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Abstract

In general, the Malaysian government has created the People's Housing Project (PPR) which is a People's Housing Program that aims to balance the basic housing needs of Malaysians in the B40 group (low-income group) while protecting their human rights to a good life. The main objective of this study is to adapt 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. The case study involved one local People's Housing Project (PPR) in Kuala Lumpur, Malaysia focusing on the children's health issues. The outcome of the project was a proposed Healthcare Social Welfare Conceptual Model for Community IT-based Project. This research supports Sustainable Development Goals on Good Health and Well-Being and Quality Education.

Keywords: Soft System Methodology, Healthcare Social Welfare, Sustainable Development Goals, Information Technology

Introduction

Improved health and well-being, neglected with poverty-stricken people. In reality, a healthy population is a precondition for progress, catalyzing economic development. Studies conducted at Amazon prove that significant inequalities in income sources affect access to basic infrastructure and the availability of healthcare and professional services (Castro, 2022). Past studies show that such inequalities have been exacerbated by development models and policies that focus on certain groups that have exploited resources and ignored local voices, knowledge, and needs.

The relationship between health and nutrition is intertwined. Context is important when examining the link between food intake and health. Poor nutrition is often connected with poverty, although excessive consumption may occur with either poverty or affluence, and it may be related to inadequate nutritional intake in both cases. There is a bidirectional link between food and nutrition: in certain circumstances, bad health may impair the capacity of families or people to farm and produce food, as well as to work and get nourishment. Fundamentally, satisfying one's caloric and micronutrient and macronutrient requirements is a prerequisite for maintaining one's health. There are growing studies on targeted poor community cases in Malaysia (Zainal et al., 2012, Isa et al., 2020; Isa et al., 2020). The main objective of this study is to adapt the soft system methodology for Community IT-Based project.

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. The case study involved one local People's Housing Project (PPR) in Kuala Lumpur, Malaysia focusing on the children’s health issues.

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

Soft Systems Methodology (SSM) is a cyclic learning system that uses models of human activity to explore the actors in a real-world problem situation, their perceptions of the situation, and their readiness to take purposeful action that takes into account different actors' perceptions, judgments, and values. In this research, soft systems methodology was used as the method. This research study discusses finding out the problem situation, including where it came from and why it was formed. It will then go over the many regions and stages of SSM to have a better view of the situation and solve the problem, especially children’s health issues at a local People's Housing Project (PPR) in Kuala Lumpur, Malaysia. In SSM's approach, seven process stages are shown to represent the investigation stage. This is seen in Fig. 1.

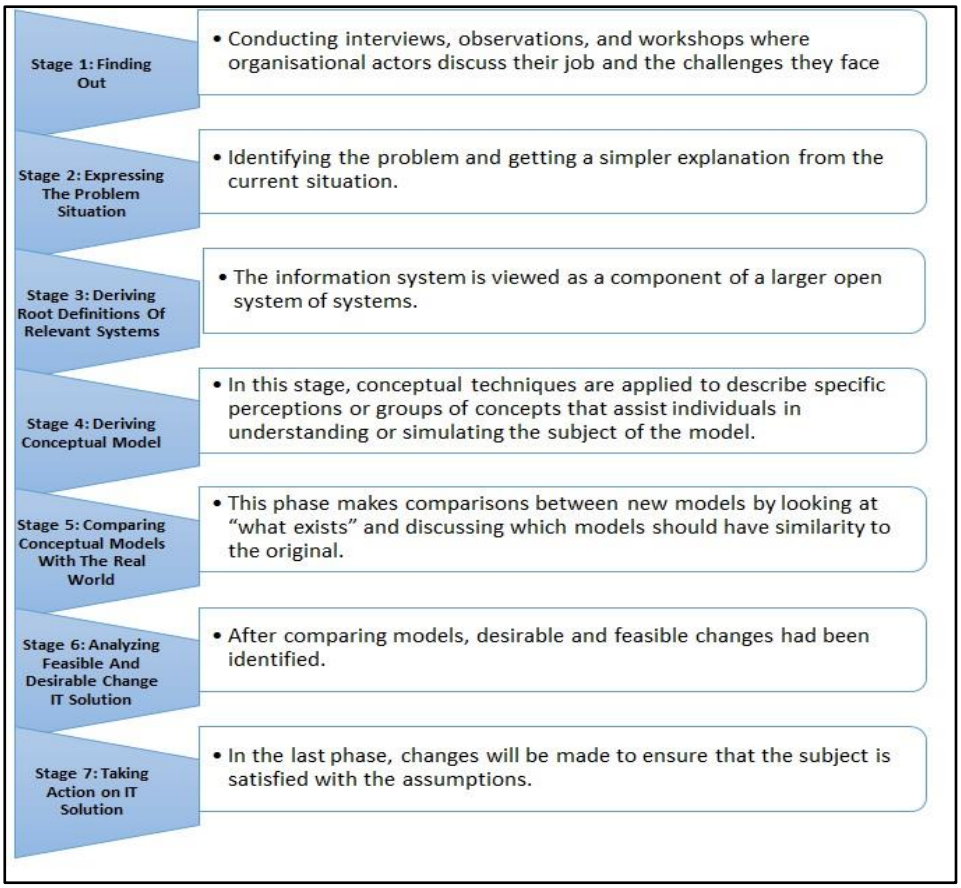

Fig. 1. The adaptation of soft systems methodology in the research study

Discussions

Stage 1: Finding Out

"Would-be improvers of the issue situation" (Checkland and Scholes, 1990) attempt to comprehend the problem scenario background and content in as broad and comprehensive a sense as feasible. By conducting interviews, observations, and workshops where actors discuss their job and the challenges they face, this may be accomplished. Referring from a previous study (Nambiar et al., 2017) stated that improvements in the quality of healthcare can contribute to a healthier population. However, researchers also point out that many global and national health strategies do not take into account the issue of measuring and improving the quality of health care in low-resource environments. To go on to a condition where the issue is pretty well understood and can be stated in words and diagrams, it is critical to regard this stage as a forerunner to articulating the problem scenario. This initial stage was done by interviewing residents from the PPR to resolve the problem and begin the analysis. Table 1 are some of the questions being asked to the respondents.

Table 1
Questions

1.	Monthly Income?
2.	Residential Status?
3.	How long have you lived in this PPR house?
4.	Do you think insurance cards or medical cards are important?
5.	Do you think that the government needs to minimize hospitalization bills for children with parents that have a low income?
6.	How long have you lived in this PPR house?
7.	Is your apartment OKU-friendly? (OKU = Orang Kurang Upaya or Disabled People)
8.	How frequently do you get your medical check-up?
9.	What are your plans in the event of a medical emergency for you or your family?
10.	What is the preferred payment method to pay for your health service?

Stage 2: Expressing the Problem Situation

Due to the lower production or import cost of generic drugs, this permits private hospitals, clinics, and pharmacies to mark up the final retail price, even more, resulting in higher prices overall but larger profits. Private hospitals, retail pharmacies, and other private premises frequently claim that price-setting for medical supplies is within the parameters of the free market, or in other words, that mark-up conduct is completely lawful, even though many people consider it unethical. It's challenging for consumers to evaluate prices and make informed judgments, especially when a prescription or restricted pharmaceutical pricing is not transparent.

Furthermore, environmental pollution contributes to malnutrition. Street food is frequently prepared in unsanitary conditions, resulting in outbreaks of food-borne illnesses like botulism and salmonella. In the urban areas of Klang Valley, poor communities are the most susceptible in this regard and they are far away from receiving the bare minimum of healthcare services. This is primarily due to the intricate interaction between dwellers, awareness, knowledge, and earnings. The health awareness of poor slum dwellers is largely influenced by a lack of education and information, which prevents them from accessing trained doctors and better services.

Furthermore, they are harmed twice because of poor living conditions, insufficient preventive health care, and a lack of sufficient curative healthcare. Because health awareness is directly related to income, profit sharing or low-interest-based microcredit programs can assist dwellers in increasing earnings, adopting healthier diets, and addressing malnutrition issues. Hence, these kinds of problems lead to health problems among the urban poor.

Stage 3: Deriving Root Definitions of Relevant Systems

The root definition contains a list of the elements, as well as a description of their function and purpose within the system. The root definition outlines what the activity is and why it may be considered relevant in the first place. When defining the root definition, the information system is viewed as a component of a larger open system of systems. Because of this, additional relevant systems have been investigated to aid in the construction of the root

definition. The underlying criteria are urban poor children in the People's Housing Project (PPR) in Kuala Lumpur, Malaysia who are exposed to a high risk of health complications as a result of several limitations. Mcadams et al (2022) stated that the contributing factor to healthcare for families with low household income is the low level of health literacy contributes as an important factor that affects the poor health outcomes.

There are two steps to making root definitions which are by using input-output transformation diagrams to figure out what the system is supposed to do or change and implementing the CATWOE framework to write a Root Definition for each transformation.

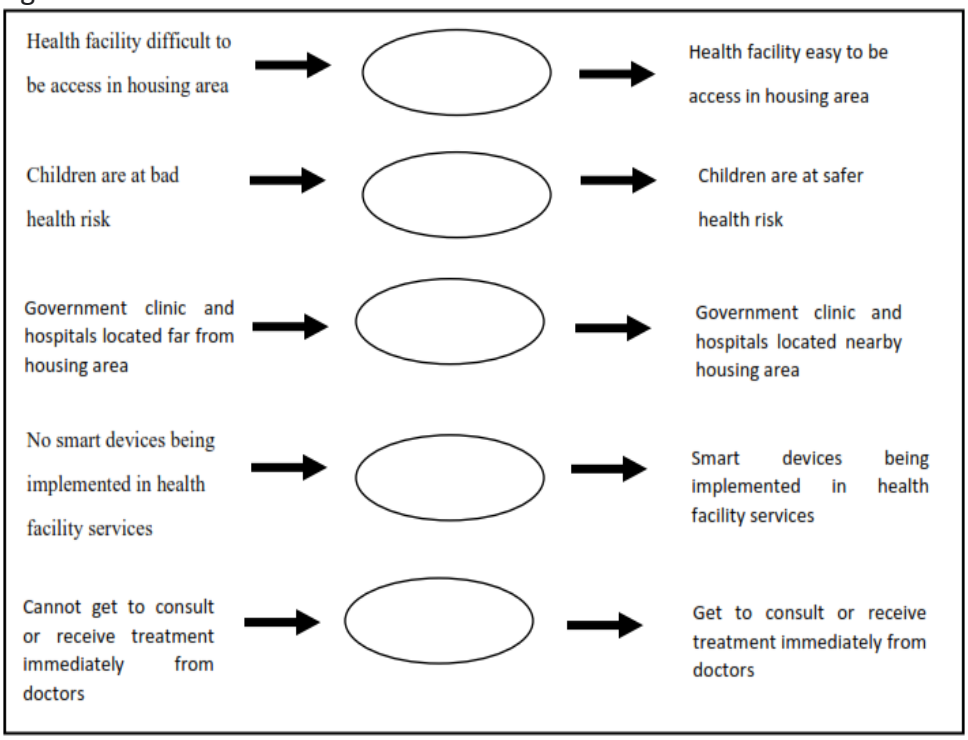

Fig. 2. Input-output Diagram

As shown in **Fig. 2**, the Input-output transformation diagram distinguishes the distinct functions of the system of human activity. It represents many viewpoints, thus it is a good idea to incorporate as many individuals as possible, in presenting these opinions. Include individuals from all levels of management and work, from all parts of the company such as both participating in, and external to, our human activity system. In addition, the CATWOE approach is a framework for examining and identifying the views of business stakeholders. Overlooking these viewpoints could lead to severe problems later on, as any differences of opinion can turn into disagreements. If business requirements are given varying degrees of importance, this might lead to contradictory priorities being assigned to them, or even conflicting needs emerging on their own.

Table 2
Elements of Catwoe

Element of CATWOE	Module
Customers – The people that are affected negatively or positively, within or outside the system	• Children • Targeted community
Actors – The people in roles who carry out the activities.	• Targeted Community • Government's Healthcare Department
Transformation – The process of converting inputs to outputs.	• Design, development, manufacture, market, installation, and training in application software and the maintenance and support of smart devices.
Worldview – The interpretation or view of the environment in which the system is placed.	• Better technology advancement in the healthcare field for better reliable and efficient health services
Owners – Those with the power to terminate operations	• Government Healthcare Department
Environmental Constraints – The environment in which the system is placed	• Time Constraint • Short of available budget • Legislations by the government • Design Iterations

Stage 4: Deriving Conceptual Model

Humans have an insatiable desire to depict one thing with another. It can be easier to understand when we use one object to represent another. And that is the foundation of a conceptual model, which is a technique of portraying a certain notion or group of concepts that aid individuals in understanding or simulating the model's subject. Conceptual models, which are frequently depicted as diagrams, depict relationships between variables and the flow of data or processes. A visual artifact in the form of a diagram, motif, map, and other types of the figure is being used for reacting to and testing the thinking about the problem in current health issues among poor children in one local People's Housing Project (PPR) in Kuala Lumpur, Malaysia, and to assess research progress and outcomes. This schematizing a children's health informatics conceptual model to represent the relationships among children's health issues with its factor and related entities which happened to be the root cause of the problem.

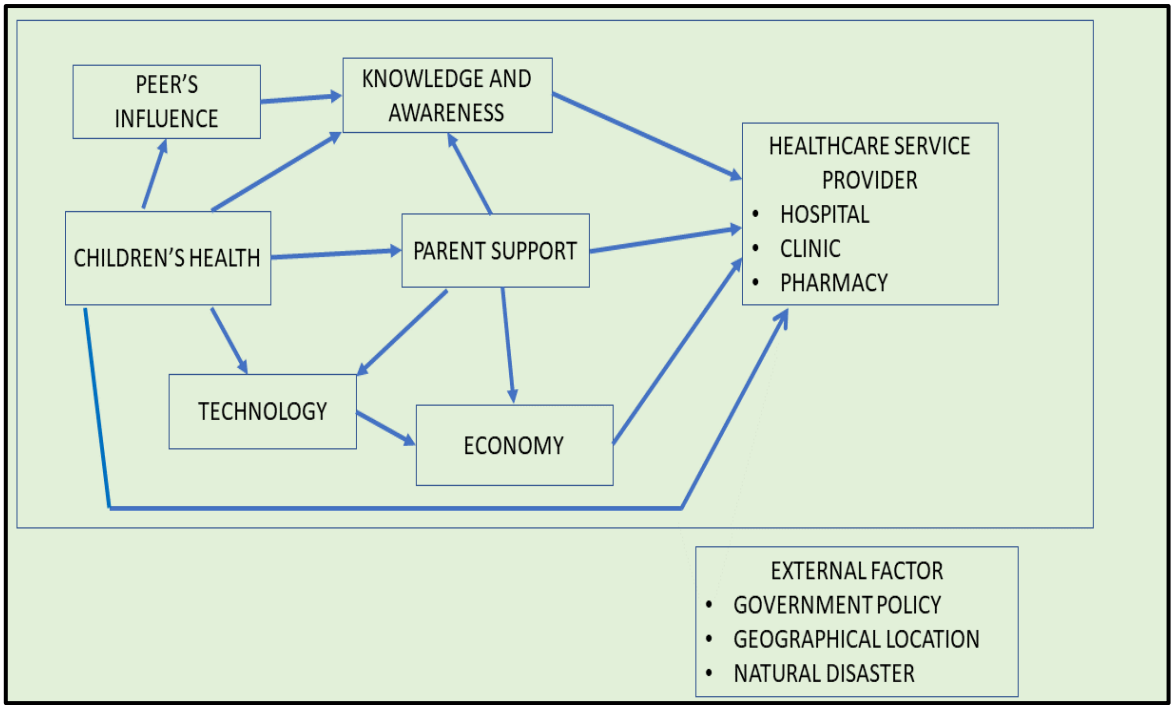

Fig. 3. Children's Healthcare Conceptual Model

Fig. 3 presents a conceptual model representation of a poor children's health issue system where peer's influence can have an impact on your health by offering moral and emotional support. Peers, on the other hand, are in a great position to bring our children's health down if their own isn't up to par. If the children spend more time with friends and peers who don't care about hygiene routines like showering, for example, our children are more likely to dismiss cleanliness as a crucial aspect of general health and things get more serious if they get into unwanted activities like smoking and drug abuse.

Next, the interconnection between parents' support and parenting style also has an impact on their children's health in one local People's Housing Project (PPR) in Kuala Lumpur, Malaysia. Because parents are the ones who take their children to the doctor, some parents may initiate these appointments. As the model shows, peers and parents are connected to knowledge and awareness which influences the nature and quality of care that is given to the children. These parents may be more aware of their children's symptoms and recognize the need for immediate medical attention. While peers will be able to show you the importance of maintaining a healthy lifestyle, especially if they have a positive outlook and awareness on the issue of health.

Infant mortality and children's health are also substantially connected to parental education, knowledge, and family income. Children have antecedents in the well-known relationship between health and a stable economy among parents. The onset and impact of chronic illnesses can explain a portion of the link. Poor children have greater illness risk factors, such as childhood obesity, which is a powerful predictor of adult obesity. Other than economic stability, overuse of technology may have a more significant impact on children's health in one local People's Housing Project (PPR) in Kuala Lumpur, Malaysia. Today, social media, games, and mobile gadgets can cause psychological and physical problems like eyestrain and difficulties concentrating on crucial tasks as the current children generation tends to spend

more time with their mobile devices, especially the poor children who may experience less attention and supervision from their parents. All the entities ended up towards the healthcare service provider near one local People's Housing Project (PPR) in Kuala Lumpur such as the government or private hospitals, clinics, or even pharmacies, where the actual and prime objective of the children's health issue can be solved by receiving a proper consultation, diagnose and treatment for any children's minor or moderately serious health problem. By getting the correct health services, screenings, and treatment we are taking important steps toward living a longer and healthier life for our children.

The conceptual model also stated the external factors that may be outside of the people and entities related to the children's health in one local People's Housing Project (PPR) in Kuala Lumpur, Malaysia but will have an impact unconditionally such as government policy, natural disaster, and geographical location. These attributes need to be considered as external inputs beyond controls so preparation can be made upon readiness for any potential events that may impact the children's health issues even worse.

Stage 5: Comparing Conceptual Models with the Real World

Table 3 shows comparing conceptual models with reality.

Table 3

Elements of Catwoe

Components of Conceptual Model	**Presence in a real-world situation**	**Comments**
Peer's Influence	Healthy lifestyles are classified and raced, and children's health behaviors should be shaped by increased exposure to peers and adults from a specific class or racial group.	We need to encourage positive peer pressure by talking to them about what kind of friends they want to have, and what their values are (self-worthiness).
Technology	They are constantly bombarded with technology.	The need for improved communication, and parents' commitment on which app/channel to allow their children to engage in.
Knowledge & Awareness	Poor knowledge and info sharing among parents, who are constantly inundated with a lot of platforms, and the sources are sometimes not reliable.	To respond to their children's diverse needs, parents must develop both depth and breadth of knowledge, which includes understanding the role of professionals (e.g., educators, child care workers, health care providers, social workers) and social systems (e.g., institutions, laws, policies) that interact with families and support parenting.
Economy	Poverty is a major cause of illness and a barrier to receiving needed health care. This is a financial relationship: the poor cannot afford to buy the things necessary for good health, such as adequate quantities of quality food and health care.	We need a strategic plan for the policies introduced. The government has reduced the direct cost of care at the point of service, e.g. by reducing/abolishing user fees for the poor or expanding health coverage to the poor. However, the policy implementation process may be complex, and the policy may not reach every person who is required, particularly in urban poverty where the community is preoccupied with their basic needs.

Components of Conceptual Model	Presence in a real-world situation	Comments
Parents	Parents may struggle if they lack the necessary knowledge and motivation to play an educational role in promoting healthy lifestyles for their children.	We need people to commit to the program. How schools encourage parental involvement is likely to influence such a partnership between schools and parents. Most schools appear to use the same strategies for all parents, regardless of parental needs, social class, or individual circumstances.

Stage 6: Analyzing Feasible and Desirable Change IT Solution

There are studies to analyze to determine the feasibility and desirable change in IT solutions, taking into account the factors listed below.

A. Cultural Feasibility

i. **Economy opportunities**

Lower-income groups are more likely to face barriers to accessing healthcare, such as long wait times or appointments, difficulty paying medical bills, and so on. With the rapid growth of urban poor residents, the demand for healthcare supply will rise, fostering economic growth such as the opening of new clinics or public health assessments for long-term healthcare. As the new health center requires resources, medicines supply, and demand increase in that area, the cost for medical access will not be as expensive as it was previously when they needed to travel outside of their areas.

ii. **Develop a healthcare app to detect common symptoms such as My Sejahtera**

MySejahtera is an application developed by the Government of Malaysia to assist in monitoring the COVID-19 outbreak in the country. Because the government and private sector organizations have been constantly developing and releasing apps since the outbreak, they can create a similar app with the same features associated with the urban poor. The app should highlight the major health issues caused by urbanization.

There are some feasibility outcomes when introducing new technology to new users, especially in urban areas. In cultural feasibility, older people will be less attracted to the new app, while looking at level education where mostly IT is illiterate to access the system, they have a negative mindset toward the system. Tackling to changes, the desired change to offer perhaps as older people will have less interest in the new technology, the technologist should make a system easy for them as they can only access as simple as can.

iii. **Health awareness campaign through media such as YouTube, TV, or free social media platform for all**

Planning and promoting health awareness to improve the health of the urban poor and empower slum communities on a long-term basis. There are typical campaigns that take place in media that reach large audiences, most frequently via television or radio, but are associated with new trends, internet, and mobile phones that have actively target audiences.

Feasibility outcomes as when this platform might be expensive to them as they require access to the technology which the cost they require and internet connection. To address the cost issue, the health awareness campaign will be carried out through the common platform they use daily for social communication, such as Facebook.

iv. The government may need to adopt internet hospitals to expand not only to focus on Covid-19

During the pandemic, online hospitals play a vital role. Reports have surfaced of physical hospitals being suffocating under the weight of anxious patients who mistake their mild fevers or coughs for signs of coronavirus. This may be happening right now in various nations throughout the world, resulting in cross-contamination between patients and doctors. With Internet hospitals offering official endorsement for remote medical services and eliminating cross-infection, we urge the revolutionary treatment model to adopt Internet hospitals. Compared to traditional hospitals, Internet hospitals are more efficient, cost-effective, and offer non-contact therapy.

Free COVID-19 consultations and counseling for home quarantine are available through an internet hospital's website during an epidemic, and these services contribute to roughly 20% of the hospital's total online medical services. Patients with chronic conditions who are experiencing delays should turn to Internet hospitals for help. Internet hospitals could also provide medical services such as frequent follow-up, medication instructions, and contactless pharmaceutical delivery to patients who are experiencing delays. By utilizing real-time telemedicine consultation from interdisciplinary specialists, internet hospitals can also enhance the efficiency and quality of care for chronically ill patients in urban areas. However, in the cultural feasibility outcome, they tend to consult face to face with the doctor because they do not believe in the online consultation. They are also willing to wait for a long time just to book an appointment. It somehow must be difficult for them to adapt to these Internet hospital ideas.

B. Technical Feasibility

i. **New technology advancement of ideas and concepts helps in spreading awareness and improving healthcare facility**

When COVID-19 first emerged, it put an even greater amount of strain on health systems throughout the world, particularly those in resource-limited nations, with 90 percent of countries in five WHO regions facing interruptions to their health services as a result. Nations in poor and middle-income countries have reported the

most significant issues. The weak healthcare infrastructure in such nations leaves them particularly vulnerable to COVID-19.

In this case, patients with limited technology and connectivity should be reached out to through the use of the telehealth and tele-triage methods for assessing and caring for all patients to help reduce the number of people seeking medical treatment in facilities, especially throughout times of high transmission of diseases such as COVID-19. As for the technical feasibility outcome, our concept and idea on this new technology will help a lot in spreading and improving healthcare awareness among the residents.

ii. **New technology introduced can be useful for now and also for the future too**

Healthcare is becoming increasingly reliant on technology. Future advancements in-home healthcare technology have the potential to not only facilitate the function of telehealth within the broader healthcare system but also to aid in the promotion of community-based independence for people living in their own homes.

In addition, implementing technology to improve health outside of hospitals and nursing homes could have several positive effects, including extending the ability of people to remain in their own homes, lowering the costs of healthcare, and lessening the burden on both the medical workforce and the caretakers. As for the technical feasibility outcome, our newly introduced technology will be useful in the future as it gives more advantages for healthcare services.

Stage 7: Taking Action on IT Solution

In rural areas, health information technology (HIT) is a basic instrument for working on the quality, security, viability, and conveyance of medical care administrations. Rural patients and suppliers in distant districts can be associated with experts in metropolitan regions using HIT. For rural emergency clinics and suppliers with restricted assets and information, executing, keeping up with, refreshing, and further developing HIT can be a consistent issue.

i. **Digital Touchpoints**

As the rural children will face services fees or costs, the technology helps to reduce costs. A significant part of the services should be possible for less cash because of services headways. The diminished expense of creation adds to higher overall revenue, which is basic for destitution destruction. While certain rural communities will continuously really like to call to book an arrangement as a patient, take care of a bill, or get some information about their consideration, many individuals progressively hope to have the option to finish these standard exercises carefully. Patients' fulfillment is expanded because of the making of an internet-based entryway, application, or other computerized channel empowering them to connect with emergency clinic administrations.

ii. **Telehealth Application**

Developing differences between the rich and the poor is somewhat because of inconsistent admittance to data and correspondence. The economy financially has

given one gathering admittance to the apparatuses they need to create while another remaining part is devastated. With telehealth applications that further increase access to the data even the economy gradually decreases. Telehealth refers to the utilization of digital information and communication technology, like computers and cell phones, to get to and oversee medical care benefits from a distance. These may be innovations that you use at home or that doctor employs to improve or enhance medical care administrations.

iii. Health Portal

Patients can access their well-being data on the web through confidential and secure patient health portals. The rural parents can have awareness of their health quality not only for themselves but for their children also. A plethora of applications has been created to help this rural children's community better get sorted out their clinical information in one safe area. These advanced innovations may help this gathering in putting away private wellbeing data, recording indispensable signs, ascertaining and following calorie admission, setting drug updates, and following active work, for example, everyday step counts.

An electronic personal health record system, frequently known as a PHR framework, is an assortment of wellbeing-related information that holds and controls. They might utilize a PHR application on any web-empowered gadget, like their computer, tablet, or cell phone, whenever. An individual wellbeing record may promptly give fundamental data to crisis administrations, like current determinations, medicines, drug sensitivities, and personal contact data, in case of a crisis.

iv. Remote Monitoring

Even without the expensive mobile phone to install the application or move forward with technology, the rural community can simply use the available mobile phone to connect with the health care for their children. A large number of advancements permit the specialist or medical care group to remotely screen the well-being of children in rural areas. Home monitoring devices that recognize deviations in children's activities like falls. A monitoring system for children is like an assortment of data, including development, temperature, social and rest examples, and that's only the tip of the iceberg. The information gives basic bits of knowledge about a children's well-being and day-to-day existence to doctors and clinical specialists.

Depending on the rural area of the children's living community, many have crisis buttons or sensors that recognize circumstances like flames or falls. Contingent upon the maturing checking framework, calls to the police or parents can typically be made straightforwardly or by the monitoring system.

v. Support Nutritional Technology Education

Nutrition educators use general production tools such as illustrations, graphics, presentation software, and computer photographs, notwithstanding programs planned explicitly for food and nourishment training, to work on the creation, transformation, and scattering of nourishment data. Sustenance training might assist parents to rest easy thinking about children by upgrading their feeling of prosperity,

further developing their appearance through weight control, and expanding their inspiration, information, and capacities. The objective of nutrition education in technology, defer or reduce the event of numerous constant and perilous sicknesses. From one-on-one meetings to large gathering programs, nourishment schooling might take various structures. Nourishment nutrition programs, which are instructed by experienced and taught people, help the children in rural communities in settling on nutritious food decisions and giving an underpinning of dietary data to construct solid practices.

Conclusion

The main objective of this study is to adapt 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. The case study involved one local People's Housing Project (PPR) in Kuala Lumpur, Malaysia focusing on the children's health issues. The outcome of the project was a proposed Healthcare Social Welfare Conceptual Model for Community IT-based Project. This research supports Sustainable Development Goals on Good Health and Well-Being and Quality Education. The research provides awareness for the postgraduate students about the situations of the targeted community. The research contributes as it provides insights from a case study. The proposed conceptual model may guide the relevant stakeholders as guidance for the actual development or improvement of relevant systems or applications as future work.

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