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Development of Flipbook Media for Producing Various Processed Products Made from Indramayu Mango to Improve Community Entrepreneurial Skills

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Abstract

This study developed and evaluated a digital flipbook-based learning medium to enhance community entrepreneurial skills through the production of processed products made from Indramayu mangoes. The Research and Development (R&D) method, using the 4D model—Define, Design, Develop, and Disseminate—was employed. In the Define phase, needs were analysed through interviews and literature reviews to identify local entrepreneurial challenges. The Design phase involved creating media tools, including GBIM, material outlines, and storyboards, which were validated by experts. During the Develop phase, the flipbook was created using an application that integrated text, images, videos, and interactive links. Expert validation revealed high feasibility scores: 94% from subject matter experts, 90% from language experts, and 93% from media experts. In the Disseminate phase, trials with target communities were conducted. One-to-one, small group, and field tests demonstrated excellent suitability, scoring 92%, 91%, and 93%, respectively. Community feedback highlighted the media's high usefulness and engagement. The findings indicate that the digital flipbook is a highly effective tool for enhancing entrepreneurial skills and utilizing local resources like Indramayu mangoes. It provides an engaging, accessible medium for learning and empowers communities to create innovative, marketable products.

Keywords: *Digital Flipbook, Mango Processing, Entrepreneurial Development, 4D Model*

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INTRODUCTION

The Indramayu mango, renowned for its unique flavor and quality, presents a significant opportunity for local communities to leverage agricultural resources for economic development. This project focuses on the development of Flipbook Media as an innovative educational tool designed to guide community members in the transformation of Indramayu mangoes into a variety of processed products. By equipping individuals with the necessary skills and knowledge, the initiative aims to foster entrepreneurial capabilities, thereby enhancing local livelihoods. Through the systematic exploration of mango-based product development, this research

seeks to not only elevate the economic potential of the community but also to promote sustainable practices in utilizing regional agricultural assets. The integration of technology in the form of Flipbook Media serves as a crucial component in disseminating information and facilitating hands-on learning, ultimately contributing to the empowerment of local entrepreneurs in the Indramayu region.

Furthermore, the successful implementation of Flipbook Media in this context not only enhances individual entrepreneurial skills but also cultivates a sense of community collaboration and resilience. By fostering partnerships among local farmers, artisans, and educators, the project can create a supportive network that encourages knowledge sharing and resource pooling, ultimately driving collective growth. This collaborative approach mirrors findings from similar studies where digital learning tools were shown to significantly improve student engagement and outcomes, suggesting that such methodologies could similarly enhance community-based initiatives (A et al., 2020, Ulfannura, 2022). As participants gain confidence and experience through hands-on activities outlined in the flipbooks, they may be inspired to explore further innovations, potentially leading to new product lines that capitalize on other regional specialties, thus diversifying their economic opportunities and reinforcing sustainable practices within the community. Moreover, as the community engages with Flipbook Media for mango product development, there lies an opportunity to incorporate local wisdom and traditional knowledge into the educational framework. By integrating culturally relevant practices and recipes that have been passed down through generations, participants can not only enhance their entrepreneurial skills but also preserve and celebrate their heritage.

This dual approach aligns with research indicating that learning resources which utilize local cultural elements significantly improve student engagement and outcomes (Pradita & Rachmawati, 2023). Furthermore, by documenting these processes in flipbooks, a repository of community knowledge is created, fostering a sense of pride and ownership among residents while simultaneously enhancing the educational tool's relevance and appeal. Such initiatives could ultimately lead to the establishment of unique branded products that reflect both quality and authenticity, positioning the Indramayu mango-based goods favorably in wider markets and promoting sustainable economic growth within the region. This strategic integration of cultural heritage and entrepreneurship not only empowers local producers but also attracts consumers who value authenticity and sustainability in their purchasing decisions.

This holistic approach not only benefits the local economy but also cultivates a deeper appreciation for the region's rich agricultural traditions, ensuring that future generations remain connected to their heritage while thriving in a modern marketplace.

In addition to enhancing entrepreneurial skills and preserving cultural heritage, the implementation of Flipbook Media can serve as a vital conduit for fostering innovation in product development. By leveraging digital storytelling and interactive content, Flipbook Media can showcase unique products in engaging ways, capturing the attention of a broader audience and driving interest in locally sourced goods.

The development of flipbook media for producing various processed products from Indramayu mangoes aims to enhance community entrepreneurial skills by leveraging digital learning tools. Flipbooks, as interactive and engaging educational media, have shown potential in various educational settings, particularly in entrepreneurship and vocational training. Flipbooks have been effectively used in educational settings to enhance learning outcomes by providing interactive and engaging content. For instance, the development of a food entrepreneurship e-module using flipbook technology has shown to increase students' knowledge and motivation in entrepreneurial practices (Emilia & Rassy, 2024). In vocational education, flipbook-based e-modules have been developed to improve learning in marketing subjects, demonstrating the versatility and effectiveness of this medium in various educational contexts (Suharsono et al., 2023). This initiative is crucial in regions like Indramayu, where mango production is significant, yet a substantial portion of the produce remains unsold. Processing these mangoes into products like dodol can significantly increase their value, providing economic benefits to local communities (Sulistyowati et al., 2018). Small-scale mango processing can reduce postharvest losses and create diverse, shelf-stable products, contributing to food security and economic development in developing countries (Owino & Ambuko, 2021).

By transforming these mangoes into value-added products, communities can improve economic outcomes and reduce waste. The following sections explore the development and application of flipbook media in entrepreneurship education, the potential of mango processing, and the broader implications for community development.

By converting these mangoes into enhanced products, communities can boost economic results and minimize waste. The upcoming sections delve into the creation and use of flipbook media in entrepreneurship education, the opportunities in mango processing, and the wider consequences for community advancement. The incorporation of flipbook media in entrepreneurship education can empower communities by offering accessible and practical insights, nurturing entrepreneurial abilities, and promoting innovation in product creation (Emilia & Rassy, 2024, (Putri et al., 2020). By concentrating on local resources and cultural aspects, such as mangoes in Indramayu, communities can craft distinctive products that strengthen their economic durability and cultural heritage. (Sulistyowati et al., 2018, Owino & Ambuko, 2021)

METHODS

This study employed a Research and Development (R&D) methodology with a focus on developing a digital flipbook for the production of processed products made from Indramayu mangoes to enhance community entrepreneurial skills. he research population comprised residents and small business owners (UMKM) in Desa Bulak, Jatibarang, Indramayu, with specific participants selected for trials during the development process. The research utilized the 4D development model—Define, Design, Develop, and Disseminate—as outlined by Thiagarajan et al. (1974). The Define phase involved identifying the specific needs and characteristics of the target community, while the Design phase focused on creating a user-friendly digital flipbook that would effectively showcase various processed

mango products. The Develop phase entailed the actual production of the flipbook, incorporating feedback from participants to ensure that it met their expectations and provided valuable information on product preparation and marketing strategies. The final Disseminate phase aimed to distribute the digital flipbook widely within the community, ensuring that small business owners could access and utilize the resource to enhance their marketing efforts and promote local mango products effectively.

In this research, the tools employed were questionnaires, which comprised various types: Validation Questionnaires: These were given to media specialists, content experts, and language professionals to evaluate the practicality of the created product. User Feasibility Questionnaires: These were circulated among community members as users to assess the appropriateness of the media during the testing stages. Community Response Questionnaires: These were designed to collect feedback from the community throughout the trial phase.

The validation tools included various important elements such as Material Relevance, which checks how relevant the materials are to the topic; material accuracy, which verifies the correctness of the provided information; Support for Learning, which assesses how effectively the materials assist in the learning process; and Evaluation Relevance, which evaluates how well the materials can be judged based on learning results. The requirements for the media Feasibility Validation Instrument as described in the publication by Pendidikan & Perbukuan in 2014 included important features like the book cover design, which is crucial for attracting readers; the book content design, which should be interesting and informative; the user-friendliness, which refers to how easy the materials are to use for the target audience; and the level of support offered, which includes extra resources and assistance available to learners. The Language Feasibility Validation Instrument specifications, also presented by Pendidikan & Perbukuan in 2014, included vital criteria such as the clarity of language used, which makes sure that readers can easily understand the intended message; the inclusion of interactive dialogues, which promote engagement and participation; the appropriateness of language for the audience's developmental level, ensuring it is not too simple or too complex; and the coherence of the material, which concerns how well the ideas connect and flow throughout the text. Moreover, the specifications for the One-to-One, Small Group, and Field Test Instruments discussed by Putri & Rinawati in 2018 incorporate important aspects like Media Characteristics, which assess the visual and functional qualities of the media; Content, which evaluates the relevance and educational worth of the material; and Audio and Visual elements, which look into the effectiveness of sensory components in enhancing learning experiences and outcomes. Additionally, the advantages gained from these tools are significant, as they enhance the overall effectiveness and quality of educational materials. Finally, the specifications for the Community Response Instruments, studied by Lijana et al. in 2020, emphasize crucial aspects like Interest, which measures the level of engagement and curiosity among the audience; and Satisfaction, which evaluates the overall happiness of the community with the materials being assessed. These tools not only offer valuable feedback for educators and content creators but also create a collaborative environment where community needs can be more effectively addressed.

Data were analyzed using descriptive statistics to calculate percentages of feasibility and community responses. The initial step in analyzing the data for the development of the flipbook media on the production of various processed products made from Indramayu mangoes involves calculating the total score obtained from each expert, dividing it by the maximum score, and multiplying by one hundred to determine the percentage of the feasibility test score from each expert. The following formula, adapted from Arikunto (2010), is used to calculate the percentage score:

$$Feasibility\ Percentage = \frac{total\ score}{maximum\ score} x100\%$$

Explanation:

Total Score: The total score obtained from respondents.

Maximum Score: The highest possible score on the questionnaire.

Following this, the feasibility percentage is transformed into descriptive statements to assess the appropriateness of the media. The table below presents the criteria for feasibility percentages, as suggested by Arikunto (2010). The criteria classify the feasibility percentages into ranges that signify whether the media is regarded as very highly feasible (81-100%), feasible (61-80%), less feasible (41-60%), or not feasible (21-40%), and very unfeasible (<21%), thus offering a clear framework for evaluation and decision-making.

The subsequent phase entails computing scores derived from the community response survey to evaluate the extent of media effectiveness. These percentage scores are subsequently transformed into descriptive statements to gauge the degree of community response success. The criteria for score interpretation, adapted from Riduwan (2022) as referenced in Faryanti & Panjaitan (2016) are very weak (0%–20%), weak (21%–40%), moderate (41%–60%), strong (61%–80%), and very strong (81%–100%). After the percentage scores have been converted, the following phase is to classify the community responses by aligning the percentage scores with positive criteria. The table beneath highlights the standards for the levels of community response achievement: very positive (85% ≤ Interval), positive (70% ≤ Interval < 85%), moderately positive (50% ≤ Interval < 70%), and no positive (Interval < 50%).This classification allows for a clearer understanding of how effectively the community has engaged with and responded to various initiatives, providing valuable insights for future planning and intervention strategies (Table 1)

Table 1. Criteria for Feasibility, Score Interpretation, and Community Response Levels

Feasibility Test Score		Score Interpretation		Levels Of Community Response Achievement	
Score	Criteria	Score	Criteria	Score	Criteria
81-100%	highly feasible	81%–100%	very strong	85% ≤ Interval	very positive
61-80%	feasible	61%–80%	strong	70% ≤ Interval < 85%	positive

41-60%	less feasible	41%–60%	moderate	50% ≤ Interval < 70%	moderately positive
21-40%	not feasible	21%–40%	weak	no positive	Interval < 50%
< 21%	very unfeasible	0%–20%	very weak		

RESULTS AND DISCUSSION

The respondents in this study consisted of community members and SMEs (Small and Medium Enterprises) in Bulak Village, Jatibarang, Indramayu.

Define Phase

This phase aimed to identify the needs required in the learning process. It consisted of five steps:

1. **Initial Analysis**

Interviews with subject matter experts and online surveys revealed that the community in Bulak Village, Jatibarang, had already produced mango-based products such as chips, jam, and dodol (traditional chewy sweets). However, issues were identified, such as limited product variation, simple packaging, limited marketing knowledge, and lack of promotion. More innovative, high-quality, and attractive product development as local specialties was needed.

2. **Learner Analysis**

An analysis of the community's background knowledge and skills in processing mango-based products revealed that most had experience but predominantly used traditional methods for processing and packaging.

3. **Task Analysis**

Key skills needed for enhancing product quality and variety were identified, including brainstorming new product ideas, testing production processes, and developing packaging and marketing designs.

4. **Concept Analysis**

The developed product concepts focused on creative and efficient innovations. The main objective was to empower the community of Bulak Village, Jatibarang, to process mangoes into high-quality products capable of competing in local and national markets.

5. **Specifying Instructional Objectives**

Based on task analysis, concepts, and learning objectives, the media's goal was for learners to organize and structure the principles of product development steps. The learning indicator was the ability to accommodate the scope of production and presentation.

Design Phase

After identifying the problems, the next phase was the design stage, consisting of:

1. **Constructing Criterion-Referenced Tests**

This step bridged the Define and Design phases, creating grids to guide flipbook media development.

2. **Media Selection**

Digital flipbooks were chosen for their flexible access via phones, tablets, or laptops, interactivity (text, images, audio, video), and comprehensive material delivery without time constraints.

3. **Format Selection**

Links and barcodes were selected for ease of access. Users could scan barcodes or click links to access the flipbook online.

4. **Initial Design**

The initial design involved creating an outline of media content, material breakdowns, and storyboards based on community needs and literature studies for further development.

Develop Phase

At this stage, the conceptualized product (media outline, material breakdown, and storyboard) was realized into the flipbook media.

1. **Material Development**

The content was tailored to community needs, including mango-related information, local culinary business insights, product variations, and packaging and labeling information.

2. **Media Planning and Creation**

Recipes and trials for bakery, pastry, traditional cakes, and preserved mango-based products were conducted. Visual documentation and relevant animations or images were incorporated.

3. **Design and Editing**

The flipbook design involved determining dimensions, fonts, spacing, and margins. Editing tools such as Canva and were used.

4. **Conversion and Export**

After finalizing the design, the flipbook was converted into PDF format, uploaded to , and exported as HTML or barcode for easy community access.

5. **Expert Validation**

Subject matter, language, and media experts validated the flipbook to ensure its feasibility. Feedback was used for improvement before trials.

Development Testing

Testing was conducted in three stages:

- **One-to-One Testing:** Three individuals tested the media, providing comments and suggestions.
- **Small Group Testing:** Seven individuals assessed the usability and benefits.
- **Field Testing:** Thirty individuals evaluated the feasibility, with results showing the media was ready for use.

Disseminate Phase

Following validation and trials, the flipbook was disseminated via HTML links and barcodes accessible online. The feasibility analysis of the developed digital flipbook was conducted through expert validation and community trials. The results demonstrated a high level of feasibility across multiple aspects (table 1)

Table 2. Summary of Feasibility Test Scores and Community Response Levels for the Digital Flipbook

Aspects	feasibility test score	the criteria for feasibility percentages	criteria for score interpretation	levels of community response achievement
1. Material Feasibility	94	highly feasible	very strong	very positive
2. Language Feasibility	90	highly feasible	very strong	very positive
3. Media Feasibility	93	highly feasible	very strong	very positive
4. Community Trials				
One-to-One Testing	92	highly feasible	very strong	very positive
Small Group Testing	91	highly feasible	very strong	very positive
Field Testing	93	highly feasible	very strong	very positive

1. **Material Feasibility**

Validation by subject matter experts yielded a score of 94%, indicating that the material was comprehensive, accurate, and well-structured. The flipbook content effectively aligned with the intended learning objectives, providing users with clear and relevant information. This aligns with Thiagarajan et al. (1974), who emphasize the importance of content alignment with learning goals in instructional design.

2. **Language Feasibility**

Language validation by experts resulted in a score of 90%, categorizing the language usage as highly feasible. The content was presented in a clear, concise, and engaging manner, suitable for the target audience. This finding supports the recommendations of Susilana and Riyana (2008), who note that language clarity enhances comprehension and learning outcomes.

3. **Media Feasibility**

Media experts rated the flipbook at 93% for its design and interactivity. The flipbook incorporated user-friendly navigation, high-quality visuals, and interactive features such as hyperlinks and multimedia content, enhancing its accessibility and engagement. These results are consistent with Newby et al. (2011), who highlight that well-designed media improve usability and learner engagement.

4. **Community Trials**

- **One-to-One Testing**: Conducted with three participants, this phase resulted in a score of 92%, highlighting the practicality and relevance of the flipbook.
- **Small Group Testing**: Seven participants evaluated the flipbook, providing a score of 91%, indicating its effectiveness in small-scale implementations.

- **Field Testing**: Involving 30 participants, the field test achieved a score of 93%, confirming the flipbook's usability and impact in real-world settings.

These community trial outcomes align with Ridwan (2022), who states that iterative testing phases improve product feasibility by addressing user feedback. Additionally, the findings are supported by Richey and Klein (2014), who advocate for robust field evaluations to ensure practical effectiveness.

The overall results affirm the digital flipbook's feasibility, with scores consistently falling in the "Highly Feasible" category across all validation and trial phases. These findings underscore the flipbook's potential as an effective educational tool for enhancing community entrepreneurial skills, particularly in the context of processing Indramayu mangoes into value-added products.

CONCLUSION

The flipbook media for producing various processed products made from Indramayu mango was developed using the Research and Development (R&D) method with the 4D development model (Define, Design, Develop, Disseminate). This flipbook underwent a validation process conducted by subject matter experts, language experts, and media experts, yielding highly satisfactory results. Validation scores were 95% from subject matter experts, 87.5% from language experts, and 95% from media experts, all categorized as highly feasible. These findings indicate that the flipbook meets the feasibility standards. Following validation, the media was tested with the community, achieving excellent results. The one-to-one test scored 95%, the small group test scored 90%, and the field test scored 94%. Additionally, community response data showed a satisfaction and interest rate of 94%, reflecting high levels of interest and satisfaction with the use of the flipbook for producing various processed products made from Indramayu mango.

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