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Government Policies Influencing the Retainment of Civil Engineers in Guyana's Public Sector

Gracelyn George
Walden University

Walden University

College of Health Sciences and Public Policy

This is to certify that the doctoral dissertation by

Gracelyn George

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Review Committee
Dr. Ayse Ozcan-Buckley, Committee Chairperson,
Public Policy and Administration Faculty

Dr. Lori Demeter, Committee Member,
Public Policy and Administration Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

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Abstract

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by

Gracelyn George

MSc, University of Wales, 1998

BSc, University of Guyana, 1994

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

The low retention of civil engineers in Guyana's public sector has impeded the execution of needed infrastructure projects in the country. The literature reviewed highlighted that there continued to be questions regarding why people leave engineering jobs. Moreover, there was a limited understanding of what societal attributes influenced the problem, while there continued to be a growing demand for civil engineers. The literature specific to government policies influencing the retention of civil engineers in the public sector was lacking, presenting an opportunity to expand the application of the policy feedback theory, which provided a lens for examining retention measures in the public sector. The purpose of this generic qualitative study was to explore the perspectives of current and former civil engineers on how government policies influenced their decision to remain or leave employment in the public sector. Purposive non-convenience sampling techniques were used to recruit 20 civil engineers with work experience in the public sector. Four themes were identified: (a) reasons for working as civil engineers, (b) factors influencing the decision of civil engineers to leave the public sector, (c) factors influencing the decision of civil engineers to stay in the public sector, and (d) a comprehensive policy that contributes to civil engineering development. Policymakers in Guyana and other countries can potentially use the identified strategies to foster a culture that engages civil engineers, leading to positive social change by retaining valuable civil engineers and ensuring quality social infrastructure for citizens.

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Dedication

To my creator; my dad, Kenneth George; my brother Godfrey George, for his unwavering guidance; and my entire family, for your support.

Acknowledgments

To the committee that provided a supportive environment for this research.

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Chapter 1: Introduction to the Study

Engineers in Guyana are constantly being pushed from the public sector to the private sector. Approximately 19 public sector engineers have been lost to the private sector since 2017 (Ministry of Finance, 2019). Recently, there was a request from the Minister of Public Works to the Ministry of Finance for an additional 35 engineers. The loss of engineers created implementation challenges for infrastructural development due to the lack of critical staff. These human capacity constraints have also affected planning, procurement, and contract management (Ministry of Finance, 2019). Current research has yet to determine why engineers enter the public sector but do not remain to build the needed capacity. Human resources management is an important aspect that determines the growth and success of an institution. The infrastructure industry is a human capital-intensive business that experiences high employee turnover worldwide (Hazeen & Umarani, 2023). This experience is no different within the infrastructure industry in Guyana. Human capital capacity is an essential requirement for improving the execution of the capital program, as rollover projects account for 29.1% of the 2021 capital budget. Additionally, the capital budget of the Ministry of Public Works grew from an actual position of $32,500,000,000 in 2021 to $149,000,000,000 in 2023, a massive growth of 358.5% (Ministry of Finance, August 15, 2023). This study seeks to understand the issues of reducing proportion of civil engineers in the public sector from a public policy perspective. It examines various government policies aimed at addressing the problem.

Although there is a specific policy regarding training engineers and introducing new programs for engineers by providing a $4,100,000,000 budget to the University of

Guyana, the Government is still dealing with retaining civil engineers in the public sector (Ministry of Finance, February 4, 2024). In addition, current and previous government policies mainly focus on training engineers and enhancing the academic human capacity in the public sector. The Ministry of Education, through the Education Sector Plan 2021 to 2025, has commenced strengthening the new Faculty of Engineering and Technology. Also, the University of Guyana has initiated new programs that include engineering technologies to reduce the shortage of engineers and enhance the academic human capacity in the public sector. Additionally, the Government continues to train engineers in procurement planning to enable improved execution of the civil engineers' assignments (Ministry of Finance, February 4, 2024). Even though the Guyana government has implemented several measures, including increasing the salaries and allowances of civil engineers in the public sector to improve the situation, retaining civil engineers in the public sector remains a challenge.

The studies conducted so far have not provided a distinct investigation into the reasons why Guyana continues to struggle with retaining civil engineers. Thus, it is essential to evaluate the impact of existing and new government policies such as training policies designed to improve the retention of civil engineers in Guyana’s public sector. Further, it is important to address the current gap in the literature by investigating how government policies through social integration and social skill experiences influence the retention of civil engineers in Guyana. Therefore, the lack of research on how government policies through social integration influence civil engineer retention in the public sector initiated the need to conduct this study. The results of this research provided important details to influence the improvement of current programs and policies and the development of new policies, such as comprehensive ones to enable the government to retain civil engineers in the public sector in Guyana.

This study may influence positive social change by providing policy recommendations that affect civil engineers' retention in the public sector in Guyana. It would increase the number of available civil engineers to build schools and roads in new and existing communities. The higher number of school buildings would allow more students to have improved learning conditions. Also, increasing city and farm roads would improve the lives of families engaged in entrepreneurial activities. These advancements eventually led to positive social change by strengthening communities and contributing to Guyana's development. In this chapter, I provided (a) background; (b) problem statement; (c) purpose of the study; (d) research question; (e) theoretical framework; (f) nature of the study; (g) list of definitions; (h) assumptions; (i) delimitations; (j) limitations, (k) significance of the study; and (l) a chapter summary.

Background

Engineers' retainment in the public sector has become an emerging issue in the recent literature (Çelik & Oral, 2021; Hazeen & Umarani, 2023). Regarding this, the retention of engineers has also become important because socioeconomic development depends on engineers. The phenomenon of interest, which is the impact of government policies on the retention of skilled civil engineers within the public sector of Guyana, was reviewed by previous researchers from different perspectives. Matthews et al. (2012) mentioned that the appropriate engineering capacity is necessary for any country’s economic and social development. Further, it is the basic requirement for the provision of infrastructure that supports better health care, and access to education (Matthews et al., 2012). It is important to understand the short and long-term policy implications of this phenomenon. The short-term policy implication could be to import engineers through a migration program (Blau, 2011). Additionally, long-term measures could be extracted from understanding the perceptions of current students and graduates from the civil engineering program at the University of Guyana (Matthews et al., 2012).

The movement of engineers from the public sector to the private sector continues to be of concern to the government despite implementing various policies. Human resources management is critical for the retention of a skilled workforce within the engineering sector (Hazeen & Umarani, 2023). The loss of engineers caused infrastructural development to experience implementation challenges, due to the need for more critical staff. These human capacity constraints have also affected planning, procurement, and contract management (Ministry of Finance, 2019). There is no current research with a focus on establishing reasons why engineers enter the public sector but do not remain to build the needed capacity. This capacity is an essential requirement to improve the execution of the capital program.

Another aspect that should be considered is the types of incentives that would attract engineers to the public sector in the face of the growing demand for engineering skills within the country. In addition, the inadequate human and financial resources for the civil engineering program at the University of Guyana may influence the number of engineers being trained (University of Guyana, August 15, 2017). Hence, the Ministry of

Education, through the Education Sector Plan 2021 to 2025, commenced strengthening the new Faculty of Engineering and Technology at the University of Guyana by introducing new programs within engineering technologies to reduce the shortage of engineers and enhance the academic human capacity in the public sector. In addition, the Government continues to train engineers in procurement planning to enable improved execution of the civil engineers' assignments (Ministry of Finance, February 4, 2024). Although, the government in Guyana implemented several measures including increasing the salaries and allowances of civil engineers in the public sector to improve the situation, retaining civil engineers in the sector remains a challenge.

Previous authors such as Direito et al. (2021) investigated the concerns of individual programs and policies regarding the retention of civil engineers in the public sector in the study of "Grit in Engineering Education Research: A Systematic Literature Review." It was found that the perceptions vary regarding the employment of public-sector engineers relative to the provision of skills to the private sector. As mentioned above the aspect that should be considered is the types of incentives motivating engineers to stay in the public sector in the face of the growing demand for engineering skills within the country. Further, the findings of the research indicated that there were inconsistencies regarding the conceptualization of the impact of grit in engineering education; thus, the findings of the study synthesized and identified the direction for future research. However, the aspect of social integration had not been examined. There was a need for new insight. I responded to the gap in the literature by examining how social integration can influence the retention of civil engineers in Guyana's public sector through a comprehensive policy for the engineering sector.

Problem Statement

My motivation for examining the literature stemmed from the government of Guyana's inadequate policy to support the retention of civil engineers in the public sector. This study focused on providing information to policy stakeholders in Guyana to improve civil engineers' retention in the public sector. The lack of a comprehensive policy has resulted in difficulties executing large-scale projects due to limited expertise. This problem impacts the execution of needed infrastructure projects reflecting human capacity constraints that affect planning. Even though there is a specific policy regarding training engineers and introducing new programs for engineers by providing a $4,100,000,000 budget to the University of Guyana, the Government is still dealing with retaining civil engineers in the public sector (Ministry of Finance, 2024). The government policy mainly focuses on training engineers and enhancing the academic human capacity in the public sector.

The Ministry of Education, through the Education Sector Plan 2021 to 2025, has commenced strengthening the new Faculty of Engineering and Technology. In addition, the Government policy, in Budget 2024 is to provide $4,100,000,000 to the University of Guyana to introduce new programs including engineering technologies to reduce the shortage of engineers in the public sector and enhance the academic human capacity in the sector (Ministry of Finance, 2024; Ministry of Finance, 2023). Also, the Government continues to train engineers in procurement planning to enable improved execution of the civil engineers' assignments. Although the Government of Guyana implemented many initiatives to alleviate the issue, including raising the wages and allowances of civil engineers in the public sector, retaining civil engineers in the public sector remains a challenge.

The problem is that no comprehensive public policy exists to retain civil engineers specifically for executing large-scale projects such as the Linden to Lethem corridor, the construction of a Business Incubator Centre at Lethem Industrial Area, Region №. 9, and the rehabilitation of concrete and wooden office buildings at Coldingen Industrial Estate. Notably, human capital is essential in the infrastructure industry since it is still a labor-intensive business that encounters high employee turnover worldwide (Hazeen & Umarani, 2023).

Purpose of the Study

The purpose of this qualitative study is to explore how government policies in Guyana influenced the perspectives of current and former civil engineers regarding their decision to remain or leave employment in the public sector. I conducted the study to understand the influence of the current government training and incentive policies, to identify strategies, and provide recommendations from the lived experiences of public sector civil engineers. This study addresses how social integration of current government policies would influence a new comprehensive government policy to minimize the shortage of civil engineers within the public sector.

Research Question

What influence the current government policies in Guyana have on the decision of civil engineers to remain or leave employment in the public sector?

Theoretical Framework

Grant and Osanloo (2014) mentioned that the selected theoretical framework requires a deep and thoughtful understanding of the research problem, its purpose, significance, and the research questions. Thus, all four aspects must be closely aligned and intricately interconnected so that the theoretical framework can serve as the foundation for the study and guide the choice of research design and data analysis.

The theoretical framework that underpinned this research is the policy feedback theory (Mettler & SoRelle, 2018). The policy feedback theory is frequently used to investigate policy as an after-effect of politics, questioning how new policies resulted in new politics (Mettler & SoRelle, 2018; Pierson,1993). Policy feedback theory is concerned with understanding the "feedback effects" of public policy. Mettler and SoRelle (2018) developed a different perspective in 2000 from the premise that policies shape policies, noting that the policy feedback theory aims to understand what happens after a policy is implemented, with a focus on resources and interpretive influence on the general public.

I applied policy feedback theory to investigate how policies are developed and how they can affect the political behavior of individuals and groups within society (Weible & Sabatier, 2018; Mettler & SoRelle, 2018). Mettler and SoRelle (2018) identified four key research areas of investigation in the policy feedback literature: how policies shape political agendas and policy problem definitions, influence the form of governance, affect group power, and define the meaning of citizenship.

The policy feedback theory developed by S. Mettler and M. SoRelle (2018) explored the efficiency of existing government training policies targeted at civil engineers in the public sector. In the case of this study, the policy feedback theory was used to explore how government policies regarding the creation of the new programs at the University of Guyana and additional training in procurement could influence the retainment of civil engineers in Guyana’s public sector. The theory's key features are reviewing the impact of policies that are created in reshaping policies and how such transformation would affect subsequent policymaking. The recent policies created were to provide $4,100,000,000 to the University of Guyana to introduce new programs, including engineering technologies to reduce the shortage of engineers in the public sector and enhance the academic human capacity in the sector. The policy feedback theory declares that policies once legislated, restructured, and rearranged into an altered form can influence or constrain subsequent policies and policy alternatives. Additionally, social integration implies compatibility among educational institutions, social systems, and individuals in society. Thus, the policy feedback theory was used in this study to examine how social integration through government policies influences the retention of civil engineers in the public sector.

Nature of the Study

To address the research question in this study, a qualitative research methodology was used to address the research question in this study. The researcher conducted generic qualitative research since it is associated with the study of various human phenomena and seeks to discover and describe the events of people in their everyday lives. It also addresses what their actions signify by evaluating multi-factor interventions and focuses on how the intervention improved the lives of individuals (Erickson, 2011). Aspers and Corte (2021) highlight that qualitative researchers perform an iterative process to improve the scientific community's understanding of new phenomena. Furthermore, the paradigms of qualitative research include but are not limited to traditional foundationalism, positivism, and the various methodologies associated with culture and interpretive studies. These aspects of qualitative research make it interesting and unique.

Qualitative research through empirical material and various methods, such as a case study, participatory inquiry, interviewing, participant observations, and interpretive analysis, describes routine and problematic moments in an individual's life (Denzin & Lincoln, 2013). Further, these methods locate the observer in the world and, through interpretative practices, allow the world to become visible.

Ravitch and Carl (2021) stated that qualitative research begins with a question of interest or problem. Additionally, these studies are conducted in natural environments to interpret phenomena in the context of understanding the human experience of the situation. These aspects of qualitative research methods give the researcher an exciting and unique experience. Earnest (2020) posited that trustworthiness in the qualitative study means adequate and methodological soundness in research. It is also connected with the level of confidence the researchers have pertaining to the credibility, transferability, and dependability of the qualitative data results (Earnest, 2020). Thus, ensuring quality, trustworthiness, and credibility in qualitative studies is essential. Shenton (2004) mentioned that Lincoln and Guba's (1986) framework proposed four criteria. These aspects are credibility, dependability, confirmability, and transferability, which are the primary measures through which research quality is determined (Shenton, 2004). Given the literature reviewed above, qualitative research methodology is the most appropriate strategy for this study for several reasons.

Qualitative researchers often focus on investigating a phenomenon through participants' experiences, perceptions, and attitudes in their natural settings (Patton, 2014). The fundamental characteristic of qualitative methodology is to allow researchers to provide accurate and systematic descriptions of a phenomenon where limited research currently exists through thick descriptions (Erickson, 1985). Thick and rich descriptions are the fundamental strengths of qualitative studies, given that the researcher provides a detailed description of the research in terms of methodology, settings, population characteristics, data analysis, data collection, and other relevant background information that can be used to improve the understanding of the studied phenomenon (Erickson, 1985). In so doing, qualitative researchers seek to accurately portray the phenomenon studied by participants as they experienced it naturally. Furthermore, the qualitative researcher's quest is to explore the phenomenon by probing participants' experiences and the interpretations they assign to their individual experiences (Merriam & Tisdell, 2016). One of the characteristics of qualitative research methodology is the reality of multiple meanings through which knowledge is socially constructed when individuals interact with the environment.

Given the literature mentioned above, qualitative research methodology is the most suitable approach for this study for various reasons. First, as previously stated, qualitative research methodology is used to investigate a phenomenon from a naturalistic perspective (Merriam & Tisdell, 2016). Similarly, a qualitative research methodology aligns with the current study because the investigator intends to explore the influence that established current government policies in Guyana have on the decisions of civil engineers to remain or leave employment in the public sector, which becomes the natural setting of the study.

The primary source of data for this study was gathered through individual interviews via Microsoft Teams and Zoom. Patton (2014) recommended the use of interviews for qualitative studies, given the ability to allow researchers to collect in-depth data on the phenomenon. The interviews were audio recorded and lasted 60–90 min based on participants' availability. Throughout the study, data integrity was protected by storing information on a personal computer using a unique password. All hard copies will be stored in a secure cabinet at the researcher's home for 5 years, after which they will be destroyed.

I recruited 10 currently and 10 former employed civil engineers who worked in the public sector of Guyana (20 participants total). Inclusion criteria for former civil engineers included being employed within the public sector for a period of 6 months to 60 months. Inclusion criteria for the currently employed civil engineers included 36 months to 60 months. In addition, participants were holders of at least a first degree in civil engineering. Also, the inclusion criteria comprised former employed civil engineers who left the public sector within 48 months. The sampling technique was “convenience sampling” to keep the study focused on precisely defined inputs and outcome variables. According to Hennink and Kaiser (2022), qualitative studies reach saturation within a narrow range of interviews. Hence, the sample size of the research was 10 former and 10 currently employed civil engineers. However, data collection continued until saturation was achieved.

The data analysis follows Saldana’s (2021) descriptive coding process and uses first and second-cycle coding. Descriptive coding summarizes the primary topic, and it is used to assign labels to words or phrases in the data. The first and second coding aimed to review the data more than once using one or more types of coding. The codes were used to organize the data into categories for synthesizing the codes into groups with specific features, commonalities, and differences, highlighting consolidated meaning. The categories were moved into themes, which are the perceptions and experiences of the participants. These perceptions and experiences are reported in phrases or sentences that describe the outcome of the process which is to design government policies that influence the retainment of civil and mechanical engineers in the public sector.

Definitions

Engineer retention: Policies the government uses to prevent employees from leaving the public sector (Siwela & van der Bank, 2021).

Government training policy: Training programs that allow employees to broaden or develop their skill sets and take on new responsibilities within their organization (Goyal et al., 2023).

Public policy: Policies that are formulated and executed by government agencies and officials (Anyebe, 2018).

Public sector: The part of the economy in which all resident institutional entities are managed directly or indirectly by the resident government units. (International Monetary Fund, 2014).

Social integration: Compatibility between learning institutions, social systems, and individuals in society (Jili & Enaifoghe, 2023).

Assumptions

In research, assumptions are statements that researchers believe to be true but cannot be proven. In this study, there are various assumptions that the researcher holds as true (Theofanidis & Fountouki, 2018). Researchers must disclose their assumptions so that future researchers have the knowledge they need to increase replicability and transferability to other studies. The following assumptions apply to the study.

It is assumed that participants provided honest responses. The trustworthiness of study participants is critical to the validity of qualitative findings. To achieve this, participants are expected to be honest in their responses. In qualitative investigations, participants are volunteers, and researchers have little influence over the responses. Self-reported data may be deceptive, undermining the reliability of the study's findings. To address this constraint, all volunteers was reminded of their commitment to the study by demonstrating honesty.

The selected theoretical framework is assumed to provide a theoretical lens and foundation for investigating the current study phenomenon. The researcher assumes that the policy framework inquiry provided a theoretical lens through which to explore how social integration affects civil engineers' retention in the public sector. This assumption is significant because theories play a crucial role in interpreting study results.

I also assumed that the selected research methodology effectively investigated the influence of social integration on civil engineers' retention in the public sector. A qualitative research methodology was chosen for this research. The researcher anticipates that by adopting a generic qualitative research methodology, participants were able to provide accurate descriptions of their views, attitudes, and experiences about the influence of social integration on civil engineer retention in the public sector.

Scope and Delimitations

Delimitations are the boundaries established by the researcher to limit the scope of the investigation (Theofanidis & Fountouki, 2018). In this research, the current study was delimited by the topic of the study. The researcher specifically looked at the impact of social integration on civil engineering retention in Guyana's public sector. I limit the selection to current and former employed civil engineers who worked in the public sector of Guyana. Participants were limited to former civil engineers with work experience within the public sector for a period from 6 months to 60 months. Inclusion criteria for the currently employed civil engineers include 36 months to 60 months. Additionally, participants were limited to holders of a first degree in civil engineering from the university. The study was also delimited to the selection of qualitative descriptive research methodology and the policy feedback theory to explore the efficiency of existing government training policies targeted at civil engineers in the public sector. Furthermore, this research may be transferable to another context due to the dynamic nature of the relationship between civil engineers and government policies in the public sector of Guyana.

Limitations

Limitations refer to flaws or potential drawbacks in research (Theofanidis & Fountouki, 2018). Although limitations do not always invalidate the validity of the study's findings, it is technically necessary for researchers to mention them. (Theofanidis & Fountouki, 2018). Essentially, researchers must state the limits of their techniques, data collection source, and sample to ensure that the findings can be replicated in the future.

The primary limitation of this study is the limited sample size. Given the range of descriptive data collected and analyzed in qualitative studies, a modest sample size is typically used. Furthermore, qualitative researchers employ data saturation to determine an appropriate sample size, which may result in a sample that is not representative of the overall population. As a result, a small sample size may limit the study's findings' applicability to other settings.

Another potential disadvantage of the study is the researcher's lack of experience. This was the first official study, so the researcher's statistical knowledge was modest. Such restrictions may have an impact on the study's design and analysis. To address this constraint, the researcher received additional data analysis training and engaged with data professionals.

This concern stems from the basis that the potential population of participants were volunteers for the study. Further, there are concerns about confidentiality since the organization would have liked to be actively involved in the process. To assist with the confidentiality aspect of the research, I reduced the agency’s involvement by requesting the use of their social media sites. Also, there are no challenges in relation to storing data and the separation of roles. In relation to the separation of roles, the participants for the interviews were selected from outside of my current workplace. However, the issue of trust could arise since I stated on the consent form my current place of work. To deal with matters of that nature, anonymity was encouraged.

Significance

This study is significant as it addresses a gap in understanding government training and previously implemented incentive policies influencing civil engineers’ decisions to stay in or leave the public sector of Guyana, focusing specifically on the development of the problem statement regarding retaining civil engineers in the public sector. The results of this study are expected to aid the government by understanding the influence of the current training policies and the need to design a comprehensive policy to retain civil engineers and reduce the turnover of engineers in the public sector of Guyana. In addition, the findings of this research should assist the government in identifying the need for an inclusive government policy for the engineering sector that aided in retaining civil engineers in the public sector to support future infrastructural development in Guyana. Additionally, infrastructural development has contributed to social changes in citizens' lives in society, thus, government policies should assist Guyana in advancing its capability in this area. Retaining civil engineers within the public sector supported building schools and the development of roads in the new and existing housing schemes. The increase in school buildings allowed for more students to have improved learning conditions. Also, increasing city and farm roads improved the lives of families that are engaged in entrepreneurial activities. Of note, these advancements eventually lead to positive social change by strengthening communities and contributing to Guyana's socioeconomic development.

Summary

The specific problem that was addressed through this study is the lack of research examining the influences of government policies on training at the University of Guyana and professional training in procurement that impacted the retention levels of civil engineers in Guyana's public sector. The purpose of this qualitative phenomenological study was to explore the perspectives of current and former civil engineers regarding how government policies may influence their decision to remain or leave employment in the public sector. The chapter was used to identify the literature gap and the need for the gap to be addressed. In the background section, information on the impact of projects, as well as historical and current data, was provided. Other sections discussed include the theoretical framework, nature of the study, research questions, purpose of the study, problem statement, and definition of key terms, assumptions, limitations, delimitations, and significance of the study. Chapter 2 includes a review of the literature on engineers' retention in the public sector. The theoretical framework was discussed in detail and how it informs different themes supporting the study.

Chapter 2: Literature Review

Introduction

The purpose of this study was to address the inadequate number of civil engineers who build schools and roads in communities and assist in the socioeconomic development of Guyana. Furthermore, the shortage of civil engineers hinders the completion of projects on time, affecting social transformation in society. Therefore, I explored the retention of civil engineers in the public sector to inform government policies.

According to the literature review, there is a lack of research on the link between government policies and engineer retention in the Guyana public sector. Thus, this research aimed to investigate the sparsity of civil engineers in the Guyana public sector. The specific research problem that was addressed through this study is a lack of research examining how government policies may influence the shortage of civil engineers in Guyana (Ministry of Finance, 2024). Kiazad (2024) highlighted that there continue to be questions regarding why people leave engineering jobs. Also, there is little understanding of what societal attributes may influence the problem. However, the demand for the employment of engineers continues to grow (Kiazad, 2024). At the same time, retaining a strong base of technical expertise within the public sector remains a significant challenge for the government. (Ministry of Finance, 2024). Notably, considerable research has been conducted on employee retention policies over the past 55 years (Béland et al., 2022; Hacker & Pierson, 2019; Farris, 1969; Froiland 2023 & Mulla et al., 2013). The authors mentioned employee retention is costly to the organization that invested in training the employees and the employees who dedicated their time to the company by seeking employment in other companies (Béland & Schlager, 2019; Goyal et al., 2023; Hacker & Pierson, 2019).

Retaining civil engineers in the public sector improved communities and the livelihood of families. The research is expected to fill a gap in understanding the conceptual processes of the interrelationship of multiple influential factors. In particular, the study's purpose is to examine incentive approaches that encouraged engineers to remain in the public sector (Ministry of Finance, 2024). This chapter aims to provide a synthesis of the literature on civil engineers' retention and the government policy influences in the public sector. The chapter covered the literature search strategy, the theoretical foundation, the conceptual framework, a comprehensive review of the literature regarding government policies influencing the retainment of civil engineers in Guyana's public sector, and a summary of Chapter 2.

Literature Search Strategy

The databases searched include online learning in databases such as Taylor and Francis Journals, Emerald Insight Journals, Education Source, Open Access, Public Administration Review Journals, Policy Studies Journals, Review of Policy Research Journals, International Journal of Public Administration, and IEEE Xplore digital library and multi-database search including United Nations databases. The keywords for the research are public *policy, engineering in public policy, retention, government policies, public sector, public service, Guyana public sector, the policy feedback theory, human resource management, academic human capacity, employee attrition, civil engineering,* *mechanical engineering, shortages, employee turnover, employee attrition causes, education, organization analysis, qualitative research*, and *short-term demand and supply of engineers.*

Initially, searches were conducted in the Walden Library database for recent dissertations (2020-2023) to review the topic and the previous theory of Herzberg et al.'s (1959) Herzberg's two-factor motivation-hygiene theory. Given the topic's uncommon nature, no specific information was available. However, dissertation information is available on the theory that focuses on job satisfaction to retain employees. The theory is changed to the policy feedback theory. Searches were conducted in the Walden Library web database for the dissertation that utilized the policy feedback theory, and it was discovered that the theory is popular with recent dissertations at Walden and other universities. Although researchers examined the issue, this topic is uncommon and there are no similar dissertations in that subject area, despite expanding the keywords and search strategy. The public policy top ten journals and the public policy and administration database were searched extensively via the Walden University Library, EBSCO eBooks, ProQuest, Web of Science, and Google Scholar. Additionally, I used the Cited By feature in Google Scholar to access recent articles. I also requested the most recent publication on the policy feedback theory from the Walden Library. Also, a literature matrix was prepared in Microsoft Excel with the headings of authors, year of publication, book title, theme, subtheme relevant to the research topic, theory, research-designed notes, and references. The lack of information caused me to adjust the topic from "Government policies influencing the retainment of civil and mechanical engineers in the public sector" to "Government policies influencing the retainment of civil engineers in the public sector". Nevertheless, literature specific to government policies influencing the retainment of civil engineers in the public sector remains lacking and represents a gap in the literature. This is an opportunity to expand the application of the policy feedback theory. Wipulanusat et al. (2021) suggested that future scholarly work should be conducted to examine the outcomes of career satisfaction and its connections to career success in the public sector. The research revealed that career satisfaction was a significant indicator used to study the extrinsic and intrinsic outcomes of professional engineers' career success in the public sector. Also, the study informed that career success was a factor considered by professional engineers when deciding whether to stay or leave the public sector.

Theoretical Foundation

Mettler and SoRelle (2018) indicated that policies shape politics. The policy feedback theory seeks to understand what happens after a policy is adopted with an emphasis on resources and interpretative effects on society. The findings revealed that the policy influences the political agenda by shaping the "old business" realm, which requires attention by offering frames for interpreting new issues and policy alternatives. Also, the policy adds a new dimension to the study of the policy process. This is important concerning the author's research since it focuses on the structure and politics of policymaking and the factors that influence policy change (Beland & Schlager, 2019). Hence, it may help explain the reasons for the engineer turnover and provided recommendations for the retainment of engineers in the public sector. The study seeks to explain the implementation of the government policies of training more engineers to reduce the shortage of engineers in the public sector. Further, it may help create a clear understanding of the ontological and epistemological aspects within the literature review of the dissertation process.

The policy feedback concept was born from recognizing the need to receive responses from existing policies to shape aspects of future policies (Mettler & SoRelle, 2018). Policy analysts examine policies to assess their effectiveness. They evaluate the policy's effect by scrutinizing socioeconomic policies to determine if they match the objectives intended to benefit the citizens (Béland et al., 2022). Policies have positive and negative feedback. Positive feedback policies result in stable or expanded outcomes over time, while negative feedback is those that have less stability or result in the contraction of spending on the infrastructure sector or lower eligibility and benefits of social care to citizens (Béland et al., 2022). Furthermore, the effects of policies differ in the intensity to which they were expected by those who shaped the policy (Mettler & SoRelle, 2018). Policy changes influence citizens' beliefs and values and could alter policymakers' decisions. Legislators tend to create policies that lasted for a long time and hope for an expansionary dynamic, such as social security (Béland et al., 2022).

The policy feedback theory's key tributaries and scholarly relevance of analysis are from the historical institutionalist perception, the government standpoint, the perspectives of target groups, and a citizen's viewpoint (Weible & Sabatier, 2018). The policy feedback literature posited that depending on how policies are shaped it influences the attitudes of citizens and groups, and scholars conducted research to determine the mechanisms by which this outcome occurs. The results considered the attitudes of individuals and groups toward the programs themselves or their recipients and how policies affect attitudes toward government and the market (Béland et al., 2022). In my study, I aimed to understand the policy feedback theory and the policy feedback effects from the perspective of target groups.

Skjaerseth (2018) used the policy feedback theory to examine a Polish interest group’s implementation of the European Union (EU) climate/energy target and policies package of 2020, the aim of which was to reduce greenhouse gas emissions, increase the share of renewable energy consumption, and improve energy efficiency by 2030 and beyond. Using multiple sources, including semi-structured interviews with a selected group of Polish experts, and societal and governmental actors, Skjaerseth explored the impact of Poland's energy interest on the EU climate and energy framework for 2030. The outcome revealed positive support for the EU policies. Also, it was observed that Poland is the least climate-ambitious member, thus, not having a major influence on the EU climate/energy policy. The study resonates with the drivers shaping EU policy were liberal intergovernmentalism and autonomous supranational actors. It was established that positive or negative policy feedback from the least ambitious member states is necessary but does not ratify the position of the whole of the EU. More research is needed to examine policy feedback from implementation member states to have a complete view of the EU policy dynamic. An analysis of this study highlighted that the policy feedback theory can apply to various aspects of scholarly research. Hence, the policy feedback theory in this research explored how government training and incentive policies influence whether civil engineers stay or leave the public sector.

The policy feedback literature highlighted the necessity of receiving responses from current policies to design features of future policies (Mettler & SoRelle, 2018). The usefulness of such information received allows for expanding the target population and mass public to create policies for specific groups. The study addressed that the policy feedback theory was understudied, even though it provided critical information on the feedback process to shape policies on race, and the role of the organizations. Further, the policy feedback research should be conducted in non-U.S. territories to allow for comparison with other scholars (Beland & Schlager, 2019). Additionally, the policy feedback theory provides information regarding how social benefits to individuals, or a particular group to pursue their goals influence their participation in politics (Weible & Sabatier, 2018). Thus, it assisted with the reasons why civil engineers decide to stay or leave the public sector. Furthermore, the theory assessed the impact of the implemented government policies of training additional engineers to reduce the shortage of engineers in the public sector. Scholars indicate that more information is needed to understand the implications of how policy shapes citizens' attitudes and understanding the consequences could enhance the efficiency and effectiveness of policymakers (Béland et al., 2022). Hence, the policy feedback theory would investigate the research question from the perspectives of current and former civil engineers. What influence do the current government policies in Guyana have on the decision of civil engineers to remain or leave employment in the public sector?

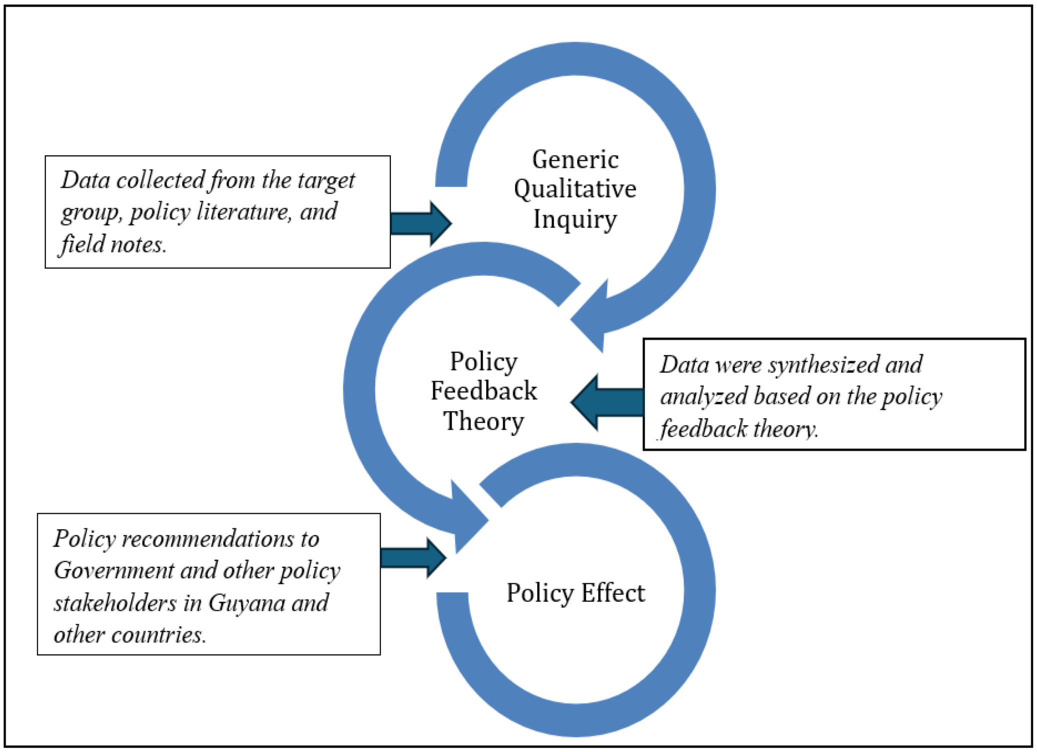
Conceptual Framework

Information regarding the factors influencing the decision of civil engineers whether to stay or leave the public sector of Guyana is limited. Therefore, to understand the phenomenon of shortages of engineers in the public sector more information is needed to assist the government in creating policies that encourage the much-needed civil engineers to remain in the public sector. Most of the literature examined for my research explored engineers' retention against skills, passion, personal relationships, career expectations, environmental upbringing, recruitment and selection, competitive policies, and public service motivation. This study is different from the research assessed and presented in the literature review because the conceptual framework has provided a different view by using the policy feedback theory to explore, understand, and explain the influence of target groups on policy change and the effect of policy change on shaping future policies within in the public sector (Mettler & SoRelle, 2018).

In Figure 1, the conceptual framework depicts the policy feedback theory applied to the generic qualitative inquiring model, which establishes the theoretical underpinning and provides a lens to research, analyze, and interpret the data on the factors influencing civil engineers' decision on whether to stay or leave the public sector and to provide information to government and other policy stakeholders in Guyana. The data generated provided insight into different opinions and points of view that exist surrounding the topic. The information obtained was applied to the policy feedback theory.

Figure 1

Conceptual Framework



Note. I drew from Amos (2023), Grant and Osanloo (2014) and Mettler and SoRelle (2018) in creating this figure.

After policy effects were identified from the target group, the data analyzed and synthesized from the perspective of current and former civil engineers in the public sector. The study aimed to explain civil engineering retention in the public sector. The data can inform public policy to enhance a comprehensive policy to improve the retention of civil engineers in the public sector through policy change (Mettler & SoRelle, 2018). An increase in civil engineering retention rates may improve stability in the public sector and enhance the overall development of the lives of civil engineers and society with improved social services such as roads and schools.

Literature Review

The literature review begins with discussion of factors influencing civil engineer retention in Guyana. Other topics include the implications of administration reforms for civil engineer retention; challenges in retaining civil engineers; the impacts of human resources management policies and training on retention; and strategies for retaining and sustaining civil engineers in the public sector, in particular in Guyana's new oil and gas industry. I explored these topics to gain insight on government training policy, engineer retention, and social integration in the public sector.

Factors Influencing the Retention of Civil Engineers in Guyana

The government of Guyana's budget speech in 2023 reported a dramatic increase in public expenditure financed by higher tax and non-tax revenues and borrowing from international and regional financial agencies. Ministry of Finance (2023) documented higher revenues and current and capital expenditure by institutions in the country, Guyana. The higher revenue resulted from the sales of oil and higher collections from withholding, corporation, and personal taxes associated with oil resources. One of the agencies with a significant increase is the Ministry of Public Works.

This agency is responsible for the country's infrastructure and employs civil engineers. The institution's budget has increased by 39.5%, or $66,800,000,000. Further, the 10 administrative regions in the country have public works programs that cater for the current and capital expenditure to conduct the infrastructural works in each region.

Notably, the public sector has historically struggled to attract and retain suitable qualified professionals and faces human resource gaps for infrastructure, particularly engineers and professionals in bridge construction and procurement. (Ministry of Finance, 2019). Hence, the government policy in 2024 budget is to provide $4,100,000,000 to the University of Guyana to introduce new programs including engineering technologies to reduce the shortage of engineers in the public sector and enhance the academic human capacity in the sector. The government continues to train engineers in procurement planning to improve the execution of civil engineers' assignments. Although the government in Guyana implemented several measures including increasing the salaries and allowances of civil engineers in the public sector to improve the situation, retaining civil engineers in the public sector remains a challenge (Ministry of Finance, 2024).

Thus, the government of Guyana's purpose for introducing science, technology engineering, and mathematics (STEM) in society is to understand the dynamics of what is required to develop human capacity individually or collectively (Ministry of Finance, 2019 & Ministry of Finance, 2020). STEM also promotes physical, social, economic, cultural, and psychological teamwork to foster the development of a country towards a knowledge-based- society to create a modern future. Technology provides instruments and means for achieving human aims and purposes in accordance with the prevailing norms and values of the society concerned. Engineering applies scientific knowledge in its operations to accommodate sustainability whereas education in mathematics teaches critical thinking for addressing issues in the various communities in the country (Kiazad et al., 2024).

The effective incorporation of STEM in society is essential to develop sustainable solutions for all citizens and stakeholders to support community development. Kiazad et al. (2024) revealed that professionals working in the sphere of science technology, engineering, and mathematics (STEM) have a fundamental responsibility to address current and future challenges in their countries including those outlined in the United Nations Sustainable Development Goals (SDGs). . However, many qualified individuals with university and college degrees in STEM leave their current jobs to pursue careers in non-STEM fields while the demand for employment in STEM continues to grow (Kiazad et al., 2024). This is a significant challenge for countries.

In 2022, the International Labour Organization indicated that in 1 year the number of required graduates with diplomas in civil engineering in Guyana is 90 and within 5 years it should be 170 individuals. The education program in Guyana was considered one of the best in the Caribbean in the 1960s to a system that currently requires improvement among its Caribbean counterparts (Jornitz & Parreira Do Amaral, 2021). The literature highlighted that the essential contributions of governments to STEM programs improved the living standards of the mass public. Hence, governments worldwide continue to fund STEM education programs to prepare the current and future workforce for economic and societal development (Kiazad et al., 2024). The STEM courses were launched in 2018 in Bartica as a pilot program that was an extracurricular activity conducted outside the regular school period. Also, educators received STEM training (Jornitz & Parreira Do Amaral, 2021). The improvement of STEM in Guyana is associated with CARICOM's Human Research Development 2030 Strategy. The strategy aims to enhance students' technological, scientific, and engineering skills to manage change and transformation of self and society and to provide the needed skills to the new labor market with the emergence of hydrocarbon revenues.

Administration Reforms and the Retention of Civil Engineers

Wipulanusat et al. (2021) indicates that administrative changes such as competition policy, contracting out and commercialization impacted the number of engineers within the Australian public sector. The reduction of professional engineers within the public sector between 1990 and 1999 was 20% and 50% within the Commonwealth, State, and local government. The literature highlighted that one of the major skill shortage groups was professional engineers in the Australian Public Service. Also, recruiting new graduates and retaining existing employees have become problematic for government agencies. In Guyana, commercialization through introducing a new product on the market in the form of hydrocarbon affected the turnover rate of engineers in public service. This caused the government to recognize the deficiencies, causing it to source the requisite pedagogical skills to ensure that civil engineers are not deprived of quality education and the necessary skills needed for development and to promote social transformation (Ministry of Finance, 2019).

The emergence of this new sector presented several challenges for the public sector in retaining engineers, as the oil and gas sector absorbs national engineering capacity faster than Guyana can produce, and public sector wage rates, even at their best, make it difficult to compete with the private sector. The administrative changes are to develop policies within the education system to stimulate activity and proficiency in foundational STEM areas. Hence, the policy is to allocate $4,100,000,000 to the University of Guyana and to administer various procurement training for engineers to enhance the variety of skills in public sector (Ministry of Finance, 2024).

Al Balushi et al. (2022) mentioned that creating a career program to motivate and retain staff is the best way to enhance employees' organizational commitment; the research evaluated career growth's influence on turnover intention, mediated by employees' commitment through self-reported employees' perceptions among 500 employees of 38 government units within the Sultanate of Oman. According to the research findings, to encourage retention and reduce the turnover intention of public sector managers, a package that includes viable career advancement as well as effective and continuous commitment programs that are meaningful to support career progress and reduce employee turnover intention is necessary.

The literature highlighted that the primary dimensions of organizational commitment include effective continuance and normative commitment. These factors indirectly mediate the relationship between career growth and employee turnover intentions (Al Balushi et al., 2022). Further, Al Balushi et al. (2022) indicated that career growth is the improvement of a career, related prospects, experiences, duties, and responsibilities through intervention and purposeful accountability of individuals and their environment. Career growth consists of four major components which are career goal progression, professional ability development, promotion speed, and remuneration growth.

The authors noted that employees feel an affinity toward their organization when one or more of these factors are considered by employers. Also, career satisfaction is employees' feelings of satisfaction or dissatisfaction with their entire careers (Wipulanusat et al., 2021). Araújo and Salerno (2021) addressed that the career trajectories of young engineers in Brazil were reviewed by applying optimal matching analysis to employment official data and found that trajectories were within 3 years but promotion to the managerial position was within 8 to 10 years and crisis periods (economic recessions) affected the attractiveness of the engineering career. In 2019, in the area of career satisfaction policies, the government of Guyana implemented a comprehensive substantive compensation package including upgrading the salary scale and promoting engineers to higher scales to build human capacity while reducing turnover in the public sector. During the period between 2017 to mid-2019 the public sector lost 19 engineers (Ministry of Finance, 2019).

Challenges in Retaining Civil Engineers

The challenges of retaining civil engineers were examined within the context of public sector motivation apart from career satisfaction. Hue et al. (2022) revealed that different aspects of public sector motivation affect employees' behavior consistent with the context of Vietnamese public universities by examining the mediating role of person-organization fit through four dimensions of public sector motivation. These are the attraction to policy-making commitment to the public interest, self-sacrifice, and compassion that affect both positive and negative aspects of employees’ outcomes in the form of work efforts, turnover intention, and work-related stress in the public sector, using 313 random faculty and staff from 45 Vietnamese public universities. It was found that public employees who are committed to the public interest and are attracted to public policy-making exerted more effort in their work. In addition, there was a direct link between faculty and staff with high public service motivation, who displayed self-sacrifice, passion, and commitment to the public organization, with a lower likelihood of quitting their jobs, and those with negative effects, with low levels of public service motivation and a higher level of leaving the job. The outcomes of this study could influence government policy that provides public service motivation to enhance person-organization fit and reduce employee turnover in the public sector.

Additionally, the Vietnamese prefer public sector jobs to private sector jobs because they offer higher security and status and usually display work ethics of high levels of diligence, hard work, skillfulness, and trustworthiness. However, on account of the high pressure, dissatisfaction, and burnout public servants experience at work, they voluntarily resigned (Hue et al., 2022).

I examined the challenges and low retention of civil engineers in Guyana's public sector, and alleviate the problems associated with the retention of civil engineers in Guyana. In addition, it guided policymakers to formulate a comprehensive policy to improve the retention of civil engineers in the public sector. Another phenomenon influencing employee turnover is work-related stress that affects their well-being, attitude, service delivery, and behaviors in the public sector. Bao and Zhong (2021) highlighted work-related stress using the two-dimensional stressor framework to assess the relationship between challenges and hindrance stressors with turnover intention, concentrating on organizational identification and the moderating role of public service motivation, using information from 399 Chinese public sector employees. The authors found practical implications for public managers. For instance, public managers should provide more resources through organizational support and leadership to buffer the negative effects of hindrance stressors on organizational and turnover intention, environmental constraints, and training to instill the notion that not all stressors are "bad." Additionally, public managers could emphasize that the challenge stressors such as intent workload and high job responsibility were associated with the organization making significant contributions to society. Hence, the employees should see the role of the institution in a positive light (Bao & Zhong, 2021). Thus, infrastructural development promotes social change in communities by developing schools and health centers (Ministry of Finance, 2023).

Low Civil Engineer Retention and Public Infrastructural Development

Public infrastructural development is critical for social change in countries by providing the physical foundation for rural and urban development. Also, it improves connectivity and productivity within a country (Mwamvani et al., 2022). Public infrastructural development plays an important role in stimulating economies by providing roads, schools, hospitals, and employment for citizens. Mwamvani et al. (2022) revealed the causes and factors of the implementation delay of road projects. The findings mentioned that the primary reason was the shortage of engineers in conducting detailed proposed project surveys; other contributing factors were the delayed removal of existing public utility infrastructure, clients' funding issues, scope changes delay and the shortages of construction equipment. Rivera et al. (2020) highlighted project delays as a persistent worldwide problem resulting from the lack of experienced professionals within the construction industry and inadequate planning. This assessment was conducted by gathering data from 25 developing countries and found that the factors affecting the delay in road projects were human-related, including inexperienced engineers and poor communication between stakeholders.

To analyze the availability and retention of civil engineers to sustain the higher demand in the U.S. workforce the authors examine the growing need nationwide. Young et al. (2022) stated that the increased need for civil engineers in the US workforce was due to the newly approved infrastructural bill. Therefore, it is crucial to comprehend the reasons that drive students to pursue this field of study, as it can play a vital role in addressing the shortage of civil engineers in the workforce and attracting future engineers. The researchers surveyed 1,071 college students to ascertain the factors influencing their academic and career development choice to pursue civil engineering. The authors revealed the key factors were personal relationships, skills and passion, career expectations, and environmental upbringing. Within the career expectations category, the reasons cited were to serve others, solve problems, receive a good salary, have a good job, and have job stability. Also, teachers and parents participated as influential factors in students' decisions to pursue civil engineering at the university level.

Human Resources Management Policies and Civil Engineer Retention

Human resources management is one of the institution's main components that helps to achieve various developmental goals. Piatak et al. (2021) mentioned that public service motivation uses two aspects of the human resource management process: job design and recruitment and selection. The research also evaluated the human resource management process within the context of public service motivation using these aspects and performance management. It revealed that human capital is one of the most essential components for effective public service delivery within communities to create positive social change among citizens. Examining the influence of policy outcomes in the public sector from the perspective of various decision makers, the literature revealed that information exchange among staff contributes to a network of accountable colleagues that aids in the achievement of policy objectives.

Baldwin (2020) assessed the effects of participatory governance in the electric sector and indicated that it has an instrumental impact on policy outcomes. The researcher used qualitative evidence from two states, Connecticut and Maryland, to examine how the participatory approach to governance ensures that policy change reflects citizens' preferences and needs to achieve better-desired outcomes. The researchers found that information exchange among participants directly affected the efficiency plan and contributed to a network of stakeholders accountable for achieving the policy goal. To assist with the retention of civil engineers within the public sector in Guyana similar techniques could be employed to encourage the exchange of technical information and create networking to strengthen local knowledge and problem-solving capability. Useful feedback among peers could enhance participatory governance to improve accountability and policy goal outcomes.

Training and Civil Engineer Retention in the Public Sector

Training in Guyana is conducted mainly through the University of Guyana at its two campuses, Tain in Berbice and Turkeyen in Demerara. The University of Guyana faces difficulties regarding staffing, financing, and infrastructure upkeep that affect the retention and recruitment of students in the areas of science and mathematics. Furthermore, one of Guyana's most challenging situations is the retainment of trained professionals in the public sector and the country because of low pay, poor working conditions, and competition for the best-trained individuals (Jornitz & Parreira Do Amaral, 2021). To assist with the shortages of educators within the STEM subject areas, the development strategy was launched in 2020, namely the Decade of Development, focusing on having educators trained in STEM. In addition, given the rapid pace of transition to the petrostate, having a skilled workforce is necessary. Thus, greater attention should be given to building human capital - knowledge, skills, creativity, and well-being through significant investment in the education system. Towards this end, the government in the budget 2024 allocated GY$4,100,000,000 to the University of Guyana to aid with the training of engineers. Pan et al. (2021) indicated that in the context of globalization, higher education is important to improve the quality and level of civil engineers by strengthening their profession and academic knowledge through training. This enables civil engineers to have a broad international vision and stronger communication skills.

Training civil engineers is critical in the public sector since infrastructure work contributes significantly to the gross national product and employs a large workforce in most countries. Thus, regular training to update the workforce's knowledge regarding the latest and future technology is essential to upskill and reskill the workforce. In Europe, such training programs have driven progress in areas like digitalization, sustainability, and adherence to environmental regulations. This not only prepares professionals with key competencies but also supplies employers with a highly adaptable workforce ready to efficiently undertake contemporary projects. Research has shown that continuous job education or professional development impacts workforce decisions. Shiri et al. (2023) indicated that constant job training or professional development influences the retention of current employment. The study reviewed 7,338 publications of various disciples to assess the influence of training and development on workers' decisions to stay or leave the job. The authors found that increased intention to remain in the current job and reduced intentions to leave a current job were associated with employers that invest in their staff's training and development opportunities. Further, the study found decreased employee turnover, job change, or early retirement, and employees were enthusiastic about returning to work. Thus, training is the main motivation or influencer to retain workers in their current employment (Shiri et al., 2023). The research was conducted for workers dealing with chronic diseases in the health sector. However, this study is useful in other disciplines to examine how government training policies influence STEM programs and its applicability to policies pertaining to the training and development of civil engineers in the public sector. Additionally, training enhances the workers' knowledge and skills about their jobs. It helps workers advance their careers and provides better service to citizens.

Additionally, Day et al. (2021) highlighted that most institutions make huge investments in leadership training and development initiatives for their employees; however, determining which programs were beneficial to the organization was not always clear. Thus, to aid policymakers and leaders, including those in human resources management in investment decisions regarding training and development, the authors conducted a meta-analysis of 335 studies of leadership training programs. The study found that training contributed on average to 25% of improved workers' skills through learning, 28% was associated with on-the-job training that enhanced leadership behavior, and 25% improvement to the agency output level in areas such as higher profits, lower cost, turnover, and absenteeism.

Institutions invest strategically in training and development based on the country's needs. The social and economic conditions in Guyana demanded the need for training of civil engineers due to the recent hydrocarbon discovery. Consequently, the training priorities of the economy were restructured, ensuring employees and organizations received the required skills to reshape the economy. Furthermore, Day et al. (2021) indicated that training and development both assist in fostering individual changes and unlock individual potential to bolster the evolving leadership structure of various organizations. The authors noted that training should be conducted at different timescales, focus on distinct content and processes, and target staff in the agency at different levels. The training is designed to improve specific job knowledge, skills, and attitudes within the agency. Training is also used to teach employees new policies and technologies to enhance team performance by improving employees' ability to address challenges that may arise from the new sectors within the country. Day et al. (2021) also mentioned that training conducted correctly is beneficial to employees and the agency. Hence, the goal of training in an organization is to provide the team with a foundation to execute their task effectively. Additionally, successful training is associated with the location, timing, and duration of the training as well as the techniques used for teaching (in-house or external lecturer) and is highly dependable on whether a need analysis was conducted before training (Akyazi et al., 2020; Day et al., 2021)

The construction sector plays a strategic role in any economy, it delivers buildings and infrastructure needs for the rest of the economy and society (Akyazi et al., 2020; Ministry of Finance, 2024). The sector is expected to grow by 23.4% in 2024 and contribute 3.6% of the oil gross domestic product. Moreover, the government allocated GY$1,500,000,000 for employment costs in 2024. Within the construction sector, civil engineers play a key role in designing and supervising the building of schools, hospitals, roads, and bridges within all 10 regions in the country. Civil engineering deals with analyzing, designing, and building public facilities in the economy to meet the needs of individuals in society which is a dynamic process (Wang et al., 2022). Also, there is a high demand for such skills in the recently established and developing oil and gas sector. Hence, to fulfill the need for additional civil engineers in the country and to equip the employees with the necessary knowledge, skills, and attitude to handle the technical challenges of the new sector and the expanded work requirement, training is essential to have a highly qualified and competent workforce (Akyazi et al., 2020).

Thus, government policies that promote human resource advancement are vital for sustaining and retaining civil engineers in Guyana’s public sector. In addition to the growing demands in the oil and gas industry and advancements in the public sector, these fields are characterized by their dynamic and evolving nature, which requires additional civil engineering capacity. nature. Moreover, sustainability and robust human-centered development resonate with the citizens and cause shifts globally in economic, social, and environmental spheres hence, additional training and development are fundamental to retaining and sustaining the current civil engineering workforce. Wang et al. (2022) reviewed 79 articles that dealt with sustainability in civil engineering at higher education and found that the teaching needs should be balanced to improve the technical competencies and leadership skills of future engineers, especially on the social aspect of sustainability of individuals knowledge, skills, and attitudes. Additionally, the training of civil engineers minimizes the environmental impact of structures that provide critical infrastructure services as well as comfort and convenience to human society. The social integration aspect of training civil engineers provides appropriate materials and technologies to design and construct public facilities on time and produce long-lasting public structures.

Strategies for Retaining and Sustaining Public Sector Workers

Long-term retention of employees worldwide plays a critical role in achieving success for the organization and, in various instances, for the country. Cyriac and Baskaran (2020) highlighted that recent data showed an increase in job-hopping due to uneven work–life balance and limited advancement opportunities for existing employees.

Additionally, large-scale globalization and the transition of the economy from one based on subsistence to a multi-faceted economy have required employers to change their management style (Cyriac & Baskaran, 2020). In the case of Guyana, the country found hydrocarbons, and a new oil and gas sector was created that required a high demand for engineers.

Retaining civil engineers in the public sector required monetary and nonmonetary strategies to reduce staff turnover. Employee retention is the efforts by employers to motivate and encourage staff to stay in the agency for a longer period for the organization's sustainability (Krishna & Garg, 2022). Patil (2022) indicated that employees are essential to the organization and to retain skillful and committed employees, management should find out the reasons for the turnover. Employees stay or leave the job for personal or professional reasons. This information can be obtained through peer-led stay interviews. Stay interviews are different from exit interviews and seek to identify and address issues that may be causing dissatisfaction or potential turnover while employees are still actively employed within the agency (Krishna & Garg, 2022; Warren et al., 2024). Once the information is obtained the institution can develop retention strategies such as two-way communication, career and succession planning, setting clear expectations, skills utilization recognition, and reward systems to create positive employee perception through social integration within the organization (Patil, 2022). The stay interview is seen as a vital tool since it assists institutions with the retention of employees. Particularly, a stay interview is a structured discussion between a leader and an employee to learn strategies to support the engagement and retention of staff in the organization, hence the application may be questionable (Warren et al., 2024). This strategy was used to retain nurses when the shortage increased during the COVID-19 period. Such a strategy can be applied within the public sector to reduce the turnover of civil engineers.

Bautista and Cahigas (2024) highlighted that engineers are in high demand in different organizations because they create a foolproof system. Employee retention among younger individuals, known as the Generation Z team in the Philippines, is difficult. The generational Z team was described as a group spanning 13–27 years and was perceived as entitled and excessively demanding, as well as emotional individuals with limited job loyalty. The authors found that the dissatisfaction of Generation Z is associated with the level of supervisor support, company attachment, job satisfaction, contribution, emotional support, and shared value. The information was useful for the company executives, the human resource department, and the organization's leadership team. Further, sustaining this group of employees is a challenge for the human resource department, thus using conventional human resources management strategy and practices is insufficient to retain this highly skilled workforce. The findings of this study provide a platform to identify factors that affect the retention of engineers known as Generation Z in the workplace and could be used to evaluate civil engineers in the public sector.

A review of these articles highlighted the intrinsic and extrinsic reasons for the shortage of engineers in the public sector. Also, the impact that training and development have on individual employees and agencies. It was stated that training is associated with improving the knowledge, skills, and attitudes of the team; thus, enhancing the output level of the organization and thereby meeting the social and economic demand in the country. However, most research was conducted in the United States and European countries. Further, various aspects of the studies, such as job satisfaction and human resource capacity advancement are universal and could apply to Guyana's situation in some respects. Therefore, scholars in Guyana should add literature to this field of study to bridge this gap since the United Nations Sustainable Development Goals indicated the need for more funds in STEM worldwide. Moreover, the policy feedback theory was not applicable in most research within the literature review.

Summary and Conclusions

The specific research problem addressed through this study is that more studies are needed to examine how government policies may influence the shortage of civil engineers in Guyana's public sector. The literature review analysis highlighted that a few studies have explored worldwide engineer retention in the public sector from a public policy and administration stance. No such research exists in Guyana, although researchers have investigated this issue. The topic has yet to be explored in this way; there needs to be more literature on why Guyana continues to struggle with retaining civil engineers who enter the public sector but do not remain to build the required capacity. d. Thus, it is essential to evaluate the impact of existing and new government policies and training policies designed to improve the retention of civil engineers in Guyana’s public sector. Given this gap in the literature, the current study addressed it by exploring the possible reasons for the shortage of engineers in the public sector in Guyana. This chapter discusses factors influencing civil engineers' retention, the benefits of retaining civil engineers in the public sector and improving engineer retention. Chapter 3 presents the research methods and methodology that were used to conduct the study.

Chapter 3: Research Method

Introduction

The social circumstances that prompted the researcher to examine the literature were the ability of the government to retain civil engineers in the public sector, the quality of the roads, and the time of completion of the projects. Despite reforms, many improvements are still needed in the public sector to improve engineers' retention. An assessment of the current literature indicated that there is a limited understanding of what societal characteristics may influence the problem. As such, the specific problem addressed in this study is the lack of research examining how government policies may influence the shortage of civil engineers in Guyana. The purpose of this qualitative study is to explore the perspectives of current and former civil engineers regarding how government policies in Guyana may influence their decision to remain or leave employment in the public sector. In Chapter 3, I discuss the research methodology and design I used to undertake the research. Other topics discussed in the chapter include the researcher's role, methodology (participant's description, sampling, sample size, and recruiting processes), data analysis plans, and trustworthiness issues. In the chapter, the researcher addressed ethical issues related to the current study. The chapter finishes with a transition into Chapter 4.

Research Design and Rationale

The research question that was investigated was, What influence established current government policies in Guyana have on the decision of civil engineers to remain or leave employment in the public sector? The phenomenon of interest for this research examined employee satisfaction, staff retention, and social integration, and the benefits of a comprehensive policy in the public sector regarding former and currently employed civil engineers in Guyana's public sector.

The phenomenon of interest in qualitative study pertains to how things work. Muhammad et al. (2024) mentioned that qualitative research has evolved and is recognized in the Pakistani academic community for various reasons. Primarily, there is a greater understanding that qualitative methodologies have numerous advantages when it comes to the diverse range of social, cultural, and political variables occurring in the country. Additionally, qualitative approaches have the flexibility and agility to investigate new challenges in society.

Furthermore, it includes getting detailed, descriptive data and perceptions regarding the disparities in information and the implications of those differences for the people and processes involved. One of the major ways is to capture the stories of people about how things operate (Patton, 2015; Zina, 2021).

The phenomenon of interest for this generic qualitative study is the shortage of engineers in the public sector. Additionally, concerns arose about the doubling of the infrastructure sector program within the 2020 Budget. Thus, it is reflected in the capacity to spend such a large budget, given the usual concern of the shortage of engineers and the quality of work by the contractors. Also, the public sector competed with the private sector for the same set of skills. Notably, the new oil and gas sector offered a more attractive package to civil engineers, including a higher salary (Ministry of Finance, 2019). This led to the formulation of a research topic on the impact of the shortage of civil engineers on the increased infrastructure sector capital and current budget. After reviewing the literature, a more suitable topic was developed which is "Government policies influencing the retainment of civil engineers in Guyana's public sector." The research question that was investigated is what influence the established current government policies in Guyana have on the decision of civil engineers to remain or leave employment in the public sector?

The purpose of qualitative research is to identify the phenomena and how they are perceived by people in a situation or setting. The qualitative inquiry approach is associated with examining the interest of individuals' lived experiences of a phenomenon such as employee satisfaction and staff retention. The phenomenon is not necessarily bound by space and time. Moreover, qualitative research aims to discover and describe the substance of a given experience, which encompasses not only what participants have experienced, but also how they experienced it (Burkholder et al., 2019; Patton, 2015). Thus, the lived experiences of the former and currently employed civil engineers who worked in the public sector were examined in a setting of the public sector. In addition, qualitative research explores phenomena with a group of individuals, and the data collection process included interviews. Hence, interviews with the former and currently employed civil engineers who worked in the public sector were the data collection tool.

The rationale for choosing the generic qualitative inquiry approach is that it guided the development of the study by exploring how individuals make sense of experiences and transform their individual and shared experiences into outcomes (Patton, 2015). The approach used the perceived experiences of former and current civil engineers of the public sector of Guyana to describe and judge the phenomenon of employee satisfaction and staff retention in the public sector. The approach provides information on how research shapes collecting data and provides explicit strategies for analyzing employee satisfaction and retention of staff in the workplace. This provides a comprehensive understanding of the perceptions that influence civil engineers' retention and offers insights into strategies that can minimize the shortage of civil engineers and the turnover of engineers in the public sector of Guyana. Also, it guided the data collection tools in-depth interviews with people who have directly experienced the phenomenon of interest.

Role of the Researcher

The task of the researcher in a qualitative study is to evaluate the thoughts and feelings of the interviewees. Creswell and Creswell (2018) highlighted two important reflexivity points: connecting past experiences with the research question and how past experiences shape interpretations. Ravitch and Carl (2019) pointed out four areas involved in reflexivity during data collection. The areas include writing researchers' memoranda, keeping a research journal, engaging in dialogic engagements, and conducting researcher interviews. Creswell and Creswell (2018) mentioned that sufficient reflexivity occurs when researchers record notes during the study process, reflect on their personal experiences, and deliberate on how their personal experiences may influence their interpretation of outcomes. Furthermore, the researcher restricted any discussion of their personal experiences to keep the research focus and maintain the importance of the content of the study.

The researcher identified potential barriers when collecting primary data and mitigated such barriers. These included partner site agreements despite the assurance from the Guyana Association of Professional Engineers that the association was willing to share information available and organize participants for the interviews. This concern stems from the basis that the potential population of participants was volunteers for the study. In addition, there are concerns about confidentiality since the organization wanted to be actively involved in the process. To assist with the confidentiality aspect of the research, I would try to reduce the agency's involvement by requesting the use of their social media sites. Also, there were no challenges in relation to storing data and the separation of roles. Creswell and Creswell (2018) indicated that the researcher's interpretation could be influenced during the study based on the relationship between the researchers and the participants. Thus, concerning the separation of roles, participants for the interviews were selected from outside of my current workplace. However, the issue of trust could arise when I stated in the consent form the researcher's current place of work. Anonymity was encouraged to deal with matters of that nature.

Methodology

In the study, I employed a generic qualitative research design using triangulation, which accesses various sources to gather information to gain an overarching understanding of the research topic and answer the research question. The research methodology is aligned with the research question and purpose to ensure the study design is feasible for the researcher and understandable for the reader (Burkholder et al., 2019).

In the following section, I explained the connection between the research design and the research problem.

Participant Selection Logic

I recruited at least 10 former and 10 currently employed civil engineers who worked in the public sector of Guyana. Inclusion criteria for former civil engineers include being employed within the public sector for a period of 6 months to 60 months, while inclusion criteria for the currently employed civil engineers include 36 months to 60 months. In addition, participants must be holders of at least a first degree in civil engineering. Also, formerly employed civil engineers who have left the public sector within 48 months were part of the inclusion criteria. The sampling technique was purposive nonconvenience sampling to keep the study focused on precisely defined inputs and outcome variables. The total population size was 20 engineers. According to Hennink and Kaiser (2022), qualitative studies reach saturation within a narrow range of interviews. The research revealed that from a population of 17 participants, saturation was attained after the ninth interview. Hence, the potential sample size of at least 10 former and 10 currently employed civil engineers was considered. Additionally, before confirming participants' approval for the study, participants were asked to complete a prescreening questionnaire to ensure they met the participation criteria. The sample size in qualitative studies is determined by various factors, however, researchers generally use a saturation point as the guiding principle during data collection (Mason, 2010). Further, the saturation point in a qualitative study is very important since it indicates that enough information was collected to gain a comprehensive understanding of the research topic

(Creswell & Creswell, 2018; Mason, 2010). Thus, collecting new data would not add any additional light to the matter investigated. Guest et al. (2006) highlighted that saturation is essential for excellent qualitative research, however, there are no published guidelines or test of adequacy for estimating the sample size required to reach saturation. Baker et al. (2012) mentioned that sample sizes are determined not only by the number of interviews but also by the presence of participants' observations. Guest et al. (2006) mentioned that determining when and how the saturation point is reached in a qualitative study depends on several factors such as (a) the number and complexity of data, (b) investigator experience and fatigue, and (c) the number of analysts reviewing the data. In addition, saturation could be subjected to the researcher's analysis and has no boundaries. Mason (2010) also suggested saturation helps to estimate sample size, but there is little information available regarding this aspect. Notably, Mason (2010) mentioned that five to 25 interviews should be enough for qualitative studies to achieve a desirable research objective.

Additionally, Hennink and Kaiser (2022) posited that twelve interviews should suffice for organizations that aim to understand common perceptions and experiences among a group of relatively homogeneous individuals. Thus, the sample size was 10 former and 10 currently employed civil engineers. The sources for finding participants who fit the criteria for inclusion in the sample of the qualitative interviews that explore new issues or present or old problems in new ways could be drawn from several sources.

Rubin and Rubin (2012) highlighted that research gathers information in the words of individuals who know about the issues from their own experience and knowledge, hence, the studies portray real people, real events, and real experiences (Rubin and Rubin, 2012). Therefore, the sources to find participants to be included in the sample could come from documents with names of individuals who have participated in similar events. Essential information can also be obtained from newspapers, websites, newsletters, or archival records to find names of individuals who are knowledgeable of the phenomenon of interest. Rubin and Rubin (2012) mentioned that once a suitable participant was located the participant would lead the researcher to other individuals with the knowledge. In addition, the researcher could ask for help from various institutions depending on the field of study. These could be social workers, doctors, and police, depending on the research question (Rubin & Rubin, 2012). For my study, I intended to contact the Guyana Association of Professional Engineers for assistance in locating suitable participants. However, due to management changes in the organization, the agency declined and the mayor and councillors of Georgetown, City Engineering, participated instead. In the letter, I incorporated the approval from Walden University to the agency. I explained the purpose of the study and explained carefully the participation criteria. The participants received an email confirming their involvement, along with a note stating that a copy of the abstract would be shared with them. After agency leaders orally confirmed their intention to participate in the study, I provided them with a letter of cooperation to formalize their and my involvement (see Appendix A).

Participation was voluntary, and no compensation was given to participants. I recruited participants through the agency and conducted a prescreening questionnaire on the initial call to confirm civil engineers' suitability. After participants were confirmed, I shared the interview date, a copy of the questions asked during the interview, and a copy of the informed consent form.

Instrumentation

Burkholder et al. (2019) suggested that qualitative research questions can, and often do, evolve during a study. Also, well-chosen research questions are vital to the success of a research study and are the basis of research design. To collect the kinds of data you need to answer your research questions, you must intentionally align your research methods with your research questions (Burkholder et al., 2019). The research questions for the study were not personal or embarrassing, nor put the participant at risk. Turner (2010) posited that an interview guide is generally more associated with structured and semistructured interviews than an informal conversational interview. Even with a conversational interview, there are some flexibilities for follow-up questions during the interview process. In this study, I used the primary data collection instrument. I collected data from in-depth, semistructured interviews, state policy relating to civil engineering retention in the public sector, and field notes. After transcribing interviews with participants, I reviewed the transcript against my field notes. Before commencing the interview, I explained the information consent process and my intention to use the participants' responses as data for my dissertation. Also, I obtained consent before starting the interview. The interview was conducted in person in public places such as the local library. The interview was audio recorded via Microsoft Teams and Zoom.

The current research questions were developed using the generic qualitative inquiry approach. Further, the generic inquiry approach was chosen after examining various qualitative approaches. Notably, the initial research questions were based on a basic qualitative inquiry approach, however, further examination of the literature led to the revision of the research questions to suit a qualitative case study inquiry approach for the initial submission of the prospectus form, Supplementary reviews suggested that the phenomenon of interest, which was to explore government policies' influence, employees' satisfaction, and staff retention among civil engineers within the public sector, was better analyzed using the generic qualitative inquiry approach.

Procedures for Recruitment, Participation, and Data Collection

Participant recruitment started after approval from the mayor and councillors of Georgetown, City Engineering Guyana and Walden University's Institutional Review Board (IRB; approval no. 01-09-25-1167428). The subsequent step was to contact participants using a list obtained from the mayor and councillors of Georgetown, City Engineering, Guyana. The participants were informed of the interview through email invitations (see Appendix B). In addition, the IRB informed consent form was sent to the participants. Rubin and Rubin (2012) indicated that an essential requirement of the IRB is informed consent which is to ensure that the participants understand the nature of the research, are aware of the risk it poses, and are not forced either covertly or overtly to participate, such guidance was adhered to during this research.

Participants were contacted by email. Afterward, the researcher screens the participants using a participant prescreening questionnaire. Participants in the study were only the successful participants who met the inclusion and exclusion criteria. Data collection was conducted through one-on-one interviews. For this study, I conducted interviews with individuals that last 60–90 min. During the interview, I (a) followed an interview protocol, (b) recorded the conversation, (c) actively listen to participants, (d) offered clarifying questions, and (e) take notes. Permission to audio record participants were obtained at the start of the interviews. After the interview, I reviewed the audio recordings and transcribed data analysis. My professional knowledge, academic experience, and the literature reviewed informed the interview guide. The transcripts were generated by Microsoft Teams and Zoom, however, the cleaning of the transcripts to ensure the correct information is collected was recorded and lasted for approximately 3 hr. I asked the participants to check all transcripts to guarantee an accurate representation of members' perspectives.

In this study, data were cleaned before analysis. The data analysis process commenced by transcribing interviews, and the researcher transcribed the interviews. The data were coded using the Saldana coding guideline for qualitative researchers, which provides advice on the descriptive coding method and use of the first and second-cycle coding process (Saldana, 2021). The literature suggested that a code captures social life's intricate linguistic narratives, visual, and material orders. Additionally, Babbie (2016) indicated that coding is the procedure of classifying or categorizing specific pieces of data together with a retrieval system. Further, Rubin and Rubin (2011) mentioned that coding is the procedure of finding and labelling the concepts, events, and examples in the transcripts that were associated with the research question. In addition, Saldana (2021) posited that codes and coding are ways to progress toward a theory because they develop categories. Muhammad et al. (2024) indicated that in Pakistan participants' language was translated into codes and articulated into concepts and experiences unique to the culture of the study location. Burkholder et al. (2019) indicated that codes reflect the initial stage of the process of sorting the database for possible participants' responses that could be associated with the literature review. The second phase of the process is open coding, which is the procedure of identifying conceptual categories for the data analysis. The next phase is axial coding, during this stage, the codes that form a group are evaluated for further separation and recoding for common characteristics, context, or conditions to provide clearer insight into the meaning of the data (Burkholder et al., 2019). The codes were used to organize the data into categories for synthesizing the codes into groups with specific features, commonalities, and differences, highlighting consolidated meaning. The categories were moved into themes, which are the perceptions and experiences of the participants that were interviewed and recorded as phrases or sentences that describe the outcome of the process.

Rubin and Rubin (2011) highlighted that a typology could be created to ascertain the new categories that suggest new concepts. The categories identified from the interviews captured the main aspects of government policies' influence, employee satisfaction, and staff retention of civil engineers within the public sector.

Data Analysis Plan

The purpose of this qualitative study is to improve the understanding, from the perspective of current and former public sector civil engineers who have completed a Guyana project, and to illustrate how Guyana can recruit and retain civil engineers within the public sector.

In this study, I researched what influence the established current government policies in Guyana have on the decision of civil engineers to stay or leave employment in the public sector. The chosen research design is the generic qualitative inquiry approach. The basis for choosing the generic qualitative inquiry approach is that this method is expected to guide the development of the study by exploring how individuals make sense of experiences and transform their individual and shared experiences into outcomes (Patton, 2015). The generic qualitative inquiry approach used in the study to perceive the lived experiences of former and current civil engineers of the public sector in Guyana. It described and judged the phenomenon of employee satisfaction and staff retention in the public sector. The approach provides information on how the research shapes collecting data and provides explicit strategies for analyzing employee satisfaction and retention of staff in the workplace. This provides a comprehensive understanding of the perceptions that influence civil engineers' retention and offers insights into strategies that can minimize the shortage of civil engineers and the turnover of engineers in the public sector of Guyana. Also, it guided the data collection tool, such as an in-depth interview with people who have directly experienced the phenomenon of interest.

Burkholder et al. (2019) highlighted that generic qualitative research requires direct responses from participants; hence, generic qualitative researchers often collect data by using interviews. Ravitch and Carl (2019) indicated that to understand individuals' lived experiences, qualitative researchers often employ the process of bracketing. Thus, when using a generic qualitative approach, bracketing is essential to alleviate the potentially adverse effects of biases that may contaminate the research process.

Further, Burkholder et al. (2019) mentioned that there are several ways to conduct bracketing, such as the writing of memoranda, external interviews, and reflexive journals. Additionally, the researcher recorded the potentially biased comments during the interviews and bracket them during data analysis despite this, bracketing does not guarantee objective data collection or analysis.

The data analysis followed Saldana's (2021) descriptive coding process and used first and second-cycle coding. Descriptive coding summarizes the primary topic which is used to assign labels to a word or phrase in the data. The first and second coding aims to review the data more than once using one or more types of coding. The codes were used to organize the data into categories for synthesizing the codes into groups with specific features, commonalities, and differences, highlighting consolidated meaning. The categories were moved into themes, which are the perceptions and experiences of the participants that were interviewed and recorded as phrases or sentences that describe the outcome of the process.

According to Saldana (2021), a code captures social life's intricate linguistic narrative, visual, and material orders. In addition, Babbie (2016) suggested that coding is the process of classifying or categorizing specific pieces of data concurrently with a retrieval system. Furthermore, Rubin and Rubin (2011) indicated that coding is the procedure of finding and labelling the concepts, events, and samples in the transcripts that relates to the research question. Additionally, Saldana posited that codes and coding are ways to advance a theory because they develop categories.

Saldana (2021) mentioned that Excel software could be sufficient for basic code entries of modest amounts of qualitative data. Further, Rubin and Rubin (2012) indicated that Excel can be used to organize data and perform simple sorts; thus, it was useful for the coding of the interviews. Saldana (2021) highlighted that coding refers to identifying the topic, issues, similarities, and differences that were revealed through the participants' interviews and the researcher's interpretation.

The coding commences by extracting information from the original transcript into the notes and transcript sections of the Excel format. The exercise was useful since the information was examined at different stages, such as notes, a more concise transcript, descriptive codes, concept codes, patterns, and quick memos. During the stage of creating the 1st cycle of descriptive code, the primary topic was summarized, and labels were assigned in the form of words or phrases (Saldana, 2021). Further, establishing the first and second coding provided an additional review of the transcript. The construction of the codes organizes the data into categories for synthesizing the codes into groups with specific features, commonalities, and differences, highlighting consolidated meaning (Saldana, 2021). The information in the form of categories was transferred into themes, which are the perceptions and experiences of the participants interviewed and recorded in the form of phrases or sentences that describe the outcome of the process.

Creswell and Creswell (2018) indicated several stages of the data analysis process. The focus of Stage 1 is on organizing and preparing the data for analysis. This included recording interviews, typing field notes, cataloging all of the visual material, and sorting and arranging the data into different types of folders. Data for this study were audio-recoded via Microsoft Teams and Zoom. In Excel, two main folders were created through the data menu in accordance with the research topic that is one folder stored civil engineers still within the public sector and one for those who leave the public sector. In Stage 2, the researcher examines all the data to understand the general ideas of all the participants, to ascertain the tone and the overall depth and credibility of the information. During this stage, general thoughts were sketched in the margins of the manual printed transcripts.

In Stage 3, the researcher commenced coding the data manually by bracketing. The documents were coded by highlighting the content attached to a theme pattern. Stage 4 involves reviewing the codes to remove redundancy and creating potential categories and themes. Stage 5 encompasses the generation of descriptions and themes within each folder. The coding process was used to create a detailed description of the setting as well as categories or themes for analysis. In Stage 6, the researcher prepares a preliminary analysis representing the description and themes of the study. This included a detailed narrative, figures, and tables of events as well as information on several themes and the interconnection of themes.

Issues of Trustworthiness

Qualitative researchers use trustworthiness criteria to consider the research's dependability, credibility, transferability, and confirmability (Anney, 2014). Credibility is defined as the confidence that can be placed in the truth of research findings.

Furthermore, Burkholder et al. (2019) mentioned that credibility means that the findings of the study are believable given the data presented. Additionally, credibility proves whether the research findings represent credible information drawn from the participants' original data and is the correct interpretation of the participants' original views (Anney, 2014).

In addition, triangulation helps to reduce bias, and it investigates the integrity of the participants. Burkholder et al. (2019) indicated that qualitative studies must meet a standard of dependability. Dependability means that there is evidence of consistency in data collection, analysis, and reporting. It also means that any adjustments or shifts in methodology that can occur in qualitative studies, are documented, and explained in a fashion that is publicly accessible. Anney (2014) stated, that involved participants' assessment of the findings, and the interpretation and recommendations of the study ensured that it is in line with the data received from the informants of the study using the audit trail. Transferability refers to the degree to which the results of qualitative research can be transferred to other contexts with other respondents (Shenton, 2004). That is the interpretation can be used generally. Anney (2014) suggested that confirmability is associated with the degree to which the results of the study could be confirmed or corroborated by other researchers. Notably, the main strategy used was credibility with a focus on triangulation.

Earnest (2020) posited that trustworthiness in the qualitative study means adequate and methodological soundness in the research. It is also associated with the level of confidence the researchers have pertaining to the credibility, transferability, and dependability of the qualitative data results (Earnest, 2020). To ensure quality, trustworthiness, and credibility in qualitative studies, Shenton (2004) mentioned that Lincoln and Guba's (1986) framework proposed four criteria. These aspects were credibility, dependability, confirmability, and transferability which are the primary measures through which research quality is determined (Shenton, 2004).

Credibility

Credibility which could be associated with internal validity is one of the essential factors in establishing trustworthiness. It investigates how compatible the findings of the research are with reality (Shenton, 2004). Specific techniques that could be utilized are the examination of previous research findings which examine the level of consistency of the present research with past studies (Shenton, 2004). The investigator's ability to connect his/her research findings to the existing body of literature is viewed as one of the major criteria for evaluating qualitative research.

Another aspect of credibility is allowing your peers to scrutinize the research, this affords constructive criticism which could improve the analysis. Shenton (2004) mentioned that such detailed scrutiny provides opportunities for feedback from colleagues, peers, and academics at conferences (Shenton, 2004). Moreover, the data collection techniques of triangulation, use different approaches such as observation, focus groups, and individual interviews. Also, triangulation involves utilizing a wide range of informants from various sites that provide a rich picture of the attitudes, needs, and behaviours of a range of people. The findings of the research obtained from various sites might allow the readers to view the study as credible (Shenton, 2004). In this study, I provided all participants with summaries of their interview transcripts to ensure correctness. Furthermore, participants were asked to evaluate the researcher's assessment of their responses and were allowed to clarify whether their interpretation matched their responses. The procedures outlined above ensured the credibility of the findings. Thus, through the process of reflection and the examination of previous research findings, credibility was added to the research.

Transferability

Burkholder (2019) suggested that transferability relates to external validity in qualitative research which refers to how the findings of one study could be transferred to another situation. Shenton (2004) indicated that the main concern was generalization which is the application of the outcomes of one study to the wider population. The challenge of generalization in qualitative studies is the findings are specific to a small number of participants and environments. Nevertheless, the study could be detailed so that the readers of the study is able to make their own judgments regarding what scenarios the results may be applied to (Burkholder, 2019). In this study, I ensured that the study outcomes are transferable by providing a full description of all research processes, including research method design, sampling methodologies, data collection, and data collection plan, to ensure that other researchers can replicate the study. Information was provided regarding the study's background, which enables the research's context to be established. Also, framing the phenomenon of interest in the questions allowed the comparison to be made in the research.

Dependability

Shenton (2004) mentioned dependability is also referred to as reliability. This technique shows if the works were repeated, in the same context, with the same methods, and with the same participants, the results gained should be similar. Additionally, dependability could be associated with credibility if overlapping methods are utilized such as focus groups and individual interviews. Shenton (2004) mentioned dependability requires an in-depth methodological description to allow the study to be repeated. The features that should be detailed are the research design and its implementation, the operational details of the data gathered, and the reflective appraisal of the project (Burkholder, 2019). In this research, I used a change matrix spreadsheet to track major document changes and investigate design modifications. Furthermore, the study used an overlapping technique, which allows the findings to be replicated.

Confirmability

Confirmability could be related to objectivity in qualitative research (Shenton, 2004). This feature ensures that the findings are the results of the experiences and ideas of the informants, rather than the characteristics and preferences of the researchers. Shenton (2004) posited that the use of triangulation methods reduced investigator bias. Additionally, the main criterion for confirmability is the beliefs underpinning decisions made and methods adopted should be acknowledged within the research report. This assisted in identifying weaknesses in the technique (Shenton, 2004). I improved the confirmability of this study by employing an interview methodology and member checking to ensure that the results accurately reflect the perspectives of the participants. l also used the committee's suggestions to improve the study design. In addition, an audit trail was implemented, which consists of detailed descriptions of essential research techniques. The audit trail confirmed the integrity of the data. I offered a detailed description of data collection, participant demographics, and all other methods to ensure confirmability.

Ethical Procedures

The assurance given during the interviews to participants was that the information shared was not used for any other study or in any other form without their consent. Further, there were no surprising questions, hence, the questions were straightforward. In the case of a focus group, confidentiality was assured. Also, the freedom to discontinue the interview if the participants were not comfortable with the questions being asked. The interviewee could have withdrawn from the interview if the participant was not satisfied with the place of the interview, or a person who is part of the focus group. Burkholder et al. (2019) mentioned that an invitation to participate in a study should contain a consent form.

In addition, "If you do not understand what you are reading, do not sign it. Please ask the researcher to explain anything you do not understand, including any language contained in this form. If you decide to participate, you will be asked to sign this form, and a copy will be given to you. Keep this form; in it, you will find contact information and answers to questions about the study" (Burkholder et al., 2019, p 457). Furthermore, to ensure that participants clearly understand the process and what is required during the interview, they were asked to have the consent form read.

Patton (2015) posited that interviews could become confessions, particularly under the promise of confidentiality. But beware of that promise since social scientists can be summoned to testify in court. We do not have the legal protection of clergy and lawyers. In addition, some information must be reported to the police, for example, evidence of child abuse. Thus, the power of interviewing can put the interviewees at risk. Additionally, in-depth interviewing opens up what is inside people, qualitative inquiry may be more intrusive and involve greater reactivity than surveys, tests, and other quantitative approaches. Thus, the interviewer needs to have an ethical framework for dealing with such issues. Therefore, if any unethical information was disclosed during the interview pertaining to abuse, such information is reported. Also, I followed the ethics code and guidelines of the institutions that are participating in the study. However, my research topic was not in these areas.

Furthermore, at the commencement of the interviews, the participants were thanked for their willingness, efforts, and courage to participate in this research study. They were informed that the interview contributed to a research study pertaining to the challenges of retaining civil engineers within Guyana's public sector. In addition, using extra precautions, the participants were informed of the purpose of this qualitative study, which is to improve the understanding, from the perspective of current and former public sector civil engineers who have completed a Guyana project, and to illustrate how Guyana could recruit and retain civil engineers within the public sector.

The participants were reminded of the signed informed consent form about the importance of their privacy and confidentiality during the interview. Additionally, the participants were advised that they could decline to answer any question they do not wish to answer or withdraw from the interview at any time. Also, precautions were taken to keep the interviewee's identity and participation confidential unless the law requires me to do otherwise. Thus, to protect the identity of the interviewees, names were separated from any collected study data, and a unique study ID number was used when reporting the findings. Furthermore, the participants were not identified in the documentation, and no one was able to identify them from their answers. Also, the interviewees were made aware of the purpose of the interview and that it was recorded for transcription purposes, and notes were taken. The interview time of 60–90 min was discussed with the interviewee. Once the interviewees agreed to participate, I informed them that all answers were examined to conduct data analysis, and some of the answers were shared with my instructor.

I conducted the study in conformity with applicable guidelines provided by Walden University's IRB. Before conducting and collecting data, the researcher seeks general information from the mayor and councillors of the City of Georgetown, City Engineering Guyana. Regarding civil engineers in Guyana. Afterward, I sought IRB permission from Walden University. Following approval, the researcher contacted participants to begin the data collection procedure.

I made certain that the research adhered to the *Belmont Report* principles of respect for persons, justice, and beneficence (Friesen et al., 2017). To maintain the principles of respect for persons, I sought permission from participants. Prior to the interview commencement, participants were asked to sign a consent form after a brief overview of the study. Participants were informed that their privacy and confidentiality shall be upheld throughout the study process using pseudonyms. Regarding beneficence, the researcher informed participants about the advantages and disadvantages of participating in the study. However, the advantages of participating in this study outweigh the minimal psychological risks of a 60–90-min interview.

According to the justice principle, all interested participants were asked to participate in the study without discrimination. Participants who are dissatisfied with the study were at liberty to discontinue the research at any time. Data obtained from the study shall be destroyed immediately upon withdrawal from the study. Data acquired from this research will be stored for at least 5 years before being destroyed. Electronic data will be deleted from the hard disk, and hard copies will be shredded. Throughout the research, participants' official identities were secured using pseudonyms to guarantee their privacy.

Summary

The research problem that was addressed through this study is a lack of research that examines how government policies may influence the shortage of civil engineers in Guyana's public sector. The purpose of this generic qualitative study is to explore the reasons why civil engineers leave or remain in the public sector. Chapter 3 of this dissertation discusses the research methodology and design the researcher employed to conduct the study. Other sections addressed in the chapter include the researcher's role, methodology (participant's description, sampling, sample size, and recruitment procedures), data analysis plans, and trustworthiness issues. In the chapter, the researcher also discussed ethical issues related to the current study. Chapter 4 presents the study's results.

Chapter 4: Results

Introduction

The purpose of this generic qualitative study was to explore how government policies may influence the perspectives of current and former civil engineers regarding their decision to remain or leave employment in the public sector. The low retention of civil engineers in the public sector is of concern. Thus, the research focused on understanding the influence of the current government training and incentive policies to identify strategies and provide recommendations from the lived experiences of public sector civil engineers. This study addressed how the social integration of current government policies influences a new comprehensive government policy to minimize the shortage of civil engineers within the public sector. The following research question was used to guide this study: What influence do the established current government policies in Guyana have on the decision of civil engineers to remain or leave employment in the public sector?

The next section of this chapter describes the experience gained while setting up the data collection procedure. I proceeded with an explanation of the participants' demographic data, followed by descriptions of the data collection and analysis techniques. A discussion of the evidence supporting the findings' trustworthiness is then presented, followed by a full description of the results. The chapter finishes with a summary of the findings.

Setting

The setting of data collection was the online application Zoom and Microsoft Teams. The researcher conducted the interviews from a locked, private office where they would not be overheard to maintain the confidentiality of the participants' identities. The participants were invited to participate in the interviews from any safe, comfortable location where they would have privacy and few distractions. There were no personal or organizational conditions at the time of the study that would influence the interpretation of the results.

Demographics

The participants were a purposeful sample of 20 civil engineers: 10 currently employed civil engineers in the Guyana public sector and 10 civil engineers who were previously employed in the public sector of Guyana. The civil engineers were above 30 years of age. Table 1 indicates the demographic characteristics of the individuals who participated in the study.

Table 1

Participant Demographics

Participant	Age (years)	Gender	Race/ethnicity	Years of professional experience	Educational level	Sector
P1	60	Male	African	40	Master's	Private
P2	64	Male	African	12	Master's	Private
P3	55	Male	African	21	Master's	Private
P4	57	Female	African	8	Master's	Public
P5	45	Male	African	17	Master's	Public
P6	44	Male	African	7	Master's	Private
P7	40	Male	African	20	Master's	Public
P8	45	Male	African	23	Master's	Public
P9	39	Female	African	14	Master's	Private

P10	40	Female	African	15	Master's	Public
P11	40	Male	African	10	Master's	Public
P12	45	Male	African	9	Bachelor's	Private
P13	32	Male	African	9	Master's	Public
P14	45	Male	African	23	Master's	Public
P15	48	Male	African	21	Master's	Public
P16	32	Male	Mixed	6	Master's	Public
P17	35	Male	African	8	Bachelor's	Private
P18	34	Male	African	3	Master's	Private
P19	37	Male	Mixed	1	Bachelor's	Private
P20	53	Male	African	20	Master's	Public-Caricom

Data Collection

The interviewees were civil engineers with experience working in the public sector. The interview questions focused on the civil engineers' experience related to the retention of civil engineers in the public sector. Participants were allowed to take as much time as needed and requested breaks. Field notes were collected simultaneously with the interviews. I was the only contributor to the note memos. One individual interview was conducted with each of the 20 participants; some responses were brief, and others were detailed. The setting of the interviews was Zoom, and four participants requested Microsoft Teams. The interviews were audio-recorded using Zoom and Microsoft Teams' integrated audio-recording features. The average duration of the interviews was approximately 60 min. There were no deviations from the data collection procedure described in Chapter 3, and no unexpected circumstances were encountered during data collection.

Data Analysis

After transcribing the audio recording using Micro copilot, I commenced the manual hand coding in Microsoft 365 Excel using The Coding Manual for Qualitative

Researchers recommended by Saldana (2021). The first step involved gaining familiarity with data. Familiarity was gained by reviewing the transcripts in full three times, and notes were made on repeated terms, ideas, and phases during the familiarization process. Afterwards, I conducted bracketing to organize, sort, and code the data using thematic analysis. I further reviewed the data two more times. I did not review the data with preconceived codes in mind.

Generating the first level, coding was the second step. The interview transcripts were broken down into segments of text, each consisting of a phrase or a group of phrases that expressed one idea relevant to addressing a research question. A total of 745 such segments were identified across 20 transcripts. Each of these segments of text was assigned a code in Microsoft Excel. When two different segments of text expressed similar, relevant meaning, they were assigned to the same code, and in this way, different excerpts from the data that express similar ideas were clustered inductively, according to the emergent patterns of meaning that were recognized in them. The codes to which the text segments were assigned were labeled with brief descriptive phrases to summarize the meaning of the data assigned to them (see Table 2).

Table 2

*Initial Codes From the Thematic Analysis of the Interviews (*N *= 20)*

Initial code	No. of participants contributing to the data	No. of data segments assigned to code
Passion for building the environment	16	20
Good job opportunities	9	9
Obligations to the government	1	2
Training to ensure proper use of community items	8	12
Public consultations with beneficiaries	12	23
Community transformation moments	16	45
improvement in people's lives	13	26
Multi-exposure opportunity	18	38
Making dreams a reality	16	20
Monitoring project, meeting with stakeholders	10	14
Really exciting time	9	11
Mixed emotions, frustration, and joy	11	13
Guidance, training, and mentorship	16	56
Rescheduling deadlines dealing with delays	9	11
Long days with meetings and site visits	20	35
Lots of projects completed with limited staff	18	36
Flexibility of time off to attend to family matters, study	4	4
Limited resources to complete the job	6	8
Improve remuneration	20	36
Policy makers can afford but zeal is low to update human resource policy.	9	15
Additional benefits include duty concession, monetary and nonmonetary incentives.	11	12
Higher salary increases given to other sectors and the private sector	11	11
Working overtime and open communication to maintain good relationship with supervisor and ensure project is completed.	13	24
Very good relationship	17	19

Initial code	No. of participants contributing to the data	No. of data segments assigned to code
Teamwork, hard work, and respect	10	13
Retirement	2	2
Job security	15	18
Organization without any succession plan	13	22
Clear policy needed on human resource upward mobility, bureaucracy in the system	18	37
Contract employment and gratuity every 6 months or twice yearly.	2	3
Healthy work environment	8	14
Incomparable salaries between public and private sector for engineers	9	15
Incomparable salaries between public sector Guyana and public sector Caricom for engineers.	2	3
Gap between the practices and experiences of engineers	8	16
On the job training, project management training and procurement training	19	41
The sector is in need of a code of ethics.	12	29
Having the bill is useful.	13	22
Having the bill is useless.	1	1
No opinion	8	9
Total	433	745

The third step of analysis involved forming concepts. Concepts were formed by grouping the related initial codes into smaller numbers of broader categories to identify larger patterns of meaning in the data. For example, the codes ‘long days with meetings and site visits’ and ‘lack of mentorship, training, and guidance’ were grouped to form a theme since they both indicated reasons why civil engineers might not remain in the public sector.

In the fourth step, I identified themes. The transcript analysis was essential to the interviews and allowed for deeper examination and the ability to link themes and codes within the data. For example, *training* was a broad theme linked to community training to ensure the proper use of the new community water supply systems, training in procurement, and other training such as project management for professional development. The transcript analysis allowed for a deeper analysis to identify larger themes to dissect training into social change in the communities and training for personal educational advancement.

The themes were reviewed against the original data to confirm that the themes are associated with the data and to ensure the accuracy of the information received from the participants. Also, the themes were compared to others to make sure there is no overlap in the content. Further, each theme was reviewed in itself to ensure that it expressed only a single coherent idea, rather than multiple ideas that would be better presented as two or more themes. The themes were compared with the research questions to identify each theme's significance as an answer addressing the research question. Table 3 shows the final four themes and their underlying initial codes along with the prevalence of each code in the data.

Table 3

The Final Themes Grouped With Corresponding Initial Codes

Final theme (initial code)	No. of participants contributing to the data	No. of times cited in the data
Theme 1: Participants' Reasons for Working as a Civil Engineer		
Passion for building the environment	16	20
Good job opportunities	9	9
Obligations to the government	1	2
Training to ensure proper use of community items	8	12
Public consultations with beneficiaries	12	23
Communities' transformation moments	16	45
Improvement in people's lives	13	26
Multi-exposure opportunity	18	38
Making dreams a reality	16	20
Monitoring project, meeting with stakeholders	10	14
Really exciting time	9	11
Mixed emotions, frustration, and joy	11	13
Theme 2: Factors Influencing the Decision of Civil Engineers to Leave the Public Sector		
Lack of guidance, training, mentorship	16	56
Rescheduling deadlines dealing with delays	9	11
Long days with meetings and site visits	20	35
Lots of projects completed with limited staff	18	36
Limited resources to complete the job	6	8
Higher salary increases given to other sectors and in the private sector	11	11
Policy makers can afford but zeal is low to update human resource policy.	9	15
Retirement	2	2
Organization without any succession plan	13	22
Clear policy needed on human resource upward mobility, bureaucracy in the system	18	37
Incomparable salaries between public and private sector for engineers.	9	15
Incomparable salaries between public sector Guyana and public sector Caricom for engineers.	2	3
Gap between the practices and experiences of engineers	8	16

Final theme (initial code)	No. of participants contributing to the data	No. of times cited in the data
Theme 3: Factors Influencing the Decision of Civil Engineers to Stay in the Public Sector		
Improve remuneration	20	36
Flexibility of time off to attend to family matters, study	4	4
Additional benefits including duty concession, monetary and nonmonetary incentives.	11	12
Working overtime and open communication to maintain good relationship with supervisor and ensure project is completed.	13	24
Very good relationship	17	19
Teamwork, hard work, and respect	10	13
Job security	15	18
Contract employment and gratuity every 6 months or twice yearly.	2	3
Healthy work environment	8	14
On the job training, project management training and procurement training	19	41
Theme 4: A Comprehensive Policy That Contributes to Civil Engineering Development		
The sector in need of a code of ethics.	12	29
Having the bill is useful	13	22
Having the bill is useless	1	1
No opinion	8	9
Total	433	745

The final step of the analysis involved reporting the findings. The findings were reported by writing this chapter of the study. The results section of this chapter includes a detailed report of the findings.

Evidence of Trustworthiness

In qualitative research, trustworthiness criteria are used to examine the research dependability, credibility, transferability, and confirmability (Anney, 2014).

Trustworthiness was a priority throughout the study. I followed the IRB-approved process closely without deviation. I followed Earnest's (2020) description of trustworthiness in the qualitative study to ensure adequate methodological soundness was applied to the research. Further, to ensure quality, trustworthiness, and credibility in qualitative studies, Shenton (2004) mentioned that Lincoln and Guba’s framework proposed four criteria. These aspects were credibility, dependability, confirmability, and transferability, which are the primary measures through which research quality is determined (Shenton, 2004), were utilized in the analysis of the data.

Credibility

Credibility, which could be coupled with internal validity, is one of the essential factors in establishing trustworthiness. It investigates how compatible the findings of the research are with reality (Shenton, 2004). Specific techniques that could be utilized are the examination of previous research findings which examine the level of consistency of the present research with past studies (Shenton, 2004). The investigator’s ability to connect his/her research findings to the existing body of literature is viewed as one of the major criteria for evaluating qualitative research.

In this study, peers scrutinize the research, which affords constructive criticism to improve the analysis. Shenton (2004) mentioned that such detailed scrutiny provides opportunities for feedback from colleagues, peers, and academics at conferences (Shenton, 2004). Also, triangulation involves utilizing a wide range of informants from various sites that provide a rich picture of the attitudes, needs, and behaviours of a range of people. In this study, participants were provided with summaries of their interview transcripts to ensure correctness. Furthermore, participants were asked to evaluate the researcher's assessment of their responses and were allowed to clarify whether their interpretation matched their responses. The procedures outlined above will ensure the credibility of the findings. Thus, through the process of reflection and the examination of previous research findings, credibility was added to the research.

Transferability

Burkholder (2019) suggested that transferability relates to external validity in qualitative research which refers to how the findings of one study could be transferred to another situation. Shenton (2004) indicated that the main concern was generalization which is the application of the outcomes of one study to the wider population. The challenge of generalization in qualitative studies is the findings are specific to a small number of participants and environments. Nevertheless, the study could be detailed so that the readers of the study would be able to make their own judgments regarding what scenarios the results may be applied to (Burkholder, 2019). In this study, transferability was achieved by providing a full description of all research processes, including research method design, sampling methodologies, data collection, and data collection plan, to ensure that other researchers can replicate the study.

Dependability

Shenton (2004) indicated that dependability is also referred to as reliability. This technique shows if the works were repeated, in the same context, with the same methods, and with the same participants, the results gained should be similar. Additionally, dependability could be associated with credibility if overlapping methods are utilized such as focus groups and individual interviews. Shenton (2004) mentioned dependability requires an in-depth methodological description to allow the study to be repeated. The features that should be detailed are the research design and its implementation, the operational detail of the data gathered, and the reflective appraisal of the project (Burkholder, 2019). In this research, I used a matrix spreadsheet to track major document changes and investigate design modifications. Furthermore, the study used an audit trail and member checking to increase the study's dependability.

Confirmability

Confirmability could be related to objectivity in qualitative research (Shenton, 2004). This feature ensures that the findings are the results of the experiences and ideas of the informants, rather than the characteristics and preferences of the researchers. Shenton (2004) suggested that the use of triangulation methods would reduce investigator bias. Additionally, the main criterion for confirmability is that the beliefs underpinning decisions made and methods adopted should be acknowledged within the research report. This would assist in identifying weaknesses in the technique (Shenton, 2004). In this study, the interview methodology and member checking were used to ensure that the results accurately reflect the perspectives of the participants. I also used the committee's suggestions to improve the study design. In addition, I conducted an audit trail, which consists of full descriptions of essential research techniques. Further, I provided a detailed description of data collection, participant demographics, and all other methods to ensure confirmability.

Results

In this qualitative study, I sought to explain what influences the decision of civil engineers to remain or leave the public sector and to help shape a comprehensive policy in the public sector in Guyana. The participants answered the interview questions using their experience as civil engineers. I examined the data generated from those experiences to explain civil engineers' retention in the public sector in Guyana. One question guided my exploration regarding how civil engineers who worked in the public sector in Guyana experience retention or leave, and how the civil engineers' experience can shape policy to promote retention effectively. I created an interview guide consisting of five sections with 20 questions to support the interviews, to help explain how civil engineers experience retention or leave the public sector. I used a semistructured interview technique to conduct all interviews. Afterwards, I analyzed the data, and four themes were identified. In the following section, I provided a detailed analysis of the themes related to the research question.

The research question was, What influence do the current government policies in Guyana have on the decision of civil engineers to remain or leave employment in the public sector? Four themes emerged to address this question: (a) participants’ reasons for working as a civil engineer, (b) factors influencing the decision of civil engineers to leave the public sector, (c) factors influencing the decision of civil engineers to stay in the public sector, and (d) a comprehensive policy that contributes to civil engineering development.

Theme 1: Participants' Reasons for Working as a Civil Engineer

While there were diverse reasons reported for working as a civil engineer, the majority of participants indicated three major reasons: multi-exposure opportunity, community transformation moments, and their passion for building the environment. The multi-exposure opportunity was mentioned by 18 of 20 participants as a key reason for working as a civil engineer. Community transformation moments were cited by 16 of the 20 participants, and similarly, 16 of the 20 participants indicated a passion for building the environment.

Civil engineers explain their role as implementers because they provide the basic needs of society in areas such as water, roads, and buildings, from the design stage to deployment, ensuring the solution is incorporated correctly with the existing system. The participants perceived that these implementations transformed the communities and the lives of those living in the communities. Many civil engineers have explained that the broad scope of responsibilities in the public sector was overlaid with joy and frustration from interaction with community members. The mixed emotions experienced while improving the lives of people, making dreams become reality, and their love for solving problems, were provided by the participants as the motivating factors for the civil engineers. Civil engineers indicated that their motivation is inspired by a passion for building long-lasting structures in the environment that change the living situation of people by providing potable water, improving the sanitation system, or enhancing the physical road conditions in communities.

When exploring the interview transcripts of the civil engineers, I found a wide range of reasons when the participants were asked why they served as civil engineers. The responses were the passion for building communities, a respectful job with economic benefits, an obligation to the government, through scholarship, multi-work exposure, opportunity to interact with people, public consultations with beneficiaries, making dreams a reality, which provides exciting emotions and opportunities for the community.

Many participants perceived themselves as enthusiastic, creating transformation moments in the community by building the environment through improving sanitation, new roads, schools, and hospitals. P1 said, “I like seeing things built, and civil engineering is an active part of building the environment.” P 6 reported, “I was always fascinated with the various facets of civil engineering, so there was an inner passion to build things.” P 8 said, “ His love for drawing and the influence from his older brother from early childhood caused him to choose this profession in high school:

> I think it's very rewarding because you're able to see the impact that your work has on people. For example, when infrastructure is completed, you see how people are dependent on it, whether it be roads or bridges, it changes or improves the lives of people and society, when these infrastructures are put in place. It improves their lives in such a way that they don't even realize but with new road, several things happen firstly your property value increases, so that adds value to you, also you have other benefits of reduced cost because it's less damage to your vehicle, it adds so much value to the people's life by, having these infrastructures in place.

P 9 reported, “I have a passion for mathematics and a passion for puzzles, along with the gap within society. It was easy for me to notice the gap regarding additional engineers within society because my father is also an engineer, so from being in the household with him, some things were easier for me to see. Also, I like the fact that you had a direct opportunity to contribute to the improvement of society.” P 10 said, “ I was advised by a fellow civil engineer that the sector pays reasonably well.” P 19 reported, “I like construction work and infrastructure work, and I like the technical part, especially to get problems solved,” and P 20 described his passion for making a difference in the community:

> It gives me an opportunity to make a difference in the infrastructure area. I've always had a keen interest in the sciences and always wanted to know how construction is really developed, and that has drawn my interest in terms of understanding how things are built, such as our roads.

Many participants described their experiences as having really exciting times, improving the lives of people, and multiple exposures to community development. It was noted that 11 of 20 participants mentioned having exciting experiences in seeing new roads, schools, and hospitals completed, for use by residents. Also, 16 of 20 civil engineers said, the excitement came from seeing people's lives improved, and 18 of 20 participants reported having various exposure to social programs. P1 said, “We built a lot of schools, hospitals, health centers as social infrastructure and productive infrastructure like farm-to-market roads and other roads.” In the area of exciting times, P1 said, “It is working with people in the communities, to complete a project which they would have chosen.

While working in the sanitation sector, we train a lot of people. We provide training programs for the Local Democratic Governments, including the National Democratic Council and Municipalities, on public sanitation and the proper construction and operation of septic tanks.

P11 said he received multiple exposures:

> The experience is dealing with qualified personnel and people in a light environment. But my experience, specifically with civil engineering, is quite a journey. I did several project approaches in civil engineering; I did not just work on a specific project, but on several projects. I also get to learn technical aspects of engineering over the years, moving from 1 area to another. For example, I've learned in civil engineering how to design roads, bridges, and buildings as well as how to manage projects. I also had to implement projects despite the challenges that might come. Over those years, my experiences were designing bridges, roads, crossings, and managing various programs.

P19 said,

> The experience was great. You get to work on a lot of projects of different magnitudes and in different geographic locations. Also, dealing with people of all different backgrounds and professions, sometimes the work will be very tedious, but we had to manage, and it was always a challenge to get work done to a good standard in the designated period.

P20 said,

> In terms of the public sector, what I have found very interesting is that the public sector has more opportunities in terms of growth. You find that with the public sector, you are able to be more open in terms of development in your field of studies, such as civil engineering, since there is a wide scope. Because you can either go into the department that deals with water, roads, or housing, if you are to make a comparison between the public sector and the private sector. In the private sector, you would realize that you're more in a vacuum, where if you're given X, that is what you have to do. And you're not given that opportunity to embrace something else that might draw your interest. Whereas with the public sector, you may want to major in roads, for instance, and public works is an area that deals with roads, bridges, and sea defence. In public works, you can actually do roads, sea defence, and you can still do buildings, so that opportunity is wide within the public sector. It is one of the ways in which you, as an individual, sit and realize that, hey, you know what? They may not be paying the amount of the private sector, but the opportunities for development and growth are what come with the public sector.

The participants cited several exposure opportunities in the form of work opportunities, geographical, and community transformational activities that give mixed emotions, both joy and frustration. Nevertheless, these activities are the main reasons they are civil engineers. P 6 said, "I have always enjoyed doing work. I was part of a sanitation project, and there is pure Joy when people run to you and hug you to thank you because they benefited from a project that they've been waiting years for".

Civil engineers are very concerned about the quality of public consultation with beneficiaries and community development programs. The participants cited that the community modernization moments, making dreams a reality, interaction with stakeholders, and participating in community development are reasons they enjoy working in the public sector. Since this is where the country's transformation development process has a positive impact on people's lives. Thus, participants explained that policymakers should do more to retain civil engineers in the public sector to ensure quality development. The next theme discussed factors influencing the decision of civil engineers to leave the public sector

Theme 2: Factors Influencing the Decision of Civil Engineers to Leave the Public Sector

There were several answers provided regarding what factors influenced a civil engineer's decision to leave the public sector. The majority of participants cited three primary reasons: long days with meetings and site visits, bureaucracy in the system with no clear strategy on human resource upward mobility, and many projects to complete with limited resources. All 20 participants reported lengthy days filled with meetings and site visits; 18 of the 20 participants mentioned bureaucracy in the system, with no clear policy on human resource upward mobility; and 18 of the 20 participants indicated a large number of projects to complete with limited resources.

Civil engineers explained 37 times in the interview that there is a need for a clear human resources policy on upward mobility within the organization, while removing the bureaucracy in the system to ensure the availability of information. The participants reported several challenges when asked about their interest in working in the public sector. Many civil engineers communicated the lack of guidance, training, and mentorship, which results in the young engineers being responsible for projects without proper supervision from seniors. The participants indicated long days with meetings, site visits, and rescheduled deadlines due to delays, lots of projects with limited staff, limited resources to complete the job, low remuneration, limited allowances, and the gap between practice and the experience of engineers. Nine participants indicated that the level of salary for civil engineers in the private sector is incomparable to the amount paid in the public sector. Two civil engineers highlighted the incomparability of the salaries of civil engineers in the Guyana public sector and the public sector in the other CARICOM countries.

Thirteen participants reported that there is a need for succession plans in the organizations/ministries. P6 said,

> The public services have been stuck since about 30 years ago and have not evolved the scales, the arrangements, the work descriptions, everything remained the same and I think the leaders actually know that's the case because I attended one main forum in which one of the leaders, the highest leader of the country, mentioned, they understand what's happening in the public sector and berated people for expressing interest in other directions. Nobody wants to change the system; the only encouragement that people give to young professionals is to join the public service because of the security that it offers. Also, over time, there is a pension for your service. For innovation, I am being practical, for finding and

> advancing in a career, the public sector doesn't offer that. P 2 shared, “Your upward mobility was in question because there was no pathway. The criteria for forward mobility were not clear.

P 10 shared that due to a lack of a clear structure:

> Engineers are not allowed to function freely as engineers, as technical persons. And to make decisions based on engineering principles. And as per contractual obligations.

P14 said,

> There are two different roles. I can really differentiate between my role as an engineer and my role as an administrator, or as the data budget agency representative. I can clearly identify the role of the engineer in the process, and I can clearly identify where our role ends. However, especially in this public sector regional setting that we are in, many people think that the engineers are the people who are responsible for the award of work or the wider projects. But that's not how it works.

P16 shared,

> I think engineers should be able to make influential decisions for projects. Recently, we tended to go along with the contractor over the engineers, giving the contractors their way on projects. The reason is that if you are changing, it should be done together. So, the structure should be that the changes should be made together instead of the contractor going over the engineer to somebody higher to benefit themselves.

When asked how a typical day works, all 20 participants mentioned 35 times that the workdays are very long, with meetings for planning and site visits. Civil engineers work very long days to accomplish deadlines, stay within budget, and ensure the beneficiaries receive the benefits on time.

P3 said, "The day could be made up of several meetings because sometimes it's a whole week of numerous meetings, or you can have a combination of meetings for planning with your supervisors, while your desk work is not completed." P1 indicated, "We set deadlines so that the project can be completed on time, as we monitor the finances of the project, so they don't have a cost overrun. Since, if we get a cost overrun, they must go back to the ministry for additional money, and they asked a lot of questions regarding keeping the project within the budget."

P7 shared the following:

> I have a typical day on Monday or Tuesday to manage projects. On those days, I leave home to visit the site. I have a meeting with the engineers on site because I want to know what challenges they're having and maybe how I could assist. On the days in the office, I am discussing with the team in the board room on the progress of the projects and whether we are meeting our targets. There are also days when I visit the various regions, sometimes four projects, across the country, some in the hinterland regions. So, another day would be traveling to the hinterland to inspect works to be able to prepare evaluations to pay the contractor.

P 9 said,

I work from 8:00 to the close of business. Most times we have to review documentation and check your e-mail to confirm that everything you have submitted was approved and that none of them has issues. For most of the day, you have to either manage the design of a new project or manage contractors during execution. Both times, in management, contractors would entail encouragement. I find engineering involves a lot of encouragement and motivation for the Contractor or the team that you have to work with.

P13 indicated, "For me, recently, it is meetings all day, and the actual desk work starts from 5:00 p.m. to midnight. [This is] while I am responsible for the development of a young family."

Having a low salary, the lack of zeal by the policymakers to update the human resource policy, and having limited software computer packages, equipment, and vehicles to complete the Job were other types of resources highlighted by the civil engineers. The civil engineers shared that having updated software packages would assist civil engineers responsible for reviewing designs. Also, having adequate working vehicles to complete inspections in the regions would be useful, reducing project delays since inspections would be completed on time with less frustration for the staff.

P1 shared,

A lot of projects were done with inadequate staff. To attract qualified people, the government needs to establish a project department within the ministry that will work directly on projects. The thing that attracted staff was the higher salary on contract, and the government got the funds.

P3 said,

> There was a shortage of human resources to deal with the maintenance of the system. Therefore, the approach was to resolve issues as they popped up. Rehabilitation projects for sections of drainage along Georgetown would commence, and the follow-up to that rehabilitation would be assigned to the contractor, initially, in 3-month maintenance contracts. Also, the human resource challenge did impact one's ability to properly maintain the system.

P6 mentioned that the salaries are too low and the private sector gets 4 to 5 times higher than the civil engineers in the public sector. P 8 shared, "Two things need to improve in the public sector to retain civil engineers are, their salary and job satisfaction. The salary is the reason it is very low."

P14 said that the low and inequality of salaries between civil engineers are a deterrent and will discourage people from remaining in the public sector. "One weakness is that there is a lot of a lack of equity regarding salaries, and people are aware that their colleagues are earning more than they are and doing the same work despite they graduated at the same time. Some may have a master's, degrees but because they are working in the Public Works ministry, their earnings are way above engineers in the regions. The strange thing is that even in some cases, the Public Works Ministry clerk of works earns more than the engineers in the regions. So that is a sore point. And it's a deterrent and it discourages people from really giving their best."

Thus, the participants indicated that policymakers should more purposefully promote and invest in civil engineers, remuneration, organization structure, human resource upward mobility, and respect civil engineers' decisions. These factors will encourage civil engineers to remain in the public sector since job satisfaction will be realised. In addition, review the number of projects and ensure that software and other resources are available to assist the civil engineers. The following theme indicates ways in which the participants shared aspects that policymakers could implement to retain civil engineers in the public sector.

Theme 3: Factors Influencing the Decision of Civil Engineers to Remain in the Public Sector

There were numerous explanations for the circumstances that influenced a civil engineer's decision to remain in the public sector. The majority of participants identified three main reasons: better salary, on-the-job training, project management training, and procurement training, as well as having a great working relationship with supervisors and team members. The entire 20 participants reported increased pay; 19 of the 20 participants mentioned ongoing training, such as on-the-job training, project management training, and procurement training; and 17 of the 20 participants reported having a very good working relationship with supervisors and team members.

Additionally, when asked about the reasons that influenced their decision to stay as civil engineers in the public sector, most participants expressed that one such factor is job security. Another factor, which most participants indicated was their perception that in the public sector, all the transformation projects take place in the country; therefore, there is major work exposure as a civil engineer. The participants perceived that policymakers could promote retention of civil engineers in the public sector by improving remuneration, providing mentorship, on-the-job training, project management, and procurement training. Also, 10 participants indicated teamwork and respect for the civil engineers. Nevertheless, many participants explained that one of the positive aspects of working in the public sector is having a very good working relationship with their immediate supervisor.

Civil engineers suggested that training is necessary, especially on-the-job training. The participants shared that project management and procurement training are also important; however, civil engineers should be trained in areas associated with their line of work. Training was mentioned 41 times by 19 out of 20 participants. The civil engineers who were interviewed expressed that mentorship and training are useful for the development and retention of civil engineers in the public sector. P1 said, "Engineers need on-the-job training, which is the highest form of training. There is also a need for procurement training and project management.

P10 explained,

> In terms of my procurement training, it helped me within my field. It gave a greater understanding and insight regarding the relationship between the market trends and the efficiency of any project because the procurement stage is a cycle, and certain things have to be taken into consideration and have to be factored into any design to make a realistic projection as to how and when this project can realistically be delivered.

P14 shared,

> The procurement training enhanced my knowledge by guiding how to improve my work." P17 said, "One of the strengths of the public sector is that there is a lot of training. However, the nominee involved should be the one who needs it. Therefore, it should be more structured, that is, the relevant staff sent to the training are the persons whose careers or studies are aligned with the training.

P20 said,

> I had several trainings, including procurement and project management. Those two areas are needed; both procurement and project management are useful, as they help you understand the basic project planning to help with completing your projects on time. Further, it highlights shortcomings, enabling you to solve challenges as they arise during various stages of the project. Procurement and project management help in managing projects and avoiding cost overruns. Therefore, the procurement aspect is related to project management. The procurement aspect is to procure everything that you need.

In the area of mentorship, P 17 shared,

> We need mentors. Engineers with no years of experience, those who have just graduated, are given the responsibility to supervise projects. We should have a period of mentorship. The senior engineers should provide guidance and support to the new engineers.

P20 share,

> Mentorship would help these engineers who have completed university, it will give them a sense that I am not an engineer yet. There's still a whole lot for you to

learn, and it will deal with the situations of quality control and cost overrun. In this program, the senior engineer guides the junior engineer, so he learns and is not placed into a supervisory position without guidance.

Flexibility of time to attend to family matters was expressed by four of the participants. Furthermore, eight of the 20 participants stated that a healthy physical work environment would enhance the morale of the workers. Thus, the civil engineers explained that monetary and nonmonetary incentives, including duty-free concessions, would influence civil engineers to remain in the public sector.

Theme 4: A Comprehensive Policy That Contributes to Civil Engineering Development

When asked regarding having a comprehensive policy for engineering development the participants identified two main reasons: the first was the sector's need for a code of ethics and the second was that it was useful for the industry. Thirteen of the 20 participants indicated that it will be helpful in the engineering industry, and 12 of the 20 participants mentioned the sector requires a code of ethics for advancement.

The participants made 29 significant statements regarding the influence of having a code of ethics in the sector. They enthusiastically suggested that having a bill is useful, however, one civil engineer explained that the bill is useless, since the participants' perspective was that the engineering bill was not crafted by the technical people in the profession. Further, eight participants expressed no opinion on the usefulness of the bill, and other policies that would retain civil engineers in the public sector.

P4 shared,

I think it's a very good thing that we are doing, because it gives protection to engineers by allowing engineers to be licensed. The licensing of the engineering personnels will cause engineers to be more responsible

P5 said,

I have read it, and it’s a very good start to avoid having nontechnical people above the participant making technical decisions without notifying the technical individuals.” The participant indicated that sometimes our decisions or our recommendations are not acted upon, and the decisions taken sometimes are not the best technical decisions. The participant shared, “What a bill does is make some engineers criminally liable for all of their actions. So, if you design something no one can change, your design, since your signature is there as the design engineer, and if anything happens, you are criminally liable. The bill will ensure that I have that authority and, whatever I recommend, stands, this is the greatest Good of the engineering bill.

P8 explained,

It is long overdue and is something that should have been implemented decades ago. The bill will have an impact, and it will change how engineers operate for the better. The bill will have a positive impact on the engineering field, and it's something that is needed. The bill is good with the ethics and with liability. It is my perception that the certification of engineers is a good thing, especially in the areas of multi-billion-dollar projects, and there is always the door in terms of corruption. However, I hope that the bill is applied to everybody, including those

> who manage the system; it must be transparent, and it must be applied equally to everybody.

P12 stated,

> The bill is a good move by the government, also, people would have been advocating for the bill a long time because it holds persons accountable. Further, there is a need to standardize and regularize the profession.

Finally, P19 explained, “It's a good bill once the requirements are met, because in Guyana, we have a lot of people practicing as engineers with honest taxpayers' money, billions of dollars in projects, and they are not properly qualified. They design, supervise, and execute these works. The bill would keep people accountable.”

Summary

I explored the perceptions of civil engineers who leave and those who remain in the public sector. The participating civil engineers provided substantial data for the research question of this study. The research question was, What influence will the current government policies in Guyana have on the decision of civil engineers to remain or leave employment in the public sector? Four themes emerged to address this question.

The first theme was participants’ reasons for working as civil engineers. Most participants explained that, in their perception, the reasons for working as a civil engineer were the passion for building the environment, having an exciting time building social infrastructure, and public consultations with the beneficiaries. The participants shared various emotional experiences when the community development was achieved and the people in the community's lives were improved.

The second theme was factors influencing the decision of civil engineers to leave the public sector. Most participants indicated that there is a long day with meetings and site visits, low salaries, lots of projects, and limited staff. Some participants also mentioned that there is inequality between engineers in the regions and those working at the main ministry. Further, there is a lack of a succession plan in the organization; therefore, participants are unsure of promotion in the organization.

The third theme was factors influencing the decision of civil engineers to stay in the public sector. Many participants indicated that job security, training locally, regionally, and internationally. Also, some explained exposure geographically and in terms of experience working on various projects, such as school, medical center, hospital, roads, water well, and sanitization projects that improve the lives of people in various communities. Also, as indicated in theme 1, civil engineers love transforming communities, and it was expressed that in the public sector, most of the transformation projects occurred.

The fourth theme was having a comprehensive policy that contributes to civil engineering development. Several participants indicated that having a comprehensive bill would improve ethics in the profession and cause civil engineers to be more accountable. Some participants indicated that the bill is useful for licensing and updating the register of civil engineers, and nontechnical people would not be able to make technical decisions.

In general, civil engineers explained that they remain in the public sector to experience job security, training, multiple exposure, and the passion of making dreams become reality. While civil engineers who experience low salaries, overwork, limited guidance, and mentorship, as well as those unsure of their upward mobility, leave the public sector. Data saturation was evidenced by recurring themes in the data.

The qualitative research design generated data that helped to explain what influences civil engineers to remain or leave the public sector. In Chapter 4, I delivered an organized presentation of the data. In chapter 5, I summarize the key findings and interpreted the findings through the theoretical concepts of this study. Further, I indicated policy implementation from the data and explained how policymakers can use the research to shape civil engineering policy in Guyana. Furthermore, the study will provide academic recommendations pertaining to public policies to retain civil engineers in the public sector as well as practical recommendations to create positive social change in various communities in Guyana.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this qualitative study was to explore the retention of civil engineers in the public sector who build schools, hospitals, health centers, and roads in communities and thereby assisting in the socioeconomic development of Guyana. Further, the sparsity of civil engineers would hinder the completion of projects on time, affecting social transformation in society. The Ministry of Finance Budget (2024) indicated that retaining a formidable technical skill base in the public sector is challenging for the government. The literature review revealed there is a gap in research that links government policies and civil engineer retention in the Guyana public sector.

In this study, I used a qualitative research design to generate data by interviewing civil engineers, reviewing archival data, and collecting field notes. The interview protocol prompted civil engineers to share their experiences to help explain their retention in the public sector and the reasons they leave the public sector. The data may be used to inform policymakers in Guyana to shape policy to increase civil engineer retention in the public sector. After analyzing the data, I identified four themes: (a) the first theme was participants' reasons for working as civil engineers, (b) the second theme was factors influencing the decision of civil engineers to leave the public sector, (c) the third theme was factors influencing the decision of civil engineers to stay in the public sector and (d) the fourth theme was having a comprehensive policy that contributes to civil engineering development. In addition to informing public policy, the results from my study may be used to improve the quality of service offered to communities. In this chapter, I presented the interpretation of the findings, discussed the study's limitations, provided recommendations, outlined implications for social change, and offered a conclusion.

Interpretation of the Findings

The data generated from my study correspond with the findings in the literature review and contribute new information to explain civil engineers' retention in Guyana's public sector. Together, the 20 civil engineers whom I interviewed had approximately 287 years of experience in the public sector. I base the discussion and interpretation of findings on the following research question: What influence will the current government policies in Guyana have on the decision of civil engineers to remain or leave employment in the public sector?

The findings revealed that civil engineers' passion for community transformation generated exciting times in the development of social infrastructures in communities. Further, multiple geographical exposure and various kinds of training opportunities were included in the following themes to help explain civil engineers' retention in the Guyana public sector: (a) the first theme was participants' reasons for working as civil engineers, (b) the second theme was factors influencing the decision of civil engineers to leave the public sector, (c) the third theme was factors influencing the decision of civil engineers to stay in the public sector and (d) the fourth theme was having a comprehensive policy that contributes to civil engineering development. In the following section, I correlated the outcomes of my study with research data and explained the data using a theoretical framework.

Participants' Reasons for Working as Civil Engineers

Civil engineers are inspired by being part of a system that actively contributes to improving the lives of people in society by turning dreams into reality, moving programs from the design stage to implementation. Young et al. (2022) found that career expectations cited were to serve others, solve problems, receive a good salary, have a good job, and have job stability as well as job security. The civil engineers' interview data revealed that they have worked in the public sector for 10 months to 40 years and indicated that the retention of younger individuals is challenging. Consistent with the current study findings, past research demonstrated that engineers are in high demand in different organizations; thus, employee retention among younger individuals, known as the Generation Z team, is difficult. (Bautista & Cahigas, 2024). The committed civil engineers are sensitive to the needs of the people, and they work to improve the standard of living of individuals in various communities. The interview data are consistent with the findings from the literature review. Kiazad et al. (2024) posited that government contributions to technical programs are critical for improving the living standards of the mass public. Civil engineers are also influenced by multiple training opportunities and exposure to various geographical locations, allowing them to explore the beauty of the country. Ministry of Finance (2024) highlighted the government's contribution of $4,100,000,000 to the University of Guyana for improving the technical programs. The civil engineers revealed that training is important, however, the training should be suitable to the needs of the participants.

Civil engineers' interviews confirmed earlier findings in the literature review, indicating that civil engineers expressed joy in performing the task of building schools, hospitals, roads, and bridges within all 10 regions in the country. Civil engineers are passionate with evaluating, designing, and building public facilities in the economy to suit the needs of individuals in society (Wang et al., 2022). During the interviews, civil engineers explained that there is a high demand for such skills in the recently established and developing oil and gas sector in Guyana. Young et al. (2022) stated that the availability and retention of civil engineers to sustain the higher demand workforce is a growing need nationwide due to the newly approved infrastructural bill. However, participants indicated that the public sector is where the transformation of communities and all the exciting moments occur. Thus, policymakers in Guyana may benefit from exploring additional ways to understand civil engineers' passion by creating policies intended for the retention of civil engineers in the public sector. Hence, employing techniques from this study's theoretical framework. For example, identifying factors that impact civil engineers using policy feedback theory can influence policy development in Guyana.

Factors Influencing the Decision of Civil Engineers to Leave the Public Sector

The findings from the literature analysis and civil engineer interviews linked many projects with inadequate resources for civil engineers, leaving the public sector. The study results revealed that civil engineers' decisions to leave the public sector were based on having numerous projects with an inadequate workforce complement and resources to complete the assignments. Hue et al. (2022) indicated that, on account of the high pressure, dissatisfaction, and burnout public servants experience at work, they voluntarily resigned. Civil engineers indicated that there are long days with meetings and site visits to evaluate the progress of the assignment, as well as dealing with rescheduled deadlines due to delays. Mwamvani et al. (2022) mentioned that the primary reason for the implementation delay of road projects is associated with the shortage of engineers in conducting detailed proposed surveys; other contributing factors were scope change delays and the shortage of construction equipment. The civil engineer said that there is a gap between the practices and experiences of engineers because there is a lack of mentorship, and civil engineers without on-the-job training are given projects to manage. Rivera et al. (2020) revealed project delays as a persistent worldwide problem resulting from the lack of experienced professionals within the construction industry and inadequate planning. Further, highlighting circumstances affecting the delays were human-related, including inexperienced engineers and poor communication between stakeholders.

Previous findings also aligned with the current study's results, revealing that there is a need for a clear human resource policy for upward mobility and the organization's succession plan to aid in the retention of civil engineers. Piatak et al. (2021) revealed that human capital is one of the most essential components for effective public service delivery within communities to create positive social change among citizens. The interview data provided insight into the inequity of remunerations between Civil engineers in the regions and those working within the main ministry in the capital city, Georgetown. Al Balushi et al. (2022) indicated that career growth consists of four major components, which are career goal progression, professional ability development, promotion speed, and remuneration growth. Policymakers need to do more, updating the human resources policy in the public sector by using the framework of this study to connect data to policy changes that positively impact the retention of civil engineers. The policymakers should continually collect data from civil engineers to use as a source to influence policy that fosters positive career growth to increase civil engineer retention in the public sector.

Factors Influencing the Decision of Civil Engineers to Stay in the Public Sector

In the literature review and the civil engineer interview, the data linked training to the retention of staff. Shiri et al. (2023) indicated that constant job training or professional development influences the retention of current employment. Akyazi et al. (2020) found that to fulfill the need for additional civil engineers in the country and to equip the employees with the necessary knowledge, skills, and attitude to handle the technical challenges of expanded work requirements, training is essential to have a highly qualified and competent workforce. Additionally, Day et al. (2021) indicated that on-the-job training enhanced leadership behavior, and can improve the agency output level in areas such as higher profits, lower costs, turnover, and absenteeism

The interview data provided insight into the relationship between civil engineers and supervisors. Piatak et al. (2021) indicated that information exchange among staff contributes to a network of accountable colleagues that aids in the achievement of policy objectives. My study findings revealed that teamwork, hard work, and respect were instrumental in the retention of civil engineers, also working overtime and open communication with supervisors ensured projects were completed. The study added to past studies by establishing that an intense workload and high job responsibility were associated with the organization making significant contributions to society. Hence, the employees should see the role of the institution in a positive light (Bao & Zhong 2021).

The findings revealed that civil engineers need job security and improved remuneration, which is consistent with previous literature about approaches to improving civil engineers' retention. For example, Hue et al. (2022) mentioned that public sector jobs were preferred to private sector jobs because they offer higher security and status. Young et al. (2022) found that career expectations in the construction field are to serve others, solve problems, receive a good salary, have a good job, and have job stability. The theoretical framework of this study can be used to continually collect data to identify specific civil engineering resources that may influence civil engineers' retention in the public sector. In the final section, I related how having a comprehensive policy can contribute to civil engineering development.

A Comprehensive Policy That Contributes to Civil Engineering Development

In the civil engineer interview data, I discovered a link in the literature review between civil engineers and having a comprehensive civil engineering policy. I found that both the literature review and the civil engineer interviews emphasized that a comprehensive policy would enhance ethics in the profession. Hue et al. (2022) revealed that in the public sector, there is a display of work ethics incorporating high levels of diligence, hard work, skillfulness, and trustworthiness. Some civil engineers believe that having a comprehensive engineering policy would be useful for the profession. Further, the civil engineer interviews data confirm that ethics is linked to the quality of roads, hospitals, schools, and health centers built in communities. For example, P20 said,

> The bill is critical because a lot of engineers don't have professional ethics. The engineering bill should be developed by technical professionals to establish a controlled environment that guarantees adherence to standards and the implementation of quality control. Also, civil engineers will be licensed to operate, assigning more responsibility regarding accountability to the engineer.

Pan et al. (2021) established that in the context of globalization, there is a need for higher-quality civil engineers by strengthening their profession and academic knowledge. As a result, improving work ethics among civil engineers may improve their performance and encourage civil engineers to stay in the public sector. Policymakers may identify relevant technical individuals to review the engineering bill recently presented to parliament. The reviews should include assessing the needs of civil engineers and interpreting their experiences through the theoretical framework of this study. Further, the findings of this study add to previous literature by establishing that a comprehensive engineering bill will improve ethics and should encourage civil engineers to stay in the public sector

Limitations of the Study

The limitations mentioned in Chapter 1 are consistent with the limitations that were identified in earlier qualitative studies. The primary limitation of this study was the limited sample size of 20 participants. Given the range of descriptive data collected and analyzed in qualitative studies, a modest sample size is typically used. Furthermore, qualitative researchers employ data saturation to determine an appropriate sample size, which may result in a sample that is not representative of the overall population. As a result, a small sample size could affect the transferability of the study's findings and its applicability to other settings because the participants may not represent the whole population.

The study was also limited to the selected geographical location. In particular, the study was conducted in Guyana, and only participants drawn from selected institutions participated, thus negatively affecting the transferability of the findings. I used purposive nonconvenience sampling to precisely define inputs and outcome variables. The limitation is that purposive nonconvenience sampling is based on the researcher's judgment, which may result in research bias affecting the reliability of the study findings. Further, researcher dependability can be a barrier to qualitative study trustworthiness. I generated data using triangulation techniques by identifying at least three sources for data. I further synthesized the data using the three sources. I integrated data triangulation techniques by conducting in-depth, semistructured interviews, reviewing archival data, and creating field notes.

Recommendations

Recommendations for Future Research

This generic qualitative study aimed to explore the retention of civil engineers in the public sector of Guyana. I conducted the study to inform public policy by studying the perceptions of civil engineers who leave and those who remain in the public sector. I employed generic qualitative inquiry techniques. I utilized the theoretical framework of the policy feedback theory (Mettler & SoRelle, 2018). The interview data, the literature review, and the theoretical framework collectively impacted the findings. The literature review gave both a historical and global type of validity to some of the data. Furthermore, the literature review guided the analysis of this study because of the rich set of data and trends among research studies and retention of human capital in the organization. For example, trends such as ethics, job security, training, and improved remuneration were identified as key elements for future studies to improve the retention of civil engineers in the public sector.

The literature review supported the recommendation for this study. In the literature review, the studies provided suggestions for future research. Those suggestions were used to gain insight into civil engineers' tendencies, which may have an impact on retention in the public sector of Guyana. For example, Wipulanusat et al. (2021) proposed that more research be conducted to explain how official position, salary changes, and formal structure relate to career satisfaction and impact retention in the public sector. The recommendation was used as a stimulus for data collection to explain civil engineer retention in the public sector of Guyana.

The study addressed the gap that policy feedback theory was understudied, even though it provided critical information on the feedback process to shape policies on race, and the role of the organizations. Further, the policy feedback research should be conducted in non-U.S. territories to allow for comparison with other scholars (Beland & Schlager, 2019). Hence, the reason for conducting the policy feedback theory in Guyana. Nevertheless, after reflecting on the findings from this study, and considering the limited geographical location and participants drawn from selected organizations, which negatively affect the transferability and generalizability of the findings, ongoing research should consider different locations and organizations in Guyana. Furthermore, if policymakers do not conduct continuous reviews to examine the effectiveness of their policies in supporting the goals of civil engineers in the public sector, the policies will be ineffective. Hence, Future research is needed to promote the advancement of a comprehensive engineering policy and ongoing improvement of the quality of social infrastructure, such as roads, schools, and hospitals in the country. Moreover, after considering the findings of this study, I identified the following areas for academic recommendations:

1. Explore the trends in civil engineers' passion, civil engineers' multi-exposure on the job, and employee retention.
2. Identify and correlate civil engineer training curriculum to civil engineer retention.
3. Using policy feedback theory, create a system for assessing civil engineer training needs through regular data collections.

Recommendations for Practice

The findings of this study will aid the government in understanding the influence of the current training policies and in updating the design of the comprehensive engineering policy. Regarding the implications for positive social change, policymakers can use the outcome of this study to identify the importance of aligning a comprehensive engineering policy and updating the human resource policy to improve civil engineers' retention in Guyana’s public sector. After reflecting on the findings from this study, I identified the following areas for practical recommendations:

1. Develop a system for detecting and analyzing civil engineering educational needs in specific domains like roads and bridges, utilizing policy feedback theory and frequent data collection.
2. Ensure alignment of a comprehensive engineering strategy with an updated human resource policy to increase the retention of civil engineers in Guyana's public sector.

Implications

Implications for Practice

Civil engineers are fundamental to improving the social infrastructure situation in Guyana. The number and the amount of funds allocated for social infrastructural developments in the national budget are increasing annually. Therefore, the public sector in Guyana must retain and increase the number of civil engineers. Retaining civil engineers begins by collecting information at the foundation level to make positive social change. The policy feedback theory (Mettler & SoRelle, 2018) provides a framework to explore how policies influence policy stakeholders and shape the direction of policy development. This theory can provide a revolutionary tool for policymakers in Guyana's public sector to develop streamlined policies to improve the quality of social infrastructure by increasing the civil engineers' satisfaction and retention.

Civil engineers may use the findings to enhance their determination to remain in the public sector to improve the needed social infrastructure and for their career success.

Bao and Zhong (2021) revealed that intent workload and high job responsibility in the public sector were associated with the organization making significant contributions to society. Thus, the employees should see the role of the institution in a positive light.

I collected data to explain the retention of civil engineers in the public sector in Guyana. Based on the findings from this study, the impact of shaping policy to improve civil engineers' retention in the public sector is critical. Furthermore, increasing mentorship programs, training, improving remunerations, and establishing a clear human resource policy for upward mobility will enhance civil engineers' intentions to remain in the public sector.

Implications for Positive Social Change

The study results have provided insight into gaps in social skills development and may help policymakers and other stakeholders increase retention and the quality of roads, schools, hospitals, and health centers built in the communities to improve the lives of families. This study's findings can be used to retain engineers to create positive social change by building sanitation systems in new and existing communities. Having potable water and safe spaces leads to positive social change by strengthening communities and contributing to Guyana's development. Additionally, social infrastructural development has contributed to social changes in citizens' lives in society. Technical institutions were built in regions to facilitate training for people in the communities, making them available for employment, thereby contributing to the development of the families and the communities. The road-built city and farm roads would improve the lives of families that are engaged in entrepreneurial activities. Thus, the policymakers can use this study's findings to inform government policies that should assist Guyana in advancing its capability in this area. Retaining civil engineers within the public sector would support building schools and the development of roads in the new and existing housing schemes. The increase in school buildings would allow for more students to have improved learning conditions. The research findings can be beneficial to policymakers and civil engineers, enabling them to learn how social integration promotes positive social change by strengthening communities and contributing to Guyana's socioeconomic development.

Implications for Theory

The study findings validate the theoretical framework applied. In particular, the study was guided by the policy feedback theory (Mettler & SoRelle, 2018). The policy feedback theory investigates policy as an after-effect of politics, questioning how new policies will result in new politics (Mettler & SoRelle, 2018; Pierson,1993). Policy feedback theory is concerned with understanding the "feedback effects" of public policy. Mettler and SoRelle (2018) indicated that the policy feedback theory aims to understand what happens after a policy is implemented, with a focus on resources and interpretive influence on the general public. The theory presented policymakers with a tool for reorganizing policies that can enhance the quality of social infrastructure by increasing civil engineers' retention and exploring the effectiveness of existing government training policies for civil engineers in the public sector.

The study findings support the policy feedback theory (Mettler & SoRelle, 2018) by demonstrating that policymakers can improve training programs, quality of roads, schools, hospitals, water supply, sanitation systems, and health centers by reshaping policy to include the perspectives of technical employees. Furthermore, a recently proposed comprehensive engineering bill presented to the national assembly should incorporate the experiences of technical individuals. Therefore, the study findings have verified that the policy feedback theory provides opportunities to promote social skills development among civil engineers, which can influence their retention in the public sector.

Conclusion

In this study, I examined the impact of government training and how incentive policies influenced the shortage of civil engineers in the public sector of Guyana. Despite significant reforms, many improvements were needed in the public sector of Guyana. The study added knowledge about mentorship, training, monetary and nonmonetary incentives impact on the retention of civil engineers in the public sector. However, the study was limited to the selected geographical location. In particular, the study was conducted in Guyana, and only civil engineers drawn from selected institutions participated, thus negatively affecting the transferability of the findings.

The findings of this study may further government officials' understanding of the impact of current training policies and update the design of a complete engineering policy. In terms of positive social change, policymakers should use the findings of this study to highlight the significance of harmonizing a comprehensive engineering strategy and updating human resource policies to improve civil engineer retention in Guyana's public sector. In addition, further research should be conducted to develop a system to identify and analyze civil engineering education needs in specific domains, such as roads and bridges, using policy feedback theory and regular data collection. Also, synchronization of engineering strategy with human resource policy updates.

Moreover, the study findings revealed that despite the civil engineers' passion for building the environment to improve the lives of people in the various communities, there is a need to improve remuneration, training that is applicable to their respective needs, and a human resource policy for upward mobility in the public sector. The research has answered the research question and the purpose of this study by providing crucial information on how to promote social skills development among civil engineers, which can influence their retention in the public sector.

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Appendix A: Partner Organization Agreement

Partner Organization Agreement

Insert:
Partner Organization Name
Partner Organization Email Address
Partner Organization Phone Number
Date

The doctoral student, [Gracelyn George], is approved to collect interview data from [Insert participant role] at our organization.

STUDENT RESPONSIBILITIES
I understand that, as per the student doctoral program requirements, the student will publish a scholarly report of this study in ProQuest as a doctoral capstone (withholding the names of the organization and interviewees), as per the following ethical standards:

a. In all reports (including drafts shared with peers and faculty members), the student is required to maintain confidentiality by removing names and key pieces of evidence/data that might disclose an organization's/individual's identity or inappropriately divulge proprietary details. If the organization itself wishes to publicize the findings of this project, that is the organization's judgment call.

b. The student will be responsible for complying with the organization's policies and requirements regarding data collection (including the need for the partner organization's internal ethics/regulatory approval, if applicable).

c. Via an Interview Consent Form, the student will describe to interviewees how the data will be used in the doctoral project and how all interviewees' privacy will be protected.

d. The doctoral student will not use these data for any purpose other than the doctoral study outlined in this agreement.

I confirm that I am authorized to approve research activities in this setting.

Signature ____

Partner Organization Leader's Name and Title

____

Appendix B: Participant Invitation

You are invited to share your views for a study titled: Government Policies Influencing the Retainment of Civil Engineers in Guyana's Public Sector.

- One 60-90 minute interview that will be audiorecorded (no videorecording)
- To protect your privacy, the published study will not share any names or details that identify you

Interviews will take place during April.

Volunteers must meet these requirements:

- Participants must be holders of at least a first degree in civil engineering.
- Former civil engineers should have been employed within the public sector for a period of 6 months to 60 months.
- Formerly employed civil engineers who would have left the public sector within 48 months
- Currently employed civil engineers must have at least 1 year of working experience in the Public Sector.

You can ask questions of the researcher by phone or email at ------------------- and gracelyn.george@waldenu.