

Development of Kitchen Skills for Down Syndrome Students in Preparing Indonesian Gastronomy

Pengembangan Kitchen Skill Siswa Down Syndrome dalam Membuat Gastronomi Nusantara

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Abstract

An adaptive approach is required in the process of kitchen skills education for students with Down Syndrome to help them understand and master practical skills. The goal of this teaching activity is to increase the independence of Down Syndrome students through the visual learning method, especially at the service activity location, SLB Ngamprah Raya in West Bandung Regency. This method was chosen because students with Down Syndrome tend to have stronger visual comprehension, despite experiencing cognitive and physical limitations. This service activity involves cooking training using high-protein, gluten-free, and casein-free ingredients from Nusantara gastronomy, featuring a menu of Sate Lilit and Seaweed Jelly Ice. Through the visual approach, students can more easily understand the steps of cooking and improve their fine motor skills. The results of the activity show improvements in students' practical skills and confidence, as well as social benefits gained from participating in group activities. This indicates that visual learning is effective in supporting the development of life skills for students with special needs. The sustainability of this activity, carried out regularly at school or at home, is expected to become one of the effective methods used by guardians and teachers of special needs schools (SLB) to improve the motor skills, self-confidence, and independence of children with Down Syndrome.

Keywords: Down Syndrome; visual learning; kitchen skills; Indonesian gastronomy; community service

Abstrak

Pendekatan adaptif diperlukan dalam proses pendidikan keterampilan dapur bagi siswa dengan Down Syndrome guna memahami dan menguasai keterampilan praktis. Kegiatan pengajaran ini bertujuan untuk meningkatkan kemandirian siswa Down Syndrome melalui metode visual learning terutama di Lokasi kegiatan pengabdian yaitu SLB Ngamprah Raya Kabupaten Bandung Barat. Metode ini dipilih karena siswa dengan Down Syndrome cenderung memiliki pemahaman visual yang lebih kuat, meskipun mengalami keterbatasan kognitif dan fisik. Kegiatan pengabdian ini melibatkan pelatihan memasak menggunakan bahan tinggi protein tanpa gluten dan casein dari gastronomi Nusantara dengan menu Sate Lilit dan Es Agar-agar Rumput Laut. Dengan pendekatan visual, siswa dapat lebih mudah memahami langkah-langkah memasak dan meningkatkan keterampilan motorik halus mereka. Hasil kegiatan menunjukkan peningkatan dalam keterampilan praktis dan kepercayaan diri siswa, serta manfaat sosial yang diperoleh melalui partisipasi dalam kegiatan kelompok. Hal ini menunjukkan bahwa visual learning efektif dalam mendukung perkembangan keterampilan hidup bagi siswa dengan kebutuhan khusus. Keberlangsungan kegiatan ini secara rutin di sekolah atau di rumah diharapkan dapat menjadi salah satu cara efektif yang dilakukan oleh para wali dan pengajar SLB dalam meningkatkan kemampuan motorik, kepercayaan diri dan kemandirian pada anak dengan Down Syndrom.

Kata kunci: Down Syndrome; keterampilan dapur; visual learning; gastronomi nusantara; kemandirian siswa

1. INTRODUCTION

Kitchen skills education for students with Down Syndrome requires an adaptive approach to accommodate their needs in understanding and mastering practical skills (Krasniqi, V et al., 2022). The learning abilities of children with Down Syndrome vary depending on their intellectual levels, which generally range from mild to moderate. According to the American Association on Intellectual and Developmental Disabilities (AAIDD), individuals with Down Syndrome usually have below-average IQs, with IQ scores ranging from 50 to 70 for mild intellectual disabilities and 35 to 50 for moderate intellectual disabilities. This classification influences teaching approaches, as they tend to require simpler instructions, repetition, and hands-on learning to reinforce their understanding and skills.

One approach considered effective is visual learning, where information is conveyed through visual representations such as pictures, diagrams, or videos. Research has shown that visual approaches can improve fine motor skills and coordination, which often present challenges for students with Down Syndrome (Krasniqi, V et al., 2022; White et al., 2023). Additionally, children with Down Syndrome tend to have poor short-term memory but exhibit strengths in visual-spatial intelligence (Sideropoulos et al., 2023). The use of visual learning is highly beneficial for students with Down Syndrome as it can optimize their visual-spatial intelligence, which is a strength, while also helping to overcome challenges related to short-term memory limitations, fine motor skills, and coordination. This method allows students to more easily grasp information through visual representations, thus supporting their development of practical skills more effectively. A three-month study on children with special needs showed a significant improvement, with the percentage of excellent performance increasing from 0% in the first month to 26.7% in the third month, indicating that visual learning is considered highly effective (Jeetha, S & Prasad, K. K, 2024).

Students with Down Syndrome often face cognitive and physical limitations that impact their ability to develop kitchen skills (Ku, B., 2020). Several studies have revealed that visual methods can help students with special needs to better understand the concepts being taught, particularly those involving technical skills. In this context, visual learning helps students overcome difficulties in comprehending complex verbal instructions and facilitates independent learning.

Visual learning has been widely applied in various fields of special education, and specifically in kitchen skills training, this method has been proven to enhance student participation and performance (Wuang, Yee-Pay & Su, Chwen-Yng, 2011). Students with Down Syndrome who use visual learning methods show significant improvement in cutting, mixing, and cooking skills. Other studies also mention that this approach enhances students' understanding of work sequences and the use of kitchen equipment (Snowling et al., 2008). With visual learning, students can more easily understand and remember the sequence of steps in cooking or other kitchen skills, ultimately increasing their independence in daily activities. This approach also helps reduce students' reliance on direct supervision and boosts their confidence in completing tasks independently (Lorenz, S., & Heinitz, K., 2014).

Nusantara gastronomy, a part of Indonesia's culinary heritage, presents various complex traditional cooking techniques (Prastowo et al., 2023; Mardatillahet al., 2019). Teaching Nusantara gastronomy to students with Down Syndrome through visual learning methods helps them to understand the cooking process more deeply. Additionally, Nusantara gastronomy introduces students to local food resources around them. Nusantara gastronomy is closely related to local food processing (Putri & Yulianto, 2022), so studying gastronomy supports the sustainable use of local food resources. Students with Down Syndrome tend to learn more effectively through approaches involving concrete experiences. This is because they often face challenges in understanding abstract concepts, processing information, and mastering motor skills related to everyday activities. Teaching kitchen skills using visual methods or experiential learning helps students with Down Syndrome connect abstract concepts with real actions, improving their understanding of the steps involved in specific activities like cooking.

SLB Ngamprah Raya, a special needs school in Indonesia, has implemented the "Merdeka Belajar" program, but cooking classes focused on students with Down Syndrome have not yet been conducted. Therefore, this initiative aims to further explore the effectiveness of the visual learning approach in developing kitchen skills for students with Down Syndrome at SLB Ngamprah Raya, particularly in the context of teaching Nusantara gastronomy. By understanding the potential of this method, it is hoped that more appropriate learning strategies can be developed to support the independence and life skills of students with special needs.

The primary partners of this community service are 12 students with Down Syndrome at SLB Ngamprah Raya, along with their accompanying teachers. The partner location is at Jl. Cihaliwung Wetan, RT. 05, RW. 03, Sukatani, Ngamprah, Sukatani, Kec. Ngamprah, Kabupaten Bandung Barat, Jawa Barat 40552. This SLB was chosen because the majority of the students come from low to middle-income families. It is hoped that the menu designed will meet the nutritional needs of the Down Syndrome students according to their capabilities.

SLB Ngamprah Raya was established in 2005 after its initial founding in 2002, with operational permission granted in 2007. Currently, the school faces issues with government attention related to financial, human resource, and facility constraints. With approximately 100 students, there are only 13 teachers and 3 staff members, some of whom are still on temporary contracts. There are only 3 teachers for Down Syndrome students, and the lack of instructors makes teaching less effective. According to Indonesian Law Number 35 of 2014 concerning Amendments to Law Number 23 of 2002 on Child Protection, Article 9, Paragraph 2, and Article 12, the situation at the partner location shows that the students have not fully received the proper education to achieve the well-being set by the state.

The children at SLB Ngamprah Raya, especially those with Down Syndrome, mostly come from low-income families. Although the school encourages students to bring their own lunches, many families cannot provide proper nutrition for their children. Upon observation, due to economic limitations, children are often given meals consisting of just rice with MSG seasoning or instant noodles in plastic cups. Additionally, due to financial issues, out of the total number of students, only about 20 parents pay the school fees, which range from Rp20,000 to Rp50,000 and are not paid regularly. SLB Ngamprah Raya relies solely on the annual BOS fund of Rp4,000,000, which is allocated for school maintenance, staff wages, and teacher salaries. The school struggles to provide effective teaching and the proper rights for the students. There are 7 classrooms, but some are partitioned with thin plywood to separate teaching levels based on the students' mental ages.

2. METHOD AND MATERIALS

A case study approach is used to explore a deep understanding of a specific phenomenon, namely the development of kitchen skills through visual learning. This case study will focus on students at SLB Ngamprah Raya who have Down Syndrome and are participating in a cooking skills training program using local ingredients from Nusantara gastronomy. This qualitative research also involves direct interaction with the subjects to understand how the visual learning method influences students' skills. The research is conducted in four main stages:

- a. Preparation: In this stage, the researcher designs a Nusantara gastronomy learning module based on visual learning. The module includes the use of pictures, tutorial videos, and step-by-step instructions that are simple and easy to understand for students with Down Syndrome.
- b. Implementation: In this stage, students receive cooking skills training using the visual learning method. Each learning session is accompanied by visual guides to help students understand the cooking procedures. Cooking activities are carried out in small groups to provide special attention to each student.
- c. Observation and Interviews: Direct observation is conducted during the learning sessions to observe how students practice kitchen skills based on visual instructions. In addition,

interviews with teachers and caregivers are conducted to gain their perceptions of the students' progress.

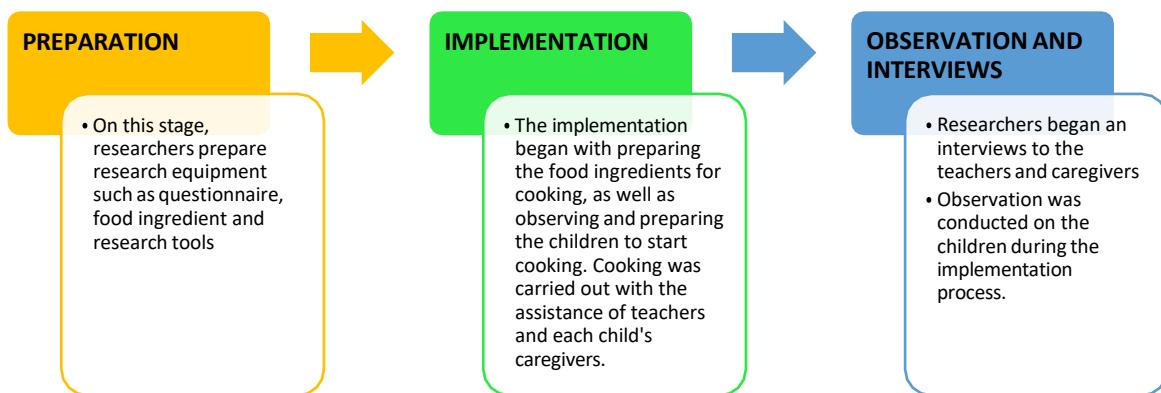


Figure 1. Research Flow Diagram

d. **Activity Evaluation:** Data collection is carried out during the implementation of the activities, along with interviews with accompanying teachers and parents as testimonials of the activity. The following are the assessment indicators used during the activities:

- 1) Recognizing ingredients and tools
- 2) Dexterity or skill in working
- 3) Neatness in working
- 4) Cleanliness in working

The scoring criteria are as follows:

- 1) The child is given a score of 0 if unable to perform the task
- 2) The child is given a score of 1 if able to perform with physical assistance
- 3) The child is given a score of 2 if able to perform with verbal assistance
- 4) The child is given a score of 3 if able to perform independently.

3. RESULTS AND DISCUSSION

The activities were conducted in August 2024, over two sessions. The activities began with an introduction to ingredients and tools, followed by a cooking class. In the kitchen skills development program at SLB Ngamprah Raya, students with Down Syndrome were taught how to make Sate Lilit, a traditional dish from Bali that is part of the Nusantara Gastronomy heritage (Pugra, 2016; Sukerti & Marsiti, 2019; Sutaguna et al., 2022). They were also taught how to make seaweed jelly ice, a drink made from abundant local ingredients in Indonesia. The activities were attended by students with Down Syndrome and their accompanying teachers.

Children with Down Syndrome require a special diet low in casein and gluten to prevent tantrums and improve their daily social conditions (Ginting SA, Ariani A & Sembiring T, 2016; Afnuhazi R & Sari FS, 2019). Foods high in casein and lactose include dairy products, with casein being a type of protein found in milk that makes up about 80% of its composition. The sugars in milk include lactose (Mardelana I, 2021). Sate Lilit and Seaweed Jelly Ice have chicken meat and jelly as their main ingredients. These foods are rich in protein, minerals, and vitamins, without containing lactose and casein. In the seaweed jelly ice composition, coconut milk replaces dairy milk, ensuring the diet remains intact. The following outlines the nutritional content of Sate Lilit and Seaweed Jelly Ice per serving.

Table 1. Nutrient Component

Nutrient Component	Sate Lilit (1 Portion)	Seaweed Jelly Ice (1 Portion)
Energy	135 Kkal	100 Kkal
Protein	7 g	1 g
Fat	11 g	5 g
Charbohydrate	3 g	14 g
Calsium	9 mg	188 mg
Phosfor	80 mg	75 mg
Iron	1 mg	2 mg
Vitamin A	260 RE	12 RE
Vitamin B	0 mg	0 mg
Vitamin C	0 mg	1 mg



Figure 2. How to Make Sate Lilit



Figure 3. How to Make Seaweed Jelly Ice

The visual learning method can enhance the understanding of complex concepts, including kitchen skills, because students with Down Syndrome tend to process visual information faster than information presented verbally or textually (Boato et al., 2022). In the context of Nusantara gastronomy, students trained using visual instructions more easily recognize local ingredients and the traditional cooking techniques being taught.

In addition to understanding cooking procedures, observations also showed improvements in students' motor skills, particularly in cutting, mixing, and processing food ingredients. After training with the visual approach, students demonstrated increased dexterity

in using kitchen tools. They became more skilled in handling knives, spoons, and other cooking utensils, which is a key indicator of significant fine motor skill development.



Figure 4. Childern's Activity Make Sate Lilit

Interviews with the accompanying teachers revealed an increase in students' confidence and social participation. Students who were previously passive and tended to need assistance in kitchen activities began to show a desire to try new tasks independently. They also became more active in interacting with their classmates during the cooking sessions, which enhanced their social engagement.

Table 2. Children's Motoric Skill

No	Name	Indicator			
		Recognizing ingredients and tools	Dexterity or skill in working	Neatness in working	Cleanliness in working
1	Fitri Widiansyah	3	2	2	3
2	Mutia Hasna Arsani	3	2	2	3
3	Nazwa Khoirunnisa	3	2	2	3
4	Wina April Yanti	3	2	2	3
5	Kenzie Dhiwa Azzahro	3	1	2	3
6	Ruhiyat	3	1	2	3
7	Nurul Husna	3	2	2	3
8	Nafiza Wafiq Azizah	3	1	2	3
9	M Eka Firdaus	3	2	2	3
10	Nenda Andriyanti	3	2	2	3
11	Neneng Ayu	3	2	2	3
12	Muhammad Dimas	2	1	1	3

From the Table above, it can be concluded that the students were able to follow the cooking activities fairly well. Although some students faced limitations in performing tasks independently and conveying instructions verbally, this did not hinder them from actively participating in the cooking process. With proper guidance and support, they were still able to engage in each stage of cooking. Additionally, the introduction of Nusantara gastronomy to the students was effective. The rich flavors of traditional Nusantara dishes made it easier for the students to remember the food and beverages they prepared, as the unique and delicious taste left a strong impression on them. The sensory aspects of this culinary experience also helped the

students recognize and appreciate Indonesian culinary culture through a fun and educational approach.



Figure 5. Childern's Activity Make Es Agar-Agar Rumput Laut

Involvement in structured cooking activities with a visual approach can help students with special needs, such as Down Syndrome, to feel more confident and motivated in completing practical tasks. Active participation in kitchen activities also serves as a form of social reinforcement, where students can experience the results of their hard work through the cooking process and by sharing meals with others.

Developing kitchen skills for students with Down Syndrome in preparing Nusantara gastronomy faces several challenges, most of which relate to cognitive and physical limitations, as well as the adaptation of teaching methods (Vandoni et al., 2023; Merzbach et al., 2023). One of the main challenges is that students with Down Syndrome often struggle to understand complex processes, especially when kitchen tasks require fine motor coordination and better memory skills (Jarrold et al., 2002; Laws, 2002). For example, preparing traditional Nusantara dishes such as rendang or sate involves a lengthy sequence of steps and cooking techniques that require a high level of precision. Students with Down Syndrome may have difficulty remembering the sequence of cooking steps, resulting in greater dependence on teachers or instructors.

Additionally, physical limitations such as hypotonia (low muscle tone) and weak motor skills can affect students' ability to perform kitchen tasks like stirring, cutting, or frying. These tasks require good hand-eye coordination, which is often challenging for individuals with Down Syndrome (Nadkarni et al., 2012). Another challenge is that while the visual learning method is effective for introducing concepts, it may not be strong enough to help students master skills that require higher sensory involvement, such as assessing the doneness of ingredients through touch or smell.



Figure 6. End of Product

4. CONCLUSIONS

This community service program demonstrates that the visual learning method effectively enhances cooking skills among students with Down Syndrome. Through the use of images, diagrams, and videos, students experienced significant progress in following instructions, improving fine motor skills, and building confidence in performing cooking tasks. The focus on traditional Indonesian cuisine not only introduces cultural elements but also provides valuable life skills to support their independence. The success of this program emphasizes the importance of adaptive teaching approaches in special education, particularly in developing practical skills that contribute to the independence and well-being of students. This initiative can serve as a model for future educational programs aimed at empowering students with Down Syndrome. The sustainability of this activity, carried out regularly at school or at home, is expected to become one of the effective methods used by guardians and teachers of special needs schools (SLB) to improve the motor skills, self-confidence, and independence of children with Down Syndrome.

ACKNOWLEDGMENT

The author would like to express gratitude to SLB Ngamprah Raya as the participant in this activity, as well as to the Research and Community Service Institute (LPPM) of Universitas Pendidikan Indonesia for funding this initiative.

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