3.0. RESEARCH METHODOLOGY

3.1. Research Design

- The researcher proposal should State the design(s) adopted and provide reasons for the choice by linking the design to the study topic

After completing the introduction and literature review, the next task in the proposal is the methodology. This chapter of the research deals with the description of the methods applied in carrying out the research study. It is organized under the following sections: Research design, Research site, Population, sampling techniques, research instruments, data collection procedures and data analysis.

Research Design

A research design can be thought of as the structure of research. It is the 'glue' that holds all of the elements in a research project together. A design is used to structure the research, to show how all of the major parts of the research project work together to try to address the central research question. Orodho(2003) defines it as the scheme, outline, plan that is used to generate answers to research

problems. A research design can be regarded as an arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance with the research purpose. It is the conceptual structure within which research is conducted. It constitutes the blueprint for the collection, measurement and analysis of data (Kothari, 2003)

Steps to follow in Selecting a Research Design

Below are some of the steps a researcher should follow while selecting a research design:

a) Identify the kind of research you intent to carry out. Being aware of the purpose and objectives of your study and the theoretical foundations will considerably influence how you design your research: where you go, for how long, with whom you talk, and the kind of questions you ask. Deciding if you intent to test or elaborate existing theory or trying to build a new, grand theory, or are using existing theory in a new way, has implications in the kind of information you need to collect.
b) Use library to analyze samples of research designs from books and periodicals. The internet is another option.
c) Discuss with colleagues on the validity and reliability of your research and make a decision on what design

will assist in answering your research questions appropriately.

Qualities of Effective Research Design

- They are systematic and logical. They effectively address the questions raised in the study. Based on this design the researcher can construct questions that will solicit the desired information.
- They contribute to accurate and fair interpretation of results
- They clarify to the researcher the respondents and the means by which the study will be conducted.
- They contribute to deeper insights and better understanding of the research topic

Guidelines in Selecting a Research Design

The following are the essential points that researchers should adhere to while selecting a research design;

a) Identify the research to be addressed by the study: The researcher should identify and reflect on the research questions raised in the study. Reflection should include brainstorming on issues such as:

- Do the questions raised in the study require information by interviewing or questionnaires? If

the response is positive, then the researcher will use survey design

- Do the questions raised in the study require systematic manipulation of independent and dependent variables? If the answer is yes, then the researcher will use experimental design
- Does the study require the researcher to assess the degree of relationship between two or more variables? If the answer is positive, then a correlation design will be used
- Does the study seek to describe a unit in detail? If so then a case study will be used.
- Does the study seek to compare the behavour patterns of different cultures? If the answer is positive, then cross-cultural research design will be applicable.

b) After identifying the research design to be used, read materials related to that design to understand its advantages and disadvantages. Indicate the research

design pointing out its validity and reliability to the current study

Pitfalls in Selection of Research Designs

While selecting a research design, a researcher should be on the lookout for the following pitfalls and avoid them

a) Choosing a design that cannot assist in meeting the research objectives
b) Choosing a design that is too complex for the research at the level at which the student is studying
c) Choosing a design that requires extensive study and a lot of time assigned to the study is limited.
d) Lack of clarity about the design
e) A research design that lacks flexibility

From the above, it is clear that in selecting a research design the researcher should ensure that it links concepts and questions with the study and it is specific and flexible and expansive enough to adapt to various complexities.

SAMPLE RESEARCH DESIGN

Refer to the one in the proposal sent

3.2. Study Area

- In this section there is need to outline the characteristics unique to the site that are relevant to the study problem and provide relevant maps and diagrams where applicable. There should be a justification for the geographical choice of site of study. The study area should also include the thematic issue(s) inherent in the study.

3.3. Study Population

- There is need to describe the population from where the research sample will be selected. Researcher must justify the choice of the population and give figures supported by credible sources. The population(s) must cover all the possible target samples in the study.

3.4. Sampling Procedure and Sample Size

- Researcher must demonstrate the procedure applied to derive a sample category from the population earlier identified e.g. random, purposive, snowballing etcetera.
- Researcher should then give the proportion of the sample in relation to the accessible population.
- Numerical findings from the sampling processes in this section must be coherently justified.

3.5. Data Collection Techniques

- This process involves collecting information through techniques such as observation, interviews, questionnaires, documents and visual materials etcetera and establishing the methods for recording information.
- The researcher must describe how each instrument will be used in the study and on which specific population sample.
- The researcher must make sure that each instrument is linked to the collection of relevant data for the study objectives to guide the analysis and findings chapter.

3.6. Reliability and Validity/Confirmability

- Describe how the research instruments will be tested for their worth using pilot sites. Also the researcher should explain how validity and reliability will be achieved e.g. Pilot study

Validity

Validity is defined as the extent to which a concept is accurately measured in a quantitative study. For example, a survey designed to explore depression

but which actually measures anxiety would not be considered valid. The second measure of quality in a quantitative study is *reliability*, or the accuracy of an instrument. In other words, the extent to which a research instrument consistently has the same results if it is used in the same situation on repeated occasions. A simple example of validity and reliability is an alarm clock that rings at 7:00 each morning, but is set for 6:30. It is very reliable (it consistently rings the same time each day), but is not valid (it is not ringing at the desired time). It's important to consider validity and reliability of the data collection tools (instruments) when either conducting or critiquing research. There are three major types of validity. These are described in table 1.

Table 1
Types of validity

The first category is *content validity*. This category looks at whether the instrument adequately covers all the content that it should with respect to the variable. In other words, does the instrument cover the entire domain related to the variable, or construct it was designed to measure? In an undergraduate nursing course with instruction about

public health, an examination with content validity would cover all the content in the course with greater emphasis on the topics that had received greater coverage or more depth. A subset of content validity is *face validity*, where experts are asked their opinion about whether an instrument measures the concept intended.

Construct validity refers to whether you can draw inferences about test scores related to the concept being studied. For example, if a person has a high score on a survey that measures anxiety, does this person truly have a high degree of anxiety? In another example, a test of knowledge of medications that requires dosage calculations may instead be testing maths knowledge.

There are three types of evidence that can be used to demonstrate a research instrument has construct validity:

1. Homogeneity—meaning that the instrument measures one construct.
2. Convergence—this occurs when the instrument measures concepts similar to that of other instruments. Although if there are no similar instruments available this will not be possible to do.

3. Theory evidence—this is evident when behaviour is similar to theoretical propositions of the construct measured in the instrument. For example, when an instrument measures anxiety, one would expect to see that participants who score high on the instrument for anxiety also demonstrate symptoms of anxiety in their day-to-day lives.[2]

The final measure of validity is *criterion validity*. A criterion is any other instrument that measures the same variable. Correlations can be conducted to determine the extent to which the different instruments measure the same variable. Criterion validity is measured in three ways:

1. Convergent validity—shows that an instrument is highly correlated with instruments measuring similar variables.
2. Divergent validity—shows that an instrument is poorly correlated to instruments that measure different variables. In this case, for example, there should be a low correlation between an instrument that measures motivation and one that measures self-efficacy.
3. Predictive validity—means that the instrument should have high correlations with future criterions.[2] For example, a score of high self-

efficacy related to performing a task should predict the likelihood a participant completing the task.

Reliability

Reliability relates to the *consistency* of a measure. A participant completing an instrument meant to measure motivation should have approximately the same responses each time the test is completed. Although it is not possible to give an exact calculation of reliability, an estimate of reliability can be achieved through different measures. The three attributes of reliability are outlined in table 2. How each attribute is tested for is described below.

3.7. Data Analysis and Presentation

- Explain the methods that will be applied in analyzing the data based on each objective stated. The theoretical/ conceptual framework tenets should be mentioned here as parameters of data analysis. In qualitative studies indicate the method of thematizing and coding, and indicate. In this section the researcher should explain how data will be presented after analysis is complete for example whether in textual or tabular forms.

3.8. Ethical Considerations

- This section requires direct permission to carry out research readily available from the Maseno University Ethics Review Committee. This is a mandatory procedure without which the study is invalid. The researcher must show understanding of research ethics and how one will observe ethical issues related to researching human subjects in particular.