**Chapter III**

**METHODOLOGY**

This chapter describes the procedure used in developing the design and in development of the required program needed to make the prototype functional.

**Research Locale**

The Multi-Functional Monitoring Device for Blood Pressure and Pulse Rate

will be conducted in Lucban, Quezon where this study was built. The researchers decided to conduct this study in this location for easier testing of the system with the help of chosen respondents.

**Respondents**

The respondents of the study are the registered nurses; they will check if the output of the device will be the same to their measurement using the traditional reading of blood pressure.

The researchers will also ask teens, parents, and adults who are experiencing a High and Low Blood Pressure to use the device to determine the evaluation of the device in terms of its design, effectiveness and reliability. The evaluators will answer set of questionnaires that the researchers provided.

**Research Design**

This study uses an applied type of research. Applied Research as defined, is used to find solutions to everyday problems, and develop innovation technologies. It defines the different parameters considered in constructing the device. Material, tools and components that will be used in the design were further studied to come up at its functionality. Designing the schematic diagram of the required circuitries are strongly considered in order to materialize the desired prototype.

(more)

**Planning**

**Designing**

**Gathering Materials**

**Circuit Construction**

**Programming**

**Assembling**

**Testing**

**Evaluation**

**Figure 1. Project Design Development**

**RESEARCH INSTRUMENT**

The researcher will gather all the required and comparative data , enough to continue basic construction of the device.

With the help of this research instrument the researches gathered information with the use of the following.

1. **University Library Books**
2. **Textbooks**

The textbooks discuss the different uses and functions of the information that we needed to develop the system.

1. **Thesis**

The researchers are required to read some unpublished thesis from the university to guide and provide additional information.

1. **Internet Articles**

Internet articles is important to a research because it support the fundamental needs of the project. The internet provides useful and more detailed information about the data you are searching. It confirms and strengthens the researches to develop the system.

1. **Internet Research**

The researches use the World Wide Web to have a global information that is related to the design project. It has an information that suits every detail and the data that connect to the study.

1. **Consultation**

Consultation was done with the IT professionals and acknowledges people in the field of medicine and medical practitioner. The researchers were able to identify and gather additional data to improve the design of the prototype.

**e. Questionnaires**

The researchers conduct a survey for the evaluation of the system. The respondent evaluates the user interface of the system, reliability and efficiency of the device.

**PROCEDURES/ DATA COLLECTION**

**Planning**

Choosing the right software application to program the system, choosing the right operating system for the raspberry pi, choosing the right and efficient components, and the beneficiaries are the factors that the researchers considered for building the system. The researcher creates hypothesis and concept that would resolve the problem.

**Designing**

Designing of the system for Multi-Functional Monitoring Device for Blood Pressure and Pulse Rate. Designing of the device including the connections of the whole system. Designing of the GUI for the application. The researchers created a flow chart for easier understanding on how the whole system will work.

**Gathering Materials**

The researchers have considered the availability, cost and the quality of different materials that is needed for the whole system. The researchers chose appropriate components and materials carefully so that the system will not compromised its quality.

**Circuit Construction**

After designing the circuit diagram, researchers started to work on printing the circuit design on PCB. Proper wiring of the system and connections of all circuits to the microprocessor.

**Programming**

After gathering of the materials and making a circuit the researchers proceed to the software development. Creating the algorithm for the device. Creating a program for the software application. Compiling and debugging of the code. Testing of the program.

**Assembling**

After creating the program for the software, the researchers assemble all the materials needed for the system. Then the researchers test the circuit connection if it is working. And lastly, building the case for the prototype and connecting the software to the hardware part**.** Assembling all the components needed will lead to the finished project that the researchers will test.

**Testing**

To determine if both device and application of the study works properly, the researchers conduct a series of testing if the device read the blood pressure and pulse rate of the user and compare the result of the blood pressure gathered from the device and from the traditional method. The researchers also tested the software application if the process in the system flowchart is followed.

**Evaluation**

The researchers determine the people who will use the system. The researchers will ask the user of the experience in using the system via questionnaires. The questionnaires contain set of questions that will allow the researchers to know if the device of the study is convenient to use, the design of the UI and the program is user-friendly.

**Statistical Treatment**

Since the researcher conducted a survey as part of the evaluation of the study, statistical treatment is needed for the computation of the evaluation scores. The arithmetic weighted mean formula used to compute the gathered data:

WM = (f)+2(f)+3(f)+4(f)+5(f)

N

Where:

WM = weighted mean value

F = frequency

N = number of respondents

Likert scale was determined to use as tool to interpret the computed data:

**Range Scale Acceptability**

**1 1.00-1.75 Excellent**

**2 1.76-2.50 Very Satisfactory**

**3 2.51-3.25 Fair**

**4 3.26-4.00 Poor**

**(% error)**