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# 3.0 Introduction

The purpose of this study was to examine how to improve computer science education in Ghana. This chapter discusses the approaches used in this present work. The chapter covers descriptions of research design, population, sample and sampling procedure, data collection instrument, and data collection and analysis procedure. Furthermore, the chapter presents a consideration of ethical issues and how these were addressed.

# 3.1 Sampling technique, population, and size

Ghana has several Universities. In this research responses from University of Ghana (UG), University of Professional Studies Accra (UPSA), Kwame Nkrumah University of Science and Technology (KNUST), Ghana Telecommunication University (GCTU) and University of Cape Coast (UCC) were sampled.

After conducting the survey, the obtained responses were distributed as follows: 70 from University of Ghana (UG), 60 from Kwame Nkrumah University of Science and Technology (KNUST), 48 from University of Cape Coast (UCC), 43 from University of Professional Studies Accra (UPSA), and 27 from Ghana Telecommunication University (GCTU). The cumulative sum of these responses amounted to a total of 248.

# 3.2 Research method

To ensure the acquisition of quantifiable and measurable data, a quantitative approach was employed. Quantitative research entails focusing on specific questions and hypotheses that remain consistent throughout the study, and subsequently employing standardized statistical techniques for analysis (Vermeulen, 1993). This research method involves the collection and analysis of numerical data, aiming to interpret outcomes derived from these data. This approach facilitates the researcher's comprehension of distinct variables and their interconnectedness within the study population's context.

# 3.3 Research design

The research design selected for this study is a descriptive design. Descriptive research designs serve as a valuable tool for addressing inquiries related to the 'who', 'what', 'when', 'where', and 'how' aspects of a specific research problem. They are particularly suited for providing insights into the current state of phenomena and offering a comprehensive depiction of "what exists" concerning variables or conditions within a given context (Labaree, 2009).

A descriptive study design involves a systematic and scientific data collection process from either a population or a sample population, employing instruments such as personal interviews, scale opinion questionnaires, direct observation, or a combination thereof (Popoola, 2012).

In this research, the primary objective is to establish a comprehensive understanding of the challenges in computer science education in Ghana. The investigation centers around two pivotal variables: the independent variable, which pertains to the various challenges faced in computer science education, and the dependent variable, which revolves around the educational outcomes and experiences of students studying computer science at the University of Ghana.

# 3.4 Research instrument

The tool employed for data collection was a questionnaire comprising 56 items. This questionnaire was divided into five distinct sections labeled as A, B, C, D and E. Section A was formulated to gather personal information from the participants. Section B aimed to ascertain whether the respondents had encountered challenges with their faculty, and if so, the specific challenges they faced and to what degree. Section C encompassed inquiries designed to know the challenges student encounter in relation to securing internship opportunities. Section D encompassed questions that help get information about the course content for all the courses student offer for their academic stay and finally, Section E has questions that discusses the extent to which student have support systems such as career guidance, access to resources such as laptop, lab and better internet for their academic work.

# 3.5 Ethical consideration

In social research, there are rules that guide how research is done properly. Some of these rules include explaining what the research is about, how information will be collected, allowing people to stop participating if they want, telling people what they will be asked to do or not do, and deciding who can see the collected data. These rules were followed when collecting data for this study. They involve informed agreement, keeping things private, and not sharing people's personal information.

Before starting, the people taking part in the research were told what the research was about so they knew what they were agreeing to. This is called informed agreement. This means people were asked if they wanted to join the research after learning what it was about, including the good and not-so-good parts, as explained by Khanlou and Peter (2005).

To protect privacy, the questions in the questionnaire didn't ask for people's names, so their identity was kept safe. Having no name or personal details is what being anonymous means, as Walford (2005) explained.

Also, anything that could identify someone was kept secret to respect their privacy, which is described as confidentiality by Xu, Dinev, Smith, and Hart (2011).

The information collected from the questionnaires was kept private and only used for learning purposes. Following these rules shows that the research cares about the participants and wants to make sure their information is safe while making sure the research results are reliable.

# 3.6 Data Analysis

After going to the field, 248 questionnaires were analysed with the use of Microsoft Power BI. Heat map was also done to measure if there were relationships between some variables of the study. Tables and charts were used to visualize the data.