Need Analysis of Integrated Science Digital Teaching Materials with Blended Learning Models in the New Normal Era for PGMI Students throughout East Java

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Abstract

The Covid-19 pandemic has affected all sectors of life, including education. During the Covid-19 pandemic, all tertiary institutions changed learning process by using blended learning, including the Madrasah Ibtidaiyah Teacher Education (PGMI) study program throughout East Java. Blended learning can only be successful when paired with instructional resources tailored to each student's individual requirements. This research aims to identify and evaluate gaps in East Java's PGMI student population's access to digital scientific instruction resources that are compatible with blended learning pedagogies. This study employed a quantitative survey method involving PGMI students throughout East Java. Data were collected using questionnaires distributed online. Need analysis included learning characteristics, teaching materials, and learning orientation. Based on the analysis that has been done, it is concluded that students need interactive teaching materials based on problem-based learning equipped with virtual practicums or online students worksheets.

Keywords: *digital teaching materials, blended learning, new normal era.*

Abstrak

Pandemi Covid-19 telah mempengaruhi semua sektor kehidupan, termasuk pendidikan. Di masa pandemi Covid-19, seluruh perguruan tinggi mengubah proses pembelajaran dengan menggunakan *blended learning*, termasuk program studi Pendidikan Guru Madrasah Ibtidaiyah (PGMI) se-Jawa Timur. *Blended learning* hanya dapat berhasil apabila dipasangkan dengan sumber daya instruksional yang disesuaikan dengan kebutuhan individu masing-masing mahasiswa. Penelitian ini bertujuan untuk mengidentifikasi dan mengevaluasi kesenjangan akses populasi mahasiswa PGMI se-Jawa Timur terhadap sumber pengajaran sains digital yang kompatibel dengan pedagogi pembelajaran campuran. Penelitian ini menggunakan metode survei kuantitatif yang melibatkan mahasiswa PGMI se-Jawa Timur. Pengumpulan data dilakukan dengan menggunakan kuesioner yang disebarkan secara online. Analisis kebutuhan meliputi karakteristik pembelajaran, bahan ajar, dan orientasi pembelajaran. Berdasarkan analisis yang telah dilakukan, disimpulkan bahwa siswa membutuhkan bahan ajar interaktif berbasis pembelajaran berbasis masalah yang dilengkapi dengan praktikum virtual atau LKS online.

Kata kunci: *bahan ajar digital, blended learning, era new normal.*

INTRODUCTION

The Covid-19 pandemic has caused significant changes in world conditions. Covid-19 disrupts daily lifestyles and causes new living habits that must apply limited isolation to various areas of life (Huber & Helm, 2020). By the end of April 2020, UNESCO (2020) estimates that 186 nations would have instituted nationwide closures, affecting around 73.3% of schooling worldwide. UNESCO also estimates that more than 1.6 billion students have experienced educational suspension due to Covid-related school closures (UNESCO, 2020). By the end of April 2020, UNESCO (2020) estimates that 186 nations would have instituted nationwide closures, affecting around 73.3% of schooling worldwide. Therefore, 78% of schools and tertiary institutions in Indonesia conduct online and offline learning (Mendikbud, 2020).

The Covid-19 epidemic has impacted schools at all levels, including those in higher learning. As a result of the global spread of the Covid-19 virus, all parties involved in and beneficiaries of higher education throughout the globe must rapidly adjust to novel circumstances and make the transition from conventional in-person instruction to remote learning via online forums and other virtual learning environments (Angelova, 2020; Bao, 2020; Mishra et al., 2020; Neuwirth et al., 2021). Some online platforms used to change the post-Covid-19 education system are Coursera, Google Classroom, Edmodo, and E-Learning Moodle. Lederman (2020) suggests that with the Covid-19 crisis, learning between students might experience a digital academic peak as the peak of the online learning process.

During the Covid-19 epidemic, Islamic universities in Indonesia adapted their curricula to help students survive. During the Covid-19 epidemic, some Islamic universities switched to entirely online instruction (Hasanah & Setiawan, 2020; Yudiawan, 2020). Online learning facilitates the coordination of all parties (Tolsteneva et al., 2020). Online learning might create A modern learning environment in the Higher Education environment (Huda et al., 2018). Madrasah Ibtidaiyah Teacher Education (PGMI) study program in all State Islamic Religious Higher Education (PTKIN) in East Java carried out entirely online learning using various platforms, including Moodle e-learning (Fadhilah, 2021), Google Classroom (Faizah & Khairiyah, 2021; Khikmah & Musthofa, 2021), and WhatsApp Group (Amaniyah et al., 2021; Rohmah, 2020).

In the 2020/2021 academic year, the Ministry of Education and Culture emphasized that learning activities in tertiary institutions can be carried out both offline (face-to-face) and online meetings (blended learning) (Kebudayaan & Indonesia, 2020). Thus, all Indonesian Islamic tertiary institutions also carried out adaptations in this regard. The East Java Islamic Higher Education Madrasah Ibtidaiyah Teacher Education study program also implements blended learning by combining online and offline learning.

Online learning can be a complement to face-to-face learning. Blended learning combines traditional classroom instruction with online components like discussion boards and collaborative software that enables students to engage in real-time learning. Blended learning, in which face-to-face and online techniques and technology that may complement one other are integrated (Alexander et al., 2019; Garrison & Vaughan, 2008), is one of the most desired learning delivery models in higher education (Peimani & Kamalipour, 2021). Blended learning allows students to broaden their horizons and encourages them to learn independently (Francis & Shannon, 2013; Jeffrey et al., 2014). Accordingly, student preparation, teacher and student digital literacy, and the instructor's technological proficiency

are crucial factors in successfully implementing blended learning (Aji et al., 2020). Additionally, using instructional resources is a determining factor in introducing blended learning (Bahri et al., 2021).

Learning is bolstered in part by the resources that teachers provide. Creating new educational resources is an integral aspect of the evolution of educational breakthroughs. Reading and understanding the materials used in the classroom are crucial (Fajri, 2018). Arsyad (2002) believes that teaching materials can convey messages or information in learning. Therefore, it can stimulate students' attention in learning. Implementing blended learning where digital teaching materials are integrated with technology is needed to enable the students to access them easily anytime and anywhere.

The development of integrated technology in blended learning (Wei et al., 2019) leads to innovative digital media being urgently needed by involving digital technology (Rubio-Tamayo et al., 2017). One of the efforts to bring innovations in teaching and learning education during the new normal era is using digital teaching materials. Learning science in East Java Islamic Higher Education requires digital teaching materials to support learning. This supports the objective of learning science, namely to build scientific students who can solve problems, evaluate information logically, and prove it (Paige et al., 2016). Learning science supported by technology, including visuals, will be more effective than learning science with conventional classes. This might encourage students to learn science and increase real and concrete knowledge (Rehmat & Bailey, 2014). In compiling digital teaching materials, it is necessary to have a need analysis to explore the characteristics, features, and platforms of digital teaching materials that students most need. Hence, this study focused on analyzing student needs relating to the need for digital science teaching materials in the blended learning period in the new normal era.

METHODS

This study employed a quantitative approach using a survey research method. The data generated in this study were described quantitatively with statistical analysis. The survey was intended to obtain a general description of the characteristics of the population, for example, attitudes, values or beliefs, and other aspects. This research used a survey approach to identify and characterize the blended learning process following the Covid-19 epidemic and the demands of PGMI students in East Java for digital science teaching resources.

This research was undertaken in four State Islamic Religious Universities in East Java: UIN Maulana Malik Ibrahim Malang, UIN Sayyid Ali Rahmatullah Tulungagung, UIN Sunan Ampel Surabaya, and IAIN Kediri. The Madrasah Ibtidaiyah Teacher Education study program was the focus of the investigation. The study was conducted in a month from mid-August to mid-September 2022. The research population was all Pendidikan Guru Madrasah Ibtidaiyah study program students in East Java. In contrast, the sample of this study was students who were randomly selected to fill out an online questionnaire voluntarily and have taken the science course. Several 87 respondents or students were obtained as the sample of this study. The details of the research subjects are presented in Table 1.

Table 1. Research Subjects Details

University	Number of Samples
UIN Maulana Malik Ibrahim Malang	35 students
UIN Sayyid Ali Rahmatullah Tulungagung	22 students
UIN Sunan Ampel Surabaya	18 students
IAIN Kediri	12 students
Total	87 students

The data were collected using a survey by distributing online questionnaires to all PGMI students from four State Islamic Religious Universities in East Java. The research instrument was a questionnaire distributed online via GoogleForm. This research instrument was used to obtain data on students' needs for digital teaching materials, characteristics of science teaching materials, and characteristics of science materials. The data were then analyzed using the percentage results regarding students' digital science teaching materials needs.

RESULTS AND DISCUSSION

The article's discussion is meant to do the following: (1) respond to the problem statement and research questions; (2) detail the methodology used to collect the data; (3) provide an explanation of the results; (4) integrate the results into existing bodies of knowledge; and (5) propose novel explanations or refinements to the prevailing paradigm. The advantages of the study should be discussed here, not the outcomes of the repeat. This analysis needs to fill in the outlined hole.

This study aims to analyze the needs of PGMI students in East Java for digital science teaching materials. The needs analysis instrument mentioned three main categories, including characteristics of science learning that had taken place, the characteristics of the required teaching materials, and the required learning orientation in teaching materials. Each category of need analysis is described as follows.

Characteristics of Science Learning that Taken Place

The first category in the needs analysis is the characteristics of science learning. This category consisted of several indicator questions in the needs analysis questionnaire, including what methods/models were used, whether ongoing learning had facilitated 21st-century skills, and what teaching materials were used in the past year. The survey results showed that 97.7% of students stated that learning had taken place online during the last year and 100% of students agreed that learning in the 2022/2023 Academic Year should take place in blended learning, with a more significant portion of offline learning.

Furthermore, in terms of the learning methods, students stated that lectures were carried out using the following methods, lecture at 40,2%, practicum at 69%, project-based learning at 39.1%, and problem-based learning at 27.6%. Percentage details on aspects of learning methods are presented in Figure 1. In the learning aspect that can facilitate students' 21st-century abilities, students were asked to choose points one to five, with the following criteria, 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree. The questionnaire results showed that 23% of students strongly agreed, 44.8% agreed, 28.7% were neutral, and 3.4% did not agree with the statement. The results of the questionnaire on learning aspects that can facilitate 21st-century skills are presented in Figure 2.
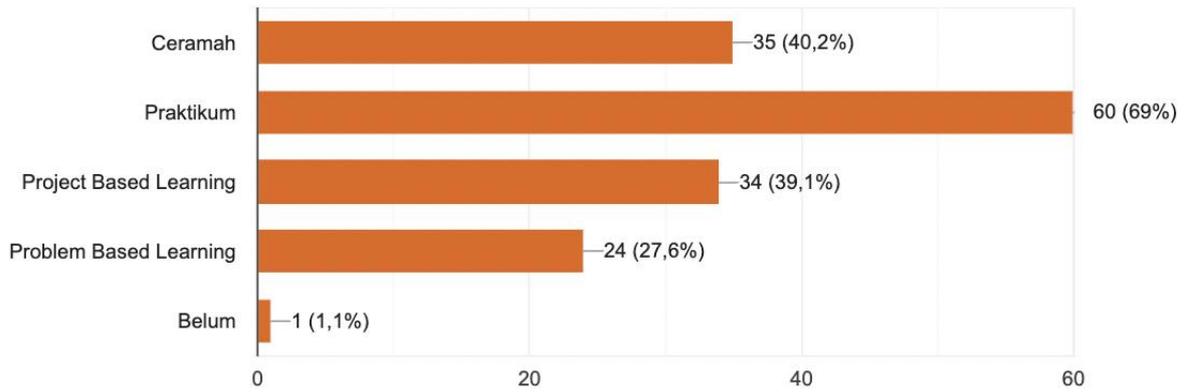
Figure 1. The Percentage of Learning Methods Used in the Science Learning Process
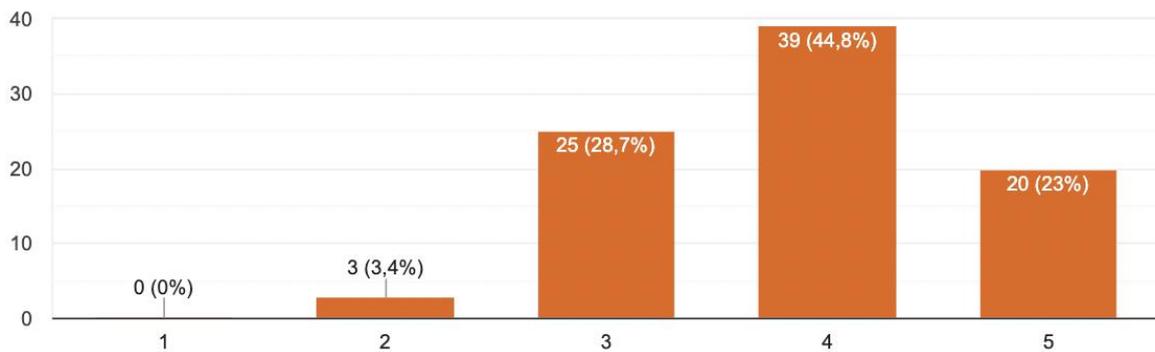

Figure 2. Details of Learning that Facilitates the 21ˢᵗ Century

In the aspect of teaching materials that had been used, students were allowed to fill in a choice of teaching materials that had been used and might choose more than one type, including books, student worksheets, teaching modules, e-modules, e-books, YouTube videos, and others. 73.6% of students admitted that the teaching materials were YouTube videos, 44.8% used e-books, and 34.5% used e-modules. Details of the types of teaching materials used in science learning are presented in Figure 3.
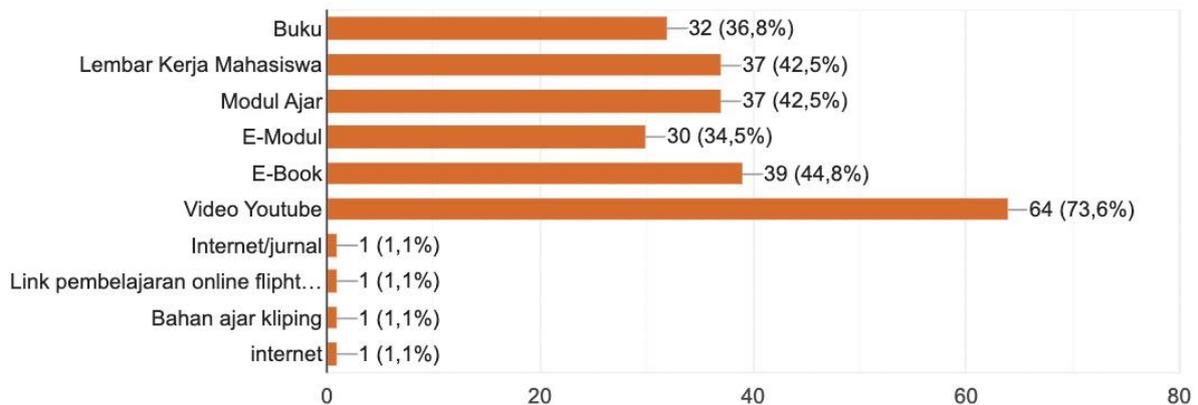

Figure 3. Characteristics of Teaching Materials Used in the Science Learning Process

Characteristics of Teaching Materials

The second category in the need analysis is the desired characteristics of the teaching materials. Several criteria point to this: the form of teaching materials, features of teaching materials, and teaching materials platforms. In the desired form of teaching materials, students were given a choice of printed student worksheets, printed textbooks, e-modules, online videos, and others. The survey found that 54% of students chose online videos, 52.9% chose printed textbooks, 39.1% chose printed student worksheets, 27.6% chose e-modules, and 2.2% chose other things. Details of the characteristics of the teaching materials desired by PGMI students in East Java are presented in Figure 4.
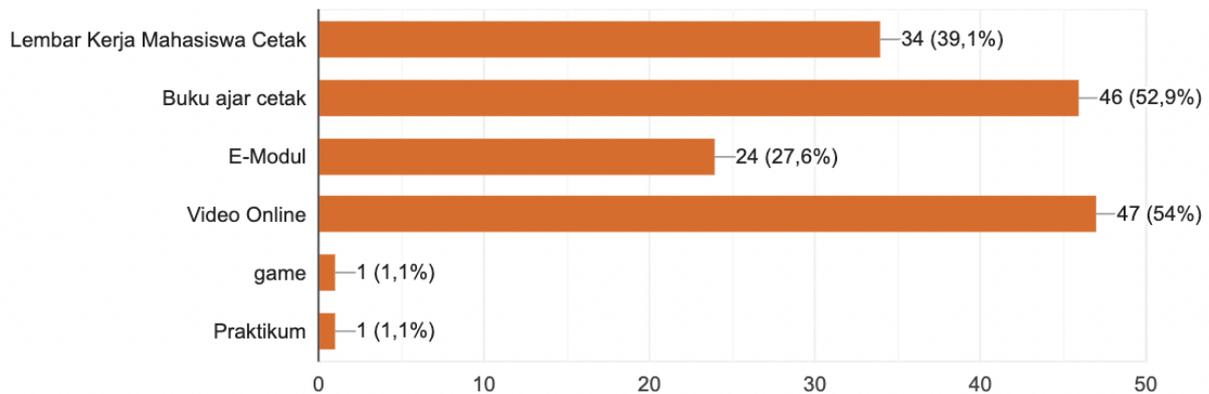

Figure 4. Characteristics of Teaching Materials Desired or Needed by Students

The second point is what features students consider important and must be in teaching materials. Students were given choices, including online student worksheets, video materials, help buttons, and online practice questions. In general, the percentage of features students need is almost the same as one another. The survey results showed that 66.7% of students chose the online student worksheet feature, 56.3% chose the video material feature, 47.1% chose the help button feature, and 40.2% chose the online practice questions. Details of the percentage of features needed are shown in Figure 5. The next thing is the desired platform for digital science teaching materials. Some of the platforms students choose are YouTube, interactive e-modules with Canva, e-modules in pdf form, and others. The survey results indicated that 39.1% of students chose the YouTube platform, 32.2% chose the interactive e-module platform with Canva, 25.3% chose the pdf e-module, and 3.4% chose others. Details of the percentage of platforms that students desired are presented in Figure 6.
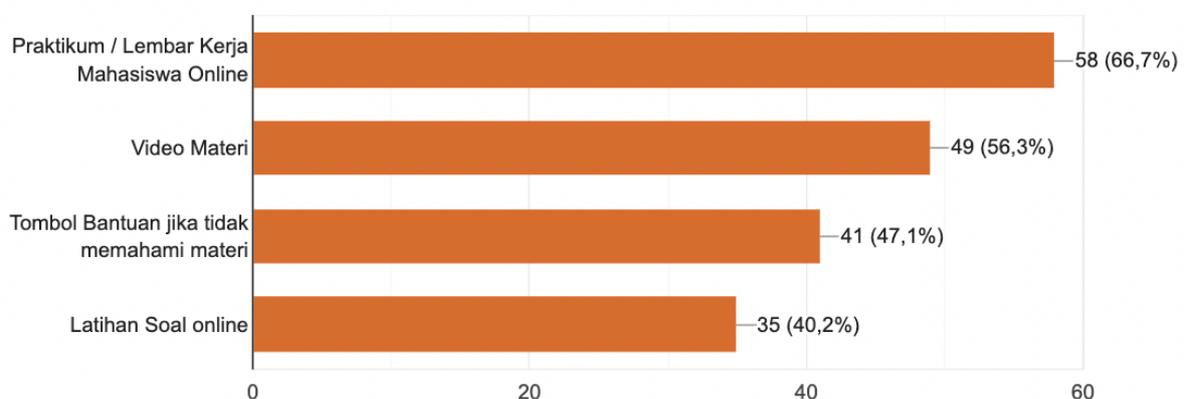

Figure 5. Important Features in Teaching Materials

Figure 6. Platforms Needed in Teaching Materials

Learning Orientation

The third aspect of needs analysis is learning orientation. This consists of what learning models are used in teaching materials, what abilities are facilitated in teaching materials, and what materials are considered difficult and requires digital teaching materials. The learning model aspect identified students' opinions on what digital teaching materials are in the form of problem-based learning. Students were asked to express their opinion with the following criteria, 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = disagree. 39.5% of students strongly agreed, 34.9% agreed, 24.4% were neutral, and 1.2% disagreed. Details on the percentage of aspects of the learning model are presented in Figure 7. The next thing to discuss is identifying student opinions on PBL digital teaching materials and whether they can develop problem-solving skills and scientific reasoning. The survey results found that 35.6% of students strongly agreed, 36.8% agreed, 26.4% were neutral, and 1.1% disagreed. Details on the percentage of student opinions are presented in Figure 8. Then, aspects of student opinion related to scaffolding problem-based learning identified that 89.7% of them had never accessed digital teaching materials based on scaffolding problem-based learning, as presented in Figure 9.
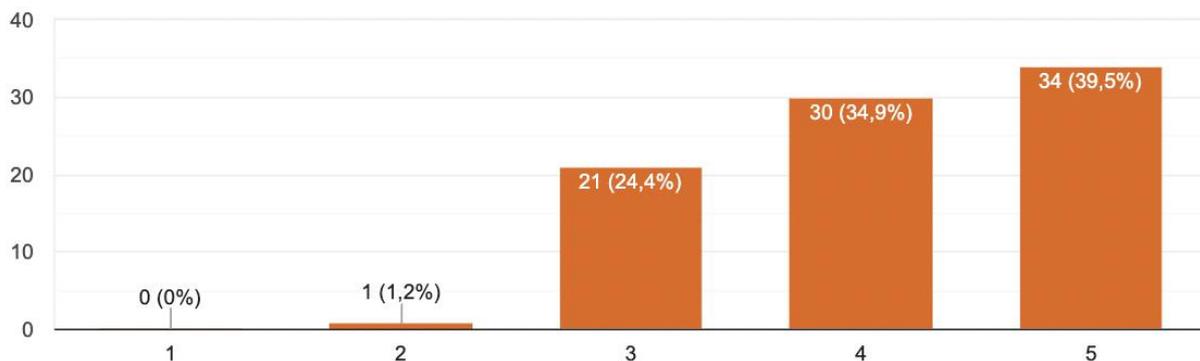

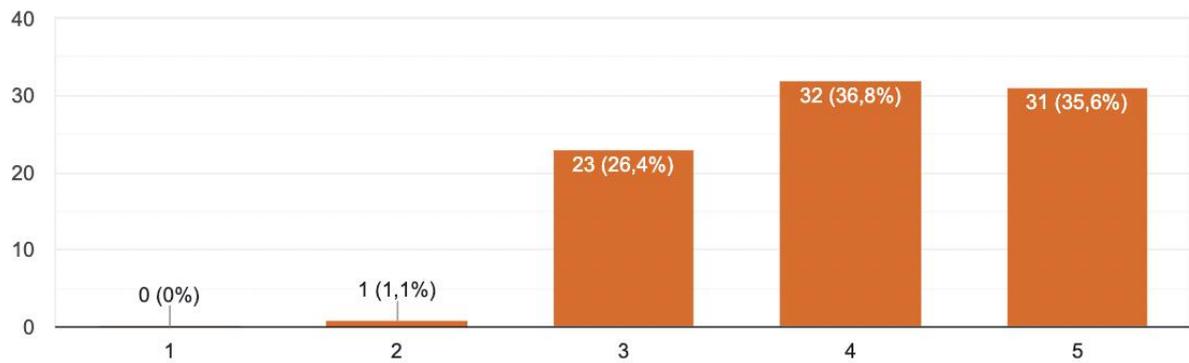Figure 7. Percentage of Problem-Based Teaching Materials

Figure 8. Details of the Percentage of Problem-Based Learning Teaching Materials that Can Develop Students' Problem-Solving and Scientific Reasoning Skills

The last aspect found is the most challenging science material, which requires teaching materials. Students were given a choice of materials, including kinematics, temperature and heat, electricity and magnetism, human body systems, and living things and their environment. The survey results found that the most challenging materials requiring digital teaching materials were 29.9% kinematics, 29.9% electricity and magnetism, 26.4% temperature and heat, and 12.6% human body systems and 1.1% living things and their environment. Details of challenging materials and digital teaching materials needed are presented in Figure 9.
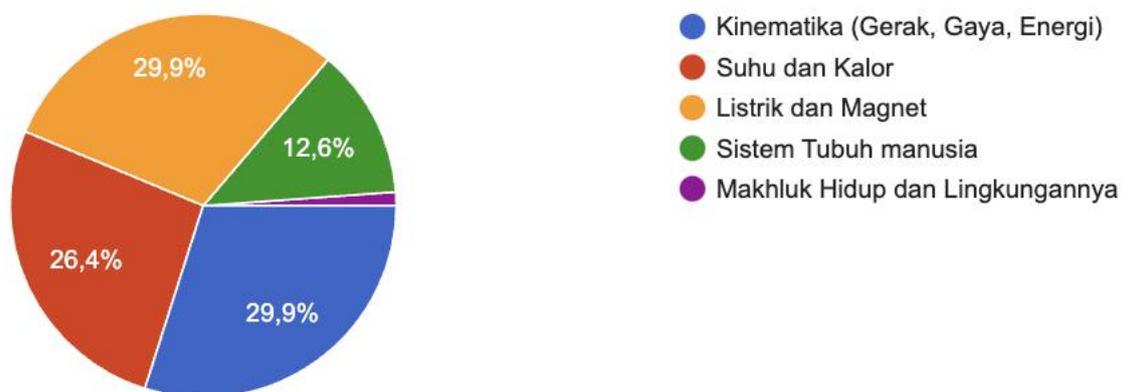

Figure 9. The Percentage of Difficult Science Materials

In terms of the characteristics of learning that had taken place, in general, learning in the Pendidikan Guru Madrasah Ibtidaiyah study program throughout East Java runs in a blended learning manner using the most widely used practicum method. The majority of online training for 21st-century skills made use of YouTube videos. YouTube videos as part of a blended learning strategy may help students improve their skills (Taufik et al., 2022), communication skills (Purnamasari, 2018; Rachmijati et al., 2019), and student understanding of concepts (Sakina et al., 2020). Using YouTube videos allows students to listen, observe, and communicate (Tarnopolsky & Degtiariova, 2003). Previous studies conducted by Jaffar, (2012); Orús et al., (2016); Styati, (2016) proved that the use of YouTube videos could increase student learning motivation and can be an exciting and relevant additional teaching material for students.

In terms of the characteristics of teaching materials, students want teaching materials in the form of interactive e-modules with Canva equipped with online videos and online student lab work or worksheets. Using e-modules in the learning process can improve thinking skills, effectiveness, innovation, and fun conditions in learning (Purnamasari, 2018; Waluya et al., 2022). Learning with interactive e-modules can convey all material according to learning targets (Amelia, 2021; Maielfi, 2021; Priantini & Widiastuti, 2021). Moreover, with high flexibility, students can study material in advance through digital devices anywhere and anytime (Kurniawan et al., 2019; Sidiq & Suhendro, 2021). Practicum or online student worksheets can support students in exploring and visualize abstract concepts, especially in explaining the application of knowledge (Başer & Durmuş, 2010). A study by Koretsky et al., (2011) mentions that students feel that virtual practicum can help and direct their learning experiences. This is also supported by a study done by Sari et al., (2019), which mentions that the use of virtual practicum or online worksheets can positively influence student attitudes and motivation.

Regarding learning orientation, students need teaching materials based on problem-based learning that can facilitate students' problem-solving skills and scientific reasoning. The problem-based learning model can support problem-solving abilities (Khoiriyah & Husamah, 2018; Mutakinati et al., 2018), creative thinking (Ulger, 2018), and students' understanding of concepts (Astuti & Santosa, 2017). Using problem-based learning-based modules can improve learning outcomes (Zahara et al., 2017), critical thinking, and student understanding (Putrawansyah & Sardianto, 2016). Problem-based learning-based teaching materials can also facilitate students' independent learning process (Johnson & Buck, 2014; Park et al., 2012). Based on the needs analysis that has been carried out, students need problem-based learning science teaching materials that are equipped with virtual practicums and use the Canva interactive platform.

CONCLUSION

In general, to help students succeed with blended learning amid the new normal brought on by the Covid-19 epidemic, a study of the requirements for digital scientific teaching resources is required. Interactive digital science teaching materials needed by students are expected to be problem-based learning-oriented and equipped with virtual lab or practicum features that can support blended learning science learning. Students can access teaching materials to support independent learning whenever and wherever. This study is expected to provide suggestions for further research for developing problem-based learning digital science teaching materials.

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