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Message From Editor-in-Chief

This is the sixth issue of the City University Journal; July 2023 which consists of eight articles contributed by the faculty members of City University as well as researchers from other institutions specialized in their subject areas.

I would like to express my heartfelt thanks to the contributors and reviewers of the articles who made their best effort to develop a knowledge based approach in the field of research in Arts, Social Sciences, Science and Engineering, and Business Administration.

We would like to extend our sincere thanks to the members of the editorial board and external reviewers for their time and invaluable feedback.

We believe that the Journal will continue to attract a greater number of Research Scholars, University Teachers, and Civil Society Members in the future, as it has done in previous years.



(Professor Dr. Kazi Shahdat Kabir)

Editor-in-Chief

City University Journal

City University, Dhaka, Bangladesh

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FMEA, Root Cause Analysis and Remodeling a Plastic Bucket using Injection Molding for Enhanced Durability and Longevity

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ABSTRACT

The purpose of this study is to examine the results of combining three prominent quality control approaches into the redesign of a plastic bucket. First, the Failure Modes and Effects Analysis (FMEA) was used to determine the most likely causes of failure and the severity of those causes. Second, in order to ascertain the origins of the observed failure modes, Root Cause Analysis (RCA) was carried out. Finally, injection molding was used to improve the plastic bucket's resilience and lifespan. The redesign process took into account the findings of the FMEA and RCA, resulting in a plastic bucket with greater durability and stability. The product was reworked using extra quality controls to make sure it met all applicable norms. The final outcome was a plastic bucket that was not only more resilient but also lasted for much longer, which was great for the end consumers and helped make the production process greener. This research proves that when FMEA, RCA, and injection molding are all used together, high-quality, long-lasting goods were created. Therefore, it is hypothesized that after remodeling, rebuilding the bucket and applying injection molding properly, average quarterly product damage decreased from 3.05 percent to 0.72 percent.

Keywords: FMEA, Root cause analysis (RCA), Remodeling, Injection molding, Product development.

I. INTRODUCTION

Today's businesses are expanding at a dizzying rate, and meeting the ensuing need for new product developments is a formidable task. For industries to keep up with the rest of the pack, they need to constantly innovate and release new products. The plastics company is not immune to the drive to manufacture new goods. The plastics industry in Bangladesh has expanded over the past decade. As a result of this expansion, high-quality, creative products with enhanced functionality are now the norm. The plastic bucket is an example of a product of this type that has numerous applications in numerous fields. Durability and longevity are the primary determinants of whether or not a plastic bucket lives up to its potential [1]. A plastic bucket's expected performance in light of design changes must be analyzed to guarantee that it satisfies the required performance criteria. Design engineers play a significant role here by translating customer feedback and market research complaints into design iterations that improve upon the bucket's expected performance. The bucket's performance requirements can only be met through a sequence of phases in the design customization process. The first thing a design engineer does is to look at the market and customer complaints to see what the biggest problems are. The engineer then makes use of this data to make design adjustments that address the highlighted difficulties and concerns [2].

The aim is to make sure the improved bucket can handle its new duties. The impact resistance of a bucket can be evaluated, for example, by dropping it from a set height. Another important step in making sure the bucket won't break is doing a failure modes and effects analysis (FMEA). This method pinpoints the root causes of product malfunctions and how they affect the product's functionality, allowing engineers to fix any issues that arise [3]. Another essential part of testing and analysis is called Root Cause Analysis (RCA). Root cause analysis (RCA) is a scientific process for determining what went wrong and why a product has a flaw. The engineer can take preventative actions against future problems by identifying and addressing their origins. The growth and development of the plastic industry in Bangladesh have allowed for the production of high-tech, high-performance goods like plastic buckets. The choice of plastic used to construct a bucket is essential and must consider a variety of performance parameters, not the least of which is the bucket's expected lifespan. By tailoring the design and conducting testing and

analysis including drop tests, failure modes and effects analysis (FMEA), and root cause analysis, design engineers play a significant part in ensuring the bucket satisfies the required performance parameters. The fact that the bucket is trustworthy, safe, and suitable for its intended use is confirmed by the extensive testing and analysis that was performed.

We rely heavily on plastic products, from the most fundamental of domestic items to the most cutting-edge of scientific instruments. In this analysis, the results of an analysis performed on injection molding parameters are presented. The quality of the molding process was evaluated by looking for warping, cracking and other anomalies in the finished product, and the drop test was performed to determine the plastic's durability [4]. The process of injection molding entails heating a thermoplastic until it is liquid, then forcing it to flow under pressure into a mold's cavity, where it cools and hardens [5]. Polymer granules are melted at high temperatures in this method. The molten material is then injected into a closed mold. The mold is often made up of two halves that are pressed together to withstand the force of the melting material. The molten substance is then allowed to cool and harden in the mold [6]. Buckets come in a wide range of sizes and shapes. Producing buckets of different shapes and sizes quickly and easily is best done by injection molding. Fault Mode and Effects Analysis (FMEA) is a popular and effective method for foreseeing the results of an injection molding process. Injection molding is crucial for mass-manufacturing plastic parts, despite several difficulties.

In order to ensure the safety and dependability of their products, many businesses turn to reliability management techniques like failure mode and effects analysis (FMEA), which is a proactive approach to problem solving that focuses on avoiding system failures rather than investigating them after the fact. The authors of this research suggest utilizing Failure Mode and Effects Analysis to determine the causes of plastic bucket parts breaking [7].

II. METHODOLOGY

A guided drop test stand was used for the testing. The steel frame of the drop test machine measures 14 meters in height. A thousand kilograms may be placed on it without it breaking. The impact zone



Figure 1: AT422D Izod impact tester machine for ASTM D256 test standard of the plastic buckets.

measures 2000 mm on a side. Steel-reinforced concrete forms the basis of the 1800 -kilogram base, which also features a steel impact pad. This guided drop test stand requires a unique fixture [8]. It is crucial that the test objects are not maintained in a way that limits their ability to deform in this fixture. This impact cannot be softened in any way. In addition, the fixture shouldn't hurt the thing being tested. The purpose of the test was to evaluate the durability and resistance to impact of the plastic buckets.

2.1 Test Standard

To measure the drop resistance or toughness of plastic materials, particularly thermoplastic and thermosetting resins, ASTM D256 is a widely used standard test technique. Under controlled circumstances, this test method is generally used to compare the impact and drop resistance of various plastic materials. It offers a number that may be used to evaluate the relative toughness of different materials. The test can be run on specimens with a variety of morphologies.

2.2 Drop test Before Modification:

Table 1: Drop test before modification.

Item Name	Item Specification	Test Method	Test Location	Test Number	Observation	Overall Result
15L Plastic Bucket	Homopolymer HP (1100N) 78% + Copolymer CP (360MO) 20% + Color master batch CMB 2%	ASTM D256	Controlled laboratory environment	1	Bucket was not broken but scratched	Fail
				2	Bucket was broken	
				3	Bucket was broken	
				4	Bucket was broken	
				5	Bucket was broken	

2.3 Damage Status:

Table 2: Damage status of 100 plastic buckets after Drop test

Damage Status				
SL NO	Damage Type	Sample Size	Damage Qty	Percentage
i)	Broken Handle	100	27	27.00%
ii)	Broken Handle Locking Point		25	25.00%
iii)	Broken Body		20	20.00%
iv)	Broken Corner		14	14.00%
v)	Used Bucket		8	8.00%
vi)	Scratch		6	6.00%

- **No buckets were undamaged:** All one hundred buckets were damaged to some extent by the crash.
- **Minor cracks and scratches:** About 41% of the buckets had minor damage, such as cracks or scrapes, but they were still usable.
- **Significant cracks:** Approximately 29% of the buckets had cracks large enough to endanger their structural integrity, rendering them useless.
- **Complete failure:** About 30% of the buckets failed completely and had to be thrown away.

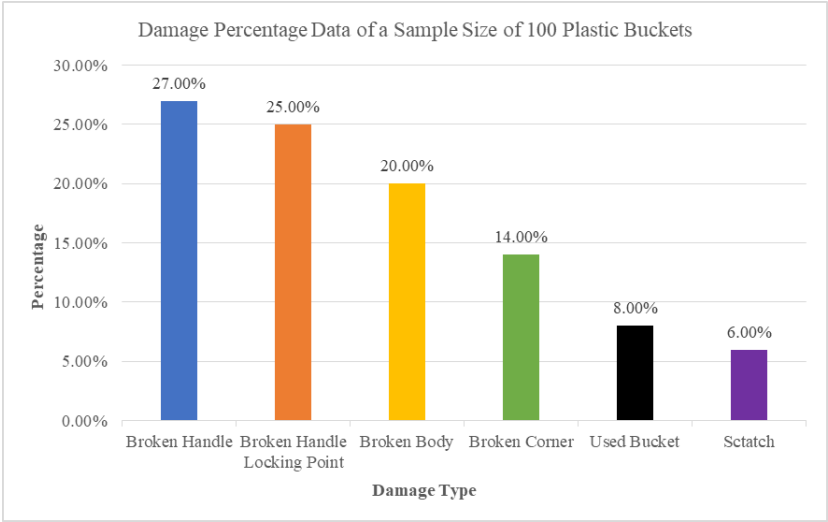


Figure 2: Damage percentage data plot of plastic bucket drop test before modification.

2.4 Damaged products Data collection before Modification:

Table 3: Data collection of damaged products before modification (three months)

Item Name	Total Number of Consumer sales in three months	Damaged Products Returned (pcs)			Total Returned Damage d Products (pcs)	Damag e (%)	Avg. Damaged Returns Per Month (pcs)	Avg. Wastage Cost Per Month (BDT)
		June-2022	July-2022	Aug-2022				
Plastic Bucket	12,89,241	2,327	3,850	7,109	13,298	3.05	4,432	10,68,426



Figure 3: Damaged state of plastic buckets.

2.5 Root Cause Analysis (RCA):

The company where the research work was conducted suffered severely in the months of June, July, and August of 2022 as a result of the massive amount of plastic bucket returns. Identifying and fixing the underlying cause of the issue is essential for reducing future instances of damaged product returns. To determine what has to be altered, Root Cause Analysis could be used in this situation.

Table 4: Root Cause Analysis (RCA) of plastic bucket

Root Cause Analysis	
Determination of Problem	The plastic bucket's biggest flaw was its lack of longevity and durability. This may have put customers at risk and led to significant discontent.
Collection of data	The plastic buckets had gone through drop tests, where they performed poorly.
	Data was collected from customers who complained about broken handles, bodies, scratches, and broken handle locks.
Identifying possible causes	Possibility of low material quality.
	Incomplete or improper manufacturing process.
	Major design flaws.
	Some possible environmental factors.
	Rough handling by the user or customer.
Determining the root causes	The plastic used to make the bucket could be of low quality and fail to hold up under normal conditions.
	Inadequate cooling or reinforcing during production can damage the structure of the bucket, reducing its durability.
	It's possible that the bucket is easily damaged due to design flaws in the construction.
	Plastic durability diminishes when it is subjected to elements like sunlight, heat, or chemicals.
	The bucket can crack or break if it is dropped, stacked, or otherwise treated roughly.
Fixing the problem	Better material quality, proper production procedures, a robust design, and careful handling can all contribute to the longevity of a plastic bucket. It's possible that more research and testing is required to identify the precise causes and apply successful solutions.

2.6 Failure Modes and Effects Analysis (FMEA):
Table 5: Failure Modes and Effects Analysis (FMEA)

FMEA Report							FMEA NO/REV: 213136/03						
Item: TEL 15L Plastic Bucket							Process/Component: Plastic Structure						
Date: 25 – 08 – 2022													
Function	Potential Failure Mode	Potential Effects or Failure	Potential Causes of Failure	Severity	Occurrence	Detection	RPN	Recommended Action	Action Taken	Severity	Occurrence	Detection	RPN
1. To provide containment for objects or liquids. 2. To provide insulation for temperature sensitive contents	The plastic bucket's fundamental structure isn't strong enough to withstand repeated uses or prolonged exposure to extreme environments.	Cracking or breaking	Plastic buckets are susceptible to cracking and breaking when subjected to stress, such as when dropped, hit, or heated to high temperatures.	6	5	240		Test thoroughly, and if at all possible, come up with a new design that can be made using injection molding.	A new design was made with "RIBS" added in vulnerable sections	3	2	48	
		Deformation	The structural integrity of plastic buckets can be compromised with time or when carrying heavy loads, leading to leaks or other problems.	5	5	200		The material used for the bucket should be thicker and better resistive to deforming permanently. Increasing the thickness by 2mm will resolve the issue.	By increasing its thickness by 2 mm, this bucket is now more rigid.	3	3	72	
		Chemical degradation	Degradation from chemicals: exposing plastic buckets to certain chemicals can cause the material to weaken, shatter, or dissolve.	3	3	72		No action needed		3	3	72	
		UV degradation	Long-term exposure to ultraviolet (UV) light can degrade plastic, making it brittle and eventually unusable.	2	3	48		No action needed		2	3	48	
		Warping	Plastic buckets are susceptible to warping when subjected to sudden and dramatic changes in temperature, which can lead to an improper fit between the lid and the container and subsequent leaks.	5	6	240		The material used for the bucket should be thicker and better resistive to warping permanently.	By increasing its thickness by 2 mm, this bucket is now more rigid	4	2	64	
		Fatigue	Weary buckets can break or crack after being used repeatedly or subjected to a lot of tension, two factors that contribute to tiredness.	3	4	96		No action needed		3	4	96	

It is common practice in the engineering industry to conduct a failure mode and effects analysis (FMEA) before a product, service, or system goes to

market in order to anticipate, analyze, and eliminate any and all failures, problems, errors, etc. [9]. A risk priority number (RPN) is calculated by multiplying the severity (S), frequency of occurrence (O), and ease of detection (D) scores assigned to each failure mode in a standard FMEA. The FMEA literature contains numerous attempts to improve upon the limitations of the simple RPN computation.

FMEA, or Failure Modes and Effects Analysis, is a technique for determining the likelihood of various failure scenarios of a system or product. The goal of an FMEA analysis applied to a plastic bucket in this report, would be to catalog the myriad ways in which the bucket could break and the various ways in which this would affect the user and the surrounding ecosystem. The examination would consider details like the plastic's strength, the handles' longevity, and the possibility of leaks. The analysis's findings would be used to determine which aspects of the product need attention first and direct future development efforts [10]. A bucket, for instance, would have its design tweaked to have stronger handles if an FMEA found that the handles frequently broke. To guarantee that the plastic bucket is trustworthy, secure, and suitable for its intended purpose, an FMEA was conducted.

III. REMODELING AND ANALYSIS

3.1 Action plan for bucket body:

- The 9.5mm diameter hole will be able to accommodate a larger locking point on the handle.
- Wall thickness at the snout region of the bucket will be 2.5mm, the same as the rest of the bucket.
- To reinforce the bucket neck, we'll be adding some ribs to it. The larger buckets will have six ribs, while the smaller ones will only have four.
- Each bucket will have its own unique mold so they can be easily identified.



Figure 4: Modification plan for bucket body.

3.2 Action plan for bucket handle:

- The diameter of the nose pin on the handle will be consistent throughout all bucket sizes. A 15-liter bucket will have an exact diameter of 8.5 mm.
- The bucket handle will be reinforced by having the same number of ribs on both the inside and outside.
- It will include cross ribs for added stability.
- Each grip will be molded individually to make it easy to tell them apart



Figure 5: Modification plan for bucket handle.

3.3 Product Design:

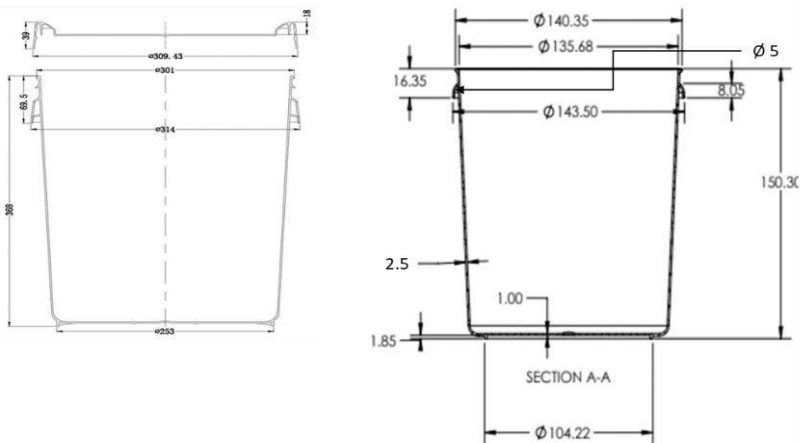


Figure 6: Product design (a) Before modification, (b) After modification.

In order to make a stronger and longer-lasting product, manufacturers frequently rework existing designs, such as plastic buckets. A 5mm diameter hole for the handle lock point, a 2.5mm wall thickness, and reinforcement ribs at the bucket's weak points are all part of the revised design. The diameter of the handle has been increased to 8.05mm, and it now features additional ribs close to the grip. The plastic bucket's resistance to cracking and bending will improve if these modifications are made. The extra ribs and thicker walls will fortify the weak spots, while the larger handle lock point hole will guarantee the handle's tight grip on the bucket. The newly designed handle will make it less likely that the bucket will slip out of your hands and break. All things

considered, the improved plastic bucket design will better serve the needs of customers who want a long-lasting and practical storage option.

3.4 Injection molding of final design:

- The plastic bucket's design is developed after considering the necessary upgrades which were determined using FMEA, drop test and RCA.
- The plastic bucket mold is created by means of tooling, such as computer numerical control (CNC) machining or electrical discharge machining (EDM).
- As soon as the mold is ready, it is placed into the injection molding machine and secured into place.
- The plastic is heated in the machine's hopper, melted, and fed into the mold under high pressure.
- The plastic is poured into the mold, and then the mold is cooled so that the plastic may solidify and take the shape of the bucket.
- The completed bucket is ejected from the mold after being cured.
- The last step is trimming, in which the final bucket is rid of any unwanted bits of material like flash.
- Measurements and visual inspections are performed to guarantee that the finalized bucket is up to snuff in terms of quality and dimensions.



Figure 7: Injection molding and final product after modification.

3.5 Drop test After Modification:

Table 6: Drop test analysis after modification.

Item Name	Item Specification	Test Standard	Test Location	Test Number	Observation	Overall Result
15L Plastic Bucket	Homopolymer HP (1100N) 78% + Copolymer CP (360MO) 20% + Color master batch CMB 2%	ASTM D256	Controlled laboratory environment	1	Bucket was not broken	Pass
				2	Bucket was not broken	
				3	Bucket was not broken but scratched	
				4	Bucket was not broken but scratched	
				5	Bucket was broken	

The plastic buckets were subjected to a series of five drop tests, and in each case, the bucket's structural integrity was unharmed. The final four tests, however, revealed a few small surface blemishes. The functional integrity of the bucket was found to be unaffected by these tiny scratches. The plastic bucket is therefore regarded as having passed the durability evaluation based on the test findings because it resisted the impact forces without degrading its intended function.



Figure 8: Condition of modified buckets after the test.

3.6 Damaged products Data collection after Modification:

Table 7: Data collection of damaged products after modification (three months)

Item Name	Total Number of Consumer sales in three months	Damaged Products Returned (pcs)			Total Returned Damage d Products (pcs)	Damage (%)	Avg. Damaged Returns Per Month (pcs)	Avg. Wastage Cost Per Month (BDT)
		Sept-2022	Oct-2022	Nov-2022				
Plastic Bucket	3,80,157	2,694	680	459	3,833	0.72	1278	3,67,732

3.7 Comparison of data Before and After Modification:

Here's a table contrasting the original version with the improved one. In the three months leading up to the redesign, the bucket suffered a total of 13,298 pieces of damage. This works out to an average of 4,432 pieces of damage each month. A total of 3,833 pieces of damage were prevented over the course of three months, with an average monthly reduction of 1,278 pieces. The

percentage of damage was reduced to 0.72 percent, down from 3.05 percent. As a side effect of this change, the yield percentage has risen from 96.95% to 99.28%. The following table and column display all data.

Table 8: Comparison of damaged products data before and after modification

Before modification	Damage Qty (pcs)			Total Damage (pcs)	Damage %	Yield %	Avg. Damage/ Month (pcs)
	June- 22	July- 22	Aug- 22				
	2,327	3,860	7,109				
After modification	Damage Qty (pcs)			Total Damage (pcs)	Damage %	Yield %	Avg. Damage/ Month (pcs)
	Sept- 22	Oct- 22	Nov- 22				
	2,694	680	459				

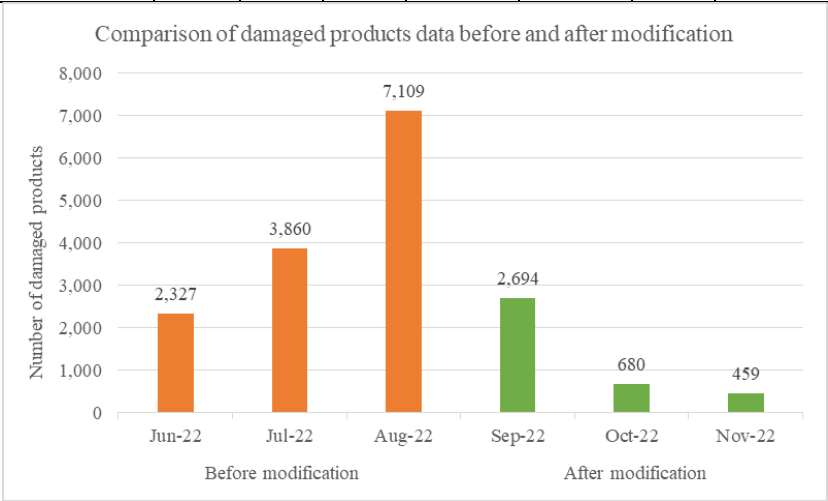


Figure 9: Comparison of damaged products data before and after modification.

IV. CONCLUSION

Drop testing, Root Cause Analysis, and FMEA were all used to modify the plastic bucket in an effort to reduce product damage and increase longevity.

Analyzing data from the three months prior to the change and the three months following the change reveals a significant drop in the percentage of damaged products. The use of these techniques has made it possible to conduct a thorough and systematic analysis of the design and production procedure, leading to the isolation of the problem. The amount of damaged goods has decreased as a result of improvements made to both the design and production processes that were implemented to address these problems.

Using FMEA has provided a methodical strategy for assessing design and manufacturing hazards. The team was able to prioritize areas in need of improvement after determining the various failure modes and their root causes. Because of the root cause analysis, the underlying problems were better understood, and the drop testing proved that the improvements had been successful.

The success of its use highlights the value of carefully analyzing the design and manufacturing stages. The team was able to significantly reduce the amount of damaged items by introducing FMEA, root cause analysis, and drop testing into the designing process, which allowed them to identify and solve the root cause of the damage. As a result, not only is the production process aided, but so too are the customer experience and the company's standing in the market.

The plastic bucket redesign was successful in decreasing product damage. As a result of using these methods, it was enough to evaluate the entire design and production process in a methodical and thorough way, making changes that were both effective and increased the quality of the final product. An important takeaway from this study is the value of doing extensive assessments to enhance the design and production process, which in turn increases product quality, customer satisfaction and the company's bottom line.

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Technological Dominance in the Retail and Consumer Industry: Based on the Evidence of IKEA

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Udayshankar Sarkar³

Abstract

The research objective was to evaluate the extent of technological superiority in the Retail and Consumer (R&C) industry, with a specific focus on IKEA as a case study. The aim was to understand how the R&C industry established technological dominance in the era of Industry 4.0 and to create a model that can guide the R&C industry in achieving technological dominance in this era. In order to achieve these goals, the study employed qualitative case study research as a methodology, with IKEA being chosen as the subject organization for the research. The data was obtained from secondary sources, including published documents, interviews, films, and other relevant sources. The research findings indicate that various aspects, including marketing strategies, networking, consumer knowledge, effective human resources management, manufacturing processes, change management, and innovation theories, can impact technological dominance and contribute to organizational success. Ultimately, the study constructed a model utilizing the findings of the investigation.

Keywords: *Tech leadership, Qualitative research, Retail business, IKEA*

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I. Introduction

The process of digitalization has profoundly transformed our world and altered how individuals live their lives (Ek & Ek, 2020). This has affected our personal matters but has also created a modern economic environment that most companies have embraced to thrive. This particular study has selected the retail industry as an example. The retail industry exemplifies the increased utilization of electronic advancements that have fundamentally transformed global sectors and market frameworks (Cöster et al., 2017). Merchants are anticipated to outsell conventional goods outlets. The transition of the recently updated retail company may present advantages and challenges to entrepreneurs, contingent upon their specific industry and geographical context (Cöster & Westelius, 2016). Industry 4.0 is commonly associated with the 4th industrial revolution, which signifies a new phase in advancing industrial governance and control, specifically in terms of creating economic worth (Ustundag & Cevikcan, 2017). From the conversation, the following questions arise:

Research Question: What strategies might the R&C industry employ to achieve technological dominance in Industry 4.0?

Like many others, the retail and consumer products industry is currently experiencing a period of transformation. Significant technological advancements, shifts in consumer tastes, changes in distribution channels, modifications in advertising strategies, barriers to entry, and improvements in supply chain and logistics techniques have significantly influenced the R&C and commercialization environment. These factors have had a profound impact in both prior years and the present (Malar, 2019). It falls within the category of Industry 4.0, and there are specific measures that R&C enterprises must use to thrive in the contemporary economy. The study topic may give rise to the development of the following aims.

Using IKEA as a case study to assess the technological dominance of the retail and consumer sectors.

- To understand how R&C is at the forefront of digital innovation in the post-industrial 4.0 era.
- To develop an R&C blueprint that will enable the company to attain technological dominance in the industrial era. 4.0.

The subsequent segment of this study evaluates the examination of current literature, followed by the third segment elucidating the research technique. Subsequently, the fourth portion provided a concise summary of the case organization, followed by the fifth section, which scrutinized the data and extracted the pivotal discoveries. The discussion result was elaborated in the sixth and seventh sections, which were followed by concluding remarks.

II. Literature Review

Incorporating Technology for Industry 4.0

The next phase in industrial digital technology is being driven by four distinct disruptions. These disruptions include the rapid increase in large datasets, computing capacity, and networking, the introduction of automation and business intelligence skills, the emergence of new human-machine interfaces like touch controls and amplified-reality platforms, and changes in the dynamics of the transition to the real economy (Caylar, Noterdaeme, & Naik, 2016). The journey towards Industry 4.0 entails the seamless integration of digital and mechanical systems in a mutually beneficial manner. This union became inevitable due to the emergence of digital platforms and new technologies, which are closely linked to the concept of "smart manufacturing." The technologies include data analytics, data storage, multiplicative production, creative robotics, virtual and augmented reality, and smart internet objects (Milward et al., 2019). By integrating computer systems that were previously separated and focused on the product and distribution network, these advancements accelerate the technical progress of production (Caylar et al., 2016). Sectors might anticipate numerous benefits, such as enhanced mobility, improved efficiency, and better organizational outcomes, by embracing Industry 4.0, modern manufacturing, and the resulting connectivity (Ancarani, Di Mauro, & Mascali, 2019).

Industry 4.0 examples in organizations

Industry 4.0 enables advanced predictive technologies, enhancing productivity in several sectors. For example, in the banking sector, this could entail faster communication among employees in administrative departments, improved data gathering, and enhanced overall efficiency. In the manufacturing sector, this could involve broader dissemination of information and implementation of inspection practices that minimize waste at each phase of the operation (Vaidya, Ambad, & Bhosle, 2018). Automotive firms have

addressed specific immediate challenges to present a more unified approach to business strategy for innovation and technology in preparation for the future of Industry 4.0. Over the past five decades, the automotive industry has invested significant money in corporate software, automation systems, and state-of-the-art product technology.

Nevertheless, automakers are still falling behind the digital technology businesses that dominate the innovative landscape of Industry 4.0. The investments made by these corporations in cost-effective processing, fast networking, and machine learning have enabled the conversion of the physical world into digital form, thereby transforming human ideas into automated systems of operation. With the entry of well-funded software companies into the automotive sector, conventional manufacturers are struggling to catch up (Gong, Zou, & Kan, 2019).

The entire paradigm of manufacturing must be reconsidered in response to the increasing prominence of the garment industry. Due to this increased demand, the sector has transitioned from being predominantly reliant on human labor to predominantly dependent upon robots for manufacturing. This topic centers around industrial revolutions in the clothing industry, including its definition and impact on the garment sector. YOHO, a Japanese apparel maker, is gradually implementing automation in its manufacturing process by replacing conventional sewing machines with ones that streamline the sewing cycle through multiple time-saving adjustments. Lectra is a clothing startup that utilizes Industry 4.0 to impact the design and garment market. This innovative production method seeks to meet customer satisfaction while maximizing the opportunities offered by the transition from mass production to personalized production promised by Industry 4.0. By integrating systems, processes, and people, the garment industry may strengthen its distribution network and increase organizational transparency, so preparing for industrial revolutions (Ahmad et al., 2020).

III. Methodology

The study employed a qualitative case-based research methodology (Khan et al., 2022). This case study utilizes an unstructured observation research methodology. Observers or researchers frequently use observational measures to examine the effects of risk-related variables, investigative actions, testing, or other relevant interventions without causing any disruptive alterations to

unexposed or non-exposed subjects (Khan & Sharma, 2020). In addition, conducting unstructured research requires the researcher to closely observe all associated irregularities without offering specific details (Malhotra & Dash, 2016). The observational study demonstrates the utilization of cohort, case studies, and cross-sectional examination (Khan, 2021). The methodology and implementation of the observational research method differ based on the research paradigm of the specific analysis, including the perspective from which investigators analyze the situation or respondents (Khan, 2019). The observation method is frequently utilized in social sciences, specifically anthropological research. The primary objective of this technique is to reveal latent events or difficulties that may significantly impact emerging economies (Khan & Sharma, 2020). The data for this study was collected from various secondary sources, including books, newspapers, journal articles, periodicals, blogs, context-related websites, and other sources that offer information on strategies, management philosophies, and technological dominance during the era of Industry 4.0. Malhotra and Dash (2016) proposed two approaches to elucidate qualitative research findings. Firstly, it is crucial to ascertain the research gaps and inquiries that are well aligned with the particular study. Next, organize the factual information and precise solutions or reactions related to the occurrences under investigation. Next, analyze the responses of participants or the data collected related to the theme design, and then incorporate that thematic design into a backdrop that promotes reflection and clarifies the elements of the narrative. The fundamental procedure was adhered to in this case study.

IV. About Case Organization

Ingvar Kamprad established IKEA in the Swedish town of Lmhult in 1943 as a catalog-based enterprise that distributed furniture and home furnishings. Currently, the business remains under family ownership and clearly aims to provide households worldwide with high-quality items at affordable costs. From our modest origins, the company has made significant progress, although our objective remains unchanged: to enhance the daily lives of individuals. Consult the IKEA narrative to acquire comprehensive knowledge regarding the company's historical background, present driving forces, and endeavors to foster positive societal and environmental influence (Elg & Welinder, 2022). IKEA operates a total of 422 stores throughout over 50 countries. Approximately 70% of the stores are located in Europe. Germany

and the USA are the two most successful markets for IKEA, accounting for 15% and 14% of total sales, respectively. The company, starting with its first store in Hyderabad, India, grew to 19 sites in the previous year (Batarfi & Attia, 2021). In 2018, IKEA had 957 million consumers who visited its physical stores, while its website attracted 2.5 billion customers (Alimamy & Gnoth, 2022). IKEA's fiscal year 2021 revenue amounted to 25,615 million Euros, which increased to 27,578 million Euros in fiscal year 2022 (Batarfi & Attia, 2021). The table below presents a concise overview of IKEA's financial performance for the fiscal years 2021 and 2022.

Table -1: Financial performances of IKEA during the fiscal years 2021 and 2022

In millions of EUR	FY22	FY21
Sales of goods	26 148	24 282
Franchise fees	1 285	1 273
Other income	145	60
Total revenues	27 578	25 615
Cost of goods sold	23 404	21 137
Gross profit	4 174	4 478
Operational cost	3 140	2 622
Total operating income	1 034	1 856
Financial income and expense	-103	-151
Result before tax	931	1 705
Income taxes	-221	-272
Net income	710	1 433

Source: Batarfi & Attia, 2021

Items of IKEA

IKEA offers a range of 9,500 products over 22 categories, encompassing various home furniture and décor. The comprehensive assortment is available at all IKEA stores, and customers may purchase most of it through IKEA's website (Alimamy & Gnoth, 2022).

Table 2: Item categories offered by IKEA across the globe.

<ul style="list-style-type: none">• Furniture• Beds & mattresses• Storage & organization• Kitchen & appliances• Baby & kids• Home textiles• Home décor• Smart home	<ul style="list-style-type: none">• Lighting• Kitchenware & Tableware• Bathroom• Rugs• Outdoor• Laundry & cleaning• Home Improvement• Plants and planters	<ul style="list-style-type: none">• Home Electronics• IKEA food & Swedish restaurant• Pet accessories• Working from home• Summer shop• Winter holidays
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Source: Alimamy & Gnoth, 2022

V. Analysis and Findings

Several companies, such as IKEA, seek to transform themselves in response to the emergence of Industry 4.0. This section attempts to compile studies on IKEA's strategic digital capabilities, organizational achievements, and impact on the company as the prevalence of digital purchasing of products and services continues to grow.

Strategic use of digital technologies by IKEA

IKEA contemplated strategies to enhance consumer engagement throughout the entire purchasing journey, starting from the initial online product discovery on the dot-com platform to the final transaction at a physical store (IKEA, 2022).

- It is crucial to be aware of the most effective networks for engaging with potential clients and ensure that these networks are prepared well for any meetings or discussions. IKEA is flourishing in this regard. IKEA utilizes several social media platforms, such as Facebook, Twitter, Instagram, and Pinterest, to advertise and publicize its products, services, sales, offers, articles, and events (Luotola & Reile, 2017).
- IKEA's augmented reality (AR) technology enhances a customer's perception of the outdoors by overlaying a computer-generated image that closely resembles reality. The company's hybrid idea is bolstered by the It application and the IKEA Place app, which was released in 2017. The introduction of augmented reality (AR) in conjunction with IKEA's Place app in 2017 aimed to offer the firm a combined viewpoint. Perusing a

catalog is problematic for purchasers as they cannot accurately assess the visual appeal or functionality of the furniture based on the provided images (Haraldsson et al., 2020).

- IKEA's dynamic and immersive experience provides clients with an exhilarating journey. Prior to completing a final transaction, prospective purchasers have the opportunity to test the virtual reality (VR) kitchen and engage in the preparation of virtual meals. These utilize virtual reality technology to establish a better connection with their clientele and ultimately gain loyalty (Tarnovskaya & de Chernatony, 2011).
- The IKEA website consistently features updated content, including recent discounts and design collections. The brand stimulates consumers' imaginations, and loyal customers are provided with an incentive to experiment with novel offerings (Almaazmi, 2017).
- IKEA's content marketing strategy is vital to the company's digital media operations. Indeed, IKEA has established itself as the unrivaled leader in producing captivating content on its website (Haraldsson et al., 2020).
- When shopping online at IKEA, you can utilize a range of simple payment methods, such as PayPal, credit cards, and debit cards. Undoubtedly, using a digital payment system has significantly enhanced the company's ability to accept a wider range of orders, positively impacting its financial performance. The reference is from Almaazmi (2017).

Successes of IKEA's Industry 4.0 platform

Although digital transformation is not a recent occurrence, it is worth examining it through the lens of a conventional company such as IKEA as digitalization progresses. This is particularly true for IKEA and other contemporary enterprises relying heavily on brick-and-mortar retail establishments (Almaazmi, 2017). IKEA has enhanced its omnichannel customer service and optimized the productivity of its furniture and food manufacturing operations through its pioneering implementation of virtual supply chain technology. IKEA has constantly demonstrated a business strategy characterized by inconsistency and necessitates continuous innovation (Haraldsson et al., 2020). IKEA is actively interacting with customers and implementing successful marketing campaigns in the

contemporary era of the Industry 4.0 platform for the retail and consumer sectors.

Furthermore, based on these findings, the organization adjusts its business operations and product roadmap and develops novel solutions that assist homeowners in their daily tasks. Ad 59 appears to embody the instructional digital advertising that IKEA has curated perfectly. To create the advertisement, the corporation conducted interviews with its customers regarding their daily habits and the impact that the ad had on their lives. IKEA offers guidance and expert support to its customers at every phase of the program (IKEA, 2022). IKEA established the Food Division online platform. The device developed by IKEA in 2022 included advanced communication systems, improved procurement information for diversified food sources, scanning capabilities for computerizing store-level product administration or receiving tasks, and several other features. Using the identical point-of-sale (POS) network utilized in IKEA's furniture stores, the company has achieved cost savings in IT expenses and obtained a comprehensive understanding of clients' purchasing patterns as they transition between different stores. By leveraging digital strategy skills, IKEA has successfully reduced costs, enhanced employee involvement, and elevated product diversity and quality assurance for its extensive customer base (Alimamy & Gnoth, 2022).

VI. Result and Discussion Section

IKEA's production philosophy is based on four basic ideas to ensure the complete automation of all manufacturing activities (Underwood, 2017). The following items are encompassed within that category:

- **Interoperability** refers to the capacity of machines and their components to interact and cooperate with humans via the Internet (Pedone & Mezgár, 2018).
- **Transparency of information** refers to the concept that IT can transform digital data into sensors, creating virtual representations of the natural environment. Integrating unprocessed sensor data with reliable contextual details can lead to the desired outcome (Underwood, 2017).
- **Provision of specialized knowledge and support:** Examples of the technological help and capabilities that a system may offer include providing thorough processing and analysis of knowledge to assist in human decision-making and facilitate rapid problem-solving. The

capacity of cyber-enabled programs to provide physical help to human resources by performing jobs that are monotonous, hazardous, or otherwise burdensome for individuals is also crucial for the effectiveness of technological support (Popkova & Zmiyak, 2019).

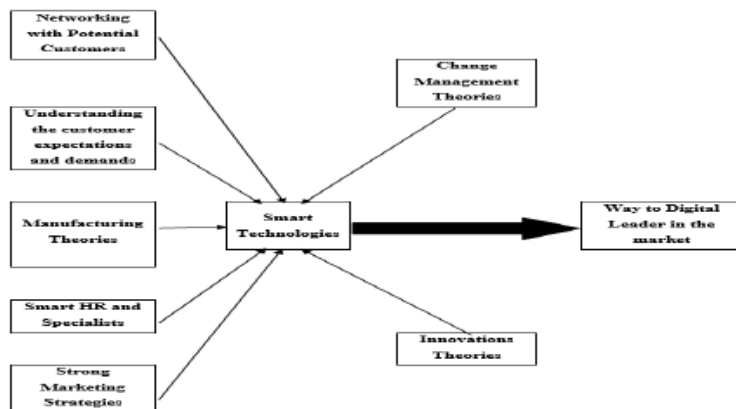
- **Decentralized decision-making:** Cyber-enabled entities can make decisions autonomously, thanks to the decentralized nature of decision-making. Modifications are only feasible in the presence of external intervention or complications with the expected goals, which may need intermittent administration of supplementary obligations. This concept distinguishes itself by emphasizing the enhanced ability to tailor products to specific production settings, particularly in industrial manufacturing (Marques et al., 2017).

Digitalization in Lean Manufacturing was initially derived from the Toyota manufacturing method and was first implemented in the automobile sector. The phrase "Lean" encompasses a range of principles employed to enhance productivity, including a philosophy, methodology, approach, disruptive management, and technology domination strategy (Tareque & Islam, 2021). Toyota has employed several digital platforms, such as Cloud technology and business software, to establish itself as a prominent figure in the automotive industry's digital landscape. Multiple studies demonstrate that Toyota's success is contingent upon its implementation of digitalized production processes, wherein lean manufacturing on a digital platform establishes a novel benchmark for the automotive industry in the era of Industry 4.0. The references cited are Kundu and Manohar (2012), Rose et al. (2014), and Aini et al. (2020).

Furthermore, the Lean methodology seeks to minimize costs while maximizing advantages for customers (or patients, in this scenario). Sephora Beauty is a prominent player in the current retail fashion industry, namely in the online cosmetics market, where it portrays itself as the premier destination for purchasing beauty products. Using technology, the company can provide customers with a diverse range of promotions through online platforms and within physical stores. While many cosmetics stores primarily emphasize in-person sales, Sephora offers a comprehensive range of digital services. These services enable consumers to engage in virtual makeovers with augmented reality and to sample fragrances through tablets and tablet-scented wind.

(Rayome, 2018). Walmart has developed a mobile robotics system called Bossa Nova, which monitors stock levels and provides real-time updates to store management as it navigates between racks. Merchants can enhance their inventory planning and pricing strategies by utilizing real-time data that reveals the competitiveness of products inside and between stores (Wingfield et al., 2018). Home Depot's technology-domination strategy allows customers to conveniently purchase online and choose between home delivery or picking up their items at nearby shops. Customers desiring to make online purchases and collect their items from a nearby store will receive them on a subsequent day within the customary two-hour delivery timeframe. According to Peterson (2013), we will use our mobile devices to do transactions and bring the purchased items back to the real store. Lolli and Pops exemplify digital innovation in the retail and consumer sectors. The store is making significant progress in the digital domain. Intel recently launched Mobica, an incentive system that uses face recognition technology. Customers who utilize the service will physically go to a store, where a camera will recognize and transmit their information to a device on the salesperson's phone (Rayome, 2018). Hence, drawing from the case study, it is possible to construct a model that serves as a comprehensive framework for achieving technological superiority in the era of Industry 4.0 (refer to Figure 2).

Figure 1: Framework for success in technological dominance



Source: Authors' Compilation

IKEA has effectively established a unique market model focused on low prices by integrating this vision into every aspect of its business, including building design, production, and delivery. An essential factor in cost reduction is a robust and computerized supply chain that incorporates digital services for its customers. Despite the negative impact of e-commerce on traditional stores, the retail giant nonetheless managed to draw in more than 715 million customers to its online platforms in 2014. (Alimamy & Gnoth, 2022). The aforementioned digital leaders have established their positions in their respective sectors by employing change management, lean manufacturing, and the concepts of disruptive, radical, and gradual innovation. Their achievement within the Industry 4.0 framework has brought them closer to their objective of attaining leadership in the digital market.

VII. Recommendations and Conclusion

Industry 4.0 is the culmination of the Industrial Revolution, encompassing the latest advancements in industrial and manufacturing technologies that have been specifically designed to drive its progress. Industry 4.0 interacts with technological domination by utilizing extensive data, integrating human-machine interfaces, and improving communication between the digital and physical realms. Integrating digital management and organizational technologies into Industry 4.0 has introduced novel opportunities and

limitations. Politicians worldwide are exerting significant effort to address cyber security challenges, primarily prioritizing cyber defense.

This study's objective was to thoroughly assess the extent to which different industries, with a specific focus on the R&C sector, have implemented the concepts of Industry 4.0. This study aimed to assess IKEA's strategic digital capabilities in the R&C business after discussing the role of digital leaders and providing an overview of the industry landscape. Based on the analysis, the study revealed that there are eight factors (networking, understanding consumers, knowledge of manufacturing theories, tech-savvy human resources, robust marketing strategies, knowledge of innovation, and knowledge of change management) that could assist any R&C business to grow through technology dominance in the market.

Obstacles in collecting data fundamentally limited the study. Due to the absence of a genuine IKEA store in Bangladesh, data was gathered via secondary sources. Research finance was another crucial concern. As a result of these limitations, the study was unable to collect primary data on a global scale. Nevertheless, due to these constraints, the findings have explicit ramifications. The study's conclusions yield recommendations for policymakers in the R&C business. The marketing manager should prioritize developing convenient features for the improved technology to capture a more significant portion of the market. In addition, they must focus on the development of efficient marketing strategies, knowledge of business management and manufacturing theories, and management techniques. Future research can investigate further using quantitative data by employing the proposed model to assess its usefulness.

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Future ambition and attitudes of parents for their children of primary level school in rural households of Bangladesh

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Abstract

The aim of the study was to reveal the future ambition and attitudes of the parents for their primary level school children on career building in Raozan sub district, Chittagong District of Bangladesh. One hundred and twenty-eight parents of primary school going children were the respondents of the study. Face to face interview were performed for information collection. A pre tested questionnaire was used to collect data from the respondents. The study location and parents of primary school going children were selected purposively. Among the respondent parents, 41% had ambition that their child would be a doctor, 15% desired for businessmen and 4% desired for engineer etc. About 64.06% parents faced financial problem regarding their child education. The study found that parents' ambitions may decline due to many obstacles. The study is concluded by providing fewer suggestions.

Keywords: *Ambition, attitudes, parents, primary school children, Bangladesh*

I. Introduction

The importance of education is seen in every aspect of life and it is especially crucial for the growth of a nation (Anonyms 2022). There is different view about education from different philosophers and different educationists. According to Nelson Mandela, "Education is the most powerful weapon which one can use to change the world" (ibid). Education is the major key element to develop human resource. Herbison & Meyers indicate that there are five ways to develop human resource and the first step is formal education (Anonyms 2017). The formal education starts up from

the preprimary school level (ibid). During the childhood development stages, the importance of education is stronger than ever. Education at childhood offers a chance for self-discovery and to learn about their unique interests (ibid). Indeed, the succession of the education of children mostly depends on the ambitions of parents and their attitudes for the future of their children (Anonyms 2023).

Parents always think about the career of their children. Parent's attitude towards child is important in determining school attendance and academic achievement of the child. Favorable attitude towards schooling and education of parents always plays a positive role in children's present and future studies. Encouragement of the parents for their school going children motivate them in their study procedure (ibid).

Parent pressure, support, anxiety has a great influence on the level of learning orientation and performance among students reading in primary school levels. Parents must always try to adopt a new horizon to boost up the self-confidence of children and direct them to perform the academic activities sincerely and with complete devotion (ibid).

Due to continuous effort of Government and also of non-Government organizations, there is remarkable improvement in literacy rate of Bangladesh (Haider 2022). To encourage female education, GOB has made free female education up to Secondary level, text books free of cost up to SSC level. So, people are now encouraged to educate their children according to their capabilities. The Primary level dropout rate is now 14.5% which was 17.20% in 2020 of Bangladesh (Ahmed 2022). The government of Bangladesh updates educational system of the country in the primary, secondary and higher secondary levels at intervals. The government of Bangladesh has announced the "Compulsory of primary education" in 1992 by considering the role of education for the development of childhood stage (Anonyms 2017). Despite it is seen that the rate of dropout of different levels school going children in the rural areas is higher (Haider 2022; Sakib 2022) in Bangladesh. It can be thus concluded that parents of rural areas are unable to fulfill their ambitions for the future of their children. The general objective of the study is to explore the ambition and attitudes of parents on their children of primary level school in Raozan sub district, Chittagong, Bangladesh. The specific objectives are to i) find out the general features of

the respondents, ii) get idea about the interest of parents on the future of their child iii) show attitudes of parents for their children to fulfill their ambition and problems faced by the respondent parents.

The present study will be able to explore the actual scenario of ambitions and attitudes of rural parents for their children's education in Bangladesh. The outcomes of the study may be helpful for the policymakers of the country to pick up a better updating of the education system especially in pre-primary to upper levels to accelerate the rural parents' ambitions for their children.

II. Literature Review

The findings of some of the studies along with other relevant information are presented below:

A study conducted on January 2018 by Mrs. S. Kalimuthu and Dr. AR. Saravana Kumar of Aliquippa University of Tamil Nadu, India on parent's attitude towards learning orientation of students at primary education level. The positive attitude was 38.64% towards learning orientation of the students in primary level. The level of percentage of parent's attitude towards learning orientation was considered under six dimensions. The dimension of anxiety 19.11%, support 15.45%, pressure 16.33%, exam orientation 16.42%, career orientation 16.55% and interest orientation 16.10% remained mild level. There was no significant difference between anxiety and exam orientation vs career orientation of parent's attitudes. There was significant difference between anxiety and career orientation vs interest orientation and exam orientation of parent's attitudes towards learning orientation of primary students.

The objective of the study (Aasy & Bhuttah et al 2021) was to examine the "Impact of parental attitude on students' performance at secondary level" in district Rahim Yar Khan. It was a descriptive type study. The population of the study was students and their parents. Data of the study came from the field survey. Likert scale was used to interpret the results of the study. The study found that parental attitudes are effective to assist children's learning conditions.

Begovic Blanca and Polo Vina Nada (2007) found in a study that the family stimulation is the resultant of the influence of cultural and educational

profile of the family and active parental attitudes regarding education and attainment of their children. They examined the student's attitudes towards schooling and to obtain answers to the question: while stimulating aspects of family context are the most predictable for the development of education aspirations, i.e., attitudes towards school and gaining knowledge, educational interests and plans for further education. The sample consisted 1.464 eighth-grade sample students, aged 15 years, from 34 primary schools in Serbia. The data were collected by the use of questionnaires filled in by the students and school principals. The results indicated a trend of interrelatedness of cognitive and educational conditions within the family and positive attitudes towards school, attainment, high aspirations and cognitive and intellectual interests for out-of-school activities.

The purpose of the study (Rasool & Zhang 2020) was to understand the experiences and perceptions of Bangladeshi, Indian and Pakistani parents of the USA to explore the key factors related to parental involvement behaviors in their children's academic achievements. The study was descriptive type and based on field level data. There were three themes identified, namely, parents' behavioral trends, parent's role and families' cultural values. The study proposed for a family school programs to encourage parents to be involved in their children's education.

The study (Samal 2012) analyzed the data from 145 parents, who had one or more than one school going children. Out of them, 116 parents belonged to tribal and 29 belonged to non-tribal families. The respondents were required to indicate their agreement or disagreement with each of the statements about children's education in a 4 point Likert type scale. The findings of the study showed that overall attitudes of the respondents were moderately favorable and positive towards schooling and education of their children.

Hossain and Sakib (2016) conducted their study about the parental attitude toward child's sports involvement in Bangladesh. It was a descriptive type of study. The study was done among the parents of under 10 children. Both secondary and primary data were included in the study. The study found that parents' ambitions are positively associated with their children involvement in sports programs.

It is evident from the above discussions that a fewer number of studies has been conducted about the parents' ambitions and attitudes for the future of

their children. None of these types of studies are done in the context of rural households' parents' ambition and attitudes for their children either in Bangladesh or elsewhere. Under this consequence, the present study is comparatively different than others.

III. Methodology of the Study

Place of study

The study was conducted in Raozan sub district of the Chittagong district of Bangladesh. The location of the study was done purposively.

Sampling

The number of respondents were 128. They were the parents of primary level school going children. It has been followed convenient type of sampling procedure to collect information from the respondents. Secondary information has been used also from journals of research and websites etc.

Research instrument

A prepared pre-tested questionnaire was the basic instrument of data collection procedure. The relevant information has been collected by face-to-face interview.

Analysis techniques

Descriptive analysis

The results were presented by descriptive study such as frequency and percentage to fulfil the objective of the study.

Quantitative analysis

A quantitative analysis has been done in order to drive the influence of obstacles faced by the respondent parents on their ambitions by following the procedures of input-output method. The fundamental tool of input-output method is $Y=f(X)$ where Y is the dependent variable and X is the independent variable. Under this consequence, Y is the parent's ambition and X is the obstacles faced by the parents in this study. Data of this study is qualitative type. Therefore, data of both variables have been converted into quantitative variable by scoring Likert type scores. For the purpose of scoring, different relevant studies have been taken into consideration (Haq

2022; Haq and Mahmud 2021; Yasmin and Alam 2006). Table 1 indicates the symbols, assumptions, scoring and expected sign of the variable which are widely followed in many similar studies (ibid). In case of quantitative analysis through regression, there is a chance of disparities among the variables. Therefore, quantitative analysis is done by using the logarithmic converter and the proposed function is as follows: $\text{Ln}Y = f(\text{Ln}X)$.

Table 1 Definition of variables

Variables	Selection backgrounds and Assumptions	Score	Expected sign
X (Obstacles faced by parents)	Parents’ ambitions decrease if obstacles increase and vice versa.	Obstacles exist 1 No obstacles 2	Inverse
Y (Ambitions of parents)	Ambitions of parents is the dependent variable. It is generally dependent on many factors such as social, financial etc. Some parents have ambition while others may have no ambitions for their children.	Parents’ ambitions 2 No ambitions 1	No expected sign as it is dependent variable

IV. Results and Discussion

General information of respondents

Age

In this research work, it was found that 33(25.78%) of the respondents were between 21-25 years, 34(26.56%) were between 26-30 years. Majority respondents 41(32.03%)were 31-35 years of age. Among the remaining parents, 13(10.15%) were between 36-40 years and only 7(5.48%) were above 41 years of age (Table 2). Parents have always tremendous influence over their children regarding out the age (Thomson 2013). One small study

found that among parents who had their first child after the age of 40 most believed that the best time to become a parent was five to 10 years earlier. In a work by Cherry (2020), it was observed that most of the over 40 parents still maintained that being an older parent had more advantages than disadvantages. Still, 80% of the mothers and 70% of the fathers said that the optimal age to have children was in the 30s (Cherry, 2020).

Gender

Among the total respondents, it was found that 126(98.44%) of the respondents were female and only 02(1.56%) were male (Table 3). This discrepancy on gender was due to time of data collection. Data were collected during office time. In that time, the male parents go outside home for their job, cultivation works and business etc. in the village of Raozan upazila.

Educational status of the parents

Considering the educational background, the literacy rate of the surveyed respondents was very high, 120(93.75%); only the remaining 8(6.25%) of the respondents were illiterate. 17(13.28%) studied up to Primary level, 40(31.25%) up to Secondary level. SSC was completed by 33(25.78%) respondents. 20(15.63%) studied up to HSC level. Among the respondents, there were also 10(7.81%) graduates (Table 4). After liberation, GOB has given tremendous effort to increase the literacy of the country. In 2022, it stands 74.66% for the people 15 years and above (WFB 2022). In India, literacy rate is 77.7% (Kritish and Kavita 2022). Literacy of a country is directly proportional to the development of a country.

Occupational status of parents

It was found that, most of the respondents were housewife, 110(85.94%) out of 128 respondents. Out of the rest 18 parents, small trader and job holders were 2(1.56%) in each category and 4(3.13%) were day labors. The rest 10(7.81%) were engaged in different professions (Table 5).

Types of family

Considering the family pattern of the respondents in this study, majority 73(57%) were of nuclear type which closes to 56.8% in the whole

Bangladesh (Statista 2021). There were 6(5%) extended three generation families. It is seen in Table 6 that joint families were 49(38%). Number of households in Bangladesh is about 35.2 million in 2021, compared to 33.3 million in 2016 (ibid). Nuclear families are increasing day by day by the breakdown of joint and extended families (ibid).

Specific information of parents' ambition and attitudes for the future of their children

Distribution of the respondent parents by the future ambition for their child

Concentrating on the main objective of this study, according to the desire of the parents, 52(41%) of the respondents wanted that their children would be doctor, 7(5%) to be service holder. Fascination for business were expressed by 19(15%) parents, 5(4%) to be engineer, 13(10%) to be other (like politician, pilot, army man, etc.) and the remaining 25(20%) has not yet decided. 7(5%) parents expected that their children would be teacher (Table 7).

Educational level of the respondent parents' children

In this work, children of 92(72%) respondents read in class 2-5 and the remaining 36(28%) were student of kindergarten-1 (Table 8). Bangladesh formally has a one year preprimary education over five years on and after one year in preprimary, a child is enrolled in class one at the age of six (Haider 20122). Most of the respondents' children studied in the Bangla medium with minor exceptions.

The extra-curricular activities of the child

It is learned from this study that as extra-curricular activity, 25(19.54%) respondents' children preferred to sing and 7(5.46%) liked dance. Other choices of respondents' children were arts 33(25.78%) and games and sports, acting etc. by 63(49.22%) (Table 9). In Bangladesh, the scope of extracurricular activities is neglected (Khalid 2017). Guardians hope how their child will secure the first place in the class. Most of the schools are lack of playgrounds. In some cases, there are good playgrounds, but no teacher allotment for the extracurricular works of the children. There is lack of

motivation work for the students by both the parents as well as teachers (Jerald and Jennifer 2020).

The types of tutors

For all level of students, private tutors are now essential for education of the children in Bangladesh. Institutional role, illiteracy of the parents, good result attitude, desire of students etc. are related factors in this ground. This study though performed in a village, is not an exception. Majority, 91(71%) respondents' children were guided at home by tutors. The rest 27(21%) respondents' children guided by parents and 10(8%) respondents' children studied by siblings (Table 10).

Study expenses for the children by their parents

Regarding the expenses of education, 62(48.43%) parents mentioned that they had to spend Tk. 1000-2000 per month for their children. Another group of 47(36.71%) parents disclosed expense of Tk. 2000-3000 per month. The highest cost for education of primary level children maintained by 19(14.84%) parents were Tk. 3000-4000 per month (Table 11). Though primary and secondary level education is free in Government level Institutes of Bangladesh, tutor and transport cost, logistic purpose expenditure etc. have to bear by the guardians. This is more acute in rural areas in Bangladesh (Sakib 2022).

Gender disparity of the children

This research also revealed the gender disparity of the children. Boys and girls were given priority by 69(53.91%) and 47(36.71%) parents respectively. But 12(9.38%) parents responded in similar way for both boys and girls. They had no extra preference either for boy or for the girls (Table 12).

Obstacles faced by the parents for education of their child

If consideration is given on the point that the respondents face obstacles to educate their child, it was disclosed that most of the parents 82(64.06%) were facing financial problem for their child's education and 24(18.75%) had mentioned about family problem. About 4(3.12%) expressed various

problems such as lack of schools and teachers etc. The rest 18(14.07%) told that they had no problem for the education of their child (Table 13).

The corresponding regression coefficient (-0.821) of problems faced (X) variable has significant (1% level of significance) and inverse effect on ambitions (Y) of parents (Table 14). The AR^2 value is 0.672 and F-value is 1% level of significance which means the specification of the model is accurate. The inverse effect of the regression coefficient indicates that, if problems faced by the parents increase, ambitions of parents decrease and this is adversely true.

Education is one of the basic rights of human being. The parents' attitude towards their children education is generally very affirmative. Guardians are ambitious and bear the dream that their child will be doctor, businessman, teacher, great administrator, engineer etc. But this level may gradually decline in upper level classes due to various problems. By the full effort, capacity and cooperation, parents with all support try to help their children to fulfil the dream for a nice career in future. So, the state should ensure institutional support, proper guideline and educational environment to build up a child as a good citizen.

V. Limitations of the study

Studies rural areas are not fully free from limitations. Although all possible precautions were taken, some difficulties were encountered in conducting the study. They were as follows:

1. Some people were not interested for answering the questions as they thought that they would not be benefited by giving answer to the question.
2. Some of the parents were ambiguous about the future ambition of their children.

VI. Conclusion and Summary of the findings

This study is a reflection of parents on their child in future and their ambition. The findings are cited in brief.

- The literacy rate of the respondents were 93.75% which is very high.
- 57% of the respondents came from the nuclear type of family.

- About 41% of the respondents hoped that their children would be doctor.
- Children of 72% respondents read in class 2-5.
- About 49.22% respondents' children liked games, sports etc. as extra-curricular activities.
- 71% of the respondents' children were provided private home tutors at home.
- The highest educational cost was found in the case of primary level children which was found BDT 3000-4000.
- Gender disparity of the children such as boys and girls were given priority by 53.91% and 36.71% parents respectively.
- About 64.06% of parents faced financial problems for the education of their children. It is found that, if problems faced by the parents increase, ambitions of parents decrease and *vice versa*.

If proper utilization can be done of the above findings, only then the research will be fruitful. Otherwise, all the effort will be in vain, only wastage of time and money. So it can be suggested that the government should extend more support to school program sector so that the goals can be achieved through the private-public partnership to become a developed nation by 2041. Moreover, the study has conducted by considering the ambitions of parents of rural households on their future education of their children. Future research may be done in the context of ambitions of children's of rural households in Bangladesh.

VII. Recommendations

This study was carried out in a small area with minimum resources, that's why this study is not enough to assess the present condition on this ground. Following there are some recommendations regarding the topic about future ambition and attitudes of parents on their child of primary school level, for the betterment of child's future:

1. Parents must give equal priorities to all their children irrespective of gender.
2. Awareness and promotional program regarding education should be encouraged.

3. Government and NGOs should take the more initiatives for the economically insolvent parents to educate their child.
4. Proper education environment, job opportunity and quality of education should be ensured for the future generation of our country.

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Appendix

Table -2 Age of the parents

Age	Frequency (%)
21-25	33(25.78%)
26-30	34(26.56%)
31-35	41(32.03%)
36-40	13(10.15%)
41>	7(5.48%)
Total	128(100%)

Table 3 Gender of the parents

Gender	Frequency (%)
Male	02(1.56%)
Female	126(98.44%)
Total	128(100%)

Table 4 Educational status of the parents

Level of education	Frequency (%)
Illiterate	8(6.25%)
Primary completed	17(13.28%)
Below SSC	40(31.25%)
SSC/Equivalent	33(25.78%)
HSC/Equivalent	20(15.63%)
Graduate and above	10(7.81%)
Total	128(100%)

Table 5 Occupation of the parents

Occupations	Frequency (%)
Housewife	110(85.94%)
Small traders	2(1.56%)
Job holders	2(1.56%)
Day labors	4(3.13%)
Others	10(7.81%)
Total	128(100%)

Table 6Type of respondents' family

Types of family	Frequency (%)
Extended	6(5%)
Nuclear	73(57%)
Joint	49(38%)
Total	128(100%)

Table 7 Distribution of the respondents' ambition for their Childs

Parents' ambitions	Frequency (%)
Doctor	52(41%)
Service	07(5%)
Teacher	07(5%)
Businessmen	19(15%)

Engineer	05(4%)
Others	13(10%)
Not yet decided	25(20%)
Total	128(100%)

Table 8 Educational level of the children

Level of education	Frequency (%)
Kindergarten	36(28%)
Primary School	92(72%)
Total	128(100%)

Table 9 The extra-curricular activities of the respondents' child

Extra-curricular works	Frequency (%)
Singing	25(19.54%)
Dancing	07(5.46%)
Drawing	33(25.78%)
Others	63(49.22%)
Total	128(100%)

Table 10 Types of tutors

Types of tutors	Frequency (%)
Tutor	91(71%)
Parents	27(21%)
Siblings	10(8%)
Total	128(100%)

Table 11 Study expenses for the children by their parents

Expenditure of parents	Frequency (%)
BDT 1000-2000	62(48.43%)
BDT 2000-3000	47(36.71%)
BDT 3000-4000	19(14.84%)
Total	128(100%)

Table 12 Parents' Gender disparity of their children

Gender disparity	Frequency (%)
Both	12(9.38%)
Girl	47(36.71%)
Boy	69(53.91%)
Total	128(100%)

Table 13 Obstacles faced by the parents for the education of their child

Hindrances for education	Frequency (%)
Financial	82(64.06%)
Familial	24(18.75%)
Others	04(3.12%)
No problems	18(14.07%)
Total	128(100%)

Table 14 Regression results

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.821 ^a	.674	.672	.15737

a. Predictors: (Constant), VAR LnX

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.457	1	6.457	260.719	.000 ^b
	Residual	3.121	126	.025		
	Total	9.578	127			

a. Dependent Variable: VAR LnY

b. Predictors: (Constant), VAR LnX

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.646	.015		43.058	.000
	VAR LnX	-.936	.058	-.821	-16.147	.000

a. Dependent Variable: VAR LnY

Undoing Gender Conventions: A Study of Virginia Woolf's Literary Rebellion Against Traditional Gender Roles

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ABSTRACT

Virginia Woolf emerges as a distinguished feminist writer in the 20th century, actively contesting the established gender roles within a patriarchal society. Employing her literary prowess as a tool, she undertakes a profound analysis of the construction and oppression of women within a male-dominated world. A pivotal argument surfaces in her notable work, *A Room of One's Own*, where she contends that financial stability holds paramount importance for achieving independence, particularly for women. Woolf's exploration of women's independence and societal expectations is vividly portrayed through her characters in *To the Lighthouse* and *Mrs. Dalloway*. Noteworthy rebellion is encapsulated in *Orlando: A Biography*, where Woolf's protagonist disrupts gender norms by embodying both male and female roles. The paper, anchored in an examination of Woolf's seminal works, delves into the intricacies of how she utilized her literary platform to champion the freedom and rights of women. This paper establishes that Woolf's characters were way ahead of their times in a sense that they rebelled against the established norms in their own way.

Keywords: Gender, stereotyping, convention, challenge, injustice

INTRODUCTION

Virginia Woolf is one of the most famous and prolific authors of the 20th century, and her works are renowned for their study of gender issues and

challenge to conventional notions of gender roles. Woolf wanted to expose the fundamental injustice and inequality of the gendered system in her literature by deploying realistically rendered characters of both sexes, presenting readers with the realities of female characters, and criticizing the limitations of traditional notions of gender. Actually, Woolf's feminism significantly affected her works, including not only her explicit feminist views but also her interest in and fascination with gender identities and with women's lives, histories, and fictions (Sellers, 2010). This essay analyzes how Woolf utilized her writings to question and investigate gender norms and expectations.

Frequently, Woolf's characters are depicted in direct conflict with gender roles and expectations, frequently with tragic or humiliating results. In her work, *Orlando*, the protagonist undergoes a journey of gender exploration, assuming numerous forms throughout life and battling fiercely against traditional gender stereotypes. *Mrs. Dalloway* sheds light on the experiences of women navigating social spaces and highlights the numerous subjugations and injustices they encounter owing to their gender, frequently in the form of societal demands to conform to established gender roles. Woolf offers viewers a unique peek into the possibility of liberation from traditional gender roles through her characters' efforts to break free from repressive gender norms and establish their individual individuality (Showalter, 1977, p. 16).

Woolf emphasizes the rigidity and inflexibility of the existing gendered system by employing traditional gender notions and symbols. She uses her female protagonists to question the assumptions made about women and to probe the difficulties women face in today's society. By flipping these depictions, Woolf seeks to question the limits placed on women and men by society. In *Orlando*, Woolf uses the notion of a man-woman to question established gender norms and consider the prospect of a gender-neutral society (Wurtz, 2010).

Additionally, the experiences of Woolf's male characters are used to examine gender relations and show the limitations of established gendered roles. Woolf frequently presents men and women in juxtaposition to one another in order to highlight the limitations of traditional gender identities. In *To the Lighthouse*, Virginia Woolf contrasts Mrs. Ramsey and her husband to

highlight the contrasting ways in which men and women are expected to interact with one another and the world (Sim, 2010).

It is obvious in Virginia Woolf's writing that she considered gender as something to be questioned and explored, as opposed to be blindly accepted. Woolf aimed to provide the readers with a glimpse of the freeing potential of non-traditional gender roles and to confront the constraints of established gender ideals. By showing realistically rendered characters of both sexes, Woolf challenges readers to comprehend the complexities of the human condition while simultaneously encouraging them to reject the repressive and outmoded gendered systems in our own society. This paper explore how Woolf raised her voice for women's rights and independence and encouraged other feminist writers to think passionately about women and gender issues based on an explorative analysis of her major works.

LITERATURE REVIEW

This literature study examines the importance of gender in Virginia Woolf's works and how she challenged established gender roles and explored women's lives through her writings. Virginia Woolf is regarded as one of the most influential novelists of the 20th century, and her writing style is frequently associated with modernism, stream-of-consciousness, and feminism. Woolf wrote strongly about gender relations and inspired her readers by highlighting how society hinders women's chances and mourning their battle for freedom in patriarchal societies. This literature review explores the different issues of gender in Woolf's works that question established gender roles, as well as the author's exploration of the female experience in her writings from books and journal articles written by various authors including an overview of Woolf's own writings. It also demonstrates the gap that exists among the existing literatures.

TRADITIONAL GENDER ROLES CHALLENGED IN VIRGINIA WOOLF'S WRITINGS

Virginia Woolf was an ardent feminist who challenged views of traditional gender roles via her fictional writings (Schaffer, 2012). The English society of the early 20th century rigorously defined "the lady" by conforming to

particular social norms about appearance, behavior, and occupation. Men were lauded for having authority, power, and control over their lives, whilst women's lives were severely restricted so that they could be deemed respectable (Badgeley, 2010). In this era, there was very little room for women to make their own decisions on marriage or other pursuits that might lead to greater self-actualization. Woolf addresses head-on this repression of women based on traditional ideals of femininity in several of her works, including *To the Lighthouse* (1927), *Mrs. Dalloway* (1925), and *Orlando: A Biography* (1928). In these works, she dismantles the customary expectations put on women by portraying multifaceted female characters that make independent decisions without being constrained by tradition or male prerogatives (Khrisat, 2012, p. 145).

Woolf demonstrates in detail how constraints put on women prohibit them from competing with males in various spheres of life, including education, professions, politics, sexual desire, motherhood, etc. *Mrs. Dalloway's* Clarissa has similar internal conflicts when she wonders aloud, "Wouldn't it be better if women weren't so ashamed?" as an example of the unique challenges women faced throughout this era of history (Woolf, 1925). She openly opposes traditional norms that restrict her to prescribed roles, such as calm domesticity at home or financial stability via marriage, such as assigned domestic service (Goldman, 2001). By exploring these possibilities for Clarissa's life, which ran counter to contemporary conventions, Woolf alludes to the possibility that young English girls could lead lives that extend beyond oppressive traditions - a claim that was not commonly made during this time period until well after her death.

Khan (2018) notes that *To the Lighthouse* (1927) is a strong novel for its distinctive presentation of dimensional transitions. One of the novelist's greatest accomplishments is the way the stream-of-consciousness style weaves its way into the arrangement of the book's contents. It appears to have a very straightforward design from the outside. A novel has always been an authentic and evolving reflection of the author's inner life and experiences. And this novel discards the obsolete authoritarian structure in family interactions, which no longer functions in contemporary society. The traditional parent-child dynamic has shifted, and so have other types of interactions inside families and among friends. That's how Woolf sees the

world, anyhow. Furthermore, he goes on to explain that the novel's global spirit and appeal will be under dialogue in particular, as will the novel's many perspectives in which what is receding and what is coming find ways to develop a strong bond with people. Therefore, this study will examine its accurate depiction of emotions and thoughts.

Prasad says that Virginia Woolf has the audacity to abandon the conventional methods of novel writing and to provide English literature a new direction, vision, and structure (Prasad, 2004). Mrs. Ramsey is greatly presented in *To the Lighthouse* as an uncompromising and lovable heroine of the novel. She appears to be a tyrant and pathetic character, though. This part of the novel is mainly presented through the consciousness of Mrs. Ramsey.

Virginia Woolf's contribution to the English novel is significant and lasting. She broke with traditional forms and techniques, and created a new vision of life and a new form of the novel. Her use of stream of consciousness, fragmented narrative, and innovative techniques of characterization have had a profound influence on modernist literature and have made her one of the most important writers of the 20th century (Branch, 2010).

It is evident from the existing literatures that Woolf's writings address the gender convention and women's consciousness of the problem, but they do not show how these works constitute a literary revolt against the dominant norms of the society. This paper thoroughly investigates these issues to reveal how Woolf endeavored to initiate a literary uprising in order to influence the society's perception.

ANALYSIS AND DISCUSSION

Virginia Woolf's distinctive and advanced style of writing represented the modernist movement. She explored women's positions and perspectives as one of her main topics. Woolf used her work to advocate for the rights and dignity of women who were excluded and exploited in her era and location, confronting the male-dominated society in which she existed.

THE EXPERIENCES OF WOMEN IN VIRGINIA WOOLF'S WRITINGS

Gender: Woolf challenged conventional gender preconceptions by creating characters that defied them. In *Mrs. Dalloway* (1925), for instance, she depicts

Septimus Smith, a soldier who suffers from shell shock and shows classically 'feminine' sentiments of compassion and melancholy. Woolf's rejection of established gender norms is a bold, well-grounded decision that signals a change away from the customary limitations and expectations of women in writing.

Experience: Woolf also pushed boundaries by examining women's distinctive experiences. She frequently presents sophisticated and nuanced female characters in her work. In *Orlando* (1928), she deconstructs the notion of a "typical" woman by having her protagonist, who is both a man and a woman, explore a range of lifestyles, roles, and experiences. Her work highlights the complexities of what it may mean to be a woman and challenges conventional norms, resulting in a very grounded approach.

Voice: Woolf does not only describe women's experiences in her writing; she provides them a voice to articulate them. She accomplished this in *A Room of One's Own* (1929), a manifesto-like work in which she demands the same freedom of speech for women as for males. Woolf emphasized the significance of a woman's voice and the strength of her words by writing boldly and without apologies.

Multiple Identities: Woolf questioned traditional gender norms by showing women in her writings as possessing many identities that blend various characteristics of femininity, masculinity, and androgyny. In *Mrs. Dalloway*, for instance, Clarissa Dalloway is presented as both typically feminine and forceful. Woolf's depiction of multifaceted characters indicates that individuals may have several identities, which is a more realistic approach to gender in literature.

Therefore, Virginia Woolf's writing played a crucial role in breaking established gender norms in literature. Her daring, audacious work, which examined the lives and experiences of women without remorse, established a standard for modern writers. She portrayed female characters in complex and freeing ways, revealing a more nuanced perspective on femininity and gender identity. Woolf's ground-breaking writings continue to exert considerable influence and serve as a reminder that gender is flexible and ever-changing.

Traditional Gender Roles Challenged in *A Room of One's Own*

Woolf's work investigates and criticizes gender conventions, especially in relation to women's opportunities for education and employment. Her feminism and critique of patriarchal institutions in society are brought out in *A Room of One's Own*, one of her most well-known writings. Focusing on the main argument "A woman must have money and a room of her own if she is to write fiction", Woolf expresses that women can't be on equal footing with men until they acquire economic and intellectual autonomy (Woolf, 1929). In this fictionalized essay the author contemplates what it might be like to be a female author in early twentieth-century England. She claims that women's inability to support themselves intellectually and financially limits the quality of their artistic output compared to that of men. Moreover, the societal barriers marginalize women doubly to express their intellect. As a consequence Woolf declares "For most of history, Anonymous was a woman" (Woolf, 1929).

Women's economic and intellectual freedom are both criticized by Woolf throughout the book. She brings up the cultural view that "Women have served all these centuries as looking-glasses possessing the magic and delicious power of reflecting the figure of a man at twice its natural size" to show how women are seen as inferior to men and the societal barriers prevent women from achieving their full potential in education and the workforce (Woolf, 1929).

The effect these views have on women's daily lives and relationships is also investigated. Woolf contends that women must be self-sufficient in both money and ideas if they are to achieve full equality with men. She thinks "Intellectual freedom depends upon material things.... Poetry depends upon intellectual freedom. And women have always been poor, not for 200 years merely, but from the beginning of time"- which prioritizes only the financial independence of women to do anything they choose with their lives (Woolf, 1929). In addition, she stresses the importance of equal educational opportunities for both sexes, arguing that women should have the same access to higher education as men. She observes that "the history of men's opposition to women's emancipation is more interesting perhaps than the history of that emancipation itself" (Woolf, 1929).

To this day, *A Room of One's Own* is still widely read and revered as a classic of feminist literature. Woolf's works criticize the gender norms that keep women from having equal opportunities in the workplace and in education. The book is important because it makes a compelling case for women's equality and empowerment and because it serves as a rallying cry for ongoing efforts to advance gender parity in society.

Traditional Gender Roles Challenged in *Mrs Dalloway*

Woolf's argument in *Mrs. Dalloway* is a critique of the societal constraints that prevent women from achieving economic and intellectual autonomy. The story focuses on the difficulties faced by women, especially Clarissa Dalloway, in a male-dominated culture, while she is introduced as "She felt very young; at the same time unspeakably aged" highlighting the societal expectations placed on women's aging and sexuality (Woolf, 1925). The role of women is stereotyped with expectations of Clarissa's being hospitable and social. She was always giving parties to cover the silence. Clarissa feels 'quite continuously' a sense of the 'existence' of her friends and acquaintances scattered about west London and her parties are 'an offering; to combine, to create' (Woolf, 1925, p. 47-51). At the same time she also conceals her innermost thoughts and feelings.

Woolf's exploration of the constraints placed on women's economic and intellectual autonomy runs throughout the work. The novel is a scathing indictment of the cultural beliefs that limit women's access to higher education and the workforce on the basis of their perceived inferiority to men. Woolf also delves into the ways in which these views manifest in women's interpersonal relationships. It is the woman herself who must indentify societal constraints imposed upon her freedom to achieve right and equality. Woolf writes, "She (Clarissa) had a perpetual sense . . . of being out, out, far out to sea and alone; she always had the feeling that it was very, very dangerous to live even one day' (Woolf, 1925). Clarissa's repetition of the line from Shakespeare's *Cymbeline* (1611), "Fear no more the heat o' the sun" also hints at her consciousness on her condition.

The message of *Mrs. Dalloway* continues to resonate with modern readers, making it an essential work in the feminist literary canon. Woolf offers a strong case for women's economic and intellectual autonomy in her literature

by writing "She belonged to a different age, but being so entire, so complete, would always stand up on the horizon, stone-white, eminent, like a lighthouse marking some past stage on this adventurous, long, long voyage, this interminable --- this interminable life" which she uses to highlight the empowering effect that a woman can feel (Woolf, 1925).

Woolf becomes an excellent critique of conventional gender norms. This novel is important because it centers female protagonists and advocates for women's intellectual and psychological liberation, which faces limitations imposed by the patriarchal society. The society stays as a labyrinth for women where their existence is invisible in man's eye. "She had the oddest sense of being herself invisible; unseen; unknown; there being no more marrying, no more having of children now, but only this astonishing and rather solemn progress with the rest of them, up Bond Street, this being Mrs Dalloway; not even Clarissa any more; this being Mrs Richard Dalloway" (Woolf, 1925). As a rallying cry for further advancement of women's rights, this book has not lost any of its contemporary relevance.

Traditional Gender Roles Challenged in *Orlando*

The plot of *Orlando* revolves around the protagonist, Orlando, as the character deals with the societal pressures of being a nobleman, poet, and eventually a lady. In this text, Woolf takes a slightly different approach to talk about the gender roles in the society as the protagonist experiences the burdens and advantages of both the sexes within a single body frame. In the second chapter the narrator-biographer says, "Nature, who has played so many queer tricks upon us, making us so unequally of clay and diamonds, of rainbow and granite, and stuffed them into a case, often of the most incongruous, for the poet has a butcher's face and the butcher a poet's; nature, who has so much to answer for besides the perhaps unwieldy length of this sentence, has further complicated our task and added to our confusion by providing...a perfect rag-bag of odds and ends within us...[and] has contrived that the whole assortment shall be lightly stitched together by a single thread. Memory is the seamstress and a capricious one at that" (Woolf, 1928). Here, the narrator considers the bizarre ways in which nature tends to mold humans in peculiar and unconventional ways. Woolf makes the attempt to argue that those of us who are unsure of

who we should alter our outlook on life. Nature doesn't make it easy to put things in order, and trying to do so only leads to frustration and annoyance.

Woolf focuses on the androgynous personality of Orlando who experiences the secret of both sexes and identifies human experiences as a whole. She uses the figure of Orlando to argue for the value of self-expression and freedom of choice in response to the limiting gender norms prevalent in her time. Traditional gender norms and the constraints they place on individuals are shown to be oppressive in *Orlando*. The text challenges the conventional role of genders established by society by making male superior than female. All through the book, Orlando struggles being both male and female, against the limitations imposed on them because of their gender and social standing. For instance, in their male guise, Orlando is expected to act as a nobleman by taking part in battle and defending patriarchal norms. When Orlando transitions into a woman, she'll still face the same limitations, but she'll also have to deal with the added pressure of meeting the standards of femininity in society, such as marriage and having children.

In the fourth chapter the narrator draws a general statement “Different though the sexes are, they intermix. In every human being a vacillation from one sex to the other takes place, and often it is only the clothes that keep the male and female likeness, while underneath the sex is the very opposite of what it is above. Of the complications and confusions which thus result every one has had experience; but here we leave the general question and note only the odd effect it had in the particular case of Orlando herself” (Woolf, 1928). Not only does this idea encompass the identity of individuals, but also the functions that men and women play in society as a whole. After undergoing her transition to female, Orlando is suddenly keenly aware of all the opportunities that have been denied to her. She may not feel any different on the inside, but the clothes she wears make everyone else look at her in a different way. Woolf makes the case for encouraging gender roles that are equal for both men and women across numerous of her novels.

As we near the conclusion of Chapter four, “Orlando then for the first time noticed a small cloud gathered behind the dome of St. Paul's. As the stroke sounded, the cloud increased, and she saw it darken and spread with extraordinary speed. ... Height upon height above the city was engulfed by it

... With the twelfth stroke of midnight, the darkness was complete. All was dark; all was doubt; all was confusion. The Eighteenth century was over; the Nineteenth century had begun” (Woolf, 1928). Through Orlando’s eyes, Woolf tries to criticize the society by saying that the nineteenth century is a gloomy, oppressive time period that is lacking in sunlight because the Victorians vigorously enforced their beliefs of good and wrong throughout this time period. Insinuating that there are no intrinsic distinctions between the sexes, Woolf only suggests that neither gender has any cause to fall behind.

Traditional Gender Roles Challenged in *To the Lighthouse*

Virginia Woolf’s *To The Lighthouse* is a novel that explores the intricacies of human relationships and the societal rules that regulate them. Through its examination of gender roles, the book questions conventional notions of femininity and masculinity, providing a new perspective on what it means to be a woman or a man. Throughout the work, Woolf attacks the prevalent rigid gender roles of her time which limit women’s role to obey domestic and familial duties. Writing as “for it was not knowledge but unity that she desired, not inscriptions on tablets, nothing that could be written in any language known to men, but intimacy itself, which is knowledge, she had thought, leaning her head on Mrs. Ramsay’s knee” (Woolf, 1927). Lily’s thought in chapter IX clearly shows why Woolf criticizes social expectation imposed upon women while leaving them with no time for their own pursuits and interests. That is why Mrs Ramsey questions herself for saying “We are in the hands of the Lord”; she repeatedly wonders “What brought her to say that: ‘We are in the hands of the Lord?’” (Woolf, 1927).

In her investigation of gender, she sheds light on the societal restrictions placed on women and how these restrictions affect their lives. It is like a dichotomy between the social expectations placed on women and the reality of their own lives. Despite being valued for their ability to bring happiness to others, women often suffer from a lack of personal fulfillment and happiness. She demonstrates that women are frequently relegated to conventional roles and denied the same opportunity for personal development and self-expression as males. For instance, Mrs. Ramsay is portrayed as a wife and mother who is defined by her relationship to her husband and children rather than by her own uniqueness and goals. Woolf’s portrayal of Mrs. Ramsey is both the novel’s

central focus and the result of careful, methodical crafting over the course of the text as Liddell (1953) says, “the subject of a novel is often, in itself, a gradual process—the gradual formation, for example, of a character”.

Woolf argues for women's financial and intellectual freedom in *To The Lighthouse*. She contends that in order for women to realize their full potential, patriarchal society must be abolished. The artist Lily Briscoe represents Woolf's image of a woman who is free to pursue her own interests and passions without being constrained by society's expectations. Unlike Mrs. Ramsay, Lily has the self-discovery as the thought comes into mind “WHAT does it mean then, what can it all mean? Lily Briscoe asked herself ... What does it mean?—a catchword that was, caught up from some book, fitting her thought loosely, for she could not, this first morning with the Ramsays, contract her feelings, could only make a phrase resound to cover the blankness of her mind until these vapours had shrunk. For really, what did she feel ...” (Woolf, 1927). Woolf wants her female characters to observe and explore all by themselves in order to regain their strength. And this tone runs throughout the text through Mrs Ramsey and Lily Briscoe. In fact, Through Lily's character Woolf symbolizes the significance of intellectual freedom for women, since it enables them to freely express themselves and lead satisfying lives.

To The Lighthouse has garnered acclaim for its avant-garde depiction of women and its defiance of conventional gender norms. Its contemporary relevance persists as it instigates ongoing dialogues on the contemporary challenges women encounter in their quest for parity. Virginia Woolf's literary oeuvre stands as a poignant reminder of the imperative to eschew constraining gender norms, advocating instead for an embracement of the entire gamut of human experiences and emotions.

Conclusion

To conclude, the literary contributions of Virginia Woolf have played a pivotal role in spotlighting women's issues and challenging established gender norms. Her notable works, such as *A Room of One's Own*, *Mrs. Dalloway*, *Orlando*, and *To the Lighthouse*, collectively function as a critical examination of the societal expectations imposed on women and as an advocacy for women's economic and political independence.

Woolf's writing effectively defied conventional wisdom by highlighting the disparity between the idealized and actual conditions for women. She underscored the social repercussions and ostracism faced by women who diverge from societal norms, emphasizing the importance of discovering one's authentic voice and unique place in the world as integral to achieving life satisfaction. Furthermore, Woolf addressed the practical challenges of womanhood, encompassing the struggles of self-discovery, the pursuit of personal gratification, and the constraints on women's intellectual and artistic aspirations.

Through her characters, Woolf portrayed women with intricate inner lives, intellectual curiosity, and creative expression, asserting that society should acknowledge and reward these qualities. In essence, Virginia Woolf's literary endeavors played a pivotal role in dismantling traditional perceptions of gender roles and confronting the real challenges confronted by women. Her groundbreaking work set the stage for subsequent generations of female writers and intellectuals, leaving an enduring impact on contemporary feminist literature and activism.

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The Primary Observations on Students' and Teachers' Attitudes towards English Version Education in Secondary Level National Curriculum in Dhaka City

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Abstract

This study showed the thoughts and attitudes of the secondary level students and teachers of English version schools. In this research, mixed methodologies have been applied. It began with a quantitative survey to find out the attitudes and perceptions of the secondary level students and teachers about English version education under the national curriculum in Dhaka city. The data has been collected from 200 students and 40 teachers of secondary level belonging to five English version schools of Dhaka city. The research was to some extent based on qualitative investigations. The qualitative survey included face-to-face interviews. All the activities of this research have been conducted in a formal setting. After that, the collected data has been analyzed especially focusing on the current status, learning outcomes, and suggestions from the respondents. This research explored the condition of authority and English version schools, the actual feedback of students and teachers about English version education, and the limitations of English version education.

***Keywords:* English version education, National curriculum, Secondary level, Dhaka city.**

Chapter 1: Introduction

English is the most used language in the world. In Bangladesh, parents and students are very tense about learning English, mostly in Dhaka city. It seems to be hard for them. To keep pace with the era, they are serious about learning the English language. Most of the students and parents prefer the English version education rather than English medium education because the English version education system is easy and less costly for them. English version education is a system of education in Bangladesh that follows the national curriculum like the Bangla medium education system, but the textbooks are translated into the English language. There are nearly 52 English-version schools in Dhaka. The first English version school in Bangladesh opened in Cadet Colleges in the late 1990s by the government (*English version schools (Bangladesh)*, 2023). However, it is not clear whether the education system is properly working or not. The other fact is also unsettled, whether the English version of educational institutes provides the proper knowledge to their students. For this reason, this topic has been chosen.

Background of the Study

Nowadays, people eagerly want to learn English to get higher opportunities. In Bangladesh, parents prefer English version schools more than Bangla medium and English medium schools. Students also want to learn English properly for their academic and professional life. English version education provides them the opportunity to polish their English language proficiency in low cost than English medium schools. However, the teaching-learning system cannot be able to reach the goal of learning the English language. The major factor is that the examination system is based on writing skills. For this reason, students have not been focusing on other skills properly rather than memorizing the lesson without understanding. In addition, teachers are also bound to complete the syllabus and give more focus on developing writing skills. Moreover, the authority of the English version education is not so conscious of the present system. The education ministry needs to focus on the English version education. So, the ultimate difficulties have been faced by the students and teachers.

The English version school is different from English medium schools. English medium schools follow the curriculum of Edexcel or Cambridge International Examination. Another thing is that English medium school is more expensive. As guardians are interested in giving their children better knowledge of English, people who are involved with the education sector have started opening English schools in the cities and towns. Most of the guardians say that their kids have been sent to English version schools to amplify the strong footing of English in their children but the teachers are not highly trained.

Context of the study

The Education Ministry is not so conscious of the English version system. The number of students from the English version is not recorded methodically. Even the number of students sitting for the SSC (Secondary School Certificate) examination is also not counted officially. The list of educational institutions remains stored in the Directorate of Secondary and Higher Secondary (DSHE), but it does not keep records of the number of the English version schools separately. The opening of the English version school is approved by the education boards (*English version schools (Bangladesh)*, 2023). The district education officer distributes the textbooks. In the Education Policy 2010, no principles and aims are fixed for the English version education (*English version schools (Bangladesh)*, 2023). Some institutions of Dhaka city offer an English version education. On the other hand, some are running both the English version and the Bangla medium. In most of the institutions, teachers do not come from an English medium background. So, their performances are not up to the mark due to lack of proper training. They cannot be able to fulfill the students' requirements and institutions' goals. Students also run after marks. They do not bother to be fluent in English. This attitude hinders them from being expert in the English language.

The Ministry of Education made a revolutionary change in the education system. They launched the communicative language teaching (CLT) method by replacing the grammar translation method (GTM) in the late 1990s. For this reason, they have introduced new textbooks. The authorized textbooks are

used in the different institutional settings in Bangladesh (*English version schools (Bangladesh)*, 2023). However, different sorts of problems have been also faced by teachers, administrations, and institutions. In this study, these would be portrayed. In addition, this study would help people to understand where to make change and where not. It would show the real scenario of the English version schools. Moreover, readers would be able to know whether these intuitions can fulfill the demands of students and parents or not. However, some limitations were also portrayed in this study.

Purpose of the study

The study would mainly focus on the real scenarios of the English version schools, teachers 'and students 'perspectives, limitations, and the solutions for improving the scenario. This would also emphasize the running process of developing the four skills of the English language. Another thing would be shown, what sorts of difficulties have been faced by the teachers and students, and their opinions on upgrading the system.

Significance of the study

The study would represent the real scenario of the English version school's education system at the higher secondary level. Through this study, it would be clear what sorts of difficulties are being faced by the students and teachers. Depending on these, further steps can be taken. In addition, this study is also important for teachers of the secondary level. They will get to know about the demands of the students. So, the teachers might be able to adopt some methods and teaching styles that will help them to teach the students properly. The authority of the national curriculum will also get to know what sorts of changes can be done which will bring a positive impact on the English version education system. This study mainly focused on the quality, demands, and limitations of the English version of institutions. This study is the first of its kind.

Research Question

This research aimed to explore the real scenario of the English version schools in Dhaka city. The study mainly addresses the following research questions:

1. How do English version schools play a role in developing the English language skills of students?
2. What sorts of difficulties have been faced by teachers and students regarding this new approach to developing English as a foreign language in the secondary level?
3. What things are needed to be done to upgrade the scenario?

Chapter 2: Literature Review

English in the National Curriculum

Mohanlal and Sharada (2004). argued that English is a compulsory subject in Bangladeshi schools at three levels. These are- primary, secondary, and higher secondary. As English is a lingua franca in terms of global communication, many people want to learn this language. However, to make English language study effective, some resources and inputs are needed. Such as proper training for the teachers, infrastructural and management facilities, financial support, and so on. This is seen that most of the time, these resources are not properly available, so the main goal cannot be achieved.

According to Rashid (2015), Comparing Bangla version schools with English version schools, it has been seen that English version schools ‘teachers use the CLT method and Bangla version schools ‘teachers use the grammar-translation method. The communicative language teaching method is more fruitful than grammar-translation methods (GTM). In GTM methods, students are forced to learn different types of grammatical rules. On the other hand, in the CLT method, students may learn the language through communication with teachers and other students which has a long-lasting impact.

Second Language Acquisition

Md. Alam (2017), argued our government imposed the CLT method in the secondary level schools. But, most of the time, this is seen that it is not being followed. As the teaching-learning approach is not properly moderated, English language learning has not been done fruitfully. However, it cannot be denied that the teachers are also busy completing the syllabus. So, they cannot be able to focus on developing the language skills of the learners. In English version school, the main motive is to develop English language skills. However, it is not possible if the teachers and learners do not communicate in English language religiously during class time.

Islam and Ahsan (2011), stated that the use of the mother tongue during EFL classes facilitates the learners linguistically and psychologically. Through this process, learners learn quickly. However, sometimes it creates problems when the use of the mother tongue replaces the use of the English language in the

classroom. According to Aziz (2018), when a teacher teaches the students thoroughly English, slow learners face the problems. The slow learners also struggle to fill up the academic demands. Here, teachers' attitudes also play the role of external factors in terms of students' English language learning. If the teachers can motivate the learners, it might be possible to acquire a second language.

According to Ullah (2015), the traditional approach to teaching is still being followed. The class is focused on reading skills and the examination is based on writing skills. For this reason, the students cannot be able to develop the other three skills (speaking, listening). So, the parents of the learners cannot be able to get the desired result by enrolling their children into the English version schools.

Mismatch Between Assessment System and Learning Outcomes

Bangladesh has started to reform the education policy to develop the English language skills of the students from the 1990s. However, the problem is in the implementation of this system. It would not be possible to train the teachers so that they can be able to cope with the new system of teaching English to secondary-level learners. There is also a mismatch between the English language assessment system and English language learning outcomes. For this reason, the reformation of secondary-level education cannot be able to provide fruitful results (Das et al. 2014).

An ineffective assessment system is the main reason for the failure of a new version of the education system (Islam et.al, 2021). The main problem is in the curriculum and the assessment system. In English version schools, most of the time, teachers need to communicate with the students in English language. But it is seen that, depending on the situation, they are required to speak Bengali for teaching purposes. However, the students use the English language in terms of written examination but, there is no system of speaking assessment which creates the major issues. It is important to get out of the vicious policy of the assessment system. Otherwise, it would be tough to get a better result of reformation.

Al Amin & Greenwood (2018), stated that the curriculum system for English is mainly surrounded by four skills. However, our education system is mainly based on writing. Teachers are forced to complete the syllabus so that students can be prepared for the examination. The authority of institutions and parents also forced teachers to complete syllabus. So, in this process, the students cannot be able to develop their language skills. For this reason, students are not learning properly. They are getting good marks in the examination without gaining proper knowledge.

Motivation of Bangladeshi Secondary Learners in Learning English

According to Gardner (1985), there are two types of motivation. One is instrumental motivation; another is integrative motivation. Instrumental motivation is like learners wanting to learn a foreign language for job and education purposes. On the other hand, in terms of integrative motivation, learners will want to learn the language due to his or her fascination with the culture and norms of the language. However, at Bangladeshi secondary level, learners and teachers both focus on the academic syllabus. Parents want their students to do better in the examination. Teachers are also under pressure to complete the syllabus and prepare the students for the examination. So, students are learning English with instrumental motivation. However, language learning is possible with integrative motivation for 12 years to fulfill the academic demands.

Encouraging positive retrospective self-evaluation can help the students learn the English language. This process is also known as the post-actional stage in motivating students for foreign language learning. In this process, students can evaluate themselves which will help them to be corrected. On the other hand, teachers will also evaluate them and provide the proper feedback. This process will provide them a force of inspiration which will help to improve their language skills (Riyanti,2019). Three things influence the language learning process of students. These are motivation, self-confidence, and anxiety (Krashen, 1982). These three things need to be activated. It will be possible if the teachers create an interesting classroom environment.

Chapter 3: Research Design

Methodology

In this research, mixed methodologies have been applied. It began with a quantitative survey to find out the attitudes and perceptions of the secondary level students about the English version of education under the national curriculum in Dhaka city. Data is also collected from the English version school's teachers to know about their expectations and perceptions of English version education under the national curriculum. The research was to some extent based on qualitative investigations. The qualitative survey included face-to-face interviews. All the activities of this research have been conducted in a formal setting. After that, the collected data has been analyzed especially focusing on the current status, learning outcomes, and suggestions from the respondents.

The Study Population and Sample

The data has been collected from 200 students and 40 teachers of secondary level belonging to five English version schools of Dhaka city. Among the students 40 participants were from South Point School & College, Mailbag branch, 40 students from Ideal School & College, Motijheel, 40 students from Banasree Ideal School & College, and 40 students from KPB School & College. and 40 students from BIAM Laboratory School & College. From each school 10 students from class 6, 10 students from class 7, 10 students from class 8, and 10 students from class 9. In addition, the data has been collected from 8 teachers from each school. Purposive and random sampling have been done. At First, purposely schools and classes have been selected. Then data is collected randomly from the teachers and students. The quantitative data was collected through a questionnaire survey which contained close-ended questions. The respondents have been encouraged to answer to bring out the real situation.

The qualitative survey involved face-to-face interviews which were taken from teachers, students, and principals. It also involves class observation. This has been done to know the student's and teachers' communication relationship in the classroom and the real scenario of the classroom. The information is collected from teachers (n-7), principals (n-5), and students (n-20). An open-ended question asked teachers to identify the problems that interrupt their teaching. Students have also been asked questions about their problems and demands from the English version education under the national curriculum system. To learn about pedagogical training and other intuitional training and also the situation of English version education, short interviews have been also conducted with the principals of these institutions. From the interviews, only some of those participants are cited. All names are not mentioned because of confidentiality.

Instruments

The survey mainly focused on the students 'and teachers 'attitudes to the English version system, its limitations, and the quality of education according to the national curriculum. SPSS has been used to analyze research data. Face-to-face interviews have been taken of the students, teachers, and principals. Besides this, class observation has been done to find out the real scenario.

Chapter 3: Data Analysis

Quantitative Analysis

There were two questionnaires, one for the students and one for the teachers. There were multiple choice questions as well as asking for short suggestions, giving the respondents a free rein. There were some common questions in the two questionnaires, in order to correlate both points of view as well as some questions that were group-specific. (See Appendix)

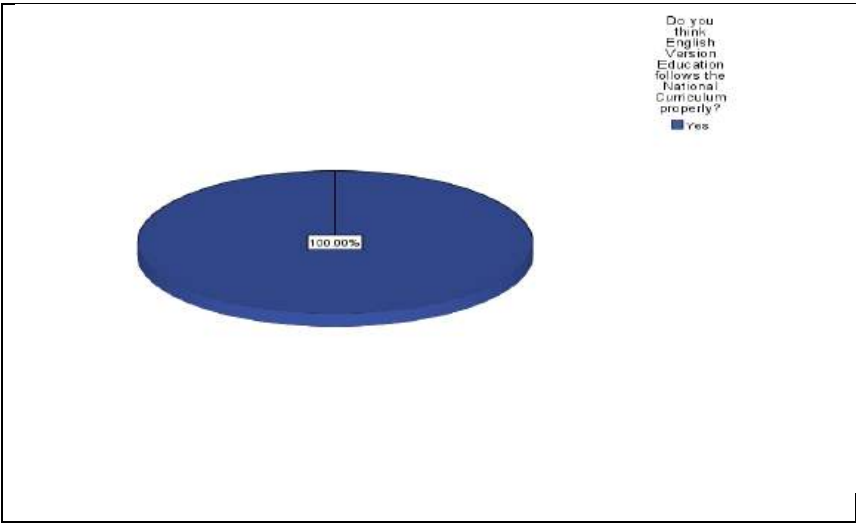
Questionnaire for Teachers

The first question asked the respondents whether the English version education follows the national curriculum properly or not. 100 % of the

respondents ticked **Yes** option, no one ticked **No** option. (See Teacher's Table-1)

Teacher's Table-1

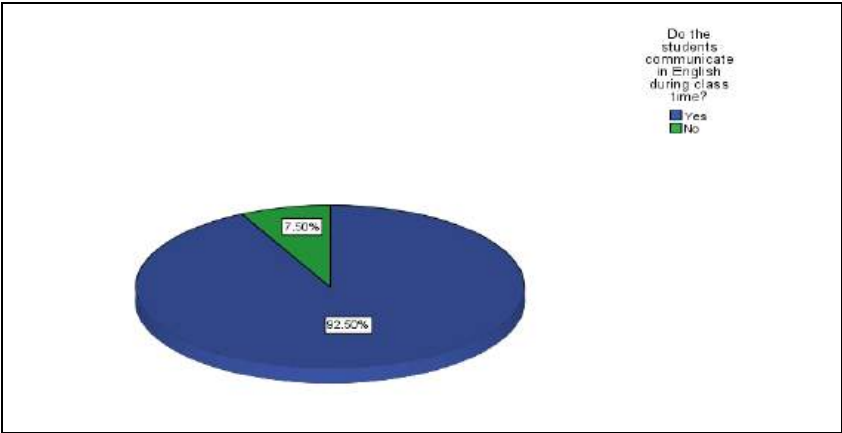
Question	Choices	Number of Respondents	Percentage %
Do you think English version education follows the national curriculum properly?	Yes	40	100%
	No	0	0%



In the second question the respondents were asked whether the students communicated in English during class time or not. 92.50% of the respondents ticked **Yes** option. 7.50% respondents ticked **No** option. (See Teacher’s Table-2)

Teacher’s Table-2

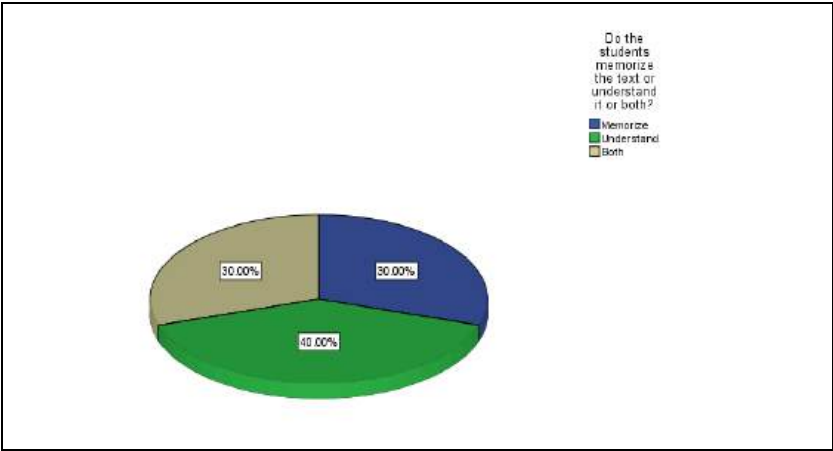
Question	Choices	Number of Respondents	Percentage %
Do the students communicate in English during class time?	Yes	37	92.50%
	No	3	7.50%



The third question has been asked to the respondents whether the students memorized the text or understood it or both.12% respondents ticked **Memorize** option, 16 % respondents ticked **Understand** option and 12 % ticked **Both** options. (See Teacher’s Table-3)

Teacher’s Table-3

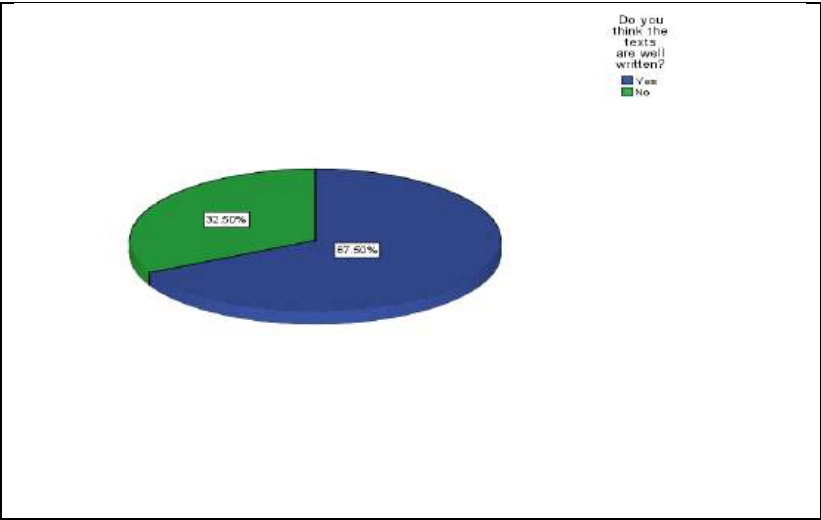
Question	Choices	Number of Respondents	Percentage %
Do the students memorize the text or understand it or both?	Memorize	12	30%
	Understand	16	40%
	Both	12	30%



The fourth question has been asked to the respondents about the textbooks whether it was well-written or not. 67.50% respondents ticked on **Yes** option and 32.50% respondents ticked **No** option. (See teacher’s table-4)

Teacher’s Table-4

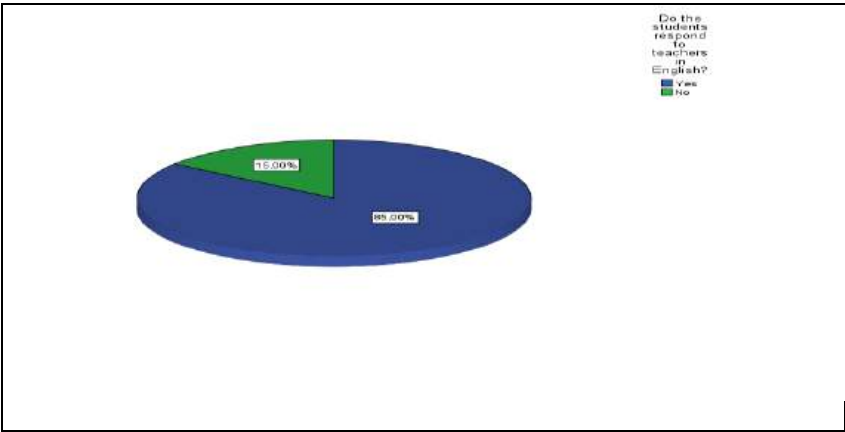
Question	Choices	Number of Respondents	Percentage %
Do you think the textbooks are well-written?	Yes	27	67.50%
	No	13	32.50%



The fifth question has been asked to the respondents whether the students responded to the teachers in English. 85% ticked **Yes** option and 15% ticked **No** option. (See teacher’s table-5)

Teacher’s Table-5

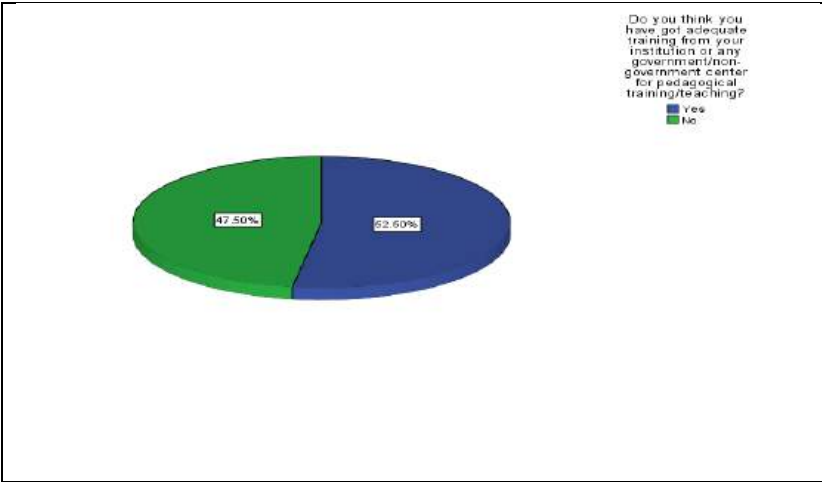
Question	Choices	Number of Respondents	Percentage%
Do the students respond to teachers in English?	Yes	34	85%
	No	6	15%



The sixth question asked to the respondents was whether they had got adequate training from their institution or any government/non-government center for pedagogical training/teaching. 52.50% respondents ticked **Yes** option and 47.50% respondents ticked **No** option. (See teacher’s table-6)

Teacher’s Table-6

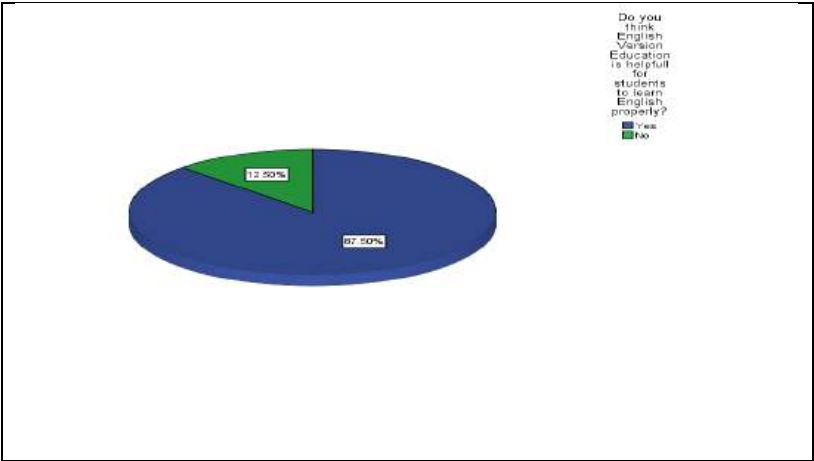
Question	Choices	Number of Respondents	Percentage%
Do you think you have got adequate training from your institution or any government/non-government center for pedagogical training/teaching?	Yes	21	52.50%
	No	19	47.50%



The seventh question that was asked to the respondents was whether the English version of education was helpful for students to learn English properly or not. 87.50% respondents ticked **Yes**, option and 12.50% respondents ticked **No** option. (See teacher’s table-7)

Teacher’s Table-7

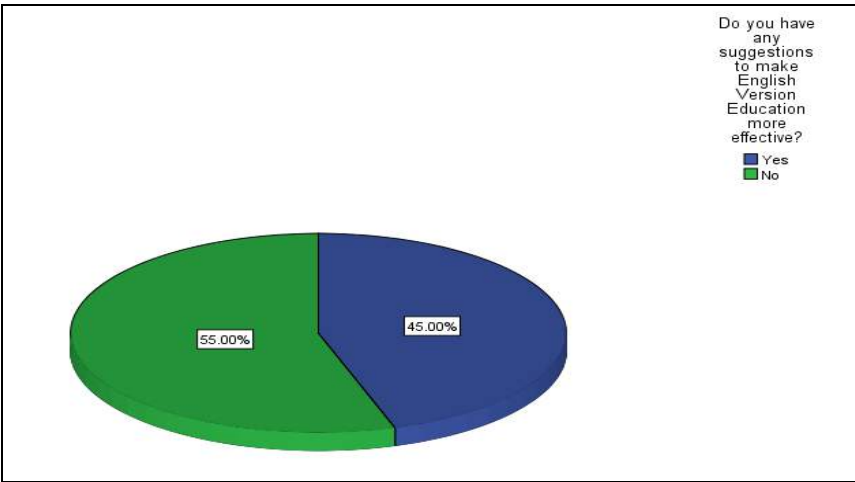
Question	Choices	Number of Respondents	Percentage%
Do you think English version education is helpful for students to learn English properly?	Yes	35	87.50%
	No	5	12.50%



The eighth question asked to the respondents was whether they had any suggestions about this system or not. 45% of the respondents ticked **Yes** option and 55% of the respondents ticked **No** option. (See teacher’s table-8)

Teacher’s Table-8

Question	Choices	Number Of Respondents	Percentage%
Do you have any suggestions to make the English version system more effective?	Yes	18	45%
	No	22	55%

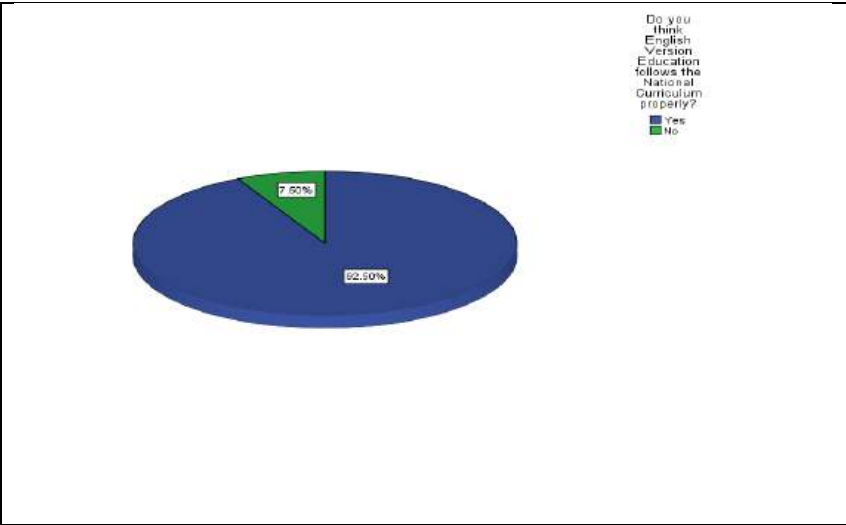


4.3 Questionnaire for Students:

The questionnaire for students consisted of 8 questions. In the first question the respondents were asked whether the English version education followed the National Curriculum properly or not. 92.50% of the respondents ticked **Yes** option and 7.50% ticked **No** option. (See Student’s Table-1)

Student’s Table-1

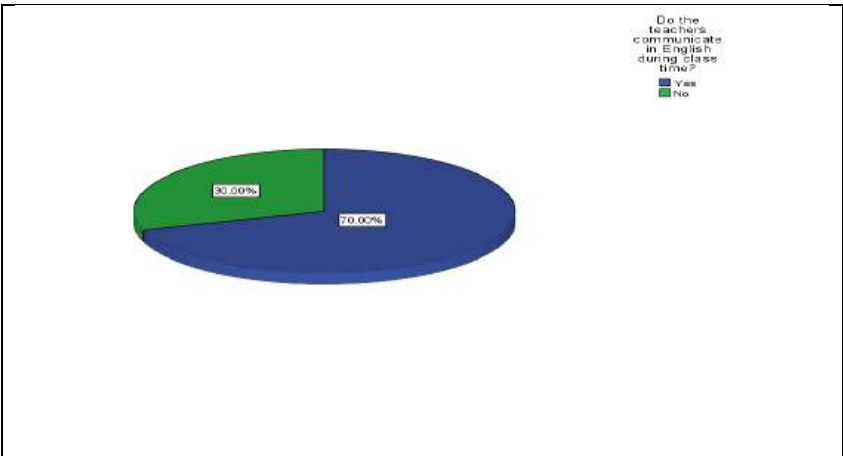
Question	Choices	Number of Respondents	Percentage%
Do you think English version education follows the National Curriculum properly?	Yes	185	92.50%
	No	15	7.50%



The second question asked the respondents whether the teachers communicated in English during class time. 70% respondents ticked **Yes** option and 30% respondents ticked **No** option. (See Student’s Table-2)

Student’s Table-2

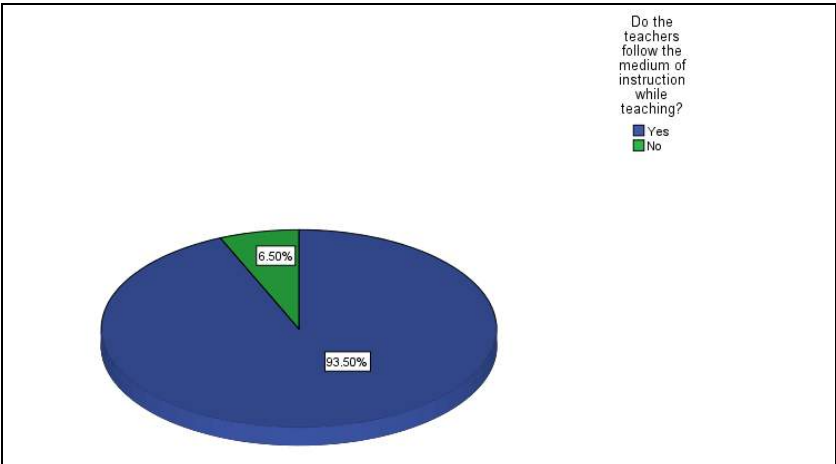
Question	Choices	Number of Respondents	Percentage%
Do the teachers communicate in English during class time?	Yes	140	70%
	No	60	30%



The third question asked the respondents whether the teachers followed the medium of instruction while teaching. 93.50% respondents ticked **Yes** option and 6.50% respondents ticked **No** option. (See Student’s Table-3)

Student’s Table-3

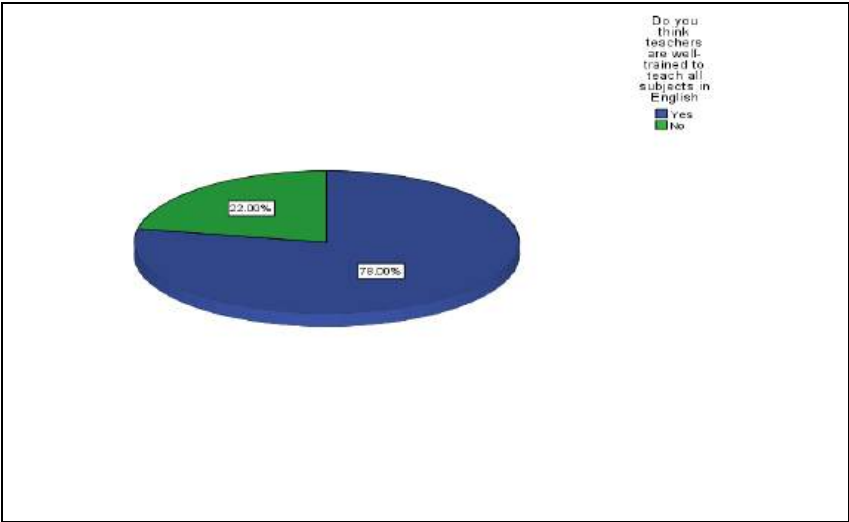
Question	Choices	Number of Respondents	Percentage%
Do the teachers follow the medium of instruction while teaching?	Yes	187	93.50%
	No	13	6.50%



The fourth question has been asked to the respondents whether the teachers were well-trained to teach all subjects in English. 78% respondents ticked **Yes** option and 22% respondents ticked **No** option. (See Student’s Table-4)

Student’s Table-4

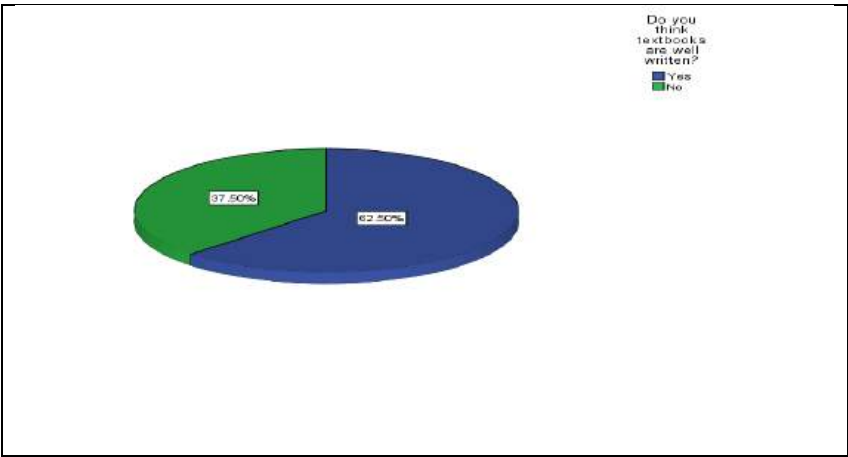
Question	Choices	Number of Respondents	Percentage%
Do you think teachers are well-trained to teach all subjects in English?	Yes	157	93.50%
	No	13	6.50%



The fifth question has been asked to the respondents whether the textbooks were well-written or not. 62.50% respondents ticked **Yes** option and 37.50% respondents ticked **No** option. (See Student’s Table-5)

Student’s Table-5

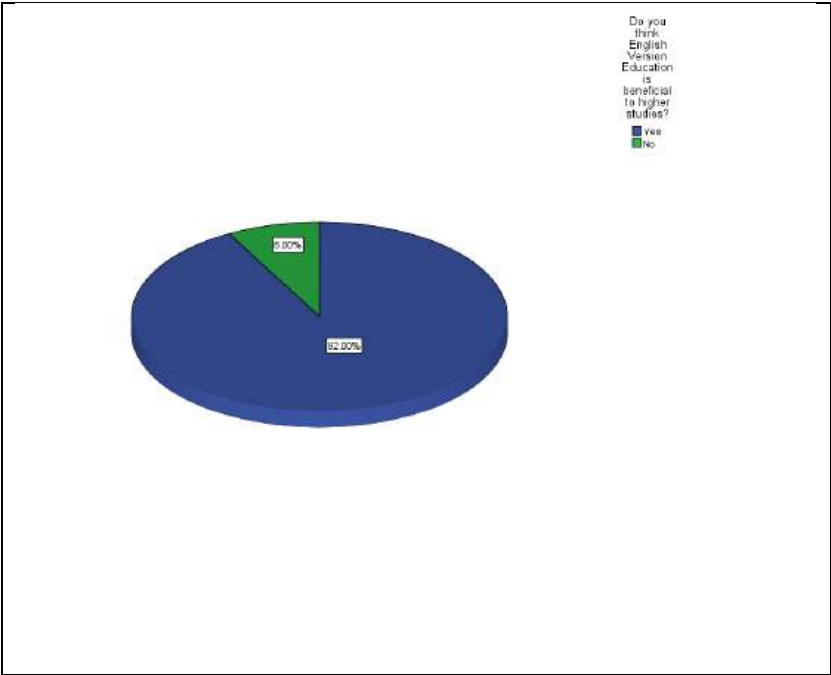
Question	Choices	Number of Respondents	Percentage%
Do you think textbooks are well-written?	Yes	125	62.50%
	No	75	37.50%



The sixth question has been asked to the respondents whether the English version educational system was beneficial to higher studies or not. 92% respondents ticked **Yes** option and 8% respondents ticked **No** option. (See Student’s Table-6)

Student’s Table-6

Question	Choices	Number of Respondents	Percentage%
Do you think English version education is beneficial to higher studies or not?	Yes	184	92%
	No	16	8%

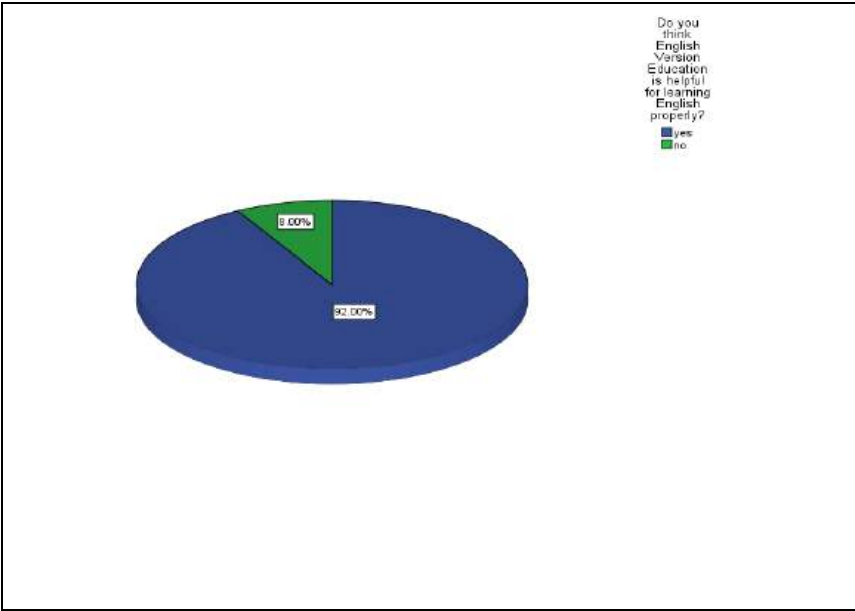


The seventh question has been asked to the respondents about the textbooks whether the English version education was helpful for learning English

properly or not.92% respondents ticked **Yes** option and 8% respondents ticked on **No** option. (See Student’s table-7)

Student’s Table-7

Question	Choices	Number of Respondents	Percentage %
Do you think English Version Education is helpful for learning English properly?	Yes	184	92%
	No	16	8%



Qualitative Analysis

Through the qualitative case study, participants' problems, benefits, expectations and plans, day-to-day activities, and barriers that they encountered have been explored. This qualitative study mainly focused on their personal opinion and experiences about the English version education under the national curriculum. Some comments of respondents have been given below.

Student (Rukayat Tazmin Tiwana):

Tiwana is a student in class seven of an English version school. She says that she does not enjoy homework, rather she enjoys class activities. She thinks that through class activities, she can learn English properly. She also believes that an English version education will help her in the future for higher studies. However, she is disappointed about the textbooks because the textbooks are not well-written.

Teacher (Farzana Yeasmin):

Farzana Yeasmin is a young teacher at a prominent English-version school in Dhaka city. She says that she has not gotten any training from the government or her own institution. She also says that some training is provided for the senior teachers but not for the freshers. She adds that class time is not enough for teaching properly. Due to the lack of time, teachers could not be able to focus on developing the skills of the English language. She uses modern technology to make lessons easy. She thinks, as all the students are Bangladeshi, most of them prefer Bangla more than English. In group work and pair work, students use the Bengali language to communicate with each other. This communication procedure is not helpful for students. She also says that teachers use the Bangla language in teaching but this is only for students to make them understand the lesson. She believes that if teachers and students both communicate in English, it will bring a good result.

Vice Principal (Jahangir Alam):

Jahangir Alam is the principal of a prominent English-version school in Dhaka city. He says that textbooks are not error-free. Books sometimes are not available. It should be ensured like Bangla medium schools. He also says that

their institution gives the teachers proper training but the government does not provide any training to the teachers. He believes that only intuitional training is not enough for English version education. He thinks that the government should emphasize the English version of education so that our young generation can communicate with the progressive world.

Other Students' points of view:

There are some students whose names have not been mentioned. They think that all teachers cannot be able to teach them properly. Some teachers are really good. But, some of them fail to communicate with them properly. They are also not satisfied with the systems of examination. This examination pattern cannot measure their capability in four skills (reading skill, writing skill, listening skill, speaking skill). All sorts of examinations including quiz, and class tests are based on writing skills. So, others' skills are not being focused properly. This has happened, because most of the classes are taken in Bangla due to other students not understanding the lesson properly. So, teachers use the Bangla language instead of the English language. So, other students face issues with this. Most of the time, they can improve their writing skills and reading skills but fail to improve the other two skills. One student says, "Creative system should be removed, less pressure should be given and spelling and grammatical functions should be corrected to make the English Version system more effective." It means pressure hinders them from learning properly. Another student says, "We should be given a book which will contain different stories about life. this will be helpful for knowledge as well as practicing English." Students want to enjoy the study by reading stories so that they can connect them with the study.

Other Teachers' points of view:

Most of the teachers have not gotten proper training. For this reason, they face issues with the new approach of teaching. They also say, they have come from Bangla medium, so sometimes, it becomes hard for them to use English in every sphere of the classroom. However, if they get the proper training, they might cope up with the situation. However, sometimes, new teachers do not get the proper treatment from the organization which also affects their

teaching process. Some senior colleagues also do not help them to learn the work that is related to teaching. One of the teachers of a South Point School says that they are given a book including guidelines from the government for teaching students. Through this guidance, they learn how to conduct the lesson. Some of them say, the communicative language teaching method has been used in Bangladesh for nearly two decades. According to the UC Research Repository, “Though compulsory fifteen years of schooling, public examination results indicate that students perform poorly in English.” It indicates that the main target is not fulfilled. Here, the Communicative language method (CLT) is very helpful. Four skills are included in the CLT method. These are reading, writing, speaking, and listening. After gaining these four skills, students can become experts in the English language.

Feedback of Class Observation:

Observation has been done in 5 classes. According to the observations, teachers and students communicate in Bangla which is not helpful for the students. Besides this, the language skills are not measured properly. Class tests, examinations, and quizzes are based on writing skills. Sometimes, teachers try to use English, but the students do not understand it properly. For this reason, they request teachers to teach in Bangla. So, teachers use the Bangla language as a medium of instruction. Another thing is, teachers focused on completing the syllabus. So, they cannot be able to focus on developing language skills. On the other hand, it has been seen that most of the time, teachers follow the grammar translation method or communicative language teaching method. However, if they can adopt different methods for different lessons, it would be more helpful. As the students are being taught in the same way regularly, they lose the motivation for learning. There are very few group activities for the students, so they do not enjoy the learning process. For this reason, they cannot be able to develop their language skills.

Convergence and Divergence

In the questionnaire survey, respondents are asked several questions. They give their feedback. There is some convergence and divergence between quantitative data and qualitative data analysis. Teachers have been asked

whether the students communicate in English during class time. 92.50% of the respondents ticked **Yes**. However, according to observation, many students communicate in Bangla during class time. Sometimes, they do not understand the lesson so they communicate in Bangla. Students are asked whether the teachers communicate in English during class time or not. 70% of students ticked **Yes**. According to the class observation and interviews, sometimes teachers communicate in Bangla to make students understand about the lesson. But most of the time teachers use the English language. They follow the medium of instruction. Students are asked whether the teachers are well-trained to teach all subjects in English or not. 93.50% of students ticked **Yes**. According to observation, it is found that some teachers are trained but most of them are not. In the sixth question, teachers are asked whether they have received adequate training from their institution or any government/non-government center for pedagogical training/teaching or not. 52.50% of the respondents ticked **Yes**. In the interviews, principals say that their institution provides training for the teachers but the teachers do not get any training on pedagogy from government/non-government centers. Teachers also say they do not get adequate pedagogical training.

Students and teachers both think that English Version Education is helpful for students to learn English properly. In the qualitative and quantitative analysis, the feedback of the respondents is the same for this purpose. Students are asked whether English Version Education is beneficial to higher studies or not. 92% of the respondents ticked **Yes**. Through the interviews of the students, it is found that through English Version Education they can easily become experts in four skills. However, it would be possible if the medium of instructions can be followed properly and the assessment system can be changed. They also agreed, English version of education is helpful for higher studies. Students and Teachers are also asked whether the textbooks are well-written or not. 62.50% respondents of the students and 67.50 % respondents of the teachers ticked **the Yes** option. According to the interviews, it is found that teachers and students both think that textbooks are not well-written and there are some printing mistakes in the textbooks. There are some convergence and divergence between quantitative and qualitative data analyses. But the

main point is that both students and teachers have suggestions to make this system more effective. They want to make this system more conducive to learning.

Chapter 4: Summary of the Findings

After analyzing the data, it has been found, the total scenario of English version schools regarding developing the English language skills is not so good. The proper steps are being decided but these are not implemented properly. Without proper training, teachers are required to teach the students. Due to these, students are not getting proper education. The examination system does not also measure the four skills of the English language. So, the imprecise implementation of examination, teaching, and training cannot allow students to develop English language skills. Students and teachers are satisfied with the decision to launch the English version schools under the national curriculum. However, they are not satisfied with the process of teaching-learning. As teachers are not getting proper training, they cannot be able to provide input properly. Students are also facing difficulties in developing four skills of the English language as they are busy with completing the syllabus. Besides this, the textbooks are not properly translated which also creates an issue. Due to these, students and parents are not getting the proper output. To improve the situation, teachers and students have shared their thoughts. four major things have been brought out. One is that, to improve the competency level, it is important to provide proper training to the teachers. Another thing is that it is important to translate the textbooks properly and must be well-written. In addition, students and teachers must follow the medium of instruction properly. Lastly, the examination system must be implemented in such a way so that the four skills can be measured properly.

Chapter 5: Conclusion

The study mainly tried to find out the real scenario of the English version education system, schools, and perspectives of students and teachers regarding this version. This study has found that the main goal will not be achieved if the system is not monitored properly. There are many lacking that create main problems in achieving the goal of the English version education system. Due to time limitations, it would be tough to bring out more information. The research was conducted only on a small size of students. It would have been better if it had been done on a larger scale. After a thorough analysis of data, The English version schools should focus on four skills. They are reading, writing, speaking, and listening. Mostly, students are interested in studying English version education to learn English properly. Four skills are important to learning English properly. Government and non-government institutions need to provide pedagogical training for the teachers. Teachers need to use more audio-visual instruments so that students enjoy the study and understand the lesson. Both teachers and students need to communicate in English properly during class time. Students should be provided with group work and pair work activities during class time. They should be instructed not to use their mother tongue during class tasks so that they can learn English properly. This research, despite its obvious limitations, can act as the base for further investigation.

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Questionnaire for Teachers

Questions on The Primary Observations on Students' and Teachers' Attitudes towards English Version Education in Secondary Level National Curriculum in Dhaka City

(The information which will be provided by the respondents will be kept secret & will be used only for research purposes.)

Profile:

Name:

.....
.....

Subject:

.....
.....

Institution

Name:

.....

Please put a tick on the black circle and make comments on the space provided.

1. Do you think English version education follows the national curriculum properly?

. Yes . No

2. Do the students communicate in English during class time?

. Yes . No

3. Do the students memorize the text or understand it or both?

. Memorize . Understand . Both

4. Do you think text-books are well-written?

. Yes . No

5. Do the students respond to teachers in English?

. Yes . No

6. Do you think you have got adequate training from your institution or any government/non-government center for pedagogical training/teaching?

. Yes . No

7. Do you think English Version Education helpful for students to learn English properly?

. Yes . No

If yes, please write down why

.....
.....
.....
.....

8. Do you have any suggestions to make the English Version more effective?

. Yes . No

If yes, please write down

.....
.....
.....

Questionnaire for Students

Questions on The Primary Observations on Students' and Teachers' Attitudes towards English Version Education in Secondary Level National Curriculum in Dhaka City

(The information which will be provided by the respondents will be kept secret & will be used only for research purposes.)

Profile:

Name:

Class:

Institution Name:

Please put a tick on the black circle and make comments on the space provided.

1. Do you think English version education follows the national curriculum properly?

. Yes . No

2. Do the teachers communicate in English during class time?

. Yes . No

3. Do the teachers follow the medium of instruction while teaching?

. Yes . No

4. Do you think teachers are well-trained to teach all subjects in English?

. Yes . No

5. Do you think text-books are well-written?

. Yes . No

6. Do you think English version education is beneficial to higher studies?

. Yes . No

7. Do you think English version education is helpful for you to learn English properly?

. Yes . No

If yes, please write down why

.....
.....
.....

8. Do you have any suggestions to make the English version more effective?

. Yes . No

If yes, please write down

.....
.....
.....

The Transvestite Voice of Michael Field

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Abstract

This paper aims to explore the theme of identity as traversed in the poems of Michael Field during the late 19th and the early 20th centuries. Late Victorian authors Katharine Harris Bradley (1846 - 1914) and Edith Emma Cooper (1862 - 1913), aunt and niece in relation, used to write their plays and poems under the pseudonym of Michael Field. Their poems were made public at a time when the literary world witnessed the impact of *Fin de Siècle*, when ‘New Woman’ and ‘aesthetes’ movements were on the vogue. Practitioners of these ideologies, Bradley and Cooper managed to override their female voice into a male one, using which they could explore the surreptitious domain of women. The voice of Michael Field becomes a transvestite, Sapphic voice, attuned by two women. Fearful of the contemporary society for being overt, they concealed their identity so that they could have the opportunity to deal with the female interior, which could not be framed and exposed properly in their time. This paper focuses on selected poems of Michael Field and aims to find how Michael Field introduces a binary voice by refashioning the voice of men and furnishing it with the opposite voice to realize the core of a ‘self’.]

Keywords: *Michael Field, Fin de Siècle, late Victorian period, Robert Browning, transvestism.*

The long Victorian period started to give in to the pressure of multifarious changes at many levels of social norms and traditions by the late nineteenth century as an outcome of socio-political and economic challenges and expectations. One such movement during the late Victorian period was the upsurge for the rights of women curved by the male world of contemporary society. This rise for the demand of rights was partly to comprehend the nature of the feminine 'self'. This movement, feminist in nature, has paved the way to study that particular type of 'self'. In line with Socrates' dictum 'Know Thyself', women of this time have shown their courage to come out and identify themselves in a rather hostile, socio-cultural pragmatics. The late Victorian period, which shows a persistent decay of the Victorian ideology, is, thus, marked with a number of discursive features, modernist temperament being one of them. The 'New Woman,' another such feature voicing "an emerging form of emancipated womanhood" (Robson and Christ 1034), undertakes the responsibilities of freeing herself in various ways.

The 'New Woman' movement encompassing *Fin de Siècle* generated many passages of new ideas and new thoughts, thereby instigating controversy within the domains of art, culture, life-style and literature. According to Caroline Baylis-Green, New Women writers were involved in debates about oppressive femininity, sexuality, educational access, social and political enfranchisement and ways of challenging the gendering of cultural forms (209). Some such diversified observations came as direct response to the conventional unwanted situations, while some others covertly fomented and led to unexpected outbursts. Yet, because of Victorian patriarchal domination, women had to speak out differently so that they might not be blamed directly. One significant voice in this regard is that of Michael Field, a male name that conceals the true identity of two women, Katharine Harris Bradley and Edith Emma Cooper, who are aunt and niece in relation. As Baylis-Green states, "Michael Field enables the extension of a relationship, a literary partnership and a performative gender dynamic, both inside and outside the act of writing" (104). Michael Field's authoritative existence continued to dominate as a poet and dramatist until the surprising secret was revealed to other Victorian authors by an influential poet who was Bradley and Cooper's well-wisher as well.

It is Robert Browning who disclosed the reality of Michael Field that this male poet is a collaboration of two female poets: Katharine Bradley and Edith Cooper, who have chosen that male name to be their united voice. In answer to the question 'why', it can be said that the term 'aesthetes' has a concrete ground for such gendered identification. Ana Vadillo states that Bradley and Cooper were much influenced by male figures such as John Ruskin, William Morris, Walter Pater, and Bernard Berenson, among others, and that Bradley and Cooper's house was decorated according to the aesthetic taste of these influential men (Vadillo, par. 3). The second point of identity issue, then, should be the concept of power. The masculine authority nurtures an emerging theme of feminine 'self' as well, particularly if that dominates the contemporaneity. In Michael Field's journals, states Gabriele Griffin, men are idolized and appear to be as father-figures, in whom the true identity was confided (33). In other words, the name Michael Field itself represents shelter and a dominating agency.

Michael Field bears the entity of not only masculinity but femininity as well. The two ladies have their voice aired through an opposite identity. For the first-time reader, the poems convey one meaning, one interpretation; however, when the reality of Michael Field surfaces, that meaning looks to a different dimension. Their preference for this name is embedded in their realization of the society as they replied to Browning's query, "We have many things to say that the world will not tolerate from a woman's lips" (qtd. in Madden 98). Whatever they are afraid of, they must have enjoyed that equally. This object of fear is the object of happiness for them. Michael Field is, in this sense, a binary identity. It is a male name with a female voice (or, rather, two voices). Michael being Bradley and Field being Cooper, Michael Field is a pluralistic entity. It is male, female, hermaphroditic, and it is lesbian in nature.

What could be a suitable pronoun for Michael Field? He, she, or they? What is it that Bradley and Cooper want to say, but cannot? In a letter to Cooper, Bradley calls her "wife" (letter 100), and in a letter to Bradley, Cooper calls

her “dear Husband” (letter 130)¹. Though the relationship is lesbian in nature, it is not one they can claim in public. They, being silent, or rather passive, create ambiguity about their relationship. Baylis-Green opines that the formation of Michael Field is both implicit and explicit, asserted as unproblematic and simultaneously deconstructed through Bradley and Cooper’s discussions concerning the use of the label (201). Their book of verse *Sight and Song* (1892) projects their interpretation of the body based on their experience of Classic paintings. However, some of their poems also talk about a feminist attempt for the exploration of the ‘self’. The poem “A Girl” (1893) carries some of the answers to these questions.² This girl has all the feminine attributes, and the soul has “lovely mysteries” (3). Despite such mysteries, the physical beauty erupts with “the lips apart” (7) to provoke sexual appeal because of the “trembling nature in the breeze” (8), after which the souls appear for the completion of the poem:

I leave a page half-writ –
The work begun
Will be to heaven's conception done,
If she come to it. (11-14)

The first ten lines of the poem are a mix-up of body and soul. The living body of the girl is not biological alone; it is socio-biological, and the heart's condition depicts the girl as rebellious, anxious, and expectant. She belongs to nature by becoming an integral part of it. The portrayal of her countenance evokes an image of sexual desire mixed with aspiration yet anxiety. At the same time, the rebel in her wants to be what she feels like to be. With this mood, the invisible girl becomes the centre of the poem, which depends on her for its completion. Heaven's conception is the happiness the two ladies aspire, a union of two, as Griffin says, of continuing a tradition of feminine interaction based on Greek sources (34). The tonal subjectivity of the poem

¹ For more information, see *The Fowl and the Pussycat: Love Letters of Michael Field, 1876-1909*, edited by Sharon Bickle.

² All the poems of Michael Field in this paper have been quoted from *Michael Field, the Poet: Published and Manuscript Materials*, edited by Marion Thain and Ana Parejo Vadillo.

emanates dependency on the subject itself. It is not heteronormative; it is Sapphic in nature, denying any male dependency, accepting and welcoming lesbian legacy.

This girl in the poem is much desired. She possesses dual existence: the girl herself and the role she is supposed to execute. The girl's essence is required for the poem to be a holistic outburst of thoughts. Though she is imaginary, she becomes real when she turns out to be the finishing touch of creativity. Michael Field writes poems with two different hands: one that of Bradley, and the other of Cooper. This very poem can be "done" (13) when the girl joins its shaping. It is not only about a girl but also about a poem whose entity depends not on a man but on a woman. The girl and the poem are one body, one soul that rejects any male authority. For its very life, it does not require any Promethean touch: the Sapphic spirit is strong enough for it to become alive. This is how the poem becomes the genesis of a paradoxical existence of two female voices into one (fe)male voice.

This denial of the male agency argues for what Simone de Beauvoir says about the body, "The body is not a thing, it is a situation: it is our grasp on the world and our sketch of our project" (66). The body's transformation from object to a situation, from concrete to abstract, signifies that it is the centre of power. Bradley and Cooper, in their poems, enact that power. Ed Madden adds that they have things to say about the relation of gender to cultural power, things they say by resituating gender, voice and poetic power in the male body, a voice of sexual difference (98). Michael Field represents a variegated 'self' that is projected on body and mind on the one hand, and society and culture on the other. Michael Field is a collaboration of freedom of choice to some extent. The name is a deliberation, a coinage for hiding the identity that is to be boosted. Yet, more importantly, Michael Field is an individuated construct for the feminine temperament of tolerance within the social periphery. Bradley and Cooper know how much it might cost them if the identity is leaked. They urge Browning to keep it the way it is so that they may enjoy what they can inside their boundary: the freedom of lesbian feminism. They are more than married to each other, aunt and niece, and the bond is beyond any generic sociability.

The reality of Michael Field is an illusion projected by Bradley and Cooper, whereas their reality is an illusion of Michael Field. This kind of reciprocity leads to a distinct ambiguity. The authorship thus becomes a predilection for a parallel, challenging world where one is conscious of oneself, knowing the limitations of the socio-cultural variables. Luce Irigaray states that women are condemned to a cultural wilderness unless the female imaginary can be symbolised, thus allowing women to become subjects in their own right rather than simply objects of symbolic projection (qtd. in Minsky 194). Michael Field becomes the representative of an impersonated 'self' that exposes a 'self' that is loyal to itself, a self-reflexive 'self' that voices itself.

Focus on the question of transvestism also brings the issue of Rosalind in William Shakespeare's play *As You Like It* (1599). Transvestism is eclectic in Shakespeare's plays, and in Ovid, Tiresias is seen as experiencing the male as well as the female sexuality. Shakespeare's characters, however, have different social roles to play with transvestism. It is Rosalind who is the most significant example of possessing a transvestite voice. She is forced to have that voice because her society demands it from her. She needs protection, and it can only be ensured through the male disguise to protect herself from male intervention in her way of life. Once she takes that disguise, she is well secured from any male obstinacy. It also empowers her to be authoritative over other males. Rosalind is transformed to Ganymede, who rules now. Like Michael Field, Ganymede grants Rosalind the opportunity to explore herself. Madeleine Kahn says that in transvestism the 'self' is split into a doubly gendered being which infinitely mirrors itself. She continues that a temporary transfer of identity from the physical 'self' to the transforming reflection is crucial to transvestism, which refers to the temporary assertion of a female 'self' whose very ephemeral nature enables the reassertion of a masculine identity (Kahn 18). If it is applicable for the transvestite man, it is equally applicable for the transvestite woman: transvestism can refer to the temporary assertion of a masculine 'self' that enables the reassertion of a feminine 'self'.

Rosalind, being Ganymede, takes the advantage of hiding herself from the masculine world to be fully aware of that world and to witness how she can dominate that world. This concealment bestows her with the power of self-identity through cross-identity. She assures Orlando to cure him by becoming Rosalind in the disguise of Ganymede who is the disguised Rosalind, "I would

cure you if you would but call me Rosalind and come every day to my cot and woo me” (3.2.367-68). This allows her to be her true ‘self’ which cannot be understood by Orlando at all. By being who she really is, Ganymede, with the male body and the female mind, and then the female body and the male situation, dominates all the developments of the play and brings a happy ending to it. The transformation of Rosalind, at first, from Rosalind to Ganymede and, later, from Ganymede to Rosalind creates two selves of Rosalind: a masculine ‘self’ and a feminine ‘self’. Here, the feminine ‘self’ uses the masculine ‘self’ to empower itself. Michael Field, the masculine ‘self’, hides the feminine selves of Bradley and Cooper, who exploit masculinity to replenish themselves.

Michael Field’s poem “Maids, Not to You My Mind Doth Change” (1889) is a consequential poem of the *self* as mentioned earlier. The title, which is the first line of the poem, has been borrowed from Sappho, thus showing Bradley and Cooper’s ideological indebtedness to her. The speaker here treats man as subordinate who survives at the mercy of the woman, “Men I defy, allure, estrange, / Prostrate, make bond or free:” (2-3). The woman is dominating agency here; readers witness inversion in the role of the gender. The impression is that this is exactly how women are treated by men in society. Women lack the voice, which is theirs in this poem. Setting thus female supremacy over male, the poem then proceeds to assert the reliability of women on women. An authoritative sense of lesbian feminism starts working from the second line, coiling its very spirit round the whole poem. The reliance here is not sexual, nor is it merely physical; it is purely psycho-physiological. The ‘self’ exposes itself to another ‘self’, a homo-self, on which it can rely. Even heteronormativity has its limitations, the speaker claims, whereas the “desire” (9) has its fulfillment in that same-sex identity. Desire is related to power. The male is castrated, and the female is empowered with the existence of another one. The power is practiced in two ways: first, the male castration, and then, the female embodiment of desire. As de Beauvoir has said, the female body becomes the situation. The speaker has her own limitation, which she is conscious of, “To you I never breathe a sign / Of inward want or woe” (13-14). The question comes as what this inward want or woe might be.

This want or woe is the desire or the mode of expression of that desire for exploring the ‘self’ that remains a mystery even to itself. It is mysterious in the sense that it relies on itself for its identification, and it is uncertain about its extent. When it finds a similar one, it treats the other as a mirror, and the reflexive ‘self’ is a reflection of its own. For it, peace lies here, within. The ‘self’ is in relation to itself, and so a homologous impulse erupts. The “weary bosom” in the last line indicates anxiety, fatigue, and frustration mixed with concealed hope because the poem ends with the word “fill” (21). It is the fulfilment of expectation of becoming conscious of one’s own ‘self’, and that consciousness rises from the mirror where it is reflected. From powerlessness, the poem demonstrates female power. Like many other poems of Michael Field, this poem talks about “transgressive sexuality and gender” (qtd. in Bevis 571).

Kate Thomas asserts that Bradley and Cooper’s multigenerational lesbianism is related to their own sense that as poets and lovers they joined hands and wrote against their age (329). The poem “It Was Deep April, and the Morn” (1893) is a poem for the future expectancy of the poet Michael Field. It is subjective in tone, and declares the desires of the poet. One is about the poetic identity in the second line, “Shakspeare³ was born;” (2). Once the birth is proclaimed historically, its hierarchy is reiterated in the following lines, “My Love and I took hands and swore, / Against the world, to be / Poets and Lovers evermore,” (4-6). Michael Field’s desire is to be a renowned poet and dramatist. However, the very notion of selfhood cannot be ignored with the plural form of the two poets’ identity. Michael Field continues the subjectivity and faces the challenges of the society upon them, “The world was on us, pressing sore;” (3), with a sustainable desire to topple them. The poem becomes radically challenging itself, introducing Classic reference, about their relation and identity, as mentioned in Michael Field’s letters earlier. Their claim in the last line, “Indifferent to heaven and hell” (16), is what they expect: it is not who Bradley and Cooper are as women, it is who they are as a poet, or may be two poets, posthumously. Michelle Lee asserts that Michael Field has the power, the ability to choose and change identity, body, and mind (Lee). With their choice of freedom and interdependence, Bradley and Cooper have

³ This is the spelling of ‘Shakespeare’ in the poem.

theoretically and practically managed to introduce a different concept of identity, a distinct voice unknown to their contemporary authors. This conjoined authority allows them to speak for themselves as well as for other women with their suppressed voice at a time when the background of such an entity receives slanting treatment even in the domain where they dwell.

“At the heart of contemporary Western culture”, writes Eva Illouz, “is the division between the staged self, enacting itself in the public sphere, and the true self whose home is the private sphere of family, love, and emotions” (91-92). Michael Field, being the stage for Bradley and Cooper, generates the opportunity for them to be what they want to be. Michael Field is the aesthetic construct of two collaborative poets, who rely on each other to be part of the other’s ‘self’. In other words, Bradley and Cooper negotiate with the other and disseminate on the other so that a correlative ‘self’ can be explored. Michael Field, in the *Fin de Siècle*, is the manifestation of a pluralistic, corresponding ‘self’ that formulates the position of empowerment.

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Numerical Simulation of Effect of twist ratios on Heat Transfer for Circular-cut twisted tape inserts in U-shaped Pipe

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Abstract

Numerical simulation effects have been studied on heat enhancement for twisted tape with Circular-cut of twist ratios. A turbulent model has been considered during simulation including Reynolds numbers (Re) between ranges $7500 \leq Re \leq 35000$ under a constant heat flux. This numerical simulation study was carried out for twist ratios 3.0, 4.0, 5.0, and 6.0 individually. And the U-loop pipe is 850 mm length where water is working fluid. From the numerical results it has been found that the Nusselt number (Nu), the friction factor (f), and the thermal performance (η) increased while the twist ratio reduced. From the results it is also observed that the heat transfer enhancement depends not only on the type of different shapes of the geometry insert but also on the twist ratio.

Keywords : *Circular-cut inserts, Twist Ratio, velocity, K-omega turbulent model, Numerical Simulation.*

1.1 Introduction

Machine-driven devices are devices that are operated by machines or automated systems. Machine-driven devices are widely used in manufacturing and production industries to streamline the process, increase efficiency, and reduce costs [1]. These technologies are driving the growth of the 4IR (Fourth Industrial Revolution) which emphasizes the integration of digital and physical systems to create “smart devices” that are more efficient, flexible, and responsive to industrial demands [2-3]. The heat transfer devices are related to heat exchangers, radiators, boilers, heat pumps, evaporators, condensers, heat sinks, etc. The exchange of heat can differ over time due to various factors including the geometrical shapes of the pipe, flow rate, temperature, pressure, and its inserts [4].

Mechanical engineers use a variety of tools and techniques to analyze and optimize heat transfer in their designs. Computational fluid dynamics (CFD) is a common tool used to model the flow of fluids and heat transfer within mechanical systems [5]. Twisted-tape inserts are widely used in heat transfer applications due to their ability to enhance heat transfer by creating turbulence in the flow of fluid [6]. This turbulence increases the rate of heat transfer between the fluid and the surrounding surface, leading to improve performance and efficiency. The use of twisted-tape inserts is a passive method of heat transfer enhancement, meaning that it does not require any external power or energy [7]. This makes it a cost-effective and practical solution for many industrial applications. Twisted-tape inserts are also known for their fixed performance and effectiveness.

Overall, twisted-tape inserts are a popular and effective solution for enhancing heat transfer in a variety of industrial applications. Inserts in a U-shaped pipe are typically used to enhance fluid flow and prevent turbulence [8]. The U-shaped pipe is often found in applications where the fluid needs to be transported from one point to another, such as in industrial or chemical processing plants. This insert is typically a metal coil that is inserted into the pipe, creating a spiral flow path for the fluid [9]. The spiral flow path helps to reduce turbulence and increase the velocity of the fluid, resulting in improved flow and reduced pressure drop [10-11]. This insert is typically a

series of flat plates or vanes that are placed inside the U-shaped pipe. Inserts can also be used to increase heat transfer in U-shaped pipes [12]. A twisted tape insert can be used to enhance heat transfer by increasing the surface area of the pipe and creating turbulence in the fluid flow [13].

Seigel [14-15], Zozulya, and Shkuratov [16] they have found that 2 to 3 times better heat transfer rate comparing the plain tube when they consider twisted tape inserts. Noothong 2006, and Murugesan 2009 computed experimentally trapezoidal-cut twisted tape inserts keeping ratios 4.0 and 6.0. the paper concluded that the Nusselt number (Nu) rate increases with decrease the twist ratio and the friction factor also increases with shrinking the twist ratio [17-18]. In 2013 B. Salam et.al. and 2015 Hossain, S., conducted an experimental study in a round tube provided with rectangular-cut twisted tape inserts with a twist ratio of 5.5. It has been promoted by a heat transfer rate of 1.9 to 2.3 times better than a plain tube [19-20].

From the literature analysis, numerous analytical and experimental methods exist to enhance the heat transfer through a pipe. These paper gives the importance to development the heat transfer rate with twisted tape inserts where Reynolds number range is 5000 to 25000 with a constant heat flux. This research work presents the heat transfer phenomena in a circular pipe by the Finite Element Method (FEM). In these paper studies a non-isothermal k-omega turbulent flow model for this numerical simulation.

2 Governing Equations

To calculate the fluid dynamical performance inside the U-loop pipe, Computational Fluid Dynamics holds the extreme probable for wide-ranging application. By means of computer and numerical methods, CFD resolves problems involving the effort of fluid inside the tube And CFD procedure solves the Navier-Stokes equation where the mesh is generated by using the Finite Element Method. The governing equations which describe the flows are [21] Equation of Continuity

$$\frac{\partial \rho}{\partial t} + \nabla \cdot (\rho \mathbf{u}) = 0 \quad (1)$$

and the Equations of Momentum

$$\rho(\mathbf{u} \cdot \nabla) \mathbf{u} = \nabla \cdot [-p\mathbf{I} + (\mu + \mu_T)(\nabla \mathbf{u} + (\nabla \mathbf{u})^T) - \frac{2}{3}(\mu + \mu_T)(\nabla \cdot \mathbf{u})\mathbf{I} - \frac{2}{3}\rho K\mathbf{I}] + \mathbf{F} \quad (2)$$

The k-omega transport equation are below

$$\rho(\mathbf{u} \cdot \nabla)k = \nabla \cdot [(\mu + \mu_T \sigma_k^*) \nabla K] + p_k - \rho \beta^* k \omega \quad (3)$$

$$\rho(\mathbf{u} \cdot \nabla)\omega = \nabla \cdot [(\mu + \mu_T \sigma_\omega) \nabla \omega] + \alpha \frac{\omega}{k} P_k - \rho \beta \omega^2 \quad (4)$$

The equations (5) describe the energy equation,

$$\rho C_p \frac{\partial T}{\partial t} + \rho C_p \mathbf{u} \cdot \nabla T = \nabla \cdot (K \nabla T) + \mathbf{Q} + Q_{vh} + W_p \quad (5)$$

2.1. Boundary setup

In this model, it is assumed a uniform velocity $\mathbf{u} = \mathbf{u}_{in} = 0.3 \text{ m/s}$ and the temperature is $T = T_{in} = 293.15 \text{ K}$ at inlet. Wall function of the outlet and no-slip on the inner wall of the domain.

$$[(\mu + \mu_T)(\nabla \mathbf{u} + (\nabla \mathbf{u})^T) - \frac{2}{3}(\mu + \mu_T)(\nabla \cdot \mathbf{u})\mathbf{I} - \frac{2}{3}\rho k\mathbf{I}]\mathbf{n} = -\rho \frac{u_\tau}{\delta_w} \mathbf{u}_{\tan g} \quad (6)$$

3. Computational Domain setup and Mesh Design

Figure 3.1 shows the twist ratio 3.0 a computational domain. A modified U-loop circular-cut twist insert has been considered, whose pipe length is 2436.80mm, inner diameter 29mm, thickness 2mm. Computational simulations mesh design have been performed to adjust until the desired outcomes obtained accurately. For large domain, computer processor is a important issue that's why fine mesh is considered for whole domain. Simulation has been performed on a high-performance computer whose configuration is 16GB DDR3 RAM and Intel core i7 processor. COMSOL MULTIPHYSICS is FEM-based software which is used for numerical simulation [22-23]. The computational full-length inserts domain is shown in Figure 3.2 and the inlet mesh is represented in Figure 3.3. near the insert positions, the Mesh element becomes more complex shown in Figure 3.4.

Various inserts mesh comparison shown in table 3.1.

Table 3.1.Distinct Mesh Elements Comparison

Properties	Ratios			
	3.0	4.0	5.0	6.0
Elements of Tetrahedral	187294	218971	372281	406709
Elements of Triangular	29788	31650	46494	48154
Elements of Edge	3414	3658	4267	4410
Elements of Vertex	224	216	140	156
Elements (Minimum) quality	0.1559	0.01222	0.1153	0.3702
Average element quality	0.7401	0.7206	0.7315	0.7335

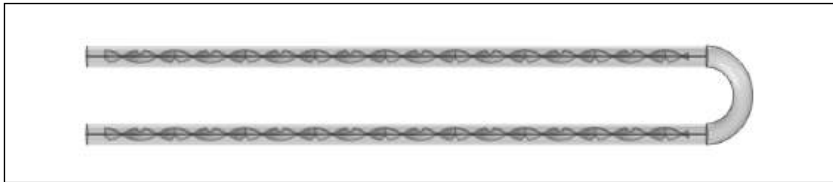


Figure 3.1.Computational full domain.

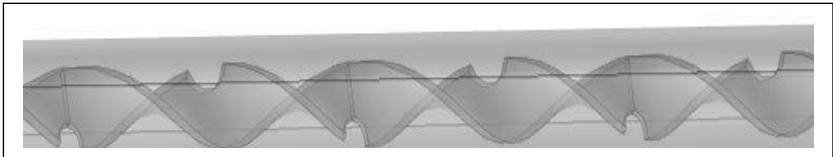


Figure 3.2.computational full inserts domain.

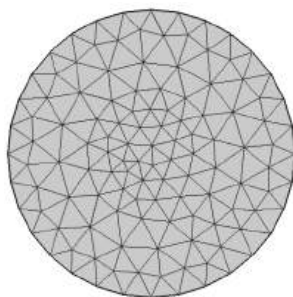


Figure 3.3.computational inlet mesh design

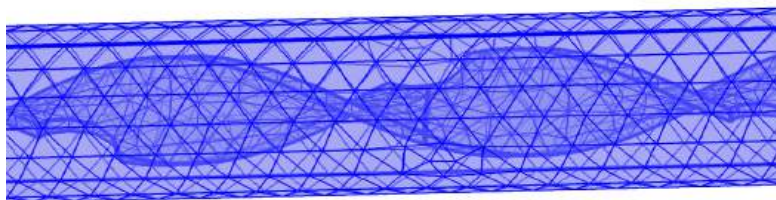


Figure 3.4.computational mesh design for inserts.

4 Numerical Analysis

Computational simulations have been performed with the Finite Element Method (FEM) of the tetrahedral triangular elements. The main purpose of the numerical model is to ensure the enhancement of the heat transfer phenomenon in a U-loop tubular pipe. A non-isothermal k- ω turbulent flow model has been considered by the geometrical shape. The steady of time has been taken for the simulation. Tube thickness is neglected for this numerical analysis. It has been given attention to improve the heat transfer rate by the flowing fluid. The flow of heat is overlooked in the tube. In this U-loop tubular pipe water has been taken as the employed fluid. To understand the effect of twist ratio into the heat transfer phenomenon, the simulations have been carried out using several types of ratios whereas the ratios are 3.0, 4.0, 5.0, and 6.0

separately.

Figure 4.1 (a, b, c, d, e) represents the simulation results for the twist ratio 3.0. It has been seen that in the inlet 293.15K temperature input initially. It is also observed that the outlet temperature is 298.77K, where the Reynolds number is 7500. If the Reynolds number is increased gradually to 14000, 21000, 28000, and 35000, where the maximum temperature was obtained at 297.36K, 296.52K, 296.52K, and at 29295.56K respectively. From observation of the numerical simulation, it is found that the Reynolds number is increased where the outlet temperature is decreased [23-24].

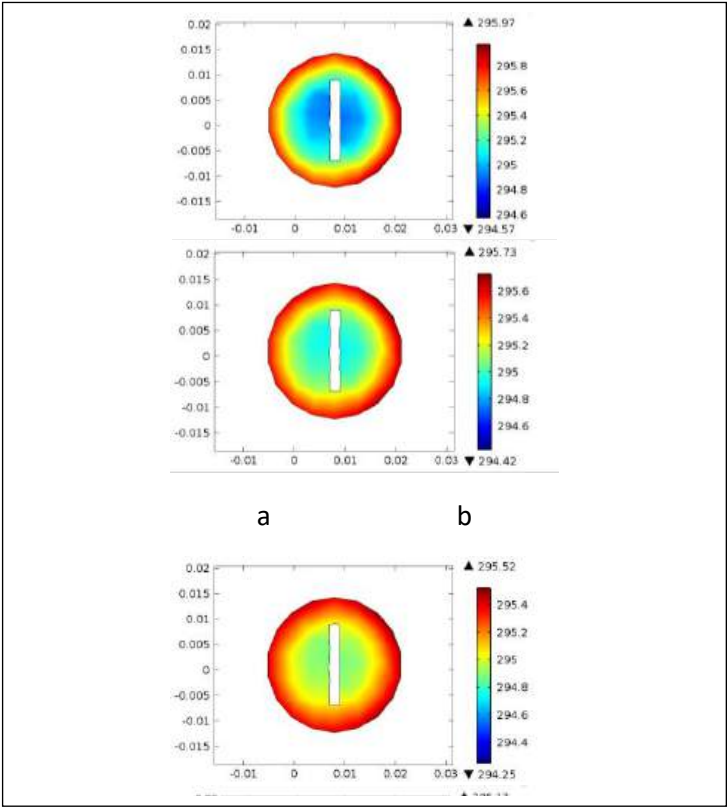


Figure 4.1 slice of the twist ratio 3 for Reynolds number (a) 5000 (b) 10000 (c) 15000 (d) 20000 (e) 25000 respectively in a position of 600mm.

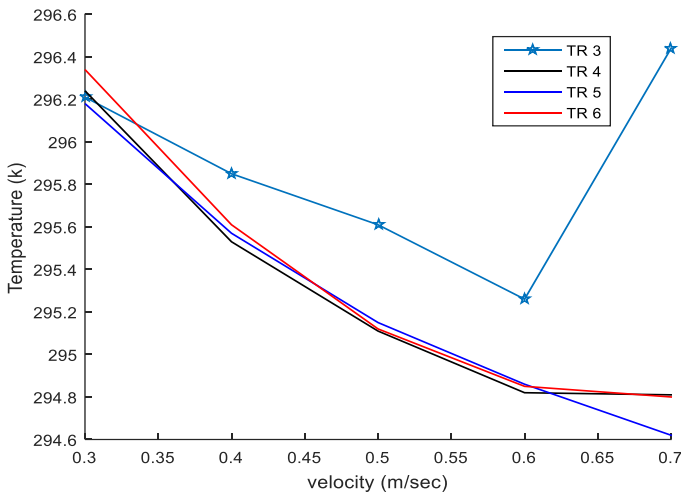


Fig. 4.2 Temperature distribution

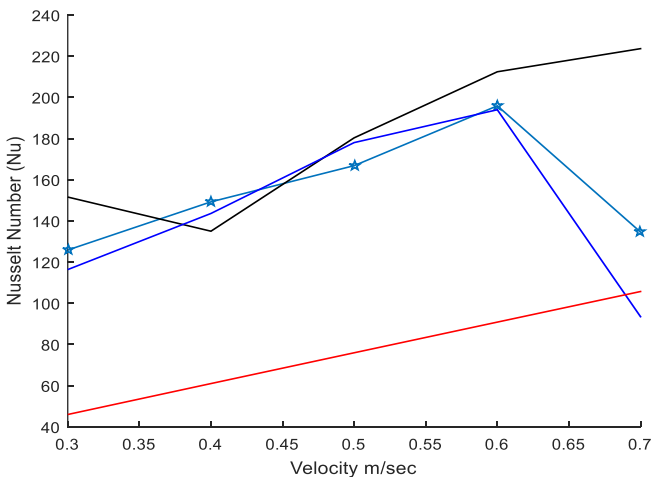


Fig. 4.3 Velocity vs Nusselt number

From the figure 4.3 seen that the Nusselt number (Nu) increased with the increase of velocity, while Figure 4.2 shows the temperature distribution for diverse twist ratios, 3, 4, 5, and 6 respectively. It is seen that the temperature decreased gradually with the increase of velocity in all cases, but on the other hand, it also found an abnormal behavior of the last velocity of twist ratio 3 [23-24].

4. Conclusion

Numerical simulations have been performed to analyze heat transfer, friction factor, and thermal performance factor. The effects of twist ratios (3.0, 4.0, 5.0, and 6.0) have been considered for the numerical simulations. The numerical analysis has been carried out for the describe range with provided heat flux. On the basis of numerical analysis result the following conclusions can be summarized:

- i. The initial temperature is 293.15K whereas the outlet temperature is observed at 298.77K for the Reynolds number 7500. Increasing the Reynolds number gradually to 14000, 21000, 28000, and 35000, the maximum temperature was obtained at 297.36K, 296.52K, 296.52K, and 29295.56K respectively. It is concluded that the Reynolds number increased whereas the final temperature decreased for a constant heat flux.
- ii. It is also decided that increased of Nusselt number temperature is decreased for various twist ratios, 3, 4, 5, and 6, respectively.
- iii. To check the effect of circular cut inserts together with different twist ratios, a numerical simulation is carried out. In this numerical simulation, the enhancement of heat is observed while inserts are used. When the twist ratio is 3, the enhancement is higher. It is also concluded that heat transfer rate depend on the twist ratio and different shapes of the geometry.

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Investigation of eco-friendly dyeing of cotton fabric with natural colorants extracted from banana leaves and mango leaves

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Abstract

Due to increased natural awareness about the potential harmful effects of some synthetic colorants, the use of eco-friendly natural dyes in textile coloring has gained major relevance. However, the use of metallic mordents renders naturally colored textile products unfriendly to the environment. With this in mind, the goal of this research was to employ natural waste sources, such as pigments recovered from banana and mango leaves, to color some selected cotton fabrics without the use of harsh chemicals, including salt. The variables influencing the extracted dye's fixation with cellulose were investigated. The mechanical parameters of the treated and untreated cloth samples were measured as tensile strength (kg/force) and elongation (percentage). The dyeing process was evaluated based on color parameters (L^* , a^* , b^* , and E) and fastness characteristics (wash, rubbing, and perspiration test). Experimental results revealed that, with the creation of natural dye from banana and mango leaves as a byproduct, the samples provided good quality results, which are crucial for sustainable industrial applications.

Keywords: *Eco-friendly, Natural colorants, Cotton fabric, Banana leaves, Mango leaves*

I. Introduction

Natural dyes have been used to color food items, leather, and natural fibers including wool, silk, cotton, and flax since prehistoric times (Kim, 2006). Natural colors come in a vast range of shades, and the majority of them are derived from the roots, bark, leaves, flowers, fruits, and other parts of plants. Following the introduction of synthetic dyes in 1856, the use of natural colors for textile dyeing declined more noticeably. Because synthetic dyes are more affordable, offer a wider range of bright colors, and have faster drying capabilities than natural dyes, they are increasingly used to achieve the necessary coloring in the global textile trade (Saleh et al. 2009). These dyes are created and used in a way that releases a lot of waste and unfixed dyes, posing serious health concerns and upsetting the natural eco-balance (Janhom et al. 2006). Greater interest in natural dyes for textile applications has resulted from increased environmental awareness of the need to avoid some toxic synthetic colors. Natural dyes are thought to be more environmentally friendly and have adequate color fastness levels. They are also thought to be more readily available, non-carcinogenic, non-skin-sensitive, easily obtained, and sustainable resources. Therefore, using natural colors in textile applications is preferable to using synthetic dyes. Natural dyes can produce distinctive visual attributes that add value to the textile business while also demonstrating the moral importance of an environmentally responsible product. The features of processing textile goods that do not disrupt ecological balance have an impact on both human and environmental health, making this a crucial area for research.

II. Literature Reviews

Due to the entry of contaminants into the environment, the use of synthetic dyestuffs and salt during their application in the dyeing and printing industries has come under fire (Ibrahim et al. 2020). The lives of humanity will undoubtedly undergo several significant changes with the start of the new millennium. One of these will be the move away from synthetic dyes, which have been steadily losing ground due to increased global awareness of the need to preserve the environment and ecology. Growing environmental awareness has resulted in calls for the use of natural colors in textiles

(Arifuzzaman & Muhib, 2018). Craft dyes and printers have been the principal users of natural dyes for coloring textiles. In recent years, there has been an increase in interest in employing these dyes, and a small number of commercial dyes and small businesses have begun to investigate the potential of using natural dyes for dyeing and printing textiles. Natural dyes are less harmful, non-polluting, less hazardous to health, vivid, have uncommon color ideas, and cause fewer allergic reactions.

The majority of natural colors do not adhere to the fibers very well, so mordents must be added. They also improve the fabric's ability to absorb color and its color brightness. The majority of the time, they are metallic salts of alum, ferrous sulfate, copper sulfate, and tin (stannous chloride) (Adeel et al. 2018). By adhering to the fiber and combining with the dye, these compounds function as a mordant. The use of metallic mordents during natural dyeing, on the other hand, raises concerns about the eco-friendliness of natural colors because only a small portion of these metal salts fix on the cloth and the remainder leaks out as effluent, contaminating land and water resources. Furthermore, the wearer is exposed to some risk due to the presence of some of these metal salts in the completed item (Hayat et al. 2022). In order to have pleasing fastness properties against the harmful synthetic mordents of metallic salts, it is important to look for natural mordents that are bio-friendly, as well as to examine their reasonability and sustainability.

One kilogram of cotton dyed with reactive dyes requires 70 to 150 liters of water, 0.6 to 0.8 kg of salt, and 30 to 60 grams of dyestuff. Due to these issues, this class of dyes is the most unfavorable from an ecological standpoint; the effluents produced have high values of BOD/COD (Biological oxygen demand/Chemical oxygen demand) and disrupt the delicate biochemistry of aquatic life by increasing the salinity of rivers. The annual production and use of more than 80,000 tons of reactive dyes makes it possible to calculate the overall quantity of pollution generated by their use (Saleh et al. 2009).

In order to address some of these concerns, the purpose of this study was to investigate the potential and possibilities of dyeing cotton fabric with natural dyes produced from mango and banana leaves and metallic and natural mordents. This study was justified by the fact that earlier studies had only focused on dyeing with natural colorants or simply salt-free dyeing

(Arivithamani & Dev, 2018; (Adeel et al. 2021). This study, however, concentrated on both of these parameters with comparative outcomes and some additional tests, such as data color and color fastness to perspiration test.

III. Methodology

III.I Materials

Different types of raw material and instruments had been used in this study (Table 1 & 2).

Table 1: List of Raw Materials and Chemicals Used for the Study

Name of the Material	Amount of the Material	Specification
Cotton Fabric	400 gm	Single jersey 100% cotton fabric, gsm-168
Mango Leaves	300 gm	Adult and fresh Leaves
Banana Leaves	300 gm	Adult and fresh Leaves
Salt	180 gm	Sodium Chloride (NaCl)
Acid	2.2 gm/l	Sodium dihydrogen orthophosphate dihydrate
Alkali	2.5 gm/l	di-sodium hydrogen phosphate

Table 2: Instruments Used in this Study

S.N.	Name of Instruments	Specification
1	Sample Dyeing Machine	Beaker Capacity: 75 ml- 500 ml. Cooling: Forced Air Cooling. Heating: IR Radiation. Automation: Through microprocessor controller DC4F/R (Option DCF-5) (Amanat Shah Fabrics Ltd.)
2	Data Color Spectrophotometer	Datacolor-600, Dual beam d/8° spectrophotometer, Pulsed xenon filtered to approximate D65, SPX Analyzer.
3	Perspirometer	Model- UI TX-59
4	Rub Fastness Tester	Model- UI FT-23
5	<i>Washing Fastness</i> Tester	Model- UI TX-58

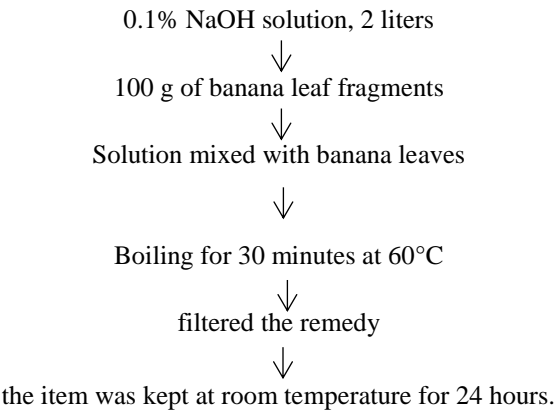
III.II Methods

III.II.I Dyeing Methods

III.II.I.I Extraction process of the colorants from the leaves

With clean, clear water, the leaves were thoroughly cleansed. Banana leaves weighing around 100 grams are sliced up with a little peach and cooked in two liters of 0.1% NaOH solution. After being heated at a high temperature and reduced to almost 1 liter, the slurry was allowed to react for some time before being filtered to remove any solids. It was then stored for 24 hours in a typical cold environment.

Here is the flow chart of making natural colorants,



Mango leaves were extracted in the same manner.

III.II.I.II Method of dying Process

Dyeing Recipe:

- Dyes (Liquor Colorants) = 80%
- Wetting agent = 1 g/L.
- Leveling agent = 0.8 g/L
- Soda ash = 20 g/L.
- Salt = 30 g/L.
- M: L = 1:40.
- $P^H = 6-7$ for exhaustion = 11 ± 0.5 for fixation.
- Time = 35 ' -45 ' for exhaustion = 40 ' -60 ' for fixation.
- Temperature = $40^0 - 50^0C$ for exhaustion = $50^0 - 60^0C$ for fixation

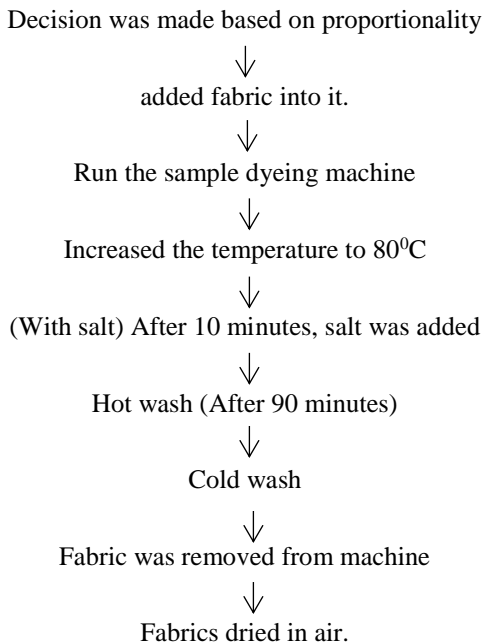
Dyeing bath process of cotton fabric with salt:

Fabrics were dyed by alkaline extraction. The alkaline banana leaf extraction liquors were used to color the cotton cloths for 90 minutes at $60^{\circ}C$ while they were being stirred. Salt was infused into the mixture after ten minutes. The ratio of salt to fabric was 1:10. The dye's pH was adjusted to 9, and the liquid-to-solids ratio was set to 1:40. The materials underwent water washing and air drying once the dyeing process was finished.

Dyeing bath process of cotton fabric without salt:

Fabrics were colored by alkaline extraction. The alkaline banana leaf extraction liquors were used to color the cotton cloths for 90 minutes at $60^{\circ}C$ while agitating them. The dye's pH was adjusted to 9, and the liquid-to-solids ratio was set to 1:40. The materials underwent water washing and air drying once the dyeing process was finished.

Dyeing of cotton fabric with mango leaves colorants were done in same way. Here is the common flow chart of dyeing with natural colorants-



The process and flow sequence were the same in salt free dyeing, but no salt was used. After coloring banana leaves in two distinct ways (without salt and with salt), mango leaves were colored in the same manner.

III.II.II Testing Methods

III.II.II.I Data color

The newest generation of benchtop color measuring instruments, the Datacolor high performance benchtop spectrophotometers (Datacolor 650TM, Datacolor 600TM, and Datacolor 400TM), incorporates cutting-edge CMOS integrated circuit technology. All of them are created to be tools for measuring, defining, and assessing color in both production and laboratory environments.

After the calibration process had finished, and the data color was then available for usage. The following were the measuring techniques for the standard sample:

- (a) Place the standard sample on the data color probe or port with care. The sample is typically folded four times to do this.
- (b) On the desktop, click the New Std button. By doing so, the Name field is cleared and the pointer is positioned there.
- (c) Give the sample a name. Sample data may originate from the keyboard, the database, or the instrument. There are two buttons on the desktop that let you know where the batch and standard measurements came from. (This is from the instrument).
- (d) Each sample type has its own measurement strategy that is set. In this instance, the instrument serves as both the source of the standard and the batch measurement (Inst). The measurement can be started by clicking the Std: Inst button.

III.II.II.II Color Fastness

Color Fastness to Washing Test (ISO 105 C06)

Following working procedure are followed for Color Fastness to Washing:

Took the sample in bulk and curing it for 4.30 to 6 hours results in a specimen that measured 4 by 10 cm.



Sewed the specimen in one corner with a piece of multi fiber fabric that was the same size.



Prepared a solution using sodium perborate (1 g/liter) and ECE detergent (4 g/liter) (if SKFL was needed, used 0.15 g/liter TAED).



Submerged the specimen made of a multi-fiber cloth in Rotawash m/c (Program: C2S) 30 minutes at 60 degrees Celsius and 40 degrees Celsius.



Applied hot water to rinse as necessary.



The sample was splashed with cold water (hand wash).



The air was then dried at a temperature of no more than 60 °C.



After that, the stitching was removed, with the exception of one of the shorter ends.



Prepared test report and examined the staining and color change in gray scale.

Color Fastness to Perspiration (ISO 105 E04)

Following working procedure are followed for Color Fastness to Perspiration Test:

- (a) To create a composite specimen, align the test specimen and the multi-fiber fabric and stitch them together along the short edge.
- (b) Weigh each specimen of the composite. Calculate the test solution's volume based on a specimen's liquor ratio of 1:50.
- (c) One composite sample should be thoroughly moistened in a pH 8.0 solution with a 20:1 liquor ratio, and it should be left in this solution at room temperature for 30 minutes. Pour the solvent off, then insert the composite sample between two glass plates that are approximately 7.5 cm by 6.5 cm and press down with roughly 4.5 kg of force.
- (d) Apply the same procedures to the second sample, but use a pH 5.5 solution.
- (e) Place the equipment containing the samples in an oven set to 37°C for 4 hours.
- (f) Remove the sample from the white cloth, then let it air dry at a temperature of no more than 60°C.
- (g) After drying, evaluate each specimen using the gray scale to determine any color changes and each component on the nearby multi-fiber fabric to determine any stains.

Color Fastness to Rubbing Test (ISO 105 X12)

Sample Preparation:

- a) Two specimens were used for both the dry and wet testing each.
- b) Extra samples are utilized to improve the precision of the average.
- c) Cut specimens of at least 50 x 130 mm (2.0 x 5.1 in) and position them for testing with the long dimension perpendicular to warp and filling, or wales and courses.

- d) When several tests were required or when they were being used for production testing, larger or full-width lab samples could be used without cutting individual specimens.
- e) Knit a piece of fabric measuring at least 50 x 130 mm, or tightly wind yarn on a suitable form measuring at least 50 x 130 mm with the yarn running in the long direction; or stretched the cloth in another manner.

Color Fastness to Rubbing Procedure:

In BS EN ISO 105X12:2016, the methods for determining fastness to rubbing were laid out. The test sample was rubbed with a dry and a wet rubbing cloth. The test was typically conducted using a device known as a crock meter, which rubbed a finger covered in cotton rubbing cloth 10 times over the test sample and 10 times over the control sample at a constant pressure. A rectangular finger (19 mm x 25.4 mm) was used for pile textiles, and a cylindrical finger (16 mm in diameter) was used for other fabrics. Cotton rubbing cloths that were both dry and moist were used to conduct the rubbing tests. The gray scale for staining was used to determine how much the two cotton rubbing cloths had been stained.

IV. Result & Discussion

IV.I Color Fastness

IV.I.I Color fastness result of Banana leaves and Mango leaves (Salt free)

Color fastness to wash

The results for color fastness to wash showed that the average differences between dying with mango colorants and dyeing with banana colorants were nearly identical (Table 3). The gray scaling was done from 1 to 5 scale. If the fastness result showed less than 3, the tested materials would be unacceptable commercially. In this study, both banana and mango leaves showed good

results (>3) in color fastness test. Similar kind of results were also found by Balakrishnan et al., 2019.

Table 3: Rating on Gray Scale for Color fastness to wash

Leaves	Color Change	Wool	Acrylic	Polyester	Nylon	Cotton	Acetate
Banana	4-5	4	4-5	5	5	4-5	4-5
Mango	4	4-5	4	4-5	4	4-5	4

Color fastness to Perspiration

The findings of the color fastness to sweat test in Table 2 showed that using mango and banana colorants for dyeing generated satisfactory outcomes and respectable gray scale values just like Zhang et al. 2012.

Table 4: Rating on Gray Scale for Color fastness to Perspiration

Leaves	Color Change	Wool	Acrylic	Polyester	Nylon	Cotton	Acetate
Banana	4	4	4-5	4	4-5	4	4-5
Mango	4	4	4-5	4	4-5	4-5	4

Color fastness to Rubbing

Jayaprabha et al., 2011 demonstrated the rubbing test for cotton fabric and found satisfactory results. The results of this study also demonstrated that mango exhibits the best color fastness to rubbing. However, banana displays a little worse outcome than mango. Both, nevertheless, are within a reasonable ratio (Table 5).

Table 5: Rating on Gray Scale for Color fastness to Rubbing

Leaves	Color Change	Wool	Acrylic	Polyester	Nylon	Cotton	Acetate
Banana	4-5	4	4-5	4-5	4	4	4-5
Mango	4	4	4-5	4-5	4-5	4-5	4

IV.I. II. Color fastness result of Banana leaves and Mango leaves (with salt)

Color fastness to Wash, Perspiration and Rubbing

Color fastness to wash, perspiration and rubbing were also done with salt mordant (Table 6-8). Results revealed almost similar kind of findings like color fastness tests were done without the salt.

Table 6: Rating on Gray Scale for Color fastness to water (with salt)

Leaves	Color Change	Wool	Acrylic	Polyester	Nylon	Cotton	Acetate
Banana	4-5	4	4-5	4	4-5	4	4-5
Mango	4	4-5	4	4-5	4	4.5	4

Table 7: Rating on Gray Scale for Color fastness to Perspiration (with salt)

Leaves	Color Change	Wool	Acrylic	Polyester	Nylon	Cotton	Acetate
Banana	4	4	4-5	4	4-5	4	4-5
Mango	4	4	4-5	4.5	4-5	4-5	4

Table 8: Rating on Gray Scale for Color fastness to Rubbing (with salt)

Leaves	Color Change	Wool	Acrylic	Polyester	Nylon	Cotton	Acetate
Banana	4-5	4	4-5	4-5	4	4	4-5
Mango	4	4	4	4-5	4.5	4-5	4

The results in Table 6-8 demonstrated that the overall outcome was positive. Additionally, the result ratio for mango and banana also displayed the typical outcome. However, banana colorants also produced good outcomes. Some findings for mango colorants were found to be superior. Similar kind of testing were also exhibited by Amir et al., 2017; Sheng et al., 2014 and Canbolat et al., 2015.

IV.II DATA COLOR

Data color results were generated for both banana and mango leaves (Fig. 2 & 3).



Fig. 2: Data color comparison result for salt free and with salt dyeing (Banana Leaves)

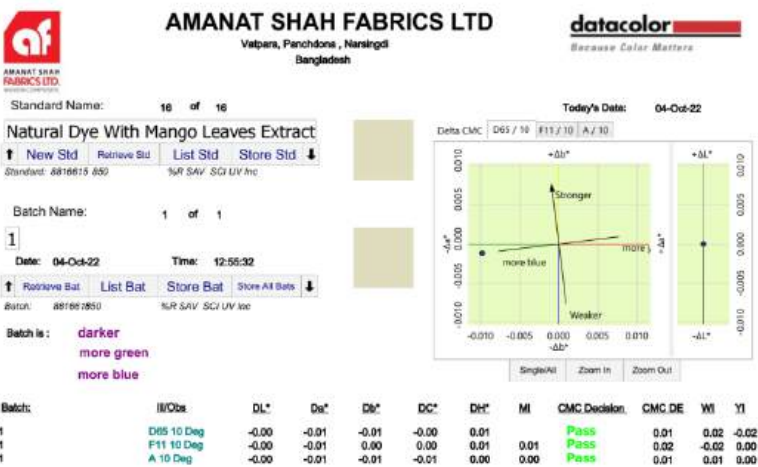


Fig. 3: Data color comparison result for salt free and with salt dyeing (Mango Leaves)

The best possible outcome in terms of color fastness to perspiration for salt-free dyeing could be expected, as shown by those data. Further, the color fastness against rubbing achieved by salt dyeing was unparalleled. The ratios of salt-free CF to perspiration and CF to rubbing were slightly different from those of salt-dyed CF. However, they were equivalent in terms of the overall ratio. The data color result displayed that there was a slight difference in data color between salt-free and with salt dyeing, but that both methods were suitable.

IV.I.III Color Fastness Comparison between salt and salt free dyeing

It was evident from the comparing chart results that salt-free dyeing exhibited the finest color fastness to perspiration (Fig. 1). Additionally, salt dyeing resulted in the finest color rubbing resistance. The proportion of CF to perspiration, CF to rubbing, and CF to salt-dyed CF varied slightly. However, for both salt-free and salt-dyed fabrics, the CF to water and CF to wash ratios were the same.

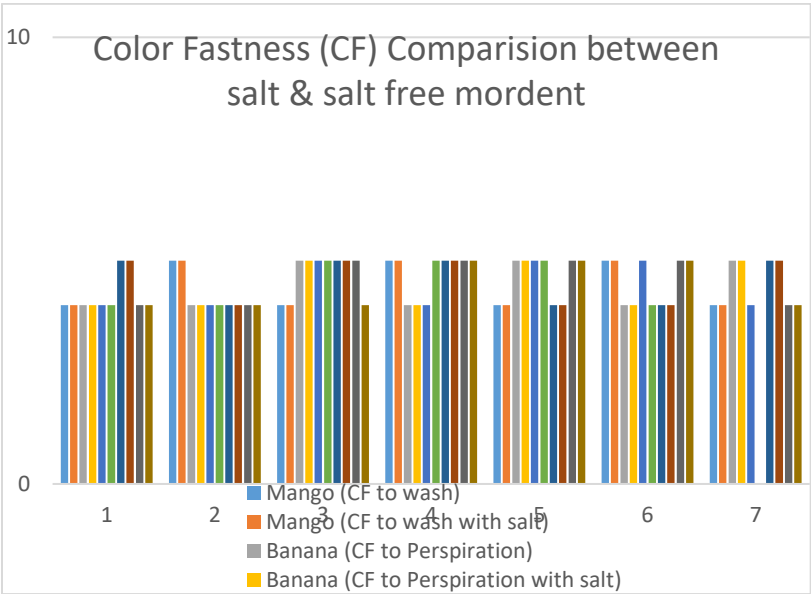


Fig. 1: Comparative result between salt free and with salt dyeing

V. Conclusion

By completing this study, it could be stated that mango and banana leaf colorants were potential sources of dyes for cotton fabric dyeing. It provided the opportunity to color cotton fabric with dye made from mango and banana leaves without adding any salt to the process. The results between salt-free and salt dyeing are essentially the same, according to the study. It is advisable to use natural colorants for environmentally friendly and salt-free dyeing as utilizing salt during the dyeing process is one of the main issues with dyeing cotton goods. Further analysis is also recommended to expand the scopes of natural dyes with different mordants to enhance their commercial values.

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Call for Papers

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