

# Mobile Health Tracker Application for Children (Telehealth): Applying Soft System Methodology for Community IT-based Project

Wan Abdul Rahim Wan Mohd Isa<sup>1</sup>, Ahmad Iqbal Hakim Suhaimi<sup>1</sup>, Nurulhuda Noordin<sup>1</sup>, Mudiana Mokhsin@Misron<sup>1</sup>, Afdallyna Fathiyah Harun<sup>1</sup>, Norkhushaini Awang<sup>1</sup>, Farah Azira Nor Azmi<sup>2</sup>, Izah Shahirah Mohamad<sup>3</sup>, Muhamad Wisnu Alfiansyah<sup>1</sup>, Rauhil Fahmi<sup>1</sup>

<sup>1</sup>Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, 40450, Shah Alam, Selangor, Malaysia, <sup>2</sup>PLANMalaysia (Jabatan Perancangan Bandar Dan Desa), Blok F5, Kompleks F, Presint 1, Pusat Pentadbiran Kerajaan Persekutuan, 62675, Putrajaya, Malaysia, <sup>3</sup>Jabatan Kesihatan Negeri Sabah, Bahagian Pengurusan, Tingkat 1, Rumah Persekutuan, Jalan Mat Salleh, 88590, Kota Kinabalu, Sabah, Malaysia.

Corresponding Author Email: [aiqbal@fskm.uitm.edu.my](mailto:aiqbal@fskm.uitm.edu.my)

To Link this Article: <http://dx.doi.org/10.6007/IJARPED/v11-i2/13249>

DOI:10.6007/IJARPED/v11-i2/13249

*Published Online:* 06 May 2022

## Abstract

The main objective of this study is to apply the soft system methodology for Community IT-Based project. The method involved using action research. Postgraduate students in Information Technology from a public university in Malaysia taking the problem-solving course for information technology had applied the soft system methodology in their group project as part of their learning activities. The case study selected was an operating shelter home for the orphaned, the abused, abandoned, and neglected children in Selangor, Malaysia. The outcome of the project was a proposed prototype called Mobile Health Tracker Application for Children (Telehealth) that supports Sustainable Development Goals on Quality Education and Good Health and Well-Being.

**Keywords:** Soft System Methodology, Community IT-Based Project, Sustainable Development Goals, Information Technology

## Introduction

Health is a very important aspect of life. Those who have money may easily get health services. But not for the underprivileged. Children are very susceptible to disease if they live in an environment that is not clean and lacks adequate nutrition. There are still cases related to poor health in children who come from poor families. There are children's communities that exist to help these children in getting their right to health. Thus, there is a need for a mobile application that monitors and tracks the health problem issues for the operating

shelter home for the orphaned, the abused, abandoned, and neglected children in Selangor, Malaysia. Health issues include skin problems, malnutrition, and weight management.

There are growing examples of research that had applied soft system methodology in proposing community IT-Based projects (Isa et al., 2020)

The main objective of this study is to:-

- Apply the soft system methodology for Community IT-Based project.

The case study selected was an operating shelter home for the orphaned, the abused, abandoned, and neglected children in Subang Jaya, Selangor, Malaysia. The outcome of the project was a proposed prototype called Mobile Health Tracker Application for Children.

### **Methodology**

The method involved using action research. Postgraduate students in Information Technology from a public university in Malaysia taking the problem-solving course for information technology had applied the soft system methodology in their group project had applied the soft system methodology in their group project. The case study selected was an operating shelter home for the orphaned, the abused, abandoned, and neglected children in Selangor, Malaysia. Observation and an interview were also done to support the data gathering process. On February 4, 2022, an interview session was conducted with the representative from the operating shelter home.

### **Results and Discussion on the Application of Soft System Methodology (Adapted from Checkland & Scholes, 1990).**

#### **Stage 1: Problem Situation**

The operating shelter home for the orphaned, the abused, abandoned, and neglected children in Selangor, Malaysia was chosen and an online interview was conducted with the representatives. At this stage, we want to identify; (i) what are the problems and (ii) whether the problems are unstructured or uncategorized. Therefore, from the results of the interview session, we developed the following five questions to explore and comprehend the unstructured situation, which, in the end, necessitates objective investigation and analysis. The following are the questions that have been asked and the results are summarized in

#### **Fig. 1:**

1. Find out about the problem situation?
2. Who are the key players?
3. What is their perception of the situation?
4. What current process is going on and how?
5. What does the organization look like?

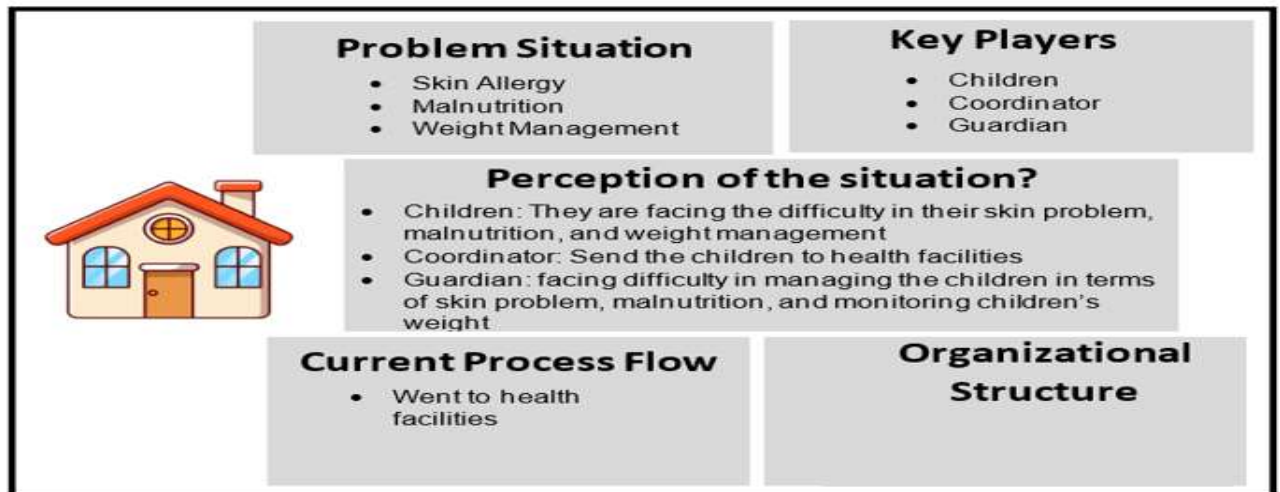


Fig. 1. The problem situation

**Stage 2: Rich Picture**

In addition, based on the information gathered in stage 1, a rich picture has been sketched out to express the important features which include the issues raised in an operating shelter home for the orphaned, the abused, abandoned, and neglected children in Selangor, Malaysia in making their life better. We discovered at this stage that many aspects of life are involved in running an orphanage center to serve them appropriately. The main issues that the children faced are skin health and weight management. Fig. 2 shows the Rich Picture.

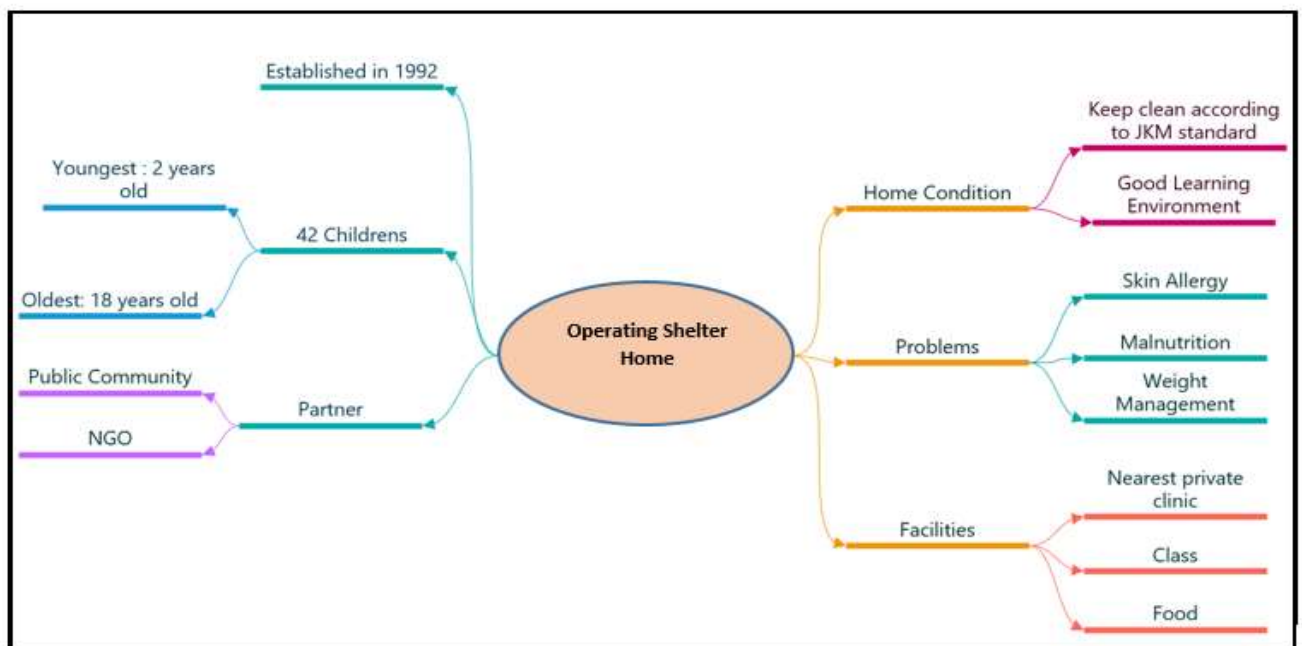


Fig. 2. Rich picture

**Stage 3: Root Definition (RD)**

A root definition is defined as a transformation process that takes some entity as input, changes or transforms that entity, and outputs a new form of the entity. The most serious issues are that they are facing the skin health and weight management of the children.

### Root Definition (RD)

The following is a written basis of Root Definitions:

### Root Definitions (RD)

A system to do P by (means of Q) to do R

P: What does the system do

- Provide a platform that can solve the skin health and weight management issue

Q: How it does

- To guide and monitor the children to solve their skin and weight management problems

R: Why it's being done

- To provide a solution to the problem of skin health and issue

### CATWOE Analysis

1. **C - Clients:** Children in the operating shelter home for the orphaned, the abused, abandoned, and neglected children in Selangor, Malaysia
2. **A - Actor:**
  - Staff in the operating shelter home for the orphaned, the abused, abandoned, and neglected children in Selangor, Malaysia.
  - Health Facilities
3. **T – Transformation:** The children can get better skin health, malnutrition guidance and can manage their weight
4. **W - Weltanschauung:** They can get consultation and can monitor their skin health, malnutrition problem, and weight
5. **O - Owner:** Government Agencies
6. **E - Environment:**
  - Public
  - Health Facilities

### Stage 4: Conceptual Model

Next, after determining the Root Definition (RD) and CATWOE Analysis in stage 3, the conceptual model was constructed to match the human activity involved in skin health and weight management and which were interrelated to each activity. **Fig. 3** shows the Conceptual model for the operating shelter home for the orphaned, the abused, abandoned, and neglected children in Selangor, Malaysia

We use Three E (3E) to define the measure of performance E1 is Efficacy, E2 is Efficiency and E3 is effectiveness.

### Measure of Performance

E1 - Does the system provide enough to improve the skin health and weight management problem?

E2 - How do the children get better skin health and monitor their weight?

E3 - Do the children can avoid their skin problems and monitor their weight?

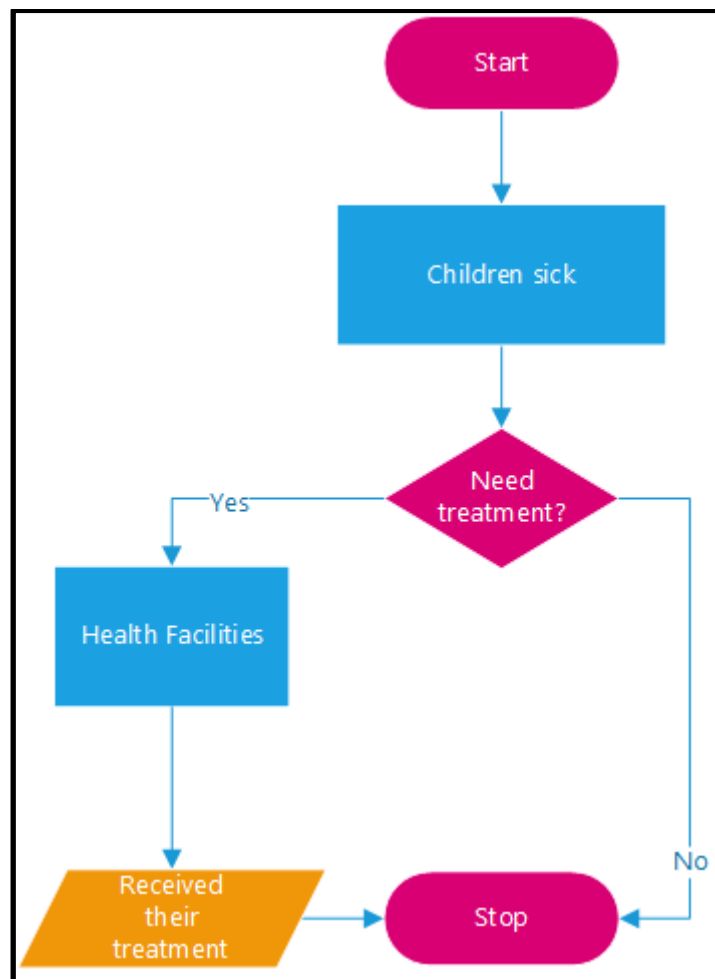


Fig. 3. Conceptual model

### Stage 5: Compare Model with the Real World

After we design the conceptual model, we compare it to real-world aspects to see if it is compatible and suitable for implementation in the real world. This model is used to check that the conceptual model represents a viable human activity system. S is a formal system if it meets the following criteria:

- S can help to improve the children's skin problem
- S can monitor the children's weight
- S can help in guiding food diet nutrition
- S can help to give free consultation to the children

### Stage 6: Define Possible Changes

An application named Telehealth is developed as a consultation application for skin problems and weight management for children. This application will ease the guardian of the operating shelter home for the orphaned, the abused, abandoned, and neglected children in Selangor, Malaysia for getting a consultation regarding their skin problems, malnutrition, and weight management of the children.

### Stage 7: Recommend Actions

Telehealth is encouraged in helping the operating shelter home for the orphaned, the abused, abandoned, and neglected children in Selangor, Malaysia reducing skin problems and

monitoring children's weight. By using this system, they can get a free consultation regarding their skin problem, diet plan nutrition and also monitoring their weight in maintaining a normal BMI. This will also reduce the rate for the operating shelter home coordinators to spend more to go to specialists at the hospital. The highest expected positive effect from stage 6 is easy monitoring of the children's weight and getting a consultation on the skin problems and malnutrition problems. The administrator of Telehealth needs to learn how to manage the system to monitor the health performance of the children anytime and anywhere.

### **Discussions**

On February 4, 2022, an interview session was conducted with the representative from the operating shelter home. The essential pieces of information such as the children's general basic background, the conditions at the house, the health problems the child experienced while there, and the steps taken to overcome the problems were identified.

The first is the average number of children raised in the operating shelter home comes from poor and abusive families. Because of such family conditions, most of these children experience skin allergies and malnutrition problems. This skin allergy is related to the children's environment, which is below health standards (slums). Malnutrition is associated with the lack of nutritional intake received by children due to difficult family economic conditions. Malnutrition is typically the outcome of poverty, which is frequently related to a family's low economic standing, the environment, challenging housing conditions, and insufficient access to food, safe drinking water, news, and medical aid. Children with cases of malnutrition are very susceptible to various diseases, such as kwashiorkor, beriberi, Marasmus, and scurvy.

The second is about the conditions at the operating shelter home for the orphaned, the abused, abandoned, and neglected children in Selangor, Malaysia. Until now, 42 children have been cared for in the operating shelter home, where the youngest is two years old, and the oldest is 18 years old. In the dormitory, no special treatment is given. All children are equal regardless of age, gender, and so on. To manage the community, the operating shelter home for the orphaned, the abused, abandoned, and neglected children in Selangor, Malaysia is assisted by several parties, such as the Public and other NGOs. The house is always kept very clean and the dormitories are provided according to standards. We provide a good learning environment as education is our priority.

The third is about health problems the child experienced while there. The children usually have health problems with skin allergies and malnutrition. The fourth is about the steps taken to overcome children's health problems there. The steps they take are when children enter the operating shelter home for the first time, most of the children are malnourished, and the operating shelter ensures excellent and nutritious food are provided for them. When a child is sick while in the dormitory, the operating shelter home immediately gives treatment at the nearest clinic, hospital, or specialist, this was done because the operating shelter home has an excellent private clinic nearby that gives the children free treatment.

The problems faced by the children of the operating shelter home are skin allergies and poor nutrition. The solution provided by the operating shelter home for children who experience these problems is to contact the nearest clinic or hospital. Then if the disease is severe enough, the child will be taken to the clinic or hospital. In addition to the solutions above, the operating shelter home also implements preventive measures to ensure children

stay healthy, including keeping the home very clean and in order according to existing standards. The operating shelter home also good learning environment as education is its priority.

### **Recommended Solution**

To overcome the main problems faced by the operating shelter home, a Mobile Health Tracker Application for Children (Telehealth) was being proposed as an IT solution. Telehealth uses digital technologies to deliver medical care, health education, and public health services by linking many users in separate locations. Telehealth embraces a broad concept of technology-enabled health care services. Telehealth encompasses telemedicine (diagnosis and treatment of sickness or damage - see detailed explanation below) and services such as assessment, monitoring, communications, prevention, and education. It involves a broad range of telecommunications, health information, videoconferencing, and digital imaging technologies.

Telehealth technologies can assist in achieving the government-established "triple aim" of health care, which includes improved patient outcomes and access to care, and cost savings to the healthcare system. Telehealth enables the advancement of health outcomes and access to care and the efficiency and cost-effectiveness of health care delivery systems. Telehealth can offer critical medical services where they are most needed, overcoming limitations such as time, location, and provider scarcity. This encompasses rural locations and underserved urban areas.

With the TeleHealth app, it is hoped that later it will overcome the problem is developed as a consultation application for the skin problem and weight management for the children. This application will ease the guardian of the operating shelter home for getting a consultation regarding the skin problem and weight management of the children in the operating shelter home, especially in terms of getting health facilities as early as possible.

### **Prototype Application**

The Mobile Health Tracker Application for Children) (Telehealth) was being proposed as an IT prototype solution that helps the organization overcome the problems regarding health issues among the children. The IT solution that we propose is a mobile application specifically for children named TeleHealth. This application can store multiple records of children since this application specifically monitors the children's health status. The following are a few of the important features of the prototype system:

- *Track Body Health Status*

This feature will display the children's Body Mass Index (BMI) where the user will key in the data manually and the application will help them to calculate the BMI. As been told by the coordinator, weight management is highly needed as the children in the house have problems with malnutrition issues which also affect their body weight. In addition, this feature also stores a medical record such as allergy status as the doctor's reference for their next appointment whether on-site or online.

- *Nutrition Tracker*

This feature is to monitor the children's daily meal log. Since one of the issues is malnutrition, this feature is specially designed for it. The user will key in the data manually, then the user will be able to keep track of the children's nutritional status every day such as the water intake



and calories consumed. Other than tracking nutritional status, this feature also will give recommendations to the user types of the meal or supplement the children should consume based on their health status and prescription from the doctor.

- *Consultation with the Doctor*

For this feature, the application enables text, phone, and video call appointments between the children and their doctor. It will benefit both health and convenience. Also to help prevent the spread of COVID-19, flu, and other infectious diseases, doctors can use TeleHealth appointments to prescreen patients for possible infectious diseases. It saves the user and children from having to come into the clinic or hospital.

### **Future Work**

TeleHealth will undergo several improvements in the future. First, the TeleHealth application is used in a community and can connect with other communities in the Klang area. In addition, the TeleHealth application in the future can involve other parties, such as NGOs and the government. Because of the presence of other parties, the process of ensuring the quality of children's health in the community can be further improved with mutual collaboration and support.

### **Conclusion**

The main objective of this study is to apply the soft system methodology for Community IT-Based project. The case study selected was an operating shelter home for the orphaned, the abused, abandoned, and neglected children in Subang Jaya, Selangor, Malaysia. The outcome of the project was a proposed prototype called Mobile Health Tracker Application for Children that supports Sustainable Development Goals on Quality Education and Good Health and Well-Being.

The research contributes as it provides insights from a case study that highlights the contextual contribution of this research. It represents a different case study of a targeted community of a local operating shelter home with different results. The proposed application (The Mobile Health Tracker Application for Children) (Telehealth) may guide the system developer as guidance for the actual development and implementation of the system as future work.

### **Acknowledgment**

This research is funded by the LESTARI SDG TRIANGLE grant, Universiti Teknologi MARA, Malaysia. (Project Code: 600-RMC/LESTARI SDG-T 5/3 (138/2019))

### **References**

- Checkland, P., & Scholes, J. (1990). *Soft systems methodology in action*. Wiley.
- Isa, W. M. W. A. R., Noordin, N., Suhaimi, A. I. H., Ismail, I. N., Mahat, S. R., Abdul Aziz, N. S., Tumin, M., & Yaakob, M. N. H. (2020). Framing soft system methodology in community it-based project: case of asnaf. *International Journal of Advanced Science and Technology*, 29(6 Special Issue), 1580-1587.
- Isa, W. M. W. A. R., Suhaimi, A. I. H., Noordin, N., Safiq, M. S., Azmi, W. N. N., Norham, N. A., & Hammami, S. (2020). Applying soft system methodology in community it-based project: case of poverty tramps. *International Journal of Advanced Science and Technology*, 9(1.4), 131-137. <https://doi.org/10.30534/ijatcse/2020/2091.42020>