

Nagmamahal, Mama (Love, Mom): An Interactive, Collaborative Cookbook Addressing Pediatric Malnutrition and Picky Eating Behaviors in Children from Quezon City, Philippines¹

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Abstract

Malnutrition in early childhood severely impairs cognitive development, academic performance, and long-term social mobility. In the Philippines, the Pantawid Pamilyang Pilipino Program (4Ps) is a government initiative that provides financial assistance to low-income households, yet it lacks a strong focus on pediatric nutrition. Consequently, more than four million Filipino children under five remain underweight and stunted despite receiving aid intended for food and health.

This article presents an interdisciplinary intervention to help combat malnutrition, combining approaches from Psychology, Communication, and Information Design. Working with 30 families in Barangay² Matandang Balara, Quezon City, we conducted interviews, focus group discussions, and home visits to explore food practices and economic constraints. Insights revealed that children's cravings for salt, sweetness, and crunch often led mothers to choose packaged snacks over nutritious options.

In response, we co-created an interactive, community-based cookbook in Filipino, featuring affordable, healthy, and appealing recipes. The cookbook draws on Harvard Medical School's Healthy Eating Plate and integrates Zimmerman's Empowerment Theory, Goffman's Framing Theory, and the CRAP Principles of Visual Composition. Developed through iterative feedback with participating families, it has now reached 138 households and serves as a sustainable, locally grounded tool for promoting pediatric nutrition.

Keywords: community-based intervention; malnutrition; medical humanities

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² A *barangay* is the smallest administrative division in the Philippines, similar to a village or neighborhood.

Introduction

In children's formative years, there must be a strong emphasis on their education, care, health, nutrition, and social protection to foster their growth in physical, cognitive, linguistic, and socioemotional domains (Zubairi & Rose, 2017; World Bank, 2013). The Second Congressional Commission on Education (EDCOM II) stresses the idea that youths from infancy to eight years of age require proper nutrition, early education, and responsive caregiving to unlock the best of their abilities (EDCOM II, 2024). Moreover, achieving proper nutrition still stands as a significant thrust among developmental researchers in the Philippines, considering that around 4 million Filipino children aged five (5) and below are underweight and stunted. "Good nutrition can affect how young children fare in school. Research has shown that effective early childhood nutrition interventions lower the age of school start, improve reading comprehension and nonverbal cognitive ability test results, and boost the chance of earning more later in life," asserts EDCOM II.

The impact of nutrition and feeding on the cognitive, physical, social, and emotional development of children is strongly associated with their ability to become receptive to learning and to form positive relationships with the people around them (Sorhaindo & Feinstein, 2006; Sridhar, 2008). With these parameters, we can infer that malnourished children are more likely to incur developmental gaps and face intellectual challenges compared to peers who do not have nutritional deficiencies. Similarly, an early onset of malnutrition leads to poor academic performance, consequently limiting educational opportunities, hindering social mobility, and ultimately perpetuating a cycle of poverty.

For these reasons, children from four to ten years old were the main scope of our cookbook; improving their food intake may have significant benefits on their schooling and cognition. Thus, our work helps counter the detrimental effects of malnutrition by improving the nutritional status of children even after their first three years of life. Moreover, our cookbook also empowers mothers to make the right food choices early on to optimize their babies' nutrition from their infancy. Furthermore, our cookbook caters to a variety of food flavors and textures to make kids' food experiences more fun for them.

Having a well-balanced diet on a tight budget is challenging, but not impossible. Overall, our goal was to address pediatric malnutrition in the community by offering equally delicious and nutritious meal options for the kids. This was achieved through creating and compiling recipes with the available food options from local markets and compiling them into a follow-along cookbook. Thus, our group aimed to achieve the following objectives through the course of our work:

1. Gather data and capture the experiences of families and children from Barangay Matandang Balara through one-on-one interviews and focus group discussions (FGDs), guided by the components of the Food Choice Framework, to identify the available food budgets and options
2. Describe the effects of nutritional imbalances on their children's overall physical and psychological health by explaining how their current eating habits and food choices cause and exacerbate malnutrition
3. Curate a collaborative cookbook with 4Ps mothers written in Filipino with affordable, convenient, and healthy recipes for their children

The State of Matandang Balara, Quezon City

In the highly urbanized landscape of Quezon City lies a relatively populous *barangay* called Matandang Balara, or Old Balara, with a population of 71,022 in the 2020 Audit Report of the Commission on Audit. To further support the need for social security, the 4Ps, a government-led conditional cash transfer (CCT) in the Philippines, provides financial assistance and access to healthcare to indigent families, including families in Matandang Balara who registered into the program. Beneficiaries of the 4Ps in the Philippines receive a combination of monthly cash grants to support health, education, and nutrition. As of 2024, each household receives, reflected in U.S. dollars, around \$13.03 per month for health and nutrition support, and \$10.42 per month for rice subsidies. Educational subsidies range from at least \$5.21 at Elementary level, to a maximum of \$12.16 per child per month at Senior High School, depending on the child's grade level. These grants are conditional upon beneficiaries meeting specific health and education requirements.

However, despite the program's commitment to alleviating the plight of poor families, it has faced significant challenges and incongruities, which led to the community-led formation of the *Samahan ng Nagkakaisang Pamilya ng Pantawid*³ (SNPP). The SNPP, formally launched on November 30, 2016, is a parent-leader-led organization that advocates for the continuity of 4Ps. It was organized primarily to protect and promote the 4Ps program, to protect and amplify the voices of marginalized families, and to institutionalize the program through legislation.

Challenges in Quezon City healthcare were further nuanced by the SNPP mothers we interviewed for this applied research project. The Quezon City government aims to lessen the rates of underweight children and to reduce stunting and malnutrition among children, which led to the implementation of the Joy of Urban Farming program (JOUF) in 2010. However, despite the provision of resources like seedlings to households, malnutrition among children persists. This is particularly seen in the city's low dietary diversity in children aged 24-59 months in 2020 and 2021 (Auma et al, 2023). In the context of SNPP mothers in Matandang Balara, many of their children are underweight, and this is primarily due to insufficient portions and nutrients of food they eat, which impede their growth. In response to inflation, SNPP mothers often opt for substituting nutrient-dense food with cheaper and accessible alternatives. One SNPP mother shared that her children typically eat rice with soy sauce as a viand. Although they mentioned that the local government unit provided seedlings to them under the JOUF program, a problem they raised was that some of their children would not eat vegetables at all. We see in these problems how multifaceted nutrition is, highlighting the need for a more holistic approach in interventions to boost children's nourishment in the long term.

³ The *Samahan ng Nagkakaisang Pamilya ng Pantawid* roughly translates to the Association of United Bridging Families. It is a nationwide organization of 4Ps beneficiaries advocating for social protection and development.

Review of Related Literature

Examining the Limitations of a Local Food Model

To fight against malnutrition, the Department of Science and Technology (DOST) Food and Nutrition Research Institute established the *Pinggang Pinoy*⁴, a set of easily understandable infographics that show ideal food portions as seen on a plate to educate Filipinos on what their typical meals should look like. Food suggestions for these plates vary depending on the consumer's age groups, ranging from kids (3-12 years), teens (13-18 years), adults (19-59 years), and older persons (60 years and older), as well as a specialized plate for pregnant women. Following these age guidelines, the *Pinggang Pinoy* reflects the following standard food rations that the DOST deems appropriate for meeting nutritional needs regardless of age:



Figure 1.1: *Pinggang Pinoy* Food Plate Model
(Department of Science and Technology (DOST) Philippines, 2014)

However, a major discrepancy in this baseline diagram is that the figure is exactly the same for all age groups and developmental stages, with the only difference being the increased portion size suggestions as one gets older. Considering that a person's basal metabolic rate and daily activity level directly influence their nutritional needs (National Research Council, 1922), the portions of carbohydrates and proteins must vary to supply different individuals with enough energy to perform tasks and recover afterward. Furthermore, the plate appears more carbohydrate-dense instead of emphasizing protein intake and nutrient input by means other than fruits.

The model shows a large portion of rice and carbohydrate-rich fruit on the side. While fruits such as bananas and mangoes, as suggested on the website, are rich sources of dietary fiber (Phillips et al, 2021), they also contain significant concentrations of naturally occurring sugar. When paired with a serving of rice or noodles, they may cause a spike in blood sugar: an unideal consequence in people with diabetes and insulin resistance. Given these factors, the *Pinggang Pinoy* takes a rather one-size-fits-all approach to nutrition, which does not promote a deeper understanding of adequately fueling the body to fit one's unique metabolism, lifestyle, and comorbidities.

⁴ *Pinggang Pinoy* translates to "Filipino Plate," a food guide developed by the DOST to illustrate healthy meal portions.

Exploring an Alternative Model of Healthy Eating

In 2011, the Harvard T.H. Chan School of Public Health and Harvard Health Publishing introduced the Healthy Eating Plate. Harvard's guide offers more practical recommendations for maintaining a balanced diet by placing stronger emphasis on food quality rather than food categories.

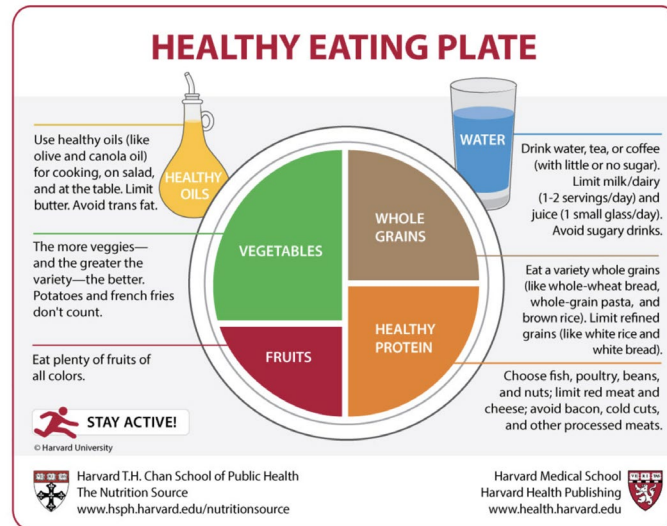


Figure 1.2: Healthy Eating Plate, Harvard Health Publishing (Harvard T.H. Chan School of Public Health, 2011)

When visually compared to the *Pinggang Pinoy*, Harvard's model shares a similar proportion of vegetables, stressing the importance of plant-derived vitamins. However, a key difference lies in the way the remaining half is divided: one-quarter of the plate is dedicated to healthy protein sources such as fish, poultry, beans, and nuts, while the other quarter is assigned to whole grains, such as brown rice, quinoa, and whole wheat. This is notably distinct from *Pinggang Pinoy*, which visually equates the grain portion with the vegetable portion and does not differentiate between refined and whole carbohydrates. In an agricultural country like the Philippines where rice is a staple, advocating for whole grains offers an accessible and sound adjustment.

Additionally, the Harvard model allocates a smaller space for fruits, moderating sugar intake naturally through portion control. It also includes healthy oils, such as olive and canola oil, along with a broader selection of beverages, encouraging water intake without hindering consumption of unsweetened tea or coffee. *Pinggang Pinoy*, in contrast, only depicts a single glass of water and lacks dietary fats despite their importance in hormonal health, brain function, and vitamin absorption.

Ultimately, the Healthy Eating Plate presents a more holistic and flexible approach to nutrition. Rather than promoting restrictions or rigid servings, it supports balanced eating with an understanding of individual dietary needs. Its comprehensive layout empowers individuals to make informed choices without negatively portraying any food group, fostering sustainable and inclusive dietary habits. Its holistic approach to nutrition aligns more closely with our diverse and evolving dietary needs, allowing for cultural adaptability. By incorporating whole grains, healthy fats, and more varied beverage options, we have deemed this plate to be a more appropriate foundation for our work.

Nutritional and Cognitive Stimulation Against Malnutrition

McGregor et al. (1997) investigated the long-term impacts of early nutritional supplementation and psychosocial stimulation on the cognitive development of stunted Jamaican children. The study involved 127 children aged 7–8 years who had been stunted in early childhood and had received food supplementation, cognitive stimulation, both, or neither during infancy. Their results showed that both interventions independently contributed to improved cognitive outcomes, with the combined treatment group showing the most significant improvement as they very nearly caught up to their healthy peers. However, the study also noted that the effects were not entirely additive at the end of the intervention, and some benefits were more pronounced in children whose mothers had higher verbal IQs. Overall, the findings underscore the importance of early nutritional and cognitive interventions in mitigating the effects of early childhood stunting on later development.

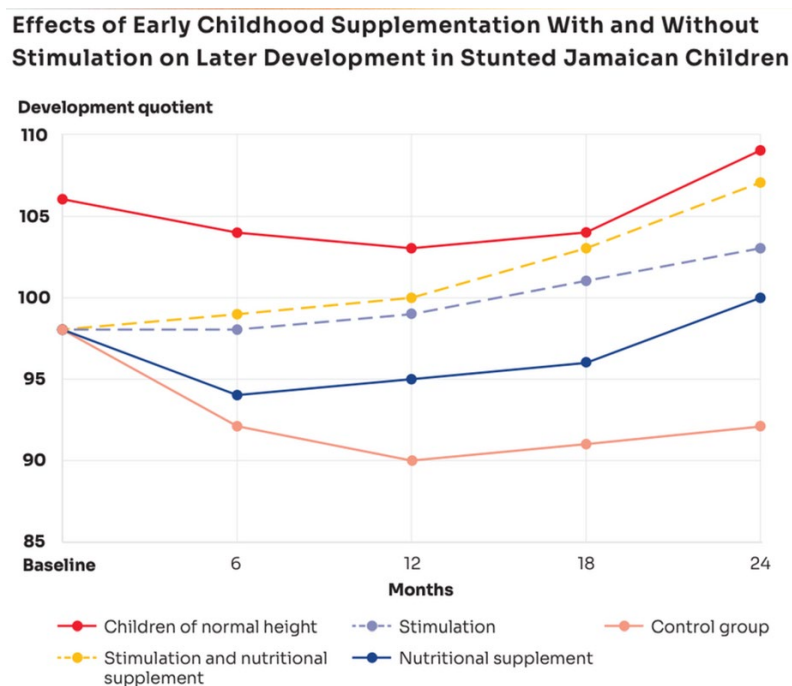


Figure 1.3: Effects of Childhood Supplementation and Stimulation on Development (Grantham-McGregor et al., 1997)

While the effects of malnutrition may not be entirely reversible compared to healthy controls, this evidence suggests that targeted interventions can yield significant improvements. Ensuring adequate and timely nutritional support while providing cognitive stimulation have shown the best promise in mitigating developmental delays, which aligns with the objectives of our interactive cookbook.

Methodology

Phase 1: Implementing Ethical Considerations

Before data gathering, we sought to ensure that our respondents fully understood the ethical terms of our project. We explained that we would obtain their informed consent and that we would not incentivize their participation in any way. With the help of our thesis adviser, we distributed consent forms written in Filipino for our partner parents to consider and sign,

emphasizing that they and their children's participation in our research is fully voluntary, and that they may withdraw or refuse to answer our questions at any time.

Additionally, we pledged to our respondents that their identities will not be disclosed nor appear anywhere in the study. Instead, we used pseudonyms to represent each respondent, adult or child, who imparted personal information for our study. Moreover, we treated our respondents without any judgment or prejudice for the stories they shared with us.

Lastly, before seeking feedback from our partner community in terms of the quality of our proposed recipes, we ourselves tested out the food we cooked to ensure that it would not cause any adverse reactions in the body. We also computed estimates of each recipe's macronutrient content before bringing samples of our cooking to our local families for them to taste; afterwards, we modified the amount of the ingredients used to fit their liking, and ensured that our food's nutritional contents were still viable before disseminating the final recipes in our cookbook.

Phase 2: Data Gathering

Devising a nutritional cookbook for kids and their parents to follow along goes beyond merely telling kids to eat nutritious food for them to be healthy. Rothe and Dunn (2021) state that personal food systems are multidimensional, as they comprise various elements and forces influencing people's food choices and eating habits. This is why we explored the food systems of SNPP mothers and their children to properly inform the creation of the recipes and their presentation in our cookbook.

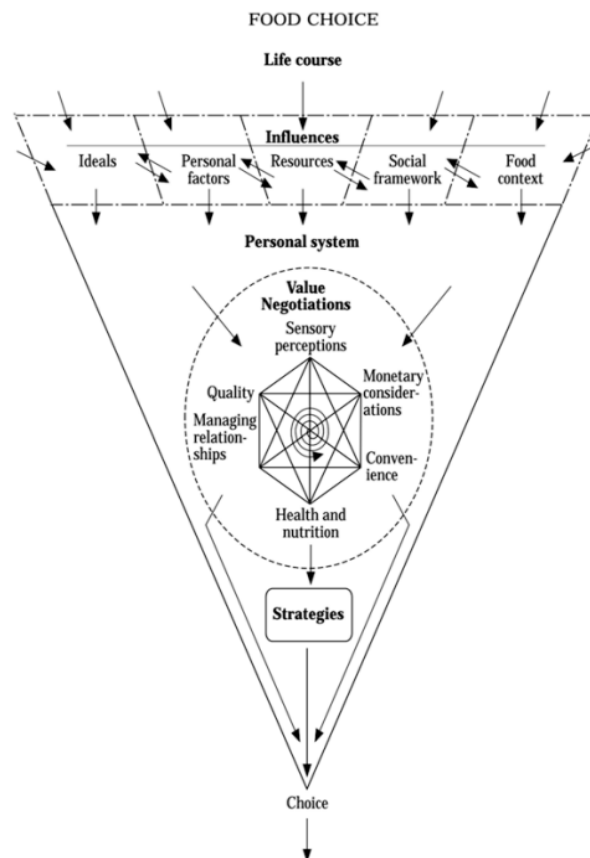


Figure 2: Food Choice Framework (Furst et al, 1996)

Rothe and Dunn (2021) utilize and recommend Furst et al.'s (1996) Food Choice Framework, a conceptual model for understanding personal food systems when designing healthy eating experiences. As illustrated above, this model looks into several influences on an individual's food choices, specifically ideals, personal factors, resources, social framework, and food context. It also explores certain values placed in food choices, such as sensory perceptions, monetary considerations, convenience, health, and nutrition. Thus, we grounded our data collection on these variables to have a substantial understanding of how the families and children of Matandang Balara view food as nourishment and as a social symbol. Following this framework, we then asked the mothers for consent by having them read and sign data waivers, to which they agreed to share their information for the objectives enumerated in our project.

Over five weeks, we conducted focus group discussions and one-on-one interviews with five representative mothers in Matandang Balara for data collection; each team member got to interview a different mother on a rotational basis, having in-depth conversations about their aspirations and frustrations in the community. As the barangay representatives, they possess deep familiarity with the inner workings of the 4Ps system, as well as with the everyday challenges and needs of families in their area. We especially consulted them to know what kinds of recipes would be most helpful and familiar to them. From this, we gathered a list of common ingredients they suggested, which included basics like eggs, vegetables, and noodles. Fish and rice were also emphasized as key parts of their meals. These inputs helped us choose ingredients that fit the mothers' usual cooking routines well.

Furthermore, our intervention would have been merely prescriptive if we limited our roles to conducting interviews, independently creating recipes, and sharing these to the participants for them to follow. Instead, we ensured that our output truly reflected their lived experiences; we simply processed the information shared with us by our local families, and returned it to them in the form of a tool that can help them eat well. In doing so, we adapted our project to align with their needs, emphasizing that our solution was rooted in their contributions rather than imposed by us externally. By grounding the cookbook in the community's context, we underscored how our final product emerged from the interplay of both our partner community's participation and our facilitation.

Phase 3: Data Analysis

We then applied a Thematic Analysis to identify patterns and themes within the data gleaned from the interviews. The qualitative data, which are the transcripts and notes from the interviews, were segmented and translated into codes. Then, these codes were organized into themes, and analyzed according to how these themes inform the objectives of the project. Three of these key themes are reflected below.

Table 1: Thematic Analysis

Theme	Codes	Code Description	Number of Respondents
Finances	Amount	Total funds received	5
	Division	Sharing of funds per family	3
	Timeline	Temporal aspect of cash grants	5
Attitudes	Children	Concern towards their kids	5
	Neighbors	Concern towards neighbors	5
	Health	Concern for health	5
Food-related	Behavior	Habits affecting nutrition	5
Practices	Routines	Regularly followed mealtime actions	2
	Frequency	How often meals are eaten	3

Finances

In Matandang Balara, families enrolled in the 4Ps program continue to struggle with financial instability; the cash grants they receive are reportedly inadequate, and at times do not arrive on time. While some beneficiaries receive relatively higher amounts, others report significantly lower monthly support, with no clear explanation for the disparity. For example, some mothers shared that they received only ₱2,700 to ₱2,900 (approximately \$47–\$50 U.S. dollars) in a month, despite expecting up to ₱3,900 (around \$68 U.S. dollars) for educational assistance alone. In contrast, others reported monthly incomes ranging from ₱6,000 to ₱8,500 (roughly \$104 to \$148 U.S. dollars), revealing a noticeable gap in how the program is implemented across households.

Adding to this challenge, most of the families interviewed had at least two children, with a few supporting up to seven family members on limited funds. All five mothers emphasized the difficulty of having to stretch these already minimal resources to food, education, and basic needs. The burden is further exacerbated during months when the cash grants are reduced or delayed. This reflects how insufficient social assistance can leave vulnerable families in a cycle of financial insecurity.

Attitudes

The mothers hold deep concern for their children's health and future. Many of them shared that their children often refuse to eat the home-cooked meals prepared for them, which causes both frustration and worry. This reflects the mothers' struggle to maintain their children's well-being, especially when their options are already limited by tight budgets. A sense of collective responsibility and shared struggle was also evident in the mothers' reflections. All expressed concern for their neighbors and extended relatives who live in close quarters: often entire families within cramped, vertically arranged homes. Since they would often share food, water, and electricity, this further stretches already limited supplies and increases the risk for spreading diseases. Additionally, two mothers also expressed concern for their husbands, who rely on irregular, informal jobs to sustain the family's needs. These concerns reflect how they value collective well-being in addition to their children's future.

Food-related Practices

An important factor pointed out by the mothers was the general lack of consistency in meal schedules and eating patterns within their households. Not all their families eat together at the same time, and meal times often vary depending on the availability of food or on their children's behavior. In some cases they would skip meals altogether, while others would sporadically snack throughout the day. These irregularities affect both nutrition and the sense of mealtime routine.

Compounding this challenge are behavioral difficulties around feeding that each mother also pointed out. Many shared how hard it is to get their children to eat, describing scenarios where they have to chase after them or coax them repeatedly, as some children often refuse to sit for meals. Some children would also "escape" to nearby stores or other houses to get candy or snacks, further complicating efforts to establish healthier eating habits. These scenarios underscore the mothers' desire for routine family mealtimes, not only to improve their children's eating behaviors but also to foster a sense of togetherness.

Phase 4-5: Recipe Research and Testing

After collecting and interpreting the data, we did a hands-on search for ingredient options and alternatives that the 4Ps families could access. We visited markets near the community, making a list of possible food items to be used along with their respective prices. From there, we worked around the food parameters given by the mothers, taking their kids' requests into account while emphasizing nutritional value. We based our recipe portions on the Healthy Eating Plate and double-checked the daily recommended values of macronutrients from the National Institute of Health.

After developing these baseline recipes of traditional Filipino food with healthier alternatives, our team proceeded to cook the recipes to see if they were workable, and adjust for flavor accordingly. When our initial draft of recipes was completed over a week, we then sought feedback. We consulted the mothers and their kids regarding the meals we prepared, sharing full meal samples and asking for additional suggestions for improvement. Once approved, we revised our recipes accordingly, ensuring they still included the healthier flavor substitutes for the typical sodium-dense, sugary, and crunchy food the children would eat. In this sense, our cookbook is a collaborative effort that ensures the applicability and practicality of the home-cooked meal ideas we provided.

Phase 6: Devising the Cookbook

Our project draws from both psychological and sociocultural frameworks to empower kids to take care of their health and to cultivate more sustainable eating habits. One of the key theoretical foundations we draw from is Goffman's Framing Theory, which highlights how individuals interpret and communicate with the world through socially constructed frames; these are mental structures that provide context and meaning to everyday experiences. These frames shape how people perceive situations, assign value to actions, and choose how to respond. Thus, Goffman posits that meaning is not fixed or inherent, but, rather, is produced through the lens through which it is experienced. In applying this theory, our cookbook reframes the act of eating and food preparation from a mundane or "obligatory" task into an imaginative, empowering activity. We aimed to foster the idea that meals are not simply recipes to be followed, but episodes in an unfolding adventure where children play a significant role.

Hence, to reshape kids' food-related behaviors, we designed our cookbook to present each recipe as a mission or journey by assigning the children an integral role such as helper, hero, or explorer. To assure cultural sensitivity within playful storylines, each recipe involves notable settings and side characters from Filipino culture and mythology. This also fosters a sense of agency, encouraging children to make independent decisions and engage creatively through purposeful activity. By merging culturally-grounded storytelling with interactive food preparation, we aimed to strengthen children's relationship with food, transforming it from a point of struggle into an opportunity for exploration and empowerment.

Helping individuals gain a sense of control over their lives is also a central tenet of Zimmerman's Empowerment Theory. Psychological empowerment, as Zimmerman describes, offers a distinct approach to designing social interventions, emphasizing individual strengths, resilience, and self-determination. Rappaport (1985) further underscores that this kind of empowerment allows individuals to redefine their roles, not just as passive recipients of help, but as active participants in shaping their lives and communities. Among Zimmerman's proposed levels of empowerment, our project focuses on the Interpersonal component, which involves helping children build confidence, recognize their abilities, and make meaningful choices that promote their own well-being. This level is characterized by self-efficacy, or the belief in one's capacity to succeed in specific situations, along with self-esteem and autonomy. From here, our cookbook serves only as a flexible guide, such that the decisions, outcomes, and creative twists that kids want to add to their food are entirely theirs to make.

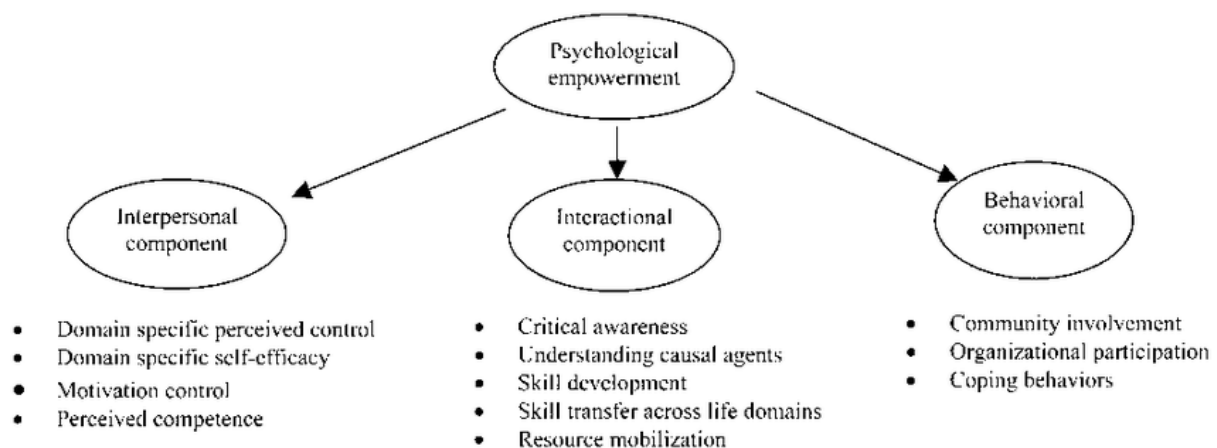


Figure 3: Zimmerman's Empowerment Framework (Zimmerman, 2000)

Additionally, our recipes feature “quirky,” unconventional methods of plating and food presentation. This design not only stimulates creativity, but also intentionally combats functional fixedness, the cognitive bias that limits people to using objects only in their traditional ways. By inviting children to reimagine how food can look, be arranged, and be interacted with, we encourage early development of flexible thinking and problem-solving.

In designing the visual layout of the cookbook, we applied graphic designer Robin Williams’s CRAP (Contrast, Repetition, Alignment, Proximity) principles to create a warm and engaging experience for children. First, we manipulated the Contrast to highlight important elements such as action steps, ingredients, and key story moments. We used bold and vibrant colors to draw attention to interactive prompts and character dialogues, distinguishing them from the rest of the narrative text. This not only makes the pages more exciting, but also helps children and their parents easily identify what they need to do by establishing visual hierarchy in each recipe page.

Next, Repetition played a crucial role in maintaining visual consistency across our different recipes. Icons, fonts, and layout structures were repeated throughout the book to give children a sense of familiarity and predictability, which is especially helpful for early readers or children with learning differences. This visual rhythm supports comprehension and encourages independent engagement with each new page.

To apply Alignment, all pages used 0.2-inch margins to maintain a clean, organized layout and to accommodate safe printing boundaries. Line spacing was also carefully considered: 1.5 spacing was used for general body text to promote legibility, while 0.135 spacing was applied to subheadings and recipe instructions for a compact and structured look; this is because our final cookbook was printed in a 5x8-inch format, so the kids could easily hold it and bring it around.

Finally, we ensured Proximity to strengthen the connections between related elements. We intentionally grouped word chunks, text blocks, and images close together to indicate that they are part of the same idea and narrative sequence. This helps young people cognitively understand that, for example, a character’s dialogue and a cooking step are part of the same story moment. By avoiding large gaps between related components, we maintained narrative flow and aimed to reduce confusion, allowing children to easily follow both the storyline and the recipe.

Excerpts from the Cookbook

Our cookbook features a total of 15 recipes divided into five essential food groups: carbohydrates, fish, chicken, soup, and desserts, with three recipes per category. Each recipe was designed not only to introduce the holistic and healthy portions suggested by Harvard Medical School (as discussed earlier), but also to immerse children in a playful narrative that promotes agency and decision-making. This section features selected excerpts from our cookbook, beginning with a look at the cover design, which sets the tone for the entire piece.

Cover Design

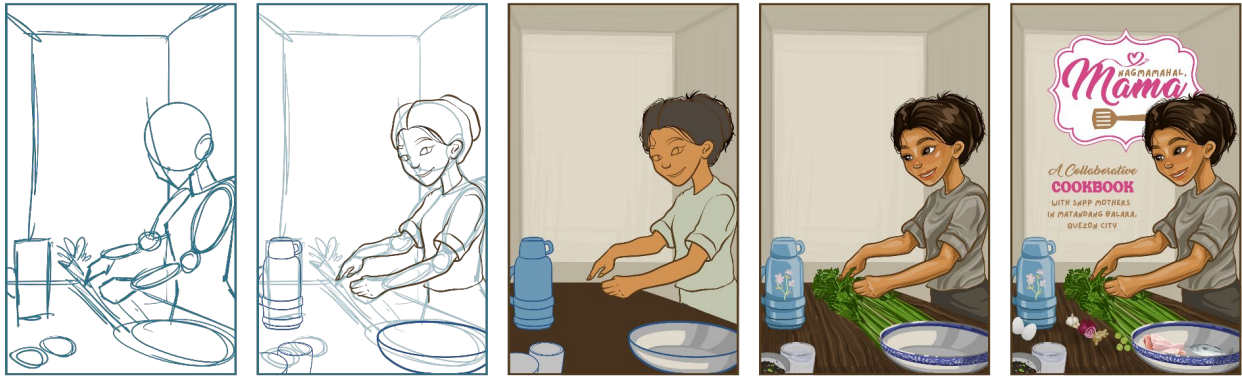


Figure 4.1: Cookbook Cover Page (Panergo, 2024)

To capture the essence of our title, “*Nagmamahal, Mama*”⁵ from the outset, we featured a mother who lovingly prepares food for her family on our cookbook’s cover page. We aimed to create a scene that is relatable to our partnered mothers by depicting her in comfortable clothing and a hair bun. For the background, we drew from typical items in a Filipino household like the Asian floral thermos, a traditional *mangkok*⁶, and locally sourced ingredients. We used a white frame with the hex code #FFFFFF under the title to make the pink text with a hex code #D44786 pop, guided by the Contrast principle in our design framework. The contrast ratio of text and background amounted to 4.16:1, passing the standard contrast ratio for large texts. We used MediBang Paint Pro for the main illustration of the cover page and Canva for the text, frame, and some ingredients on the table.

⁵ “*Nagmamahal, Mama*” translates to “Love, Mom” in English. The title encapsulates the idea of food as an everyday act of love and care from a mother to her children, reflecting the enduring significance of home-cooked meals.

⁶ *Mangkok* is the Filipino word for bowl, typically used for serving rice, soup, and other dishes. It is a common household item and an essential part of traditional Filipino dining.

Chicken



Figure 4.2: Adobolicious (Lazo et al., 2024)

Our first chicken recipe “Adobolicious” features a Filipino staple, *adobo*⁷. The storyline on the left translates to, “A storm passed through last night. The roofs of some houses were blown away, and have disappeared! Fortunately, you and your two brave knights, Wrencey and Justin, are here to help. Be a good leader and help your people find their roofs and bring them back!” Geographically, the Philippines is hit by monsoon rains and typhoons every year during the wet season as an effect of its position along the Pacific Ring of Fire. People can lose their homes as a result of the devastating effects of the weather, so given this reality we opted to portray the rainy season as a time to extend a helping hand to others when they are in need.

This recipe portrays crispy kangkong leaves as the missing roofs, and the chicken slices as the houses themselves. Its ingredients, *Mga Sangkap*, are ½ kg of native chicken, 1 ½ spoon of soy sauce, 3 *calamansi*⁸, ¼ of an onion, ¼ of a head of garlic (1-2 cloves), pepper, *kangkong*⁹, cornstarch, egg, and tomatoes. Our cooking tips, or *Tips sa Pagluluto*, were to marinate the chicken in soy sauce, *calamansi*, onions, garlic, and pepper. The chicken should not be fried, but instead boiled with the marinade in a shallow pot of water. For the crispy *kangkong*, each leaf should only be slightly dipped in the cornstarch for a few seconds before

⁷ *Adobo* is a popular Filipino dish made by simmering meat in a savory mixture of soy sauce, vinegar and garlic, often paired with tomatoes and egg.

⁸ Also known as Philippine lime, *calamansi* is a tiny, round citrus fruit native to the Philippines.

⁹ *Kangkong* is water spinach native to Southeast Asian countries like the Philippines and Singapore.

being pan-fried in a pan with only a small amount of oil. As for the egg, it should only be boiled for 6-7 minutes. In terms of design, the title is a mix of *adobo* and the word “delicious” to give the kids an idea that this dish will be tasty.

As for the *Masustansiyang Alternatibo*, or healthy alternatives involved in the recipe, native chicken is suggested to instead of purchasing chicken with unnatural additives; furthermore, families in Matandang Balara are wary of what is fed to locally-sourced chicken, and can monitor what they consume compared to store-bought chicken. Then, *calamansi* is used as an alternative for added table salt, considering that we already included soy sauce in the recipe. Finally, to avoid consuming too much oil, we made boiling the primary cooking method for the chicken and the egg.

Additionally, eggs have all nine essential amino acids and healthy cholesterol to protect muscle mass. On top of that, tomatoes and *kangkong* are rich sources of Vitamin C and Potassium for healthy eyes, and for enhancing the nonspecific immune system to have more robust responses to allergens and pathogens. Since *adobo* can be high in sodium content, we found an alternative to excess soy sauce and salt, which is *calamansi* or any citrus. When presented to the moms, they were surprised to know they could substitute salt with *calamansi*. Furthermore, *kangkong* is the crunchy component of the dish to meet the kids’ preference for crunchy food; instead of deep-frying, using a minimal amount of oil allows kids to consume a safer amount of dietary fat.

Fish

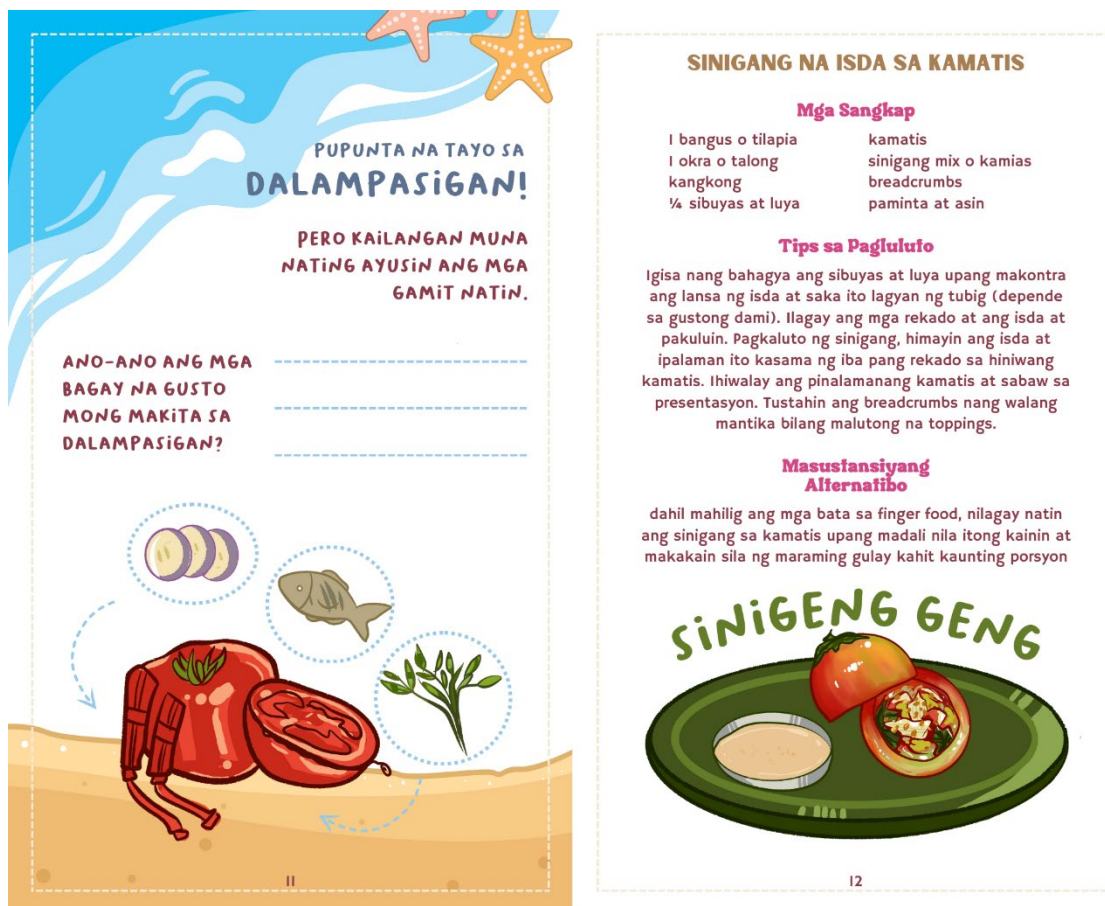


Figure 4.3: Sinigeng Geng (Lazo et al., 2024)

One of our crowd favorites, “Sinigeng Geng,” involves a Filipino staple, *sinigang*¹⁰, and a trip to the beach. This recipe title is derived from a Gen-Z-coined term “gang” used in reference to a group of friends, further hinting at a beach trip as the perfect vacation spot with loved ones. The text translates to, “*We’re going to the beach! But we need to fix our bags. What are the things you want to see at the beach?*” Though brief, this recipe, along with the other two fish items, takes on a summer vibe that transports kids to the salty air and sands of Philippine beaches. Given that our main audience is children below ten years, our fish recipe-stories are all set at the beachside to tap into children’s natural symbolic thinking, which is especially strong in kids from that age group. By anchoring the setting in a familiar yet imaginative environment, we encourage them to role-play as if on vacation, and fully immerse themselves in the cooking adventure. The tomato on the left page is meant to resemble either a backpack or a crab; the kids are free to interpret the illustration as they wish.

The ingredients include 1 milkfish or *tilapia*, 1 eggplant and/or okra, *kangkong* leaves, ¼ of an onion with ginger, tomatoes, *kamias*¹¹, breadcrumbs, pepper, and salt. In this recipe, the tomatoes are stuffed with fish and other vegetables, which strikes the perfect balance between protein and minerals. Additionally, fish are rich in omega-3 fatty acids essential for heart health. Our bodies cannot naturally produce these triglycerides, so supplementing them with fish helps reduce inflammation and protect against cognitive decline. Furthermore, our cooking tips and healthy alternatives include sautéing the fish with onions and ginger, before putting them in a pot of water to get rid of the fishy odor and excess oil. Breadcrumbs are only optional for added crunch, should the kids opt to use leftover store-bought bread so that it does not go to waste. Finally, the *sinigang* is served with a stew of tomato innards, *kamias*, and okra or eggplant.

¹⁰ *Sinigang* is a traditional Filipino meat stew known for its sour flavor from tamarind or other native fruits like *calamansi*.

¹¹ *Kamias* is a sour, green tropical fruit used in Filipino cooking to add sourness to dishes like *sinigang*.

Soup



Figure 4.4: Nilaga 4 Alaga (Lazo et al., 2024)

Our last recipe excerpt, “Nilaga 4 Alaga,” is from the vegetables and soup group, where the real challenge lies. *Nilaga*¹² rhymes with *alaga*, the Filipino word that denotes caring. In this sense, we give kids the idea that this soup serves its purpose for nourishment and taking care of them, as suggested by its wordplay title. To make the vegetables more enticing to eat, we introduced a warm and welcoming atmosphere in these pages by drawing in Lola Basyang, or Grandmother Basyang, a well-known fictional storyteller in the Philippines who shows her love for children by telling extensive fantasy lore to them. The storyline above translates to, “After you leave the wizard’s house, you keep on walking and see Lola Basyang! She is sitting beside a pot atop a small fire, and she noticed that you are sleepy, so she gave you some soup. She says she has a nice little bedtime story for you.” The narrative then ends on an endearing note for the kids to ask their mother for the whole story, inviting them to slow down for a while and spend quality time with their family after a long day. We live in a digital age where gadgets can pose distractions by making us lose touch with the relationships we have, so to balance out screen time we invite the kids to have storytime with their parents.

¹² *Nilaga* is a traditional Filipino boiled soup made with meat (usually beef or pork), vegetables like potatoes, cabbage, and corn, and seasoned simply with salt and pepper.

The ingredients are boiled water, salt and pepper, 2-3 corn cobs, $\frac{1}{4}$ or more of a cabbage, and 3 potatoes. Our cooking tips emphasize chopping the vegetables into very small pieces so the kids are not mentally overwhelmed by, or conscious of the portion sizes, making them easier to consume. Afterwards, these vegetable slices are to be boiled in a stew pot with water for the flavor to leak out into the soup. The main healthy alternative is that, while *nilaga* usually involves cubed beef or pork, we replaced the animal meat with potatoes for affordability. Potatoes are a good source of slow-release carbohydrates to give kids energy for longer periods of time due to the slower insulin release they elicit from the pancreas. They also have dietary fiber to keep the kids full.

Discussion

Overall, we developed a recipe-based intervention aimed at promoting nutritional awareness and affordable meal planning among local 4Ps families. A total of 15 recipes were created, distributed equally across five food groups: carbohydrates, fish, chicken, soup, and desserts, with three recipes per category. The intent behind this structure was to offer a breadth of meal options that encourage dietary variety while remaining within the scope of the Harvard Healthy Eating Plate. Each recipe was designed to serve 2–3 kids while adhering to a cost limit of ₱150 per meal (approximately \$2.60–\$2.70 U.S. dollars), fitting within the average cash grant given to 4Ps households; this would mean that parents would not have to spend more than ₱450 (\$8.10 U.S. dollars) a day to feed their children, assuming they consumed three meals every day. However, not all families have 2-3 children or members, limiting our cookbook's promise to smaller families.

The Harvard Healthy Eating Plate promotes a holistic approach to meal planning, advocating for balanced food groups, such as whole grains, protein, vegetables, and fruits, alongside recommendations for physical activity. An important element that we could not include in the cookbook was a wider variety of fruits, grains, and legumes, because these food groups can be just as expensive as red meat in the Philippine market. Another limitation is that, while this project adhered to the dietary guidelines of the model, it did not incorporate the exercise component, as the scope focused on nutritional intake. Also, our cookbook does not include strict mealtimes; preparing food would be left to the discretion of parents. Given the constraints of food access and budgeting, healthy food consumption was prioritized.

In addition to nutritional balance, our cookbook emphasizes healthier preparation methods such as boiling or steaming, instead of just frying. We also advise children and their families to use oil only sparingly when frying; while consuming too much oil can lead to chronic heart disease, the absence of dietary fat in one's diet also poses its own risks. These techniques, as also assured by our partner families, are practical for low-income households. Furthermore, all ingredients were chosen for their affordability and accessibility, based on local markets in Quezon City. However, this presents a geographical limitation: the availability and pricing of food ingredients differ significantly across regions in the Philippines. This may affect the feasibility of replicating these recipes within the same price parameters in other major cities.

The cookbook also does not include red meat and pork despite their recognized nutritional value as protein sources. This exclusion was based on cost-efficiency, as these ingredients alone typically exceed the 150-peso price ceiling. By focusing on chicken and fish, the recipes remained both affordable and nutritionally sufficient, though not fully representative of the broader Filipino diet.

In addressing picky eating behaviors, our study successfully determined their underlying source to be the children's need for sensory stimulation through flavor and texture, providing insight into why they may favor certain junk food over the meals prepared for them. We developed our cookbook in response to these preferences for parents to be able to prepare meals that are both nutritionally beneficial and enjoyable by their children. However, while this strategy helps to reduce food refusal, it does not fully eliminate the broader tendency toward picky eating. To promote long-term behavior change, behavioral reinforcement may also be applied at mealtimes. For example, parents can mention the mere possibility of giving their children a small portion of their preferred snack, provided that they fully consume a healthy meal prepared for them first. This does not directly incentivize the consumption of nutritious food, but instead motivates the kids to engage with healthier options as a means to receiving occasional rewards. Over time, this approach may serve as a foundation for developing more balanced eating habits, reinforcing the idea that treats with lower nutritional value can be eaten in moderation as long as the majority of one's diet remains healthy.

Furthermore, an important recommendation for future iterations of this project is to include recipes for youths aged 0–3. During our fieldwork, several mothers shared that they struggle to provide for their youngest children due to the high cost of infant formula, which is often sold at unaffordable prices in drugstores. As our current cookbook focuses primarily on meals for children above toddler age, there remains a gap in addressing the nutritional needs of infants in low-income households. Providing accessible alternatives such as homemade purées or soft food options using locally available ingredients could help prevent malnutrition at a young age without imposing additional financial burdens on families already navigating economic hardship.

Finally, the most significant limitation of the project lies in structural constraints beyond our project's control. As researchers, we cannot change the financial allocations provided by the government to 4Ps beneficiaries. However, this constraint solidifies our project's purpose; we sought to equip families—especially children—with knowledge and agency to take care of their health. The cookbook reframes everyday cooking into a space of learning and empowerment, allowing young readers to engage with food preparation not only as a necessity, but as a fun journey. Compared to one-time food drives or feeding programs that offer temporary satiation, our approach promotes long-term, sustainable change through education and habit formation.

Conclusion

Ultimately, our project presents an interdisciplinary intervention to malnutrition, one of the most pervasive public health challenges in developing countries like the Philippines. Our project met its three research objectives by combining grounded research, cultural insight, and thoughtful design. First, through our data gathering, we gained a deeper understanding of daily struggle in Matandang Balara, particularly the financial constraints that shape the food choices of 4Ps beneficiary families. Second, our thematic analysis played an integral role in understanding the social and personal factors that contribute to the kids' nutritional imbalances, and how these affect their health. Lastly, we addressed these concerns by designing a collaborative and interactive cookbook with affordable, nutritious recipes that empower children and their families.

By integrating principles from the psychology of empowerment, framing in communication, and effective information design while being rooted in a healthy eating framework, our cookbook moves beyond traditional nutrition guides; it stands as a tool for

empowerment, education, and change. Through narrative-driven recipes, culturally relevant settings, and budget-friendly meal planning, we aimed to equip children and families, particularly those under the 4Ps program, with the knowledge and agency to make healthier food choices in their everyday lives.

The cookbook not only considers nutritional content, but also sustainability by providing an alternative to short-term interventions such as feeding programs or one-time food drives. By curating recipes within budget constraints, we offered realistic meal options that users can easily replicate. Though strict limitations such as regional price differences remain, our project is a step forward in intersecting public health and education through design.

We have currently collected donations amounting to ₱53,000 (roughly \$950 U.S. dollars) to print 140 copies of our cookbook, which we have supplied to the families of Matandang Balara. Since this is our pilot study, we initially thought to simply distribute our cookbook to the families we engaged with throughout the course of our work. A possible follow-up study to finally measure the effectiveness of our intervention would involve taking the baseline height and weight of children who received our cookbook, and comparing them with healthy BMI standards. Apart from monitoring the kids' biometrics over a span of at least eight months, we would also have to closely monitor their food intake to ensure that their projected improvements would be from our recipe recommendations in assessing whether our cookbook truly addresses malnutrition while staying within an affordable budget. This will allow us to move from design intervention to measurable impact.

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