai penguat karakter sains peserta didik. *Jurnal Karunia*, 60.
- Firmansyah, G., & Hariyanto, D. (2019). Penggunaan *QR Code* pada Dunia Pendidikan: Penelitian Pengembangan Bahan Ajar. *Jurnal SPORTIF: Jurnal Penelitian Pembelajaran*, 5(2), 265-278.
- Hartoto, M., Mulyono, D., & Syafutra, W. 2021. Pengembangan modul pembelajaran atletik berbantuan *QR Code*. *Edu Sportivo: Indonesian Journal of Physical Education*, 2(1), 51-60.
- Heinich, R., Molenda, M., Russell, J.D., & Smaldino, S.E. 2002. *Instructional media and technologies for learning*. Edisi ke 7. New Jersey: Prentice-Hall.
- Nurafandi, A. 2017. Pengembangan Modul Interaktif Berbasis QR Code pada Konsep Virus (Bachelor's thesis).
- Pratiwi, D. M. S., Supriana, E., & Hidayat, A. 2019. Pengembangan Modul Berbasis Project Based Learning (PjBL) dengan Sistem QR Code untuk Membantu Siswa Menerapkan Konsep Keseimbangan dan Dinamika Rotasi. In *Seminar Nasional*

- Fisika dan Pembelajarannya, 48-54.
- Purwandar, R. D. 2022. Pengaruh Aplikasi QR Code Terhadap Motivasi Dan Prestasi Belajar Siswa Kelas V Mata Pelajaran IPA Sub Pokok Bahasan Pencernaan Makanan Pada Manusia Di MI Muhammadiyah Wangon Tahun Pelajaran 2021/2022. *Dwija Inspira: Jurnal Pendidikan Multi Perspektif*, 5(1), 49-62.
- Rosdianwinata, E., Rifa'i, R., Sutihat, S., & Suryani, N. 2022. Efektifitas Pembelajaran PBL (*Problem Based Learning*) Berbantu QR Code Dalam Meningkatkan Hasil Belajar Matematika. *MENDIDIK: Jurnal Kajian Pendidikan Dan Pengajaran*, 8(1), 58-65.
- Saenab. 2017. Respon Mahapeserta didik Terhadap Penggunaan *Quick Respons Code*. *Jurnal Bionature*, Volume 17(1): 58-62.
- Sianipar, A. Z., Saprudin, S., & Zulhalim, Z. 2021. Pengembangan Modul Statistika Berbasis QR Code Untuk Melatih High Order Thinking Skills (Hots) Mahasiswa. *Journal Of Information System, Applied, Management, Accounting And Research*, 5(1), 271-275.
- Slameto. 2003. Belajar dan Faktor-Faktor yang Mempengaruhinya. Jakarta: Rineka Cipta.
- Sugiyono. 2011. Metode Penelitian Kuantitatif, Kualitatif, dan R & D. Bandung : CV. Alfabeta.
- Sugiyono. 2018. Metode Penelitian Kuantitatif, Kualitatif, dan R & D. Bandung : CV. Alfabeta.
- Tamu, S. D., Hulukati, E., & Djakaria, I. 2020. Pengembangan Modul dan Video Pembelajaran Matematika Persiapan Ujian Nasional pada Materi Dimensi Tiga. *Jambura Journal of Mathematics Education*, 1(1), 21-31.
- Taukhid, M. 2022. Efektivitas E-LKPD berbasis quick response code dengan model eksperimental jelajah alam sekitar (EJAS) di era pandemi Covid-19. *Bioma: Jurnal Ilmiah Biologi*, 11(1), 35-49.
- Yahya, F. F., Abas, Hafiza., & Yussof, R. L. 2018. Integration of screencast video through QR Code: An effective learning material for m-Learning. *Journal of Engineering Science and Technology*, 1-13.