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Integration of the Marketplace-Based Locality Application, Literacy, and Gamification to Optimize Generation Z's Role in the Agro-Industrial Sector for Economic Sustainability

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Abstract
This study aims to determine the level of product acceptance, including perceptions of the LOCALITY application in terms of perceived usefulness, perceived ease of use, and increased knowledge/awareness of technology use and sustainability, as well as the effectiveness of LOCALITY in improving Generation Z's understanding of agroindustry and sustainable economics. This research represents an effort to accommodate agro-industry actors and foster regeneration in the agro sector through the integration of the LOCALITY platform—based on marketplaces, digital literacy, and gamification. This study employs a research and development model, a method used to design and test the effectiveness of a product. The research was conducted at the Faculty of Economics, Universitas Pendidikan Ganesha, using a survey method and sample testing with 75 student respondents, whose effectiveness was then evaluated using a paired sample t-test. The results showed that respondents rated product acceptance levels very highly, including perceptions of LOCALITY, with total averages for each statement above 86.40. Furthermore, respondents' understanding of agroindustry and sustainable economics increased from an average of 69.32 to 92.53. The Sig. (2-tailed) value in the paired sample t-test was 0.000 (< 0.05), indicating a significant difference in outcomes following use of the LOCALITY application.
Keywords: Agroindustry, Sustainable Economy, LOCALITY, Gen Z, Mobile Application

INTRODUCTION

Regenerating actors in the agro-industrial sector to create a sustainable economy in a country that holds the status of an agrarian and maritime nation certainly presents both opportunities and challenges. An unexpected achievement, as an agrarian country, Indonesia's food commodity imports have nearly doubled in the last 10 years (2013–2023), increasing from US$10.07 billion to $18.76 billion. In terms of volume, imports of eight essential food commodities—namely rice, corn, wheat, soybeans, raw sugar, and garlic—increased by 8.46 million tons, from 20.55 million tons to 29.01 million tons (Rinawati, 2025). It's no wonder this figure will increase throughout 2025, due to the increasingly fluctuating value of local agricultural and fisheries distribution. Indonesia is an agrarian country and holds the title of a maritime nation with abundant marine resources. However, the favorable natural conditions did not align with the buying and selling activities of those who, as most of the Indonesia's population, work in the agricultural and fisheries sectors (Agustina et al., 2024).

The distribution chain for agricultural and fisheries products is still dominated by middlemen, who number in the tens of thousands of informal actors across various regions in Indonesia. Middlemen or intermediaries, who act as distribution channels, have surprisingly had a negative impact on both the agricultural and fisheries sectors. According to data from the Ministry of Agriculture in early 2025, the production of 21 billion kilograms of rice, multiplied by a price difference of Rp2,000, could generate Rp42 trillion in revenue for middlemen, with

a profit margin of up to 67% (CNBC Indonesia, 2025). A supply chain that is too long, eventually reaching the consumer, causes losses for agro-industrial actors.

Various efforts have been made, from corporatizing farmers by establishing cooperatives that act as aggregators, to creating the TANAM application integrated with Google Maps, which has provided information on land management and food varieties since 2016 (Azis & Suryana, 2023). Limitations in the commodities listed on the application, as well as the lack of relevance in creating the application because it targeted farmers who were predominantly elderly at that time, reduced its effectiveness. This application is only available on Android. In 2016, the Ministry of Agriculture was determined to develop it for the iOS system. However, as of now, the application is still inaccessible. Finally, although this step aligns with the goal of food sovereignty, as a result, this effort did not work effectively. This is shown by the ironic figures amidst the income of farmers and fishermen, which is still in the range of Rp1–1.5 million per month (Agustina et al., 2024).

The fact that farmers and fishermen still rely on middlemen despite the widespread use of technology is a regressive phenomenon for Indonesia, a country that holds the status of an agrarian and maritime nation. There is a digital literacy gap among the public, so various systemic uses of technology are needed. This aims to create an agro-product distribution chain that can be processed directly by industries and large buyers, without reducing the income of fishermen and farmers. Therefore, the role of young people is needed to become the new generation in creating an agro sector that moves toward a sustainable economy. The population is now dominated more by younger generations, which puts a greater spotlight on Generation Z.

Based on current issues, many agro-industry actors are still older generations, such as Gen X and Baby Boomers, and not Gen Z. However, demographically, Gen Z accounts for 27.94% of Indonesia's total population, and they are still productive (BPS, 2025). However, only 2.14% of the total Gen Z population in Indonesia are involved in agro-industry (BPS, 2025). Surveys show that only 6 out of 100 Gen Z individuals (aged 15–26) want to work in the agro-industrial sector. They believe that the agro sector is unpromising, risky, lacks literacy regarding agro-modernization, has little impact, and generates low income (BPS, 2025). This thinking arose from the structural dependence of agricultural actors on middlemen due to a lack of capital, strong kinship ties, and limited access to distribution reaching consumers.

The main problem to be studied in this research is how digital technology can enhance the active role of the younger generation in actively participating in managing the agro sector to have a sustainable economic impact. This research also understands the main constraints faced by young people in adopting sustainable agro-industrial practices. This is important considering that the transition toward a sustainable agro-industrial system requires regeneration, as well as more intensive technological support. The direction of the solution to be studied in this research includes the development of the LOCALITY mobile application that supports the adoption of e-commerce integrated with supply chain management, discussion forum activities, agro-industrial education in a sustainable context, daily missions, and scoring sustainability impact for the implementation of a green economy. LOCALITY is an application specifically designed for the agro-industrial sector, combining a marketplace with supply chain management and sustainable economic literacy. Equipped with 9 key features, LOCALITY is

designed for buyers and sellers to create regeneration among young generations for the agro-industrial sector.

Additionally, this research will analyze how the impact of digital technology through the LOCALITY application—specifically designed for the concept of sustainable agroindustry—can stimulate the interest of the younger generation in starting and understanding the agro market. Therefore, it is important to examine how perceptions and the effectiveness of improving young people's understanding of agroindustry and sustainable economics can be enhanced through the LOCALITY application. In this context, the adoption of digital technology is not just about facilitating, but also about changing behavior and mindset toward current human needs.

From a scientific perspective, this research is novel in its approach, which combines economic-management concepts with sustainable economic literacy and game concepts within a single application framework. So far, there is no mobile application called LOCALITY that focuses on the concept of agroindustry. Therefore, this research aims to: 1) develop the LOCALITY application, 2) determine the acceptance level of the LOCALITY application among Generation Z, 3) understand user perceptions (perceived usefulness, perceived ease of use, and increased knowledge/awareness), and 4) assess the effectiveness of LOCALITY in improving Generation Z's understanding of agroindustry within the context of sustainable economics.

Thus, this research is expected to contribute to the development of sustainable agro-industrial strategies amidst the global need for circular economy, green economy, and blue economy practices, thereby realizing a sustainable economy based on the principles of balanced development. The findings of this research are also expected to contribute as a reference or recommendation for designing more effective agro-actor regeneration programs for Generation Z, particularly students in the Faculty of Economics at Universitas Pendidikan Ganesha. Ultimately, the findings of this research can contribute to achieving the Sustainable Development Goals (SDGs), particularly in the areas of decent work and economic growth, reducing inequality, and responsible consumption and production.

The use of mobile applications as a form of technological digitalization is one of the important aspects for finding a turning point for young generations to begin understanding economic knowledge more easily. According to Prima (2024), "unconsciously, most people cannot be separated from digital media, which indicates that the status quo is now in the digital revolution." One example of this is the use of mobile applications. The use of mobile applications is now becoming a favorite with the changing trends in consumer behavior. Therefore, mobile applications must now optimize their UI and UX to prove that digital technology through mobile applications truly makes life easier for many people around the world (Hanifurohman & Hutagalung, 2020).

Mobile applications can be shown as a means of buying and selling through e-commerce, which offers many benefits to businesses and their consumers, while also serving as an educational tool. Mobile applications are software designed and developed to run on mobile devices such as smartphones or tablets (Digital & Moyers, 2023). According to Wahono (2020), "mobile applications can be programs downloaded and installed by users to perform various

specific tasks, whether for entertainment, communication, business transactions, or daily productivity needs."

Based on the opinions of these experts, a mobile application in this context is an application used to facilitate all generations, especially young people and agro-industry practitioners, in gaining easier access. Based on previous research, the researcher found a significant difference in the objects. From the research objectives, the application form and features displayed, to the user experience that certainly cannot be obtained from other applications—through e-commerce features, discussion forums, supply chain management, impact quizzes, and sustainability scores. Therefore, it can be concluded that mobile applications are software designed for mobile devices such as smartphones and tablets, serving various purposes ranging from entertainment, communication, business transactions (e-commerce), to education.

The term "agroindustry" refers to businesses that process plant or animal resources, where the products undergo physical or chemical processes to transform and preserve them before being stored, packaged, and shipped (Afandi, 2023). Agro-industrial activities have several characteristics, including increasing added value, producing products, extending shelf life, and increasing income and profits for producers (Wijaya et al., 2024). The agro-industrial supply chain plays a crucial role in the distribution of products. According to Bahari (2024), "in the context of agroindustry, the supply chain involves various stages from raw material procurement, processing, storage, to product distribution to the market." Each of these stages is an integral part that must be managed effectively to ensure product quality and operational efficiency. The concept of the supply chain emphasizes the integrated pattern in the production flow process, from raw materials to reaching the consumer (Pricillia, 2021).

This research focuses on agroindustry in the agricultural, fisheries, and plantation sectors. Despite Indonesia being an agrarian and maritime nation, young people face challenges in entering the agricultural sector. These challenges include price opacity, limited market access, income inequality, and a lack of digitalization to facilitate downstream processing. Furthermore, the structural conditions of society, which are still dominated by middlemen who manipulate market prices, lead to a lack of interest among young people in managing and deepening the sustainable agro-sector economy.

Therefore, it is important for agro-industrial actors to implement sustainable and environmentally friendly practices, as well as invest in research to find innovative solutions that can reduce negative impacts on the environment. The lack of literature researching application development in the agro sector and its role in a sustainable global economy is the objective and scope of this research. Therefore, it can be concluded that agroindustry is an industry that processes products from sectors such as agriculture, fisheries, plantations, animal husbandry, and forestry into high-value food products.

The theory of sustainability was first proposed by Meadows et al. (2004), who explained that it is "society's effort to prioritize social responses to environmental and economic problems." This social response is expected to meet the needs of the present and future generations. The concept of sustainability is currently evolving and being applied in the context of economic sustainability (Abdi et al., 2022). Abdi et al. (2022) explain that "economic sustainability refers to practices that support long-term economic growth without negatively impacting the social, environmental, and cultural aspects of society."

Furthermore, Ali (2021) explains that "sustainable economics is integrating ecological and social factors into the economic framework for long-term prosperity." In this study, sustainability theory is focused on sustainable economics. Sustainable economy in this context is focused on increasing the involvement and concern of the younger generation in creating a sustainable economy through the agro sector, facilitated by a mobile application. Therefore, it can be concluded that sustainability theory is an idea that emphasizes the importance of social response to maintain a balance between environmental and economic needs for the present and future (Hariram et al., 2023; Harrington, 2016).

In line with the research objectives, which are to determine the level of acceptance, perceptions of perceived usefulness, perceived ease of use, increased knowledge/awareness, and product effectiveness in improving understanding, the researcher used the research and development method, commonly known as Research and Development (R&D). The purpose of the development is to produce a product based on field testing, which is then revised. According to Fauziah et al. (2025), "the Research and Development (R&D) research method is a widely adopted research method for designing and testing the effectiveness of a product." Products are not always physical objects or hardware, such as books, stationery, and other learning tools. However, it can also be in the form of software (Okpatrioka, 2023).

Research and development (R&D) in subsequent literature is research that produces products in a specific field of expertise, accompanied by certain byproducts and demonstrating the effectiveness of those products. Development is the engineering process of arranging a series of elements to create a product (Waruwu, 2024). In this case, the R&D method is used by researchers to develop a mobile application as a transaction and literacy medium aimed at understanding various aspects focused on improving, effectiveness, and the perceptions of the research target. Therefore, it can be concluded that the R&D method in this case is a research method used to create a specific product—both hardware and software—and simultaneously test the effectiveness of the product in the field. In this study, the R&D method was used to develop a mobile application.

To reach the final research objective, the researcher used a pre-test and post-test research design instrument. The pre-test aimed to determine the initial knowledge of the research subjects, in this case, students from the Faculty of Economics. Meanwhile, the post-test was administered after the research subjects were given treatment (in this case, the mobile application) to determine the increase in knowledge (Magdalena, Annisa, Ragin, Ishaq, 2021). Therefore, it is hoped that the product in this study will truly be able to increase the target audience's knowledge and acceptance of the product.

METHOD

This research was conducted on students from the Faculty of Economics at Universitas Pendidikan Ganesha from November 1st to 20th, 2025. The research sample was taken using the purposive sampling method with a total of 75 respondents. Students from the Faculty of Economics were chosen as research subjects because they have a strong academic relevance to the issues of the green and blue economy and are considered to have high potential to contribute to the agro-industrial sector. The development of the LOCALITY application uses a research model adapted from Research and Development. According to Fauziah (2025), 'research and

development methods are approaches aimed at producing a specific product and testing its effectiveness.' Here is the development flow for the LOCALITY application.

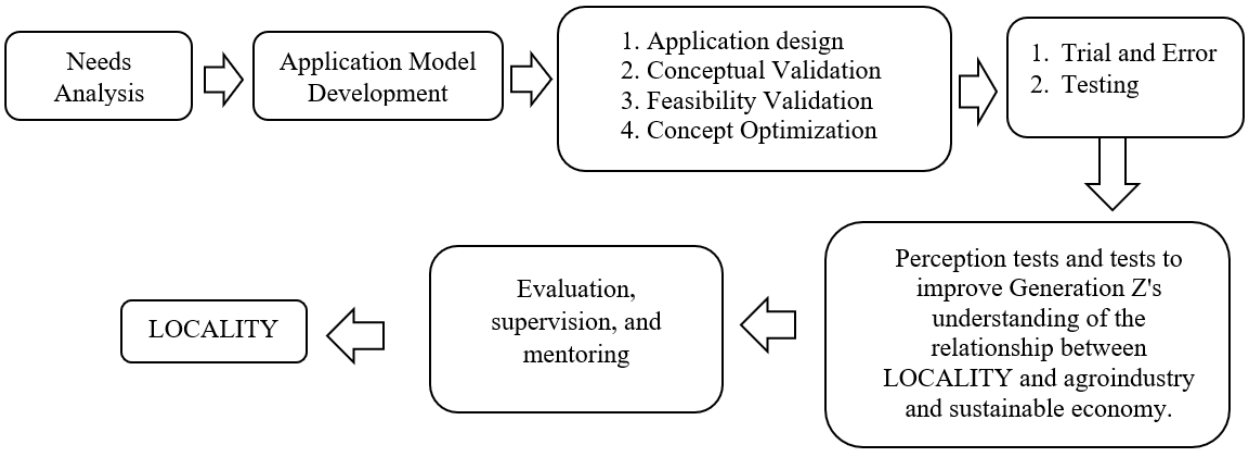

Figure 1. *Application Development Flow*
Source: Researcher (2025)

Application Development Procedure and Data Collection Instruments

1. Needs Analysis

The development of the LOCALITY application is based on the urgency of regenerating actors in the agro sector thru Generation Z, which currently dominates Indonesia's population at 27.94% and is a productive generation for realizing a sustainable economy thru the implementation of digital technology.

2. Application Model Development

a. Application Design

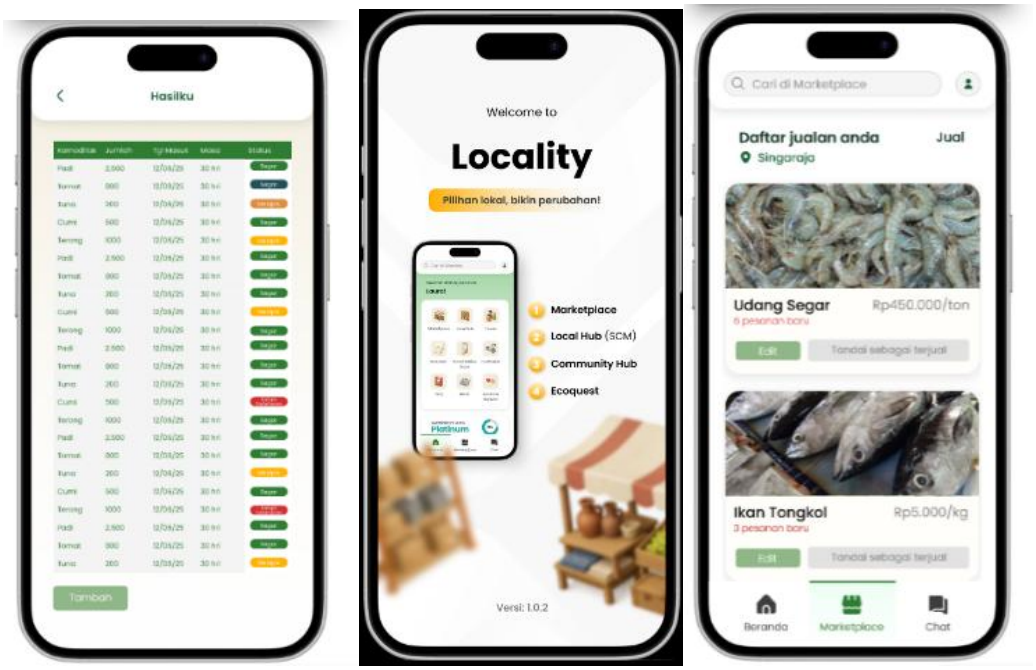

Figure 2. *LOCALITY*
Source: Researcher (2025)

b. Conceptual Validation

Conceptual validation is carried out to determine the content validity of the instruments used, both for the application instrument and the pre-test and post-test instruments. Conceptual validation is conducted in two important stages. The first stage is a literature study aimed at exploring various reliable information sources, such as journal articles, scientific books, proceedings, and other relevant sources discussing sex education issues. The second stage involves validation by experts with the competence to ensure the accuracy and relevance of the concept. The expert validators involved in this research are Putu Dhanu Driya, S.Kom., M.A., a lecturer in the Information Systems study program, Faculty of Engineering and Vocational Studies, and Rikky Rundu Padang, S.M., M.M., a lecturer in the management study program at Universitas Pendidikan Ganesha.

c. Feasibility Validation

Researchers conducted feasibility validation by testing the LOCALITY application under the supervision of the research team.

d. Concept Optimization

The results of the conceptual and feasibility validation were then evaluated and optimized to improve the LOCALITY application.

e. Trial Error and Testing

In the field test, two stages of testing were conducted, including the acceptance-perception level testing stage and improving understanding of sustainable economics and agroindustry thru LOCALITY.

Test Product Acceptance and Perception Levels

After trying the LOCALITY application, 75 respondents were asked to provide their assessment of the LOCALITY product, including their perceptions of perceived usefulness, perceived ease of use, and increased knowledge/awareness. The assessment was conducted using a questionnaire with multiple-choice (closed) responses, using a Likert scale. In the questionnaire, there are 5 ratings ranging from strongly agree (SA), agree (A), neutral (N), disagree (D), strongly disagree. (SD).

Tests to Evaluate the Effectiveness of the Application in Improving Understanding of Sustainable Economics and Agroindustry

a. Pre-test before using the application

In this pre-test, 75 respondents were given 15 questions to determine their initial knowledge of agro-industry and sustainable economics.

b. Post-test after using the application

In the post-test, 75 respondents were given 15 questions to determine their knowledge of agroindustry and sustainable economics after playing.

A. Data Analysis Techniques

1. Product Acceptance Level

The data obtained thru the questionnaire was then analyzed qualitatively by assigning scores to each respondent's answer based on the Likert Scale. The results of the questionnaire were then interpreted quantitatively using the following scoring intervals.

Table 1. Index and Rating Interval Categories

Index (%)	Category
80-100	Strongly Agree
60-79.99	Agree
40-59.99	Neutral
20-39.99	Disagree
0-19.99	Strongly Disagree

Source: Ruhansih (2021)

Measuring the Effectiveness of Using the LOCALITY Application in Improving User Understanding

Pre-test and post-test data were analyzed descriptively and inferentially. Descriptive analysis was used to examine the average pre-test, post-test, and score difference scores of the respondents. Inferential analysis used a paired sample t-test to determine if there was a significant difference between scores before and after using the LOCALITY application. Descriptive analysis in this study refers to the guidelines according to Ruhansih (2021) as follows.

Table 2. Scores and Categories

Score Result	Category
90-100	Very High
80-89	High
65-79	Moderate
55-64	Low
0-54	Very Low

Source: Ruhansih (2021)

Next, the effectiveness of the application was analyzed using a paired sample t-test because the data came from two measurements of the same respondents. This test aims to see if the observed increase in scores is statistically significant. The decision-making criteria are as follows: if the Sig. value (p-value) < 0.05, then there is a significant difference between the pretest and posttest scores, indicating that the use of the LOCALITY application is effective in improving user understanding.

RESULT AND DISCUSSION

LOCALITY Application

LOCALITY is an application designed by combining economics, management, literacy, and games thru 5 main features. This application aims to facilitate agro-industrial players and Generation Z in developing businesses that are transparent, without the intervention of middlemen, and sustainable. The 5 main features of LOCALITY include a Marketplace, where sellers and buyers can transact without fear of intermediaries, integrated with Google Maps to determine the distance to the nearest needs. Local Hub, a simple supply chain management system that makes it easier for agro-industry players to monitor the status of their products. Is it still in large quantities, or has it even run out.

EcoQuest, aimed at the younger generation as a form of knowledge about the agroindustry, sustainable economy, and SDGs. EcoMission is a daily and weekly game designed to encourage more activity within the agro-actor network, in-app transactions, product reviews, and so on, with rewards claimed at certain score milestones. Sustainability Score is a score earned with each transaction or daily mission, aimed at increasing awareness and impactful behavior. As for other features, they include the Community Forum, FAQ, Latest News, and *Apa Kata Mereka*? (user review). The following Figure 3 is the overall application of LOCALITY.

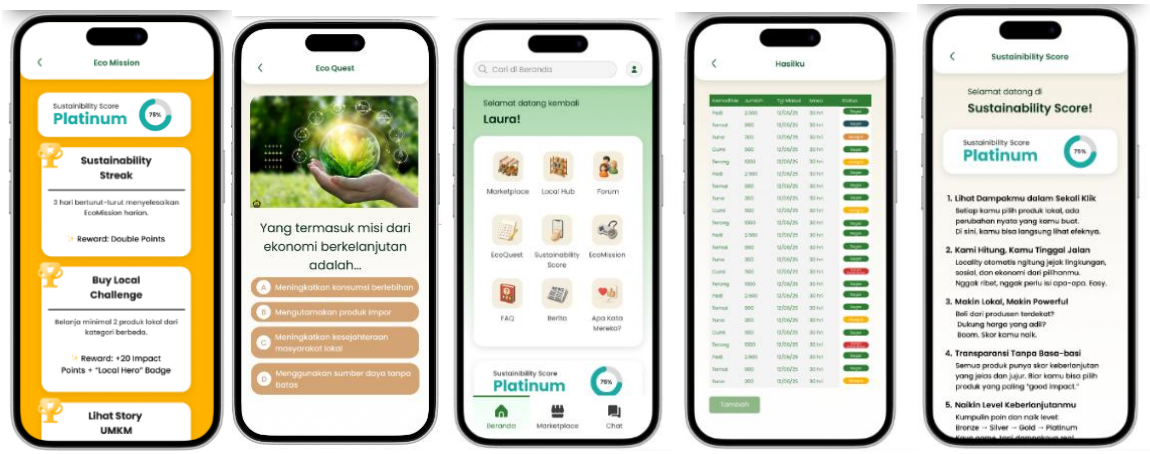

Figure 3. *LOCALITY Application*
Source: Researcher (2025)

User Acceptance and Perception Level of the LOCALITY Application

Perception data shows that all indicators have very high index values, ranging from 86.40 to 90.40, with all categories falling under "Strongly Agree." This means that user acceptance of LOCALITY is very high. A score of 87-90 on perceived usefulness indicates that users believe LOCALITY is truly beneficial. Users feel that LOCALITY makes it easier for them to find local products, makes them feel like they are contributing to a sustainable economy, helps them understand the environmental impact of consumption, and guides them to make more responsible purchasing decisions.

A score of 86-89 on perceived ease of use indicates that the application is very easy to use, intuitive, and not confusing. This means that the UI/UX design of LOCALITY is already suitable for young people and does not pose any barriers to use. A score of 87-90 on perceptions of sustainable economy & technology indicates a strong increase in understanding of the relationship between local products and the well-being of farmers/fishermen, the role of technology in strengthening agro-industry, and the basic concepts of sustainability in the agricultural-plantation-marine sector. Increased awareness & attitudes toward sustainability, with a score of 86–89, show that users are increasingly concerned about social and environmental impacts, are motivated to choose local products, feel they are agents of change, and are willing to encourage others to use LOCALITY.

This indicates that the application not only increases knowledge but also changes behavioral intention, which are two important points in sustainable change. Overall, the perceived value in the "Strongly Agree" category with an index of 86–90 indicates that users have a very high level of acceptance toward the LOCALITY application. Users not only rate

the application as useful and easy to use, but also feel an increase in their knowledge and awareness of sustainable economics. Thus, LOCALITY has proven to be an effective technology platform for young people in supporting the agro sector and promoting sustainable consumption practices.

Effectiveness of Application Usage in Increasing User Knowledge

To see the improvement in respondents' understanding of sex education thru the LOCALITY application, two stages were carried out: starting with a pre-test before using the application, and a post-test afterward. Based on the two stages performed, the following Table 4 shows the results obtained.

Table 3. Pre and Post Test Results

Statistics		
	Pre-test	**Post Test**
N	75	75
Mean	69.32 (Moderate)	92.53 (Very High)
Minimum	50	73
Maximum	83	100

Source: Researcher (2025)

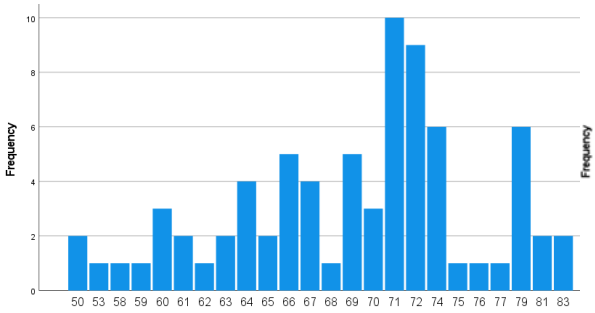

Figure 4. *Pre-Test*

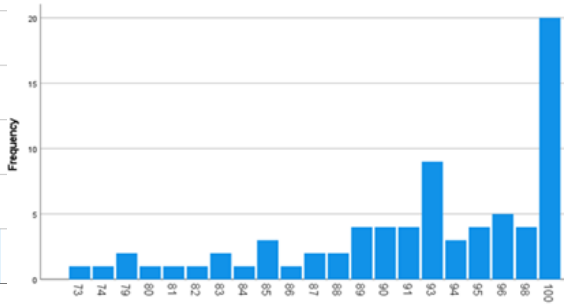

Figure 5. *Post-Test*

Source: Researcher (2025)

Table 4 and Figures 4, 5 show that there was an increase in the average pre-test score (69.32) compared to the post-test score (92.53). The pre-test results indicate that the respondents' understanding was in the MODERATE category, but information about agroindustry, sustainable economy, supply chain management, and green & blue economy was still limited. From the post-test results, it can be seen that thru the LOCALITY application, knowledge and understanding of agroindustry, sustainable economy, and green economy increased significantly, or can be said to be in the VERY HIGH category. This is because the LOCALITY application contains material aspects that are tailored to current global needs.

In this study, the effectiveness of LOCALITY was analyzed using a paired t-test to compare two measurements on the same subjects and observe significant differences after the intervention.

Table 4. The results are shown

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre Test	69.32	75	6.956	.803
	Post Test	92.53	75	6.852	.791

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Pre Test & Post Test	75	.175	.133

Table 5. Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std.Deviation	Std.Error Mean	95 Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 PRETEST-POST TEST	-23.213	8.867	1.024	-25.254	-21.173	-22.671	74	.000

Source: Researcher (2025)

Thru the paired t-test sample table, the results show that the Sig. (2-tailed) value is 0.000 < 0.05, so it can be concluded that there is a significant difference in the results of using the LOCALITY application between pre-test and post-test data. Therefore, it can also be concluded that the LOCALITY application can improve users' understanding of agroindustry, sustainable economy, and other instruments.

The findings of this study align with previous research that also explores the development of digital technology for agroindustry. Delima et al. (2022) highlight several opportunities for technological advancement, including the widespread use of ICT devices, especially smartphones. The government's focus on expanding internet access, the substantial role of Indonesia's agricultural sector, and the large number of households engaged in agro-industrial activities. Similarly, Sutiarso et al. (2020), through their study on web-based systems for marine agroindustry, recommend developing an agro-industrial platform by analyzing management and technology utilization through an optimization-focused approach.

This research offers an alternative designed to meet the needs of the agro-industry across management, technology, and sustainable economic literacy. Viewed through its opportunities and challenges, LOCALITY addresses social needs by regenerating the agro-industrial sector. Developed through optimization rather than mere revision, it serves as an application that supports Indonesian agro-industry while aligning with SDGs 8, 10, and 12. Ultimately, LOCALITY not only aims to reduce middlemen but also to cultivate a new generation that advances a sustainable global economy.

CONCLUSION

The LOCALITY application effectively facilitates agro-industrial actors and Generation Z in developing sustainable businesses without middlemen by integrating economics, management, literacy, and gamification, achieving high product acceptance and positive user perceptions. Respondents strongly agreed that it supports responsible purchasing, is user-friendly for novices, enhances understanding of technology's role in agro-industry development, and motivates them to recommend it to others for local economy and sustainability support. Its effectiveness in boosting Generation Z's comprehension of agroindustry within sustainable economics was confirmed by significant pre- and post-test improvements, validated through paired t-test analysis, thus fulfilling the research objectives. For future research, exploring the long-term behavioral impacts of LOCALITY on actual agro-business participation and scalability across diverse Indonesian regions could further validate and expand its contributions to economic regeneration.

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