# The Development of a Web-Based Infographic for the Introduction of the Palm Industry to Young Learners

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**Abstract**

Exposure to the palm industry begins in the early stages of secondary school, highlighted through the agricultural sector topic in the geography subject syllabus. However, the information provided about the palm industry is insufficient to give young learners adequate exposure. Consequently, Generation Z lacks knowledge and remains unaware that the palm industry significantly contributes to the national economy. This paper aims to explain the process of developing an infographic website to expose the palm industry to young learners. The topics are traditionally presented using textbooks, but it is essential to incorporate information delivery methods in line with technological developments and interactive aspects to cater to today's Generation Z. An infographic website has been developed to introduce the palm industry to the younger generation, serving as a platform for information delivery and exposure. The website development process follows the Agile model, encompassing planning, analysis, design and development, testing, and deployment phases. Based on end-user testing involving 81 high school students who completed questionnaires, the three usability test criteria yielded an average score of 4.82 for web usability, 4.72 for information quality, and 4.82 for interface quality. The results of the students' feedback were positive, indicating that the infographic offered more detailed information, and the use of animation and posters provided a clearer depiction of palm industry-related information. In conclusion, an infographic website introducing the palm industry to the younger generation proves to be a suitable alternative for their initial exposure, garnering positive responses from this target group.

**Keywords:** Palm industry, web-based, infographics, young learners.

## INTRODUCTION

The palm oil sector is one of the major contributors to the Malaysian economy with export earnings of palm oil and palm-based products jumping to RM137.89 billion in 2022 from RM108.52 billion in 2021. Meanwhile, Malaysian palm oil accounted for 31 percent of the world palm oil export market. (Kementerian Perladangan Dan Komoditi, 2023). However, palm oil production as the primary industry is still not the main focus. The results of the palm industry are not only focused on the

production of palm oil but also on other various products such as cosmetics, furniture, and food products. Notably, Malaysia's palm industry faces challenges, particularly the lack of a local workforce, which is overcome by substituting with foreign workers. Furthermore, the palm industry is currently dominated by workers from neighboring countries such as Indonesia, Bangladesh, and Myanmar (Maros & Che Abdul Rahman, 2017). The lack of a local workforce, especially from the young generation, is due to the lack of information and exposure that is related to the palm industry (Lai et al., 2021).

Awareness of the need to disclose information that is related to the palm industry and a suitable alternative to convey information for the palm industry need to be provided. In 2019, the government launched the 'Sayangi Sawitku' campaign, which has been recommended to be expanded at the school level (Mohd Amin, 2019). In order to respond to the campaign, the school needs to play an essential role in applying education that is related to the palm industry to the students. In line with the current development of digital technology and the campaign's target audience, the younger generation, online and interactive learning methods should be used. Moreover, infographic-based learning technology is easier to achieve as it is a quick and straightforward way of presenting information (Ferreira et al., 2023).

Therefore, an infographic website for introducing the palm industry to young learners, known as Didik Sawit, was developed to be a platform for delivering and disclosing information. Web-based infographics are used because they are more academic than social media such as TikTok and Instagram. It is also easier to view and understand holistically. The content of Didik Sawit's website has been sourced from the Malaysian Palm Oil Board (MPOB) and secondary school geography teachers. The content has also gone through the verification phase by experts.

**CURRENT WORK**

**Palm Industry**

Malaysia is well-known for its palm industry, which is its primary economic source. Being the country's pillar and hope to improve the palm industry, the young generation is needed to continue productivity and increase the potential of the Malaysian palm industry. However, this industry is less popular among the young generation, especially teenagers, who still need to gain knowledge about and exposure to the industry itself. The palm industry is often seen as merely offering plantation work, which young people do not demand.

The palm industry is vast, comprising the plantation sector, technology, as well as research and development. The younger generation's involvement in the palm plantation sector is unsatisfactory compared to other sectors (Sieng et al., 2021). Among the factors that cause the lack of involvement of the younger generation in this plantation sector are negative perceptions, environmental and worker safety factors, and a lack of knowledge (Sieng et al., 2021). The lack of knowledge and exposure is

the main challenge for the industry in encouraging the young generations to venture into the oil palm industry.

The problems of low wages, difficulties in developing a career, difficult rural life, and jobs in the 3D sector (difficult, dirty, and dangerous), which are challenging, dirty, and dangerous, are often associated with jobs in the palm plantation sector (Kamaruddin et al., 2018). Significantly, palm oil is the fourth-most significant contributor to the national economy and has rapidly progressed over the past few centuries (Hashim et al., 2020). Although this palm commodity has high potential, human resources are seen as a factor that becomes a constraint that affects the rapid development of this commodity.

## Young Learner

The young generations belong to the age range of 10 to 19 years and are the groups that will lead the country in the future (Jimenez, 2006). They are an essential asset to the country. Nowadays, young people need to be exposed to the importance of the country's palm industry and the country's economic issues that are related to oil palm. They need to be more aware of the final production of palm products and their advantages that help drive the country's economy. If this group is not exposed to accurate information and believes in the propaganda of Western countries, eventually, oil palm will be marginalized in the future. It will cause the country's economy to be affected. However, young people are not interested in getting involved in the palm industry and are more focused on other job sectors (Hashim et al., 2019). The study by Hashim et al. (2020) has shown that the factor that causes the lack of interest and involvement among the younger generation in the palm industry is the lack of job information. Their knowledge about the jobs in this sector is that the work is burdensome and exhausting, and the remuneration is low. Therefore, all stakeholders need to channel accurate information relating to the palm industry holistically to them.

## Infographic

Infographics are a combination of words, information, and graphics that provide a display involving a combination of information and graphics to convey information quickly and clearly. Infographics are also data visualizations that make it easier for users to learn and obtain complicated information quickly and easily (Basak et al., 2017). Data in images, motion, and audio are combined to produce a meaningful infographic for each piece of information (Basak et al., 2017). Nowadays, the use of infographics in learning has become a trend. Infographic methods are often used to facilitate the understanding and acceptance of information. A study by Ismaeel and Al Mulhim (2021) mentions that using infographics as an alternative to traditional text-based learning methods increases students' success in school.

Various types of infographics can be used to present information, including static infographics, animated infographics, and interactive infographics. Static infographics combine images and text to

prepare information to be conveyed, such as posters, maps, and charts (Ismaeel & Al Mulhim, 2021). Static infographic delivery methods do not involve user interaction because they are a constant source of information delivery (Shaltout & Fatani, 2017). An animated infographic is a static infographic where some of its elements are animated to add the illusion of movement. It is also known as a video with narration that allows its users to be involved in delivering the information (Doukianou et al., 2021). Interactive infographics involve user interaction with information displays. It depends on the user manipulating it by selecting elements or answers (Ismaeel & Al Mulhim, 2021). Therefore, the three types of infographics are a good and effective method of delivering information, especially to the current generation.

**Website**

Web 2.0 is an accessible medium to convey information, especially to the younger generation. Learning using a website can attract the younger generation's focus on information, whereby the information can be accessed at the fingertips without the limits of borders and social strata (Hasbullah et al., 2022; Roslin et al., 2022). In addition to the use of infographics as a method of conveying information, replacing the text provides an environment that promotes a higher level of awareness and opportunities to optimize cognitive abilities (Damyanov & Tsankov, 2018), which makes it easy to understand (Alyahya, 2019) and can reinforce the message to be conveyed (Sharudin et al., 2020).

**METHODS**

Developing an infographic website for introducing the palm industry to the young learner, Didik Sawit has been adapted from the Agile model. The Agile model is used because this model allows small changes without incurring high costs or carrying out schedule transfers (Fowler & Highsmith, 2001). There are six phases in this model's development: planning, analysis, design, development, testing, implementation, and deployment. Stakeholders' involvement in the website's development is prioritized from the beginning of the development process. It is to ensure that the stakeholders are directly involved in each development phase so that the website that is produced meets their needs. Figure 1 below shows the Didik Sawit development process framework that is adapted from the Agile model.
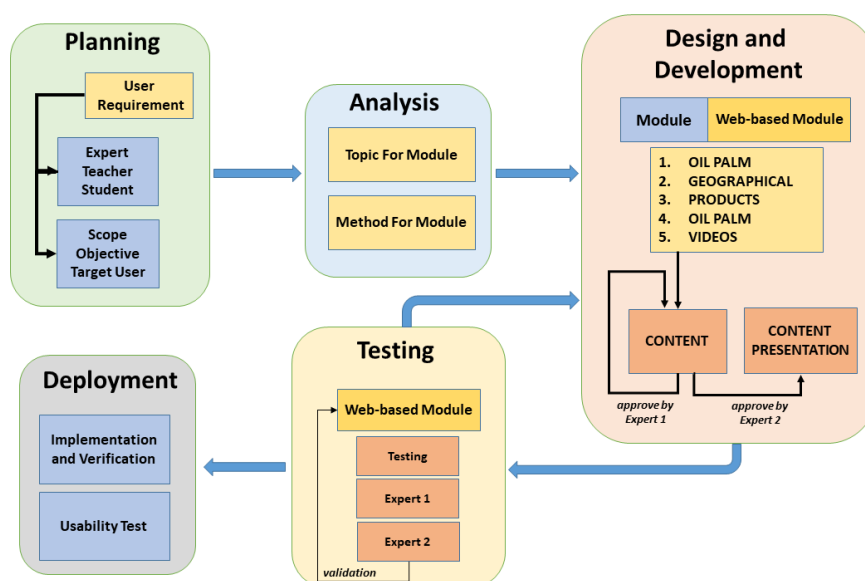
**Figure 1:** The framework for developing the Didik Sawit website

**Planning**

The planning phase is the leading and essential phase that involves identifying the website development objectives, module scope, and target users for this website. The main aim of this project is to produce an infographic web-based Didik Sawit to teach about introducing the palm industry to young learners and assess the level of usability of Didik Sawit. The target users for Didik Sawit are young learners who must be exposed early to the industry. This phase also involves obtaining the user's requirements, involving experts from MPOB, geography subject teachers, and school students. The method used is through online discussions and interviews as well as the distribution of questionnaires. The aims are to collect data and feedback on the website to be developed, propose solutions, and identify content that is suitable for target users and delivery methods that can interest them.

**Analysis**

The analysis phase was carried out to obtain the results from the interviews and questionnaires that had been distributed in the planning phase. The results of this analysis provide input on the needs in the development of Didik Sawit in terms of topics and module content, as well as the module delivery methods that should be present in Didik Sawit and are suitable for young learners. Based on the analysis result, several module delivery methods have been suggested, i.e., posters, infographics, videos, and animations. Topics for the module are also identified based on the results of the analysis that has been carried out. The result of this analysis is a significant input before entering the design phase.

**Design and Development**

The design phase involves two main parts: the module's design and content and the design of the Didik Sawit website. The module's design was produced based on discussions with experts from MPOB and geography specialist teachers appointed by the school. Five modules have been selected: Palm Trees, Crop Geography, Palm Products, Sustainable Palm Oil, and Palm Videos. The content of each module is reviewed and verified by the MPOB. The review and verification process is repeated until the content is accurate and complete. Next, the design of the module content delivery method is prepared based on the feedback that has been obtained from the questionnaires and interviews. Table 1 explains the presentation based on selected infographic methods such as posters, videos, and animations to attract the interest of young learners. The design of this content delivery method also goes through an evaluation process by the teacher, who is a geography expert, before going to the development phase. Storyboards are provided for the Didik Sawit website design to facilitate the development process.

The development phase is the phase where the development of the website is started based on the requirements and the design planned before. This phase begins by developing content delivery methods such as posters, videos, and animations. Canva, PowerPoint, and Video Editor software produce posters, videos, and animations. Accordingly, Vue Js for the front-end framework, PHP for the back end, and phpMyAdmin for the database have been used to develop Didik Sawit. Interactive elements are also applied to some modules so that learning is more effective and attracts the interest of young learners.

**Table 1:** Design of content delivery methods in each module

| Module (*using Malay term) | Design of content delivery |
|---|---|
| 'Pokok Sawit' | ● Infographic poster ● Video ● Animation |
| 'Geografi Tanaman' | ● Infographic poster ● Interactive map |
| 'Produk Sawit' | ● Infographic poster |
| 'Minyak Sawit' | ● Infographic poster |
| 'Video Sawit' | ● Video |

**Testing**

The testing phase is conducted to test each function that has been developed and is available in Didik Sawit. This phase is essential to ensuring Didik Sawit works smoothly and meets the users' needs. The testing was also conducted to ensure that there were no errors when using Didik Sawit. Any errors that are identified will be recorded. Moreover, the design and development process will be repeated to correct the error. While the MPOB and Geography Expert Teachers conduct this testing, improvements are also made based on the feedback from both parties.

**Deployment**

The implementation and evaluation of Didik Sawit were conducted face-to-face in two secondary schools in the Hulu Langat district, involving 81 students from various academic levels. The evaluation was conducted to determine the learning outcomes using a questionnaire based on the content of the Didik Sawit module and the usability of Didik Sawit as a platform for delivering information and introducing the palm industry to young learners using Post-Study System Usability Questionnaire (PSSUQ) instrument (Sauro & Lewis, 2012). The PSSUQ covers all aspects of usability: effectiveness, efficiency, satisfaction, and learnability (Hodrien & Fernando, 2021). They have been referred to as tools that are used in various applications and provide good validation in order to evaluate the usability of educational technology systems (Schnall et al., 2018). In addition, Didik Sawit was also publicized through the Innovation Carnival program, which involved participants from students in Selangor. The feedback from the students has stated that Didik Sawit can help reveal palm industry information to young learners.

**RESULTS AND DISCUSSION**

The results of this study have achieved the set objective of developing Didik Sawit's infographic website as a platform for introducing the palm industry to young learners and evaluating the usability of Didik Sawit. Didik Sawit is developed based on identified and designed modules, as shown in Figure 2 below. The five modules are Palm Trees ('Pokok Sawit'), Crop Geography ('Geografi Tanaman'), Palm Products ('Produk Sawit'), Palm Oil ('Minyak Sawit'), and Palm Videos ('Video Sawit'). The module's title and content selection are discussed with experts to provide information that is suitable for young learners. Table 2 describes the content for each module that has been developed.
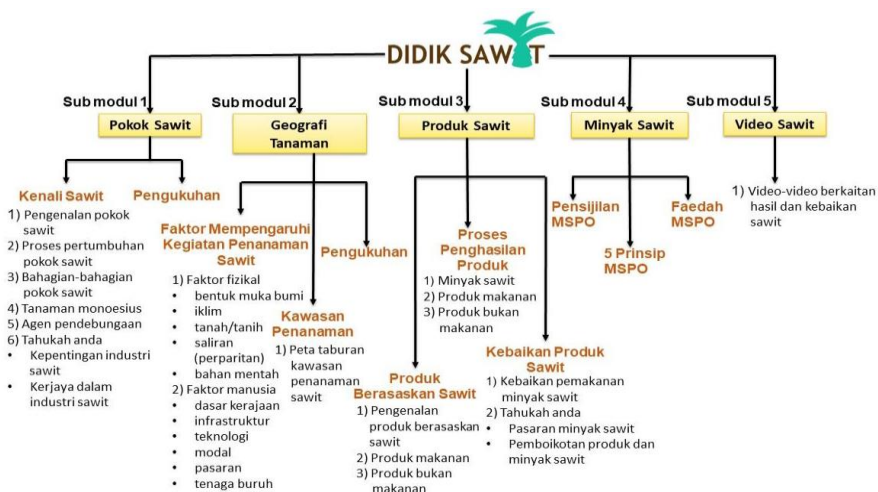


**Figure 2:** Didik Sawit module design

**Table 2:** Didik Sawit module description

| Module (*using Malay term) | Description |
| --- | --- |
| 'Pokok Sawit' | It contains two submodules, which are Palm Recognition and Strengthening.<br>• Get to know Palm provides general information about palm trees and the palm industry.<br>• Reinforcement provides quiz questions to test the user's understanding. |
| 'Geografi Tanaman' | It contains three submodules: Factors Affecting Oil Palm Planting Activities, Planting Areas, and Strengthening.<br>• Factors Affecting Oil Palm Planting Activities provide information on the aspects of physical factors and human factors that are involved.<br>• Plantation Area provides a map showing the oil palm planting area in each state in Malaysia.<br>• Reinforcement provides quiz questions to test the user's understanding. |
| 'Produk Sawit' | It contains three submodules: Palm-Based Products, Product Production Process, and Palm Product Quality.<br>• Palm Based Products provide information on food and non-food products from the palm industry.<br>• The Product Production Process provides a process flow for the production of Palm products.<br>• Benefits of Palm Products: Explain the benefits of palm industry products. |
| 'Minyak Sawit' | It contains three submodules: MSPO Certification, 5 MSPO Principles, and MSPO Benefits.<br>• All three submodules provide general information about MSPO. |
| 'Video Sawit' | It contains ten videos that explain the products of the oil palm industry and their benefits. |

**The Interface of Didik Sawit Web**

Figure 3 below is the home page of Didik Sawit, which contains the links to the five main modules that have been mentioned earlier. Each module has sub-modules that display detailed content for that topic. The displayed content is in infographics such as posters, videos, and animations to facilitate the understanding and acceptance of young learners today. Figure 4 shows the available selection of sub-module titles for Palm Tree modules.
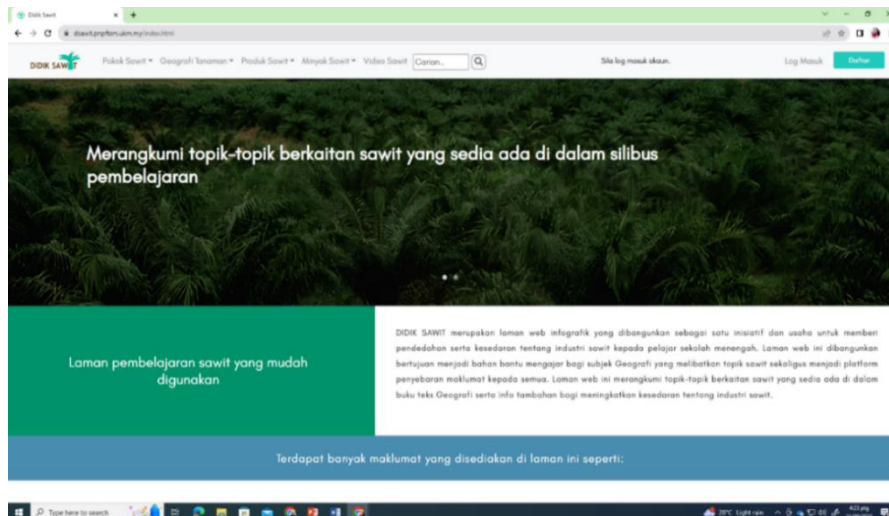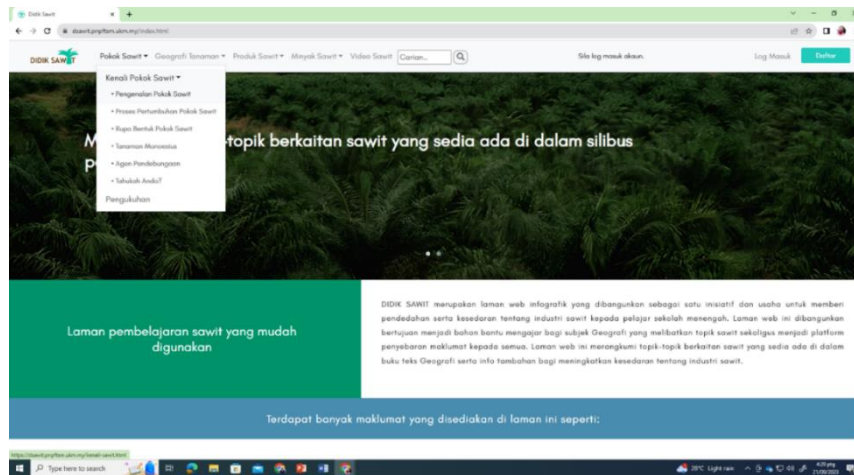


**Figure 3:** Didik Sawit home page

**Figure 4:** Sub-module title for the palm tree module

**Didik Sawit Infographic View**

The presentation of the content that has been provided in Didik Sawit is in an infographic form; infographics display content in a visual format to facilitate understanding and acceptance of the information that is provided. Combining text, images, and audio creates an attractive and easy-to-understand content delivery design. The three types of infographics that have been used are static, animated, and interactive. Figure 5 shows the display of content that has been delivered as a static infographic, a poster that combines images and texts.
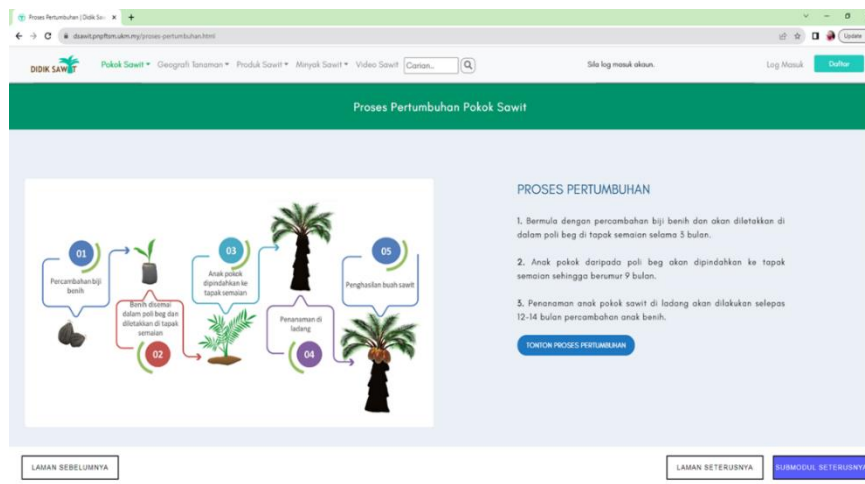


**Figure 5:** Static infographic (poster) for sub-module palm growth process

Correspondingly, a video is the animated infographics approach (Doukianou et al., 2021). Figure 6 shows the content of the sub-module that is provided in the form of a video involving audio and the movement of elements showing the simultaneous process, which can help the users to focus on the information that is presented and to understand the process that is described. Using a video allows the user to view it repeatedly to improve their understanding of the information being presented.
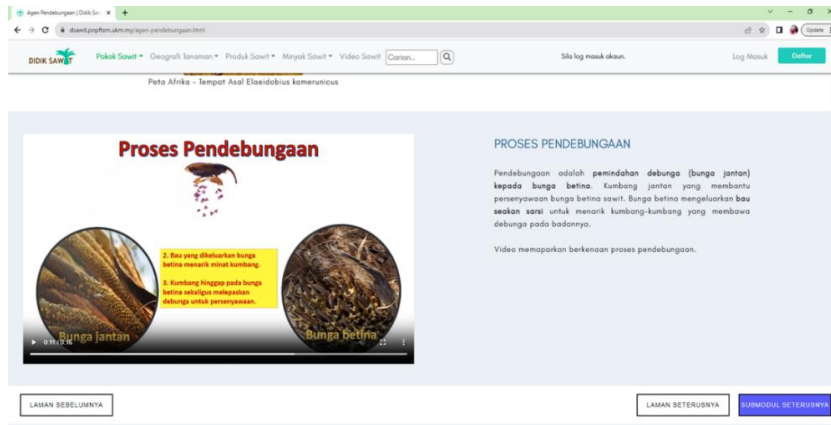


**Figure 6:** Animated infographic (video) shows the pollination process

In addition, interactive infographics are also applied to sub-module content that requires users to interact with the display. Figure 7 shows an interactive infographic display where the users need to click on the map that is provided to display the name of the state, the flag, and the palm cultivation area in the state.
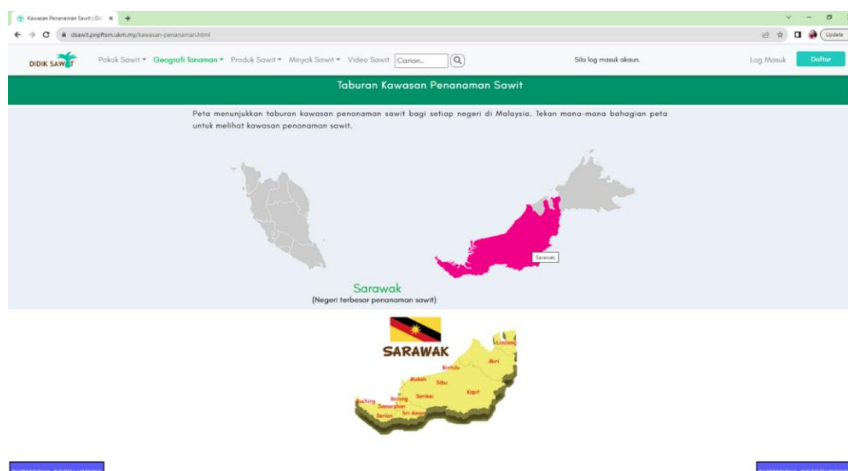


**Figure 7:** Interactive infographic of palm oil cultivation area

**Didik Sawit Web-Based Usability Test**

Didik Sawit's web-based usability test was conducted using the Post-Study System Usability Questionnaire (PSSUQ) instrument (Sauro & Lewis, 2012). This test was conducted to see Didik Sawit's usability levels among school students. The analysis of this test refers to the interpretation scale as follows: 1.00 -2.33 (low), 2.34 - 3.66 (moderate), and 3.67 - 5.00 (high) (Ahmad, 2002). The analysis results in Table 3 below found that the three main criteria have obtained a mean score of more than 4.0 out of 5.0. Overall, the analysis results prove that Didik Sawit has high usability and can benefit users.

**Table 3:** Usability of Didik Sawit website

| Num. | Criteria | N | Mean and Level |
|------|----------|---|----------------|
| 1. | Web Usage | 97 | 4.82 (High) |
| 2. | Information Quality | 97 | 4.72 (High) |
| 3. | Interface Quality | 97 | 4.82 (High) |

The younger generation's awareness of the palm oil industry, such as job opportunities, palm oil products, the benefits of products, and the contribution of the palm oil industry to the country, is better with the exposure given through the Didik Sawit website. With this awareness, it is hoped that the younger generation is interested in venturing into this field and can improve the country's economy.

**CONCLUSION**

Didik Sawit is an infographic website that has been developed to be used as a platform that can provide information and exposure to the introduction of the palm industry to young learners. The five selected modules are suitable for the target users and contain additional information that is suitable to be disclosed to young learners. The selection of content delivery methods in the form of infographics, posters, videos, and animations facilitates understanding and attracts the attention of young learners. The functional testing that has been done can ensure that the developed Didik Sawit meets the needs of users and works well. In addition, the usability testing feedback shows positive results and feedback from the respondents. Didik Sawit meets the usability criteria for web usability, information quality, and interface quality. Didik Sawit also successfully exposed the palm industry to young learners. It hopes to be one of the leading platforms to expose the palm industry to young learners, opening their minds and attracting their interest in venturing into it.

**ACKNOWLEDGEMENTS**

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