

# Needs Analysis of Class XII Students of MA Raudlatul Ulum on the Development of a Recitation Program as an Interactive Learning Media on Magnetic Field Material

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**Abstract** - This study aims to analyze the needs of Class XII students of MA Raudlatul Ulum for the recitation program as an interactive learning media on magnetic field material. This research's method is descriptive. The research subjects are class XII students of MA Raudlatul Ulum who have taken magnetic field subject. The data collection techniques are interview with 1 teacher who teaches magnetic field subject and questionnaires for 30 students. Based on the data obtained, we identified several problems that occur in the magnetic field material, including (1) the lack of time allocation in the learning process despite the magnetic field material being a broad and complex material, (2) the lack of feedback in learning, (3) less interactive and boring learning media used, (4) lack of practice questions. Referring to these problems, it is necessary to develop a recitation program as an interactive learning media on magnetic field material. This program contains practice questions accompanied by feedback on each correct or incorrect answer.

**Keywords:** Recitation; Interactive; Magnetic Field

## INTRODUCTION

Physics is a subject that is closely related to concepts (Setyowati, Subali, and Mosik 2011). In the learning process, students are not only required to know and memorize the concepts, but they must also understand these concepts and relate one concept to another (Kulsum and Nugroho 2014). Essentially, Physics learning is designed to help students understand, arrange, and perfect all pieces of the concepts, thus forming a complete set of concepts (Mulyastuti, Sutopo, and Taufiq 2017). Concept understanding is also related to other abilities. The understanding of Physics concepts is related to critical thinking skills (Alatas 2015) and creative thinking skills (Trianggono 2017). In addition, concept understanding also serves as a basis before students develop said concept in the form of formulas and it is also needed in solving more complex problems (Amin, Wiendartun, and Samsudin 2016; McDermott 2001; McDermott and Redish 1999).

Magnetic field material is a complex material. The difficulty level of magnetic field problems is also quite high with many variants of questions. In addition, magnetic field does not only study the magnitude of the magnetic field but also examines the direction of the magnetic field (Halliday and Resnick 1987; López 2003; Phommarach, Wattanakasiwich, and Johnston 2012). Given this, concept understanding hence becomes very important in the studying of magnetic field materials.

Unfortunately, facts on the ground turned out to be different from what was expected. Several studies explain that students have difficulty in magnetic field material (Amnirullah et al. 2015; Sarkity and Sundari 2020). Furthermore, Nurjannah explained that the magnetic field material is one of the top-ranked material in the category of materials that are considered difficult by students (Nurjannah et al. 2020). Students also experience misconceptions about the magnetic field material that has been revealed by Nurjannah (Suana 2014). Misconceptions

occur when students' understanding of physics concepts is not in accordance with the literature or expert agreement (Sholihat, Samsudin, and Nugraha 2017). This indicates that students have yet to understand the concept of magnetic field correctly.

Based on the results of the literature review, several problems experienced by students in learning magnetic field material as the cause of the lack of understanding of the concept were identified. The first problem is the lack of time allocation for the learning process, which causes the teachers to not be able to have maximum performance in teaching all of the material (Lestari, Ayub, and Hikmawati 2016). This is even though the magnetic field material is a broad and complex material. As a result, students feel like they haven't explored the concepts enough, which can affect the next material. In addition, the second problem is the lack of feedback in learning. Meanwhile, direct feedback to students provides temporal and visual connections between the related concepts (Finkelstein, Adams, and Wieman 2006). Such an approach, when properly focused, can facilitate students' understanding of the concept (Clark and Mayer 2003). The third problem is the lack of practice questions (Sari, Surantono, and Ekawati 2013). Students who rarely practice working on physics questions, when then faced with various kinds of questions, will have difficulties in answering said questions. The final problem is that the current physics learning mostly only refers to textbooks (Husono, Eso, and Sahara 2019). Therefore, students become bored in the studying of Physics and always think physics is difficult.

Rahmawati (2017) revealed that physics students are still lacking the correct understanding of the concept of magnetic fields (Rahmawati 2017). In MA (Islamic Senior High School) Radlatul Ulum, teachers have designed the learning as good

as possible, but shortcomings remain to exist. Therefore, this research is focused on analysing the causes of the problems experienced by students in studying magnetic field material as well as on discovering the media needed to support the learning process of the material.

## RESEARCH METHODS

This study uses descriptive method which describes a situation. This study aims to analyze the media that students need based on the problems faced when studying magnetic field material.

The research subjects are Class XII students of MA Raudlatul Ulum who have taken magnetic fields lessons. This is because the magnetic field material was studied in Class XII. The respondents of this study were 1 teacher who taught the magnetic field subjects and 30 students. The research data was obtained through interview and needs analysis questionnaire on the media to be developed.

The data from the interviews were analyzed descriptively. Meanwhile, the analysis technique for the data from the questionnaire was done in percentages and was then described descriptively.

Questions in students' needs analysis questionnaire on the learning media are as follows:

1. What media is used to study magnetic field material?
2. Is the media used in the magnetic field material interactive and does it make you not bored?
3. Is the classroom hour enough to study magnetic field material?
4. Does the teacher always provide feedback to students in answering questions about magnetic fields?
5. Is feedback in each question needed when studying magnetic fields?
6. Do you feel that you are not practicing the questions during the learning of

magnetic field material enough?

## RESULTS AND DISCUSSION

The recitation program is a program that can be used to improve students' concept understanding. This program contains practice questions that are equipped with feedback on each answer choice, be it correct or incorrect answers. The presence of feedback can strengthen students' understanding of concepts or correct conceptual errors that are understood by students while studying Physics. Feedback for incorrect answers contains an analysis of student errors in answering the question, while feedback for the correct answer contains praise because students have understood Physics concept correctly (Taqwa & Faizah, 2016). The provision of this feedback must be done as soon as possible so that students' erroneous understandings are not firmly attached to their mind (Taqwa et al., 2017). This is even worse if the answer containing the wrong concept also presents in the answer options. Certainly, students will feel very confident with the answer choices even though they are not in accordance with scientific concepts.

This recitation program is given to students because it is sensed that the subject matters are overly plentiful, whereas the classroom hours allocated are limited (Yusuf Aditya, 2016). Recitation is given to students outside of the classroom hours after the teacher explains a material. This program contains a presentation of the teaching materials where the teacher provides exercises so that students can learn the material more thoroughly. In the recitation program, teaching and learning interactions also occur (Laba, 2010). Students can work on practice questions in the recitation program anywhere and anytime. According to Nurlaelah, recitation can make students more actively involved in learning and motivate them to increase independent learning (Nurlaelah, 2015). Along with active independent learning, students' understanding of concepts will improve.

Based on the results of the interview, the teacher stated that the classroom hour was still insufficient to teach magnetic field material. This is because the magnetic field material is a material that is quite broad and complex. In addition, teachers also do not always provide feedback to students when working on the questions given the short time allocation in class. Feedback on the questions is usually given only for some of the questions during in-class learning. The teacher also stated that the existence of learning media had an important role in supporting students' concept understanding in magnetic field material. Therefore, the teacher agreed on the development of a learning media that can provide feedback to students in answering magnetic field questions. Learning media development is very helpful for the students, especially during distance learning in an era of pandemic as is the case for the present time.

**Table 1.** The results of the questionnaire given to students

No	Statement	Response	Percentage
1	Types of media used in learning	PowerPoint	30%
		e-book	5%
		Video	5%
		Textbook	60%
2	The media used is interactive and not boring	Yes	30%
		No	70%
3	Classroom hour is sufficient for learning magnetic field material	Yes	30%
		No	70%
4	The teacher always gives feedback to students in answering magnetic field questions	Yes	60%
		No	40%
5	Feedback is needed in answering magnetic field questions	Yes	100%
		No	0%

No	Statement	Response	Percentage
6	Magnetic field question practice is lacking	Yes	90%
		No	10%

Based on the results of the questionnaire given to physics students, it can be concluded that the majority of the media used to study magnetic field material are printed books with a percentage of 60%. Meanwhile, the other media are eBooks with a percentage of 5%, learning videos with a percentage of 5%, and PowerPoints with a percentage of 30%. This is in accordance with Husono's research which states that most physics learning only refers to textbooks and PowerPoints (Husono et al. 2019).

However, as many as 70% of the students said that the media used was not interactive enough and was boring. Therefore, students become less enthusiastic in participating in magnetic field learning. As a result, students are less able to explore the concepts of magnetic field material correctly and later, it will also affect the subsequent learning process considering that physics materials are interrelated with each other.

As many as 70% of the students said that the classroom hour was also not sufficient for studying magnetic field material, considering that magnetic field material is a broad and complex material. This is in line with Lestari's research which states that insufficient allocation of in-class learning can result in the learning becoming less optimal (Lestari et al. 2016). Moreover, studying a broad and complex material takes a fairly long time.

Most students also feel that they do not have enough practice on magnetic field questions, with a percentage of 90%. This is in accordance with Sari's research which states that the cause of poor concept understanding is the lack of practice questions. Students who rarely practice

working on physics questions and then are faced with various kinds of questions will have difficulties in answering said questions.

In addition, teachers also do not always provide feedback every time the class works on magnetic field questions, whereas students feel that feedback in answering questions is much needed so that they can tell where their mistakes are. Clark and Mayer mention that a feedback approach when properly focused can facilitate students' understanding of concepts for the material (Clark and Mayer 2003). As many as 100% of the students or in other words all students consider that feedback in the learning process is much needed to support concept understanding.

From the results of the questionnaire given to the students, it can be concluded that poor concept understanding in magnetic field material is caused by several factors. The first factor is the learning media used during the learning process being less interactive and boring. The majority of the teachers use PowerPoint and eBook. The second factor is the lack of allocation for in-class learning which results in teachers not being able to maximally teach all the materials. Moreover, magnetic field material needs to be taught for quite a while because the material is broad and complex. The third factor is the lack of practice on the questions. If students are often faced with questions, they will have no more difficulty in answering questions with numerous variations. Therefore, frequent practice on questions become pretty important in improving students' concept understanding. The fourth factor is the lack of feedback from the teacher during the learning process. This feedback is considered important by students because students can find out whether their understanding of the concept is correct or not.

To overcome these problems, the solution needed is a recitation program. Recitation is a learning method in the form of multiple-choice practice questions accompanied by feedback for each answer

choice, be it correct or incorrect. Therefore, this program is able to provide reinforcement for the students and verify the correct concept and hence can improve students' concept understanding (Ghozali, Sutopo, and Hidayat 2017; Oliveira and Oliveira 2013). Feedback on incorrect answer choices is intended to show misconceptions in concept understanding that students may experience, while feedback on correct answer choices contains praise and videos discussing the question. With the presence of the discussion video, it is hoped that it will be easier for the students to understand Physics concepts. Feedback provision is very important for strengthening students' understanding of concepts or correct misconceptions experienced by students.

This recitation program is usually given outside of classroom hours to practice the strengthening of the concepts on material that is considered difficult by students after being taught in class by the teacher (Docktor and Mestre 2014). Based on literature review, this recitation program is effective to be used in the attempt to improve understanding of Physics concepts (Sutopo, et al. 2016) (Suana, 2014). This recitation program is confined into an interactive learning media. The presence of this interactive learning media is considered able to foster students' interest, increase concept understanding, and stimulate students' minds so that they can easily understand a material (Siboro et al. 2020).

### Examples of Recitation Problems on Magnetic Field Material

An area has a uniform magnetic field of 4 tesla, directed north. A positive point charge of  $3 \times 10^{-10}$  Coulomb is moving south. If this magnetic field does not exist, at a speed of 200 meters per second, the force exerted by the point charge by the magnetic field is...

- A. Null
- B.  $24 \times 10^{-8}$  N, north
- C.  $24 \times 10^{-10}$  N, west

### Feedback for option A

Congratulations! You have understood the concept of magnetic field correctly.

Note that the magnetic field is directed north and the velocity of the charge is directed south. Therefore, the angle between the magnetic field and the velocity is  $180^\circ$ . The magnitude of the force exerted on the point charge by the magnetic field can be determined by

$$F = Bqv \sin \theta$$

$$F = Bqv \sin 180^\circ (\sin 180^\circ = 0)$$

$$F = 0$$

### Feedback for option B

INCORRECT!

### Feedback for option C

INCORRECT!

### CONCLUSION

Based on the results of the needs analysis, we can conclude several things, namely (1) the media used at the present time are mostly in the form of available printed books, and hence they are less interactive and boring; (2) time allocation for classroom learning is lacking despite the magnetic field material being quite complex; (3) there is a need for feedback in answering magnetic field questions in order to know the correct concept; (4) students still feel that they don't have enough practice on magnetic field questions, (5) both teachers and students require a learning media that can overcome student problems, (6) the recommended media for this magnetic field material is a recitation program that contains practice questions with feedback on each answer choice.

It is hoped that more learning media will be developed for magnetic field material since the variety of the media used in the learning is still limited.

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