SDG 4 and Quality of Secondary Business Education in Bangladesh

A thesis submitted for the degree of Doctor of Philosophy

by

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Declaration

I now certify that the material in my dissertation, titled 'SDG 4 and Quality of Secondary Business Education in Bangladesh' is original research that I conducted. I further declare that I have not submitted this research work to other universities or institutions pursuing a higher degree.

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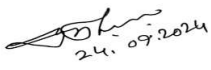

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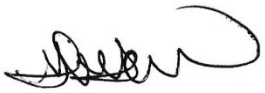

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AI	Artificial Intelligence
AVE	Average Variance Extracted
CAPs	Competences Assessment Programs
CAPS	Cape Area Panel Study
CBSE	Central Board of Secondary Education
CEDAW	Convention on the Elimination of all Forms of Discrimination Against Women
CMV	Common Method Variance
COVID	Coronavirus Disease
CPD	Continuing Professional Development
CRI	Centre for Research and Information
CS	Curriculum Standards
CVI	Content Validity index
DSHE	Directorate of Secondary and Higher Education
EE	Equitable Education

ERT	Emergency Remote Teaching
FVI	Face Validity Index
GAI	Generative Artificial Intelligence
GB	Governing Body
ICT	Information & Communication Technology
I-CVI	Item Level Content validity index
IE	Inclusive Education
IER	Institute of Education and Research
IMF	International Monetary Fund
I-P-O	Input-Process-Output
ITE	Infrastructure and Technical Equipment
LL	Lifelong Learning
LSBE	Life Skill-Based Education
MDGs	Millennium Development Goals
MoE	Ministry of Education
MoPME	Ministry of Primary and Mass Education
MPO	Monthly Payment Order
NAEM	National Academy for Educational Management
NAPLAN	National Assessment Program – Literacy and Numeracy
NCTB	National Curriculum and Textbook Board
NEPC	National Education Policy Center
NGO	Non-Government Organization
NTRCA	Non-government Teachers Registration and Certification Authority
OECD	Organization for Economic Cooperation and Development
PIAAC	Program for the International Assessment of Adult Competencies
PISA	Program for International Student Assessment
PIRLS	Progress in International Reading Literature Study
PLS	Partial Least Square
PSL	Pedagogy for Sustainable Learning

QS	Quality of Students
QT	Quality of Teachers
QSBE	Quality of Secondary Business Education
RMSA	Rashtriya Madhyamik Shikha Abhiyan
S-CVI	Scale-level Content Validity Index
SEM	Structural Equation Modeling
SDGs	Sustainable Development Goals
STAR	Student Teacher Achievement Ratio
SMC	School Management Committee
SPSS	Statistical Package for the Social Sciences
TIMSS	Tread in International Mathematics and Science Study
TTC	Teachers' Training College
TQI	Teachers' Quality Improvement
TQI	Teaching Quality Improvement
TQM	Total Quality Management
TVET	Technical & Vocational Education and Training
UN	United Nations
UNFPA	United Nations Population Fund
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund
VIF	Variance Inflation Factor
VL	Virtual Learning
WB	World Bank
WLE	Work/Learning Environment

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Abstract

Education is the key to scientific and technological development, employment generation, and economic advancement (Chimombo, 2005). Quality education is the center stage of Sustainable Development Goal Four (SDG 4) and is supported by a general commitment to ensuring inclusiveness, equitability, and sustainability (Saini et al., 2022). SDG 4 is a foundational goal that has an enabler role in realizing most of the other SDGs. Seven SDGs (3, 8, 12, 13, 14, 16, and 17) are directly related to SDG 4 (Lawrence, 2020). This study aims to conceptualize the quality of secondary business education from the perspective of SDG 4, to identify the critical dimensions of quality in secondary business education, and to develop a framework model for the quality of secondary business education based on SDG 4. This study has employed a cross-sectional sample survey. Teachers and students in secondary high schools, both government and non-government, have formed the universe. The sample for the study has been determined systematically through a multi-stage cluster sampling method for collecting data. Quantitative data were collected through a validated questionnaire, and the secondary high school teachers and students from the business studies group and head teachers were the respondents of this research from schools of four grades- A, B, C, and D of the different types of Upazilas. This study has developed a model for evaluating quality in secondary business education based on SDG 4. 11 hypotheses and two mediating variables were proposed in that research model. Data collected from different respondents focusing on the dimensions of quality education have been analyzed using descriptive and inferential statistics. Microsoft Excel, Statistical Package for the Social Sciences (SPSS) software, as well as Partial Least Squares-Structural Equation Modeling (PLS-SEM) technique-Smart PLS 4 (Version 4.0.8.9) software (Ringle et al., 2022), have been used to analyze the data and research model. Two types of validity- 'Convergent validity' and 'Discriminant validity'- were examined to assess the measurement model. The proposed hypotheses were tested using the SEM technique to examine the structural model. Based on the results, it can be concluded that the model is significant because most of the hypotheses are accepted. The mediating effect of the two variables – 'Quality of students' and 'Quality of Teachers' has also been found. Based on demographic data (Gender), one

control variable is created in the structural model and tested using the bootstrapping method. No significant gender effect on the quality of secondary business education was found. The study also conducted an ANOVA test to examine the multigroup effects and found substantial effects on the quality of secondary business education. This model established some influential dimensions and subdimensions to evaluate the quality of secondary business education. Moreover, it is straightforward to examine the relationship among the different factors or dimensions identified in the model through the result of path coefficients. Through the lens of SDG 4, this study has developed three emerging antecedents of quality education: inclusive education, equitable education, and lifelong learning. Thus, this study has filled a gap in the body of research on the quality of secondary business education. Additionally, this research has practical implications as it has developed and empirically tested the model within the framework of secondary business education. At the policy level, this research will provide necessary data to educationists, lawmakers, and secondary education administrators. As a future research direction, this study suggests further research on the quality of secondary business education for cross-cultural comparisons of different countries' developmental stages, especially between developing and developed countries. This study also recommended that future research on the efficacy of technology-driven education might be carried out to ensure safe, effective, and sustainable technology in the classroom.

Chapter 1

INTRODUCTION

1.1 Introduction

Education is fundamental for human development and poverty reduction (Sivakumar & Sarvalingam, 2010). Education is also required for the development of any country. It builds people's capacities to contribute to society and the economy. After building the required capacities, the people become human resources. Economic development is highly associated with using these human resources (Khan et al., 2014). Education sharpens human propensities. The education journey is expanded 'from womb to tomb' (Mukhopadhyay, 2020). Quality education must be needed to develop such human resources and set up a knowledge-based society. The quality of education has a more significant impact on economic and social development (Dumciuviene, 2015). To fulfill the dreams and goals of the great Liberation War of 1971, a skilled and patriotic generation is needed to lead Bangladesh. Ensuring quality, a suitable education system can produce such a generation (Prodhan, 2016). Quality education is an important issue and is a government commitment worldwide (Biswas & Biswas, 2020). In the global competitive arena, secondary education has become part of basic education. Schooling at the secondary level is vital for acquiring responsibility, knowledge, skills, and attitudes essential for learners and society (Rahman et al., 2010).

Secondary educational institutions play a vital role in Bangladesh, providing education for 43.95% of students (BANBEIS, 2022). In classes IX and X of secondary education, business education or business study is taught to the students. One should study basic business education to learn about economic and business activities. Quality business education can make business personnel or entrepreneurs more competitive and efficient (Vivian, 2017). Therefore, every student at the secondary level needs a quality business education.

Quality education is the center stage of SDG 4 and is supported by a general commitment to ensuring inclusiveness, equitability, and sustainability (Saini et al.,2022). SDG 4 is a fundamental goal that is prime in achieving most other Sustainable Development Goals. SDGs 3, 8, 12, 13, 14, 16, and 17 directly relate to SDG 4 (Lawrence, 2020). Out of 17 SDGs, SDG 4 focused only on education and a catalytic force across all the SDGs (Campaign for Popular

Education, 2019). For the first time, the UN has formulated such a unique goal based on education. The content of SDG 4 is "*Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all"* (UN, 2015). Ensuring quality education is not only access to education but also an attempt to ensure that all children, irrespective of country, receive standard education. In quality education, every student acquires his or her full potential, and after completing their study, they go into society as productive citizens. UN Secretary-General Ban Ki-moon has emphasized the presence of students in schools and the improvement of the quality of the schools. For implementing SDG 4 by 2030, the role of secondary schools is indisputable. Therefore, a comprehensive study on SDG 4 and the quality of secondary business education is needed.

SDG 4 has seven targets concerning fairness and excellence in various stages of education. According to targets 4.1, 4.2 and 4.3, all children and adults should access high-quality education from early infancy through primary and secondary school and technical and university levels. Increasing the number of adults and youth with work-related skills for the employment generation through decent jobs or the development of entrepreneurship is target 4.4. This target emphasized business skills. Target 4.5 discusses how different demographic groups are given access to education while considering the requirements of vulnerable populations, indigenous peoples, and people with disabilities. Target 4.6 ensures that all young people receive reading and numeracy instruction while drastically reducing adult illiteracy. Target 4.7 is the only one discussing education to promote human rights, gender equality, peaceful and nonviolent cultures, and sustainable development (UN, 2015).

In addition, the three targets, 4A, 4B, and 4C, are intended to make it easier to accomplish the goals of equality and quality. Target 4A involves building and renovating gender-, child-, and disability-sensitive educational facilities that provide safe, secure, and effective learning environments. Increased access to higher education is the main goal of Target 4B, which also aims to enhance the number of scholarships available for higher education in developing and African countries. The goal of Target 4C is to increase the availability of certified teachers (UN, 2015). Though the different levels of education are linked with SDG 4, the researcher has chosen secondary business education to narrow down the field for his study. Quality is an elusive concept, and it is challenging to define it. Pfeffer and Coote (1991) have treated quality as a

slippery concept. Quality may be defined both as an absolute and as a relative concept. We use the term absolute in everyday conversation: 'This is a quality product.' As an absolute, the quality of the things is exhibited as the highest possible standard. On the contrary, quality is mostly a relative concept in the technical sense. Quality is not a product or service attribute in the relative idea. Usually, we sometimes say, 'The quality of your handwriting is better than your brother's.' Here, quality is measured against the standard. The quality of the final product is assessed to determine whether it meets the criteria (Sallis, 2002). A client's appreciation is the ultimate index of quality in the case of service (Mukhopadhyay, 2020).

In the context of education, what is quality? Zwalchir (2009) views successful teaching and learning for all learners as quality education. Mukhopadhyay (2020) distinguishes between three degrees of quality in education: system, institution, and individual. The trait in question is multifaceted and intricate. Quality is frequently referred to by a few synonyms, including efficacy, equity, and efficiency (Adams, 1993). Quality was described by Murgatroyd and Morgan (1994) as an assessment or evaluation technique to determine whether instructional activity satisfies intended standards. Thus, consumers and clients of education, including students, parents, and the community, constantly anticipate the highest calibre of instruction. According to Steyn (2001), high-quality education is urgently needed since it differentiates between success and failure. Diverse education stakeholders have differing definitions of quality education. Williams (2001) would instead use the term "output" to denote excellence. (Thijs & Van den Akker, 2009).

According to Sallis (2002), different customers of education are as follows:

• **Primary customers** are the learners who directly receive education and related services from educational institutions to meet individual needs.

Parents, governors, and employers who have a direct

• **Secondary customers are** parents, governors, and employers who are directly interested in a particular person's or an institution's education and are considered secondary consumers.

• **Tertiary customers** are the future employers, government, and society who have indirect involvement but a significant stake in education.

• **Internal customers** are the teachers and supporting staff of the institutions who have a critical stake in education.

Total Quality Management (TQM) in education is highly needed (Bradley, 1993; Greenwood & Gaunt, 1994; Murgatroyd & Morgan, 1993). Total Quality Management (TQM) is a systematic management philosophy that creates a culture among the organization's members for the continuous improvement of processes, products, and services for the satisfaction of the customers (Deming, 1986; Juran, 1999). The success of TQM in the business, especially in the manufacturing industry, motivates educationists and researchers to apply this approach in different service organizations (Farrington et al., 2018), including educational institutions (Sahney et al., 2016; Sfakianaki, 2019; Weckenmann et al., 2015). TQM, a philosophy of continuous improvement, describes the tools and techniques, such as brainstorming and force-field analysis, used to implement quality improvement. It follows a strategic and systematic approach to operating an organization that focuses on the needs of its customers and achieves an appropriate level of quality (Sallis, 2002). TQM ensures a learning environment where education, training, and retraining are vital for success. As a result, teachers and employees are empowered, they build teamwork, increase the awareness of all stakeholders, and finally fulfill the expectations of students and guardians by providing quality education (Kaiseroglou & Sfakianaki, 2020).

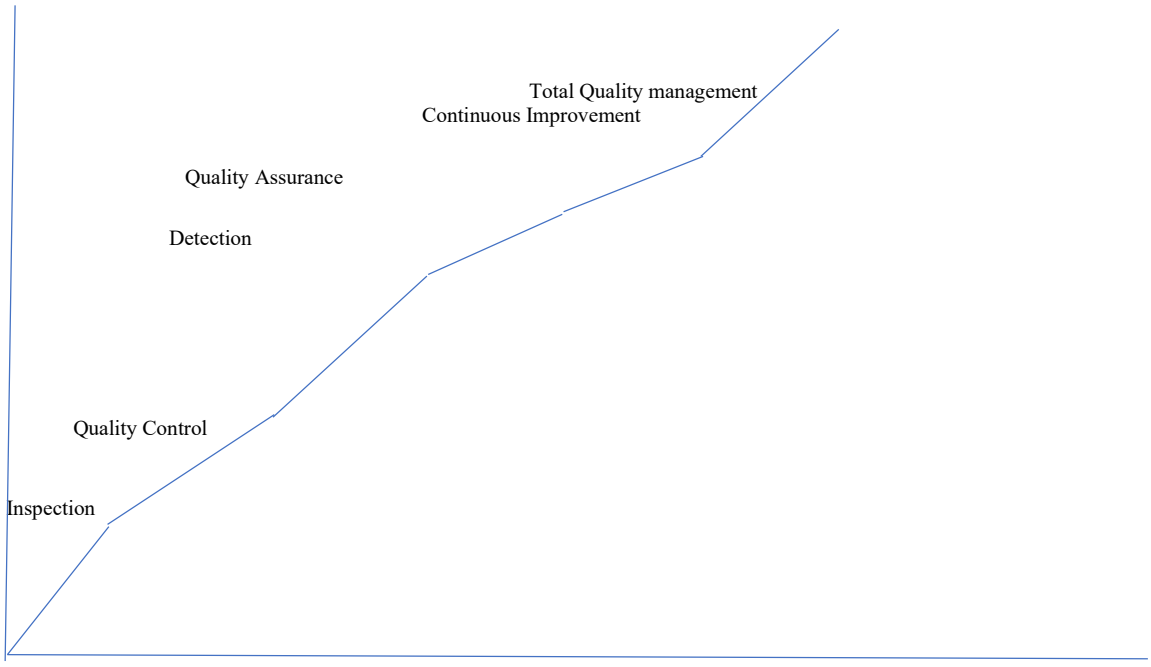


Figure-1.1: The hierarchy of quality concepts (Sallis, 2002)

Total Quality Management (TQM) consists of institution-wide efforts to permanently establish a climate for continuous improvement of its capability, efficiency, and values to provide the highest-quality education services to the stakeholders. Centering quality, TQM is a participatory management approach in educational institutions that satisfies customers in the long term for society (Iyer, 2018).

Quality is the most preferential issue from national and global perspectives. For any educational institution, ensuring the quality of education is also the most crucial task (Akhter, 2008). Therefore, to face the challenge in the practical business field, quality business education should be ensured, and it is essential to know the quality of secondary business education through the lens of SDG 4. The study has analyzed existing literature, formulated 11 hypotheses, and constructed a model showing the antecedents of quality in secondary business education. As a result, it has closed the gap in the research on SDG 4 and quality education at the secondary level. The outcome of this study will contribute to researchers, educationists, business professionals, policymakers, and government.

1.2 Background of Secondary Education in Bangladesh

The existing secondary level of education includes classes VI to X. As per National Education Policy 2010, classes IX to XII belong to secondary education. After completing secondary education, students enter different branches of higher education according to their merits and choices. Some students do not engage in higher study; instead, they start earning in their work lives by acquiring vocational education or seeking further vocational skills. Therefore, quality secondary education is essential for nation-building. Teaching the roles and competencies of business affairs is the focus of the educational field known as business education. This field has several educational levels, including secondary, higher secondary, and university. At the secondary level, it is called business studies, which includes accounting, finance, marketing, business organization, and economics. The first education commission of Bangladesh, chaired by Dr. Qudrat-e-Kuda, strongly emphasized secular education to help create jobs. These recommendations were made in response to the government of Bangladesh in 1974. The commission gave quality in education priority. The recommendations given by the commission

were not implemented. Later, various commissions were formed, and they submitted reports and recommendations.

In 2010, a major initiative was undertaken. A commission was formed to prepare the National Education Policy from primary to university level in their 1974 report. In addition, the commission suggested a new primary education system that would run from grades 1 through 8, a secondary education system from grades 9 through 12, and technical and vocational 2010. Dr. Kudrat-e-Khuda Commission has suggested the duration of primary and secondary education. Restructuring primary schools, including classes VI, VII, and VIII, and increasing infrastructure facilities and the number of teachers were suggested. The deadline for ensuring eight years of primary education for all children of the country, regardless of gender, socio-economic conditions, and ethnicity, was by 2018. National Education Policy 2010 states that the ratio of teachers and students in primary school will be 1:30. The policy also emphasizes curricula, syllabi, environment, education materials, solutions, teaching method, student assessment, teachers' recruitment, and promotion, etc. and these have a positive impact on quality in education (National Education Policy-2010).

1.3 Sustainable Development Goals (SDGs) and Targets of SDG 4

This section briefly outlines the Agenda 2030 for Sustainable Development. The 17 sustainable development goals and targets of SDG 4 are presented in two separate tables. Based on existing literature, the relationship between SDG 4 and the other 16 SDGs, as well as the challenges and opportunities of SDG 4 in secondary education, are presented.

1.3.1 Sustainable Development Goals (SDGs)

Following the MDGs' expiration, world leaders announced a new agenda at the 69th UN General Assembly session on September 1, 2015: "Transforming our world: the 2030 Agenda for Sustainable Development." They unveiled 17 Sustainable Development Goals (SDGs) with 169 related goals that balance sustainable development's economic, social, and environmental facets in an integrated and indivisible manner. Essential objectives were established for the next fifteen years to encourage action for the earth and humanity. The plan will be carried out by states' rights and obligations under international law to benefit all present and future generations. The

United Nations established the 17 Sustainable Development Goals (SDGs), an action plan for enhancing global peace to ensure prosperity, safeguard the environment, eradicate poverty, and promote global partnerships for sustainable development (UN, 2015). In Appendix A, a list showing all SDGs was furnished.

1.3.2 Sustainable Development Goal Four (SDG 4)

Among the 17 SDGs, the fourth goal - SDG 4- is essential for ensuring quality education for all. Seven targets and three means are set to implement SDG 4 by 2030 (UN, 2015). The targets of SDG 4 highlight dimensions of quality education. Targets 1,5, 6,7, and A & C directly relate to secondary education.

1.3.3 Relationship between SDG 4 and the other 16 SDGs

SDG 4 and the other 16 SDGs are directly and indirectly connected. This is essential to accomplishing the other aims (Campaign for Popular Education, 2019). The relationship between SDG 4 and the other 16 SDGs was investigated by Lawrence et al. (2020) at two levels: from the aim (SDG 4) to the targets (Targets of 16 SDGs) and from the targets (10 targets, including three means of implementing SDG 4) to the targets (159 targets of 16 SDGs). Between the aims of SDG 4 and the remaining 16 SDGs, they found 322 indirect linkages and 38 direct relationships. They concluded that there are numerous ways the SDGs are related (indirect relationships) or interdependent (direct relationships).

1.3.4 The Challenges of SDG 4 in Secondary Education

Before COVID-19, the global community grappled with a learning crisis characterized by many students dropping out and limited opportunities for youngsters to attend school. The global pandemic had a profound impact on the entire global schooling system. Consequently, educational institutions worldwide were universally closed. The unexpected closure of schools has resulted in a decline in educational attainment, a rise in the number of students leaving school prematurely, and an exacerbation of social disparities (World Bank, 2020).

To achieve SDG 4, the government of Bangladesh undertook several projects with financial support from aid agencies such as the World Bank and the UNFPA. The child enrollment rate in Bangladesh is 99%, and the literacy rate is 73%, which is also growing. However, the percentage

of enrollment in secondary and higher education is gradually lower. Continuing education in rural areas of Bangladesh is very challenging. ILO noted that 27% of the youths lack education, employment, or training (Purbasha, 2022).

For the inclusive education system, many challenges are to be faced. Poverty, gender inequality, ethnicity, remoteness, language barriers, issues for children with disabilities, as well as the negative impact of climates, such as floods, cyclones, landslides, and other natural calamities, are significant challenges. The existing humanitarian crisis of Rohingya children in Bangladesh is also a big challenge for implementing inclusive education. Therefore, for formulating and establishing an inclusive education system, local culture, climate, resources, and geographical conditions be considered (Begum et al., 2019). The high dropout rate in secondary education in Bangladesh is a big challenge. The primary reasons behind the existing dropouts are physical disability, poverty, child marriage, social insecurity, gender preference, etc. (Akther, 2022).

The SDG 4 strategic framework document showed that overcoming many challenges, there was high access to secondary education like primary education in Bangladesh (Government of Bangladesh, 2019). Secondary schools in Bangladesh were closed for 1.5 years due to the pandemic, as a result, researchers believe that the implementation of target 1 (By 2030, to ensure quality education at primary and secondary levels) of SDG 4 has been hampered. There are socioeconomic differences across many states and areas of the world, sometimes even within the same state. During the transition phase from offline to online learning, less developed countries allocate a smaller portion of their budgets and resources to provide adequate technological equipment and internet facilities. Only 34% of students in Indonesia can utilize their computers, compared to 95% of students in Switzerland, Norway, and Austria. In contrast to over 25% of kids from socially disadvantaged families, practically all 15-year-old students in the United States who come from wealthy families have access to at least one computer (Li & Lalani 2020).

Another significant issue in Bangladesh is regional prejudice among various educational institutions. The types of education offered in urban and rural settings differ. Additionally, education costs in public and private institutions and urban and rural areas differ. Pupils from low socioeconomic backgrounds cannot finish their education (Akther, 2022).

1.3.5 The Opportunities of SDG 4 in Secondary Education

Along with the enormous risks, disparities, and costs generated by COVID-19, this pandemic has created opportunities in the field of education by making significant human and technological development (Corlatean, 2020). Friedman et al. (2020) found substantial initiatives for females to eliminate educational disparities worldwide. SDG 4 focuses on global issues linked to education directly or indirectly to facilitate global citizen education (Grifths, 2021). In addition, this unique goal was set to provide affordable and quality primary and secondary education to every child, providing free education for up to 12 years (Ferguson & Roofe, 2020).

According to the latest Global Gender Gap Index 2021, Bangladesh ranks 65th among 156 countries (World Economic Forum, 2021). Bangladesh has been the best-performing country among South Asian countries for seven consecutive years (Islam et al., 2022). Therefore, Bangladesh's achievement of target 5 of SDG-4 is satisfactory.

In Bangladesh, the adult literacy rate has increased substantially. The rate was around 58.8% in 2011 and increased to 74.9 % in 2020. The average annual growth rate is 2.81%. Around 4 million children at the primary level throughout the country are facing limitations to access education, such as children who are working, disabled, indigenous, and live in remote areas or slums with poverty. Therefore, to achieve the targets 1 and 5 of SDG-4 is a big challenge (GoB, 2020). In Bangladesh, foundational reading skills have been raised to 74 % by Grade 6 and 91 % by Grade 10. Numeracy skills are comparatively lower than literacy skills. The rate is 42% of children in grade 6 and 65% of those in grade 10 (UNICEF, 2021).

The quality of secondary business education must be evaluated today to meet the targets of SDG 4 by 2030. The main goals of this research are to identify characteristics of quality education based on SDG 4, find out the key factors of quality education, and create a model or framework for evaluating quality business education at the secondary level. As a result, the researcher's study is pertinent to SDG 4 and helpful in carrying out the stated objectives.

1.4 Statement of the Problem

The education system in Bangladesh is far behind in a knowledge-based society (Khan et al., 2014). With quantitative development, qualitative development in secondary education is highly required (Sarker & Ullah, 2023). Goal 4 of the SDGs refers to quality education. The goal is to

ensure inclusive and equitable quality education as a lifelong learning (UN,2015). SDG 4 is a catalytic force across all the SDGs, with connections to all the other global goals that need to be emphasized (Campaign for Popular Education, 2019).

Kumar (2020) treated business education as a crucial component of the entire educational system where business determines the possibility of a nation's economic growth in the era of globalization and free markets. With the changing situation and development of social structure, the way of business has been diversified, and quality business education can play a vital role in generating self-employment and creating entrepreneurial societies with the inclusion of young people (Apasieva et al., 2020). Target 4.4 of SDG 4 also emphasized increasing youth and adults with the relevant technical and vocational skills for employment through quality jobs or being entrepreneurs doing business (UN, 2015). The TQM approach facilitates a quality culture in the production and marketing system in the industries (Deming, 1986; Juran, 1999) and educational institutions (Sahney et al., 2016; Sfakianaki, 2019). During the COVID-19 pandemic, digital entrepreneurship opportunities in technology, healthcare, entertainment, e-commerce, etc. flourished (Modgil et al., 2022). This pandemic has changed the way we live, learn, and work. Different innovative approaches have been introduced for continuing education to facilitate learning and teaching for learners and teachers (Kitcharoen, 2021). Following the COVID-19 pandemic, many secondary schools worldwide have adopted Wi-fi connections, smart classrooms, e-learning platforms, online courses, and other related features as vital components of their educational infrastructure (Wong et al., 2019; Bao, 2020). In this development experienced by COVID-19, we can conduct comprehensive research to explore the antecedents of quality in secondary business education.

Some research works (Biswas & Biswas, 2020; Ahmed et al., 2021) have been conducted on the quality of primary and higher education in Bangladesh, but the research work on the quality of secondary education in Bangladesh is hardly seen as well as ‘SDG 4 and quality of secondary business education in Bangladesh’ is not conducted before. No conceptual framework of quality in secondary business education is found. In Bangladesh, business education begins in secondary school. According to Rahman et al. (2010), this is the foundational level of business education or business studies and the cornerstone of higher education. Therefore, a comprehensive study on quality in secondary business education from the perspective of SDG 4 is needed to examine

whether the dimensions of quality in secondary business education exist in Bangladesh and to develop a model by using them.

1.5 Research Questions

In a broader sense, the research is motivated by the question, "How could the quality of secondary business education in Bangladesh be examined from the perspective of SDG 4?" The research argues that by incorporating the dimensions of quality education into the development of the theoretical framework, improved insights into the influential factors of quality in business education may be generated to examine the quality. Accordingly, some research questions are designed for the study. They are:

- How can the quality of secondary business education be conceptualized and measured from the SDG 4 perspective?
- What are the key quality dimensions in secondary business education in Bangladesh?
- What is the framework model for the quality of secondary business education based on SDG 4?

1.6 Objectives of the Study

The main objective of this research is to examine the quality of secondary business education in Bangladesh based on SDG 4. The study determines the following specific objectives for implementing the key objective:

- To conceptualize and measure the quality of secondary business education from the perspective of SDG 4.
- To identify the key dimensions of quality in secondary business education.
- To develop a framework model for the quality of secondary business education based on SDG 4.

1.7 Significance of the Study

The study will theoretically and practically contribute to the existing literature on quality education. This research has explored the dimensions or factors of quality in secondary business education and proposed a model or theoretical framework for quality assessment. It also evaluated the reflection of SDG 4 in secondary business education. Dwaikat (2020) formulated and tested a model based on the TQM philosophy for assessing quality in higher

education that included six constructs and 19 items. In this study, a significant construct/dimension, ‘curriculum standards,’ is added. In addition, three subdimensions of the dependent variable are developed based on SDG 4. In the research model, 49 items are available to measure quality in secondary business education in Bangladesh. Among them, some items are developed that are related to the targets of SDG 4 and COVID-19. As a result, the proposed model is very comprehensive and more relevant. Therefore, from a theoretical perspective, research is significant to add new knowledge to the field of quality education. From a practical perspective, the study's findings may be helpful to researchers, educationists, policymakers, business personalities, and the government. They can apply the study's model, findings, or suggestions to their fields or countries. This study will be helpful and inspiring for future education researchers, as it sets a benchmark for quality education research.

1.8 Organization of the Remaining Chapters

This dissertation contains seven chapters, including this introductory chapter. In chapter two, a comprehensive literature review is presented. Some learning theories of education have been given in this section. Chapter three deals with sustainable development goal 4. Different targets of SDG 4 have been discussed here. In chapter four, the researcher outlines the conceptual framework for the research model. In that section, there were descriptions of the different constructs and items. Methodology is one of the essential chapters, and it is presented in chapter five. Research design, research philosophy, sample size determination, measurement scale, instrument design, and data analysis tools were stated in this chapter. In chapter six, the researcher presents the data analysis section, where the study results are given. Chapter Seven is the last part of this study, in which findings and discussions are furnished. In addition, limitations, contributions, and future research directions were included in this chapte

Chapter 2

LITERATURE REVIEW

2.1 Introduction

Assessment is an essential key to the improvement of the quality of education. Assessment raises many questions and identifies problems (Kellaghan & Greaney, 2001). The objectives of the literature review of this study are to identify the research gap, to explore the dimensions of quality education, and to develop a model for assessing quality in secondary business education.

2.2 Background of Learning Theories

Total Quality Management (TQM) is a systematic management philosophy for continuous improvement that creates a quality climate in the organization. The application of TQM in secondary education and the two influential learning theories in education - enactivism theory and connectivism theory are the theoretical background of this study. 'Enactivism' indicates that people know the world by interacting with it physically, experientially, and cognitively. Continuous interaction is the main feature of this theory, which holds a relational ontological belief that all social realities, knowledge, and things are interdependent (Hosking & Bouwen, 2000). Siemens (2004) developed connectivism theory. The basis of this theory is that knowledge exists everywhere in the world, not only in the head of any individual. It uses a network of connectivity that allows teaching and learning with technology for positive outcomes. Learners must use technology to further their understanding of their learning environments (Morchid, 2020). Among the different learning theories, connectivism learning theory is more suitable for the 21st century because it facilitates internet technologies for learners and promotes quality education (Corbett & Spinello, 2020).

2.3 Assessment of Quality in Education

Some secondary school teachers lack the necessary abilities to teach business courses. Hence, they are no longer qualified to do so (Nwosu, 2005). A curriculum's high standards should be sensitive to the demands of the students and help to give high-quality education. Chibuike (2008) emphasized that relevance and utility are the main reasons the business education curriculum is successful. According to Okoli (2010), the curriculum needs to be updated for the graduates of business education programs in schools to be prepared for the demands of the workplace's evolving technological landscape. Another investigation discovered some difficulties with

Bangladesh's secondary business education. The primary obstacles identified in that study were those related to curriculum, pedagogy, infrastructure, assessment, and attitude, with the curriculum challenge being the most significant (Ahmed et al., 2021). Griffith (2008) focuses on relative assessment and absolute assessment as the two methods for evaluating the quality of education. The author proposes a framework based on outcomes defined according to educational standards that focus on the school's mission. He emphasized the standards of classroom curriculum that should be customized with the learning process responding to the schools' environment.

A school can formulate its curriculum, give freedom and opportunity to the students and teachers for learning and assessment, and promote students' engagement to ensure quality education in a decentralized school-based management system (Zaid et al., 2022). To ensure the quality of education, prescribed curriculum and subjects, timetables of school, teacher qualification, student admission, etc., are used as dimensions. Parents are trying to choose one school from several schools for quality education. Again, some guardians withdraw their children with dissatisfaction from the same school. Therefore, as a customer, different parents define quality education differently (Mukhopadhyay, 2020).

In the case of enrolment, including girls, to secondary schools, an increase in the number of schools, colleges, and teachers, a reduction of gender inequality, and curriculum revision in Bangladesh proceeded significantly. However, the context of quality in secondary education remains a significant concern (Rahman et al., 2010). In the past 10 years, Bangladesh has improved Madrasa education and Technical and Vocational Education and Training (TVET) along with the progress of primary and secondary education. Gender equity has been attained at both levels. Maintaining progress and accessing quality education (Centre for Research and Information, 2018).

All Bangladeshi secondary schools fall short of expectations in terms of quality. The government should take the initiative to find solutions to improve student outcomes and educational quality (Biswas & Biswas, 2020). Bangladesh is a signatory to the MDGs, SDGs, UN Convention on the Rights of the Child, and CEDAW. Thus, the worldwide pattern of educational quality has affected elements of Bangladesh's educational quality (Islam, 2021; Nelson, 2021). Some

essential components of quality education, including eradicating gender-based discrimination and illiteracy and decreasing poverty and dropout rates, have been included in education policy (Ministry of Education [MoE], 2010). In addition to these highly focused qualitative elements, specific quantitative metrics, such as the literacy rate, are still considered benchmarks for educational quality in Bangladesh. Bangladesh has received loans and grants from the World Bank (WB), the Asian Development Bank (ADB), the International Monetary Fund (IMF), and other donor organizations to reduce poverty (Talukdar, 2018).

According to Tokushige et al. (2008), a study identified several high-quality elements of Bangladeshi education, including the student-teacher ratio, teacher accountability, student and teacher evaluation, decentralization, active School Management Committee (SMC), teacher preparation, technology and ICT integration, child-centered learning, and extracurricular activities. According to a different study, Bangladesh needs several components of high-quality education, including insufficient funding, a shortage of trained teachers, and uninvolved stakeholders (Morshed, 2017). Resources include infrastructure, learning materials, funding, and textbooks. Collaboration between ministries such as MoE and MoPME results in increased involvement from teachers, parents, local community stakeholders and district and Upazila-level education offices (Mousumi & Kusakabe, 2021). Morshed (2016) conducted a study to investigate additional aspects of quality in secondary education in Bangladesh. Materials, pedagogy, high-quality textbooks, further teaching materials, helpful ICT resources, evaluation of the materials' effectiveness, student achievement, sufficient contact hours, the pay scale for educators, and the caliber of teacher preparation for professional growth are among them.

2.4 Exploring Dimensions of Quality in Education

According to UNICEF (2000), five aspects make up a quality education. They are: (a) Quality learners, (b) Quality environments, (c) Quality contents, (d) Quality processes, and (e) Quality outcomes. Barrett et al. (2006) proposed a quality framework comprising five elements: sustainability, equity, effectiveness, efficiency, and relevance. Ten quality dimensions—authenticity, cognitive complexity, fairness, meaningfulness, directness, transparency, education outcomes, reproducibility, comparability, and costs and efficiency—were employed in Competencies Assessment Programmes (CAPs) to evaluate educational quality. The views of experts, educators, and stakeholders were analyzed on the CAP quality aspects. To support the

useful application of these aspects, more research is required to assess CAPs (Baartman et al., 2007).

Mamun et al. (2008) identified forty-five variables related to the quality of education in a study conducted on students attending private universities in Bangladesh. Ashraf et al. (2009) studied private universities in Bangladesh and proposed five dimensions for evaluating the quality of higher education. In the study, faculty credentials, the academic calendar, campus facilities, research facilities, and the cost of education were considered independent variables. In contrast, the quality of education was handled as the dependent variable. Faculty qualifications encompass five sub-dimensions or components: the faculty's academic background, teaching experience, up-to-date course content, communication abilities, and equitable treatment of students. The second aspect, the academic calendar, encompassed several components, such as adhering to precise timetables, providing opportunities for missed classes, implementing an automated registration system, and ensuring prompt registration completion. The third most significant determinant is the quality of campus amenities, encompassing state-of-the-art campus infrastructure, transportation options, dormitory accommodations, cafeteria services, recreational and fitness facilities, high-speed internet connectivity, an extensive library, and computer laboratory resources. The fourth component encompasses providing resources for both student and faculty research, research centers' presence, and publication facilities' availability. The cost of education was assessed based on factors such as exorbitant tuition prices, financial assistance for economically disadvantaged students, the availability of scholarships, on-campus employment opportunities, and the expenses associated with study materials. In addition, the researchers employed five measuring scales to assess the dependent variables. The reasons for choosing this institution include a) National acclaim for delivering exceptional education, b) Well-compensated graduates in demand in the job market, c) International university partnerships, d) Students' sense of pride, and e) Faculty accessibility for student support.

Mamun et al. (2008) found forty-five indicators of quality education in research involving students at private universities in Bangladesh. Five dimensions for evaluating the quality of higher education were also discovered by Ashraf et al. (2009) in another study on private universities in Bangladesh. In that study, quality education was regarded as a dependent variable. In contrast, faculty credentials, the academic calendar, campus facilities, research facilities, and

the cost of education were the factors displayed as independent variables. Five sub-dimensions or components comprise a faculty's credentials: communication skills, current course content, teaching experience, academic background, and treating students fairly. The second component, the academic calendar, comprised the following: upholding rigorous timetables, offering make-up classes, automating the registration process, and ensuring that registration was completed on time. Campus amenities, including contemporary campus structures, transportation, food options, living and working out facilities, gym memberships, high-speed internet access, a sizable library, and computer labs, rank third in importance. Supporting faculty and student research, having research centers, and publishing facilities are all included in the fourth factor, the research facility. High tuition fees, financial aid for low-income students, available scholarships, on-campus employment opportunities, and the price of study materials were all used to gauge the cost of education. For the dependent variables, the researchers additionally employed five measurement scales, such as *"(a) Nationwide recognition for providing excellent education, (b) High-paid graduates on the job market, (c) Foreign university affiliation, (d) Students' pride and (e) Faculty's availability to help students."*

Hoque et al. (2013) established a few quality-related variables for evaluating postsecondary business education. The factors mentioned above—faculty credentials, student selection and assessment procedures, campus amenities, research environment, university leadership, market orientation, and corporate attachment—should be considered by policymakers and administrators when evaluating the caliber of their business schools.

Gibbs (2010) uses the widely used Biggs's 3P model (Biggs, 1993) to evaluate the quality of higher education in the UK. This model depicts education as a complex system with interdependent "Presage," "Process," and "Product" characteristics. The beginning of students' learning is linked to the presage dimension; the process dimension influences students during their learning, and the result of that learning is related to the product dimension. The following factors make up the presage dimension of quality: (a) funding, (b) student-staff ratio, (c) instructional staff quality, and (d) student quality. The process dimension of quality covers the following: (a) class size, (b) class contact hours, (c) quality of teaching experience and training, (d) research atmosphere, (e) intellectual challenge level, and (f) formative evaluation and feedback. The product dimension of quality belongs to (a) Student performance and degree

categorization, (b) persistence and retention, and (c) employability. Large-scale studies in the USA (Astin, 1977, 1993) also employ the 3P model, the "Input-Environment-Output" paradigm.

To ensure quality education, 'The Commonwealth Education Hub' (2017) has proposed a Holistic Quality Education Ecosystem with a national qualification framework. It includes six quality standards: inclusive, access, equity, and equality; (b) Quality of teachers; (c) Curriculum; (d) Environment; (e) Sustainability; and (f) Governance. Across the Commonwealth states, the national education qualification framework may vary from one country to another.

The I-P-O model (UNESCO, 2002) created a framework comprising three dimensions - adequate teaching materials and qualified human resources (Input), teaching techniques (Process), and teaching outcomes (Output) for evaluating quality education. A modification to this overall input-process-output structure was presented in the UNESCO Global Monitoring Report (UNESCO, 2005), which rearranged the various components and suggested five dimensions: Learners' attributes (a), the teaching and learning process (b), facilitating inputs (c), results (d), and context (e). Nikel and Lowe (2010) identified seven dimensions: effectiveness, efficiency, equity, responsiveness, relevance, reflexivity, and sustainability. In 2007, the UNESCO Santiago model offered five characteristics of excellence in education, considering the many viewpoints of stakeholders and social interactions. They were equity, pertinence, efficacy, efficiency, and relevance.

Quality indicators proposed by the Central Board of Secondary Education (CBSE) of India in 2005 are: i) Scholastic process, ii) Beneficiary satisfaction, iii) Infrastructure, iv) Leadership, v) Human resources, vi) Continuous evaluation, and vii) Management and administration. The quality determinants given by UNESCO in 2009 are i) Home school relations, ii) Safe school and classroom environment, iii) Class school mission, iv) Management leadership, v) High expectation for success, vi) Opportunities to learn and student's time on task, vii) Frequent monitoring of student's success. The quality indicators proposed by Rashtriya Madhyamik Shikha Abhiyan (RMSA) of India in 2009 are i) School planning and management, ii) Curriculum transaction, iii) Teaching learning resources, iv) Learner's progress in all areas, v) Teacher's professional development vi) Infrastructure and other resources vii) Frequent monitoring of teaching and learning process. The above quality indicators are suggested by

CBSE, UNESCO, and RMSA to improve education outcomes and enhance the quality of secondary education (Pallavi & Pushpanadham, 2018).

Garira developed a comprehensive conceptual framework for school quality's input, process, and output level components (2020). The input, process, and output dimensions are used to measure the quality of education in schools, classes, and the country. The input components include a relevant curriculum, human resources, material resources (such as textbooks), parents' backgrounds, democratic government, and collaborative decision-making. Peer pressure, instructor monitoring, support for teaching and learning, professional development, and other elements are examples of process components. Students' accomplishments are output dimensions (e.g., pass rate, social skills, etc.).

Luong and Nieke (2014) created a conceptual framework emphasizing quality in education based on the inputs-process-output model. The circumstances of the school, the community, the country, the region, and the world all affect the quality of education. The four main factors that define the quality of education are the following: (a) policies, strategies, and standards; (b) human resources (administrators, teachers, learners, and community); (c) infrastructure, facilities, curriculum, and materials; and (d) financial resources. The tasks that comprise the process dimensions are divided into four main groups: managing and organizing, networking and partnerships, teaching and learning, and monitoring and assessing. The output dimension of high-quality education encompasses transformative citizenship, well-being, cultural values, literacy, numeracy, and life skills.

Biswas & Biswas (2020) emphasized urgently taking necessary measures to improve quality assurance in Bangladesh's secondary education. They pointed out some common issues in this regard, such as fair admission of students, fair recruitment of teachers, good governance, academic management skills, establishing the primary level of education, improving salary packages for teachers, etc. The input-process-output paradigm for evaluating quality was also provided by Chua (2004). The input dimensions are student selection and entrance requirements. The process components include the teaching-learning approach, contents, instructor knowledge, curricular standards, medium of instruction, social activities, and assessments. The output dimension includes employability, job opportunities, and academic performance. Ahmmed et al.

(2022) explored three key dimensions: teacher quality, technology and school leadership of quality in primary and secondary education. They positively influence students' academic performance. Tyas and Naibaho (2021) evaluated secondary school quality using the context, input, process, output, and result components. Under the components, they also listed 27 sub-components.

To evaluate quality education at the higher education level, Dwaikat (2020) developed a conceptual model based on three perspectives—input, process, and output—that includes six aspects of quality education with 19 quality indicators. This model was developed using the Total Quality Management (TQM) approach. The model considered the independent factors of education infrastructure, pedagogical standards, learning environment, student quality, and academic staff quality. One of the output variables was the academic program's quality. This methodology is deficient in the curriculum, a crucial component of education. Teachers in Malaysia also proposed using TQM to raise the standard of instruction and learning in classrooms (Pourrajab et al., 2011).

The study conducted by Nawelwa et al. (2015) in Zambian secondary schools on the use of Deming's (1986) and Lockwood's (1992) TQM concepts reveals quality-related goals. They created a framework and a few theories to help implement TQM in the classroom. They also suggested setting up a forum where head teachers, educators, students, parents, and other interested parties may get together and discuss how the TQM philosophy can benefit all parties. Sfakianaki (2019) examined the potential and application of TQM in Greek primary and secondary educational institutions using instruments with 66 items and seven dimensions. The study's dimensions included leadership, student focus, continuous improvement, process control and involvement, education and training, measurement and evaluation, and change management.

The educational process directly impacts educational outcomes. Students' capabilities and employability are positively affected by the caliber of their education and research experiences. They determined the following eight crucial aspects of higher education quality (Gora et al., 2019) listed the following: (a) technical infrastructure; (b) educational content; (c) teaching personnel; (d) teaching activities; (e) research activities; (f) practical activities; (g) knowledge, skills, and competencies; and (h) employability. Ibrahim et al. (2017) list seven characteristics of

a quality education. These include (a) having sufficient teaching materials; (b) having infrastructure for education; (c) imparting the "right" knowledge; (d) meeting educational "yardsticks"; (e) providing support for teachers' well-being; (f) creating a positive learning environment; and (g) having qualified teachers available.

Extracurricular and co-curricular activities benefit students' education. To enhance the quality of education, Rodriguez et al. (2022) highlighted the role that students' extracurricular activities have in society in addition to classroom instruction. These exercises help students become more resilient, influenced by qualities associated with teachers (affective, dedication to the organization and profession, etc.), typically low in at-risk students (Freund et al., 2022).

2.5 Quality Education in the Pandemic Situation

The COVID-19 pandemic has significantly influenced secondary education on a global scale. According to UNESCO (2020), educational nations shut down in 165 nations. Following the outbreak of the COVID-19 pandemic, the educational system has seen unprecedented disruption, affecting about 1.6 billion pupils across over 190 countries. As a result, the closure of schools affected 94 percent of pupils globally and up to 99 percent of children in low and lower-middle-income countries (United Nations, 2020). Before the COVID-19 epidemic, a total of 258 million children and teenagers who were of primary and secondary school age were not registered or attending school. These dropout rates have increased because of the COVID-19 epidemic, resulting in poorer educational outcomes (World Bank, 2020). Digital technology integration into in-person and online learning has revolutionized education (Haleem et al., 2022). Digital platforms are a new standard in school academic activities (Khalili, 2020). Online learning is distance learning, which involves technologies as a mediator of the learning process through Internet facilities (Heng & Sol, 2021). Students can exchange their ideas, thoughts, or educational materials in this online learning (Aslam & Sonkar, 2021).

Online learning designs and organizes a better learning environment using digital technology that implies specific pedagogical content knowledge (PCK) (Rapanta et al., 2020). In pandemic scenarios, educators have used contemporary technology to support instruction through online learning (Surma & Kirscher, 2020). Christopoulos and Sprangers (2021) have emphasized integrating educational technology, especially in crucial times that enhance existing knowledge.

They suggested that technology integration should be implemented without any technological pressure to achieve pedagogical goals. To implement practical pedagogical goals and continue online learning, Cuellar et al. (2021) have proposed several actions and choices to ensure quality education. They attempted to investigate the difficulties facing pedagogical management in Chile's three distinct administrative and financial school governance systems of distance education during COVID-19.

Many educators emphasized the necessity of distance learning during the COVID-19 pandemic to continue educational progress and achieve learning outcomes (Majumdar et al., 2022). Gathering knowledge relating to ICT inspires educators to provide the best service at that time. They developed suitable methods with interactive learning environments for the learners that fulfill their demands in the twenty-first century (Bawaneh, 2020; Mahmood, 2022). Modern digital technologies have influenced our lifestyle, thinking, communication, and education (Haleem et al., 2022; Tameryan et al., 2022). Consequently, technologies have gained appeal, pleasure, entertainment, and preference to address the demands of human existence and fulfil their modern necessities (Al Salman et al., 2021).

Incorporation of technology into the educational process is crucial for the advancement of educational systems, and this is what enables distance learning to achieve its objectives with utmost efficiency effectively (Al-Adwan et al., 2021; Qiao et al., 2021; Zhou et al., 2022). Goren et al. (2020) did a study to assess distance education in Ankara during the COVID-19 epidemic. The study aimed to gather the perspectives of students, teachers, parents, and administrative staff. Most participants believed that distance education was less effective than traditional in-person education.

Basar et al. (2021) conducted a case study in Malaysia and discovered unfavorable outcomes on the efficacy of online education. The researchers found that 41.5% of students lacked enthusiasm for online learning, while 66.7% demonstrated moderate proficiency in group work. Ninety-eight percent of students acknowledged the significance of in-person teaching and learning. In contrast, the research revealed that secondary schools and administrators held more favourable views regarding the quality and prospects of distance education. The COVID-19 pandemic highlighted the lack of preparedness in educational systems globally and in individual schools to

effectively handle crises and deliver high-quality education even during a pandemic (Barnova, 2020).

In a review paper, Mahajan et al. (2023) examined the influence of COVID-19 on management education. The researchers determined that the duration of the COVID-19 pandemic represented a period of transition from a pandemic state to an endemic state. They advised capitalizing on the benefits that this transitional phase offers. The inquiry determined that the knowledge and insights gained from the epidemic can be utilized in future educational practices as a precautionary step. The quality of education has been enhanced by exploring five key areas: digital pedagogy, collaboration and partnership, adaptability and resilience, innovation and transformation, and fostering an entrepreneurial mindset. They did not specify leadership competence metrics or quality standards despite emphasizing creative pedagogies and leadership competencies to meet post-pandemic issues and improve educational quality.

Sarker and Ullah (2023) also identified five major emerging themes for quality assessment criteria in another review paper. These themes include technological infrastructure, blended learning environment, ICT competency and adaptability, pedagogy for online education, cooperation, partnership, and motivation. The study recommended using generative AI and metaverse in a secondary school as a potential avenue for future research to enhance quality.
In the era of rapid technological development, generative artificial intelligence, or GAI, has become a game-changing breakthrough in education. ChatGPT, or Chat Generative Pretrained Transformer, has become a widely used technology. Since teachers, students, and educational institutions can now use the various GAI tools, it is imperative to reconsider how they should be applied to classroom teaching, learning, and evaluation strategies (Murugesan & Cherukuri, 2023). Teachers can receive assistance from generative AI tools such as ChatGPT in creating presentation slides, crafting essay-style, multiple-choice, and viva questions, responding to student inquiries, video contents, assessing student responses, developing case studies, lesson planning, and producing materials for blended learning (Mondal et al., 2023).

Students can also use generative AI tools to enhance their coursework by improving their writing, developing ideas for collaborative projects, or giving in-depth explanations of topics covered in class (Liu et al., 2023). With a million users in five days and 100 million users in two

months, ChatGPT has emerged as the AI with the quickest growth rate (Efron, 2023). Therefore, we recommend more studies on applying GAI technologies in secondary education in the future. Researchers could consider the following as potential future GAI research questions: (i) What new standards for quality evaluation will be necessary? Furthermore, (ii) how using GAI tools will enhance the standard of instruction.

Metaverse is another quickly developing technology that is very well-liked by people, especially kids. A study found that two-thirds of kids in the USA between the ages of nine and twelve only use Roblox. Nowadays, the most popular metaverse technologies, including Facebook, Roblox, and Ready Player One, are studying education in addition to movies and video games for their practical use (Park & Kim, 2022). Researchers and academics doing educational research must also consider these emerging metaverse tools.

The pandemic affected the whole educational system, and they had to adapt to virtual teaching. However, in online learning, students at secondary schools face connectivity difficulties and emotional adverse effects on their quality of life (Almonacid-Fierro et al., 2022). For adapting digital tools in virtual teaching, teachers experience that 'motivation,' regulations and specifications, 'technological infrastructure,' and 'heterogeneity of students and teachers' are vital factors (Wohlfart et al., 2021). Code et al. (2022) found that a disorienting dilemma in COVID-19 will proceed toward pandemic-transformed pedagogy. Jopling & Harness (2022) examined the challenges of school leaders in Northeast England during the early stages of the pandemic and found the vulnerability of professional support. The study emphasized the mental health of the students. As a positive response to the COVID-19 pandemic, educational institutions around the world generate innovative emergency remote teaching (ERT) and virtual learning (VL) using digital technology for students who stay at home (Anthony Jnr. & Noel, 2021). Therefore, this review shows that online learning and change management theories improve students' learning and teaching pedagogy.

2.6 SDG 4 and Quality Education

To guarantee worldwide prosperity, preserve the environment, eradicate poverty, and foster greater collaboration, the United Nations (UN) adopted 17 "Sustainable Development Goals" (SDGs). These objectives provide a course of action for enhancing global peace (UN, 2015). To accomplish other goals, SDG 4 is essential (Campaign for Popular Education, 2019). There are

three means and seven targets for achieving SDG 4 by 2030 (UN, 2015). To achieve effective learning outcomes, the following goals must be met: (a) free, equitable, and high-quality primary and secondary education for all; (b) equal access to high-quality pre-primary education for boys and girls to support their early childhood development; and (c) equal access to high-quality, reasonably priced technical, vocational, and tertiary education, including university, for all men and women. (d) Increase the proportion of individuals with the necessary skills for financial success; (e) Remove gender differences in education and guarantee equitable access; (f) Ensure that all kids and a significant share of adults, regardless of gender, achieve literacy and numeracy; and (g) Education for global citizenship and sustainable development, which upholds human rights, gender equality, sustainable lifestyles, and the advancement of a peaceful, nonviolent culture (UN, 2015). SDG 4's three strategies are as follows: (A) construct inclusive, secure schools; (B) increase higher education scholarships for developing nations; and (C) boost the number of qualified teachers and international training programs available to developing nations (UN, 2015). There are also three critical principles of SDG 4. They are (i) lifelong learning, (ii) quality of education, and (iii) equity and inclusion. In the targets of SDG 4, dimensions of quality education are highlighted. Target 1, 5, 6, 7, and A & C directly relate to secondary education.

2.7 Other Quality Dimensions in Education

2.7.1 Good Health and Nutrition

Poor health and malnutrition create barriers to attending a school that hampers the best learning. However, to remove such limitations, school health and nutrition programs are so effective that they increase students' enrolment, attendance, and achievement (Bundy et al., 2006; Jukes et al., 2007). The programs increase learners' health conditions and improve their education outcomes (Graham et al., 2015; Ratala et al., 2023). There is a positive and high correlation between education and health. However, health and nutrition are concerned for assessing quality **(**Suhrcke & Niever, 2011). Therefore, good health and nutrition are the inputs that are used to assess quality education.

2.7.2 Regular Attendance

The quality assessment tool for quality education at the secondary level is the students' regular attendance (Kumakech, 2015). Absenteeism harms teaching-learning environments and

negatively impacts quality education (Segal, 2008). Learners who are habitual to being absent suffer academically and socially (Williams, 2001). Another South African study shows an inverse correlation between student absenteeism and course achievement (Wadesango & Machingambi, 2011). As a result, low attendance lowers pupils' academic performance at the school level (Klein et al., 2022).

2.7.3 Family Support

Education starts with the family, and parents are a child's first teachers. Family support substantially affects learners' academic results and personal achievements (Chohan & Khan, 2010). The study found that more than 50% of students with family support received private tuition after school. Sometimes, their older brother or sister helps them. In some cases, they do their homework with their parents' support. Li and Qui (2018) find that family background substantially impacts learners' academic achievement, including exam results. Therefore, family support influences quality education. It is also an element of the dimension of quality.

2.7.4 Quality of School Facilities

The infrastructure and modern facilities of the school are visible factors that attract the students and guardians. To ensure quality education, sufficient school facilities and modern infrastructure are the essential elements of quality education (Meje, 2012). School facilities (such as computers, libraries, and playgrounds) influence students' performance, and school infrastructure, like buildings, classrooms, laboratories, etc., are essential factors in school learning environments (Anaman et al., 2022). Another study reveals that effective instruction, better student outcomes, and a reduced dropout rate are possible for quality infrastructure (Teixeira et al., 2017).

2.7.5 Class Size

Small class size facilitates quality education for students (Biddle & Berliner, 2002). Findings of the Tennessee Student Teacher Achievement Ratio (STAR) research (1985-2007) are the foundation of this result. There is clear consistency among the research on class size in Australia, the Netherlands, Sweden, the United Kingdom, and the Far East (Achilles & Shiffman, 2012). STAR researchers also have found that large class sizes reduce school and college attendance. Whitehurst and Chingos (2011) appreciated the STAR research design and findings. Different results were found in a study conducted by Asadullah (2005). Using large-scale survey data from

schools in Bangladesh, the author assessed the impact of class size on students' outcomes in secondary education and concluded that class size reduction did not influence the quality of education in Bangladesh and developing countries.

2.7.6 Inclusive Environment

Bangladesh's Teaching Quality Improvement in the Secondary Education Sector (TQI-SEP) project aims to establish and maintain an inclusive learning environment for secondary school students. The National Education Policy 2010 recommended teacher training and integrating disabled children into mainstream schools (Ministry of Education, 2010). Inadequate adapted facilities at the school cause the low enrollment rate of students with disabilities, a lack of accessible transportation and personal help, inappropriate infrastructure, and unfavourable attitudes among staff, teachers, and other students (Campaign for Popular Education, 2019). Specific learning resources are needed to support kids with disabilities. These resources include speech and language development, social and emotional intelligence, motor skills, sensory awareness, tactile awareness, visual discrimination, core skills, and professional resources. These resources are unavailable in mainstream schools in Bangladesh, so effective learning is demanding and challenging (Kawser et al., 2016).

2.7.7 Non-violence

The fundamental themes of nonviolence are violence-free and the intention to resolve any problem by dialogue with a positive attitude (Valiahmetova & Salpykova, 2016). Around 50% of students aged from 2 to 17 suffer from physical, sexual, or mental violence (Newcomb et al., 2020; Scheer et al., 2023). Quality teachers can play a vital role in eliminating violence from schools and society (World Health Organization, 2019).

2.7.8 Student-centered, Non-discriminatory, Standard-based Curriculum

Business education became a crucial academic elevated goal of prepping students for business or higher education careers. For this reason, the program component is from the beginning of vocational education. Future-focusing and adapting to any dynamic changes are requirements for business education. The traditional perception of business schools, which mainly focus on training clerks and secretaries, is giving way to more secondary business education in Hong Kong needs a uniform and well-balanced curriculum (Cheung, 2016). Business educators now

have a more prominent leadership and planning role in educational circles. According to Shamack and Forde (2011), business teachers are increasingly active in research, in-service education courses, and curriculum development.

The time has come to perform additional academic research to support the many claims about business education's potential benefits in the primary and secondary school curriculum. All students promote its significance in grades 9 and 10 (Gupta & Sangeeta,2013). Bangladesh's government has taken the initiative to implement significant reforms from grade 1 to grade 9 to maintain standards and uniformity. They will follow and study the same curriculum, which combines the three current streams - science, arts, and business studies. The 11th and 12th grades will be the starting point for the topic division.

The primary and secondary curricula will see significant adjustments, and the textbook's contents will also alter with these changes. National security, anti-terrorism, and disaster management will all be covered in the textbook. Apart from in-class instruction, technological skills will be prioritized. 2020, the new curriculum will be finalized, and by 2023, the new textbook will be finished and disseminated. The new curriculum will have fewer open exams and a 20-point test for ongoing assessment in the classroom covering all disciplines. According to the Bangladesh Post (2019) and Dhaka Tribute (2020), NCTB has identified ten areas (subjects) of learning as part of the plan. These subjects include language and communication, mathematics and language, science and technology, information and communication technology, life and livelihood, environment and climate, values and ethics, physical and mental health and wellness, and arts and culture.

The Bangladeshi secondary and upper secondary curricula were updated in 2012, replacing the 1995 national curriculum. The 2012 national curriculum strongly emphasizes teaching future citizens 21st-century skills (NCTB, 2012). The curriculum's intended result was for the pupils to exhibit honorable and sincere attitudes toward their families, communities, and circumstances. They will give back to the community and show social responsibility (NCTB, 2012). Adding Finance and Banking in grades 9 and 10 and Finance, Banking, and Insurance in grades 11 and 12 has improved the Business Studies stream. New topics are included, along with fresh content on topics including energy security, water resources, climate change, and life skills.

2.7.9 Literacy and Numeracy

Considering SDG 4, the government of Bangladesh has set out 10 targets. The sixth target is to achieve literacy and numeracy skills in adults, which should be implemented by 2030. However, literacy and numeracy skills must be acquired to implement SDG 4 at the secondary level (Neazy, 2018). In 2020, Bangladesh's adult literacy rate (15 years and above) was 75.6 % and 74.4% in 2019 (Bangladesh Bureau of Statistics, 2020). As per the preliminary report of the Population and Housing Census-2022, Bangladesh's literacy rate was 74.66% and 51.77% in 2011 (Bangladesh Bureau of Statistics, 2022). This adult literacy rate has increased due to key factors such as expanding primary and secondary education and adopting non-formal education programs by the Government and NGOs (Hanemann, 2021).

Literacy and numeracy skills of the several OECD (Organization for Economic Cooperation and Development) countries were below standards, causing severe economic problems, significantly when governments and industry councilors expend vast amounts of money to facilitate adult people acquire basic literacy and numeracy skills (OECD, 2010 b; Industry skills council, 2011). A survey of adult skills was conducted by PIAAC (Program for the International Assessment of Adult Competencies) and found a close relationship between performance in the Program for International Student Assessment (PISA) and the literacy and numeracy skills of their students later in adult life (OECD, 2013 c). Poor literacy and numeracy skills often harm their expectation concerning getting high-salary jobs (OECD, 2013 b).

Since 2008, every year, Australian students have participated in NAPLAN (National et al. – Literacy and Numeracy) in their ages 3, 5, 7, and 9 years old. From the assessment results, the parents indicate their children's school progress and the expectations of the students and teachers. The authority and teachers can evaluate and improve their school system (McGaw et al., 2020). Australian students also participate in programs such as PIRLS (Progress in International Reading Literature Study) and TIMSS (Tread in International Mathematics and Science Study) to assess literacy and numeracy. They also participate in PISA, which is used globally to assess education systems covering three key areas - reading, mathematics, and science- for 15-year-old students (Meeks et al., 2014).

2.7.10 Life Skills

Life skills refer to the ability to adapt to changing circumstances, demonstrate constructive conduct, and effectively overcome challenges (World Health Organization, 1996). The primary goals of life skills education are to equip individuals with a comprehensive comprehension of risk management and to develop specific abilities in areas such as communication, decision-making, problem-solving, critical thinking, and creative thinking (Bancin & Ambarita, 2019). Developed countries such as the United States, United Kingdom, Germany, Greece, and Mexico have established structured life skills education programs to promote positive behavior and achieve their objectives. Nevertheless, most developing countries, such as Bangladesh, India, Sri Lanka, the Maldives, Thailand, Myanmar, and Nepal, include this concept in their educational programs to achieve rapid outcomes without meticulous planning.

Life Skill Based Education (LSBE) was started in secondary education in March 2004 in Bangladesh. Reviewing the school curriculum, necessary gaps were identified for introducing LSBE in secondary education in collaboration with UNICEF and NCTB. Essential training and workshops on LSBE at the national level were organized to enhance the capacity of DSHE, NAEM, IER, TTC, school teachers, and NGOs. Now, training programs on life skills are regularly provided to secondary school teachers (Ladiwal & Kanwar, 2021; Riad, 2023). Over the last few years, a very relevant question has arisen on social and emotional skills– do our (Bangladesh) schools/colleges emphasize the students' soft skills called "social and emotional" skills? Is there any assessment tool used to assess these skills? Still, we consider the student's performance using a traditional or summative assessment system. Parents and educational institutions let the students learn academic knowledge but do not encourage them to learn about themselves in society. As per OECD, "Social and emotional skills" refer to the capabilities to regulate one's thoughts, emotions, and behavior that differ from cognitive abilities such as literacy and numeracy (Neazy, 2018).

Oberle et al. (2020) outlined some potential challenges or barriers to implementing social and emotional learning approaches, including inadequate funding for SEL, competing priorities for educators, and resistance to change. To address these challenges, the authors suggest allocating resources for school-wise SEL approaches, providing professional development for teachers, and making SEL a priority alongside academic development. They also recommend involving all

stakeholders in the implementation process, including students, parents, and community members, and using data to track progress and identify areas for improvement. Additionally, the authors emphasize the importance of acknowledging and addressing any resistance to change and providing ongoing support and training for educators to ensure successful implementation.

2.7.11 Professional Learning for Teachers

Teachers need knowledge about pedagogical content and skills in assessment to identify exactly what students know and can do in the classroom. Teachers' sufficient knowledge about content, curriculum, and pedagogy also enhances students' achievement (Timperley, 2008; Jakob et al., 2020). In Bangladesh, the Teachers' Quality Improvement (TQI) project has been operating for several years, and training programs for school teachers have been undertaken without any research work (Hoque et al., 2013). Teachers are not ready to learn from their peers, to apply feedback in the class, or to be innovative in the light of pedagogy (Ahsan, 2018). In Bangladesh, the training program - CPD has been introduced for secondary school teachers to increase their professional knowledge and skills through interactive and participatory learning methods using ICT (Singh et al., 2021). Therefore, more training for the teachers addressing post-COVID complications is needed based on educational ICT.

2.7.12 Active & Participatory Method

In the participatory method, students are engaged in pair work, group work, peer checking, peer teaching, brainstorming, group presentation, group assignment, and so on for sharing and creating knowledge through interaction, active participation, negotiation, and critical thinking (Musa et al., 2011). A study conducted in Bangladesh examined how instructors incorporate and apply active learning techniques in secondary schools. The findings revealed that most teachers utilize active classroom learning methods (Park, 2012). Teachers are directly influential in the development of students as well as education. They prepare the students to participate, acquire knowledge, and engage in thinking during their teaching time (Alam, 2022). Teachers bear direct responsibility for the education and growth of their students as they encourage critical thinking, activate all cognitive processes, and train their students to become self-directed learners (Nasri et al., 2020). The main obstacles to implementing active learning in Bangladesh are the teachers' lack of preparation, experience in an atmosphere that supports active learning, large class sizes, and heavy curriculum loads (Chowdhury, 2018). Therefore, active and participatory learning in secondary business education promotes quality education.

2.7.13 Teachers' Working Conditions

Their working conditions significantly impact the level of instruction that teachers can give their students. The quality of teaching and learning is determined by the environment or working conditions in which instructors are employed and their qualifications (Gu & Day, 2013). According to Podolsky et al. (2019), the work environment in education plays a critical role in attracting and retaining talented teachers. Certain factors in their workplace, such as appropriate leadership styles, effective staff welfare management, school amenities, and school atmosphere, boost secondary school teachers' job happiness (Onyeukwu, 2022). More than 80% of teachers and school leaders express their satisfaction with the existing working conditions, and more than 60% are happy with their profession, on average, across the OECD countries (Rosen et al., 2021).

Working conditions of school teachers influence their job satisfaction. Job satisfaction is related to specific factors like salary, service conditions, recognition, opportunities, etc. The job satisfaction level of the school teachers was revealed from another study, which found that most of the teachers are satisfied with their jobs, and the range of satisfaction levels is from moderately satisfying to satisfying. In addition, gender, school location, school type (government, non-government with and without MPO system), and job and school management benefits are identified as distinct factors of working conditions and job satisfaction related to education policy (Jahan & Ahmed, 2018).

Another study recommended improving the working conditions of non-government teachers in Bangladesh, such as honorable house rent with salary, time promotion, regular increments, and an award system (A.K. Azad et al., 2014). As 96.81% of total school teachers and 88% of total college teachers work in non-government institutions in Bangladesh (MOE, 2013), the socioeconomic status of those teachers should be upgraded at reasonable levels to ensure quality education by 2030.

2.7.14 Administrative Support and Leadership

Administrative support and leadership quality are very influential and critical factors in school processes for students and teachers (UNICEF, 2000). Leadership empowers teachers to lead, formally and informally, to improve instructional and organizational practice within and beyond schools (Islam, 2016). Teachers' leadership skills are crucial for enhancing their instructional

quality inside and outside the classroom. Teachers' leadership improves the teaching-learning process of the school, and it is strongly related to the student's performance (Warren, 2021). As instructional leaders, secondary school principals improve teaching-learning quality and motivate teachers and parents. As a result, a

headmaster demonstrates leadership through his position rather than acting in a managerial capacity and failing to make a positive impact is observed in building teamwork, the relationship between school staff and parents, and learners' achievement (Naz & Rashid, 2021).

There are two leadership roles in secondary schools in Bangladesh: headteacher and assistant headteacher. The headteacher has formal leadership authority and oversees implementing government policy locally, while the assistant headteacher supports the headteacher (Salauddin, 2010). In Bangladeshi secondary schools, they recognize the potential talent or skill of the instructors (Salauddin, 2012; Salam & Islam, 2013). For developing leadership, the government of Bangladesh introduced TQI-SEP training for headteachers in the last decade, but general teachers are out of this leadership training (Rakibul, 2016). Moreover, headteachers need help with effective leadership and positive institutional changes due to their lack of confidence and the inclusion of local political leaders in the SMC (Salauddin, 2012).

We need to be upbeat and approach the situation with the mindset that principals or head teachers are more leaders than administrators. The leadership of the headmaster or principal should be recognized for providing quality education in Bangladeshi schools and institutions. The administrative pattern of the educational institutions is suggested to be changed from bottom-up to top-down (Hossain et al., 2023). Headteachers will enjoy complete freedom to run their schools, even formulating necessary policies and making decisions as leaders. SMC and GB (Governing Body) will act as facilitators to the headteacher and principal (Hossain & Mozumder, 2019).

2.7.15 Applying Technologies to Reduce Disparities

Blended learning, which combines online and in-person instruction, is growing daily in education technology. According to a study by the National Education Policy Centre (NEPC) in the United States, 77% of blended schools perform below state norms and just 20% of students at virtual charter schools graduate. Therefore, the impact of online and blended learning is not up to

the mark. As a result, inequality may increase, and students may not get any help from these learning methods (Molnar et al., 2019). Bangladesh is a signatory country of the SDGs and is determined to implement them (Al-Amin & Greenwood, 2018). It tries to introduce ICT and technology-driven integrated systems everywhere, even in remote areas, replacing the traditional education system to make teaching-learning more accessible and ensure quality education. As a policy implication, ICT courses were introduced at secondary and higher secondary levels, and a teacher training program was launched (Haque, 2017). The government has accomplished tremendous work for the education system to make it modern and competent using ICT. Bangladesh stood fifth in Asia in internet usage, with 80 million users in December 2017, an increase of eightfold from 10 million in 2000 (Rashid, 2019).

When educational institutions worldwide were closed as a precaution against COVID-19, Bangladesh also had to close its educational institutions (GoB, 2020, March 16). In this global epidemic, the government has found a way of teaching the students at secondary schools (from grades 6 to 10) through video classes on a state-run television channel, Samsad Bangladesh TV. The innovative idea is a popular broadcasting known as Amar Ghore Amar School. Besides this, online class activities are running at a higher secondary level in this crisis time following a directive issued by the Directorate of Secondary and Higher Education, Ministry of Education (GoB, 2020, April 01). The teachers and secondary school authorities provided online classes, video lectures, Google Classroom, etc., during the COVID-19 pandemic in Bangladesh. Students continued learning by staying home during the lockdown period (Khan et al., 2021). The barriers to online teaching-learning were the scarcity of technological infrastructure, the low speed of the internet, the financial crisis of the guardians, students' mental pressure, etc. (Ramij & Sultana, 2020).

2.7.16 Outcomes sought by parents

The involvement of parents in secondary schools is a different issue in Bangladesh. School Management Committee (SMC) and the various activities of the schools, such as students' notebooks or diary systems, progress reports, guardian meetings, home visits, annual gatherings, cultural programs, etc., help the parents to be involved with schools as community members. Parents can contribute to the students' learning outcomes and their school' improvement. To build strong partnerships between schools and parents, schools can easily communicate with parents using mobile technology or any ICT tools (Kabir & Akter, 2014). Parents and families

want to be involved in their children's learning to understand what is expected and to know how they can contribute and achieve their desired success. To improve students' outcomes, a robust relationship and connectivity among the students, parents, and community is needed (Paulsen, 2018). A case study examined the difficulties and beneficial impact of school-family-community collaborations in early childhood education in Indonesia (Safitri, 2023).

2.7.17 Outcomes of Learner Confidence, Community Involvement, and Lifelong Learning

Out of academic achievement, other outcomes of education, such as education for citizenship and skills for behavioral development, are not easily measurable by the standards because of their complexity and intangibility (UNICEF, 2000). Another non-academic achievement is lifelong learning, which is acquired voluntarily for either personal benefit or professional interest. It is a self-motivated pursuit of knowledge that facilitates social inclusion, active citizenship, self-sustainability, competitiveness, and employability (Prasanna, 2019). Lifelong learning encourages people to interact with the environment, gain experiences, and upgrade their knowledge, skills, and critical and creative thinking abilities (Luna Scott, 2015). SDG 4 emphasized lifelong learning in two ways. First, to certify the dropout students recognizing their learning under a unique platform and promote skill development activities. Second, a training course for developing specific competencies for short tenure should be arranged through 'on-the-job training' or part-time training sessions (Abdin, 2018). Lifelong learning requires a balance between formal, non-formal, and informal learning. Lifelong learning is included in SDG 4 but has not been mentioned in its 10 targets (Kurawa, 2021). In the global and national agenda, the highly skewed formal and other modes of education and the need for a balance among formal, non-formal, and informal learning must be emphasized especially (Jain, 2022). A nationwide network of permanent community learning centers, adequately resourced and supported, has been established by most developed OECD countries and many developing Asian countries as an essential vehicle for lifelong learning (Belete et al., 2022).

2.7.18 Health Outcomes

Quality education increases the benefits to students' health. Students' knowledge is increased, and their behavior regarding health and hygiene is positively impacted by the general literacy and socialization that teachers and curriculum materials provide (UNICEF, 2000). Among the significant socioeconomic determinants of health is education. Educated children lead healthy adult lives and live longer with less mortality and disability. Young women especially avail some

distinct benefits. In a study in South Africa, 3439 participants took part in the interview in wave-4 of CAPS (Cape Area Panel Study), and 3,432 (99.8%) respondents gave their positive opinion. The study concluded that better health outcomes were observed in the upper secondary graduates than the graduates from the lower secondary. The study suggested that upper-secondary education should be expanded to improve adolescent health in middle-income countries (Ward & Viner, 2016). Analyzing 186 countries of low, middle, and high income from the different socioeconomic, cultural, and political contexts, a study found strong and consistent results that the health benefits associated with secondary education are more than those with primary education (Vinner et al., 2017). Another study found that education is an influential factor in health and human capital, with a strong relationship between better education and better health and well-being (Raghupathi & Raghupathi, 2020).

2.7.19 Life-skills Outcome

Life skills are incorporated into the curriculum at various grade levels in developing nations, including Bangladesh, India, Sri Lanka, the Maldives, and Nepal. Two skills were included: communication skills, which are fundamental everyday abilities, and an intermediate skill that deals with social and health issues like gender roles (Nasheeta et al., 2018). At higher stages, the application of sophisticated life skills related to risky behaviors like drug and tobacco use was added. Highly developed nations such as the United States, the United Kingdom, Germany, Greece, and Mexico have implemented specific life skills programs aimed at fostering positive rejection behaviors and making informed decisions regarding drug and alcohol abuse, smoking, HIV/AIDS, contraception, and sexual activity perception (Menrath et al., 2012; Martin et al., 2013).

2.8 Research Gap and Conclusion

Given that secondary-level business education encompasses fundamental areas in business studies and serves as the groundwork, there is a substantial need for study in this area. Although there is limited research on SDG 4 and the quality of secondary business education, there is a lack of comprehensive research on the quality of secondary education that covers all quality dimensions. In Bangladesh, there is a lack of academic study on topics such as ‘SDG 4 and the quality of secondary business education in Bangladesh’. The absence of prior research drives the researcher to investigate the quality evaluation in secondary business education in Bangladesh to

address the current deficiency. This type of research is timely and appropriate to accomplish the Sustainable Development Goals (SDGs), particularly concerning achieving specific targets of SDG 4. The major contribution of the study, to frame a suitable model incorporating one new construct and three sub-constructs based on SDG 4, to develop and validate the hypotheses, has tried to mitigate the gap. This research conducted in Bangladesh has offered valuable insights into evaluating the quality of secondary business education in other developing nations as a future research direction. For the above mentioned reasons, the researcher finds suitability to investigate SDG 4 and the quality of secondary business education in Bangladesh.

Chapter 3

CONCEPTUAL FRAMEWORK

3.1 Introduction

This chapter initially outlines the assessment and assessment framework. It also provides the proposed research model, including seven dimensions and three subdimensions of quality education. The chapter describes the interrelationships among seven constructs and different quality indicators. Finally, various hypotheses are mentioned.

3.2 Assessment and Assessment Framework

According to the Cambridge Dictionary, assessment determines the quantity, worth, quality, or significance of anything. Data from many sources is gathered and analyzed to comprehensively understand students' knowledge and educational experiences (Huba & Freed, 2000). Measuring performance quality is the process of assessment. The two primary assessment goals describe success at a particular moment and guide for enhancing the educational process (Ministry of Education, Wellington, 2010). In educational institutions, assessment refers to a technique or instrument that instructors employ to measure, analyze, and record their pupils' academic preparedness, learning process, skill development, or educational requirements (Kizlik, 2012).

The assessment framework consists of some interrelated components for assessment or evaluation. For improving students' outcomes, different factors like assessment of the students, appraisal of the teachers with school leaders, and evaluation of schools and education system are included in the framework. The framework coordinates among the components and students' learning objectives. It covers the terms assessment, appraisal, and evaluation and distinguishes them. Judgments on individual student progress are called assessments. It includes internal (classroom-based assessments) and external assessments (terminal and public examinations). Judgments of academic staff performance, such as teachers and school leaders, are called appraisals. Judgments on the activities of schools, their systems, policies, and programs are called evaluations (OECD, 2013).

3.3 The Proposed Research Model

Teachers in Malaysia proposed using Total Quality Management (TQM) to raise classroom instruction and learning standards (Pourrajab et al., 2015). The TQM strategy was applied there

to guarantee the quality of secondary school (Rahman et al., 2021). In a study on adopting TQM concepts in secondary schools in Zambia, Nawelwa et al. (2015) disclosed quality-related objectives. Under the TQM approach, quality management is viewed from three comprehensive perspectives: the input-based perspective, the process-based perspective, and the output-based perspective (Dwaikat, 2020). Extending the Dwaikat model, the researcher framed a model for this study incorporating one independent construct named curriculum standards based on support from the literature and three developed subconstructs, such as inclusive education, equitable education, and lifelong learning, for the dependent variable based on SDG 4. In the proposed research model, curriculum standards, pedagogy for sustainable learning, infrastructure and technical equipment, work/learning environment, quality of students, and quality of teachers are essential antecedents of the quality of secondary business education. 40 quality indicators were used to measure them. On the other hand, 19 quality indicators were applied to measure the three subconstructs.

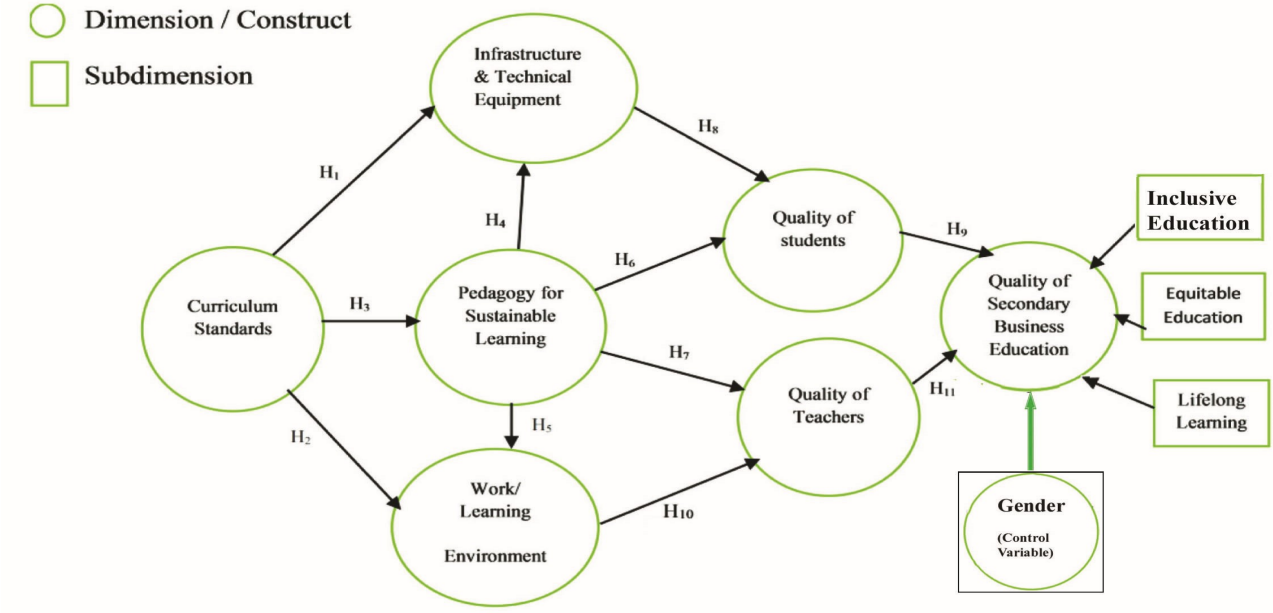


Figure 3.1: Proposed research model

3.4 Development of Hypotheses

In the above-proposed research model, there are six independent constructs, including the dimensions of quality education, and only one dependent construct adapted from reviewed existing literature. Six constructs are adapted from a research paper by Dwaikat (2020) based on

the TQM philosophy. Out of them, the term 'sustainable learning' is added with pedagogy with the literature support. Sustainable learning consists of strategies and skills that the learners use to cope with challenging and unusual situations like the COVID-19 pandemic (Ben-Eliyahu, 2021). Teaching methods influence sustainable learning outcomes. As a result, a high degree of participatory methods and changed awareness and attitudes are responsible for sustainable learning (Mintz & Tal, 2018). Boitshwarelo and Vemuri (2017) explore a stronger and more explicit relationship between curriculum and pedagogy. The curriculum is also highly related to sustainable learning (Mintz & Tal, 2018). Under this construct, a COVID-19-related question is developed and included. One construct- 'Curriculum Standards' is a new addition to the proposed model that is essential for assessing quality in education. This construct is adapted by the researcher studying the article 'The challenges of secondary level business education in Bangladesh (Ahmed et al., 2021). This construct is adapted to pedagogy, assessment methods, and the school environment (Khasawneh, 2022). With a dependent variable, one construct has been formed, 'Quality of secondary business education,' instead of 'Quality of academic program,' used by Dwaikat. Under this construct or dimension, three sub-dimensions were developed in the model based on SDG 4. There are several reflexive quality indicators in each construct. A questionnaire based on a 5-point Likert Scale will be used to measure all the quality indicators. The constructs, quality indicators, and their relationship shown by 11 hypotheses with positive statements are briefly discussed below.

3.4.1 Curriculum Standards (CS)

Cambridge English Dictionary defines curriculum as the different subjects and detailed syllabus of each subject studied in educational institutions, colleges, and universities. Social constructivism and Connectivism theories positively affect learning (Richardson, 1997; Siemens, 2017). A curriculum is described as a product that focuses on what is to be learned in contexts and as a process that mainly indicates how that is to be learned. The curriculum's contents are fixed, organized, and transformed for social, cultural, educational, and pedagogical purposes (Deng, 2009; Deng & Luke, 2008). Van den Akker (2003) showed ten parts of the curriculum: rationale, aims and objectives, content, learning activities, teacher role, materials and resources, grouping, location, time, and assessment. Each of them concerns an aspect of learning and the learning program for pupils.

Chibuike (2018) emphasized international standards when designing a business education curriculum. To ensure quality in teaching business education in secondary schools, the curriculum must be updated, and several quality teachers must also be increased. Okorie & Okoli (2014) found that the business education curriculum, facilities, textbooks, etc., in secondary schools were not sufficient, and they suggested improving them. Ahmed et al. (2021) explored challenges relating to the curriculum of secondary-level business education. They also suggested upgrading the curriculum of secondary business education. As an independent variable, CS consists of four items adapted from a research paper. They are (a) Objectives of curriculum for business studies, (b) Business contents in the syllabus, (c) Sequence of business contents in textbooks, (d) Required number of classes, and (e) Assessment method.

Ngeno et al. (2021) and Ngeno (2022) indicated that physical infrastructure positively correlates with adopting a competency-based curriculum. Rahmawati et al. (2024) found that implementing an independent curriculum significantly and positively impacts the role of school infrastructure.

H_1: Curriculum standards positively influence the education infrastructure and technical equipment.

Kim et al. (1999) explored the positive impact of curriculum on classroom learning environments in secondary schools in Korea. Curriculum standards positively influence the school environment (Khasawneh, 2022). The classroom's physical environment is like a 'silent curriculum,' which facilitates the learning process similarly to the curriculum (Taylor & Vlastos, 1983; Allen & Hessick, 2011). Therefore, the learning environment is influenced by the curriculum.

H_2: Curriculum standards positively influence the work/learning environment.

According to Jung and Pinar (2016), the curriculum is seen as the main course of study, with objectives and outcomes in which pedagogy is recognized as the preferred method of instruction. Boitshwarelo and Vemuri (2017) explore a stronger and more explicit relationship between curriculum and pedagogy. Similarly, Edwards (2021) explained their relationship, treating pedagogy as a subsidiary of curriculum and as a framework for curriculum. Khasawneh (2022) also concluded that the curriculum is highly related to pedagogy.

H_3: Curriculum standards positively influence the pedagogy for sustainable learning.

3.4.2 Pedagogy for Sustainable Learning (PSL)

Pedagogy is the function of teaching, learning, and planning to execute them. ICT in education creates excellent opportunities for innovative teaching and learning (Beetham & Sharpe, 2013). Pedagogy has gained more attention because of the development of educational ICT and outcome-based education (Salmon, 2005). Tatto (2006) proposes implementing worldwide pedagogy standards to produce certain critical skills required in the global economy. The ISO 21001:2018 pedagogy standards have been endorsed by Wibisono (2018). The various international pedagogy standards are highly relevant and helpful for improving teaching and learning (Dwaikat, 2020). During a pandemic, Yates et al. (2020) proposed a technology-based supporting pedagogy that works with students to interact and engage them for optimal learning. The suggested model includes various interactive techniques, multimedia-rich PowerPoint presentations, and business and industry visitation programs (Ahmed et al., 2021). As a produced item by the researcher, online courses taken during the COVID-19 epidemic also fall under Pedagogy for Sustainable Learning.

Dwaikat (2020) explored a significant positive relationship between international pedagogy standards and the quality of education infrastructure. Riikonen et al. (2020) highlighted a correlation between pedagogy and educational infrastructure, as evidenced by a pedagogical infrastructure supporting learning goals.

H_4: Pedagogy for sustainable learning positively influences the infrastructure and technical equipment.

Quality pedagogy is positively related to students' engagement, which indicates the learning environment and outcome (Goldspink et al., 2008). Dwaikat (2020) also revealed significant positive relationships between adopting international pedagogy standards and the work/study environment.

H_5: Pedagogy for sustainable learning positively influences the work/learning environment.

A study found that students' perceived learning depends directly on their pedagogical effect and learning performance. The pedagogical effect positively affects students' perceived learning (Abrantes et al., 2007). A positive relationship is found between quality pedagogy and students' engagement, where engagement indicates the learning environment and outcome (Goldspink et al., 2008). Pedagogy for sustainable learning positively influences the quality of students (Dwaikat, 2020).

H_6: Pedagogy for sustainable learning positively influences the quality of students.

Dwaikat (2020) found significant positive relationships between adopting international pedagogy standards and the quality of academic staff. A positive relationship between pedagogy and teacher quality is found. Teachers who are adequately trained in positive pedagogy can legitimize their actions and disseminate knowledge. Consequently, the teachers in the school experience a positive atmosphere, which enables them to fulfill their function more effectively in the classroom (Waters, 2021). Pedagogical competency has a favorable and considerable influence on school teachers' performance. Enhanced pedagogical ability improves teachers' performance (Marsen et al., 2021).

H_7: Pedagogy for sustainable learning positively influences the quality of teachers.

3.4.3 Infrastructure and Technical Equipment (ITE)

Education infrastructure with sufficient technical equipment creates a favorable environment for students' holistic development. Some of the critical items of education infrastructure are (i) Spacious and well-ventilated classrooms, (ii) Libraries and well-equipped labs, (iii) Playgrounds and games equipment, (iv) Study tables, chairs, furniture, and essential utilities such as water, electricity, etc. (v) Study halls (vi) Assembly area (vii) Well-maintained sanitation facilities (Akash,2018). Sufficient school facilities are the basic needs of quality education (Meje, 2012). It indirectly influences the quality of academic programs in secondary educational institutions (SEIs). To create suitable learning environments in schools, some basic infrastructure, such as adequate buildings, classrooms, laboratories, and equipment, is needed. As a result, schools get

several benefits, such as better instruction facilities, improved student outcomes, and reduced dropout rates (Teixeira et al., 2017).

Furthermore, many educational institutions, including secondary schools, use digital teaching systems. These days, many secondary schools worldwide depend on features like wi-fi connectivity, smart classrooms, e-learning platforms, online courses, etc., as critical components of their educational infrastructure (Wong et al., 2019; Bao, 2020). Nearly a year later, attitudes have become more hazy or unclear, and educators' experiences in this dominating online world have changed (Abel, 2021). According to TQM, the entire educational process must be continuously improved to sustain and maintain these infrastructures (Dwaikat, 2020).

Therefore, ITE is applied in the proposed model as an independent variable that includes five indicators: (a) Classrooms, (b) Computer lab with adequate facilities, (c) Facilities of sanitary groups, (d) Technical Resources (computer, projector, etc.) (e) Wireless internet access in schools (Gora et al.,2019). Chaudhary (2015) emphasized the availability of essential factors that positively impact curriculum implementation. They are workshops, libraries, classrooms, laboratories, and playgrounds. Ayeni and Adelabu (2012) found that secondary school authorities, teachers, and other stakeholders can play an essential role in improving physical infrastructure like school buildings and classrooms and introducing recreational facilities to create a conducive work/ learning environment to ensure quality education.

The school's infrastructure and educational technologies positively impact students' quality (Barrett et al., 2019). Dwaikat (2020) also discovered a noteworthy and affirmative correlation between educational infrastructure and student quality.

H_8: Infrastructure and technical equipment positively influence the quality of students.

3.4.4 Quality of Students (QS)

Babalola et al. (2007) emphasize the quality of students' capacity and motivation to learn. QS is used as a mediating variable in the proposed model. QS includes four indicators they are (a) Basic mathematical knowledge for entering business education, (ii) Students' engagement in all academic activities, (iii) Interpersonal skills, and (d) Literacy skills (Dwaikat, 2020). Skolnik

(2016), Steinberg (2002), and Fairweather & Brown (1991) have done several research studies that support the above quality items.

Ekaviana and Nurkhin (2016) found a significant and positive impact of student quality on students' accounting competence (academic performance). In addition, Dwaikat (2020) discovered that student quality is a mediating variable that positively impacts the quality of academic programs.

H_9: The 'quality of students' influences positively the quality of secondary business education.

3.4.5 Work/Learning Environment (WLE)

Students, teachers, and other employees will be in a safe and healthy atmosphere on the school campus. They should be stress-free also. In this regard, Anastasiou and Papakonstantinou (2014) found secondary education teachers' satisfaction and dissatisfaction in Greece. Teachers expressed their satisfaction with intrinsic elements. However, they were dissatisfied with some issues, such as the working environment, policymaking, and the opportunities for professional development. The study reveals that environmental factors positively impact teachers' performance. Provision of 'ethical rewards', 'good working conditions', 'motivation by the school principal', and 'participation in school administration and decision making' were treated as influential factors.

In Social Constructivism Theory, Dewey (1938) viewed the learning environment as a place where good learners can cope successfully with new developments worldwide. George and Elheddad (2020) emphasized national governance and cultural values of the institutions in this regard. The independent variable, WLE, consists of five indicators. They are (a) occupational health and workplace safety, (b) good governance, (c) organizational culture values, (d) safe and effective learning environments (Dwaikat, 2020), and (e) class size (Developed based on SDG 4. a). The classroom's physical environment is like a 'silent curriculum,' which facilitates the learning process similarly to the curriculum (Taylor & Vlastos, 1983; Allen & Hessick, 2011). Therefore, the learning environment is influenced by the curriculum.

The working environment also has influenced the performance of teachers positively. A good environment effectively facilitates the teachers' performance (Marsen et al., 2021). Anastasiou and Papakonstantinou (2014) found secondary education teachers' satisfaction and dissatisfaction in Greece. Teachers expressed their satisfaction with intrinsic elements. However, they were dissatisfied with some issues, such as the working environment, policymaking, and the opportunities for professional development. Goe and Stickler (2008) reveal a positive impact of environmental factors on teachers' performance. Dwaikat (2020) also found the positive influence of WLE on the quality of teachers.

H_{10}: Work/learning environment positively influences the quality of teachers

3.4.6 Quality of Teachers (QT)

The quality of teachers is a significant independent variable for quality education. Ludwikowska (2019) affirms that quality teachers are mandatory for quality study programs. Teachers' quality and competency should be maintained to achieve a high level of QT. Chibuike (2018) emphasized that business teachers need sufficient academic qualifications to ensure quality business education. QT is applied as a mediating variable in this proposed model and has four indicators. They are (a) recruitment of qualified teachers, (b) teachers' appraisal, (iii) continued development of teachers (Dwaikat, 2020), and (iv) enough qualified business education teachers (developed based on SDG 4. c). These indicators are also supported by several studies by Garira (2020), Gora et al. (2019), and Skolnik (2016).

Ludwikowska (2019) affirms that quality teachers are mandatory for quality study programs, and teachers' quality and competency should be maintained. Chibuike (2018) emphasized that business teachers need sufficient academic qualifications to ensure quality business education. Kalagbor (2016) found that the teacher's quality influences the student's academic performance. According to Dahar et al. (2011), students' academic progress is positively impacted by their teachers' quality. Goe and Stickler (2008) discovered a positive connection between student accomplishment and the quality of teachers. The mediating relationship between the quality of students and academic programs was disclosed by Dwaikat (2020).

H_{11}: The quality of teachers positively influences the quality of secondary business education.

3.5 Dependent Variable: Quality of Secondary Business Education (QSBE)

QSBE is a dependent variable with three sub-dimensions shown in the research model. Based on the contents of SDG 4, Equitable education (EE), Inclusive education (IE), and Lifelong Learning (LL) are set as sub-dimensions (UN, 2015).

3.5.1 Inclusive Education

Inclusive education encompasses the principle that every student is entitled to receive education at their neighborhood school, actively engage in learning activities alongside their peers, and get a high standard of education (Ainscow, 2000). An inclusive education refers to an educational system that encompasses all pupils and provides them with consistent support within the classroom. The primary emphasis is integrating pupils with impairments or learning challenges (Haug, 2017). Challenges to inclusive education in Bangladesh can be overcome by building awareness among the students, teachers, parents, and community members, increasing the teachers' training program, and ensuring sufficient budget allocation (Begum et al., 2019). Five items are adopted to measure inclusive education. They are (a) the Acceptability of students with disabilities, (b) Teachers' workload in inclusive classes, (c) the Positive attitude of the teachers, (d) the Inclusion of students who fail exams., and (e) Knowledge and skills requirement (Forlin et al., 2011).

3.5.2 Equitable Education

Equitable education refers to guaranteeing fairness and justice throughout the entire education system. According to the OECD's definition from 2012, factors like gender, family status, color, ethnicity, or disability should not hinder learners from reaching their educational goals (fairness). The aim is to ensure that everyone attains a minimal level of skills (inclusion). Fairness and inclusion are the two dimensions of equitable education (Field et al., 2007). Breveman & Gruskin (2003) mentioned equity as social justice. Teachers can positively change children's lives by creating an atmosphere and applying equity and quality strategies for classroom and school culture instructional practices. They can adapt their teaching style to meet students' capabilities for contributing to educational equity (Thompson & Thompson, 2018). Therefore, equitable education is vital in expanding the opportunity for teaching and learning in secondary education.

The global economy is rapidly changing and driven by knowledge and technology. We must understand our present position, where we exist, and how far we must go. They emphasized digital equity in education to survive in the knowledge and technology-based world (Resta et al., 2018). Based on the different targets of SDG 4, the researcher has developed some indicators of equitable education in this study. Equity in access to education, Equity in a learning environment, Gender equity, and Equity in sustainability are the items for measuring equitable education. Equity in sustainability includes sustainable lifestyles, human rights, gender equality, promoting a culture of peace and nonviolence, global citizenship, and appreciation of cultural diversity (SDG 4.7).

3.5.3 Lifelong Learning

Lifelong learning is the continuous and ongoing pursuit of information and skills throughout a person's life, aiming for personal growth and development. Knapper and Cropley (2000) proposed fostering students' generic ability to self-direct their learning, enabling them to navigate many scenarios they encounter beyond formal education. Education is not limited to official educational institutions. It can also be gained through non-formal or informal means, such as workplaces, voluntary associations, and social and recreational platforms (Merriam et al., 2007). Six items are used to evaluate lifetime learning. The two capacities are goal setting and the application of information and skills. The qualities contributing to self-directed learning include self-direction, self-evaluation, information location capacity, and adaptability to learning techniques (Kandy et al., 1994; Knapper & Cropley, 2000).

3.6 Control Variable

The control variable is a factor other than the theoretical constructs of the research model. One control variable is introduced based on demographic data in this study. According to the demographic data, gender may influence secondary business education's sustainable development and quality (Edokpolor, 2019). Gender issues in business education are also focused by Madumere-Obike and Nwabueze (2020). They treated business education as an opportunity for male and female students to gather knowledge and skills for getting business as a profession or to engage themselves in corporate jobs. For this control variable ‘gender’ based on binary data (Male 0 and female 1), a bootstrapping has been run using the software Smart PLS, taking 5000 sub-samples.

3.7 Chapter Summary

This chapter is the foundation of the research, which designed the conceptual framework, proposed a research model, and formed 11 hypotheses based on support from the literature. This chapter provides all constructs, causal relationships, and items. The model addresses two mediator variables for testing and analysis. In addition, based on the demographic data, control variables and multigroup analysis have been proposed for this study.

Chapter 4
METHODOLOGY

4.1 Introduction

This chapter describes the method applied in this study for collecting, processing, and analyzing data to achieve the research objectives. A comprehensive plan for effective research is formulated in this methodology part. The philosophical position of the study is briefly outlined in this chapter.

4.2 Research Philosophy

In this study, the researcher has applied the 'positivism' research paradigm, which includes a hypothetico-deductive method to test the priorly designed hypotheses where functional relationships are found between causal and explanatory factors (independent variables) and output factors (dependent variables). This method encompasses a cyclical process that commences with theoretical concepts derived from existing literature to formulate hypotheses that can be tested. It then proceeds to conduct experiments by operationalizing variables. Ultimately, it conducts an empirical investigation (Park et al., 2020). The paradigm – positivism includes the philosophy of ontology and epistemology. Ontology is the study of reality or existence. It indicates the specification of conceptualization (Tashakkori et al, 2020). Reality can be measured, and observable phenomena can provide creditable facts in epistemology. Epistemology examines the essence of the results of the investigation and makes a valuable contribution to the existing theory and literature. Positivism focuses on objectivity and finds generalizability of the findings through statistical, mathematical, and numerical analysis. It emphasizes empirical evidence and can establish causal relationships between knowledge and various approaches to acquiring knowledge (Malfatti, 2022). In ontological belief, research is designed to explore singular reality. With the epistemological belief, research is conducted to measure knowledge by using scientific tools and designs (Rehman & Alharthi, 2016). Aliyu et al. (2015) have argued that positivism can be addressed primarily based on its ontological philosophy and then epistemological philosophy. Based on this research paradigm and research philosophies, this study has undertaken a research methodology that has included research design, data collection, and data analysis procedures.

4.3 Research Design

This study used quantitative methodology, employing a cross-sectional sample survey. Through this methodology, the researcher has obtained data on multiple cases simultaneously and acquired extensive quantitative data from a comprehensive sample encompassing various factors (Lillis & Mundy, 2005). This methodology has effectively optimized the selection of a sample that accurately represents the population, enhancing the ability to generalize the findings (Scandura & Williams, 2000). This strategy involves developing a measurement instrument precisely tailored to address the research problems at hand (Slater, 1995). Quantitative research generates reliable and objective data that is highly suitable for establishing causal linkages, testing hypotheses, and understanding the opinions, attitudes, and behaviors of a broad population (Mohajan, 2020). This study has suggested a research model that includes the main characteristics of quality in secondary business education. It demonstrates their relationships by developing a hypothesis, following the research objectives. Hence, the utilization of the quantitative approach is justified for this investigation.

4.4 Target Population and Sampling Design

Teachers in secondary high schools, head teachers and business education teachers, and students from business studies groups have formed the universe. The sample for the study has been determined systematically through a multi-stage cluster sampling method of probability sampling for collecting data (Etikan & Bala, 2017). As a first step, one district from 64 districts of Bangladesh was selected purposely. 11 Upazilas were selected from 17 Upazilas of the district of Cumilla based on their different literacy rates. In the second step, high schools, both government and non-government, were selected from each Upazila considering their grades A, B, C, and D. Under the Ministry of Education, the Directorate of Secondary and Higher Education (DSHE) has prepared these grades following the same method for the high schools of all districts in Bangladesh. Grades A, B, C, and D indicate top-performing, well-performing, moderate-performing, and poor-performing schools. The researcher randomly chose schools of each grade to collect data from different types of Upazilas. The total schools of each grade were determined according to their numbers. Around two-thirds of the high schools in the sample were selected from rural areas as 68.34 % of people live in rural areas (BBS, 2022). In the third step, from the selected institutions, teachers from the business studies group and head teachers at those schools

were chosen as respondents. In addition, one male student and one female student from each school were included in the sample.

4.5 Sample Size Determination

This study has used the statistical power analysis technique using G*power 3.1.9.7 (Faul et al., 2009) software for determining the sample size because power analysis is the most recommended approach in partial least square structural equation modelling (PLS-SEM) literature (Hair et al., 2018; Ramayah et al., 2018; Ringle et al., 2020; Hair et al., 2023). Based on the constructs in a research model, Hair et al. (2016, 2019, 2022) suggested 80% statistical power for calculating minimum sample size using the highest number of predictors at a 5% significance level to run the model. G*power is suggested and used by many scholars (Memon et al., 2020; Yusliza et al., 2020; Anwar et al., 2020) in the case of PLS-SEM. Using this software, with the setting of $f_2 = 0.15$ (medium), $\alpha = 0.05$, number of predictors = 3, and the power at 80%, the sample size required to test the research model is 77 (Power analysis for sample size calculation using G power is attached in the appendix). The researcher has chosen the PLS-SEM approach for some advantages, including its suitability in case of non-normal data distribution and its ability to run the model with a small sample size (Chin & Newsted. 1999; Christmas, 2005; Henseler et al., 2009; Urbach & Ahleman, 2010). However, 400 respondents were selected for data collection in this study that covered more than 90% statistical power and multi-group analysis. The researcher has visited 100 schools and collected data from 400 respondents. Out of them, 100 were head teachers, 100 were teachers from the business studies group, 100 were male students, and 100 were female students from business education.

Table 4.1: Number of Respondents from the Different Grades of Schools and Upazilas

Name of Upazila	Grade A	Grade B	Grade C	Grade D	Total
Adarsha Sadar, Cumilla	16	40	8	8	**72**
Chouddagram	8	24	8	4	44
Debidwar	8	24	8	4	44
Daudkandi	8	20	8	-	36
Chandina	8	20	8	-	36
Barura	8	16	8	8	40
Sadar Dakhin, Cumilla	4	20	8	4	36
Meghna	4	12	4	-	20
Titas	4	8	4	-	16
Homna	4	8	8	-	20
Muradnagar	8	12	8	8	36
Total	80	204	80	36	400

4.6 Measurement and Scaling

Seven constructs and three sub-constructs included 49 quality indicators used as measurement scales. 37 items were adapted from reliable research articles, and the researchers developed 12 items based on SDG 4, the COVID-19 pandemic, and other literature support. A questionnaire was prepared based on the 5-point Likert Scale, attached in the appendixes.

Table 4.2: Measurement Scale

Construct	**Item No.**	**Items/Quality indicators (Full statements are given in the questionnaire)**	**Source**
1. Infrastructure and Technical Equipment, ITE	ITE_1	Suitable classrooms	Gora et al., 2019
	ITE_2	Computer lab with adequate facilities	
	ITE_3	Facilities of sanitary groups	
	ITE_4	Technical resources (computer, projector, etc.)	
	ITE_5	Wireless internet access	
2. Curriculum Standards, CS	CS_1	Objectives of curriculum for business studies	Ahmed et al., 2021
	CS_2	Business contents in the syllabus	
	CS_3	Sequence of business contents in textbooks	
	CS_4	Required number of classes	
	CS_5	Assessment method	
3. Pedagogy for Sustainable Learning, PSL	PSL_1	Participatory methods	Ahmed et al., 2021; Developed
	PSL_2	PowerPoint presentation using multimedia	
	PSL_3	Business and industry visit programs	
	PSL_4	Online classes during the COVID-19 pandemic	
4. Work/Learning Environments, WLE	WLE_1	Occupational health and workplace safety	Dwaikat, 2020; UN, 2015
	WLE_2	Good governance	
	WLE_3	Integrity as an organizational culture value	
	WLE_4	Democracy as an organizational culture value	
	WLE_5	Encourages students and teachers to respect others	
	WLE_6	Class size	

5. Quality of Students, QS	QS_1	Basic mathematical knowledge	Dwaikat, 2020
	QS_2	Student engagement	
	QS_3	Interpersonal skills	
	QS_4	Literacy and numeracy skills	
6. Quality of Teachers, QT	QT_1	Recruitment of qualified teachers	Dwaikat, 2020; UN, 2015
	QT_2	Continuous monitoring and evaluation	
	QT_3	In-house training for teachers	
	QT_4	Arranging seminars for continuous development	
	QT_5	Workshop for teachers' development	
	QT_6	Number of business education teacher	
7. Quality of Secondary Business Education		**Inclusive Education, IE**	
	IE_1	Acceptability of students with disabilities	Forlin et al., 2011
	IE_2	Teachers' workload in inclusive class	
	IE_3	The positive attitude of the teachers	
	IE_4	Inclusion of students who fail exams.	
	IE_5	Knowledge and skills requirement	
		Equitable Education, EE	
	EE_1	Equity in access to education	Developed based on SDG 4.1, 4. a, 4.5, and 4.7; UN, 2015
	EE_2	Equity in a learning environment	
	EE_3	Gender equity	
	EE_4	Sustainable lifestyle	
	EE_5	Human rights	
	EE_6	Culture of peace and nonviolence	
	EE_7	Global citizenship	
	EE_8	Appreciation of cultural diversity	
		Lifelong Learning, LL	
	LL_1	Goal setting capacity	
	LL_2	Application of knowledge and skills	Knapper & Cropley, 2000
	LL_3	Self-direction quality	
	LL_4	Self-evaluation	
	LL_5	Information location capacity	
	LL_6	Learning strategies adaption	

4.7 Operational Definition of the Items

49 items are available under seven constructs and three sub-constructs of the research model. The operational definition of each item is outlined in this part. Under the construction of ITE,

five items, such as classrooms, computer labs, sanitary facilities, technical resources, and internet facilities, were suggested (Gora et al., 2019). A classroom is where students sit together to attend teachers' classes. The classroom will be furnished with adequate furniture. A chair, table, sufficiently low bench, high bench, whiteboard, fan, etc. will be available as furniture. A spacious classroom with sufficient furniture is essentially required for an interactive class. A computer lab with modern computers, furniture, a computer teacher, a lab assistant, an uninterrupted power supply, etc., is essentially required for the students to acquire basic ICT knowledge. Facilities of sanitary groups cover toilets, urinals, and washrooms separately for both male and female students and teachers with soaps, tissues, handwash, towels, etc. Technical resources include a multimedia projector, computer (desktop or laptop), and other necessary materials for PowerPoint presentation. Internet connection and easy access to the teachers in the school are also needed for conducting online classes.

Objectives, contents of syllabus, sequence of the contents in textbooks, number of classes for each chapter, as well as an assessment method of the students, are related to the curriculum of the business studies group, and they formed the construct of curriculum standards (Ahmed et al., 2021). Curriculum means National Curriculum 2012, which is followed by secondary business education. The objectives of the curriculum for the subjects of Business Entrepreneurship, Accounting, Finance, and Banking are stated in the national curriculum. Detailed contents for each subject of the curriculum are called syllabi. As per the curriculum, all business contents were included in the syllabus of secondary business education. The sequence of the contents in textbooks indicates the order of the contents in the textbook according to the syllabus of the curriculum. Students benefit if the educational contents of a subject are appropriately arranged according to the syllabus. The number of classes for each chapter and subject is stated by the National Curriculum 2012, followed by secondary business education. The assessment method, the way to assess the students, has been described in the curriculum. The 2012 national curriculum suggested continuous assessment (20%) and summative assessment (80%).

PSL includes participatory methods, multimedia PowerPoint presentations, business and industry visit programs (Ahmed et al., 2021), and online classes that the researcher develops. The participatory method is the teaching method where teachers and students participate in discussions and share their opinions, ideas, thoughts, etc. Different participatory methods like

peer work, group work, brainstorming, etc., may be used in business education. In teaching-learning, using multimedia, PowerPoint presentations is a robust tool for audio-visual communication to secondary education students. In this method- text, video, and pictures relating to a subject or topic can be presented attractively. Business and industry visit programs for secondary business students show business and industry activities to gather knowledge from real fields. The students can observe the work of the workers, employees, and managers, learn from them, and get e-learning at home. This type of class was conducted during the COVID-19 pandemic in the whole world, and even the blended learning system after the COVID situation was very inspiring. An online class can be defined as a class delivered through distance learning or remote learning.

The independent variable WLE is measured by occupational health and workplace safety, good governance, and basic organizational culture values (Dwaikat, 2020), as well as class size (SDG 4. a). Occupational health and workplace safety indicate the environmental safety of the schools where the teachers and employees do their jobs, and the students attend the class and learn a lot from their mates. They expect a healthy and safe school environment. Good governance refers to the effective administration, rules and regulations, and transparent work procedures accessible to all stakeholders. Fundamental organizational culture values include some values such as integrity, respect, democracy, and academic freedom that influence organizational activities positively. Integrity helps transparency; respect for others' opinions and democratic culture influence the introduction of participatory management systems in the organization; academic freedom increases motivation to the teachers and students. Class size is defined as the number of students in a class. For conducting an interactive class, the number of students is a very important factor.

Basic mathematical knowledge, engagement in all academic activities, interpersonal skills, and literacy skills are the qualities of students (Dwaikat, 2020). Basic mathematical knowledge indicates the fundamental knowledge of mathematics of the students of the business studies group. This knowledge includes numeracy skills. The ability to understand and to do simple math such as adding, subtracting, multiplying, and dividing is called numeracy skill. Basic knowledge of Mathematics is also required to solve accounting problems. Engagement in all

academic activities means participation of the students in all academic activities. Regular attendance in the school and presence in the class indicate engagement in academic activities.

Interpersonal skills are essential for communicating and interacting with others individually and in a group. Interpersonal skills incorporate both communication competencies and entrepreneurial skills. Communication competencies can be defined as the ability of the students to express their ideas, thoughts, emotions, messages, information, or any matters to others effectively using oral, written, visual, and non-verbal communication, as well as to understand others' communication. Entrepreneurial skills refer to the abilities and qualities of a person that enable him/her to start a business and operate it successfully. Entrepreneurial skills include creative thinking, leadership quality, application of managerial knowledge, communication skills, decision-making, and risk-taking capacity. The ability to read and write is called a literacy skill. These skills are essential in our daily activities. The students' literacy skills in the business studies group are essential to continue their studies.

Quality of teachers (QT) includes items such as fair recruitment, appraisal, and continuous development of the teachers (Dwaikat, 2020). This construct also incorporates the number of business studies teachers (SDG 4. c). Teachers play a vital role in ensuring quality education. School authorities should recruit quality teachers impartially based on academic performance, results of recruitment tests, and experience. Teachers' appraisal means continuous monitoring and evaluation of teachers' performance, which is necessary for assuring quality teaching and learning. School authorities arrange training, seminars, conferences, and workshops for the teachers' continuous development. Teachers upgrade by receiving proper training and attending seminars, conferences, and workshops. Several qualified teachers indicate the number of qualified teachers working at a business studies group in each school. Consequently, the ratio of teachers and students will be known.

Inclusive education (IE) is the subdimension of the dependent variable, QSBE, like the other two subdimensions – equitable education (EE) and lifelong learning (LL). Acceptability of students with disabilities, teachers' workload in inclusive classes, the positive attitude of the teachers, the inclusion of students who fail in exams., and teachers' knowledge and skills requirements constitute the variable IE (Forlin et al., 2011). Through the item of acceptability of students with

disabilities, the acceptability of the disabled students by the other students at the school is measured. This item is essential for establishing an inclusive environment in the school. A teacher's workload means the amount of work to be done by the teachers. In an inclusive class, some additional work will be done due to extra care for the students with disabilities. Teachers' positive mindsets and feelings toward students with disabilities are treated as the teachers' positive attitudes. All teachers may or may not be positive toward students with disabilities. The item - inclusion of students who fail exams specifies that students who frequently fail exams should be included in regular classes. As a result, they will get the opportunity to learn from their classmates. Teachers' knowledge and skills refer to the required knowledge and abilities of the teachers belonging to secondary business education to teach students with disabilities.

Equitable Education (EE) is measured by eight developed items by the researcher based on SDG 4.1, 4. a, 4.5, and 4.7. They are equity in access to education, equity in a learning environment, gender equity, sustainable lifestyles, human rights, promotion of a culture of peace and non-violence, global citizenship, and appreciation of cultural diversity (UN, 2015). Equity in access means every student has the right to study in the business studies group irrespective of his/her socio-economic condition, gender, race, language, ethnicity, etc. Equity in the learning environment highlights that every student will get equal environmental facilities in the learning process. School authorities will build or upgrade educational facilities that provide students with a safe and effective environment. A safe learning environment means an educational atmosphere in the school where students feel safe and have a congenial learning environment.

For effective learning environments, some education facilities are needed that help autistic students and provide safe, non-violent, and inclusive learning environments for all. Gender equity indicates a situation where gender equality is established. Eliminating gender discrimination or gender disparities, schools create such a culture where no one gets privilege considering gender identity. For sustainable development, equity is needed also. The equitable development of society will be sustained for a long time. These items include sustainable lifestyles, human rights, promoting peace and non-violence, global citizenship, and applying cultural diversity. A sustainable lifestyle refers to living a better life through the consumption of better food, clothing, housing, transport, etc., for sustainable development that is economically desirable, socially equitable, and environmentally sustainable. To achieve the target 4.7 of SDG-

4, all learners should learn about sustainable lifestyles to ensure sustainable development by 2030 (UN, 2015).

Human rights are the fundamental rights and freedoms that belong to everyone from birth until death. The basic rights are the right to life and to live with food, clothes, a house, education, work, health, and liberty. These fundamental rights are inherent to us all, regardless of nationality, sex, national or ethnic origin, color, religion, language, or any other status. Promoting a culture of peace and non-violence means creating and maintaining a peaceful and violence-free environment. Violence-free and the intention to resolve any problem by dialogue with a positive attitude are the fundamental themes of non-violence (Valiahmetova & Salpykova, 2016). Peace and sustainable development are complementary to building a peaceful and inclusive society free from fear and violence (UN, 2015).

Global citizenship is the belief that individuals are members of multiple, diverse, local, and non-local networks rather than a single person in an isolated society. For social responsibilities, individuals as global citizens work for society and play a role in sustainable development. As per target 4.7 of SDG-4, by 2030, all learners will acquire the knowledge and skills needed to promote sustainable development, including global citizenship. Appreciation of cultural diversity focuses on acknowledgment and respect for different cultures. Cultural diversity means multiculturalism. It refers to the various values, preferences, practices, and behaviors that prevail in society. Appreciation of cultural diversity is essential because students worldwide have the right to equal access to quality education.

Lifelong learning (LL) has adapted six items. Goal-setting capacity, application of knowledge and skills, self-direction quality, self-evaluation, information location capacity, and adaptation of learning strategies are the indicators that have measured LL (Knapper & Cropley, 2000). Goal-setting capacity indicates the capacity of the students to set their goals for different activities in real life after completing formal education. Applying knowledge and skills focuses on the formal quality of applying academic knowledge and skills to the practical field during and after formal education. Self-direction quality means a quality of self-drivenness of the students by self-motivation. This quality will act as a teacher or guide in student life and even real life. Self-evaluation is the human quality of a successful person. Self-evaluation refers to the quality of a

student who can evaluate his/her success or failure. Information location capacity is the ability of the students to locate the information from their learning or known sources when they need it. Learning strategies adaptation indicates the students' adaptability to any learning strategies. As a result, students can deal with unexpected situations and solve problems.

4.8 Instrument Design

A questionnaire consisting of 49 direct questions was framed as a data collection instrument based on literature, previous research, and expert opinion. Each dimension of quality education included some statements, and every respondent was asked to express his/her position. In the questionnaire, the questions were as statements belonging to seven dimensions and three subdimensions. Out of them, 13 statements belonging to three constructs were adapted from a research paper of Dwaikat (2020) published in a reputed journal, 5 statements under one construct were adapted from the research paper of Gora et al. (2019), 8 items were also adapted from a research paper of Ahmed at al. (2021). In adaptation, the items are unchanged, and some words are added to each item to make significant statements (Korb & Nyberg, 2016; Nyberg et al., 2022). The independent variables include the items PSL_4, WLE_6, QS_4, and QT_6 that are developed by the researcher with literature support (SDG 4; Garira, 2020; Luong & Nieke, 2014; UNICEF, 2000; UNESCO, 2005; Achilles, 2012) and expert opinion. For sustainable learning in pandemic situations like COVID-19, the question- PSL_4 has been developed. Quality of Secondary Business Education (QSBE), the dependent variable of this study, incorporated three subdimensions- Inclusive Education (IE), Equitable Education (EE), and Lifelong Learning (LL) based on the basic theme of SDG4. Five indicators were adapted from a research paper by Forlin et al. (2011) to measure inclusive education. On the other hand, 8 items were developed for measuring equitable education based on the targets of SDG4. For measuring lifelong learning, 6 indicators were adapted from a research paper by Knapper & Cropley (2000). Therefore, in this study, a total of 12 items were developed by the researcher. The questions were designed mainly using a 5-point Likert scale, except for the demographics, as a measurement scale. In the 5-point Likert scale, the points from 1 to 5 denote strongly disagree, disagree, neutral, agree, and strongly agree, respectively.

4.9 Translation of the questionnaire

For the respondents, who were both male and female students, the translated (in Bangla) questionnaires were supplied to them. The questionnaire in English was used for the other respondents - teachers from the business studies group and head teachers. In the translation process, forward translation was first done from English to the respondents' mother language, Bangla. Two associate professors from the Department of Bangla in Comilla Victoria Government College completed this work. Secondly, translated (in Bangla) questionnaires were sent to two associate professors of the Department of English in the same institution for backward translation. They translated the questions from Bangla to English. Finally, an expert team comprising three researchers, including one professor from the Bangla Department of Comilla Govt. Women College; one associate professor from English and one assistant professor from the Department of Management in Comilla Victoria Govt. College moderated the translated questionnaires and suggested a questionnaire with 49 questions in Bangla.

4.10 Validity and Reliability of Measurement Instruments

To ensure the scale's validity, the researcher will conduct validation methods such as content validity, face validity, construct validity, convergent validity, and discriminant validity.

4.10.1 Content validity

Content validity is completed to examine whether the questionnaire is relevant. A small group of experts (10), including some academicians and researchers, examined the instrument. The expert team members were three head teachers, three assistant teachers from the business studies group, and four researchers working in educational institutions. The group members were headteachers from Yousuf High School, Cumilla City; Companygonj High School, Muradnagar; and Raghupur Shahid Manik Malak Sritee High School, Cumilla Sadar. Three assistant teachers were from Cumilla Modern High School, Cumilla city: Nimsar High School, Burichang, and Mafijuddin Girls' High School, Debidwar, Cumilla. From Comilla Victoria Govt. College, four researchers (PhD holders) were also included in that group. This group conducted content validity by independently verifying the questionnaire for its relevance and appropriateness of items (Jha et al.,2018). Expert comments and input were used to calculate the content validity index (CVI). Two different CVI values were calculated: I-CVI (Item-level Content Validity Index) for individual items and S-CVI (Scale-level Content Validity Index) for the entire scale.

For each question, the number of experts who answered "Yes" was divided by the total number of experts engaged. S-CVI was computed using an averaging calculation approach in which the I-CVI of each item was added together and divided by the total number of items. Both validity measures had acceptable index values of 0.80 and above, indicating that the contents were relevant and valid (Lau et al., 2017).

In addition to the above procedure, two education experts provided expert opinions for the content validation. The Director General (DG) of the National Academy for Educational Management (NAEM) and an education expert from the Institute of Education and Research (IER) of the University of Dhaka validated the questionnaire. Both are researchers, academicians, and vastly experienced people working on education-related projects. They provided some valuable suggestions for making the questionnaire effective.

4.10.2 Face validity

A small group of respondents and technically unskilled individuals conducted the questionnaire's face validity, also referred to as surface validity (Lau et al., 2017), for subjective judgment. Five high school teachers from the business studies group were involved in this face validity part. They thoroughly examined the items' wording, readability, and understandability (Broder et al., 2007). Respondents were required to judge the questions independently and rate them. The Face validity index (FVI) was calculated as like the CVI calculation to determine the quality of the questionnaire. The acceptable FVI value was .80 and more. For a clear understanding of the respondents, a few words and sentences were modified in the face validity.

4.10.3 Construct Validity and Reliability

The reasoning framework that underlies the development and operationalization of a test or measure is known as construct validity (Cronbach & Meehl, 1955; Aryadoust, 2023). It is conducted to determine the appropriateness of inferences based on measurements or test scores. All constructs of this research model are reflective and are measured by multiple items or quality indicators. Construct validity was tested by examining the measurement model using the Partial Least Square–Structural Equation Modeling (PLS-SEM) method. Using the PLS algorithm, the value of reflective factor loadings equal to 0.708 or above indicated an acceptable level of validity of the measurement model (Hair Jr et al., 2021; Guenther et al., 2023).

4.11 Pilot Testing

Pilot testing is done to assess the measuring scale's internal dependability and make necessary adjustments (Wang et al., 2021). A limited sample of respondents was used to test the validity of the questionnaire. In the pilot testing phase of this study, 50 business studies group teachers provided data. The structural model (/inner model) and measurement model (/outer model) were both put to the test. Reflective factor loadings indicated a satisfactory degree of validity of the measurement model equal to or greater than 0.708, as determined by the PLS method (Hair et al., 2020). The bootstrapping approach was used to check the T-values and confirm the relevance of these factor loadings. The Cronbach's alpha and composite reliability values were analyzed using the threshold value equal to or more than .70 to assess the constructs' and indicators' validity and reliability (Hair et al., 2019). Furthermore, Hair et al. (2021) evaluated the convergent validity by ensuring that the average variance extracted (AVE) was equal to or larger than 0.50. The coefficient of determination (R^2) values was taken into consideration for the structural model's validity. R^2 had to be at least 0.50 to be considered acceptable (Hair et al., 2017).

4.12 Data Collection Process

In this part, the questionnaires were delivered to the respondents—students and teachers of the 'Business Studies' group as well as head teachers at different secondary schools—for quantitative data. To avoid non-responses, the questionnaires were personally supplied to the respondents. The researcher visited different high schools and collected data from the respondents from four grade schools.

4.13 Ethical Considerations

The researcher met each respondent face to face and informed them about the purpose of data collection. He has ensured that participation is optional and that the information they provide will remain confidential. Respondents were free to withdraw their opinions at any time and the contact details of the supervisor. In addition, the two education experts validated the questionnaire and presented it at the first seminar to examine it.

4.14 Analytical Approach

Descriptive and inferential statistics were used to analyze data gathered from various respondents that focused on the elements of quality education. This study's structural model and measurement model were validated using smart PLS software and the partial least square-structural equation modeling (PLS-SEM) approach; due to the complex model, smart PLS software is reasonably appropriate (Purwanto, 2021). The research model's structure includes numerous constructs, indicators, and incidental correlations. Furthermore, according to Hair et al. (2016), the measurement scaling type is ordinal. Small sample sizes and non-normally distributed survey data in social science research are other situations when this PLS-SEM is appropriate (Hair et al., 2017a). This software is relatively easy for quantitative studies with limited sample sizes and even for novice researchers. With this program, they can quickly create the model, compute the outcomes, and save them in HTML and Excel formats (Sarstedt & Cheah, 2019). The statistical package for the social sciences, or SPSS, was also used in this investigation.

According to Haire et al. (2006), SEM is used to test theoretical models. A structural equation modeling analysis typically consists of two types. One is the measurement model assessment, which represents the theory and specifies how measured variables come together to represent latent factors and variations represent the factors. The other is structural model assessment, which represents the theory and specifies how constructs are related to other constructs in the model. In measurement model assessment, this study evaluated internal reliability, internal consistency and reliability, convergent validity, and discriminant validity through factor loadings, composite reliability (CR), average variance extracted (AVE), and heterotrait-monotrait (HTMT) ratio. After evaluating the measurement model, this study completed a structural model assessment to know the model's capacity to predict one or more desired outcomes and predictive relevance using the coefficient of determination (R^2) and predictive relevance (Q^2predict) parameters. The analytical part also tested the effect of mediation, multi-group, and the control variable. Finally, this study tested the hypotheses based on the path coefficients, t-value, and p-value.

Before the measurement model and structural model assessment, this study completed several statistical tests, such as normality, normality of the error, linearity, constant variance-homoscedasticity, and autocorrelation for the assumption testing, to check the statistical biases in multivariate analysis. To find out the issue of the common method variance (CMV) problem that

indicates all the data come from a single source, this study applied Harman's single factor test and full collinearity test.

The proposed research model consists of both lower-order and higher-order constructs. Initially, the lower-order constructs were examined for reliability and validity before moving on to the higher-order construct through measurement model assessment. A higher-order construct facilitates the research model with more abstract higher-level dimensions and more concentration on lower-level subdimensions (Sarstedt et al., 2019). To model the antecedents of quality in secondary education, the researcher has used the dependent variable, QSBE, as a higher-order construct based on SDG 4 to increase the model's relevance and significance. A higher-order construct helps extend the research model, which is appropriate for the PLS-SEM to analyze multiple relationships in complex and advanced models (Crocetta et al., 2021). For this, the researcher was motivated to apply a higher-order construct in the model, which includes three subdimensions and two mediating variables of quality education with the support of the literature. This study assessed the results of this reflective-formative framework model, including the higher-order and lower-order construct, by applying the two-stage approach (Henseler & Chin, 2010) in PLS-SEM. In the first stage, inclusive education (IE), equitable education (EE), and lifelong learning (LL) were the construct, and several quality indicators measured them. In the second stage, they (constructs) were used as indicators of the dependent variable, QSBE.

4.15 Chapter Summary

This chapter covers every research process step, including the measuring scale, target population, sampling design, sample size determination, research design, and analytical approach. It also covers the various approaches to validating and ensuring the dependability of the measuring tools, data collection techniques, pilot testing systems, and statistical tools for data analysis.

Chapter 5

DATA ANALYSIS AND FINDINGS

5.1 Introduction

Data analysis outlines a statistical assessment of the study. Before performing PLS-SEM, this chapter begins with data preparation, including data structure (data editing and coding) and data screening and cleaning (data entry errors, blank responses, straight lining, missing data, outliers, etc.). Assumption testing, response bias check, and common method variance (CMV) are also checked in this stage. Data collected from different respondents focusing on the dimensions of quality education have been analyzed using descriptive and inferential statistics. Microsoft Excel, SPSS (Version 26) software, as well as Partial Least Squares-Structural Equation Modeling (PLS-SEM) technique- SmartPLS 4 (Version 4.0.9.9) software (Ringle et al., 2022) have been used to analyze the data and research model. Recently, PLS-SEM has been used extensively in many social science disciplines (Hair Jr.et al., 2017; Hair et al., 2019). Anderson and Gerbing (1988) recommended two-stage analytical procedures. The measurement and structural models are analyzed in this stage (see Hair et al., 2017; Ramayah et al., 2017). Construct dimensionality, reliability, and validity were evaluated where multiple items measured the variables. Indicator Reliability and Internal Consistency Reliability are examined to assess the measurement model. Two types of validity - convergent validity and discriminant validity - have also been tested to assess the measurement model. The proposed hypotheses have been tested using the SEM technique to examine the structural model.

5.2 Data Preparation

Data preparation is the first step in data analysis before the research model assessment. To guarantee the accuracy and sufficiency of the data, data editing, coding, and entering are included in the data preparation step (Blumberg et al., 2014). The researcher has included the following in this area.

5.2.1 Data Structure

This research uses a manual paper-based data collection tool. For this, a data structure was created after gathering the necessary information. This study framed a questionnaire with 49

close-ended questions as items or indicators for six constructs and three sub-constructs relating to SDG 4 and the quality of secondary business education in Bangladesh. Of them, 30 items were for independent variables and 19 for dependent variables under three subdimensions. In addition, seven items are included as demographic questions for the respondents of business education teachers, six items for head teachers, and five items for the students. The data was then coded, with numbers allocated to categories to concentrate the assessment of the items into a predetermined number of groups or categories (Blumberg et al., 2014; Hair et al., 2017). The responses for the independent and dependent variables in this study were pre-coded as 1–5, with 1 signifying strong disagreement and 5 indicating strong agreement. Following that, each response was post-coded, with distinct numbers allocated to various responses (Blaikie, 2003).

5.2.2 Data Screening and Data Cleaning

Data screening and data cleaning have been conducted by checking the data entry errors, data straight-lining, and identifying blank responses and missing data.

Data Entry Error

Two procedures were used to confirm data entry errors in this study: sampling checking and random case checking. The sampling check was conducted using the SPSS program. To identify the inaccurate data entry or any entry outside the range in the incorrect responses, all fields were sorted, either ascending or descending. Instead of correct values, wrong values may be posted in some cases. To find out and remove this problem, sampling checking was done. In addition, this study has chosen 10% of the total cases randomly for random case checking.

Blank Responses

Microsoft Excel was used to check the blank responses in the questionnaires collected from the respondents. The questionnaires with blank responses on both the independent variables and the dependent variables were deleted from the sample. The researcher also used the Excel COUNTBLANK function to confirm that the respondents answered all questions.

Straight-lining

The data did not contain a straight-lining problem. The researcher tested the feedback using Microsoft Excel 2016 to detect straight-lining problems. Straight-lining occurs when a respondent gives the same answer for many questions (Hair et al., 2017).

Missing data

In this study, missing data was not noticed when importing the data set. The software smart PLS detects missing data automatically. Data screening and cleaning are used to find any missing part of the data set and missing data. Missing data occurs when the respondents do not answer one or more questions (Cantrell & Lupinacci, 2007). Missing data can damage statistical ability and provide biased estimations that lead to valueless conclusions (Graham, 2003).

5.2.3 Outliers

This study has checked outliers in all the independent and dependent variables. Extreme answers to a specific question or all questions are called outliers (Felt et al., 2017). It is mandatory to identify and remove outliers because of their adverse effects that destroy the normality of the data and generate distorted results (Hellerstein, 2008).

5.3 Assumption Testing

Assumption testing is the underlying statistical basis for multivariate analysis. Testing for the assumptions is needed for two reasons: (a) the complexity of the relationships and (b) the complexity of the analysis and results (Anderson, 2001). The first reason arises from many constructs, which cause potential distortions and bias. The second reason arises from the indicators of assumption violation (Hair et al., 2011). This study has tested for a few assumptions below:

5.3.1 Normality

Normality is the first assumption in multivariate analysis, shaped by the normal distribution assumption in each item and all linear combinations of items (Fidell & Tabachnick, 2003). This study measured multivariate skewness and kurtosis using the statistical power analysis software Web Power, available online (Ramayah et al., 2017; Cain et al., 2017). The address is https://webpower.psychstat.org/models/kurtosis/results.php?url=b7e3e6c763dab70465da40c800bcea28. Using this software, both univariate and multivariate skewness and kurtosis were calculated. In the case of univariate analysis, the cut-off value was used ±2 for skewness and ±7 for kurtosis (Kim, 2013; Wulandari et al., 2021). An ideal skewness number falls between -1 and +1, while a score between -2 and +2 is often considered adequate. Values exceeding −2 and +2 are significant signs of nonnormality (Hair et al., 2022). On the other hand, for multivariate analysis, the cut-off value was 0.141 (Critical value of $b_{1,2}$) from Mardia's Table 2 for skewness

at a 5% significance level. For kurtosis, the lower limit was 7.252, and the upper limit was 8.787 for the 400-sample size from Table 3 (Mardia, 1974). The result found that the data collected was univariate normal but not multivariate normal. Therefore, bootstrapping is required for the study.

Table 5.1: Output of Univariate Skewness and Kurtosis

Sample size: 400

Number of variables: 10

Const.	Skewness	SE skew	Z skew	Kurtosis	SE Kurt	Z Kurt
CS	0.092	0.122	0.757	-0.785	0.243	-3.225
EE	-0.174	0.122	-1.427	-0.400	0.243	-1.642
IE	-0.412	0.122	-3.375	-0.345	0.243	-1.419
ITE	-0.023	0.122	-0.189	-0.947	0.243	-3.890
LL	-0.075	0.122	-0.618	-0.655	0.243	-2.691
PSL	-0.283	0.122	-2.323	-0.731	0.243	-3.003
QS	0.055	0.122	0.449	-0.907	0.243	-3.727
QSBE	-0.197	0.122	-1.618	-0.344	0.243	-1.413
QT	-0.513	0.122	-4.207	-0.439	0.243	-1.803
WLE	-0.233	0.122	-1.911	-0.461	0.243	-1.893

Table 5.2: Mardia's Multivariate Skewness and Kurtosis

Measure	b	z	p-value
Skewness	6.35913	423.9420145	4.551914e-15
Kurtosis	120.89646	0.5786593	5.628191e-01

5.3.2 Normality of the Error Terms

This second multivariate analytic assumption was assessed using the normal Probability Plot, also known as the P-P plot, and is represented by the normal distribution. The researcher has prepared this plot using the latent variables scores in the Excel sheet. In SPSS software, the researcher clicked descriptive statistics to get the P-P plot when importing data files and going through the analysis part. Then, variables were used to draw this plot. It is shown that the points

are very close to the diagonal line. Therefore, it can be concluded that the errors are normally distributed. Quality of Secondary Business Education (QSBE) is the dependent variable.

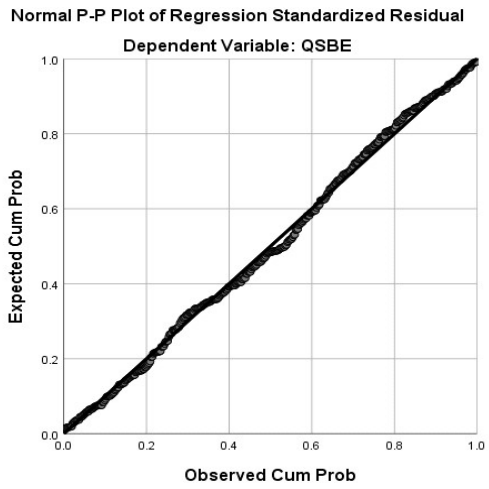
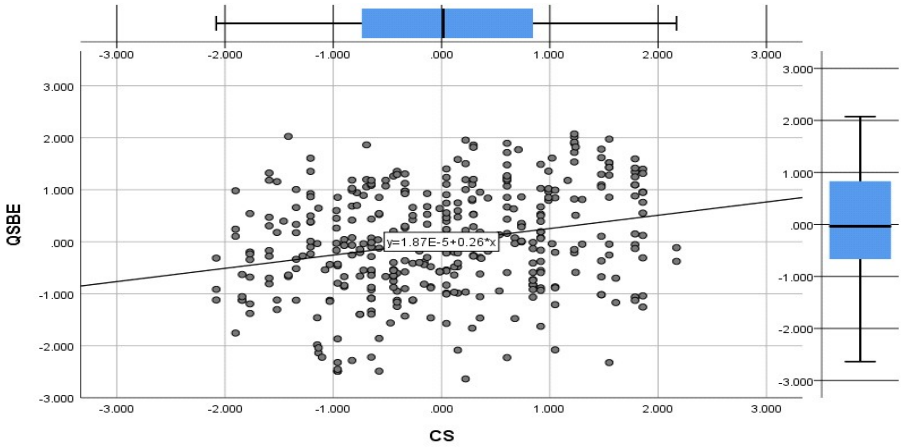
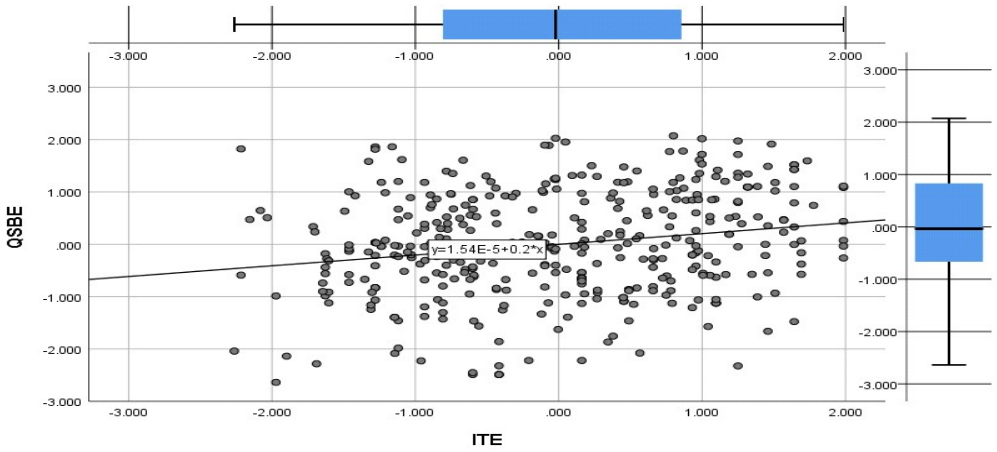


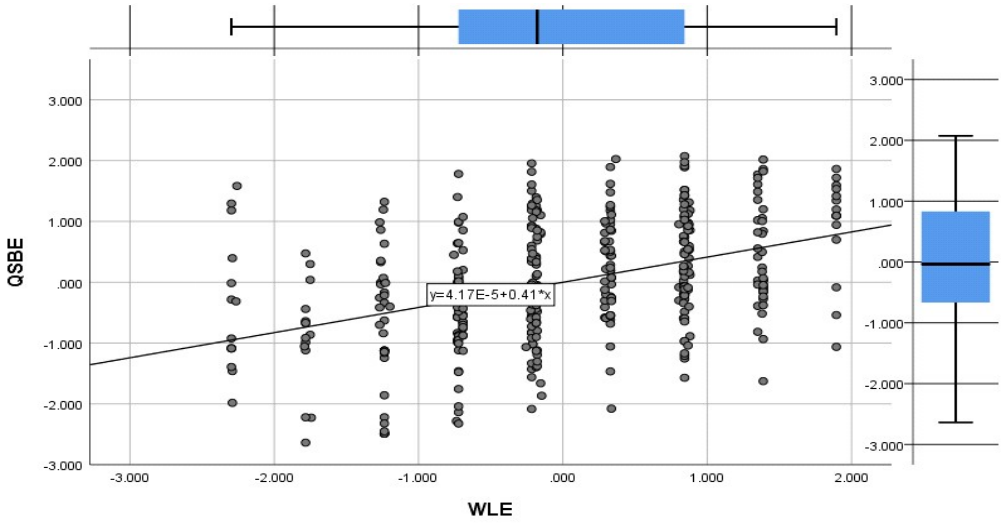
Figure 5.1: P-P plot for regression standardized residual

5.3.3 Linearity

The third premise in multivariate analysis is linearity, which denotes a linear relationship between the independent and dependent variables. With QSBE as the dependent variable, this study employed a regression variable plot to see if a straight line could be drawn on it. Six variable plots were drawn using the SPSS software where QSBE was always on the vertical axis and CS, PSL, WLE, ITE, QS, and QT were shown on the horizontal axis. As it was possible to draw a straight line for all variables, in this investigation, it can be determined that the data satisfied the linearity assumption.




QSBE
ITE
y=1.54E-5+0.2*x
-3.000
-2.000
-1.000
.000
1.000
2.000
3.000


QSBE
WLE
y=4.17E-5+0.41*x
-3.000
-2.000
-1.000
.000
1.000
2.000
3.000

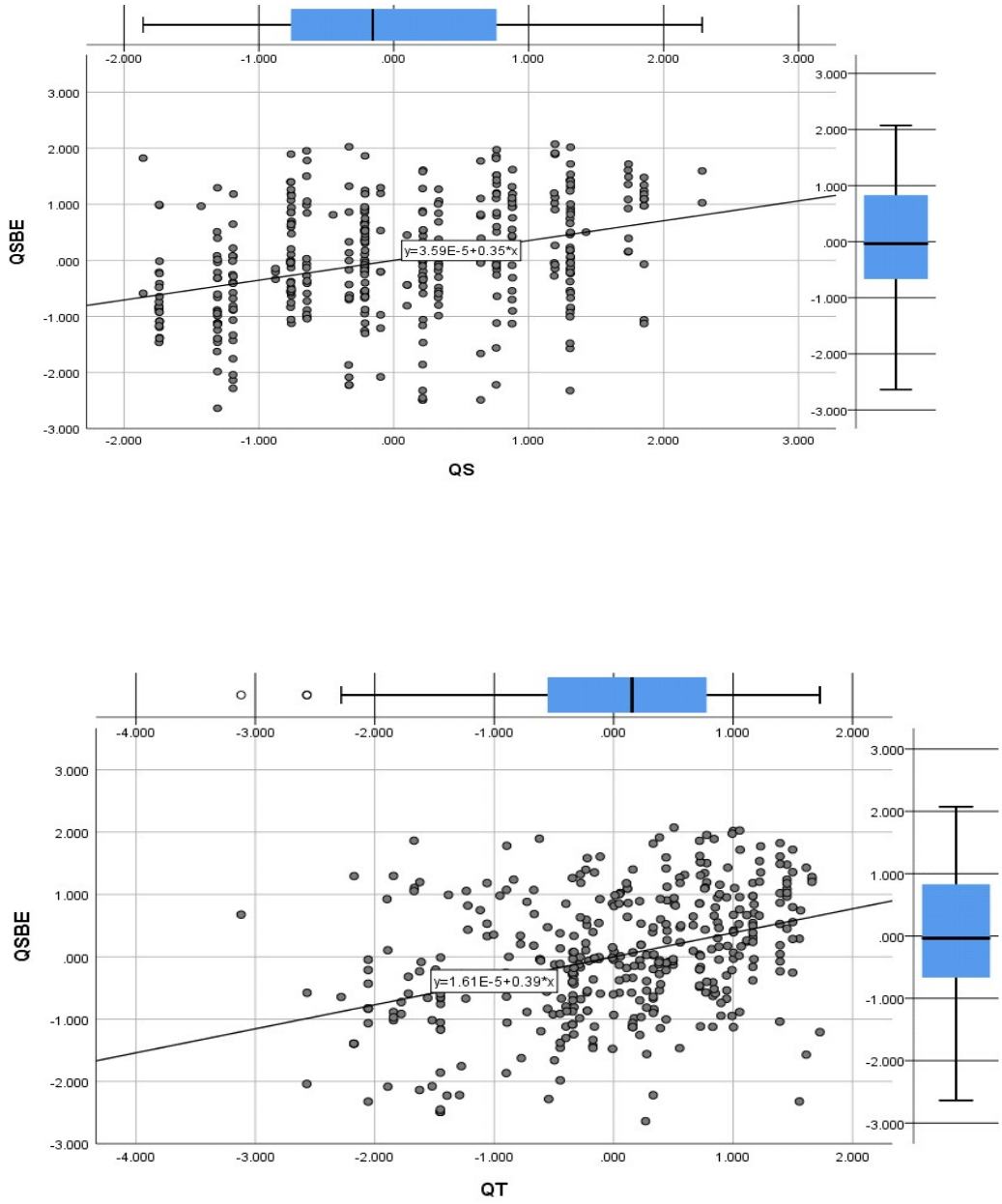


Figure-5.2: Partial Regression Plots based on QSBE as dependent variable

5.3.4 Constant Variance-Homoscedasticity

This is the fourth assumption in which the variance, rather than being heteroscedastic, must be a constant (homoscedastic). Homoscedasticity is an assumption in regression analysis. It refers to error terms or residuals being equally distributed. To conduct this test, the regression standardized residual was plotted against the regression standardized projected value using a scatter plot, and a consistent pattern was seen throughout. In the SPSS software, the researcher

analyzed linear regression first, putting QSBE as a dependent variable and CS, PSL, WLE, ITE, QS, and QT as the independent variables. Then, a scatter shows the standardized predicted value (ZPRED) in the X axis and the standardized residual (ZRESID) in the Y axis. To get a clear idea, a histogram of the regression standardized residual is also drawn. In the histogram, and scatter plot, it is seen that error terms or residuals are equally distributed. It means no heteroscedasticity is found.

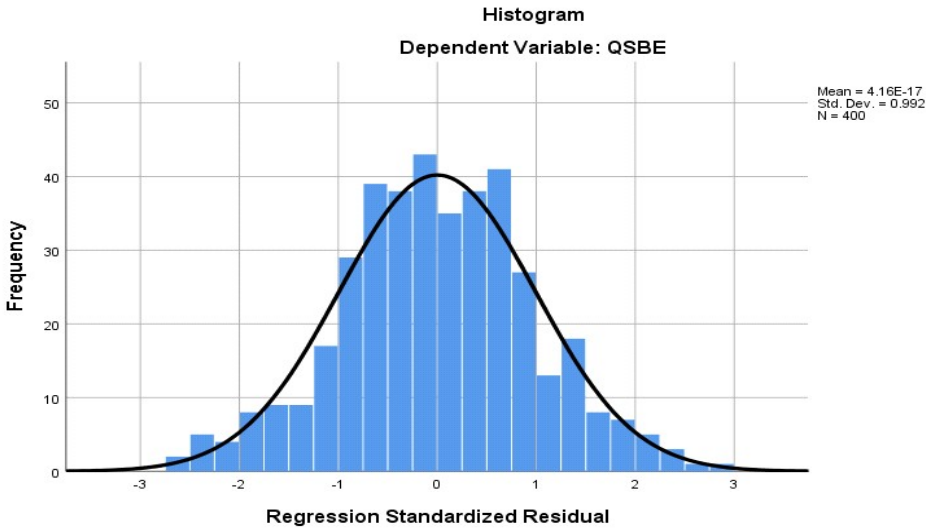


Figure 5.3: Histogram

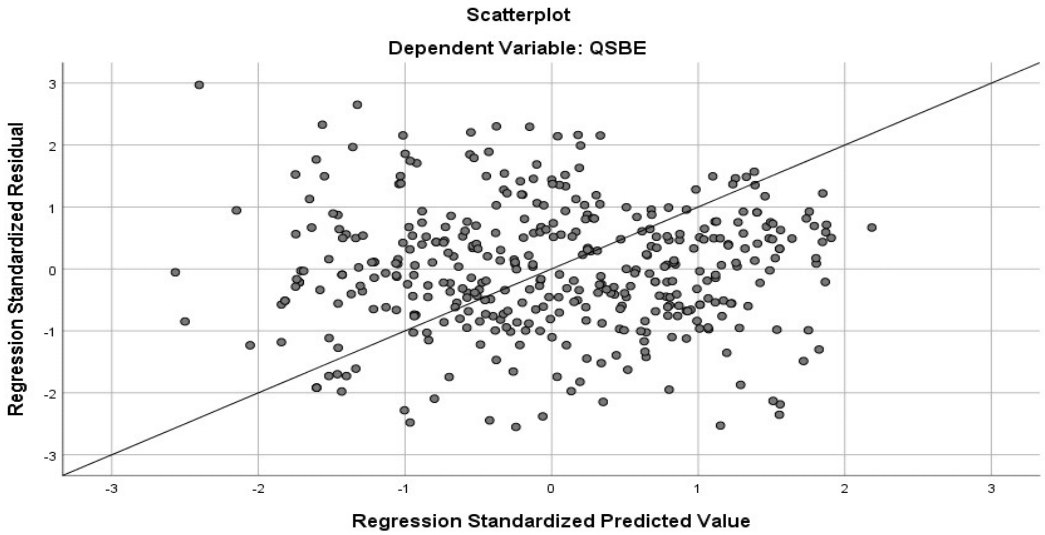


Figure 5.4: Scatter Plot

5.3.5 Autocorrelation

Autocorrelation is the fifth assumption in multivariate analysis, which emphasizes that errors should not be autocorrelated. The Durbin-Watson statistics were used to examine autocorrelation. The researcher examined the Durbin-Watson test using SPSS software. The reference value of the Durbin-Watson statistics should be between 0 and 4. This study found a value of 1.486, which was within the range.

Table 5.3: Model Summary for Durbin-Watson

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.523	0.274	0.263	0.859676	1.486

a Predictors: (Constant), WLE, CS, ITE, QT, QS, PSL

b Dependent Variable: QSBE

5.4 Response Bias Check

Responses collected from respondents must be free from bias. Otherwise, the research results will be questionable or invalid. This study has used a multimode method of conducting face-to-face surveys to increase the response rate and obtain bias-free responses. The data were collected using the sample design described in the previous chapter. Therefore, the data collection technique has ensured that there is no bias.

5.5 Common Method Variance (CMV)

CMV may be an issue since all the data for this study came from a single source. When variables are evaluated using the same sources or methodologies, it refers to a systematic error variance shared across them. The risks of CMV may be significant when collecting data via self-administered questionnaires to validate the constructs from the same individuals (Podsakoff et al., 2012). According to Tehseen et al. (2017), CMV may jeopardize the constructs' validity and introduce systemic bias into a study. To lower the CMV in this investigation, statistical and procedural corrections were used before and after data collection. The CMV is tested statistically using the marker variable approach, full collinearity test, and Harman's single factor test. In this study, the researcher did not employ the third statistical method - a marker variable technique; the first two methods - Harman's single factor test and full collinearity test were used.

5.5.1 Harman's Single Factor Test

This research has applied Harman's single-factor test to determine whether a single factor or a distinct factor explains most of the covariance (Cut-off value, 50%) among the variables in the un-rotated factor analysis (Humaidi & Balakrishnan, 2015). Using the SPSS software, it has been found that this study experiences the highest single factor variance, 37.928%, which is much lower than the threshold value of 50%. Therefore, there is no CMV problem in this study. Some researchers have raised a few criticisms that Herman's single-factor test is incomplete and insensitive (Podsakoff et al., 2012) and give the result on CMV's presence or absence (Tehseen et al., 2017).

Table-5.4: Harman's Single Factor Test - Variance Analysis

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.793	37.928	37.928	3.793	37.928	37.928
2	1.311	13.105	51.033			
3	1.072	10.718	61.751			
4	.876	8.764	70.515			
5	.799	7.985	78.500			
6	.742	7.417	85.917			
7	.571	5.714	91.631			
8	.459	4.586	96.217			
9	.378	3.783	100			
10	7.066E-8	7.066E-7	100			
Extraction Method: Principal Component Analysis						

5.5.2 Full Collinearity Test

A full collinearity test is a further method of detecting CMV. This method aimed to determine which constructs showed variance inflation factor (VIF) values of five or above (Kock & Lynn, 2012). The SPSS program calculates collinearity statistics like tolerance and Variance Inflation Factor (VIF). QSBE was the dependent variable in the research paradigm, whereas the other

variables were regarded as independent constructs. The findings imply that all independent constructs have tolerance values below the 0.10 cutoff (Menard, 1955; Myers, 1990) and that all constructs have VIFs below the 3-5 range that is advised (Becker et al., 2015; Hair Jr et al., 2021). Consequently, it has been shown that the study's results do not contain common method variance.

Table 5.5: Full Collinearity Statistics

Construct	CS	ITE	PSL	QS	QT	WLE
Tolerance	0.759	0.760	0.531	0.637	0.800	0.628
VIF	1.318	1.316	1.882	1.569	1.249	1.593

5.6 Descriptive Statistics

After completing data cleaning and testing with all the assumptions, the next stage is to run the descriptive analysis. Here are the respondents' demographic information and response rate. In this survey, 42% of respondents were female, and 58% were male. Respondents' educational qualifications, experiences, age range, etc., were furnished in the following table. Statistics of school location were also presented in this part, such as 16% in urban, 26% in sub-urban, and 58% in rural areas. 39% of respondents had a bachelor's degree, and the other 69% were master's degree holders.

Table 5.6: Demographic Breakdown of Respondents

Demographic profile	Category	Respondents	%
Respondents' Group	Students- male	100	25%
	Students- female	100	25%
	Teachers (Business Studies)	100	25%
	Head Teacher	100	25%
Gender	Male	248	58%
	Female	152	42%
Position	Assistant Teacher	88	22%
	Assistant Head Teacher	12	3%
	Head Teacher	100	25%
	Students	200	50%
School Location	Urban	16	16%
	Sub-urban	26	26%
	Rural	58	58%

The following table shows descriptive statistics of indicators. Descriptive statistics such as mean, median, minimum, maximum value, and standard deviation were presented for each indicator. These demographic data examined indicators' characteristics. Descriptive statistical values were used to perform a comparative analysis of the indicators under each construct. Each quality item's average value (Mean) and associated risk (Standard deviation) were primarily used in that analysis.

Table 5.7: Descriptive Statistics of Indicators

Construct	Indicator	Mean	Median	Observed min	Observed max	Standard deviation
ITE	ITE_1	3.55	4	1	5	1.004
	ITE_2	3.30	3	1	5	1.245
	ITE_3	4.05	4	2	5	0.792
	ITE_4	3.23	3	1	5	1.103
	ITE_5	3.28	3	1	5	1.242
CS	CS_1	3.58	4	2	5	0.982
	CS_2	3.55	4	1	5	1.033
	CS_3	3.75	4	1	5	1.004

	CS_4	3.18	3	1	5	1.108
	CS_5	2.96	3	1	5	1.256
PSL	PSL_1	3.41	4	1	5	0.981
	PSL_2	3.25	3	1	5	0.973
	PSL_3	2.47	3	1	5	1.135
	PSL_4	3.42	4	1	5	1.176
WLE	WLE_1	3.74	4	2	5	0.808
	WLE_2	3.54	4	2	5	0.818
	WLE_3	3.76	4	2	5	0.736
	WLE_4	3.92	4	2	5	0.880
	WLE_5	3.62	4	2	5	0.858
	WLE_6	3.73	4	1	5	1.165
QS	QS_1	3.42	3	1	5	1.051
	QS_2	3.49	3	2	5	0.900
	QS_3	3.49	3	1	5	0.843
	QS_4	3.26	3	2	5	0.832
QT	QT_1	3.80	4	2	5	1.058
	QT_2	3.75	4	2	5	0.829
	QT_3	3.80	4	1	5	1.122
	QT_4	2.65	3	1	5	1.236
	QT_5	3.05	3	1	5	1.186
	QT_6	3.22	3	1	5	1.361
IE	IE_1	3.39	4	1	5	1.038
	IE_2	3.59	4	2	5	0.750
	IE_3	3.86	4	2	5	0.970
	IE_4	3.72	4	1	5	1.011
	IE_5	3.14	3	1	5	1.166
EE	EE_1	3.75	4	1	5	0.887
	EE_2	3.75	4	2	5	0.829
	EE_3	3.91	4	1	5	0.939
	EE_4	3.02	3	1	5	0.824
	EE_5	3.39	3	2	5	0.811
	EE_6	3.64	4	2	5	0.714
	EE_7	3.41	3	2	5	0.789
	EE_8	3.55	4	1	5	0.817
LL	LL_1	3.35	3	1	5	0.841
	LL_2	3.48	4	2	5	0.793
	LL_3	3.10	3	2	5	0.806
	LL_4	3.50	3	2	5	0.700
	LL_5	3.24	3	2	5	0.801
	LL_6	3.54	4	1	5	0.818

5.7 Measurement Model Assessment

The software SmartPLS 4 (Version 4.0.9.9) was used to assess the research model for this investigation (Ringle et al., 2022). By analyzing the measurement model, this work has employed the two-stage analytical approaches suggested by Anderson and Gerbing (1988) to evaluate the validity and reliability of the measurements. The research paradigm in this study comprises reflecting multi-item constructs rather than formative ones. The constructs exhibit good internal consistency and are positively associated with each other, indicating a unidimensional relationship. The complex research model incorporates both lower-order and higher-order elements. Initially, the lower-order constructs were examined for reliability and validity before moving on to the higher-order construct.

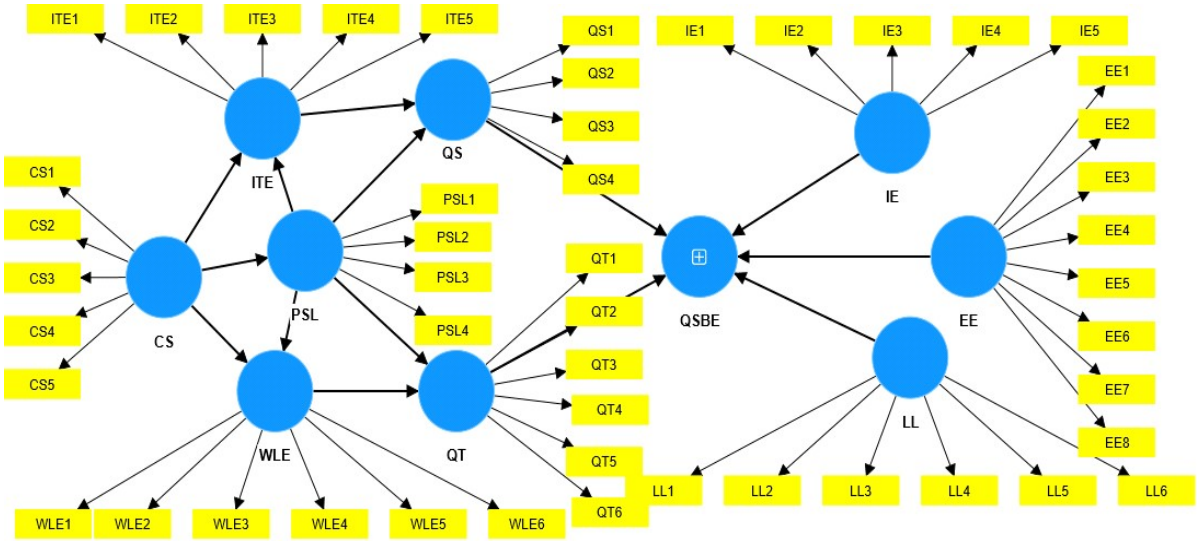


Figure 5.5: PLS Measurement Model

(Note: ITE=Infrastructure and Technical Equipment, CS=Curriculum Standards, PSL=Pedagogy for Sustainable Learning, WLE=Work or Learning Environment, QS=Quality of Students, QT=Quality of Teachers, QSBE=Quality of Secondary Business Education, IE=Inclusive Education, EE=Equitable Education, LL=Lifelong Learning)

5.7.1 Indicator Reliability (Outer Loadings)

An initial task in evaluating reflective measurement models is to analyze the indicator loadings. The reliability of indicators is assessed to see if they are reliable and capable of accurately evaluating quality (Urbach & Ahlemann, 2010). The PLS approach has evaluated the reflective factor loadings to ascertain the indicators' dependability. The construct explains more than half of the indicator's variation and has acceptable item dependability when the loadings' reference value exceeds 0.708 (Hair et al., 2019; 2021). The average variance extracted (AVE) of all the

constructs has successfully met the reference value, even though some items might have lower factor loadings.

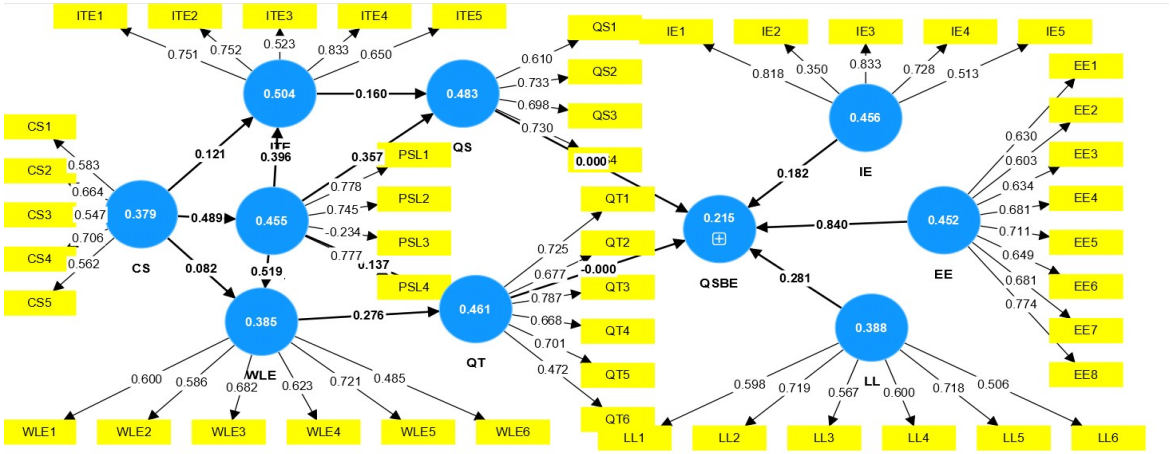


Figure 5.6: PLS Measurement Model showing outer loadings and AVE.

5.7.2 Internal Consistency and Reliability

The second phase is assessing the measurement model's reliability and internal consistency. This study employed the Composite Reliability (CR) indicator to guarantee internal consistency. Cronbach alpha is an indicator of internal consistency and dependability. According to Hair et al. (2019), a threshold value 0.70 is suggested for Cronbach alpha.

Several researchers have criticized using Cronbach's alpha as a reporting tool for internal consistency and reliability in structural equation modeling (SEM) investigations. They argue that it is consistently exploited despite its inappropriateness for such studies (Sijtsma, 2009; Cho, 2016; Flora, 2020). Furthermore, the premise of employing Cronbach's alpha is that all indicators have identical factor loadings, which is unsupported for latent variables. More precisely, the estimated values of Cronbach's alpha tend to be lower for latent constructs when their indicators exhibit differential factor loadings (Gerbing & Anderson, 1988; Cheung et al., 2023). The Composite Reliability Index has been proposed as a suitable measure of reliability (Lai, 2021). Composite reliability is regarded as a more stringent measure of reliability than Cronbach's alpha (Gotz et al., 2009; McNeish, 2018). To demonstrate sufficient internal consistency, the composite reliability (CR) should be equal to or more than 0.70 (Hair et al., 2019). The constructs in this study have all demonstrated a satisfactory composite reliability (CR) value,

equivalent to or more than 0.70, per the reference standard. It signifies that the measuring model has achieved acceptable levels of reliability.

5.7.3 Convergent Validity

The third step evaluates convergent validity to see if the construct adequately accounts for the item variability. Convergent validity has been evaluated by measuring each concept's Average Variance Extracted (AVE). AVE values were displayed in circles in Figures 6.5 and 6.6, and indicator loadings were visible in the outer model, whereas path coefficients were provided in the inner model. Squaring the loadings of each item within a construct and computing the mean value yielded the average variance extracted, or AVE. When the AVE cut-off value is 0.50 or higher, the construct has explained at least 50% of the variation in its elements (Hair et al., 2019). It has been shown that the AVE values for all lower-order constructs now surpass the cut-off criterion of 0.50 when applying the PLS Algorithm in Smart PLS 4 in this study. Some items were deleted due to lower factor loadings. As a result, the AVE of the respective constructs has been increased. Therefore, the model of the study has justified the measurement model as it has proved sufficient convergent validity.

Table-5.8: Results Summary for Lower Order Reflective Measurement Model

Construct	Item	Outer Loadings	Composite Reliability, CR	Convergent Validity, AVE
CS	CS_2	0.576	0.753	0.511
	CS_4	0.858		
	CS_5	0.682		
ITE	ITE_1	0.747	0.832	0.504
	ITE_2	0.752		
	ITE_3	0.519		
	ITE_4	0.834		
	ITE_5	0.657		
PSL	PSL_1	0.763	0.814	0.594
	PSL_2	0.768		
	PSL_4	0.780		
QS	QS_2	0.768	0.785	0.549
	QS_3	0.730		
	QS_4	0.724		
QT	QT_1	0.737	0.838	0.510

	QT_2	0.681		
	QT_3	0.798		
	QT_4	0.655		
	QT_5	0.689		
WLE	WLE_3	0.732	0.794	0.563
	WLE_4	0.701		
	WLE_5	0.813		
LL	LL_2	0.810	0.785	0.510
	LL_4	0.589		
	LL_5	0.813		
IE	IE_1	0.807	0.822	0.543
	IE_3	0.817		
	IE_4	0.752		
	IE_5	0.533		
EE	EE_1	0.606	0.861	0.510
	EE_4	0.707		
	EE_5	0.766		
	EE_6	0.666		
	EE_7	0.739		
	EE_8	0.786		

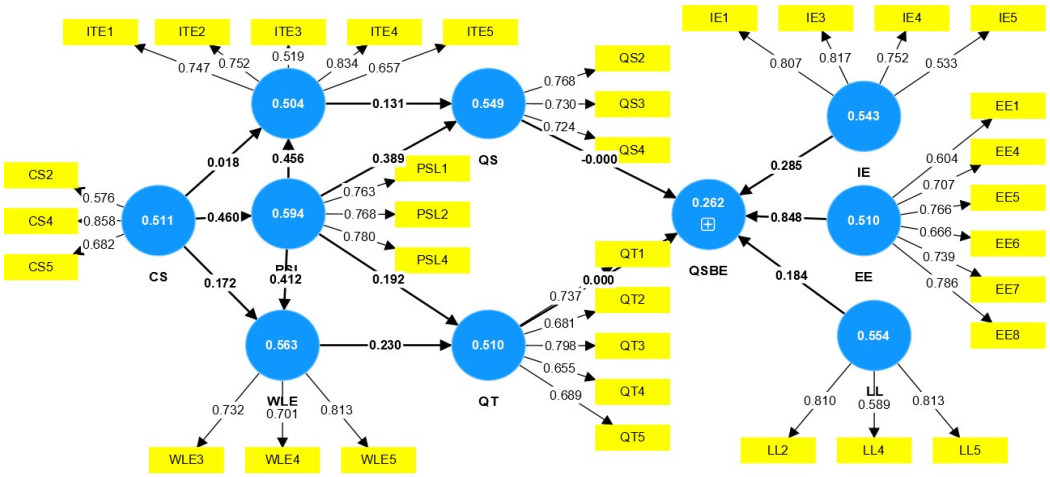


Figure 5.7: PLS Measurement Model (Refined)

The measurement model's graphical output above is refined, excluding some indicators. The constructs' (circle) AVEs are above the cut-off value 0.50.

5.7.4 Discriminant validity

The fourth step in evaluating the measurement model is to assess the discriminant validity, which shows that each construct is empirically distinct from other constructs. The Heterotrait-Monotrait (HTMT) ratio and the Fornell Larcker criterion are employed to evaluate the discriminant validity. Finding the diagonal values is the Fornell Larcker criterion; the highest values must match the rows and columns. Henseler et al. (2015) noted that the slight fluctuations (ranging from 0.65 to 0.85) in the loadings of different indicators on a construct were a sign that the Fornell Larcker criterion was not producing satisfying results. Alternatively, they proposed to assess discriminant validity using the HTMT ratio, first proposed by Voorhees et al. (2016). This study has also used HTMT ratio whose calculation involves comparing the average correlations between items within the same construct and the average correlations between items across various constructs. The discriminant validity issue arises when HTMT scores are high. For structural models, including constructs that are strongly equivalent in concept, Henseler et al. (2015) suggested a threshold of 0.90; for constructs that are more distinct in concept, the barrier was 0.85. All lower-order structures' HTMT ratios meet the designated threshold value, as shown in the table below. All values fall by a margin of 0.85 below the cut-off point. Furthermore, bootstrapping can be utilized to evaluate if the HTMT value significantly deviates from 1.00 (Henseler et al., 2015) or a predefined threshold value, like 0.90 or 0.85, which ought to be established depending on the study environment (Franke & Sarstedt, 2019). The HTMT ratio was used in this study to evaluate the measurement model for lower-order constructs, and it was discovered that all results were below the 0.85 cut-off value, supporting the model's validity.

Table 5.9: Discriminant Validity using HTML ratio

Const.	CS	EE	IE	ITE	LL	PSL	QS	QT	WLE
CS									
EE	0.343								
IE	0.293	0.252							
ITE	0.375	0.218	0.127						
LL	0.201	0.324	0.145	0.273					
PSL	0.774	0.446	0.243	0.638	0.455				
QS	0.398	0.429	0.231	0.457	0.538	0.705			
QT	0.255	0.443	0.227	0.247	0.306	0.415	0.592		
WLE	0.618	0.514	0.386	0.269	0.324	0.767	0.800	0.462	

5.8 Higher Order Model

The endogenous or dependent variable, QSBE, is the higher-order construct that is reflective-formative (Type-2) and formed by the three indicators—IE, EE, and LL; those were also the constructs in a lower-order model. Using the software smart PLS 4, the researcher has taken latent variable scores directly of IE, EE, and LL as indicators or items for the higher-order construct, QSBE.

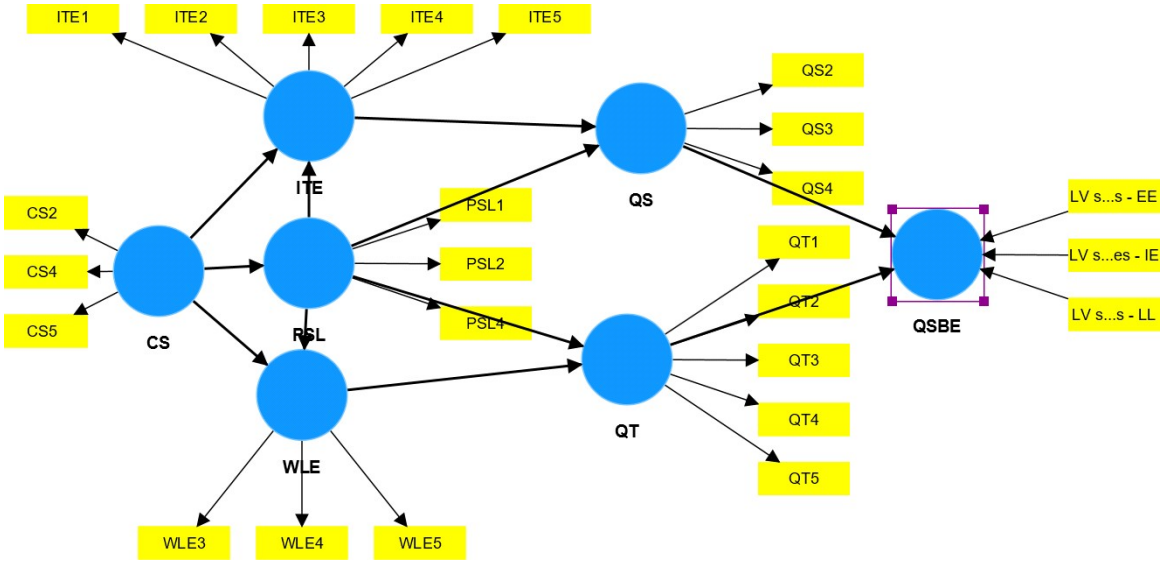


Figure 5.8: Measurement Model showing Higher Order Construct

After checking all lower-order constructs, we found that this higher-order construct has been formed and validated. For this, bootstrapping was done, and outer weights of all indicators of the higher order (QSBE) were measured. The results found that all p values are less than 0.05 and all t values are higher than 1.645. Also, both confidence intervals and bias-corrected confidence intervals for the lower level and upper level showed positive results for all paths. Therefore, the weights are significant, and thus, a higher-order construct (QSBE) is validated.

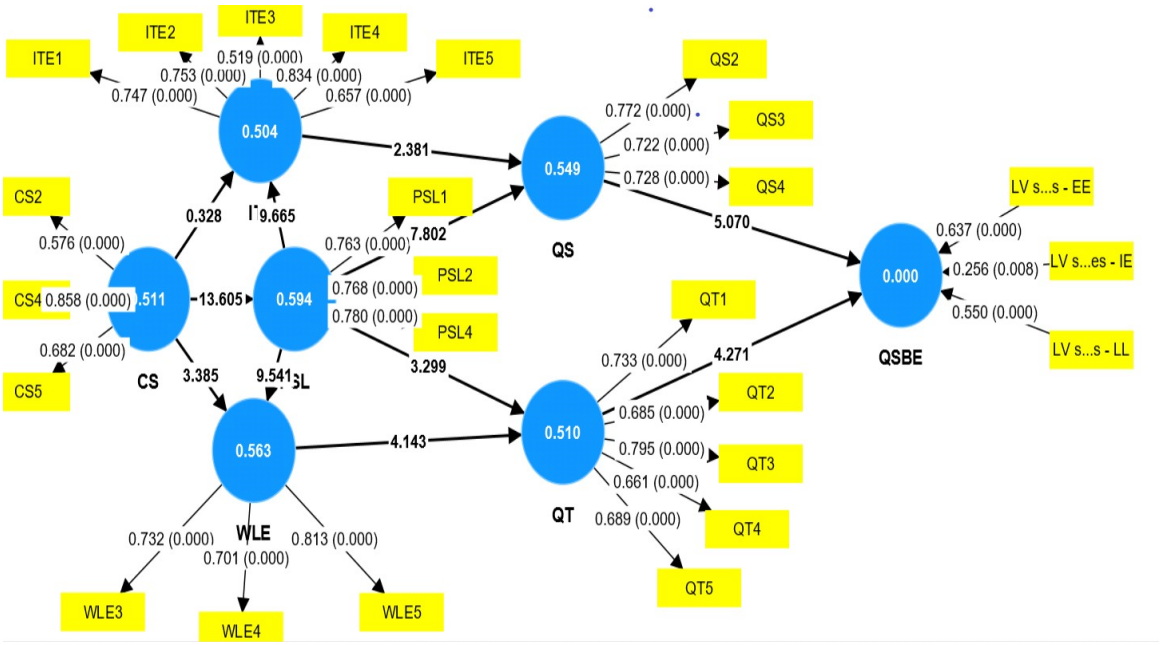


Figure 5.9: Assessment of Higher-order Construct

Table 5.10: Results Summary for Higher Order Formative Construct Validity

Relationship	Outer weights	Std. Deviation	t-value	p-value	BCILL 5%	BCIUL 95%
EE -> QSBE	0.637	0.100	6.358	0.000	0.470	0.797
IE -> QSBE	0.256	0.107	2.399	0.008	0.088	0.440
LL -> QSBE	0.550	0.107	6.161	0.000	0.359	0.710

5.9 Structural Model Assessment

First, the measurement model and then the structural model were evaluated. At this point, the model's capacity to accurately predict one or more desired outcomes has been evaluated (Hair et al., 2011). The proposed linkages were examined by evaluating the structural model. This phase involved the execution of several processes.

5.9.1 Assessment of Collinearity Issue

Analyzing collinearity issues is the initial stage in assessing the structural model. Confirming that collinearity does not skew the regression results before assessing the structural model is crucial. When evaluating the indicators ' collinearity, the variance inflation factor (VIF) is

considered. Using the latent variable scores of the predictor constructs in a partial regression analysis, the VIF values were calculated. The presence of probable collinearity issues between the predictor variables is shown when the VIF values are more than 5. Some researchers claim that even with Variance Inflation Factor (VIF) levels as low as 3-5 (Becker et al., 2015; Hair et al., 2021) or 3.3 (Diamantopoulos & Siguaw, 2006), collinearity problems can still occur. The constructions in this investigation have inner VIF values ranging from 1.000 to 1.321, as Table 6.12 illustrates. All these numbers fall below the 3.3 or 5 lowest advised level. This implies that collinearity is not a factor to be concerned about in this investigation.

Table 5.11: Collinearity Statistics (VIF)- Inner Model

Relationship	VIF
CS -> ITE	1.268
CS -> PSL	1.000
CS -> WLE	1.268
ITE -> QS	1.274
PSL -> ITE	1.268
PSL -> QS	1.274
PSL -> QT	1.321
PSL -> WLE	1.268
QS -> QSBE	1.212
QT -> QSBE	1.212
WLE -> QT	1.321

5.9.2 Assessing the Significance of the Structural Model Relationships and Testing the Hypotheses

To evaluate the connection between the constructs of the structural model, the researcher analyzed the path coefficient (β value). A bootstrapping procedure assessed the 11 hypotheses to generate data for each path coefficient in the model. Chin (2009) recommended using 1000 resamples. The t-statistics for all path coefficients acquired from the bootstrapping technique were utilized to assess the significance level. A one-tailed test, a significance level of 0.05, and a

total of 5,000 subsamples were used in the bootstrapping process. For the one-tailed test, the critical values are 2.33, 1.645, and 1.28 for significant levels of 1 percent (α = 0.01), 5 percent (α = 0.05), and 10 percent (α = 0.10), respectively (Ramayah et al., 2018). The path coefficients have standardized values between -1 and +1. According to Hair et al. (2017), the magnitude of path coefficients reflects the strength of the association: closer to +1; the relationship is suggested to be positive; closer to -1, the relationship is indicated to be negative; and closer to 0, it is weaker. The paths are deemed significant when the p-values are less than 0.05 at a 95% confidence level. Except for the CS -> ITE path, all t values exceed 1.645 at a 5% significance level for a one-tailed test, and all p values are below 0.05.

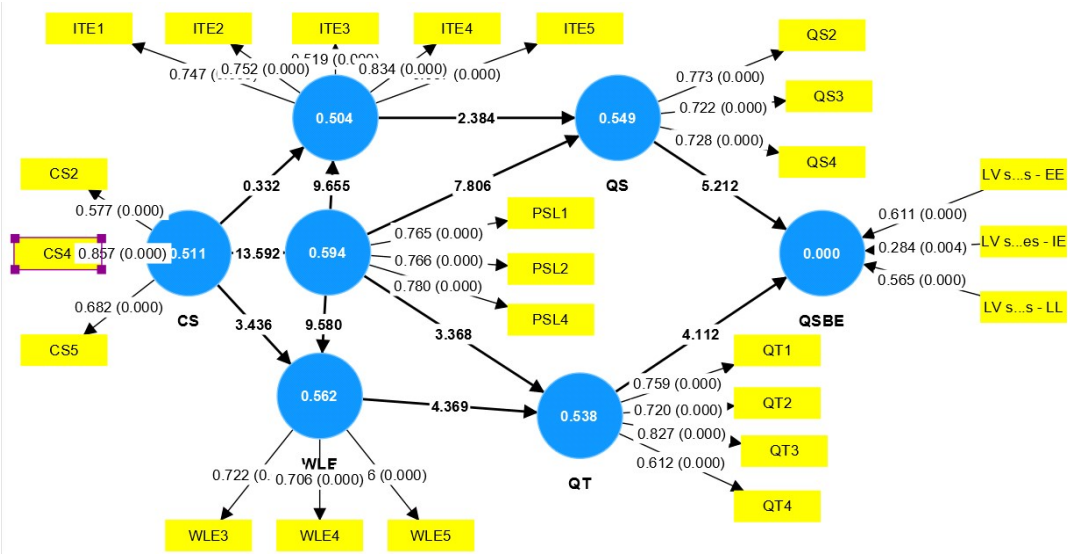


Figure 5.10: Structural Model Assessment

5.9.3 Effect Size (f^2)

To determine the relative influence of the exogenous variables on an endogenous variable, the effect size, or f^2, was computed. As stressed by Sun et al. (2010), it is imperative to report not just the p-value but also the f^2 (substantive significance) and the p-value (statistical significance). The study model's construct effect sizes were assessed by contrasting them with reference values of 0.02 for small effect sizes, 0.15 for medium effect sizes, and 0.35 for large effect sizes (Gignac & Szodorai, 2016). The findings of this study indicate that all paths/relationships, except for the path CS -> ITE, are statistically significant.

Table 5.12: Results Summary for Structural Model Assessment

Hypo.	Relationship	Std. Beta	t-value	p-value	BCILL 5%	BCIUP 95%	f^2	Effect
H_1	CS -> ITE	0.018	0.332	0.370	-0.073	0.105	0.000	No Eff.
H_2	CS -> WLE	0.174	0.243	0.000	0.087	0.254	0.032	Small
H_3	CS -> PSL	0.460	13.592	0.000	0.399	0.510	0.268	Medium
H_4	PSL -> ITE	0.455	9.655	0.000	0.372	0.527	0.208	Medium
H_5	PSL -> WLE	0.413	9.580	0.000	0.339	0.479	0.183	Medium
H_6	PSL -> QS	0.389	7.806	0.000	0.302	0.466	0.152	Medium
H_7	PSL -> QT	0.194	3.368	0.000	0.097	0.287	0.033	Small
H_8	ITE -> QS	0.132	2.384	0.009	0.038	0.221	0.017	Small
H_9	QS -> QSBE	0.310	5.212	0.000	0.206	0.400	0.101	Small
H_{10}	WLE -> QT	0.238	4.369	0.000	0.147	0.328	0.050	Small
H_{11}	QT -> QSBE	0.239	4.112	0.000	0.133	0.326	0.060	Small

5.9.4 The Coefficient of Determination (R^2)

Because there was no collinearity issue, the next step was determining the coefficient of determination (R^2) to evaluate the model's prediction ability. The R^2 value was also used to assess the model's explanatory power. The coefficient measures how much of the variability an endogenous construct can explain (Shmueli et al., 2019). R^2 is also used to evaluate the sample's capacity for prediction (Rigdon, 2012; Hair, 2020). Higher values of the R^2 coefficient, which goes from 0 to 1, indicate a better capacity to explain the data. R^2 values of 0.75, 0.50, and 0.25 will be used as benchmarks, corresponding to significant, moderate, and weak categories (Hair et al., 2019; Hair et al., 2021; Purwanto, 2021). Table 6.13 shows the values for R square and R square corrected. Every value is in the range of 0 and 1.

Table 5.13: Co-efficient of Determination (R^2)

Construct	ITE	PSL	QS	QSBE	QT	WLE
R square	0.215	0.211	0.217	0.215	0.140	0.267
R square adjusted	0.211	0.209	0.213	0.211	0.136	0.263

5.9.5 Predictive Relevance Assessment (Q^2)

Q^2 was predetermined by Hair et al. (2017)'s blindfolding approach. Q^2predict, which is generated inside the standard algorithms of SmartPLS 4 (Ringle et al., 2022) following the PLS predict algorithms method (Shmueli et al., 2016), is used to evaluate the predictive relevance of the PLS path model. According to Hair et al. (2014), the PLS-SEM approach effectively illustrates the predictive importance of the endogenous concept in reflective measurement models. For each given endogenous component, the value of Q^2 needs to be greater than zero to assess the structural model's prediction accuracy. The Q^2 value is classified as small, medium, or significant in the PLS-path model compared to cut-off values of 0, 0.25, and 0.50 (Hair et al., 2019). Using the specified method in this study, PLS prediction algorithms were computed. From the summary of LV predictions, the values of Q^2predict were determined, and all were found to be more than zero.

Table-5.14: Predictive Relevance (Q^2predict)

Construct	ITE	PSL	QS	QSBE	QT	WLE
Q^2predict	0.045	0.203	0.053	0.038	0.006	0.125

5.10 Mediating Effect of the 'Quality of Students' and 'Quality of Teachers' on Quality Education

A mediating variable is an intermediary that elucidates and discerns the causal relationship by delineating the sequence from the independent variable to the dependent variable. The mediating impact is called the indirect effect since it is conveyed indirectly through the mediating variable (MacKinnon, 2012). 'Quality of Students' and 'Quality of Teachers' are the mediating variables in this research model. To justify the mediating effect, the researcher has checked the specific indirect effect of the measurement model assessment and found the justified mediating effect of the two mediator constructs- Quality of students (QS) and Quality of teachers (QT). Specific indirect effects were computed to evaluate the relationship among the different variables, and the mediating effects were found based on t values and p values. Causal relationships between the independent and dependent variables through the two mediating variables are furnished below. The t-values are higher than 1.645 at a 5% significance level for one one-tail approach, and p-values are lower than the threshold value 0.05.

Table 5.15: Justification of Mediating Effect

Relationship	Std. Beta	Std. dev.	T values	P Values
ITE -> QS -> QSBE	0.040	0.019	2.139	0.016
CS -> PSL -> ITE -> QS ->QSBE	0.008	0.004	1.994	0.023
PSL -> ITE -> QS -> QSBE	0.018	0.009	2.054	0.020
ITE -> QS -> QSBE	0.040	0.019	2.139	0.016
CS -> PSL -> QS -> QSBE	0.054	0.015	3.720	0.000
PSL -> QS -> QSBE	0.118	0.029	4.049	0.000
CS -> PSL -> QT -> QSBE	0.023	0.009	2.474	0.007
PSL -> QT -> QSBE	0.050	0.019	2.566	0.005
CS -> PSL -> WLE -> QT -> QSBE	0.011	0.005	2.466	0.007
PSL -> WLE -> QT -> QSBE	0.024	0.010	2.552	0.005
WLE -> QT -> QSBE	0.059	0.023	2.615	0.004
CS -> WLE -> QT -> QSBE	0.010	0.005	1.968	0.025
WLE -> QT -> QSBE	0.059	0.023	2.615	0.004
ITE -> QS -> QSBE	0.040	0.019	2.139	0.016
PSL -> ITE -> QS -> QSBE	0.018	0.009	2.054	0.020
ITE -> QS -> QSBE	0.040	0.019	2.139	0.016
PSL -> QS -> QSBE	0.118	0.029	4.049	0.000
PSL -> QT -> QSBE	0.050	0.019	2.566	0.005
PSL -> WLE -> QT -> QSBE	0.024	0.010	2.552	0.005
WLE -> QT -> QSBE	0.059	0.023	2.615	0.004
WLE -> QT -> QSBE	0.059	0.023	2.615	0.004

5.11 Test the Control Variable

This study has incorporated ‘Gender’ as a control variable from the respondents’ demographic characteristics to test the influence on the outcome variable. Causal hypothesized relationships between dependent and independent constructs may be affected by the respondents’ gender identity- male or female- coded as binary data 0 and 1, respectively. The researcher took only one control variable (Gender) and found two categorical data regarding respondents’ gender character. To assess the statistically significant impact of gender on the quality of secondary business education (QSBE), this study has conducted a bootstrapping approach using 5000 subsamples, with bias correction and accelerated bootstrap. The model was executed using constructs that were colored blue, and the path coefficients were then verified. The analysis did not find a statistically significant effect, as the p-value is more than 0.05 and the t-value is lower than the critical value of 1.645 for a one-tailed test at a 5% significance level for the path 'Gender -> QSBE'. Furthermore, the results of the lower and higher limits of the bias-corrected confidence intervals exhibit contrasting indications. To examine the statistically significant effect

of gender on the quality of secondary business education (QSBE), this study has completed the bootstrapping procedure with 5000 subsamples, bias-corrected, and accelerated bootstrap. The model was run with blue-colored constructs, and the results of the path coefficients were checked. No significant effect is found as the p-value is higher than 0.05 and the t-value is lower than the reference value 1.645 for one tail at a 5% significance level of the path 'Gender -> QSBE.' Also, results of the lower and higher limits of the bias-corrected confidence intervals bear opposite signs.

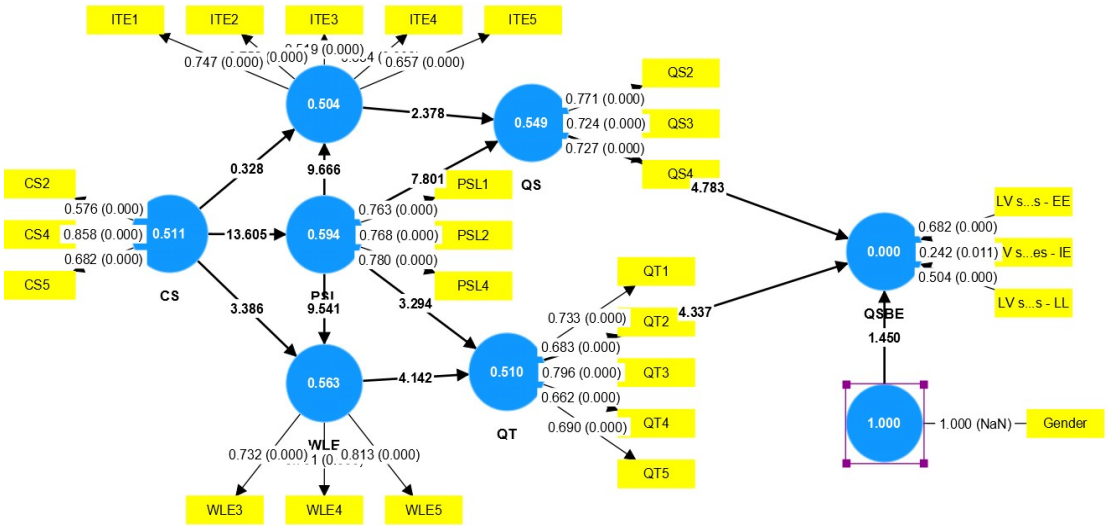


Figure 5.11: Structural Model with Control Variable

Table- 5.16: Results Summary for Structural Model with Control Variable

Relationship	Std. Beta	Std. Dev	T values	P values	BCILL 5%	BCIUL 95%
CS -> ITE	0.017	0.054	0.325	0.372	-0.074	0.105
CS -> PSL	0.459	0.034	13.59	0.000	0.399	0.510
CS -> WLE	0.187	0.050	3.764	0.000	0.101	0.265
Gender -> QSBE	-0.157	0.108	1.447	0.074	-0.327	0.036
ITE -> QS	0.132	0.055	2.380	0.009	0.038	0.221
PSL -> ITE	0.456	0.047	9.667	0.000	0.373	0.528
PSL -> QS	0.389	0.050	7.800	0.000	0.302	0.466
PSL -> QT	0.304	0.048	6.400	0.000	0.219	0.374
PSL -> WLE	0.413	0.043	9.486	0.000	0.337	0.480
QS -> QSBE	0.294	0.062	4.783	0.000	0.186	0.389
QT -> QSBE	0.260	0.059	4.365	0.000	0.153	0.351
WLE -> QT	0.229	0.055	4.142	0.000	0.134	0.319

From the comparison of the results summary between the model with the control variable and without the control variable, it has been seen that both models show almost the same result. Therefore, the control variable has no significant effect on QSBE. Irrespective of gender character, the quality of secondary business education (QSB.E) is influenced by dimensions such as curriculum standards (CS), pedagogy for sustainable learning (PSL), infrastructure and technical equipment (ITE), work or learning environment (WLE), quality of students (QS) and quality of teachers (QT).

Table 5.17: Comparison of Results for Structural Model with and without Control Variable

Relationship	**Results with control variable**				**Results without control variable**			
	Std. Beta	Std. Dev	T values	P values	Std. Beta	Std. Dev	T Values	P Values
CS -> ITE	0.018	0.054	0.328	0.371	0.018	0.054	0.328	0.371
CS -> PSL	0.460	0.034	13.605	0.000	0.460	0.034	13.605	0.000
CS -> WLE	0.172	0.051	3.386	0.000	0.172	0.051	3.386	0.000
Gender -> QSBE	-0.157	0.108	1.450	0.074	-	-	-	-
ITE -> QS	0.132	0.055	2.378	0.009	0.132	0.055	2.379	0.009
PSL -> ITE	0.456	0.047	9.666	0.000	0.456	0.047	9.666	0.000
PSL -> QS	0.389	0.050	7.801	0.000	0.389	0.050	7.803	0.000
PSL -> QT	0.193	0.058	3.294	0.000	0.193	0.058	3.299	0.000
PSL -> WLE	0.412	0.043	9.541	0.000	0.412	0.043	9.541	0.000
QS -> QSBE	0.295	0.060	4.783	0.000	0.301	0.060	5.022	0.000
QT -> QSBE	0.259	0.060	4.337	0.000	0.259	0.060	4.334	0.000
WLE -> QT	0.229	0.055	4.142	0.000	0.229	0.055	4.143	0.000

5.12 Testing Multi-group Effects

To examine the multi-group effect, this study conducted a one-way ANOVA (Analysis of Variance) test, and the respondents were categorized into four groups: commerce teachers, head teachers, male students, and female students. The hypothesis is designed as 'there is a significant difference in the quality of secondary business education across the different respondent groups.' Using the SPSS software (Version 26), this study analyzed the multi-group effects on the dependent variable (QSBE), taking four respondent groups as the factors. The four groups are numbered 1, 2, 3, and 4 for 100 respondents in each group. In one-way ANOVA, a test of homogeneity of variance is conducted, and a significant result was found, as the p-value is 0. The result of ANOVA of the between groups and within groups has been shown and found

significant results where the p-value is 0.014. Due to the significance of the result, the hypothesis is accepted, and there is certainly a significant difference in the quality of secondary business education across the four different groups.

Table 5.18: Result summary of the ANOVA test

Descriptive Statistics			ANOVA Results					
Respondents' Group	Mean	Standard Deviation		Sum of squares	Df	Mean square	F	Sig.
Commerce Teachers (1)	-.22769	.955753	Between Groups	10.530	3	3.510	3.569	.014
Head Teachers (2)	.09967	.853895	Within Groups	389.459	396	0.983		
Male Students (3)	.19692	1.276015	Total	399.989	399			
Female Students (4)	-.06888	.814317						

5.13 Summary of Hypotheses Testing

This study assesses the hypotheses using the path coefficient, t-values, and p-values. Table 6.14 provides a detailed summary of the theories examined. Using a one-tailed technique at a 5% significance level, the hypotheses are considered statistically significant when the t-values surpass 1.645 and the p-values are less than 0.05. Below is a summary of hypothesis testing, where just one hypothesis (H_1) out of 11 is not supported.

Table 5.19: Summary of Hypotheses Testing

No.	Statement	Decision
H_1	Curriculum standards positively influence the education infrastructure and technical equipment.	Not Supported
H_2	Curriculum standards positively influence the work/learning environment.	Supported
H_3	Curriculum standards positively influence the pedagogy for sustainable learning.	Supported
H_4	Pedagogy for sustainable learning positively influences the infrastructure & technical equipment.	Supported
H_5	Pedagogy for sustainable learning positively influences the work/learning environment.	Supported
H_6	Pedagogy for sustainable learning positively influences the quality of students.	Supported

H_7	Pedagogy for sustainable learning positively influences the quality of teachers.	Supported
H_8	Infrastructure & technical equipment positively influence the quality of students.	Supported
H_9	The quality of students positively influences the quality of secondary business education.	Supported
H_{10}	The work/learning environment positively influences the quality of teachers.	Supported
H_{11}	The quality of teachers positively influences the quality of secondary business education.	Supported

5.14 Chapter Summary

This chapter provides comprehensive examinations of the measurement model and structural model. Firstly, the measurement model has established the dependability and accuracy of the measurements. All the constructions satisfied the threshold of 0.70 for Composite Reliability. Additionally, nearly all the loadings exceeded 0.60, and all the AVE values were higher than 0.50. Furthermore, the structural model is validated by assessing the R square, f square, and Q square values. According to the results, 10 out of 11 hypotheses are confirmed. Using SmartPLS 4, the proposed control variable was examined, and it was determined that gender identification does not significantly affect the quality of secondary business education. On the other hand, another test, multi-group analysis is completed based on demographic data - four respondents' groups and found significant differences across the different groups. Finally, the structural model exhibits the mediation relationship. Two constructs- Quality of Students and Quality of Teachers are validated as the mediating variables.

Chapter 6

DISCUSSION AND CONCLUSION

6.1. Introduction

The previous chapter included a statistical analysis of the suggested study model and 11 hypotheses demonstrating the constructs' relationships. The chapter also presents the findings of the analysis. This chapter aims to offer explanations and draw implications from the results. This chapter further provides an in-depth analysis of the results derived from the research questions of this study. During the initial phase, this chapter generates the comprehensive conclusion of the research. Next, the study's impact on the theory, practice, and policy is explained. Ultimately, this study's constraints and potential avenues for further research are delineated.

6.2. Recapitulation of the Study

This study aims to conceptualize the quality of secondary business education using the perspective of SDG 4 to identify the key dimensions of quality in secondary business education, analyze the correlation between these factors, and establish a framework model for the quality of secondary business education based on SDG 4. This study has constructed a framework for assessing the quality of secondary business education by utilizing SDG 4 as a foundation. Based on the findings, it can be inferred that the model is statistically significant as most of the hypotheses have been accepted. This model identified key dimensions and subdimensions that help assess the quality of secondary business education. Furthermore, analyzing the path coefficients can efficiently examine the link between various dimensions indicated in the model.

After testing the validity and reliability of the measurement model (both lower and higher order), the structural model was examined to test the hypothesized relationship. Model's explanatory power or predictive accuracy was assessed by using the coefficient of determination (R^2) value and found that the research model is significant as it explains 21.50% of the variance in infrastructure and technical equipment (ITE), 21.10% variance in pedagogy for sustainable learning (PSL),), 26.70% variance in work or learning environment (WLE), 21.70% variance in quality of students (QS), 14% variance in quality of teachers (QT) and 21.50% variance in quality of secondary business education (QSBE). The explanatory power of all endogenous

constructs ranges from 0 to 1 (100%). In addition, ten hypotheses out of the eleven hypotheses proposed were supported.

6.3. Discussion of the Findings

6.3.1. Research Objective 1

To conceptualize and measure the quality of secondary business education from the perspective of SDG 4.

SDG 4 ensures inclusive and equitable quality education and promotes lifelong learning opportunities for all (UN, 2015). Based on the content of SDG 4, this study developed three sub-constructs: inclusive education, equitable education, and lifelong learning; those included 19 quality indicators and were used to measure the endogenous construct- quality in secondary business education (QSBE). For measuring Inclusive Education (IE), five items, such as acceptability of students with disabilities, teachers' workload in inclusive classes, positive attitude of the teachers, the inclusion of students who fail in exams, and knowledge and skills requirements, were used. Of them, only one item - teachers' workload in inclusive class (IE_2)- shows low factor loadings and is eliminated. Eight items or indicators measured Equitable Education (EE). They were equity in access to education, equity in the learning environment, gender equity, sustainable lifestyle, human rights, the culture of peace and nonviolence, global citizenship, and appreciation of cultural diversity. Out of them, the two indicators - equity in the learning environment (EE_2) and gender equity (EE_3) were not qualified due to low loadings and were excluded. To measure Lifelong Learning (LL), six indicators like goal setting capacity, application of knowledge and skills, self-direction quality, self-evaluation, information location capacity, and learning strategies adaptation were used. Out of them, goal setting capacity (LL_1), self-direction quality (LL_3), and learning strategies adaptation (LL_6) showed poor loadings and were eliminated. Thus, six indicators were excluded due to low loadings. Finally, as the dependent variable, quality in secondary business education (QSBE) was measured by 13 quality items (indicators) based on SDG 4.

6.3.2. Research Objective 2

What are the key dimensions of quality in secondary business education in Bangladesh?

In the literature review part, many factors or dimensions of quality education are explored by reviewing many research papers. From them, six critical dimensions as the independent variables are suggested to frame a research model where the quality of secondary business education (QSBE) is the dependent variable. Curriculum standards (CS), infrastructure and technical equipment (ITE), pedagogy for sustainable learning (PSL), work or learning environment (WLE), quality of students (QS), and quality of teachers (QT) are the dimensions of quality in secondary business education. 40 quality indicators are framed under these dimensions of quality education. Curriculum Standards (CS) include objectives of business education curriculum, business contents in the syllabus, sequence of business contents in textbooks, required number of classes, and assessment method. Due to low factor loadings, two indicators – objectives of curriculum for business studied (CS_1) and Sequence of business contents in textbooks (CS_3) are excluded. Infrastructure and Technical Equipment (ITE) dimension incorporates classrooms, computer labs with adequate facilities, facilities of sanitary groups, technical resources, and internet access in the schools. All indicators are justified under this construct. Pedagogy for Sustainable Learning (PSL) covers participatory methods, PowerPoint presentations using multimedia, business and industry visit programs, and online classes during the COVID-19 pandemic. Only one item – 'business and industry visit programs' (PSL_3)- was not included because of its low factor loadings. Work/Learning Environments (WLE) focuses on occupational health and workplace safety, good governance, integrity, and democracy as an organizational culture value and encourages students and teachers to respect others and class size. In this dimension, two items – occupational health and workplace safety (WLE_1) and good governance (WLE_2) are also excluded from the model. Basic mathematical knowledge, student engagement, interpersonal skills, and literacy and numeracy skills measure the quality of Students (QS). From the indicators of the construct QS, only one item - basic mathematical knowledge (QS_1) is not qualified and excluded. Quality of Teachers (QT) is assessed by recruiting qualified teachers, continuous monitoring and evaluation, in-house teacher training, arranging seminars for continuous development, workshops for teachers' development, and a few business education teachers. All items are validated and found justified based on their factor loadings. Finally, 22 items were selected as the quality indicators of six dependent variables, whereas 13 items were explored for measuring dependent variables as their outer loadings were up to the level.

Relationships among the factors or dimensions identified

This study formulated 11 hypotheses, and the structural model assessment supported 10 hypotheses (except H_1). These hypotheses identified relationships among the dimensions of quality education. The quality parameters in secondary business education exhibit a positive correlation. Upon analyzing the structural model, it is evident that the path coefficient (Beta value) reveals a poor association (0.018) between curriculum standards (CS) and Infrastructure and technical equipment (ITE), which does not meet the expected standard value of 0.10 or more (Eggert & Serdaroglu, 2011). Except for this, all other relationships are found to be significant. Though CS weakly influences ITE, it strongly influences (0.460) pedagogy for sustainable learning (PSL). CS also has a significant impact on WLE (0.174).

ITE is not influenced significantly by CS but strongly and significantly by PSL (0.455). The quality of teachers (QT) is less influenced by PSL (0.194) than WLE (0.238) in Bangladesh. In contrast, according to the findings of Dwaikat's research (2020), the quality of academic staff is more influenced (0.384) by the pedagogy standards than by the work/study environment (0.296) in Sweden. This result indicates that the pedagogy for sustainable learning must be improved along with the development of curriculum standards and work environment to increase the quality of secondary business education. PSL has a greater influence (0.389) on the quality of students (QS) than the influence of infrastructure and technical equipment, ITE (0.132). Dwaikat (2020) also found a stronger influence (0.380) of international pedagogy standards on the quality of students than the impact of education infrastructure (0.281). Among all significant path coefficients, the beta value (0.132) between ITE and QS is the lowest, which signals poor infrastructure and technical equipment and a challenge for achieving SDG 4 and ensuring quality business education at the secondary level. Ahmed et al. (2021) also revealed challenges related to the business education infrastructure at the secondary level of Bangladesh, such as inadequate teaching materials, unsuitable classrooms, and insufficient funds for teaching business education subjects. The authors recommended improving the education infrastructure and curriculum. The findings of our study also convey the same recommendation as we have found the insignificant impact of curriculum standards on infrastructure and technical equipment.

The quality of students and the quality of teachers have a positive and direct relationship with the quality of secondary business education, as the study's beta values of QS -> QSBE and QT ->

QSBE are 0.310 and 0.239, respectively. QS has a higher influence (0.310) on the quality of secondary business education (QSBE) than the influence of QT on QSBE (0.239). The comparatively lower impact of the quality of students (0.266) on the quality of academic programs than the impact of the quality of faculty staff (0.411) on the quality of academic programs was found by Dwaikat (2020). Gora et al. (2019) also found that the quality of teaching staff positively and directly influences learners' academic performance with a higher beta value (0.430). The path coefficient (0.239) between QT and QSBE of this study is lower than that of Dwaikat's study (0.411) and the study of Gora et al. (0.430). This is an alarming issue, as the quality of teachers is not contributing more than the quality of students to the increasing quality of secondary business education in Bangladesh. However, both QS and QT significantly affect the quality of education. Therefore, initiatives can be taken to increase the quality of teachers or recruit qualified teachers; further research may be undertaken to understand the causes of this issue.

Four independent antecedents, such as curriculum standards, pedagogy for sustainable learning, infrastructure and technical equipment, and work/learning environment, have no direct relation to the dependent antecedent, quality of secondary business education (QSBE). However, they are significantly related to the dependent antecedent, QSBE, via two mediating antecedents: the quality of students (QS) and teachers (QT).

The following hypotheses were supported based on their t values (reference value is 1.645 at a 5% significance level) and p values (reference value is less than .05).

H_2: Curriculum standards positively influence the work/learning environment.
H_3: Curriculum standards positively influence the pedagogy for sustainable learning.
H_4: Pedagogy for sustainable learning positively influences the infrastructure and technical equipment.
H_5: Pedagogy for sustainable learning positively influences the work/learning environment.
H_6: Pedagogy for sustainable learning positively influences the quality of students.
H_7: Pedagogy for sustainable learning positively influences the quality of teachers.
H_9: The quality of students positively influences the quality of secondary business education.
H_{10}: Work/learning environment positively influences the quality of teachers.

H_{11}: The quality of teachers positively influences the quality of secondary business education.

6.3.3. Research Objective 3

To develop a framework model for quality assessment in secondary business education based on SDG 4.

Based on the I-P-O (Input-Process-Output) model (UNESCO, 2002), many scholars (Chua, 2004; Luong & Nieke, 2014; Garira, 2020; Dwaikat, 2020) developed their research framework, including the input, process, and output dimensions of quality. Pourrajab et al. (2011), Nawelwa et al. (2015), Sfakianaki (2019), and Dwaikat (2020) used the TQM philosophy to develop their conceptual model and quality indicators. This study proposed a research model based on Dwaikat's model and SDG 4. The proposed research model is designed to comprise seven constructs and three subconstructs. Six constructs were adapted from research papers, and the researcher developed the other four. Examining both the measurement model and structural model, it was found that the proposed model is significant.

6.4 Implications of the Study

6.4.1 Implications for Knowledge

This study contributes to our comprehension of the quality of secondary business education. This study has addressed the lack of research on the quality of secondary business education, specifically focusing on SDG 4. The study has analyzed existing literature, formulated 11 assumptions, and constructed a model for achieving quality education. As a result, the study has tried to close the gap in the research on quality business education at the secondary level. Dwaikat (2020) created and evaluated a model based on the TQM philosophy and the I-P-O model. Considering SDG 4 and the COVID-19 pandemic, this model expanded the quality education framework by adding new constructs and components of secondary business education. In this study, the researchers have incorporated 'curriculum standards' as an independent variable with literature support in the lower-order model. In the higher-order construct of the model, the researchers have also contributed by creating three variables: inclusive education, equitable education, and lifelong learning. These variables are developed based on SDG 4. These three sub-constructs measure the dependent variable, quality in secondary business education (QSBE). Under these three factors, nineteen indicators were

measured, and thirteen were selected as significant items. QSBE, a dependent variable, is the higher-order reflective-formative construct rarely observed in the PLS-SEM. This study has contributed to the knowledge of quality education that reflects SDG 4 in secondary business education.

The study's results showed that the R2 value of the dependent variable—quality in secondary business education (QSBE) is 0.215, within the acceptable range of 0 to 1. This result proves that the model can explain the significant factors or dimensions of quality. This study determined f^2 to measure the relative impact of a predictor construct on an endogenous construct. The result of effect size (f^2) indicated that except for one path (CS -> ITE), all paths/relationships are significant.

6.4.2 Practical Implications

Additionally, the study has created an opportunity for secondary education practices in terms of quality. The researcher has examined a novel extended model within the Bangladeshi secondary business education quality framework. Dwaikat (2020) used data from Swedish higher education institutions to create a model. The researchers have created a framework model illustrating the relationships between the quality aspects by extending and changing this model. Modelling the antecedents of quality education, this study used the dependent variable, QSBE, as the higher-order construct and empirically tested it. The stakeholders will benefit when the study results are reflected in the teaching-learning process. The study's conclusions will aid educators, trainers, and other stakeholders in comprehending the main influencing factors and their effects on secondary business education. Trainers might converse with trainees or teachers on research findings about SDG 4 and the caliber of secondary business education. Teachers can also impart that knowledge to the students in their institutions' classrooms. All parties involved in secondary schools will be informed about the study's findings in this way, and they will take a more active role in ensuring quality education and achieving SDG 4.

6.4.3 Policy Implication

Policymakers will also benefit from this research, as it will supply the data needed to create policies that improve the quality of education. The researcher discovered specific issues during the data collection phase. One post of assistant teacher is assigned to serve three subjects in secondary business education in Bangladesh. Furthermore, most schools have vacant positions

of teachers due to time-consuming recruitment procedures through NTRCA rather than SMC. Ensuring the availability of computer lab facilities with internet support by student enrollment is crucial for providing quality education. These are the essential issues where policy action is required. Therefore, necessary measures like formulating a post-creation policy, a prompt recruitment policy through an appropriate authority, a policy for establishing computer laboratories with internet access, etc., are essential to address these issues. As quality items are crucial for attaining quality education in secondary schools, this study provides 40 indicators under the independent variables and 19 under the dependent variables for Bangladesh. These indicators are influenced by the relevant policies from the Ministry of Education, the Directorate of Secondary and Higher Education, and the School Managing Committee.

6.5 Limitations of the study

There exist certain limitations to this study. Primary information for this study was gathered from head teachers, business studies teachers, and male and female students in the secondary business studies program. Before preparing and verifying the questionnaire, many focus group discussions (FGDs) were scheduled, including teachers from the schools. Other stakeholders in SDG 4 and quality education such as guardians and members of the school management committee (SMC) could be included as respondents in the study.

Several vital components or aspects of quality education were included in this study as the research model's constructs, which had strong validation. Additional significant dimensions, such as government policy and funding (Shaturaev, 2021; Tomte et al., 2019; Jacob & Richard, 2021), collaboration and motivation (Garbe et al., 2020; Manca & Delfino, 2021; Fauzi et al., 2021; Erumit, 2021; Code et al., 2022; Mahajan et al., 2023), and blended learning environments (Bidarra & Rusman, 2017; Kaufman, 2019; Mulholland, 2019; Ramli et al., 2022; Bizami et al., 2023) could be included as constructs even though they had a significant impact on secondary business education quality.

There are restrictions during the data collection phase as well. This study's foundation is a cross-sectional survey. Examining the causes and effects of the responses provided by various educators is challenging. The measurement of dependent and independent variables may lead to common method bias. In most schools, the business studies class is taught by just one teacher. Consequently, gathering data was an extremely time-consuming task.

Data for this study was gathered from high schools in several Upazilas within a single district. Even though the sampling frame was determined mainly by the school grades, it might include students from several districts in several Bangladeshi divisions. Geographical location data may differ from district to district due to cultural variances. This is the study's shortcoming in this circumstance.

Another constraint of this study is the researcher's inability to use institutionally subscribed database software, such as Web of Science and Scopus, to review the literature on quality education. The researcher has encountered the issue despite the department's and the honorable supervisor's diligent efforts.

6.6 Future Research Directions

Since new teaching-learning approaches replace traditional classroom-based methods, a new set of standards for assessing educational quality is required. This study suggests developing valid and trustworthy measurement indicators for the quality assessment criteria. It also suggests further research on cross-cultural comparisons of different countries' developmental stages, especially between developing and developed countries.

Future research may also be undertaken on every antecedent of quality in secondary education found in this study. Research on curriculum standards, pedagogy for sustainable learning, infrastructure and technical equipment, learning environment, and the quality of students and teachers in secondary education is suggested for future study with the lens of SDG 4. In addition, more research on inclusive education, equitable education, or lifelong learning that facilitates quality education is recommended for education researchers.

To ensure the results' generalizability, it would be prudent to do further study by examining this model in other nations and validating it in different cultural and economic contexts. Every country that wants to employ safe, effective, and sustainable technology in the classroom must have a well-thought-out plan (Stafford-Smith et al., 2017). Bangladesh might not provide a

suitable or secure setting for any effective or secure technology. Future studies on the efficacy of technology-driven education might be carried out.

6.7 Conclusion

Sustainable Development Goal 4 and the quality of secondary business education are interrelated and complementary. This study has developed and tested a comprehensive model comprising both dependent and independent variables. Six independent constructs belong to the input and process variables of the I-P-O type model and are related to quality education. Three sub-constructs-inclusive education, equitable education, and lifelong learning were incorporated entirely based on SDG 4 under the dependent variable, QSBE, the output variable in the model. Knowing the identified dimensions and indicators of quality education, the interrelationship of the different constructs of the model, and some tested hypotheses relating to quality education are essential for achieving SDG 4. This study contributes to the theory, practice, and policy regarding quality education. It has also shown the signpost of the future research agenda. The outcome of this research will be helpful for education researchers, teachers, school authorities, and the government to formulate and implement necessary policies for establishing and upholding quality in secondary business education.

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Appendix

1. List of Sustainable Development Goals

Sustainable Development Goals

"Goal 1. End poverty in all its forms everywhere.

Goal 2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.

Goal 3. Ensure healthy lives and promote well-being for all at all ages.

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Goal 5. Achieve gender equality and empower all women and girls.

Goal 6. Ensure availability and sustainable management of water and sanitation for all.

Goal 7. Ensure access to affordable, reliable, sustainable, and modern energy for all.

Goal 8. Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.

Goal 10. Reduce inequality within and among countries.

Goal 11. Make cities and human settlements inclusive, safe, resilient, and sustainable.

Goal 12. Ensure sustainable consumption and production patterns.

Goal 13. Take urgent action to combat climate change and its impacts.

Goal 14. Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.

Goal 15. Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss.

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels.

Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.

* Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change."

Source: Draft outcome document of the United Nations summit for the adoption of the post-2015 development agenda A/RES/69/315

2. List of the Targets of Sustainable Development Goal 4

"SDG 4: To ensure inclusive and equitable quality education and to promote lifelong learning opportunities for all."

"4.1. By 2030, ensure that all girls and boys complete free, equitable, and quality primary and secondary education, leading to relevant and effective learning outcomes.

4.2. By 2030, ensure that all girls and boys have access to quality early childhood development, care, and pre-primary education so that they are ready for primary education.

4.3. By 2030, ensure equal access for all women and men to affordable and quality technical, vocational, and tertiary education, including university.

4.4. By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs, and entrepreneurship.

4.5. By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples, and children in vulnerable situations.

4.6. By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy.

4.7. By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and culture's contribution to sustainable development.

4.a. Build and upgrade education facilities that are child, disability, and gender sensitive and provide safe, non-violent, inclusive, and effective learning environments for all.

4.b. By 2030, substantially expand the number of scholarships available to developing countries globally, in particular, least developed countries, small island developing States, and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programs, in developed countries and other developing countries.

4. c. By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States."

Source: Draft outcome document of the United Nations summit for the adoption of the post-2015 development agenda A/RES/69/315

3. DATA COLLECTION TOOL FOR BUSINESS STUDIES TEACHERS

Research Title

SDG 4 and Quality of Secondary Business Education in Bangladesh

DEMOGRAPHIC DATA

1. Gender : Female Male Others

2. Age : _____ years old

3. Position : Assistant Teacher Assistant Head Teacher
Principal /Head Teacher

4. School location where you teach : Urban Suburban Rural

5. Educational Qualification : HSC Bachelor Masters Others

6. Training : Subject based ICT
Curriculum/Pedagogy

7. Teaching Experience : _____ years

Questionnaire for data collection using a 5-point Likert Scale

(1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree)

Infrastructure and Technical Equipment (ITE)	**1**	**2**	**3**	**4**	**5**
ITE_1: Classrooms are suitable with sufficient furniture for interactive teaching and learning.					
ITE_2: A computer lab with sufficient facilities is available in my school.					
ITE_3: My school has sufficient sanitary facilities for the students and teachers.					
ITE_4: My school has the resources (computer, projector, etc.) for the teacher to use in the teaching process (PowerPoint presentations).					
ITE_5: I have internet access in my school for online classes.					
Curriculum Standards (CS)	**1**	**2**	**3**	**4**	**5**

CS_1: The objectives of the business education curriculum are clearly stated.					
CS_2: The curriculum of secondary business education has included adequate business content in the syllabus.					
CS_3: The contents of business education subjects have been appropriately arranged according to the syllabus.					
CS_4: My school is conducting the required number of classes for each subject and topic, per the direction of the national curriculum.					
CS_5: My school follows the assessment methods of the students, both continuous and summative assessments described in the national curriculum.					
Pedagogy for Sustainable Learning (PSL)	**1**	**2**	**3**	**4**	**5**
PSL_1: Participatory methods (group work, peer work, brainstorming) are used while teaching business education.					
PSL_2: Business education classes are conducted through PowerPoint presentations using multimedia.					
PSL_3: Business and industry visit programs are available in my school for students in business education.					
PSL_4: I have conducted online classes during the COVID-19 pandemic.					
Work/Learning Environments (WLE)	**1**	**2**	**3**	**4**	**5**
WLE_1: School authority supports occupational health and workplace safety for its staff (teachers, employees) and students.					
WLE_2: There is good governance in my school administration system that is transparent and accessible to all stakeholders.					
WLE_3: My school fosters integrity as a fundamental organizational culture value.					
WLE_4: My school encourages students and teachers to respect others.					
WLE_5: My school practices democracy as a primary organizational culture value.					
WLE_6: The class size of the Business Studies group in my school is suitable for interactive teaching-learning.					
Quality of Students (QS)	**1**	**2**	**3**	**4**	**5**
QS_1: Basic mathematical knowledge is required to enter the Business Studies group.					
QS_2: Students' engagement in all academic activities is satisfactory.					
QS_3: Business education students acquire interpersonal skills in my school.					

QS_4: The students achieve literacy and numeracy skills by studying secondary business education.					
Quality of Teachers (QT)	**1**	**2**	**3**	**4**	**5**
QT_1: School authority recruits qualified academic staff to ensure quality education.					
QT_2: School authority applies continuous monitoring and evaluation of staff performance					
QT_3: For the continuous development of teachers, my school arranged training					
QT_4: For the continuous development of teachers, my school arranged a seminar					
QT_5: For the continuous development of teachers, my school arranged a workshop					
QT_6: My school has enough qualified business education teachers to achieve effective learning outcomes.					
Quality of Secondary Business Education					
Inclusive Education:					
IE_1: Students with disabilities are cordially accepted by the other students in my school.					
IE_2: I am concerned that my workload will increase if I have students with disabilities in my class.					
IE_3: I always show a positive attitude to the students with disabilities in my class.					
IE_4: Students who frequently fail exams should be in regular classes.					
IE_5: I have the knowledge and skills required to teach students with disabilities.					
Equitable Education:					
EE_1: In my school, students have equal access to secondary business education, irrespective of their socio-economic status.					
EE_2: My school builds or upgrades education facilities that provide safe and effective learning environments for all.					
EE_3: There is no gender discrimination in my school.					
EE_4: The students are acquiring knowledge for **s**ustainable lifestyles.					
EE_5: The students are acquiring knowledge of human rights.					
EE_6: The students acquire knowledge to promote a culture of peace and nonviolence.					
EE_7: The students are acquiring knowledge for global citizenship.					
EE_8: The students acquire knowledge to appreciate cultural diversity.					

Lifelong Learning:					
LL_1: Students can set their goals.					
LL_2: Students try to relate academic learning to practical issues.					
LL_3: Students are self-directed in learning.					
LL_4: Students can evaluate their success.					
LL_5: Students can locate information when they need it.					
LL_6: Students can deal with unexpected situations and solve problems.					

4. DATA COLLECTION TOOL FOR HEAD TEACHERS

Research Title

SDG 4 and Quality of Secondary Business Education in Bangladesh

DEMOGRAPHIC DATA

1. Gender : Female Male Others

2. Age : _____ years old

3. School location where you teach : Urban Suburban Rural

4. Educational Qualification : HSC Bachelor Master Others

5. Training : Subject-based ICT Curriculum/Pedagogy

6. Teaching Experience : _____ years

Questionnaire for data collection using a 5-point Likert Scale

(1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree)

Infrastructure and Technical Equipment (ITE)	**1**	**2**	**3**	**4**	**5**
ITE_1: Classrooms are suitable with sufficient furniture for interactive teaching and learning.					
ITE_2: A computer lab with sufficient facilities is available in my school.					
ITE_3: My school has sufficient sanitary facilities for the students and teachers.					

ITE_4: My school has the resources (computer, projector, etc.) for the teacher to use in the teaching process (PowerPoint presentations).					
ITE_5: Teachers have internet access in my school for online classes.					
Curriculum Standards (CS)	**1**	**2**	**3**	**4**	**5**
CS_1: The objectives of the business education curriculum are clearly stated.					
CS_2: The curriculum of secondary business education has included adequate business content in the syllabus.					
CS_3: The contents of the subjects of business education have been appropriately arranged according to the syllabus.					
CS_4: As per the direction of the national curriculum, my school is conducting the required number of classes for each subject and topic.					
CS_5: My school follows the assessment methods of the students, both continuous and summative assessments, as described in the national curriculum.					
Pedagogy for Sustainable Learning (PSL)	**1**	**2**	**3**	**4**	**5**
PSL_1: Participatory methods (group work, peer work, brainstorming) are used while teaching business education.					
PSL_2: Business education classes are conducted through PowerPoint presentations using multimedia.					
PSL_3: Business and industry visit programs are available in my school for students in business education.					
PSL_4: My school has conducted online classes during the COVID-19 pandemic.					
Work/Learning Environments (WLE)	**1**	**2**	**3**	**4**	**5**
WLE_1: School authority supports occupational health and workplace safety for its teachers, employees, and students.					
WLE_2: There is good governance in my school administration system that is transparent and accessible to all stakeholders.					
WLE_3: My school fosters integrity as a fundamental organizational culture value.					
WLE_4: My school encourages students and teachers to respect others.					
WLE_5: My school practices democracy as a primary organizational culture value.					
WLE_6: The class size of the Business Studies group in my school is suitable for interactive classes.					
Quality of Students (QS)	**1**	**2**	**3**	**4**	**5**
QS_1: Basic mathematical knowledge is required to enter the Business Studies group.					
QS_2: Students' engagement in all academic activities is satisfactory.					
QS_3: Business education students acquire interpersonal skills in my school.					
QS_4: The students achieve literacy and numeracy skills by studying secondary business education.					
Quality of Teachers (QT)	**1**	**2**	**3**	**4**	**5**
QT_1: School authority recruits qualified teachers to ensure quality education.					

QT_2: School authority applies continuous monitoring and evaluation of teachers' performance.					
QT_3: For the continuous development of teachers, my school arranges training.					
QT_4: For the continuous development of teachers, my school arranged a seminar.					
QT_5: For the continuous development of teachers, my school arranged a workshop.					
QT_6: My school has enough qualified business education teachers to achieve effective learning outcomes.					
Quality of Secondary Business Education					
Inclusive Education:	**1**	**2**	**3**	**4**	**5**
IE_1: Students with disabilities are cordially accepted by the other students in my school.					
IE_2: I am concerned that my workload will increase if I have students with disabilities in my class.					
IE_3: I always show a positive attitude to the students with disabilities in my school.					
IE_4: Students who frequently fail exams should be in regular classes.					
IE_5: I have the knowledge and skills required to teach students with disabilities.					
Equitable Education:	**1**	**2**	**3**	**4**	**5**
EE_1: In my school, students have equal access to secondary business education, irrespective of their socio-economic status.					
EE_2: My school builds or upgrades education facilities that provide safe and effective learning environments for all.					
EE_3: There is no gender discrimination in my school.					
EE_4: The students are acquiring knowledge for **s**ustainable lifestyles.					
EE_5: The students are acquiring knowledge of human rights.					
EE_6: The students acquire knowledge to promote a culture of peace and nonviolence.					
EE_7: The students are acquiring knowledge for global citizenship.					
EE_8: The students acquire knowledge to appreciate cultural diversity.					
Lifelong Learning:	**1**	**2**	**3**	**4**	**5**
LL_1: Students can set their goals.					
LL_2: Students try to relate academic learning to practical issues.					
LL_3: Students are self-directed in learning.					
LL_4: Students can evaluate their success.					
LL_5: Students can locate information when they need it.					
LL_6: Students can deal with unexpected situations and can solve problems.					

5. DATA COLLECTION TOOL FOR STUDENTS (Male and Female)

Research Title

SDG 4 and Quality of Secondary Business Education in Bangladesh

DEMOGRAPHIC DATA

1. Gender : Male Female Others
2. Age : _____ years old
3. Class : Nine Ten
4. School location where you teach: Urban Suburban Rural
5. Studying in this school: _____ years

Questionnaire for data collection using a 5-point Likert Scale

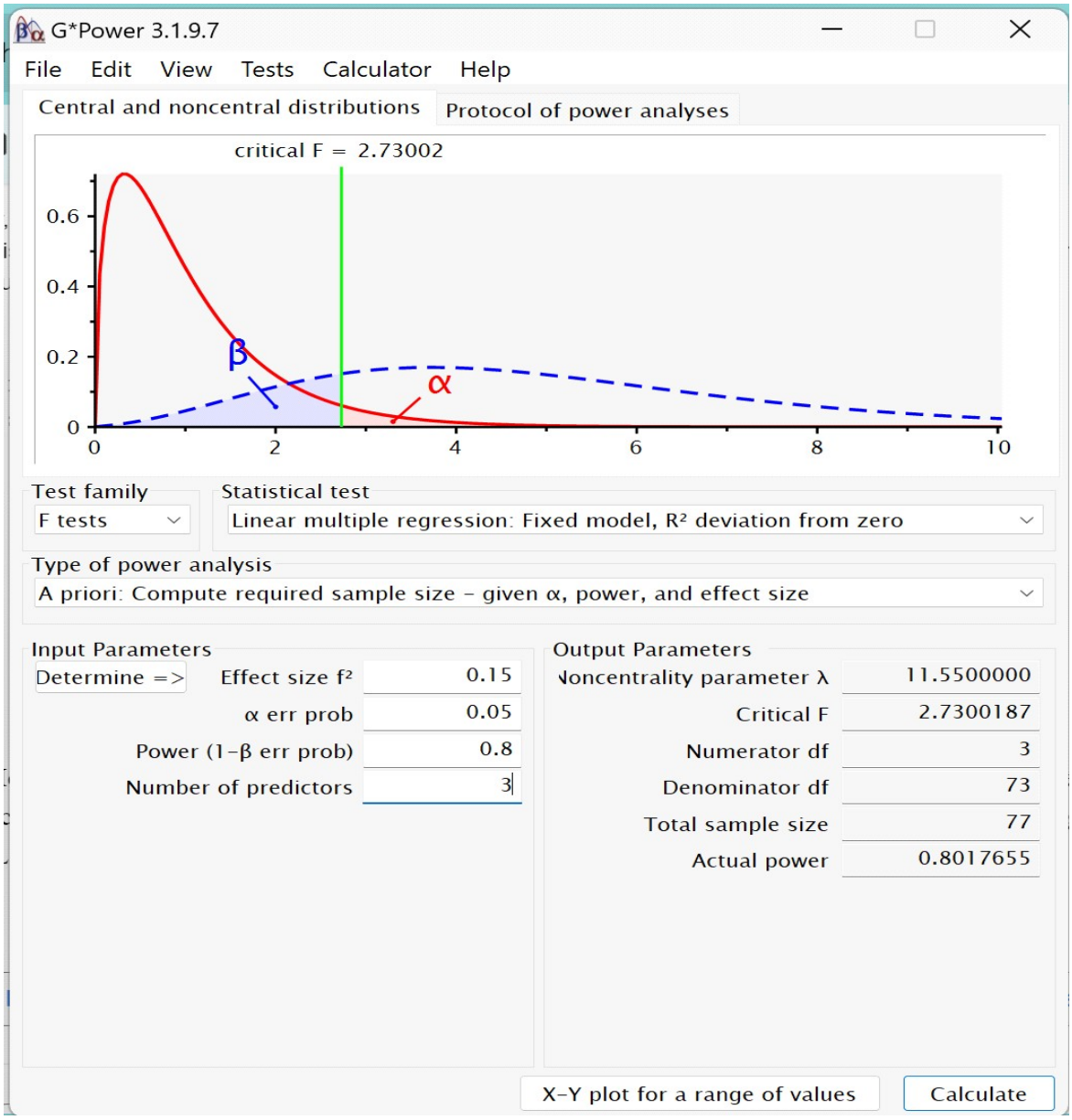
(1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree)

Infrastructure and Technical Equipment (ITE)	**1**	**2**	**3**	**4**	**5**
ITE_1 : বিদ্যালয়ে পর্যাপ্ত আসবাবপত্রসহ পারস্পরিক মিথস্ক্রিয়ার মাধ্যমে শিখন-শেখানোর উপযোগী শ্রেণিকক্ষ রয়েছে।					
ITE_2: বিদ্যালয়ে পর্যাপ্ত সুবিধাদিসহ কম্পিউটার ল্যাব আছে।					
ITE_3: বিদ্যালয়ে শিক্ষার্থী ও শিক্ষকদের জন্য পর্যাপ্ত স্যানিটারি সুবিধা বিদ্যমান।					
ITE_4: শিক্ষকদের জন্য শ্রেণিকক্ষে পাওয়ার পয়েন্টে পাঠদান করার জন্য কম্পিউটার, প্রজেক্টর প্রভৃতি সুবিধা রয়েছে।					
ITE_5: অনলাইন ক্লাসের জন্য বিদ্যালয়ে ইন্টারনেট সুবিধা রয়েছে।					
Curriculum Standards (CS)	**1**	**2**	**3**	**4**	**5**
CS_1: কারিকুলামে ব্যবসায় শিক্ষার উদ্দেশ্য যথাযথভাবে বর্ণিত রয়েছে।					
CS_2: ব্যবসায় শিক্ষার সিলেবাসে ব্যবসায় সংক্রান্ত বিষয়বস্তু পর্যাপ্ত পরিমাণে আছে।					
CS_3: ব্যবসায় শিক্ষা বিভাগের প্রতিটি বিষয়ের বইয়ে বিষয়বস্তুর বিন্যাস সিলেবাস অনুসরণ করে তৈরি হয়েছে।					
CS_4: কারিকুলামে নির্দেশিত প্রতিটি বিষয় ও অধ্যায়ের জন্য নির্ধারিত ক্লাসসংখ্যা আমাদের বিদ্যালয় অনুসরণ করে।					
CS_5: শিক্ষার্থীদের মূল্যালনে আমাদের বিদ্যালয় পর্যায়ক্রমিক ও চূড়ান্ত উভয় প্রকার মূল্যালয়ন পদ্ধতি অনুসরণ করে।					
Pedagogy for Sustainable Learning (PSL)	**1**	**2**	**3**	**4**	**5**
PSL_1: ব্যবসায় শিক্ষার ক্লাসে দলগত কাজ, জোড়ায় কাজ প্রভৃতি অংশগ্রহণমূলক পদ্ধতি ব্যবহৃত হয়।					
PSL_2: মাল্টিমিডিয়া ব্যবহার করে পাওয়ার পয়েন্ট উপস্থাপনার মাধ্যমে ব্যবসায় শিক্ষার ক্লাসসমূহ পরিচালনা করা হয়।					
PSL_3: আমাদের বিদ্যালয়ে ব্যবসায় শিক্ষার শিক্ষার্থীদের জন্য ব্যবসায় প্রতিষ্ঠান ও শিল্প-কারখানা পরিদর্শনের সুযোগ আছে।					
PSL_4: কোভিড-১৯ চলাকালীন বিদ্যালয় কর্তৃক অনলাইন ক্লাস চালু ছিল।					

Work/Learning Environments (WLE)	**1**	**2**	**3**	**4**	**5**
WLE_1: শিক্ষক, কর্মচারী ও শিক্ষার্থীদের জন্য স্কুল কর্তৃপক্ষ স্বাস্থ্য সুরক্ষা ও নিরাপত্তার ব্যবস্থা করে।					
WLE_2: স্কুলের প্রশাসনিক ব্যবস্থায় সুশাসন রয়েছে যা সকল সুবিধাভোগীর নিকট স্বচ্ছ, জবাবদিহিমূলক ও উন্মুক্ত।					
WLE_3: আমাদের বিদ্যালয় সাংগঠনিক সংস্কৃতি হিসেবে সততাকে (Integrity) লালন করে থাকে।					
WLE_4: অন্যকে শ্রদ্ধা করার শিক্ষা প্রদানে আমাদের বিদ্যালয় ছাত্র শিক্ষক সকলকে উৎসাহিত করে।					
WLE_5: আমাদের বিদ্যালয় সাংগঠনিক সংস্কৃতি হিসেবে গণতন্ত্রের চর্চা করে থাকে।					
WLE_6: ব্যবসায় শিক্ষা বিভাগের প্রতিটি শ্রেণির আকার (Class size) পারস্পরিক শিখন-শেখানোর (Interactive Learning) জন্য উপযোগী।					
Quality of Students (QS)	**1**	**2**	**3**	**4**	**5**
QS_1: ব্যবসায় শিক্ষা বিভাগে প্রবেশের জন্য মৌলিক গাণিতিক জ্ঞান প্রয়োজন।					
QS_2: সকল একাডেমিক কার্যক্রমে শিক্ষার্থীদের অংশগ্রহণ সন্তোষজনক।					
QS_3: বিদ্যালয়ে শিক্ষার্থীরা আন্তঃব্যক্তিক দক্ষতা অর্জন করে।					
QS_4: ব্যবসায় শিক্ষা অধ্যায়ন করে শিক্ষার্থীরা ভাষাজ্ঞান ও গাণিতিক দক্ষতা অর্জন করে।					
Quality of Teachers (QT)	**1**	**2**	**3**	**4**	**5**
QT_1: গুণগত শিক্ষা নিশ্চিতকল্পে বিদ্যালয়ে মানসম্পন্ন শিক্ষক নিয়োগ করা হয়।					
QT_2: স্কুল কর্তৃপক্ষ শিক্ষকদের কার্যক্রম নিবিড়ভাবে পর্যবেক্ষণ ও মূল্যায়ন করে থাকে।					
QT_3: শিক্ষকদের ক্রমাগত মান উন্নয়নে বিদ্যালয় কর্তৃক প্রশিক্ষণের আয়োজন করা হয়।					
QT_4: শিক্ষকদের ক্রমাগত মান উন্নয়নে বিদ্যালয় কর্তৃক সেমিনার আয়োজন করা হয়।					
QT_5: শিক্ষকদের ক্রমাগত উন্নয়নে বিদ্যালয় কর্তৃক কর্মশালা আয়োজন করা হয়।					
QT_6: কার্যকর শিখনফল অর্জনের জন্য বিদ্যালয়ে ব্যবসায় শিক্ষা বিভাগের পর্যাপ্ত সংখ্যক মানসম্পন্ন শিক্ষক রয়েছে।					
Quality of Secondary Business Education					
Inclusive Education:	**1**	**2**	**3**	**4**	**5**
IE_1: প্রতিবন্ধী শিক্ষার্থীদেরকে অন্যান্য শিক্ষার্থীরা আন্তরিকভাবে গ্রহণ করে।					
IE_2: ক্লাসে প্রতিবন্ধী শিক্ষার্থী থাকলে শিক্ষকদের কাজের চাপ বৃদ্ধি পায়।					
IE_3: প্রতিবন্ধী শিক্ষার্থীদের প্রতি শিক্ষকরা সবর্দাই ইতিবাচক দৃষ্টিভঙ্গি প্রদর্শন করেন।					
IE_4: পরীক্ষায় বার বার ফেল করা শিক্ষার্থীদের জন্য ক্লাসে নিয়মিত উপস্থিতি নিশ্চিত করা প্রয়োজন।					
IE_5: প্রতিবন্ধী শিক্ষার্থীদের শেখানোর ক্ষেত্রে শিক্ষকদের পর্যাপ্ত জ্ঞান ও অভিজ্ঞতা রয়েছে।					
Equitable Education:	**1**	**2**	**3**	**4**	**5**
EE_1: আর্থ-সামাজিক অবস্থা নির্বিশেষে সকল শিক্ষার্থীদের জন্য ব্যবসায় শিক্ষা বিভাগে অধ্যয়ন করার সমান সুযোগ রয়েছে।					

EE_2: আমাদের বিদ্যালয় শিক্ষার বিভিন্ন সুবিধা প্রদানের মাধ্যমে নিরাপদ ও কার্যকর পরিবেশ সৃষ্টি করেছে।					
EE_3: আমাদের স্কুলে কোনরূপ লিঙ্গ-বৈষম্য (Gender discrimination) নেই।					
EE_4: শিক্ষার্থীরা টেকসই জীবন মান (Sustainable lifestyle) সম্পর্কে জ্ঞান অর্জন করে।					
EE_5: মানবাধিকার (Human rights) সম্পর্কে শিক্ষার্থীরা জ্ঞান অর্জন করতে পারে।					
EE_6: শান্তি ও অহিংসা (Peace and non-violence)-র সংস্কৃতি উন্নয়নে শিক্ষার্থীরা জ্ঞান অর্জন করে।					
EE_7: বৈশ্বিক নাগরিক (Global citizenship) হওয়ার জন্য শিক্ষার্থীরা জ্ঞান অর্জন করতে পারে।					
EE_8: সংস্কৃতির বৈচিত্রায়ন (Cultural diversity)- কে উৎসাহিত করতে শিক্ষার্থীরা জ্ঞান অর্জন করতে পারে।					
Lifelong Learning:	**1**	**2**	**3**	**4**	**5**
LL_1: শিক্ষার্থীরা নিজেদের লক্ষ্য স্থির করতে পারে।					
LL_2: শিক্ষার্থীরা একাডেমিক শিক্ষার সাথে বাস্তব বিষয়সমূহকে মিলিয়ে দেখার চেষ্টা করে।					
LL_3: শিখন কার্যক্রমে শিক্ষার্থীরা স্ব-নির্দেশিত।					
LL_4: শিক্ষার্থীরা নিজেদের সফলতা মূল্যায়ন করতে সক্ষম।					
LL_5: প্রয়োজনের সময় শিক্ষার্থীরা তথ্য খুঁজে বের করতে পারে।					
LL_6: শিক্ষার্থীরা অপ্রত্যাশিত পরিস্থিতি মোকাবিলা ও সমস্যা সমাধান করতে পারে।					

4. Sample size determination using G power software


G*Power 3.1.9.7
File Edit View Tests Calculator Help
Central and noncentral distributions
Protocol of power analyses
critical F = 2.73002
0.6
0.4
0.2
0
0
2
4
6
8
10
β
α
Test family
F tests
Statistical test
Linear multiple regression: Fixed model, R² deviation from zero
Type of power analysis
A priori: Compute required sample size – given α, power, and effect size
Input Parameters
Determine =>
Effect size f²
0.15
α err prob
0.05
Power (1–β err prob)
0.8
Number of predictors
3
Output Parameters
Noncentrality parameter λ
11.5500000
Critical F
2.7300187
Numerator df
3
Denominator df
73
Total sample size
77
Actual power
0.8017655
X-Y plot for a range of values
Calculate