

## A Design-Based Research on a Fusion Food Textbook to Foster Creativity and Practical Skills in Culinary Learning

Lucia Tri Pangesthi<sup>1</sup>, Mauren Gita Miranti<sup>2\*</sup>, Annisa Nur Aini<sup>3</sup>, Sri Handajani<sup>4</sup>,  
Febri Lukitasari<sup>5</sup>, Isa Ansori<sup>6</sup>, Nurul Farikhatir Rizkiyah<sup>7</sup>

Program Studi S1 Pendidikan Tata Boga, Universitas Negeri Surabaya

**Corresponding Author:** Mauren Gita Miranti [maurenmiranti@unesa.ac.id](mailto:maurenmiranti@unesa.ac.id)

### ARTICLE INFO

*Keywords:* Culinary Education, Design-Based Research, Fusion Food, Practical Skills, Student Creativity

*Received :* 10 October 2025

*Revised :* 17 November 2025

*Accepted:* 21 December 2025

©2025 Pangesthi, Miranti, Aini, Handajani, Lukitasari, Ansori, Rizkiyah: This is an open-access article distributed under the terms of the [Creative Commons Attribution 4.0 International](https://creativecommons.org/licenses/by/4.0/).



### ABSTRACT

The development of the global culinary industry demands that culinary education graduates have high creativity, practical skills, and adaptability. One learning approach relevant to these demands is fusion food, which integrates various culinary techniques, ingredients, and cultures. This study aims to develop and pilot a Fusion Food textbook based on Design-Based Research (DBR) to foster students' creativity and practical skills in culinary learning. This study uses a DBR approach that includes the stages of needs analysis, design, implementation, evaluation, and iterative refinement. The research subjects involved students and lecturers in the Fusion Food course. The quality of the textbook was validated by three experts based on aspects of content relevance, pedagogical coherence, theory-practice integration, and ease of use. Research data were collected through expert validation sheets, creativity and practical skills assessment rubrics, user perception questionnaires, and observations and reflections during the learning process. Data analysis was conducted using descriptive quantitative and qualitative methods. The results show that the Fusion Food textbook has a very high level of validity and is suitable for use as a learning resource. The implementation of the textbook can enhance students' creativity in the aspects of originality, transcription, elaboration, and innovation, as well as strengthen practical skills, particularly in technical accuracy and hygiene. This study concludes that the DBR-based Fusion Food textbook is effective in supporting creative, applicable, and professional practice-focused culinary learning. These findings contribute to the development of innovative culinary learning resources relevant to the needs of 21st-century culinary education.

## **INTRODUCTION**

The rapid development of the global culinary industry has been characterized by increasing product innovation, cross-cultural exploration, and heightened demands for creativity and professional competence. One of the most prominent trends is fusion food, which integrates techniques, ingredients, flavours, and culinary philosophies from diverse cultural traditions into innovative culinary products (Kumar, V., & Kulshrestha, R., 2025). This trend reflects not only industry needs but also a growing expectation that culinary education institutions prepare graduates who are creative, adaptive, and capable of responding to complex culinary challenges.

In higher vocational and culinary teacher education, the Fusion Food course plays a strategic role in fostering advanced culinary competencies (Maharani et al., 2024). Unlike conventional culinary courses that emphasize technical mastery and recipe replication, fusion food learning requires students to engage in creative thinking, analytical reasoning, experimentation, and problem-solving. Students are expected to synthesize culinary knowledge from multiple cultures and translate it into innovative and contextually relevant products. Consequently, effective fusion food instruction requires learning resources that systematically support creativity development while strengthening practical culinary skills.

Despite the importance of fusion food in contemporary culinary education, the availability of dedicated and pedagogically grounded textbooks remains limited. In many higher education contexts, instructors rely on fragmented teaching materials, including non-standardized modules, online resources, or industry-oriented references that are not fully aligned with learning outcomes. Such conditions may lead to inconsistent instructional practices and limit opportunities for students to develop creativity and practical competence in a structured manner. Moreover, most existing culinary textbooks focus primarily on recipes and basic techniques, offering limited pedagogical support for creative exploration, reflection, and innovation-oriented learning processes.

Creativity is widely recognized as a core competence in twenty-first-century education (Mahanarani et al., 2024), particularly in applied fields such as culinary arts (Miranti, M. G., & Wilujeng, B. Y., 2018). Culinary students are increasingly expected not only to execute established recipes but also to design original products with aesthetic, sensory, and cultural value. Fusion food learning provides a unique pedagogical context for cultivating creativity, as it encourages experimentation, cultural integration, and the development of distinctive culinary identities. However, without well-designed instructional resources, fusion food learning often becomes outcome-oriented, prioritizing final products over students' creative processes and reflective engagement.

In addition to creativity, practical skills are fundamental to culinary education (Santoso et al., 2024 and Anumudu et al., 2025). These skills encompass technical accuracy, procedural compliance, time management (Santoso et al., 2024), hygiene and sanitation, and professional food presentation (Anumudu et al., 2025). Effective practical learning requires clear, structured, and contextually relevant guidance that bridges theoretical understanding and hands-on

application (Jimenez, B., Root, J., Shurr, J., & Bouck, E. C., 2021). A well-designed textbook can function as a mediating tool by integrating conceptual explanations, visual representations, systematic procedures, and authentic practice tasks aligned with industry expectations. Nevertheless, such integrative textbooks are still scarce in the context of fusion food education.

Addressing these challenges requires the development of a fusion food textbook grounded in a robust theoretical and methodological framework. Design-Based Research (DBR) offers a relevant approach, as it emphasizes the iterative design, implementation, evaluation, and refinement of educational products in real learning contexts. DBR enables researchers to produce learning resources that are both theoretically informed and empirically validated, while remaining responsive to the needs of instructors and learners. Through DBR, textbook development becomes a collaborative and adaptive process involving researchers, lecturers, and students.

The iterative nature of DBR allows continuous improvement of the textbook design based on classroom implementation and user feedback (Mohammad Naser, K., & Harb, E. S., 2025). As a result, the textbook functions not merely as a static repository of culinary knowledge but as a dynamic pedagogical tool that supports creative learning and skill development. This approach is particularly relevant for fusion food education, where learning outcomes depend heavily on students' ability to experiment, reflect, and apply knowledge creatively in practical settings (Van den Berg, C., & Bozalek, V., 2024).

Previous studies in culinary education have demonstrated that well-structured learning resources can enhance student engagement, creativity, and practical performance. Research has also highlighted the effectiveness of instructional models such as Project-Based Learning, Problem-Based Learning, and authentic practice-based learning in promoting higher-order thinking and innovation in culinary contexts. However, existing studies on culinary teaching materials predominantly focus on practice modules, recipe collections, or digital media, often lacking comprehensive pedagogical integration.

Furthermore, most instructional material development studies in culinary education employ conventional Research and Development approaches, which typically offer limited iterative evaluation within authentic classroom settings. Empirical research that applies DBR to develop culinary textbooks – particularly those targeting fusion food learning – is still limited. Consequently, there is a need for research that systematically integrates creativity and practical skills within a pedagogically grounded textbook design and evaluates its effectiveness through iterative classroom implementation.

The novelty of this study lies in the development of a fusion food textbook using a Design-Based Research approach that explicitly integrates creativity and practical skills as core learning outcomes. The textbook is designed to include exploratory learning activities, open-ended practical tasks, culinary case studies, and guided reflection components that encourage students to generate innovative culinary ideas. By embedding these pedagogical elements, the textbook aims to facilitate not only knowledge acquisition but also creative transformation and professional skill development.

Therefore, this study, entitled “A Design-Based Research on a Fusion Food Textbook to Foster Creativity and Practical Skills in Culinary Learning,” addresses a critical gap in culinary education research. The study is expected to contribute theoretically by enriching the literature on DBR-based instructional material development in culinary education, and practically by providing an empirically validated textbook that supports creative and skill-oriented fusion food learning in higher education.

## **LITERATURE REVIEW**

The global culinary industry has undergone rapid transformation, marked by increasing innovation, cross-cultural integration, and heightened demands for creativity and professional competence. One significant manifestation of this transformation is fusion food, which combines ingredients, techniques, flavors, and culinary philosophies from diverse cultural traditions into innovative products (Kumar & Kulshrestha, 2025). This trend has directly influenced culinary education, particularly in higher education, where institutions are expected to prepare graduates who are creative, adaptive, and capable of responding to complex, real-world culinary challenges. Consequently, fusion food courses have become strategically important, as they move beyond technical skill acquisition and emphasize creative thinking, experimentation, and cultural synthesis (Maharani et al., 2024).

Creativity and practical skills are widely recognized as core competencies in contemporary culinary education. Creativity enables students to design original culinary products with aesthetic, sensory, and cultural value, while practical skills ensure technical accuracy, hygiene, time management, and professional presentation (Miranti & Wilujeng, 2018; Santoso et al., 2024; Anumudu et al., 2025). Fusion food learning provides an ideal pedagogical context for fostering these competencies, as it encourages experimentation and reflective practice. However, existing learning resources in fusion food education remain limited and fragmented, often relying on non-standardized materials or recipe-oriented textbooks that lack pedagogical support for creative exploration and theory–practice integration. As a result, learning tends to focus on final products rather than students’ creative processes and skill development.

To address these limitations, the development of pedagogically grounded instructional materials is essential, and Design-Based Research (DBR) offers a suitable framework for this purpose. DBR emphasizes iterative cycles of design, implementation, evaluation, and refinement within authentic learning contexts, ensuring that educational products are both theoretically informed and empirically validated (Mohammad Naser & Harb, 2025). Previous studies have shown that well-structured learning resources and practice-based instructional models can enhance student engagement, creativity, and performance, yet the application of DBR in developing culinary textbooks—particularly for fusion food learning—remains scarce. Therefore, integrating DBR into fusion food textbook development represents a significant contribution, as it enables the creation of adaptive, creativity-oriented, and skill-focused learning resources aligned with the demands of twenty-first-century culinary education.

## METHODOLOGY

This study employed a Design-Based Research (DBR) approach to develop, implement, and refine a Fusion Food textbook aimed at fostering students' creativity and practical skills in culinary learning. DBR was selected because it allows iterative cycles of analysis, design, implementation, evaluation, and revision in authentic educational settings, ensuring that the developed textbook is both theoretically grounded and empirically effective (Van den Berg, C., & Bozalek, V., 2024). The research was conducted through multiple design iterations, beginning with a needs analysis, followed by prototype development, classroom implementation, formative evaluation, and refinement based on empirical findings and user feedback.

The research subjects consisted of undergraduate students enrolled in the Fusion Food course in a culinary education program at a higher education institution, as well as lecturers responsible for teaching the course. Students participated as users of the developed textbook during classroom and practical sessions, while lecturers contributed as expert practitioners providing pedagogical and content-related feedback. The selection of participants was based on purposive sampling to ensure relevance to the research objectives and alignment with the authentic context of fusion food learning. Overall, the research methods can be seen in the following table:

Table 1. Research Design and Data Analysis

Construct	Indicators	Instrument	Data Collection	Data Analysis
Textbook Quality	Content relevance, pedagogical coherence, theory–practice integration, usability	Expert validation sheets, questionnaires	Expert review	Descriptive statistics (mean, percentage)
Student Creativity	Originality, flexibility, elaboration, innovation	Creativity assessment rubric	Performance and product assessment	Descriptive quantitative analysis
Practical Skills	Technical accuracy, procedures, hygiene, presentation	Observation checklist, performance rubric	Direct observation, performance assessment	Descriptive quantitative analysis
User Perceptions	Clarity, usefulness, learning support	Student and lecturer questionnaires	Survey administration	Descriptive analysis
DBR Process	Strengths, challenges, refinement needs	Observation notes, reflections	Observation, documentation	Thematic analysis

The research indicators focused on three main aspects: the quality of the developed textbook, students' creativity, and students' practical skills. Textbook quality indicators included content relevance, pedagogical coherence, clarity of instructions, integration of theory and practice, and usability. Creativity indicators encompassed originality of ideas, flexibility in combining culinary elements, elaboration of concepts, and the ability to produce innovative fusion food products. Practical skill indicators included technical accuracy, procedural compliance, time management, hygiene and sanitation, and professional food presentation.

Data were collected using multiple instruments to ensure methodological rigor. Instruments included expert validation sheets to assess content and pedagogical validity of the textbook, observation checklists to evaluate students' practical skills during learning activities, creativity assessment rubrics to measure students' creative performance in fusion food projects, questionnaires to capture students' and lecturers' perceptions of textbook practicality and usability, and documentation of learning artifacts such as student products and reflective notes.

The data collection techniques involved expert judgment, classroom observation, performance assessment, survey administration, and document analysis conducted across each DBR iteration. Data were gathered during the implementation of the textbook in both theoretical and practical learning sessions, allowing continuous monitoring of its effectiveness and areas for improvement.

Data analysis was conducted using a mixed-methods approach. Quantitative data from validation sheets, observation checklists, and questionnaires were analyzed descriptively using percentage scores and mean values to determine the validity, practicality, and effectiveness of the textbook. Qualitative data obtained from observations, open-ended questionnaire responses, and reflective documentation were analyzed thematically to identify patterns related to students' creativity development, practical skill acquisition, and instructional challenges. Findings from both quantitative and qualitative analyses were integrated to inform iterative revisions of the textbook and to draw conclusions regarding its contribution to fostering creativity and practical skills in culinary learning.

## RESEARCH RESULT

### 1. Textbook Quality

The quality assessment of the Fusion Food textbook was conducted by three expert validators: a culinary subject matter expert, a learning expert, and a media/teaching materials expert, using a validation sheet with a scale of 1–4. The assessment included four sub-indicators: content relevance, pedagogical coherence, theory-practice integration, and ease of use. The following are the results of the textbook assessment by the judgment experts.

Table 2. Textbook Quality of Fusion Book

Sub-Indicators	V1	V2	V3	Average	Percentage (%)	Category
Content relevance	3,75	3,5	3,75	3,67	91,75%	Very Valid
Pedagogical coherence	3,5	3,5	3,75	3,58	89,50%	Very Valid
Theory-practice integration	3,75	3,75	3,5	3,67	91,75%	Very Valid
Usability	3,5	3,75	3,5	3,58	89,50%	Very Valid

Validation results by three expert validators indicate that the Fusion Food textbook is highly valid, with an average score of 90.63%. This finding indicates

that the textbook meets the academic and pedagogical standards for use in Fusion Food instruction in higher education.

In the content relevance sub-indicator, the textbook achieved the highest score, with a very valid rating. The validators assessed that the material presented is relevant to the course learning outcomes, global culinary trends, and industry needs. The integration of fusion food concepts with local culinary contexts was deemed to enrich students' insights and enhance the relevance of the learning. The pedagogical coherence sub-indicator also fell into the very valid category. The material presentation structure was deemed coherent and consistent, starting with learning objectives and concept presentation, practical activities, and reflection. This coherence demonstrates that the textbook is designed not only to focus on content but also on a learning flow that supports the gradual construction of students' knowledge and skills.

In the theory-practice integration sub-indicator, the validators assessed that the textbook is able to clearly and effectively connect theoretical concepts with practical applications. The presentation of work steps, practical illustrations, and exploratory assignments were deemed effective in helping students understand the relationship between theory and implementation in the practical kitchen. Meanwhile, the usability sub-indicator demonstrated that the textbook was easy to use for both lecturers and students. The communicative language, clear layout, and comprehensive practice guides supported ease of use in learning. However, several validators recommended minor improvements to the visual aspects and the addition of case examples to enhance user experience.

Overall, the research results on the Textbook Quality indicator indicate that the Fusion Food textbook is suitable and highly recommended for use as a primary learning resource. This high validity provides a strong foundation for implementing the textbook in learning and testing its effectiveness on student creativity and practical skills.

## **2. Student Creativity**

Student creativity is the ability of students to produce original, valuable, and contextual ideas and products through flexible and reflective thinking processes (B. Hendrik et al., 2022). In culinary education, creativity encompasses aspects of originality, flexibility, elaboration, and innovation, which are reflected in students' ability to independently develop and modify culinary concepts. In line with this, Tiwari et al. (2026) explain that fusion food learning is a strategic means to foster creativity because it requires the integration of various culinary techniques, ingredients, and cultures. Student creativity can be developed systematically through contextual learning design and teaching materials (Miranti, M. G., & Wilujeng, B. Y., 2018), exploratory, and supported by open-ended practical assignments and reflections, thus not only improving the quality of learning products but also equipping students with innovative competencies relevant to the demands of the modern culinary industry. The following are the results of student creativity after using the developed book:

Table 3. Student Creativity

Sub-Indicator	Average	Percentage of Achievement (%)	Category
Originality	3,4	85,00%	Very good
Flexibility	3,32	83,00%	Good
Elaboration	3,45	86,25%	Very good
Innovation	3,28	82,00%	Good

The research results show that student creativity in Fusion Food learning is in the very good category, indicating that the developed textbook can effectively support students' creative thinking processes. This finding aligns with Maharani et al. (2024), who emphasized that creativity in vocational and culinary education does not emerge spontaneously, but is instead influenced by instructional design and the availability of learning resources that provide space for exploration and reflection.

In the originality sub-indicator, students' high achievement demonstrates their ability to generate unique fusion food product ideas and go beyond simply replicating existing recipes. Creativity literature emphasizes that originality is a core dimension of creativity, developing when students are given the freedom to explore ideas and combine knowledge across domains (Kakarla, U., 2024 and Rebecchi et al., 2024). The developed textbook provides open-ended assignments and cross-cultural culinary case studies, encouraging students to develop ideas based on their own interpretations and experiences.

The flexibility sub-indicator demonstrates good achievement, reflecting students' ability to adapt techniques, materials, and concepts when faced with limitations or practical challenges. Flexibility is a crucial aspect of creativity because it relates to the ability to shift perspectives and generate alternative solutions (B. Hendrik et al., 2022 and Lazovsky, G. S., Raz, T., & Kenett, Y. N., 2024). In the context of culinary learning, flexibility is highly relevant to the dynamics of the kitchen and the frequently changing demands of the industry. These findings indicate that the textbook facilitated creative adaptation, although further reinforcement is needed to ensure students are more consistent in exploring various possible solutions.

In the elaboration sub-indicator, students demonstrated the highest achievement. This indicates their ability to develop initial ideas into more detailed and mature product concepts. This finding aligns with Chang, H.-F., & Li, T. (2025), who emphasized that elaboration reflects the depth of the creative thinking process, where ideas do not stop at the initial idea but develop through planning, testing, and refinement. Textbooks designed with product planning stages, reflection guides, and self-evaluation have proven effective in helping students elaborate ideas systematically.

Meanwhile, the innovation sub-indicator was in the good category, indicating that students were able to produce innovative fusion food products, although the level of novelty varied. B. Hendrik et al. (2022) explained that innovation is an advanced form of creativity that requires the courage to take risks and step outside of one's comfort zone. In the context of learning, innovation

often requires the support of a psychologically safe learning environment so that students dare to experiment and accept the possibility of failure. Therefore, these findings indicate the need to strengthen more challenging and experimental learning activities to increase students' innovative courage.

Overall, the findings of this study support the view that student creativity can be systematically developed through appropriate teaching material design. The Design-Based Research-based Fusion Food textbook serves as a pedagogical scaffold that facilitates the development of creativity from the initial idea stage to product innovation. This aligns with international studies that emphasize the importance of integrating learning structure and freedom of exploration in fostering creativity in vocational higher education (Kakarla, U., 2024). Thus, this discussion confirms that the development of student creativity in culinary education depends not only on individual abilities but also on the quality of textbook design and the learning strategies used. The DBR approach allows for continuous improvement of textbooks to increasingly stimulate students' originality, flexibility, elaboration, and innovation in a balanced manner.

### **3. Practical Skills**

Students' practical skills in culinary studies can be comprehensively evaluated through indicators such as technical accuracy, procedures (Santoso et al., 2024), hygiene, and presentation (Anumudu et al., 2025). These four indicators complement each other to describe students' complete practical competency, from technical precision to the quality of the final product. Technical accuracy refers to students' ability to apply practical techniques correctly, precisely, and consistently according to the standards of their field of expertise. Students with good technical accuracy demonstrate mastery of motor skills, conceptual understanding, and adequate practical experience. Procedures assess the extent to which students can systematically follow the work sequence and stages of practice (Jimenez, B., Root, J., Shurr, J., & Bouck, E. C., 2021). This indicator is crucial for ensuring efficiency, work safety, and quality results. According to Diamond, F., & Bulfin, S. (2025), adherence to procedures reflects students' structured thinking skills and professionalism in their work. Hygiene is a crucial indicator in practice, especially in the culinary and food service fields. This is in line with Marklinder, I., Wersén, V., & James, K. (2025) who explained that students who apply hygiene well demonstrate awareness of health standards, consumer safety, and professional ethics. Presentation assesses students' ability to present practical results aesthetically, neatly, and attractively according to a professional context. Presentations reflect not only creativity but also students' understanding of industry standards and user satisfaction. The following is an assessment of students' practical work after using the developed book:

Table 5. Student Practical Skill Results

Sub-Indicator	Average	Percentage Achievement (%)	of	Category
Technical Accuracy	3,42	85,50%		Very good
Procedures	3,35	83,75%		Good
Hygiene	3,55	88,75%		Very good
Presentation	3,28	82,00%		Good

The results of the study indicate that students' practical skills are in the very good category, reflecting the effectiveness of Fusion Food learning supported by a Design-Based Research-based textbook. This finding is in line with Woodhouse, A., & Rodgers, L., (2024) who emphasized that modern culinary education must emphasize mastery of authentic practical skills relevant to industry standards, not just mastery of theory or recipe reproduction. High achievement in the technical accuracy sub-indicator indicates that students can apply food processing techniques appropriately and consistently. This indicates that the textbook structure containing systematic work steps, technical illustrations, and conceptual explanations can bridge the gap between theory and practice. Previous studies have confirmed that clear and contextualized practice guides significantly contribute to improving technical accuracy and student confidence in a learning kitchen environment (Yan, W., Lowell, V. L., & Yang, L., (2024).

In the procedures sub-indicator, achievement was in the good category, indicating that students were able to follow the general workflow and practice procedures, although consistency and efficiency varied. This finding aligns with Jimenez, B., Root, J., Shurr, J., & Bouck, E. C., (2021), who stated that procedural skills require repeated practice and authentic practice experiences for students to optimally manage time, work sequence, and coordinate activities. In this context, textbooks serve as scaffolding tools to support students in the initial stages, but reinforcement through ongoing practice is still necessary.

The hygiene sub-indicator achieved the highest achievement, indicating that students have a good awareness of sanitation and food safety principles. This finding is consistent with Marklinder, I., Wersén, V., & James, K. (2025) emphasized that hygiene practices are a core competency in culinary and hospitality education and must be explicitly instilled through industry-standards-based learning. Consistent integration of hygiene aspects into textbooks has been shown to help students develop professional work habits that align with the demands of the workplace.

Meanwhile, the presentation sub-indicator was in the good category, indicating that students were able to present products with a neat and marketable appearance, but the level of aesthetics and visual creativity varied. This aligns with the view that presentation skills are not solely technical but also related to aesthetic sensitivity and visual experience that develop over time and exposure to various product samples (Liu, M., Chen, Z., Huang, J., & Wan, X., 2025). Therefore, fusion food learning needs to continue encouraging visual exploration and reflection on aesthetic aspects as part of professional competency.

Overall, these results strengthen the argument that culinary learning supported by pedagogically and contextually designed textbooks can comprehensively enhance students' practical skills. These findings support the literature stating that design-based approaches and authentic practices are effective in developing vocational competencies for the 21st century. 21st century, particularly in the culinary field, which demands technical precision, procedural discipline, and high professional standards (Reeves et al., 2011; OECD, 2018). Thus, the Fusion Food textbook serves not only as a learning resource but also as a strategic pedagogical instrument in preparing graduates to face the demands of the global culinary industry.

#### 4. User Perceptions

This perception is generally measured through several key indicators, including Clarity, Usefulness, and Learning Support (Weidlich, J., Fink, A., Frey, A. et al., 2025). Clarity refers to the extent to which users perceive a learning system or media as easy to understand and unambiguous. This indicator reflects the quality of information presentation and interface design. A high level of clarity helps users understand what to do and what to expect, thereby reducing cognitive load and increasing focus on the learning process. Usefulness indicates users' perceptions of the value and practical benefits of the learning system or media used. This indicator is closely related to relevance and actual usefulness for users. Learning support assesses the extent to which the system or media can support the user's learning process actively and sustainably. This indicator emphasizes the media's role as a learning facilitator. The following are the results of the User Perceptions assessment:

Table 6. User Perceptions of the Developed Book

Sub-Indicator	Average	Percentage of Achievement (%)	Category
Clarity	3,48	87,00%	Very good
Usefulness	3,52	88,00%	Very good
Learning Support	3,4	85,00%	Very good

The results of the study indicate that user perceptions of the Fusion Food textbook are in the very good category, indicating a high level of user acceptance and satisfaction. This finding supports the argument that the quality of teaching materials is determined not only by the completeness of the content, but also by the clarity of presentation, practical usefulness, and support for the learning process (Tambunan, A. N. K., et al., 2025).

High achievement in the clarity sub-indicator indicates that the material presentation structure, communicative language use, and visual integration in the textbook contribute significantly to user ease of understanding. Yoto, et al., (2024) explain that clarity of teaching materials is a primary prerequisite for meaningful learning, particularly in vocational education, which demands simultaneous procedural and conceptual understanding. Clear presentation of material helps reduce students' cognitive load, allowing them to focus on

mastering practical skills. In the usefulness sub-indicator, the textbook was deemed very useful in supporting Fusion Food learning, particularly in connecting theory with culinary practice. These findings align with those of Tambunan, A. N. K., et al., (2025), who demonstrated that perceived usefulness of teaching materials is positively correlated with student learning engagement and motivation. In the context of culinary education, teaching materials that are applicable and relevant to industry needs have strategic value because they help students understand the real-world context in which the competencies, they are learning are applied.

The learning support sub-indicator indicates that the textbook plays an effective role as a learning support tool, both for independent and guided learning. Features such as learning objectives, practice guides, reflective assignments, and evaluations are considered to help students organize their learning process in a more structured manner. According to Al Mamun, M. A., & Lawrie, G. (2024), teaching materials are important as learning scaffolds that facilitate student self-regulation and active learning. In a Design-Based Research approach, this type of learning support is a crucial indicator of the functionality of the learning design in real-world contexts.

Overall, positive user perceptions of the Fusion Food textbook indicate that the product developed is not only academically sound but also pedagogically and practically effective. These findings reinforce the view that developing design-based teaching materials and user feedback can produce learning resources that are contextual, relevant, and oriented towards student learning experiences (Al Mamun, M. A., & Lawrie, G. 2024; Yoto, et al., 2024; and Tambunan, A. N. K., et al., 2025). Thus, this textbook has the potential to become a strategic reference in modern culinary learning that demands clarity, usefulness, and optimal learning support.

## 5. DBR Process

The Design-Based Research (DBR) process evaluation was conducted through observation, documentation, and reflection throughout the design, implementation, evaluation, and refinement cycles of the Fusion Food textbook. The analysis focused on three main sub-indicators: design strengths, implementation challenges, and improvement needs. The following are the results of the DBR Process for the developed textbook:

Table 7. DBR Prosess Review

Sub-Indicators	Key Findings
Strengths	The textbook features a systematic learning structure, strong theory-practice integration, and exploratory activities that encourage students' creativity and practical skills. Collaboration between researchers and lecturers allows for the content to be adapted to real-life learning contexts.
Challenges	Limited practice time, varying student initial abilities, and the need for lecturers to adapt to an exploration-based learning approach were key challenges in the initial implementation of the textbook.

Refinement Needs	Simplification of several practical activities, the addition of fusion food case examples based on local contexts and strengthening of reflection guidelines to help students evaluate their creative and practical processes more deeply.
------------------	--

The research results show that the application of Design-Based Research (DBR) in the development of the Fusion Food textbook contributed significantly to the quality of the design and the feasibility of the learning. The DBR approach allows for an iterative development process through cycles of design, implementation, evaluation, and refinement based on real-life learning contexts. This finding aligns with the views of Van den Berg, C., & Bozalek, V. (2024), who asserted that DBR is effective in producing learning innovations that are both theoretically valid and practically relevant.

In the strengths sub-indicator, the textbook demonstrated key strengths in its integration of theory and practice and its exploratory activity design that fosters students' creativity and practical skills. Collaboration between researchers and lecturers during the design process enabled the content to be tailored to curriculum needs and student characteristics. This supports the literature emphasizing that stakeholder collaboration is a key element of DBR to ensure the acceptance and sustainability of learning innovations (Mohammad Naser, K., & Harb, E. S., 2025).

The challenges sub-indicator indicates that the initial implementation of DBR was not free from contextual constraints, such as limited practice time, variations in students' initial abilities, and the need for lecturers to adapt to a more open learning approach. This finding is consistent with previous research stating that DBR demands high flexibility and pedagogical readiness from instructors, especially when learning innovations shift the lecturer's role from instructor to facilitator (Padayachee, K., Howard, G.R., 2024 and Mohammad Naser, K., & Harb, E.S., 2025). These challenges are not weaknesses of DBR, but rather an inherent part of the design process in real-world contexts.

In the refinement needs sub-indicator, this study shows that reflection and feedback are the primary foundation for improving textbooks. Simplifying activities, adding contextual examples, and strengthening student reflection guidelines are forms of design adaptation that are responsive to field findings. This aligns with the principle of DBR, which emphasizes continuous refinement as an effort to increase the effectiveness and acceptability of learning products (Van den Berg, C., & Bozalek, V., 2024 and Mohammad Naser, K., & Harb, E. S., 2025).

Overall, these findings strengthen DBR's position as a relevant research approach for developing teaching materials in vocational education, particularly in the highly contextual and practice-based culinary field. DBR allows learning innovations to be not only tested under ideal conditions but also continuously refined through direct interaction with real-life learning practices. Thus, the Fusion Food textbook developed through DBR serves not only as a final product but also as the result of an adaptive, reflective, and pedagogical design process oriented toward improving the quality of learning.

## **DISCUSSION**

This study aims to develop and evaluate a Design-Based Research (DBR)-based Fusion Food textbook to foster students' creativity and practical skills in culinary learning. The results of the study indicate that textbook quality, increased student creativity, strengthened practical skills, positive user perceptions, and an iterative DBR process are interrelated and collectively support learning effectiveness. From the aspect of Textbook Quality, expert validation results indicate that the textbook has high content relevance, strong pedagogical coherence, and adequate theory-practice integration. These findings confirm that pedagogically designed culinary textbooks function not only as sources of information, but also as strategic learning tools that guide students' learning processes. High-quality teaching materials are the main foundation for meaningful learning, especially in vocational education, which demands the integration of concepts and practice (Chang, H.-F., & Li, T. (2025).

The quality of the textbooks directly contributed to increased student creativity. Students demonstrated good to excellent abilities in aspects of originality, elaboration, flexibility, and innovation in developing fusion food products. This finding aligns with the view that creativity in culinary education develops when students are provided with exploratory space, open-ended assignments, and systematic reflective support (Miranti, M. G., & Wilujeng, B. Y., 2018; B. Hendrik et al., 2022 and Tiwari et al., 2026). Textbooks that facilitate the creative process, not just the result, have been shown to encourage students to develop unique and contextual culinary ideas.

In addition to creativity, significant improvements were also seen in students' practical skills. High achievements in technical accuracy and hygiene indicate that textbooks are effective in guiding students in implementing professional practice standards. This supports the literature that emphasize that authentic practice-based learning and clear procedural guidance play a crucial role in mastering vocational skills (Sellberg, C., Lindwall, O, 2026). However, the variation in achievement across procedures and presentations suggests that the development of practical skills is progressive and requires repeated practice and broader exposure to experience.

Findings from the User Perceptions indicator indicate a very positive reception of the textbook, particularly in terms of clarity, usefulness, and learning support. This positive perception serves as an important mediator between learning design and learning outcomes. This is in line with Serki, N., & Bolkan, S. (2024), who explained that perceptions of usefulness and clarity of learning materials correlate with increased engagement, motivation, and learning effectiveness. Thus, positive user perceptions strengthen the textbook's function as a learning scaffold in Fusion Food learning.

All these findings are inseparable from the role of the DBR Process, the primary framework for textbook development. The DBR process allows for the identification of design strengths, implementation challenges, and needs for continuous improvement. Challenges such as limited practice time and varying student initial abilities serve as the basis for reflection. design refinement in the

next cycle. This aligns with DBR literature, which emphasizes that the primary value of DBR lies in an iterative and adaptive process that is responsive to real-world learning contexts (Mohammad Naser, K., & Harb, E. S., 2025).

Overall, the results of this study indicate that the development of a DBR-based Fusion Food textbook can produce high-quality learning resources, is positively received by users, and is effective in fostering students' creativity and practical skills. These findings contribute to the enrichment of culinary education studies by confirming that the integration of pedagogical design, authentic practice, and continuous evaluation is a relevant strategy to address the demands of 21st-century culinary learning.

## **CONCLUSIONS AND RECOMMENDATIONS**

This study concludes that the development of a Fusion Food textbook based on Design-Based Research (DBR) has proven effective in improving the quality of culinary education in higher education. The developed textbook has highly valid qualities, as demonstrated by expert validation results in aspects of content relevance, pedagogical coherence, theory-practice integration, and ease of use. These findings confirm that the pedagogically and contextually designed textbook is capable of meeting the complex, practice-based needs of Fusion Food learning.

The implementation of the textbook demonstrated a significant increase in student creativity, particularly in aspects of originality, elaboration, flexibility, and innovation in developing fusion food products. Furthermore, students' practical skills were also in the excellent category, particularly in aspects of technical accuracy and hygiene, reflecting their readiness to apply professional standards in the culinary field. The highly positive user perceptions of the clarity, usefulness, and learning support further strengthen the effectiveness of the textbook as a primary learning resource.

The DBR process plays a crucial role in ensuring the quality and implementation of the textbook through a continuous cycle of design, implementation, evaluation, and refinement. This approach allows textbooks to be developed adaptively to meet real-world learning contexts and user needs. Overall, this study confirms that the DBR-based Fusion Food textbook is not only academically sound but also pedagogically and practically effective in fostering students' creativity and practical skills. These findings provide an important contribution to the development of innovative culinary learning resources that are relevant to the demands of 21st-century culinary education.

## **ADVANCED RESEARCH**

Future research should extend this study by examining the long-term impact of the DBR-based Fusion Food textbook on students' professional performance, employability, and innovation capacity in real culinary industry settings. Further studies could involve larger and more diverse samples across different higher education institutions to test the scalability and generalizability of the textbook. Additionally, integrating digital or interactive components – such as multimedia content, virtual simulations, or learning management systems – could be explored to enhance learning engagement and adaptability.

Comparative research between DBR-based textbooks and conventional instructional materials would also provide deeper insights into their relative effectiveness, while qualitative investigations could further capture students' reflective learning experiences and creative processes in fusion food development.

## REFERENCES

- Al Mamun, M. A., & Lawrie, G. (2024). Cognitive presence in learner-content interaction process: The role of scaffolding in online self-regulated learning environments. *Journal of Computer Education*, 11, 791–821. <https://doi.org/10.1007/s40692-023-00279-7>
- Anumudu, C. K., Augustine, J. A., Uhegwu, C. C., Uche, J. N., Ugwoegbu, M. O., Shodeko, O. R., & Onyeaka, H. (2025). Smart Kitchens of the Future: Technology's Role in Food Safety, Hygiene, and Culinary Innovation. *Standards*, 5(3), 21. <https://doi.org/10.3390/standards5030021>.
- B. Hendrik, N. M. Ali, N. M. Nayan, N. A. Mat Isa, and M. Masril, "A New Robotic Learning Activity Design to Increase the Figural Creativity: Originality, Elaboration, Flexibility, and Fluency", *Int. J. Adv. Sci. Eng. Inf. Technol.*, vol. 12, no. 1, pp. 114–120, Jan. 2022.
- Chang, H.-F., & Li, T. (2025). A framework for collaborating a large language model tool in brainstorming for triggering creative thoughts. *Thinking Skills and Creativity*, 56, 101755. <https://doi.org/10.1016/j.tsc.2025.101755>
- Diamond, F., & Bulfin, S. (2025). Care of the profession: teacher professionalism and learning beyond performance and compliance. *Pedagogy, Culture & Society*, 33(2), 503–521. <https://doi.org/10.1080/14681366.2023.2239820>.
- Jimenez, B., Root, J., Shurr, J., & Bouck, E. C. (2021). Using the Four Stages of Learning to Assess, Set Goals, and Instruct. *TEACHING Exceptional Children*, 56(6), 452-461. <https://doi.org/10.1177/00400599211054873> (Original work published 2024).
- Kakarla, U. (2024). Fostering Creativity in Education. *International Journal of Innovative Scientific Research*, 2(3), 83-88. <https://ijisr.net/ijisr/article/view/13>
- Kumar, V., & Kulshrestha, R. (2025). Changing tastes: How globalization is shaping regional cuisines – Culinary innovation and fusion cuisine, variety, and availability of ingredients. In V. S. Rana, A. Raina, & G. Bathla (Eds.), *Global sustainable practices in gastronomic tourism* (pp. 231–242). IGI Global. ISBN 979-8-3693-7096-4. <https://doi.org/10.4018/979-8-3693-7096-4.ch013>
- Lazovsky, G. S., Raz, T., & Kenett, Y. N. (2024). The art of creative inquiry – From question asking to prompt engineering. *The Journal of Creative Behavior*. <https://doi.org/10.1002/jocb.671>
- Liu, M., Chen, Z., Huang, J., & Wan, X. (2025). From virtual reality visuals to real food perception: Uncovering the link between food aesthetics and taste in Chinese female consumers. *Food Quality and Preference*, 131, 105569. <https://doi.org/10.1016/j.foodqual.2025.105569>

- Mahanani, T., Marwanti, M., Sukardi, T., Munif, N., & Wati, I. W. K. (2024). Unlocking the potential for 21st century learning media to increase student work readiness in vocational education-culinary art. *Multidisciplinary Science Journal*, 7(4), 2025163. <https://doi.org/10.31893/multiscience.2025163>
- Marklinder, I., Wersén, V., & James, K. (2025). Food safety and healthcare professionals: The need for education and research. *Food Control*, 171, 111118. <https://doi.org/10.1016/j.foodcont.2024.111118>.
- Miranti, M. G., & Wilujeng, B. Y. (2018). Creative thinking skills enhancement using mind mapping. In *Advances in Social Science, Education and Humanities Research: Proceedings of the 1st International Conference on Social, Applied Science and Technology in Home Economics (ICONHOMECES 2017)*. Atlantis Press. <https://doi.org/10.2991/iconhomecs-17.2018.9>
- Mohammad Naser, K., & Harb, E. S. (2025). Application of design-based research (DBR) in instructional technology: Middle East education perspective. In R. Abdul Razak, N. F. Alias, & A. Y. Idris (Eds.), *Global perspectives and implementations of design-based research* (pp. 65–100). IGI Global. <https://doi.org/10.4018/979-8-3373-2086-1.ch003>
- Padayachee, K., Howard, G.R. (2024). A Combined Competency-Based and Design-Based Research (DBR) Approach to Curriculum Development: Implications for Information Technology (IT) Programs. In: Arai, K. (eds) *Intelligent Computing. SAI 2024. Lecture Notes in Networks and Systems*, vol 1019. Springer, Cham. [https://doi.org/10.1007/978-3-031-62273-1\\_16](https://doi.org/10.1007/978-3-031-62273-1_16)
- Rebecchi, K., Todd, L., & Hagege, H. (2024). Teaching responsible creativity: A path to ethical innovation. *Discover Education*, 3, 103. <https://doi.org/10.1007/s44217-024-00164-0>
- Santoso, M. T., Setyowati, S., & Nurhayati, N. (2024). Effectiveness of Laboratory Management in Efforts to Improve the Quality of Practical Work in the Food Processing Laboratory. *JMSP (Jurnal Manajemen Dan Supervisi Pendidikan)*, 9(1), 26–39. Retrieved from <https://journal-fip.um.ac.id/index.php/jmsp/article/view/1781>
- Sellberg, C., & Lindwall, O. (2026). Simulation-based training in professional education: Learning, participation, and instructional design. *Instructional Science*, 54, 9. <https://doi.org/10.1007/s11251-025-09763-2>
- Serki, N., & Bolkan, S. (2024). The effect of clarity on learning: impacting motivation through cognitive load. *Communication Education*, 73(1), 29–45. <https://doi.org/10.1080/03634523.2023.2250883>.
- Tambunan, A. N. K., Miranti, M. G., Handajani, S., & Bahar, A. (2025). The Effect Of Simulation Game As A Learning Supplement On Culinary Vocational High School Students' Motivation And Learning Outcomes. *Algebra: Jurnal Pendidikan, Sosial Dan Sains*, 5(3), 530–535. <https://doi.org/10.58432/algebra.v5i3.1454>
- Tiwari, M., Bhuyan, D. J., Barooah, M. S., & Bordoloi, P. L. (2026). Culinary innovation: Navigating challenges and embracing future opportunities. *Dalam Dietary, sensory and gastronomic applications: Exploring*

- unconventional food sources (Vol. 2, hlm. 747-764). Elsevier. <https://doi.org/10.1016/B978-0-443-33345-3.00037-7>.
- Van den Berg, C., & Bozalek, V. (2024). Design principles to develop digital innovation skills: A design-based research approach. *Educational Technology Research and Development*, 72, 947-972. <https://doi.org/10.1007/s11423-023-10308-y>
- Weidlich, J., Fink, A., Frey, A. et al. (2025). Highly informative feedback using learning analytics: how feedback literacy moderates student perceptions of feedback. *Int J Educ Technol High Educ* 22, 43 (2025). <https://doi.org/10.1186/s41239-025-00539-9>.
- Woodhouse, A., & Rodgers, L. (2024). Culinary arts education: Unpacking and disrupting its master-apprentice pedagogy. *International Journal of Gastronomy and Food Science*, 35, 100898. <https://doi.org/10.1016/j.ijgfs.2024.100898>
- Yan, W., Lowell, V. L., & Yang, L. (2024). Developing English language learners' speaking skills through applying a situated learning approach in VR-enhanced learning experiences. *Virtual Reality*, 28, 167. <https://doi.org/10.1007/s10055-024-01061-5>
- Yoto, Marsono, Suyetno, A., Mawangi, P. A. N., Romadin, A., & Paryono. (2024). The role of industry to unlock the potential of the Merdeka curriculum for vocational school. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186X.2024.2335820>