Development and Pilot Testing of Mandailing Culinary Interactive E-book

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ABSTRACT

Mandailing cuisine, renowned in North Sumatra, faces challenges in the modern era due to evolving culinary trends and digital technology. Writing a culinary history and culture book is essential to ensure proper documentation. Research is needed to identify and document the processing techniques of Mandailing cuisine, which will be presented in an interactive e-book accessible to various groups. The study aimed to develop an interactive e-book highlighting the distinctive culinary offerings of Mandailing. This study was conducted from April to November 2021 in South Tapanuli Regency, using the Four-D development model (Define, Design, Develop, and Disseminate). The research began with identifying Mandailing culinary aspects, employing quantitative and qualitative approaches in the define stage. In the design phase, the e-book's content was designed based on the identification data. The e-book was developed following the CASE-based development stages (Creative, Active, Systematic, Effective). Its dissemination targeted Nutrition and Culinary Education students. Expert validation ensured the e-book's quality, evaluating content, presentation, language, and graphics. Descriptive analysis techniques were used to identify 206 culinary types, categorized into six food groups: Side Dishes (processed fish, salted fish, poultry, beef, and mutton), vegetables, chili sauce, snacks, portion foods, and drinks. Processing techniques included high-temperature methods such as boiling, steaming, drying, smoking, stir-frying, deep frying, and low-temperature. Additional techniques involved sugar coating and convection using bamboo. Nutritional content varied across food groups. The e-book's development followed the research stages, and a feasibility test conducted by material and media experts confirmed its suitability, with an average score of 4.7. Readability tests by students during the dissemination process resulted in an average score of 4.35 out of 5.

Keywords: Cuisine, Four-D, Interactive E-book, Mandailing.

1. INTRODUCTION

Human food requirements increase to meet biological needs, and culinary choices reflect an individual's economic status [1]. The rapid development of technology makes it easier for people to access different menu options and prices. Among these options, traditional cuisine remains a popular preference. The diversity of traditional cuisine derives from the natural and cultural richness of the communities, resulting in a wide range of local specialities. Known for its the rich soil, Mandailing Natal Regency produces an abundance of different species of plants [2]. These plants serve as the main ingredients for various processed vegetables and complementary spices used in side dishes by the Mandailing society [3].

Mandailing cuisine is one of the most famous cuisines in North Sumatra and is very popular among the people of the city of Medan [4]. Well-known Mandailing dishes include mashed cassava leaves (*gule bulung gadung*), rattan young (*pakkat*), smoked fish, *rendang belut*, *sambal tuk tuk*, *pangkat* (*pusuk ni otang*), *toge panyabungan, itak poul-poul, alame (dodol), kipang*, and others [5]. *Pakkat* originally comes from the Mandailing tribe and is particularly popular with adults, but it can be difficult to find on weekdays [6]. Most Mandailing dishes use regional spices such as Batak onion, *kecombrang, asam cikala* and several other spices, resulting in various Mandailing culinary specialties.

Technology is evolving at a rapidly phase, including advances in food technology that have led to significant changes in society's cooking habits. The use of processed

food ingredients and spices, as well as the availability of ready-made spices, has led many people to substitute dry for wet spices. In addition, several studies have shown that many types of Indonesian cuisine have undergone changes affecting form, raw materials, spices, cooking techniques and related utensils. While some level of modification is not inherently wrong, excessive modification can cause traditional culinary dishes to lose their original essence and flavor. In the case of Mandailing Culinary, on-site observations reveal numerous changes, including updates to ingredients, cooking utensils, cooking processes, serving tools, and presentation styles [7], [8].

Generally processed with simple technology and equipment, Mandailing literature is based on local ingredients that are relatively affordable and do not require special skills to prepare. The recipes used are often passed down from generation to generation and characterize Mandailing cuisine with its spicy and savory flavors for side dishes [5]. The culinary use of local foods plays a crucial role in the development of tourism in a region. The delicious cuisine with its unique appeal has become a special highlight for tourists visiting North Sumatera. Writing culinary history and culture in a book is crucial for proper documentation. This documentation of Mandailing's culinary heritage, including the ingredients and cooking methods taught, will serve as a valuable resource for future generations in preserving their culture. The traditional culinary business holds tremendous opportunities, both now and in the future. The aim of this study was to identify Mandailing's culinary specialties based on food groups (side dishes, vegetables, portion dishes, and traditional cakes) and to develop interactive e-books that showcase Mandailing's distinctive culinary offerings.

2. METHOD

The study was conducted in Mandailing Natal District, employing a Research and Development (R&D) approach. The research followed four stages based on the Four-D development model (Define, Design, Develop, and Disseminate). In the Define stage, the identification of Mandailing Culinary was carried out using both quantitative and qualitative approaches. The quantitative approach involved conducting a survey at restaurants serving Mandailing cuisine, while in-depth interviews were conducted with Mandailing families and community leaders who deeply understand the customs, traditions, and culture associated with Mandailing cuisine.

Moving on to the Design stage, the e-book contents were developed based on the results of the identification data. The e-book was designed following the CASE principles (Creative, Active, Systematic, Effective). It is crucial that the e-books are exciting and engage readers actively, are organized systematically, and effectively

present the information for ease of reading and dissemination [9]. The stages of development include: (1) The validation stage, where experts evaluate the e-book's content, presentation, language, and graphics; (2) The revision stage, during which researchers incorporate feedback and improve the e-book accordingly based on the received input; (3) Pilot testing, conducted by distributing questionnaires through Google form to 10 students, to gather user feedback and assess their response to the developed e-book. The dissemination stage is implemented to determine user responses and opinions regarding the developed e-book. Data analysis employs descriptive analysis techniques, which offer an overview of the research object using sample data.

3. RESULTS AND DISCUSSION

3.1. Define

The results of Mandailing culinary identification were collected from various sources, including community leaders, families with a deep understanding of traditional Mandailing cuisine, and several restaurants in Mandailing regency and Mandailing restaurants in Medan. The research identified 185 types of traditional Mandailing food, which were categorized into four food groups: side dishes (including various types of chili sauce), vegetables, traditional pastries, and delectable cakes.

Mandailing culinary identification was based on daily food consumption patterns. The side dish group consisted of processed animal protein foods, such as processed fish, processed salted fish, processed poultry and its products, and processed beef and goat dishes. The most identified food group was the side dish group, comprising 84 types of culinary. Following that were 53 types of vegetables and 45 types of traditional cakes (see Table 1). The delicious group includes sweet portion dishes, such as banana compote, bean sprouts, and others.

Table 1. Cuisine identification by food group.

No	Food group	n
1	Side Dishes	
	Fish	49
	Chickens and ducks	17
	Beef	10
	Sambals (spices paste)	8
2	Vegetables	53
3	Traditional Pastries	56
4	Meals (food in portion)	13
	Total	206

Mandailing Natal is surrounded by several rivers, including the Batang Gadis River, where various fish inhabit along the river flow [10]. Additionally, some areas of Mandailing Natal border the sea, including processed fish dishes such as carp, eel, *baung* fish, *pora-pora* fish, anchovies, snapper, mackerel, shrimp, and others in their culinary signature. These fish are expertly

prepared using Mandailing's signature spices like *kecombrang, asam cakala,* Batak onion, ginger, galangal, and other ingredients. The result is a variety of flavorful dishes, including *gulai*, *rendang*, *pepes, balado*, and *sambal*.

Mandailing's enjoy dishes with preserved fish-based ingredients [5], such as smoked (salted) and salted fish. The prevalence of culinary dishes made from smoked and salted fish is evident compared to those made from fresh fish. Among the animal-based side dishes, those coated usually originate from river fish, including marinated fish like anchovies, fine shrimp, mullet, *tori* fish, *tundeman*, *tui* salted fish, *kapas* salted fish, *aso-aso* fish, *todak* fish, and others. Salted fish is commonly processed into chili sauce, combined with *gulai* spices, and mixed with vegetables like sweet potato leaves, fern leaves, eggplant, and even bananas. In addition to fish dishes, chicken, duck, beef, goat, and organ-meat preparations are also popularly processed using *gulai*, rendang, chili sauce, and soup.

Vegetables are abundant natural resources in Mandailing, resulting in various vegetable dishes. The Mandailing people have 53 types of vegetable dishes that are processed and served daily. Most of these dishes are prepared by boiling with coconut milk, known as *gulai*, while others are fried, boiled, steamed, and grilled [3]. The Mandailing people enjoy various processed vegetables, including sweet potato leaves, *petai*, bamboo shoots, bean sprouts, *bulung gadung*, papaya leaves, moringa leaves, bananas, long beans, raw durian, spinach, *jengkol*, young rattan shoots (*pakat*), cabbage, sumangge leaves, chayote, young jackfruit (*cibodak*), yellow pumpkin, *kundur* pumpkin, purple eggplant, mustard, *genjer*, banana core, straw mushroom, cassava leaf stem, and sugarcane flower. Notably, young rattan shoots are commonly consumed during the fasting month as they are believed to increase appetite and endurance throughout the day [6]. Preparing *pakkat* from rattan shoots involves burning them over coals or charcoal in a barrel for about 15 minutes until the shoots soften. The rattan skin is then peeled off, revealing the white rattan meat inside, known as pakkat. Most vegetable processing involves sugaring, sautéing, grilling, and using tauco as a mixture.

Traditional Mandailing cakes are also diverse and known for their sweet taste. The use of brown sugar is characteristic of these traditional cakes, such as dodol, putu, and others. Some well-known traditional cakes include *dodol (alame), itak poul-poul*, banana *garubi*, onion cake, *copit* cake, *srikaya* cake, and others. The Mandailing community also retains traditional cooking methods using bamboo to make *lomang gadung, lomang itak*, and *lomang sipulut. Dodol* or *Alame*, for instance, is a traditional Mandailing snack made from white glutinous rice flour, palm sugar, and coconut milk,

packed in woven pandan leaves in a unique shape [11]. It boasts a sweet taste and a dense texture [12].

The Mandailing Batak culture shares similarities with other regions regarding the portion or delicious food. However, some dishes, such as *toge panyabungan*, *bolgang pisang pati*, and *tarutung pati*, are unique to the Mandailing Batak [5].

3.2. Design

The design stage begins with creating an e-book draft based on the identified food groups. The study's results revealed 206 Mandailing culinary dishes, categorized into four groups: side dishes, vegetables, traditional cakes, and delicious cakes. The draft is structured to include a cover, table of contents, recipes, and photos for each food group. A format is utilized to ensure consistency and organization throughout the e-book.

The development of the typical Mandailing culinary e-book is guided by the CASE approach (Creative, Active, Systematic, Effective), aiming to enhance interest and creativity [9]. The e-book is designed with captivating and imaginative images, encouraging readers to explore and learn about culinary offerings actively. The information is presented systematically and effectively to facilitate easy reading and dissemination [13]. The content is arranged in a comprehensive, clear, and attractive manner, allowing readers to understand the culinary treasures of Mandailing better.

3.3. Develop

At this stage of development, the completed e-book undergoes validation by experts, including material experts and media experts. Validation with subject matter experts involves incorporating their suggestions to address inappropriate sentences and terms in Mandailing, ensuring consistent recipe writing, and improving image appearances. This validation process is conducted twice, before and after the revision. The initial validation resulted in an average score of 4.1, which increased to 4.7 after implementing the suggestions and input from material experts. The content of the Mandailing culinary e-book received a rating of 4.7, indicating its high quality and adherence to authentic Mandailing cuisine. The validation results, as shown in Figure 1, demonstrate that the overall material validation outcomes are categorized as good.
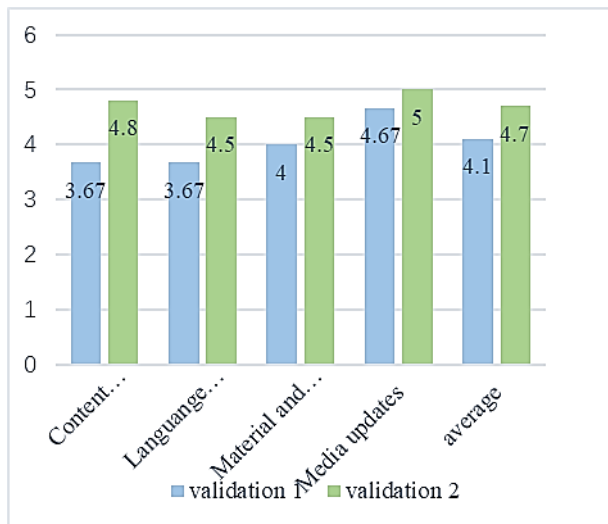
Figure 1 The results of material validation before and after revision.

Validation by media experts plays a significant role in assessing the interactive Mandailing Culinary e-book developed through the research stages (Figure 2). The validation process is conducted twice, both before and after the revision. The results indicated that the initial validation by media experts yielded an average score of 4.03, significantly improving to 4.67 after implementing the revisions. According to media experts, this e-book is considered highly suitable for presentation completeness, graphic feasibility, and usability as an electronic resource for those seeking culinary information.
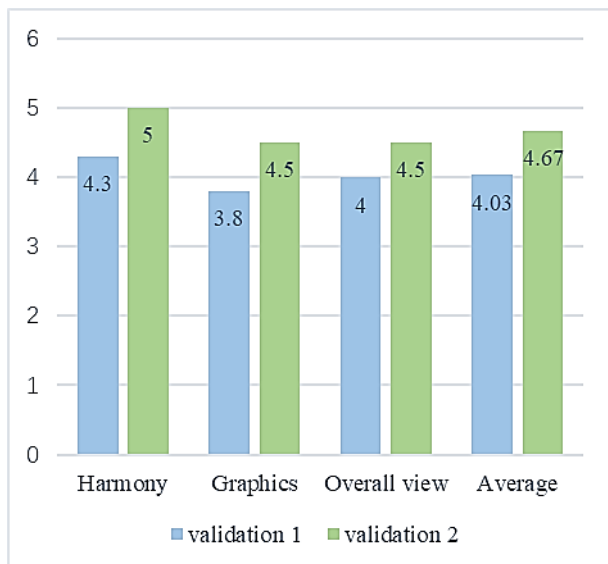
Figure 2 Media validation results before and after revision.

The material and media validation results are then used to revise and improve the e-book according to input from material experts and media experts. Material experts highlight the importance of systematically presenting content to enhance reader comprehension.

Developing e-books with interactive concepts (CASE) proves especially valuable for documenting traditional culinary, as it ensures simple and exciting literature is easily understood by readers [9], [14].

The book's content is engaging, simple, concise, and precise. This approach enables readers to understand how to use the interactive e-module and what aspects need consideration during its operation. Language factors and writing patterns also play vital roles in reading comprehension [15]. The e-book's material is interactive, employing a fixed and consistent pattern in writing [14]. The revised Mandailing culinary interactive E-book display is depicted in Figure 3.
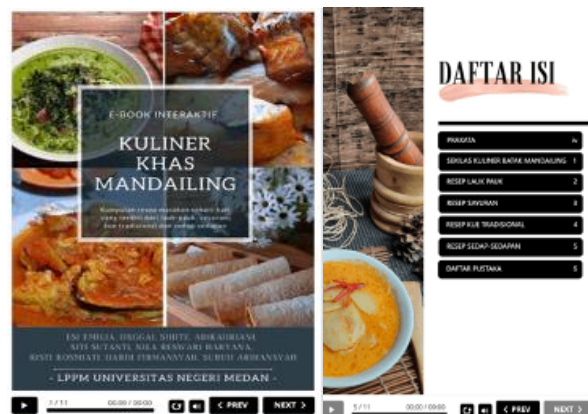

Figure 3 Mandailing culinary interactive e-book display.

3.1. Disseminate

The revised e-book underwent implementation through small group trials. These trials involved ten selected students allowed to study the developed e-book. Following this, they filled out a questionnaire assessing the readability level of the e-book. The feedback from the e-book readability questionnaire served as a foundation for further improvements, ensuring that the e-book evolved to a higher standard than its previous version. The overall result of the small group trial was 4.35, with a maximum score of 5. These results are in accordance with several studies regarding the development of culinary-related interactive ebooks. It is known that interactive ebook media as teaching materials can be categorized as feasible from the aspect of validity, effectiveness, and practicality [16]. There were also user response test results, in lecturers and students who were included in very positive category [17].

4. CONCLUSION

The development of the Batak Mandailing culinary e-book involves identifying various types of daily food and drinks. A total of 206 culinary dishes have been identified, categorized into four food groups: Side Dishes (processed fish, salted fish, poultry, beef, and goat), vegetables, traditional cakes, meals (food in portion), and delightful treats (*sedap-sedapan*). The development

process has followed the stages of definition and design. During the development stage, the e-book was validated by material experts and media experts, both of whom deemed the Mandailing Culinary Interactive e-book highly usable, with an average score of 4.7. Subsequently, dissemination efforts targeted students, resulting in an average score of 4.35, with a maximum score of 5.

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