SOCIETY: Jurnal Pengabdian Masyarakat,
Vol. 4, No. 5 (2025): September, pp. 684-697
E-ISSN:2827-878X (Online -Elektronik)

Design Faster, Code Smarter: Web Design With SASS

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ARTICLE INFO

Article history

Received : 1-8-2025

Revised : 1-9-2025

Accepted : 2-9-2025

Keywords

Web Design, SASS, CSS Preprocessor, Front-End Development, Webinar, Workshop, Scalable CSS

ABSTRACT

The "Design Faster, Code Smarter: Web Design With SASS" webinar and workshop, held on July 16, 2025, successfully educated participants on modern web design using SASS. This activity was implemented to address the challenges of managing traditional CSS code, which tends to be repetitive, difficult to maintain, and prone to errors in large-scale projects. SASS was chosen as the solution due to its dynamic, structured, and modular approach to writing CSS, offering features such as variables, functions, and mixins that significantly improve development efficiency. This community service activity employed a descriptive quantitative method, utilizing a survey approach through pre- and post-test questionnaires, as well as feedback forms, to measure participants' understanding. The 21 participants were students from the Informatics Engineering program at the University of Muhammadiyah Jakarta. A pre-test assessed initial knowledge, followed by a post-test and feedback questionnaire after the workshop. The workshop also provided hands-on coding experience, guiding participants in creating landing pages using Visual Studio Code and Figma designs. The post-test and feedback results revealed high participant satisfaction and a significant increase in understanding of SASS concepts. The percentage of correct answers to post-test questions ranged from 78.9% to 89.5%. Furthermore, 89.5% of participants stated that the material was clear (21.1% strongly agreed, 68.4% agreed), and 89.5% were satisfied with the overall event (21.1% felt very good, 68.4% good). This initiative successfully demonstrated that hands-on training effectively improves skills in modern web development and underscores the importance of continuing education programs to further enhance participants' SASS skills.

A. INTRODUCTION

The community service activity, in the form of a webinar and workshop titled "DESIGN FASTER, CODE SMARTER: WEB DESIGN WITH SASS," was organized to disseminate the results of the MSIB (Certified Internship and Independent Study) program, which focuses on

modern web development. This activity aimed to provide education and practical training to students on the use of SASS (Syntactically Awesome Style Sheets) in web design.

The background for this activity was to address the challenges of managing traditional CSS code, which is often repetitive, difficult to maintain, and prone to errors in large-scale projects. SASS was chosen because it offers a more dynamic, structured, and modular approach to writing CSS, with features such as variables, functions, and mixins that significantly increase development efficiency.

This activity was designed to help participants understand how to implement SASS simply and easily, as well as provide direct experience in creating responsive user interfaces. The webinar and workshop also discussed technical challenges such as dependency management and the compilation of SASS code into pure CSS, proposing industry best practices to ensure a smooth and error-free workflow.

Ultimately, this community service activity also focused on demonstrating web development opportunities with SASS as a practical application in various fields. For example, SASS is highly effective for building consistent and scalable design systems for large-scale web applications through the use of partials and architectures like BEM (Block, Element, Modifier). (Tsurakov, 2021), in his thesis "Refactoring legacy website styles," provides fundamental guidance on how to organize CSS for large projects and growing teams, principles that are strongly supported by SASS features. Additionally, (Giraudel, 2023) offers a comprehensive guide on clean and organized SASS code structure to ensure maintainability and scalability. This reveals that SASS technology can not only function as an effective styling tool but also have a real impact on accelerating and improving the quality of web development.

Literature Review

1. Concepts and Evolution of CSS Preprocessors
   Styling management in web development has undergone significant evolution with increasing project complexity. Pure CSS, although fundamental, often shows limitations in scalability and maintenance for large-scale projects (Al Salmi, 2023). These limitations led to the emergence of CSS preprocessors such as SASS, LESS, and Stylus. The main concept behind these preprocessors is to enable writing CSS code with programming features not available in standard CSS, such as variables, nesting, mixins, functions, and partials. These features aim to reduce code redundancy, increase reusability, and make the code structure more modular and easy to maintain.

   SASS is specifically known as one of the most mature and widely used CSS preprocessors. Since its introduction, SASS has continued to evolve, offering two main syntaxes: Sass (indented) and SCSS (CSS-like). Its popularity lies not only in its ability to simplify CSS writing but also in its strong ecosystem with various tooling and an active community. By using SASS, developers can define variables for colors, font-size, or spacing, create mixins for reusable CSS code blocks, and organize code into small files (partials) that are then imported into the main file, thus facilitating better code organization (Piironen, 2025).
2. Efficiency of Front-End Development with CSS Preprocessors
   Increased efficiency in front-end development is one of the main arguments for using CSS preprocessors. (Dinh & Wang, 2020) explicitly states that CSS preprocessors significantly increase developer productivity. They enable the creation of more organized stylesheets, reduce the time spent writing repetitive code, and minimize writing errors. Features like nesting allow developers to write nested selectors that reflect the HTML structure, while

mixins and functions reduce the need to rewrite the same code blocks repeatedly. This not only speeds up the initial development process but also simplifies the update and debugging process later on. Thus, the use of CSS preprocessors like SASS is recognized as a best practice for achieving a faster and more efficient front-end development workflow.

3. Importance of Practical Training in Modern Web Development
   In the context of continuously evolving technology, web developer skills must be constantly updated. Practical training is key to effectively adopting new technologies. Studies show that practice-based training has a significant positive impact on improving participants' skills and job readiness. For example, (Rosmelisa, et al., 2024) found that practical training contributed to improved skills and perceptions of employability among university students. In the context of web development, this means that introducing technologies like SASS is not enough with theory alone, but must be supplemented with direct practical sessions that allow participants to apply the concepts learned. This approach ensures that participants not only understand what SASS is, but also how to implement it in real-world scenarios, thereby accelerating the learning curve and adoption.
4. Technical Challenges and Solutions in SASS Implementation
   While offering many benefits, SASS implementation also comes with its own technical challenges, especially in large-scale projects. One of the main challenges is compiling SASS code into pure CSS. Since browsers cannot directly read SASS, SASS code must be compiled into standard CSS before it can be used in a browser. This requires the use of a SASS compiler, which can be run via the command line interface (CLI) or integrated into the project's build system. Dependency management and workflow automation are also crucial. In complex projects, managing many SASS files and ensuring that all changes are compiled correctly can be complicated. To overcome this, the use of automated build tools such as Webpack, Gulp.js, or Parcel is highly recommended (Danalache & Oprea, 2020). These tools allow developers to automate tasks such as SASS compilation, CSS minification, autoprefixing, and hot module replacement, all of which contribute to a smooth and efficient workflow. Integrating SASS into a structured project management system ensures that teams can collaborate without experiencing code conflicts or compilation issues.
5. Application of SASS in Scalable CSS Architecture and Design Systems
   SASS functions not only as a tool for writing more concise CSS but also as a foundation for building scalable CSS architectures and consistent design systems. Concepts such as those discussed by (Izotov, 2020) in his thesis "Design System Development" provide a framework for organizing CSS into logical categories, which is highly compatible with SASS's partials feature. With partials, developers can break down large stylesheets into small files that focus on specific components (e.g., _buttons.scss, _typography.scss), which are then imported into the main file. In addition, naming methodologies such as BEM (Block, Element, Modifier) are often used with SASS to create highly specific and modular CSS classes, reducing naming conflicts and improving code readability. (Tsurakov, 2021) extensively discusses how SASS features can be utilized to implement clean, structured, and easily maintainable CSS architectures for large-scale projects. Thus, SASS enables developers to build a strong styling foundation that can be scaled as projects grow, ensuring visual and functional consistency across web applications.

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B. METHODS

In realizing the community service activities described earlier, the Community Service Team designed a series of steps to be taken. This activity was carried out in two main stages: community education through a Webinar and training in the form of a Workshop. To organize both activities, the Community Service Team followed a number of planned stages.

1. Stage 1 (Activity Socialization)
   In this stage, the Community Service Team conducted socialization on social media by sharing flyers and registration links at the URL https://forms.gle/uXxthvwmB7PVHkXN9 regarding the Webinar and Workshop activities. Posters were posted on WhatsApp group broadcast messages.
2. Stage 2 (Activity Material Creation)
   In this stage, the Community Service Team created activity materials for the Webinar and Workshop to be held. The material was presented in PPT format and would be presented by the speakers during the activity.
3. Stage 3 (Pre-Test Completion by Participants)
   Before the activity began, participants were asked to complete a pre-test at the URL https://forms.gle/oX25kZeQM44kdpfu8 which contained material about the Webinar and Workshop. The purpose of the pre-test was to determine the participants' level of understanding of the material to be provided. The results would later be compared with the post-test given after the activity.
4. Stage 4 (Community Education Through Webinar)
   In this Webinar, the Community Service Team presented basic material so that participants could thoroughly understand Web Development with SASS. The output of this stage was an introduction to SASS, SASS Modular Structure, Web Programming, and the differences between Traditional CSS and SASS. The Webinar material began with an understanding of SASS, why use SASS, SASS Modular Structure, how to use SASS, basic Web Programming, and the differences between Traditional CSS and SASS.
5. Stage 5 (Training Through Workshop)
   This Workshop was an implementation of the Web Design Development with SASS material. Participants were briefly explained the mechanism of understanding and how to use SASS. Participants then performed coding to create a landing page using Visual Studio Code. The coding for creating the landing page was done by slicing a landing page design already provided in Figma, and the landing page code was created in Visual Studio Code. Participants had previously been advised to prepare Visual Studio Code software and sufficient internet quota before the activity began and to follow the steps presented during the activity.
6. Stage 6 (Feedback and Post-Test Completion by Participants)
   At the end of the activity, participants were asked to fill out a feedback form to determine how satisfied they were with the material presented by the speakers, and participants were also asked to complete a Post-Test. Participant feedback and Post-Test could be accessed at the URL https://forms.gle/MtanjWCxf6H9B8ebA. The results of the Post-Test would be compared with the Pre-Test to see how well the participants' understanding of the material presented had improved.

C. RESULTS AND DISCUSSION

This Webinar and Workshop activity was conducted by students of the Informatics Engineering study program, Faculty of Engineering, Universitas Muhammadiyah Jakarta.

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The activity was held online via Zoom Meeting Conference at the URL https://s.umj.ac.id/FTUMJ-02 on Wednesday, July 16, 2025, from 13:15 – 15:30 WIB.

A total of 21 participants, all students from the Informatics Engineering study program at Universitas Muhammadiyah Jakarta, attended this activity. The activity was conducted online via Zoom Meeting Conference and included interactive sessions such as Q&A. The following is the agenda for the Webinar and Workshop:

WAKTU	KEGIATAN	PIC
13.00-13.15	Committee Gathering and Dissemination of Zoom Link and VG Link (pre-test)	Mochammad Rizqi Aullia
13.15 - 13.20	Opening by MC	Afni Izzah Afkarinah
13.20 - 13.28	Singing Indonesia Raya, Mars Muhammadiyah	Mochammad Rizqi Aullia
13.28 - 13.30	Tilawah	Mochammad Rizqi Aullia
	Speech by KKN Group Leader	Taufik Hidayat
13.30 - 13.35	Reading of Webinar Speaker's CV	Afni Izzah Afkarinah
13.35 - 14.00	Webinar	Meisya Putri Anjani
14.00 - 14.10	Webinar Q&A Session	Afni Izzah Afkarinah
14.10 - 14.15	Reading of Workshop Speaker's CV by Moderator	Afni Izzah Afkarinah
14.15-15.25	Workshop	Taufik Hidayat
15.25-15.35	Workshop Q&A Session	Afni Izzah Afkarinah
15.35-15.40	Documentation Session, Post-Test, Attendance Link, Feedback	Mochammad Rizqi Aullia

Tabel 1. Activity Schedule

Stage 1 (Activity Socialization)

In this stage, the Community Service Team socialized the activity to the general public through social media and simultaneously recruited interested participants by sharing the flyer that had been created, as shown in Figure 1 below.

Figure 1. Activity Flyer

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Stage 2 (Activity Material Creation)

At this stage, the presenter will prepare the material to be presented in PPT format. The material is structured in such a way that it is easy for participants to understand. This material covers several points such as What is SASS, Why Use SASS, How to Use SASS, the Modular Structure of SASS, Web Programming Basics, and the Differences Between Traditional CSS and SASS. The activity material can be seen in Figure 2 and Table 1 below.

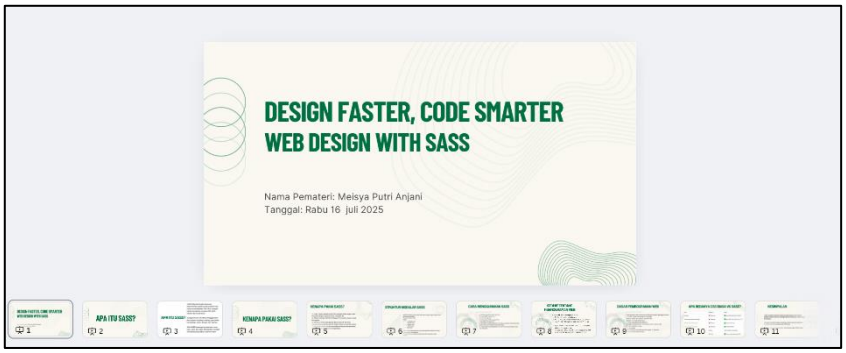

Figure 2. Webinar Activity Material

1. $purple: #563AD6;
2. $aqua: #3ABAD6;
3. $navy: #02044A;
4. $white: #fff;
5. $sofpur: #EAEAF4;
6. $darpur: #777790;
7. $medpur: #B4B5C9;
8. $lilpur: #F9F9FB;
9. $newpur: #9B9CB7;
10. $supportpur: #B19FFF;

Table 2. _colors.scss Code

Stage 3 (Pre-Test Completion by Participants)

In this stage, participants were asked to complete the Pre-Test provided by the Community Service Team. This Pre-Test consisted of questions about SASS, including the full form of SASS, its main features, SASS file extensions, SASS modular structure, and SASS syntax. The purpose of this Pre-Test was to assess the participants' understanding before the Community Service Team conducted the activity. The results showed that 22 participants completed this Pre-Test with a sufficient level of understanding.

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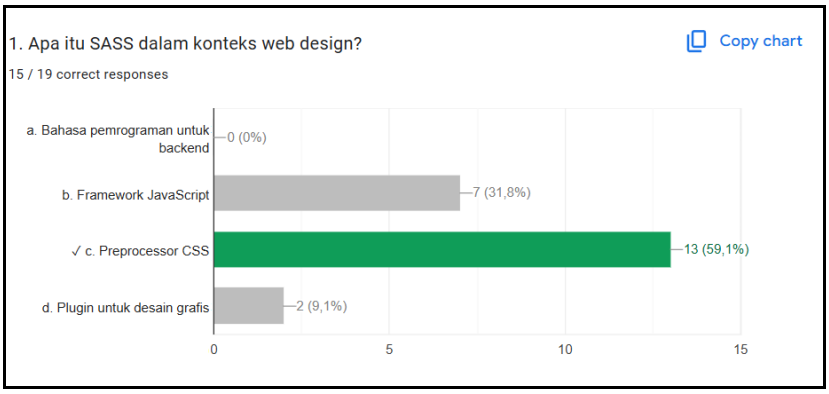

Figure 4. Participant Pre-Test Regarding What is SASS

As seen in Figure 4 above, in the pre-test regarding what SASS is, the percentage of participants who answered correctly was 59.1%.

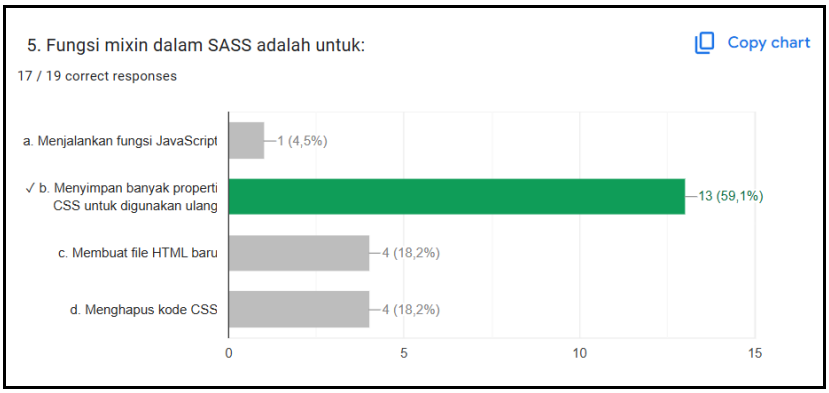

Figure 5. Participant Pre-Test Regarding Mixin Function in SASS

As seen in Figure 5 above, in the pre-test regarding the function of mixins in SASS, the percentage of participants who answered correctly was 59.1%.

Stage 4 (Community Education Through Webinar)

In this stage, the Webinar speaker, Meisya Putri Anjani, presented the material that had been created earlier in stage 3 to the participants, who were the general public. The material presented included Web Programming, specifically using SASS. The output of this stage was an introduction to web programming, SASS, SASS modular structure, and how to use SASS. The Webinar material began with an understanding of SASS, why use SASS, SASS modular structure, how to use SASS, basic Web Programming, and also the differences between Traditional CSS and SASS. In this stage, there was also an interactive session where speakers asked questions and participants responded via Zoom Meeting Conference chat. As a result, participants gained a deep understanding of web programming, especially regarding the use of SASS.

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Figure 6. Webinar Material Presentation

In Figure 6 above, the speaker explains what SASS is. This introduction aimed to ensure participants first understood SASS technology in web programming.

Figure 7. Webinar Material Presentation

In Figure 7 above, the speaker explains how to use SASS. This webinar began with a basic introduction to SASS, covering its definition, reasons for its use as a CSS preprocessor, and its key features such as variables, nesting, mixins, and functions. The speaker also explained the SASS modular structure and its differences from traditional CSS. An interactive Q&A session was also held to ensure participant understanding. The main goal of the webinar was to provide a strong foundation of knowledge about SASS before participants moved on to the practical session.

Stage 5 (Training Through Workshop)

In this stage, the Workshop speaker, Taufik Hidayat, provided a direct implementation of the Webinar material that had been presented earlier. In this Workshop implementation, the speaker used Visual Studio Code operated on a laptop with a Windows OS. Participants had previously been advised to prepare Visual Studio Code and a sufficient internet connection before the activity began. The speaker explained the implementation steps for coding a landing page from an existing design. As a result, the speaker demonstrated the creation of a simple landing page using SASS. With this implementation, it was hoped that participants would better understand how to use SASS in personal projects and at work.

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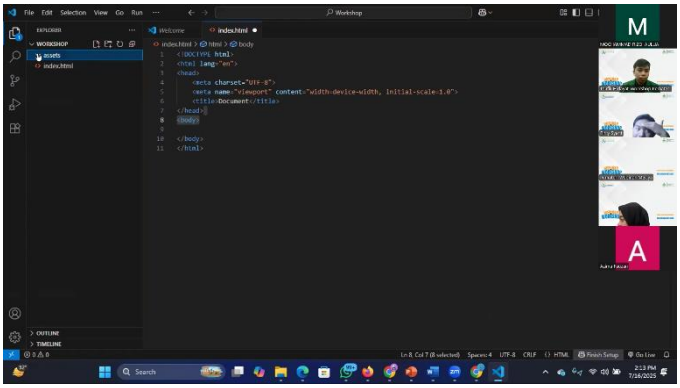

Figure 8. Workshop Material Presentation

In Figure 8 above, the speaker explains the steps needed in the landing page coding process.

Stage 6 (Feedback and Post-Test Completion by Participants)

In this stage, participants were asked to fill out an attendance form, feedback form, and Post-Test, all in the same form distributed via Google Form. For feedback, a Likert scale was used to measure participant responses. The Likert scale consists of several answer choices that define participants' agreement with a statement, with adjusted answer options. In this questionnaire, a 4-point scoring system was used with the following provisions: (4) Strongly Agree, (3) Agree, (2) Undecided, (1) Disagree. The questionnaire questions asked were as follows:

1. Is the material presented by the webinar speaker clear enough?
2. Is the material presented by the workshop speaker clear enough?
3. Overall, how satisfied are you with this event?

The post-test given was similar to the pre-test, the results of which could be used to compare participants' understanding before and after participating in this Webinar and Workshop activity. The following are the results of the feedback and post-test completed by participants. In each Webinar and workshop session, participants were very enthusiastic about the presentations delivered by the speakers. This was evident from the feedback questionnaire form provided at the end of the event to the participants. In the feedback questionnaire form, the answers to the statements given to the participants generally indicated satisfaction with the material presented. This activity was attended by 21 participants from the Informatics Engineering study program at Universitas Muhammadiyah Jakarta. Of the 21 participants who attended, 19 participants completed the pre-test, post-test, and feedback questionnaires provided via Google Form.

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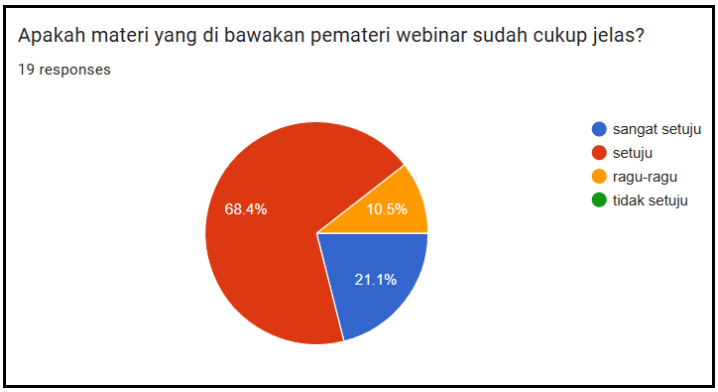

Figure 9. Participant Understanding Level of Webinar Material Presented

In Figure 9 above, it can be seen that the feedback given by participants showed 21.1% strongly agreed and 68.4% agreed that the material presented by the webinar speaker was clear enough, while 10.5% were undecided.

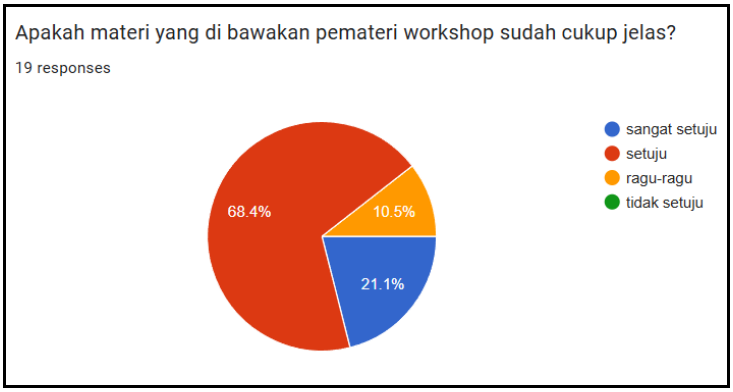

Figure 10. Participant Understanding Level of Workshop Material Presented

In Figure 10 above, it can be seen that the feedback given by participants showed 21.1% strongly agreed and 68.4% agreed that the material presented by the workshop speaker was clear enough, while 10.5% were undecided. In the next statement, the feedback results also showed positive figures as shown in the image below:

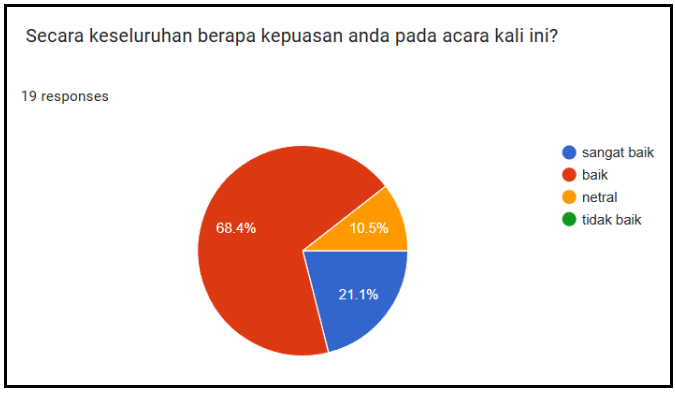

Figure 11. Satisfaction Level Towards Activity Implementation

In Figure 11 above, it can be seen that 21.1% of participants felt very good about this activity, 68.4% felt good, and 10.5% were undecided. Based on the questions asked to the participants and their completion of the questionnaire, it was evident that participants gained an

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understanding of new material in line with the activity's theme. The participants' positive response regarding their satisfaction with the material presented indicates that the speakers' delivery was good and easy to understand, allowing them to learn and comprehend new knowledge. In other words, this activity ran well and was understandable to the general public.

In addition to the feedback questionnaire, participants were also asked to complete a post-test given at the end of the activity to determine the increase in participants' understanding after participating in this activity. The following are some of the results of the post-test completion by participants:

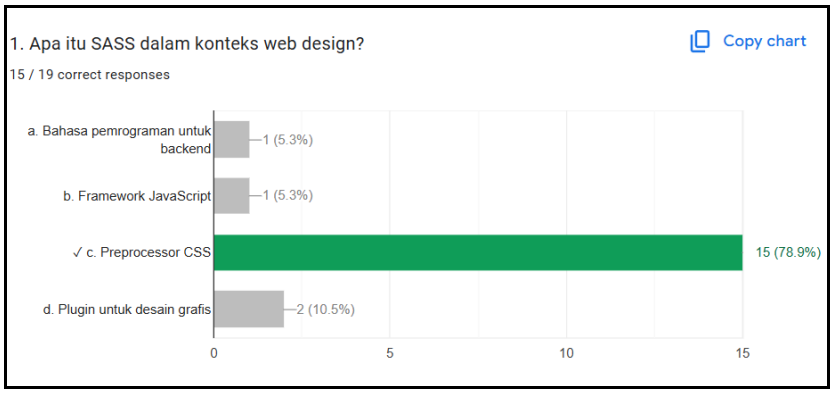

Figure 12. Post-Test Regarding What is SASS

In Figure 12, the increase in participants' understanding of SASS is clearly visible in the results of post-test question number 1. Out of 19 participants, 78.9% gave correct answers on the post-test, a significant increase from 59.1% on the pre-test. This shows an increase of 33.50%, indicating that participants have successfully understood the SASS material.

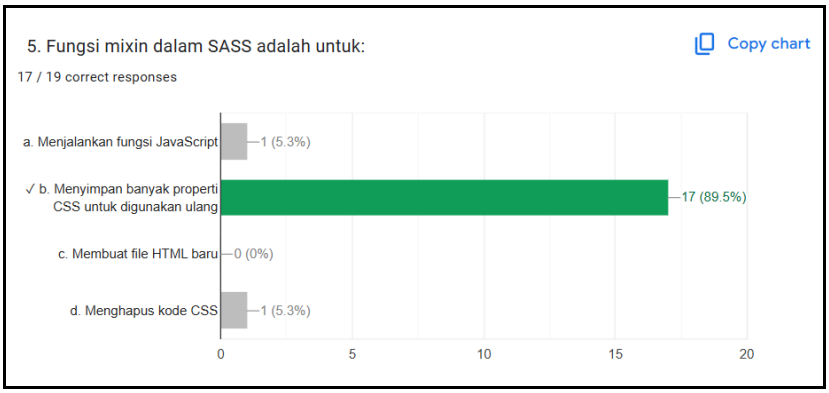

Figure 13. Post-Test Regarding Mixin Function

In Figure 13 above, the increase in participants' understanding of the Mixin Function is clearly visible in the results of post-test question number 5. Out of 19 participants, 89.5% gave correct answers on the post-test. This is a significant increase from 59.1% on the pre-test, showing an increase of 51.44% and indicating that participants have successfully understood the Mixin Function material. After all activities have been completed, participants who have attended the Webinar and Workshop will receive a certificate approved by the Head of the Informatics Engineering Study Program, Muhammadiyah Jakarta University.

Feedback Questionnaire Results (Participant Satisfaction): The feedback questionnaire used a Likert scale to measure participant satisfaction with the material and the event's execution. From the 19 responses received:

- Webinar Material: 21.1% of participants strongly agreed and 68.4% agreed that the material presented by the webinar speaker was clear enough, with a total of 89.5% stating the material was clear.
- Workshop Material: Similar to the webinar, 21.1% of participants strongly agreed and 68.4% agreed that the workshop material was clear enough, also with a total of 89.5% stating the material was clear.
- Overall Satisfaction: 21.1% of participants felt very good and 68.4% felt good about the overall event, indicating a very high satisfaction level (total of 89.5% satisfied or very satisfied).

Overall, the questionnaire data shows that this activity not only successfully improved participants' technical understanding of SASS but also provided a satisfying learning experience.

No	Before Training	After Training
1	Participants had varied initial understanding of SASS, with some participants not fully grasping the basic concepts and advantages of SASS compared to plain CSS. The average pre-test score of 69.55% indicated an initial understanding level that needed improvement.	Participants showed a significant increase in SASS understanding, including its definition, advantages, syntax, and key features such as variables, mixins, and nested rules. The average post-test score of 83.89% showed a clear improvement in material mastery.
2	Participants had limited knowledge of the practical use of SASS, such as standard file extensions, compilation commands, or the specific functions of @import and @use.	Participants better understood the practical aspects of using SASS, including file extensions (.sass and .scss), compilation methods (e.g., using Dart Sass or Live SASS Compiler), and the functions of @import and and @include for modularity and code reuse.
3	Participants may not have fully realized the impact of SASS on the efficiency and structure of CSS writing, and how SASS can speed up the styling process and make code more structured.	Participants realized that SASS makes the styling process faster and more structured, resulting in a neater and more organized CSS structure. They also understood that SASS provides advanced features not available in plain CSS.

Table 2. Comparison Table Before and After Activity

D. CONCLUSION

Based on the results of the "Design Faster, Code Smarter: Web Design With SASS" Webinar and Workshop held on July 16, 2025, via Zoom conference from 13.15 - 15.30 WIB, it can be concluded that this activity was successful and ran smoothly. A total of 19 participants from Universitas Muhammadiyah Jakarta attended this activity with high enthusiasm to learn web development using SASS. Feedback from participants showed a high level of satisfaction

with the material presented, as well as an increase in participants' understanding and abilities, as seen from the post-test results. It is hoped that subsequent webinar and workshop activities, or similar events, can continue to be held to further enhance participants' web development skills using SASS.

E. ACKNOWLEDGEMENTS

The Community Service Team expresses gratitude to the Alumni and the Informatics Engineering Study Program, Faculty of Engineering, Universitas Muhammadiyah Jakarta, for their support and facilities provided in organizing the "Design Faster, Code Smarter: Web Design With SASS" Webinar and Workshop. The Community Service Team also extends its appreciation to the committee members and organizers who have collaborated well in planning and executing this activity. Last but not least, thanks to the participants who have participated and provided valuable input during the activity.

F. AUTHOR CONTRIBUTIONS

In the webinar and workshop titled "Design Faster, Code Smarter: Web Design With SASS," each team member had clear contributions and responsibilities to ensure the smooth execution and the compilation of the scientific article. Taufik Hidayat, as the chief executive, was responsible for the overall conduct of the activity and overseeing team members' tasks, as well as serving as a workshop speaker and compiling modules. Meisya Putri Anjani served as the webinar speaker, compiled webinar materials, created pre-test, post-test, and registration forms, and compiled reports. Afni Izzah Afkarinah served as the master of ceremony, created pre-test, post-test, and feedback forms to measure participant learning outcomes, and contributed to report compilation. Mochammad Rizqi Aullia served as the operator during the event and also compiled the journal. All Community Service Team members collaborated to ensure the success of this activity and the quality of the resulting article publication. Nurvelly Rosanti served as the supervising lecturer, providing guidance, supervision, and support to ensure the smooth running of the webinar and workshop until the scientific article was checked. All Community Service Team members collaborated to ensure the success of this activity and the quality of the resulting article publication.

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