

Teacher Challenges in Designing the Learning after Curriculum Change: An Analysis of Learning Management System

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Abstract—Curriculum change is an essential educational milestone, which often aims to align the education system with the needs of continuously developing society and global trends. This research aims to identify teachers' challenges in designing learning after curriculum changes. The research design uses quantitative description. The respondents were 214 elementary school teachers in six Central Java, Indonesia cities. An online questionnaire form created using Google Forms is used to collect data. Data was taken using a survey and analyzed descriptively. This instrument consists of 3 (three) parts: (1) teacher challenges regarding curriculum changes, (2) the teacher's ability to design learning, and (3) knowledge and competence about and in using the LMS. The study results show that the biggest challenge for teachers lies in management, experience, and references in implementing the new curriculum, even though their readiness is high. Teachers need supporting facilities like a learning management system (LMS) to help them design lessons and develop learning modules. The majority of teachers are familiar with using LMS, so LMS can be a solution to adapt to teacher challenges. Using LMS to create teaching modules can increase the effectiveness and efficiency of all teacher activities at every level of education. It is hoped that the findings of this research can serve as a guide for educators, researchers, educational technology creators, and governments in exploring and developing new ways to support teachers' work, from planning to assessing learning tools. They can easily upload materials, create assignments and tests, and provide feedback to students.

Keywords—Teacher challenges; designing learning; curriculum change; Learning Management System (LMS).

Manuscript received 29 Oct. 2023; revised 17 Nov. 2023; accepted 16 Dec. 2023. Date of publication 31 Dec. 2023.
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I. INTRODUCTION

The Education System changes along with global developments. Curriculum changes are essential milestones in education, often aimed at aligning the education system with the evolving needs of society and global trends [1], [2]. Technological development, globalization, and social demands have been key drivers in transforming the education system [3]. In this 21st century, we have witnessed a tremendous transformation in how education is delivered, accessed, and managed. These changes are not only limited to teaching methods but also include curriculum structure, assessment, and the overall educational paradigm [4]. The curriculum strongly influences education to shape knowledge, attitudes, and skills in line with the development of science and technology [5]. With the rapid change in science and technology, Indonesia, through the Ministry of Education,

Culture, Research, and Technology, launched the latest curriculum, Curriculum Merdeka. The Indonesian government believes the curriculum can accommodate various perspectives of knowledge, enjoyment of learning, student potential, and attitudes to achieve 21st-century skills [5], [6].

The concept of the Independent Curriculum commands the implementation of differentiated learning based on student characteristics (learning freedom), for example, in terms of student learning styles [7]. The primary foundation in designing the Curriculum Merdeka is the principle of independent learning. In this way, the curriculum is formulated so that the teacher can create conditions in which students can realize the importance of independent learning and manage their learning process according to their learning style. Within the framework of the Curriculum Merdeka, schools and teachers have greater flexibility to adapt education to the needs and interests of individual students so

that each child can develop his potential according to his capacity. Innovation in the Merdeka Curriculum reflects the government's commitment to improving the quality of education that focuses on student growth. This approach reflects an understanding of the unique potential each needs to empower and the importance of experiential learning that encourages exploration, creativity, and skill development according to individual interests and talents [8]–[10].

The implementing Merdeka curriculum emphasizes the skills of the 21st century, one of which is teacher creativity in using technology. Teachers can access various online resources, design more engaging curricula using interactive learning software, and enrich students' learning experiences using multimedia content that arouses interest and creativity [11]. In other words, teachers are no longer just facilitators of learning that allow students to be actively involved in the teaching-learning process [12]. Teachers play a role in incorporating technology into the learning process, designing a learning environment that is more dynamic, relevant, and under the demands of the times.

Technological advances in the digital age have significantly impacted schools. The Learning Management System (LMS) is a crucial tool in this regard that contributes to the transformation of education [13], [14]. Learning management systems (LMS) facilitate interaction, collaboration, and quick access to educational resources for educators, learners, and school administrators [15]–[17]. Teachers can benefit greatly from using Learning Management Systems (LMS) when they become part of an autonomous curriculum that encourages more independent, innovative, and relevant learning. In this scenario, the learning management system (LMS) links educators' demands to create creative learning and learners' desire to acquire educational resources faster.

LMS is an electronic tool that teachers can use to organize, supervise, and provide teaching materials to students properly [8], [19]. LMS is an invaluable tool for teachers in the modern era because it integrates various features, such as interactive learning materials, online collaboration between teachers and students, and accessibility from various devices. Teachers can create more dynamic, individualized, and needs-based learning experiences using LMS to design learning processes.

Teachers are essential in facilitating and organizing student learning experiences in an educational environment [20]. Educators in Indonesia are facing new challenges due to the implementation of the Merdeka Curriculum, a recently implemented contemporary education framework. This curriculum aims to encourage learning that is aligned with its creative concepts and goals [21], [22]. A major obstacle to the successful implementation of autonomous curricula is the lack of readiness demonstrated by the personnel and educators involved.

At the beginning of the implementation of the Independent Curriculum, educators and staff faced challenges in adapting teaching and learning approaches to align with the new paradigm and equipping school administration comprehensively to meet its requirements. These observations align with previous scientific investigations that have identified many learning educators who face challenges in thoroughly preparing material and creating engaging learning experiences [23]. The incomplete readiness of

instructors now constrains the implementation of the Independent Curriculum. Undoubtedly, this factor can be one of the factors causing the gap in teacher quality, thus potentially affecting variations in overall education quality.

Teachers are responsible for transferring knowledge and skills to learners and also play a role in running the new curriculum [5], [24]. Therefore, teachers' understanding of curriculum changes is crucial, as this will affect how the material is taught, how students learn, and, ultimately, the impact of education on society. Unfortunately, there are still many teachers who experience problems in understanding curriculum changes. Teachers' incomprehension of the new curriculum can negatively impact the overall quality of education. Teachers who feel they do not understand the curriculum tend to design learning in traditional ways or not according to the objectives of the new curriculum [25], [26].

LMS encourages students to interact and engage in learning. Academics leverage and implement LMS digital tools to drive student engagement because LMS provides more data continuity and stability [1]. The challenges of teachers and students in the smart synchronous Hybrid Learning environment era are unique. It requires a large investment in technology, infrastructure, and teacher training to ensure an effective learning experience [2].

The challenges in implementing online learning were divided into three categories: internet infrastructure and connectivity, individual factors and administrative support, and curriculum and learning support materials [3]. This research is important because the curriculum should be designed to meet the needs of each student and provide the necessary skills. Therefore, the government and stakeholders must provide the necessary support to assist teachers in overcoming the challenges of curriculum change. This research is essential to conduct because it can provide benefits in understanding the challenges teachers face in designing curricula after changes in education policy and provide the solutions needed to overcome the challenges of curriculum change.

Another challenge is getting school staff, particularly teachers, to adopt a mindset that considers students, not teachers, as central to the learning process. Although the concept of students as learning centers is not new in the Indonesian curriculum, the Merdeka Curriculum can clearly show its realization. Project-based learning methods and original assessment are seen in this curriculum [5]. According to previous research, teachers believe they have a conceptual understanding of what authentic assessment is theoretically.

However, teachers have difficulty putting it into practice because of the difficulty of creating rubric scores before converting them into actual scores, sorting and distributing scores, and creating lesson plans with authentic assessments because there is no specific training available [10], [27]. It is known that teachers successfully implemented the Implementation of the Independent Curriculum and got "excellent" results. Surprisingly, satisfaction scores for assessment and evaluation did not follow. In terms of evaluation and assessment, it is known that the teacher is already quite experienced. They have difficulty assessing students by the rules of implementing the Curriculum Merdeka.

Teachers must understand their independent curriculum well, which is an essential component. When teachers understand the meaning of the Curriculum Merdeka, they can be more independent thinking, creative, inventive, and happier when involved in educational activities. The problems that occur are essential to solve through the need for teacher support to help them design lessons and develop lesson plans, one of which is by using appropriate technology.

Teachers still use few learning management systems (LMS) devices to support their students' learning activities [28]. Many teachers have yet to take full advantage of this technology despite LMS platforms and investments made by educational institutions [29]. Barriers to the adoption of LMS technology include low personalization, engagement, technical issues, cost, and limited flexibility [30]. In addition, some educators may lack the necessary skills or experience to use LMS software effectively [31]. Institutions can help teachers better understand and use LMS tools by offering training and support [32]. Institutions can improve learner learning and encourage more educators to use LMS systems by overcoming these barriers and offering adequate support.

Implementing the Independent Curriculum requires carefully considering how technology can be incorporated into creating learning resources. Teachers can manage the learning process more effectively by incorporating online platforms, teaching software, and multimedia content [33], [34]. A training activity's administration, implementation, and reporting can be handled by a software program, a Learning Management System (LMS), or a digital platform [35]. Ahmadi stated that when school districts adopt LMS, they make it a functional requirement [36].

Teachers discuss LMS administration techniques, including enabling profile features, following the curriculum, managing assignments, using discussion forums, using writing resources, and receiving teacher updates. Using an LMS can reduce the time and rigor required to create learning materials. The learning management system can accurately allocate professors and students to courses [37], [38]. Teachers may also need to take advantage of online or digital platforms to share ideas and best practices and seek help from another instructor [39]. Teachers can design learning tools more actively and creatively by working together on digital platforms because they gain knowledge from each other [40], [41].

Teachers' expertise in designing LMS-based learning is still lacking. Numerous studies have emphasized teachers' limitations and difficulties when using LMS efficiently. For example, observations have been made noting that information technology content is limited, learning is still teacher-centered, and teaching materials are rarely updated. It also highlights the need to improve LMS user acceptance and shortcomings in previous studies, including lack of customization, interaction, technology issues, and flexibility. Furthermore, it recommends that governments evaluate the adoption and use of LMS by instructors and offer adequate technical assistance to ensure their implementation. These results show that teachers' understanding and proficiency in using LMS to create engaging learning experiences can be improved [30], [31], [42].

Web-based information systems are web technologies that offer new methods for design and development compared to

conventional computer software. An LMS is a powerful software program that enhances learning. Delos Santos also said that these tools can complement teaching in conventional classrooms and enhance student learning more effectively than those taught in face-to-face learning settings [43]. As an e-learning tool, LMS offers an automated method to distribute course materials and monitor student progress [44]. LMS comes in two different forms: closed source and open source. Open-source LMSs can be used for free and customized cheaply based on user preferences [45]. Kim and Park provide a list of LMS features, including administrative tools, course delivery tools, and curriculum design, which might be viewed as supporting elements of an LMS [46]. We anticipate that the LMS will provide various features (components) that assist teachers in class preparation. In addition, we anticipate that the learning management system will make it easier for teachers to make learning.

Various studies highlight the usefulness of Learning Management Systems (LMS) in encouraging curricular modifications in schools. LMS platforms such as Moodle, Chamilo, and Ilias are essential in improving the educational process through technology integration [47]. The platform provides technical support for online activities, improves system quality, and enables interactive web-based learning activities [48]. In addition, in Saudi Arabia, LMS such as Madrasati have been adopted to promote educational transformation and innovation, especially during remote emergency teaching [49]. Teachers' acceptance and perception of LMS are critical to the success of online teaching and planning for future digital transformation in education [50]. Therefore, understanding teachers' views on LMS and their goals for utilizing these platforms is critical to optimizing online teaching and learning processes and driving school curriculum change.

More organized theoretical and empirical research is needed to understand the challenges teachers face when implementing curriculum changes [25], [51], [52]. The implementation of curriculum development by teachers has been the subject of many study papers, but little is still known about how teacher educators view curriculum changes [53], [54]. This study aims to overcome instructors' difficulties when planning lessons using LMS during curriculum changes. What needs do teachers feel when making lessons when they try to implement curriculum changes? It is a specific topic of study. The combined efforts of educators, decision-makers, and stakeholders understand how important it is to equip students with skills that must be developed according to the times needed for the Merdeka Curriculum to be implemented successfully.

II. MATERIALS AND METHOD

A. Research Design

This study employed the descriptive research survey approach based on a questionnaire. Survey research asks a sample of teachers to describe, compare, and correlate [55]. Faculty members were asked via survey how prepared they were to create instructional materials when the curriculum changed.

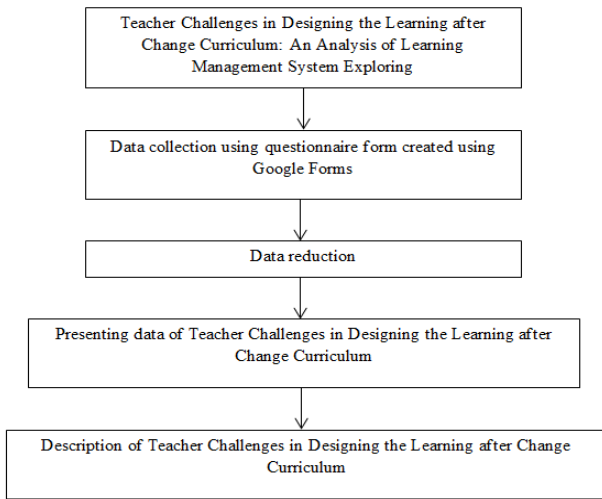


Fig. 1 Research design

B. Population

The Study respondents are 214 Indonesian elementary school teachers who taught in 6 (six) cities, such as Surakarta, Sragen, Wonogiri, Sukoharjo, Klaten, and Boyolali. There are almost equally as many male and female teachers in this population. The majority of them have more than five years of education. Regarding the respondents' professional characteristics, most have permanent status, work as instructors, and hold master's degrees.

C. Data Collection Instrument

An online questionnaire form was created using Google Forms, which is the tool used to collect data. The survey was designed simply so that respondents only needed to check the appropriate box(es) and enter a few pieces of information. The instrument is made up of 3 (three) parts: (1) the teacher's challenge on curriculum change; (2) the teacher's ability to design learning; and (3) knowledge and competence on and in the use of LMS.

D. Data Analysis

Data were analyzed using descriptive analysis techniques to determine the difficulties and requirements for teacher support facilities. Descriptive statistics were shown as percentages of the mean (%) for both numerical and categorical variables. The analysis findings are provided and discussed in order to establish the criteria for the requirements of supporting facilities and the degree of teachers' difficulty:

- 80%-100% = Very Good (VG)
- 60%-79% = Good (G)
- 40%-59% = Less Good (LG)
- 20%-39% = Not Good (NG)

III. RESULTS AND DISCUSSION

A. Teacher Challenge on Curriculum Change

Teachers always struggle to implement revised curricula because of these issues. The focus at this point is to answer 4 (four) teachers' challenges to curriculum change with a questionnaire, such as teacher readiness in implementing the new curriculum (Q1) to knowing the extent to which teachers understand the new curriculum and are ready to implement it

in the classroom, school support in implementing the new curriculum (Q2) through this questionnaire, the school can find out areas that still need improvement, such as supporting resources and training for teachers, as well as the development of relevant and effective evaluation systems in monitoring teacher and student performance in implementing the new curriculum, management in designing lesson (Q3) to assess how effective education management is in designing new lessons that fit into the new curriculum, and experience and references in implementing the new curriculum (Q4) to evaluate how prepared and skilled teachers are in implementing the new curriculum and gather information about the teacher's experience, knowledge, competencies, and references in teaching and implementing the new curriculum. Fig. 2 shows the survey results for the teacher challenge.

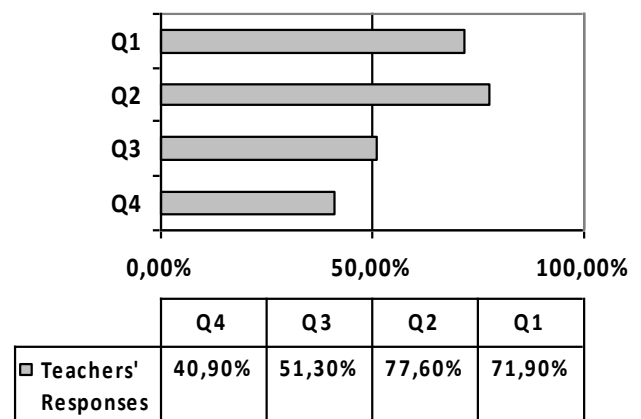


Fig. 2 Questionnaire result of teacher challenge on curriculum change.

Considering the questionnaire's outcomes in Fig. 2, it can be concluded that most teachers (72%) are ready to implement the new curriculum. School support is also considered sufficient (78%) to implement the new curriculum, with several things that need to be added and improved. The biggest challenge teachers face is mainly felt in management in preparing lessons (52%) because there are many changes ranging from designing lessons to implementing learning to evaluating learning. Then, the lack of experience and limited references for implementing the new curriculum is also a challenge for teachers (41%) because they find it difficult to find solutions to new problems that arise.

Due to society's rapid development, there is an urgent need for students with advanced degrees. Curriculum changes also change many components of learning. Modern education is currently promoting the idea of student-centeredness, which emphasizes the diversity of the cognitive structure of students [56]. The challenges that occur in changing the curriculum include: (1) teachers must change the learning design to adapt to the new curriculum; (2) the teacher should design assignments as much as possible around the teaching goals; (3) teachers should prepare as many models as possible to help students learn; and (4) teachers should make a variety of learning tools to encourage students to actively learn independently [57]. In short, teachers must adapt quickly to curriculum changes. In response to this, the teacher's ability to design learning needs to be discussed to solve the problems that occur. In response, the teacher's ability to design learning must be discussed to solve the problems.

B. The Teacher's Ability in Designing Learning Teacher

This indicator is made into three aspects, namely cognitive (knowledge), affective (attitude), and psychomotor (skills). Statements on each aspect focus on intracurricular and co-curricular teaching modules. The results of the ability questionnaire of teachers in designing learning can be seen in Table 1.

TABLE I
THE TEACHER'S ABILITY TO DESIGN LEARNING RESULTS

Aspects	Statements	Results	
		%	Category
Cognitive	Mention the concept	78.9	Good
	Distinguish the functions	58.6	Less Good
	Apply and determine	48.6	Less Good
	Summing up the results	52.6	Less Good
	Make a decision based on the result	46.1	Less Good
Average Cognitive Aspects		56.9	Less Good
Affective	Acceptance of innovation	76.7	Good
	Participate in discussions	74.3	Good
	Accept group decisions	77.1	Good
	Shows independence	69.4	Good
Average Affective Aspects		74.3	Good
Psychomotor	Prepare a new curriculum syllabus	50.8	Less Good
	Carry out teaching modules	55.4	Less Good
	Develop teaching modules	47.3	Less Good
	Identify and develop teaching materials	68.7	Good
	Identify learning and students' needs	75.1	Good
Average Psychomotor Aspects		59,5	Less Good

The survey results in Table 1 showed that only the affective aspect is in the good category, while the cognitive and psychomotor aspects are in the less good category. This means that teachers are ready to participate and accept innovations that occur in curriculum changes. However, they lack understanding and skills in designing learning, from identifying objectives and compiling syllabi to teaching materials; the teacher's perception of his abilities still needs support.

A teacher manages all content and learning activities, from planning to evaluation [58]. As the curriculum changes, management and implementation techniques also change. Therefore, teachers need support in preparing and managing learning. The need for teachers to support them in design learning is to provide facilities in the form of tools or applications in the form of LMS. Learning management system applications can assist teachers in designing learning, from preparing lessons and managing classes to evaluating learning. LMS development must be adapted to the needs of teachers so that teachers will be more effective and efficient in carrying out their obligations after changing the curriculum. Before LMS is developed, it is necessary to know the teacher's knowledge and competence about LMS for technology development needs.

C. Knowledge and Competence in and in the Use of LMS

In addition to adjusting the teachers' needs, LMS development also needs to consider the teachers' knowledge and competence regarding using LMS. This point will discuss

teachers' knowledge and competencies regarding using LMS through their experiences. The teacher's LMS knowledge survey results can be seen in Fig. 2, while the competency in using the teacher's LMS can be seen in Fig. 3.

The questionnaire results in Fig. 2 state that 74% of teachers have used LMS, 22% have used it, and 4% only know LMS. As for teacher competence, Figure 3 states that most teachers are also competent in using the LMS. It can be seen that 8.12% of teachers are very proficient, 41.44% are proficient, 26.02% are quite proficient, and the remaining 24.42% are not proficient.

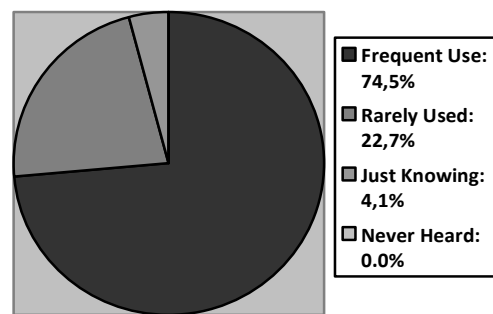


Fig. 3 Teachers' knowledge using LMS.

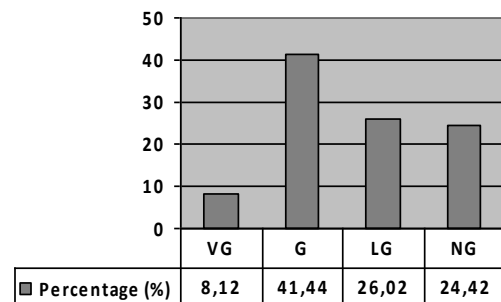


Fig. 4 Teachers' competence using LMS

The majority of teachers already use LMS and have the competence to use LMS for learning activities, but no LMS can support teachers in designing learning. Thus, LMS needs to be developed for teachers to design learning and prepare learning tools. With the development of the new LMS, it is also necessary to emphasize socializing and training teachers in implementing LMS. Users may efficiently distribute (session and user) and automatically synchronize accounts, users, and sessions. First, shortening the time spent developing learning resources for the LMS.

Furthermore, the accuracy with which the learning resources were developed for the LMS and the teacher and student placement in the class is correct. Lastly, set up the LMS classroom. Subjects, faculties, departments, and users (students and teachers) are all included. From a design and development standpoint, the contribution of this study offers a rich, recent direction of software techniques for LMS [59]. There is no need to manually enter the same information into two distinct systems. This improves efficiency and accuracy, raising the value of the LMS.

D. Design of an LMS Framework

The software architecture model has been made into an LMS platform and developed into a new form under the brand

"Kuriokreasi" The model includes four types of user roles in the LMS: Principal, Teacher, Other Teacher, and Student. The features available on LMS " Kuriokreasi " are sign up, log in, upload, comment, quiz, score, grade, log out. This LMS has advantages in the comment feature, where teachers can discuss each other's views, materials, strategies, and various learning activities through the comment menu. In addition, the principal can also see the actions of teachers through this feature. The proposed LMS platform architecture model is presented in Figure 5.

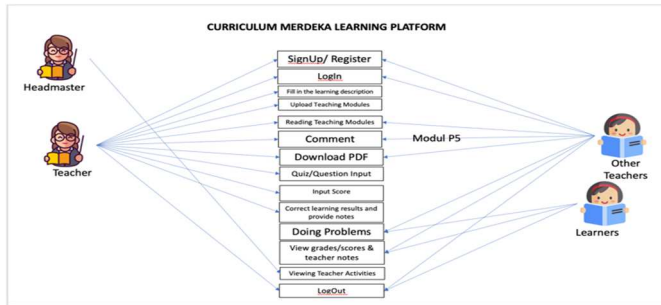


Fig. 5 Architectural model of LMS

When the LMS platform "Kuriokreasi" starts, the User Interface (UI) display is loaded, as shown in Figure 6. At the top of the window are seven buttons, all making up the system's main menu. These buttons contain text and images. In the upper right corner of the window, there is a yellow button "Start Learning" to enter the system. There is a large orange button in the middle window of "Register Now" for new user.

The "Home" display at the bottom has a discussion forum like Figure 7. This discussion forum provides communication between teachers, other teachers, and students. We use responsive web design for the front-end development of our LMS system. Its customizable design allows the platform to be used with smartphones, tablets, and other mobile computing devices. Therefore, when loading the system on a mobile device, each element of the page interface will automatically adjust for easy use on small screens.

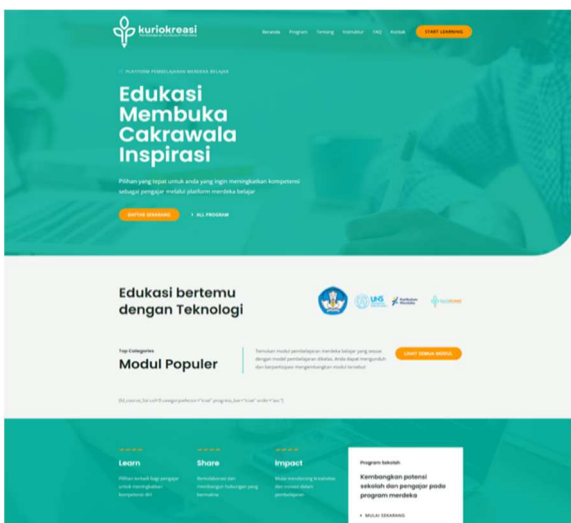


Fig. 6 Home menu display design

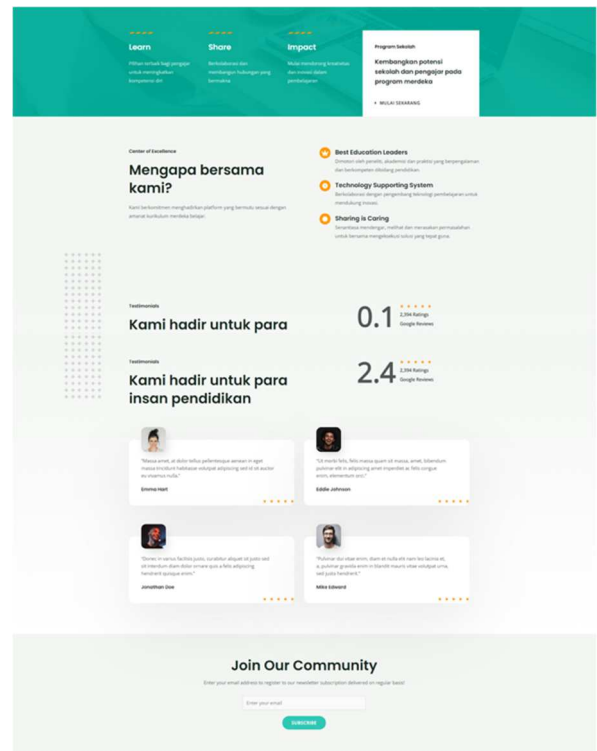


Fig. 7 Discussion forum display design

The limitation of developing this digital platform is that it requires mastery of users' technological literacy. In addition, support is needed from the principal and all teachers to use this platform effectively because the use of this platform depends on the collaborative efforts of all interested parties in the education area.

IV. CONCLUSION

The study's findings revealed that teachers encounter difficulties creating instructional materials that adhere to the autonomous curriculum. An independent curriculum allows teachers the creative freedom to tailor their lessons to the context and requirements of their students. Teachers lack the time and resources to create a curriculum and prepare lessons for the independent curriculum. Creating compelling, unique learning takes a lot of time and effort. Teachers must also know and adhere to the set curriculum requirements and guidelines. To overcome this challenge, a learning management system (LMS) is required as a supporting facility in learning design. Using an LMS, teachers can design, compile, and distribute learning materials to students. Teachers can save time and effort in creating learning tools by utilizing LMS. They can easily create assignments and quizzes, submit materials, and give students feedback. The study's findings are anticipated to guide educators, researchers, educational technology creators, and the government as they continue to explore and develop new ways to support teachers' work, from planning to assessing learning tools. They can easily upload materials, create assignments and tests, and provide feedback to students. The

research results are expected to be a reference for teachers, researchers, educational technology developers, and the government to continue researching and innovating to support teachers' work from preparing to evaluating learning.

ACKNOWLEDGMENT

We thank the research and community service institute of Universitas Sebelas Maret for funding this research.

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