

ENHANCING VOCATIONAL STUDENTS' CREATIVITY THROUGH LETTER MOLD-ASSISTED FRUITS AND VEGETABLES CARVING PRACTICE: A QUALITATIVE CASE STUDY IN INDONESIAN CULINARY EDUCATION

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ABSTRACT

Creativity is one of the main competencies that needs to be developed in vocational education, particularly in the culinary field which demands both technical and aesthetic ability. However, empirical studies on the use of structured learning media to support the development of student creativity in fruits and vegetables carving practice are still relatively limited. This study aims to analyze the dimensions of student creativity in fruits and vegetables carving practice using letter mold media at SMK Negeri 3 Blitar. The study used a qualitative approach with a single case study design. Data were collected through semi-structured interviews with the head of the culinary study program, teachers, and students, supported by observation and document analysis. Data analysis was conducted using the interactive model of Miles and Huberman, while data validity was ensured through source, technique, and time triangulation. The results showed five dimensions of creativity developing in students, namely originality in generating carving design ideas, technical creativity in modifying the use of letter molds, aesthetic creativity in the visual quality of carving results, symbolic creativity in conveying themes through the work, as well as various contextual challenges such as limitations of time, equipment, and differences in student ability that affect the creative process. These findings show that letter mold media can facilitate student creativity as a flexible and guided learning tool. The results of this study have implications for the development of innovative learning strategies and the design of vocational education curricula in the culinary field oriented toward strengthening creativity.

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INTRODUCTION

Developments in the world of work in the 21st century have brought about significant changes to the competencies required of education graduates (UNESCO-UNEVOC, 2022). The world of industry no longer demands merely technical skills, but also higher-order thinking skills such as critical thinking, problem-solving, collaboration and, above all,

creativity as key competencies for coping with rapid change (Chua et al., 2022). Consequently, creativity is no longer viewed as a skill relevant solely to the arts, but has become a fundamental competence underpinning innovation, adaptability and lifelong learning across various occupational fields (Andrea et al., 2025).

These changes have significant implications for the delivery of vocational education, or Technical and Vocational Education and Training (TVET). Vocational education is no longer directed solely at producing graduates who master technical skills in line with industry standards; it is also required to produce graduates who are adaptable, innovative and creative, so that they are able to cope with the ever-evolving dynamics of the world of work (Hamdani et al., 2023; Panjaitan et al., 2022). Consequently, various TVET systems worldwide, including in Indonesia, are encouraged to develop learning processes that integrate the mastery of technical competencies with the development of learners' creativity (Suherman & Vidákovich, 2022).

In Indonesia, Vocational Secondary Schools (SMKs) play a strategic role in preparing a skilled workforce (Yusuf, 2024). Data indicates that approximately 4.7 million students are enrolled in various vocational program at SMKs across Indonesia (BPS, 2023). One such program is the Culinary Arts Specialization Program, which equips students with a range of practical skills, such as food preparation, bakery, food presentation, and the art of food decoration. One skill with unique characteristics is fruit and vegetable carving, the art of carving fruit and vegetables, which combines technical skills with aesthetic value. Rooted in Southeast Asian culinary traditions, carving requires students to possess precision, good motor coordination, aesthetic ability and creativity in producing attractive and meaningful works (Putri et al., 2021). With these characteristics, carving has become a form of learning capable of integrating technical competence with the development of creativity (Fadillah et al., 2022).

Nevertheless, teaching practices within the Culinary Arts Program at many vocational schools still tend to emphasize the mastery of techniques through the process of reproducing or imitating predetermined examples. Students are largely directed to follow standardized procedures and produce uniform carvings in accordance with learning standards, meaning that the scope for exploration, developing new ideas, or expressing creativity independently remains relatively limited (Adkha et al., 2021). This situation highlights a challenge in vocational education: how to maintain technical competency standards without hindering the development of students' creativity (Eliza et al., 2023).

One learning innovation that has the potential to address this challenge is the use of letter molds as media during fruits and vegetables carving practice. Instead of limiting students' creative expression, letter molds function as a creative supporting framework that provides initial structural guidance while still allowing students to modify, develop, and adjust their carving designs. This approach allows students to acquire technical competence without sacrificing the opportunity for creative exploration and originality (Sawyer, 2019).

Theoretically, the use of learning media in practical activities is also supported by various constructivist and experiential learning theories. According to Kolb's (2014) Theory of Experiential Learning, the learning process occurs most effectively through a cycle of real-life experience, reflection, conceptualisation and active experimentation, all of which are present in carving activities. Furthermore, the Project-Based Learning (PBL) approach provides learners with the opportunity to complete authentic tasks that encourage the application of knowledge whilst fostering creativity in producing tangible products (Markula & Aksela, 2022; Santoso et al., 2023). From a sociocultural perspective, the concept of the Zone of Proximal Development (ZPD) explains that media such as letter moulds function as mediating tools that help learners achieve abilities they could not yet attain independently, before they are eventually able to work more independently (Vygotsky, 1978).

The concept of creativity itself has undergone significant development. Rhodes (1961), through the classic 4Ps framework, explained that creativity is influenced by four main dimensions: person, process, product, and press (environment). Furthermore, various studies confirm that creativity is domain-specific and develops through meaningful learning experiences (Beghetto & Kaufman, 2007). In the context of education, Beghetto and Kaufman (2014) introduced the concept of 'mini-c creativity', which refers to creativity that emerges through personal meaning-making, interpretation, and new understandings constructed by learners during the learning process. This concept is highly relevant to vocational education and training (VET) as creativity is not only measured by the final outcome of a product but also by the thinking processes and exploration undertaken by learners during practical sessions.

In the context of TVET, creativity is increasingly viewed as one of the key attributes that graduates must possess, alongside technical competence. Lucas (2022) explain that vocational creativity encompasses various thinking habits such as curiosity, perseverance, imagination, discipline, and the ability to collaborate. In line with this, Spöttl and Windelband (2021) emphasises that vocational education systems need to integrate technical competences with creativity and

entrepreneurship so that graduates are able to face the challenges of the Fourth Industrial Revolution. However, empirical research on the development of creativity in vocational education in the culinary field remains relatively limited, particularly in the context of TVET in the Asian region (Hsia et al., 2021).

Various studies on fruit and vegetable carving have so far focused primarily on the mastery of basic techniques and the assessment of the quality of the final product (Fridiarty, 2020; Setyowati & Hamidah, 2014). In fact, carving is a culinary skill that demands not only technical precision but also the ability to integrate aesthetic and creative elements into every piece produced (Putri et al., 2021). In Indonesia, research examining students' creativity in carving practice at vocational secondary school level remains very limited, whilst previous studies have largely focused on technical learning aspects without exploring how learning materials can facilitate the development of students' creativity (Satriawati et al., 2020).

Although creativity is increasingly recognized as an essential competency in Technical and Vocational Education and Training (TVET), previous studies on fruits and vegetables carving art have focused more on technical competence and product quality than on the creative learning process. In addition, attention given to how learning media facilitate student creativity during carving practice is still limited, particularly at the vocational secondary school level in Indonesia. As a result, empirical evidence regarding the role of letter mold media in fostering student creativity is still very limited.

Unlike previous studies that mainly evaluated carving art from the perspective of technical competence, this study conceptualizes letter mold media as a creative supporting framework that facilitates the emergence of mini-c creativity among vocational culinary students. Instead of only assessing technical performance, this study explores various dimensions of creativity, including idea creation, creative adaptation, aesthetic expression, and thematic interpretation during carving practice. Therefore, this study addresses the following research question: How can fruits and vegetables carving technique assisted by letter molds foster student creativity in vocational culinary education?

This study aims to examine how fruits and vegetables carving technique assisted by letter molds can facilitate student creativity at SMK Negeri 3 Blitar. Specifically, this study examines the process of idea creation, creative adaptation of carving technique, aesthetic expression, thematic interpretation, and the challenges faced during the creative process. The findings of this study are expected to contribute to creativity research in the field of vocational education as well as provide practical implications for the development of learning media that balance technical competence with the development of creativity.

METHODS

This study used a qualitative approach with an interpretive paradigm that emphasizes understanding of meaning, context, and participant experience rather than quantitative measurement of variables (Creswell & Poth, 2016). The research design used was a single case study as proposed by Yin (1994), because it is appropriate for examining phenomena that are specific and contextual in nature, namely student creativity in carving practice at SMK Negeri 3 Blitar. This approach allows an in depth understanding of the creative learning process within the natural environment of the practice classroom (Stake, 1995).

The research location was purposively selected at SMK Negeri 3 Blitar, East Java, because it has a Culinary Study Program that has integrated letter mold media into carving learning. Research participants were selected using purposive sampling (Patton, 2015), involving two carving subject teachers as main informants, one head of the Culinary Study Program, and twelve students who took part in carving learning and were selected based on variation in ability level and creative involvement identified through initial observation.

Data collection was carried out through three complementary techniques to support triangulation, namely semi-structured interviews, participatory observation, and documentation study. The interview guide was developed based on the research objectives and piloted with two students outside the research sample. Interviews with students lasted 30 to 45 minutes, while interviews with teachers and the program head lasted 45 to 60 minutes. All interviews were conducted in Indonesian, recorded after obtaining participant consent, then transcribed and translated by the first researcher. Participatory observation was carried out during six carving practice sessions with field notes focusing on student interaction, creative decision making process, problem solving, and aesthetic consideration. In addition, documents in the form of student carving portfolios, teacher lesson plans, assessment rubrics, and curriculum documents were analyzed to strengthen and confirm the results of the interviews and observations.

Data analysis was conducted using the Interactive Model of Miles and Huberman which includes three stages, namely data reduction, data display, and conclusion drawing and verification (Miles & Huberman, 1994). The data

reduction process was carried out through open coding which was then developed into thematic categories according to the research objectives. The reduced data was then presented in the form of matrices, theme networks, and narrative summaries to identify patterns of relationships between findings before conclusions were drawn iteratively until data saturation was reached. Data validity was ensured through the criteria of credibility, transferability, dependability, and confirmability, by applying source triangulation, technique triangulation, time triangulation, and member checking. Before data collection was carried out, all participants received an explanation of the research objectives, the right to withdraw at any time, and assurance of data confidentiality. All participants provided written informed consent, and all data were anonymized and used only for research purposes.

RESULTS

The analysis yielded five interconnected thematic dimensions of student creativity in letter mold-assisted fruits and vegetables carving practice. The themes, their constituent indicators, and representative participant voices are presented below.

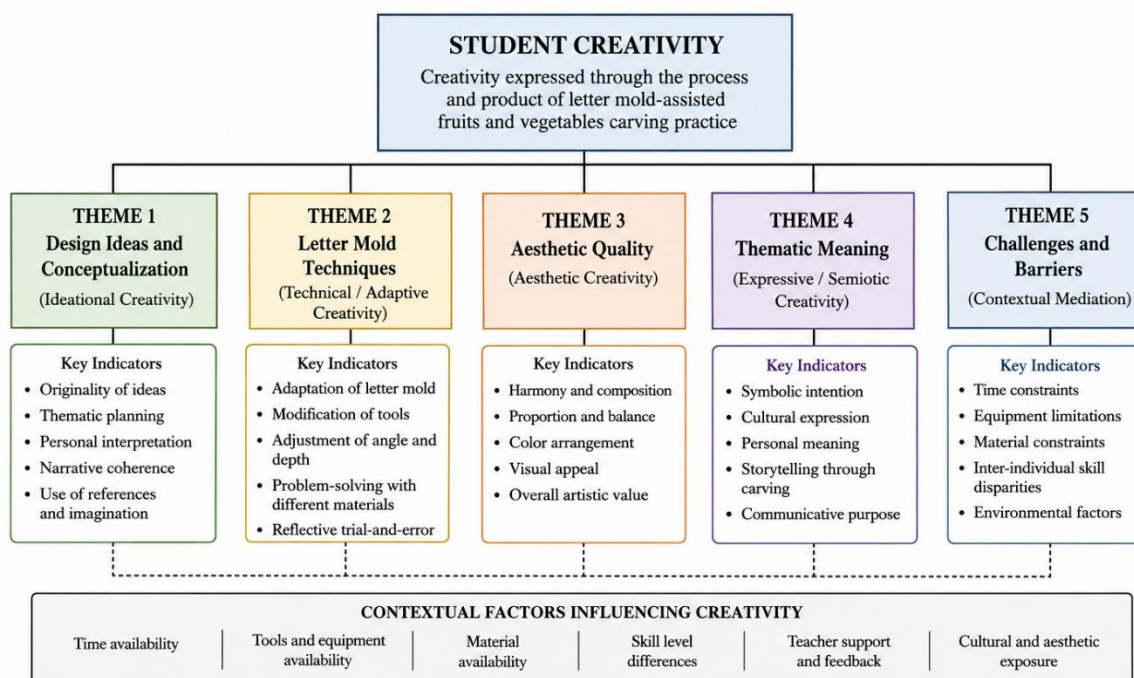


Figure 1. Thematic Map of Student Creativity in Fruits and Vegetables Carving Practice Assisted by Letter Molds

Theme 1: Creativity in Carving Design Ideas and Conceptualization

The first dimension of creativity observed was students' capacity to generate original design ideas and develop conceptual frameworks for their carving projects. Although the letter mold served as a structural anchor for each design, students consistently demonstrated the ability to transcend its basic template function by developing personalized design concepts that incorporated unique compositional choices, thematic orientations, and individual aesthetic visions.

Multiple students articulated a deliberate process of pre-carving ideation in which they mentally or visually sketched their intended design before engaging with the material. One student described this process as follows: *"Before I start carving, I always think first, what story do I want this to tell? The letter is just the beginning; around it, I imagine flowers, leaves, maybe a butterfly, something that makes the whole piece feel alive and connected."* (Student S3, personal communication)

Teachers corroborated this observation, noting that students who had internalized the potential of the letter mold as a design anchor rather than a constraining template consistently produced more conceptually coherent and visually engaging carving products. As one culinary teacher explained:

"The most creative students are the ones who see the mold as a starting point, not a cage. They ask me, 'Maam, can I add vines around the letter?' or 'What if I curve the edges differently?' They are already thinking about the design as a whole." (Teacher T1, personal communication)

This finding indicates that the letter mold functioned as a generative constraint (Vogelgsang, 2020), enabling rather than limiting original ideation by providing a stable structural foundation around which students could develop diverse and personalized creative concepts. The degree of creative elaboration in design conceptualization was notably influenced by students' prior aesthetic exposure and their engagement with reference materials such as culinary art books, social media imagery, and traditional Indonesian decorative arts.

Theme 2: Creativity in the Use of Letter Mold Techniques

The second thematic dimension concerns the technical dimension of creativity, specifically, how students adapted, modified, and extended the use of letter mold tools to achieve their intended design outcomes. While the mold provides a standardized letter shape, its application to diverse fruit and vegetable surfaces introduces inherent technical challenges that demand creative problem-solving and adaptive thinking.

Students reported a range of creative technical strategies. Some adapted the angle and depth of mold application to accommodate the curvature or texture of different vegetable surfaces; others modified the mold's edges using small knives to produce softened or ornamented letter forms. One student described their approach to working with an irregularly shaped surface: *"The mold didn't sit flat on the watermelon because of the curve, so I had to press it at an angle and then trace around it carefully. I learned to use the tip of my knife along the mold edge to get a clean line even on the curve."* (Student S7, personal communication)

This form of situational problem-solving reflects what Cropley and Cropley (2015) describe as functional creativity, creativity directed toward solving practical problems within a constrained context. Teachers observed that students' ability to adapt the technical application of the mold was closely related to their confidence with carving tools and their capacity for reflective trial-and-error learning. The program head noted: *"Before we introduced the letter molds, many students were afraid to carve freehand. The mold gave them a template they could trust, and once they felt confident with the basic form, they started trying more difficult things, deeper cuts, more intricate patterns. It became a stepping stone."* (Program Head PH1, personal communication)

This observation aligns with Vygotsky (1978) Zone of Proximal Development: the mold enabled students to perform at a level of technical sophistication beyond their current independent capability, gradually internalizing the strategies required for increasingly autonomous creative carving.

Theme 3: Creativity in Aesthetic Quality

The third dimension of creativity encompasses the aesthetic properties of students' carving products including harmony, composition, proportion, color arrangement, and overall artistic value. Aesthetic creativity in this context refers not merely to the production of visually attractive carvings but to the deliberate and informed application of aesthetic principles in pursuit of a specific visual effect or emotional quality.

Observation data revealed considerable variation in the aesthetic quality of students' carving products, reflecting differing levels of aesthetic sensitivity and intentionality. Some students demonstrated a sophisticated understanding of compositional balance, ensuring that the letter form related harmoniously to the surrounding decorative elements, while others tended toward visual crowding or imbalance. One student reflected on their color choices:

"I chose yellow and orange, papaya and carrot, because they go together nicely. The colors should balance, not fight each other. I put the orange letter in the center and the yellow decorations around the edge so it draws your eye to the middle." (Student S5, personal communication)

Teachers noted that aesthetic creativity was a domain in which students showed rapid development over the course of the carving unit, particularly when encouraged to evaluate their own and each other's work against explicit aesthetic criteria. The application of color in fruits and vegetables carving presents a unique creative constraint, as the palette is determined by the natural pigmentation of available materials. Students' deliberate engagement with these constraints including selecting, pairing, and contrasting materials for their coloristic properties represents a form of material-conditioned creativity specific to culinary arts.

Theme 4: Creativity in Conveying Thematic Meanings

The fourth dimension of creativity concerns students' capacity to imbue their carving products with thematic, symbolic, or communicative meaning. This dimension extends beyond technical and aesthetic competence to encompass

expressive or semiotic creativity which is the ability to use the carving as a vehicle for personal, cultural, or conceptual expression.

Several students demonstrated a high degree of intentionality in selecting themes for their carvings. Themes drawn from Indonesian cultural tradition, personal biography, and contemporary social concerns all emerged across the student portfolio. One student, who chose to carve the letter “I” surrounded by rice stalks and traditional Javanese floral patterns, explained: *“The letter ‘I’ stands for Indonesia, but also for me personally. The rice stalks around it represent my family, my parents are farmers. I wanted to put something of myself and my background into the design, not just make something that looks pretty.”* (Student S2, personal communication)

This level of personal and cultural investment illustrates the operation of what Kaufman and Beghetto (2009) term mini-c creativity. Teachers recognized thematic creativity as one of the most significant and sometimes unexpected outcomes of the letter mold carving unit: *“At first, I thought the students would just focus on the technical side, make a nice letter and decorate around it. But some of them surprised me. They came with stories, with reasons for every choice. That’s when I knew the activity was reaching something deeper.”* (Teacher T2, personal communication)

Theme 5: Challenges and Barriers in Carving Practice

The fifth dimension concerns the challenges and barriers encountered by students during letter mold-assisted carving practice. These challenges constitute a significant mediating context that shaped both the expression and the development of student creativity, and were organized into four primary categories: temporal constraints, equipment limitations, material constraints, and inter-individual skill disparities.

Time pressure was the most consistently cited challenge across participant groups. Students frequently reported that the allocated practice time was insufficient for them to fully realize their design intentions: *“I had the idea in my head, I knew exactly what I wanted to do, but there wasn’t enough time. I ended up simplifying the design because I had to finish. I feel like the real idea is still inside me, not on the vegetable.”* (Student S9, personal communication)

Equipment limitations, including the shared use of carving tools and the availability of letter molds, were identified as a secondary but significant challenge. Competition for limited tools sometimes disrupted students’ creative momentum and introduced stress that interfered with aesthetic judgment. Material constraints including the availability, freshness, and condition of fruits and vegetables required adaptive responses that could detract from design execution. Finally, inter-individual skill disparities created an uneven creative landscape: students with strong foundational knife skills were able to devote cognitive resources to creative decision-making, while those with less developed skills found their attention dominated by technical problem-solving, limiting the bandwidth available for creative exploration.

Summary of Thematic Findings

Table 1 presents a structured synthesis of the five thematic dimensions of student creativity identified in this study, together with representative indicators and key mediating challenges.

Table 1. Summary of Thematic Dimensions of Student Creativity in Letter Mold-Assisted Carving Practice

Theme	Dimension of Creativity	Key Indicators	Mediating Challenges
1: Design Ideas & Concepts	Ideational Creativity	Originality, thematic planning, personal interpretation, narrative coherence	Prior aesthetic exposure; access to reference materials
2: Letter Mold Techniques	Technical/Adaptive Creativity	Mold adaptation, tool modification, reflective trial-and-error	Skill level, tool availability, initial confidence
3: Aesthetic Quality	Aesthetic Creativity	Compositional harmony, color balance, proportion, artistic value	Material palette constraints; time pressure
4: Thematic Meaning	Expressive/Semiotic Creativity	Symbolic intent, cultural expression, personal communication through carving	Reflective vocabulary; cultural background access
5: Challenges & Barriers	Contextual Mediation	Temporal, equipment, material, and skill-related barriers to expression	Institutional resources; curriculum structure

DISCUSSION

The findings of this study illuminate the multidimensional nature of creativity as it is expressed and developed within the specific context of letter mold-assisted fruits and vegetables carving practice in vocational culinary education.

This section discusses the five thematic dimensions in relation to relevant theoretical frameworks and prior empirical research, and concludes with the proposed Letter Mold-Assisted Creative Culinary Learning (LMACCL) Model.

Design Ideas and Conceptualization: Mini-c Creativity in Action

The evidence presented in Theme 1 demonstrates that students engage in robust ideational creativity when invited to conceptualize their carving designs within the structured yet open framework provided by the letter mold. This pattern is closely aligned with Kaufman and Beghetto (2009) construct of mini-c creativity which is the personally meaningful insights, interpretations, and imaginative responses that arise during the learning process itself. Students' tendency to envision narratives, cultural connections, and personal meanings as the conceptual basis for their carving designs reflects precisely the kind of subjective, experientially grounded creativity that the mini-c construct captures.

This finding challenges the prevalent assumption in vocational education that structured tools and standardized templates are antithetical to creativity. Rather, the letter mold appears to function as what Stokes (2014) describes as a creative constraint which is a parameter that focuses and channels creative energy rather than suppressing it. The bounded structure of the letter form provides a cognitive anchor around which diverse and original design concepts can be generated, suggesting that creative scaffolds and original expression are not mutually exclusive, a position also advanced by Sefton-Green et al. (2011), who argue that creative learning in structured educational contexts frequently flourishes through productive tension between constraint and freedom. Furthermore, Csikszentmihalyi (2014) systemic model of creativity reinforces the finding that students who had absorbed domain knowledge (culinary arts, decorative aesthetics) were better positioned to exercise creative agency, suggesting technical and aesthetic education as a prerequisite for, rather than an obstacle to, creative expression.

Technical Creativity: Adaptive Problem-Solving in Constrained Practice

The findings reported in Theme 2 reveal a dimension of creativity specific to the domain of practical, material-based vocational learning as what Cropley and Cropley (2015) term functional or adaptive creativity. Students' strategies for accommodating the physical properties of diverse vegetable surfaces, adapting the angle of mold application, and modifying tool techniques to achieve intended design effects represent creative problem-solving within tight technical constraints. These behaviors are consistent with Kolb's (2014) Experiential Learning Cycle, wherein each practical encounter with a material challenge initiates a cycle of reflection, abstract theorizing, and experimental testing that deepens both technical mastery and creative flexibility.

Notably, the role of the letter mold in supporting technical confidence among initially apprehensive students resonates strongly with Vygotsky (1978) ZPD framework. As the program head's testimony illustrated, the mold served as a transitional scaffold enabling students to engage in carving at a level of technical complexity beyond their independent capability, gradually building the confidence required for more autonomous creative practice. This scaffolding function of instructional media in vocational creative learning has also been observed in studies of woodworking (Hadijah et al., 2022) and fashion design education (Suyitno et al., 2021), suggesting a cross-domain pattern of merit for further investigation.

Aesthetic Creativity: Material Constraints as Creative Catalysts

The aesthetic dimension identified in Theme 3 reveals an underexplored aspect of culinary creative education: the role of material constraints particularly the natural color palette of fruits and vegetables as generators of creative challenge and response. Unlike conventional art media where color is freely selectable, culinary carving imposes a materially determined palette that demands creative decision-making in material selection, pairing, and arrangement. Students' deliberate engagement with these constraints represents a form of creativity specific to the culinary domain and largely absent from the general creativity literature.

This finding resonates with Amabile et al.'s (2018) componential model of creativity, which emphasizes domain-relevant skills, creativity-relevant processes, and intrinsic motivation as the three essential components of creative production. Students' demonstrated engagement with material-specific aesthetic challenges, selecting complementary colors, balancing visual weight, achieving compositional harmony, reflects the operation of all three components within a contextually authentic task. The culinary carving classroom thus emerges as an educationally rich environment for developing what Eisner (2003) terms "aesthetic literacy", the capacity to perceive, interpret, and evaluate aesthetic qualities in visual forms, a competency with broad relevance to professional culinary practice.

Nevertheless, the findings of this study show a difference from most research on visual creativity, which is generally conducted in the fields of fine arts or graphic design, where students have full freedom in choosing color as the main aesthetic element. In fruit and vegetable carving practice, color choice is instead determined by the natural characteristics of the material, so the space for creativity does not lie in creating new colors, but in the ability to combine, arrange, and harmonize colors that are already available. This difference occurs because the characteristics of culinary media are biological in nature and have natural limitations not found in conventional art media (Febriani et al., 2021; Muslim et al., 2019; Mutiara et al., 2024). Thus, aesthetic creativity in culinary learning develops through a process of adaptation to material limitations, not through freedom in the use of visual elements. This finding extends the concept of creative constraints by showing that material limitations can function as a trigger for the emergence of more reflective and contextual aesthetic decisions.

Practically, the results of this study show that teachers do not need to provide excessive media variation to develop students' aesthetic creativity. Instead, the use of the natural characteristics of fruits and vegetables can be used as a learning source to train aesthetic sensitivity, visual composition ability, and artistic decision making in the context of professional culinary. The novelty of this study lies in the identification of aesthetic creativity that develops through natural material limitations. Unlike previous research that places color more as an element that can be freely modified, this study shows that the natural characteristics of fruits and vegetables instead become a source of stimulation for aesthetic creativity in vocational culinary education.

Thematic Meaning: Semiotic and Cultural Creativity

The finding reported in Theme 4 that students imbued their carving products with personal, cultural, and symbolic meanings, represents arguably the most theoretically significant contribution of this study. The capacity for semiotic and cultural creativity observed among students reflects a dimension of creative expression that extends beyond technical and aesthetic competence to encompass what Gardner (2011) terms "intrapersonal intelligence" and what (Craft, 2001) describes as "little-c creativity", the everyday creative expression through which individuals construct and communicate personal meaning.

The emergence of cultural references, particularly to Javanese artistic traditions and Indonesian national identity as thematic sources in students' carvings points to the role of cultural context in shaping creative expression in vocational education. This is consistent with Wei et al. (2022), who argues that TVET students in Southeast Asian contexts draw productively on cultural heritage as a creative resource and that culturally responsive pedagogies can amplify the creative dimensions of vocational practice. The culinary carving classroom, as a site where technical skill intersects with cultural memory and personal biography, emerges as a uniquely generative environment for the development of culturally grounded creativity (Mulyani & Julianto, 2018; Nurhanifah et al., 2024).

However, this study shows characteristics that differ from most creativity research in vocational education, which more often assesses creativity based on product quality, design innovation, or technical skills. In this study, creativity also develops through students' ability to give personal, symbolic, and cultural meaning to the carving results they produce. This difference arises because the learning process does not only emphasize technical accuracy, but also provides students with the opportunity to reflect on personal experience, cultural values, and local identity as sources of inspiration for their work. Therefore, creativity is understood not only as the ability to produce an attractive product, but also as the ability to build meaning through the process of creating a work.

Theoretically, this finding extends the understanding of vocational creativity by showing that semiotic and cultural dimensions are an important part of culinary creativity that has so far received relatively little attention in TVET literature. Practically, teachers can integrate the exploration of local culture, regional stories, and students' personal experiences into carving practice assignments so that the learning process not only improves technical skills, but also strengthens students' cultural identity and expressive ability. The novelty of this study lies in revealing the semiotic and cultural dimensions of creativity in fruit and vegetable carving learning. Previous research generally focused on technical and aesthetic aspects, while this study shows that creativity also develops through the construction of personal and cultural meaning embodied in culinary products.

Challenges and Barriers: Contextual Mediators of Creative Expression

The challenges identified in Theme 5 including temporal constraints, equipment limitations, material variability, and skill disparities are consistent with the broader TVET creativity literature, which consistently identifies structural and

resource constraints as significant mediators of creative learning outcomes. These findings reinforce the importance of attending to the contextual ecology of creative learning in vocational settings, recognizing that creativity is not simply an individual psychological capacity but an emergent property of person-environment interaction.

The temporal constraint finding is particularly noteworthy in the context of culinary education, where carving complexity demands extended engagement for full creative expression. Likewise, Putri et al. (2021) similarly found that time allocation was one of the most significant predictors of creative product quality in culinary practice courses, and recommended the inclusion of extended project-based carving sessions within the vocational curriculum. This study's findings align with and extend that recommendation, pointing to the need for structural curriculum reforms that prioritize creative depth over content breadth. (Kristiana & Triwahyuni, 2025; Rahmawati et al., 2024)

However, this study shows a difference from some previous research that tends to view limitations of time, tools, and materials only as inhibiting factors for creativity. The findings of this study indicate that some students are actually able to develop adaptive strategies to overcome these limitations, for example by modifying work technique, adjusting design, and utilizing the characteristics of available materials. This difference shows that the influence of obstacles on creativity is greatly influenced by learning support, practice experience, and students' adaptive ability. In other words, obstacles do not always reduce creativity, but can become a trigger for the development of creative problem solving ability when supported by an adequate learning environment.

Theoretically, this finding supports the sociocultural perspective on creativity which views creativity as the result of interaction between the individual and the learning environment. Creativity is not only determined by personal ability, but is also influenced by learning conditions that allow students to adapt to various limitations. Practically, schools need to provide more flexible practice time, adequate equipment, and varied practice materials so that students have the opportunity to explore various alternative problem solutions creatively. The novelty of this study lies in the evidence that obstacles in learning are not always negative in nature, but can function as a stimulus for the development of adaptive creativity when supported by appropriate learning strategies.

Practical Implications

The findings carry several practical implications for culinary educators, vocational school administrators, and TVET curriculum developers. For culinary teachers, the study suggests that explicitly framing the letter mold as a design anchor rather than a constraint and actively encouraging students to develop personal and cultural narratives for their carving themes can significantly amplify the creative dimensions of the activity. Integrating structured aesthetic reflection and peer critique sessions into the carving unit would further support the development of aesthetic and thematic creativity.

For vocational school administrators, the findings highlight the importance of investing in adequate carving equipment and ensuring that sufficient practice time is allocated within the curriculum to support deep creative engagement. For TVET curriculum developers, the five thematic dimensions of creativity identified in this research could serve as the foundation for a more comprehensive creativity assessment framework in culinary vocational programs, one that moves beyond assessments focused exclusively on technical precision or product appearance to encompass ideational, aesthetic, and expressive dimensions of creativity.

These practical implications show that the development of creativity in vocational education does not only depend on individual student ability, but also requires learning design that intentionally combines structure, support, reflection, and space for exploration. Therefore, the implementation of letter mold media should be positioned not as a tool for reproducing shapes, but as a pedagogical strategy to facilitate the gradual development of creativity.

Proposed Model: Letter Mold-Assisted Creative Culinary Learning (LMACCL) Model

Based on the five thematic dimensions identified in this study, and informed by the theoretical frameworks of mini-c creativity, experiential learning, and vocational creativity development, this study proposes the Letter Mold-Assisted Creative Culinary Learning Model (LMACCL Model). The model conceptualizes letter mold-assisted carving practice as a pedagogical system comprising four interacting components:

(1) Structured Creative Scaffolding: The letter mold functions as a generative constraint that enables and directs creative energy without suppressing original expression. The mold provides sufficient structure to build confidence and technical competence while leaving sufficient openness to invite personal elaboration and aesthetic interpretation.

(2) Experiential Creative Cycles: Carving practice is organized around iterative cycles of design conceptualization, technical execution, aesthetic evaluation, and reflective elaboration, corresponding to the four stages of Kolb's (2014) Experiential Learning Cycle. Each cycle deepens both technical mastery and creative flexibility.

(3) Thematic Cultural Anchoring: The integration of personal, cultural, and symbolic themes as sources of creative motivation and meaning constitutes a critical pedagogical strategy for activating mini-c creativity. Students are encouraged to connect their carving practice to their personal histories, cultural heritages, and aesthetic sensibilities.

(4) Contextual Support Conditions: Adequate time, equipment, materials, and teacher facilitation are identified as enabling conditions without which creative expression remains structurally constrained. Schools and curriculum developers are encouraged to address these prerequisites as a necessary foundation for creative learning.

Unlike creativity learning models that generally emphasize freedom of exploration without clear structure, the LMACCL Model proposes that creativity in vocational education develops optimally through a balance between scaffolding, practice experience, reflection, and cultural exploration. This difference arises because vocational skills learning requires mastery of technique as a prerequisite before students are able to produce innovation independently. Thus, this model offers a new perspective that learning structure and creativity are two complementary components in building creative competence in the culinary field.

The LMACCL Model proposes that when these four components operate in concert within a supportive pedagogical environment, the culinary carving classroom becomes a generative space for the development of multi-dimensional creativity, encompassing technical, aesthetic, and expressive dimensions which fully consistent with the vocational creativity competencies increasingly demanded by contemporary culinary industries and TVET policy frameworks (UNESCO-UNEVOC, 2021). Future research should subject this model to empirical validation across a wider range of culinary and craft-based vocational settings.

CONCLUSION

This study aims to explore the dimensions of vocational school students' creativity in fruit and vegetable carving practice assisted by letter mold media at SMK Negeri 3 Blitar. The results show that student creativity develops through five main dimensions, namely design idea development, technique adaptation, aesthetic consideration, thematic meaning formation, and the ability to face challenges during practice. These findings also show that letter mold media functions as a scaffold that facilitates the emergence of creativity, not one that limits students' creative expression. In addition, mini-c creativity is seen through students' ability to give personal meaning to the work produced.

Theoretically, this study extends the application of the mini-c creativity concept to the context of vocational education, particularly culinary practice learning. This study also offers the Letter Mold-Assisted Culinary Creativity Learning (LMACCL) Model as a conceptual framework to explain how letter mold media supports the creativity process in fruit and vegetable carving activities. Practically, the results of the study have implications for teachers and schools to integrate letter mold media with reflection activities, feedback, and contextual learning so as to develop both creativity and student competence relevant to workforce needs.

This study has limitations because it used a case study design at one school so that the findings cannot yet be widely generalized. In addition, the data were obtained through interviews and observation so that they still have the potential to be influenced by the subjectivity of informants and researchers. Future research is recommended to test the LMACCL model in various vocational education contexts, compare the effectiveness of letter mold media with other creative learning media, conduct longitudinal research on the development of student creativity, and develop quantitative instruments based on the five dimensions of creativity identified in this study.

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