A Research Report
on
Effectiveness of Productivity Improvement Training Program of NPO

Submitted to
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Declaration

It is hereby declared that all the data presented in this report are primary in nature and have been collected through questionnaire survey at different organizations of the country. The methods used for analysis of the data are stated in the report. This is an original work and is not submitted elsewhere for the award of any degree or diploma. It is expected to publish the data in any scientific journal as soon as it is accepted by the National Productivity Organization (NPO), Ministry of Industries, the Government of the People's Republic of Bangladesh.

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Abstract

Training plays a significant role in improving the productivity of the employees. The research project entitled ‘Effectiveness of Productivity Improvement Training Program of NPO’ was envisioned to study the opinion and attitudes of the employees of various Governmental and Non-Governmental organizations in Bangladesh towards the effectiveness of the training programs of NPO. Field visits and questionnaires were done for collecting data of this study. A total of 310 respondents of 18 different organizations and of different ages, qualifications, positions and experiences took part in the survey through filling the prescribed questionnaires and provided valuable suggestions. The questionnaire was prepared taking into consideration the knowledge, socio-economic, psychological, environmental aspects of the trainee and the training programs. The descriptive analyses were done through Fisher's exact Chi-square test and the final model was analyzed by logistic regression. The analysis from the comments of the respondents revealed that employees who had at least two trainings had been more likely to appreciate the training at approximately 5% level of significance. Most of the trainees expressed their satisfaction on the training programs of NPO and suggested to arrange more training programs in the future. Thus, training programs of NPO has significant impacts on employee’s performance and productivity.

Keyword: National Productivity Organization (NPO), Training, Productivity, Effectiveness, Questionnaire, Chi-square method, Logistic regression.

CHAPTER 1: INTRODUCTION

1. Introduction

Training is the systematic development of the attitude and skill behavior pattern required by an individual in order to perform adequately a given task. It is also the systematic modification of behavior through learning which occurs as a result of education instruction development and planned experiences. Training is designed to change the behavior of the employee in the work place in order to stimulate efficiency and higher performance standards [1]. Effective training and development programs are aimed at improving the employees' performance. Training means bridging the gap between the current performance and the standard desired performance. Training could be done through different means such as coaching and mentoring, peer's cooperation and participation by the subordinates. This team work enables employees to actively participate on the job and produces better performance, hence improving organizational performance.

Training programs not only develops employees but also help an organization to make best use of their human resources in favor of gaining competitive advantage. Therefore, it is mandatory by the firm to plan for training programs for its employees to enhance their abilities and competencies [2]. Training not only develops the capabilities of the employee but sharpen their thinking ability and creativity in order to take better decision in time [3]. Moreover, it also enables employees to deal with the customer in an effective manner and respond to their complaints in timely manner [4].

Training develops self efficacy and results in superior performance on job [4] by replacing the traditional weak practices by efficient work practices [5]. Training refers to a planned intervention aimed at enhancing the elements of individual job performance [6]. It is all about improving the skills that seems to be necessary for the achievement of organizational goals. Training programs also helps the workforce to decrease their anxiety or frustration due to the work or job [7]. The workers who feel themselves to be unable to perform a task with the desired level of performance often decide to leave the firm [7], otherwise their stay at firm will not be productive [8].

According to Flippo, training is the act of increasing the knowledge and skills of an employee for doing a particular job. The major outcome of training is learning. Training learns new habits, refined skills and useful knowledge during the training that helps him improve performance.

The greater the gap between the skills necessary and those possessed by the workforce, the higher the job dissatisfaction of the workers. Rowden suggests that training may also be an efficient tool for improving one's job satisfaction, as employee better performance leads to appreciation by the top management, hence employee feels more adjusted with his job [9]. According to Rowden and Conine, trained employees are more able to satisfy the customers [10] and employees who learn as a result of training program shows a greater level of job satisfaction along with superior performance [11].

Training also adds values to employee's performance. Figure 1 shows the relation between work time and economic value of an employee. It is observed that for a new recruit the performance is not so good and economic value may be negative. On training the economic value of the employee to the organization started to increase and finally it becomes positive to the organization. Thus training is must for employee of industries or any other organizations.

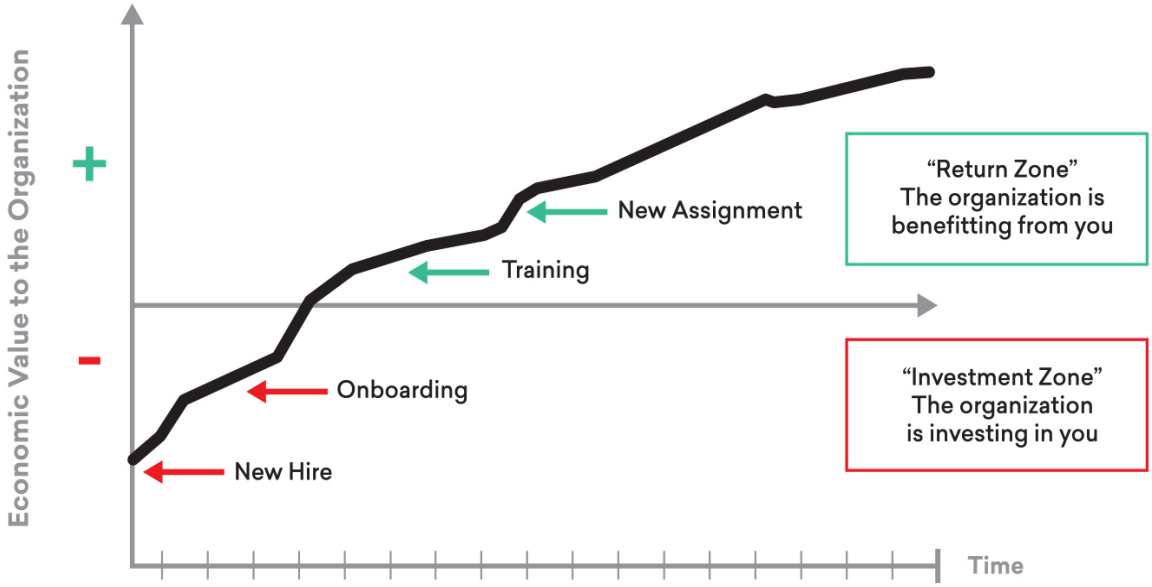

Figure 1. Economic value of an employee to the organization over time [12]

Training has been invaluable in increasing productivity of organizations. It does not only enhance employees resourcefully, but also provides them with an opportunity to virtually learn their jobs and perform more competently. Hence, training not only increases employees productivity but also organizations' productivity. Various researches indicate the positive impact of training on employees' productivity. Training as a process is one of the most pervasive methods to enhance the productivity of individuals and communicating organizational goals to personnel.

Productivity

Productivity is an average measure of the **efficiency** of production. International Labour Organization (ILO) defines productivity as the ratio between "Output of Work" and "Input of Resources."

Employee productivity (sometimes referred to as workforce productivity) is an assessment of the efficiency of a worker or group of workers.

Productivity may be evaluated in terms of the output of an employee in a specific period of time. Typically, the productivity of a given worker will be assessed relative to an average for employees doing similar work. Because much of the success of any organization relies upon the productivity of its workforce, employee productivity is an important consideration for businesses.

Figure: Schematic diagram of productivity

$$Productivity = \frac{Quatity\ of\ Goods\ and\ Services\ Produced}{Amount\ of\ Resource\ Used}$$

Training is most effective way of motivating and retaining high quality in human resources within an organization. Figure 2 shows that productivity and revenue of an organization/industry is related to employee's training. Training is a way of enhancing employee commitment and maximizing employee potential. Training is an instrument that fundamentally affects the successful accomplishment of organizations' goals and objectives. However, the optimum goal of every organization is to generate high revenue and maximize profit and a vital tool to realize this is an efficient and effective workforce. Thus, a workforce is only efficient and effective if the appropriate training and development is provided for such and therefore, leading to productivity.

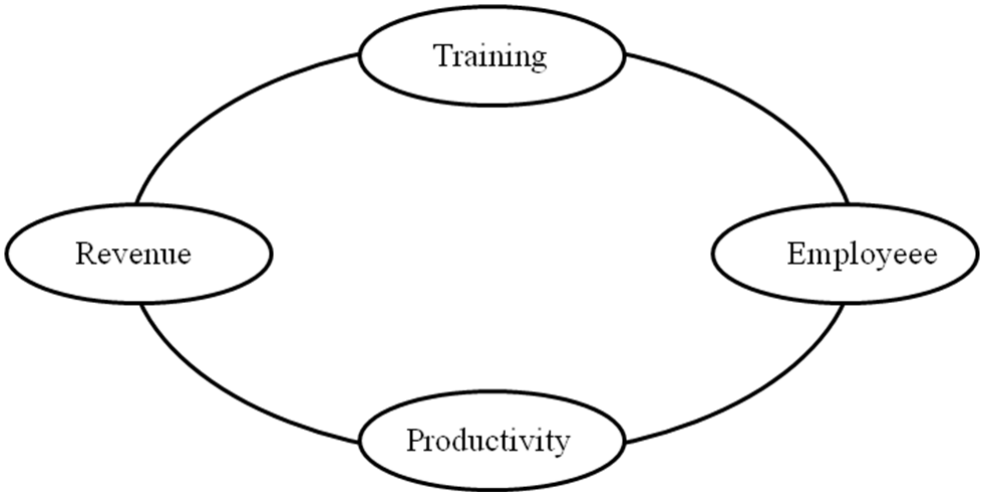

Figure 2. Relationship cycle of employee's training and productivity and revenue of an organization

1.1 Necessity of Training

Training is needed to serve the following purposes:

- ✓ Newly recruited employees always require some training so as to perform their tasks effectively.
- ✓ Training is necessary for existing employees for higher-level jobs.
- ✓ Since technology is changing rapidly, this is an absolute necessity. Employees require training so as to keep abreast of the latest developments in job operations.
- ✓ Training is necessary when a person switches from one job to another. By training the' employee can adapt the new position and improve his performance levels and achieve career goals comfortably
- ✓ Training makes employees mobile and versatile so that they can be placed on various jobs depending on organizational needs.
- ✓ Training bridge the gap between the employee's potential and the job demands.
- ✓ Training makes employees more productive and useful in the long-run.

1.2 Importance of selecting training method

When a new employee joins a team, he is generally excited and eager to learn about the company. Existing staff members also need training to learn and develop skills. Training method is very important to make it fruitful for the employee.

Technology is changing very fast. Advances in technology have given employers and human resources representatives more development training methods than ever. Whether your company is exploring newer training methods or clinging to the more traditional mediums, it's important to keep in mind that everyone learns differently. There are mainly three learning styles (Figure 3):

Visual: Learning by seeing or watching

Auditory: Learning by hearing information

Kinaesthetic: Learning through action, or by doing

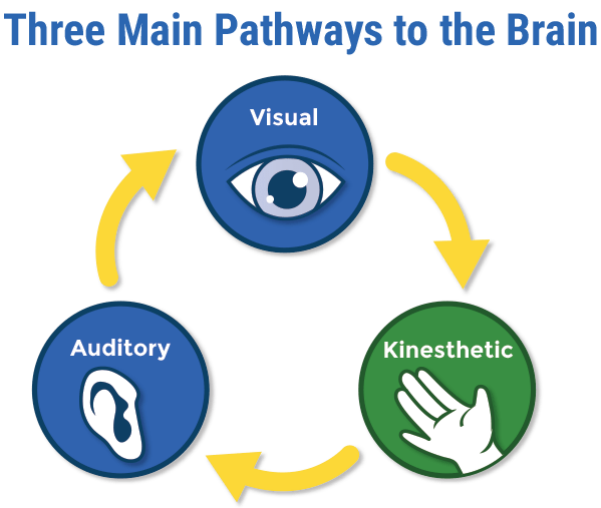

Figure 3: Three main learning pathways

1.3 Factors needed to be considered in selecting appropriate training method

Selecting an appropriate training method is very crucial. The following factors are to be considered in selecting training methods:

i. Number of people required the training

Generally people can learn more effectively in small groups. So, it is necessary to tailor the size of the training sessions accordingly. If there are larger groups, it might have to stagger them into several different time periods. Suppose, if it is necessary to train up sixty employees who all need to be trained at the same time, it's not realistic to do it all in one session. It is better to split the cohort into two groups of thirty. The number of employees also has an important impact on the cost of training.

ii. Methods of training

As discussed earlier many different training methods are available. Several factors such as available resources and facilities must be considered in selecting appropriate method of training. Considering the factors the training may be hands-on-training, or allowing them to learn on the job.

iii. Goal of training

The goal of training varies depending on organization and kinds of activities to do during work. Usually, the goal will be something like learning all the basics that a job entails (for a new worker), or, if the situation demands it, learning new skills in an established job (for example, if everyone has changed the software or e-mail client that they use). In the latter case, you'll find that one-day or weekend workshops might be more effective; in the former, you'll naturally have to devote more time and resources to the task.

iv. Culture of workplace

Culture of workplace is very important in selecting training method. If the employees are energetic and dynamic, they might respond better to fast-paced training but they might not learn as quickly.

v. Age of employee

Age of the average people must be taken into consideration in selecting appropriate methods of trainings. For example, if the employees are older, they might prefer structure and discipline. On the other hand, if the workers are teenagers, they might be more open to an environment where they have more freedom and autonomy. That isn't to say that employees should be judged based on their ages. Rather, it should be considered how they act when they're at work (or during their interview, if they haven't started working yet), and then training strategies should be altered accordingly.

vi. Necessary tools to train employees

Training programs need a lot of resources such as money, time, materials, equipment, and so on, and so forth. That’s why the available resources should be considered prior to starting any training activities.

vii. Are the employees right for the jobs they will be trained for?

If an employee passed their job interview, then they're generally right for the job. However, depending on their individual skill sets, they might not be ready for everything entailed in their job descriptions right away, as we outlined in the point above. If this is the case, then you can set them to those tasks that they're better at and are more comfortable with, which are also part of the job description. Once again, you can switch them once they've mastered those, onto the tasks they'll be using more often.

1.4 Training Effectiveness

Training effectiveness refers to the quality of the training provided and measuring whether the training met its goals and objectives.

1.5 Training Cycle

The overall purpose of training is to meet the operational standards but also to improve employee engagement and performance levels. And for training to be effective, it must have a

clear and measureable purpose and goal as well as be implemented with care. This is illustrated by the four stage process shown in the Figure 4.

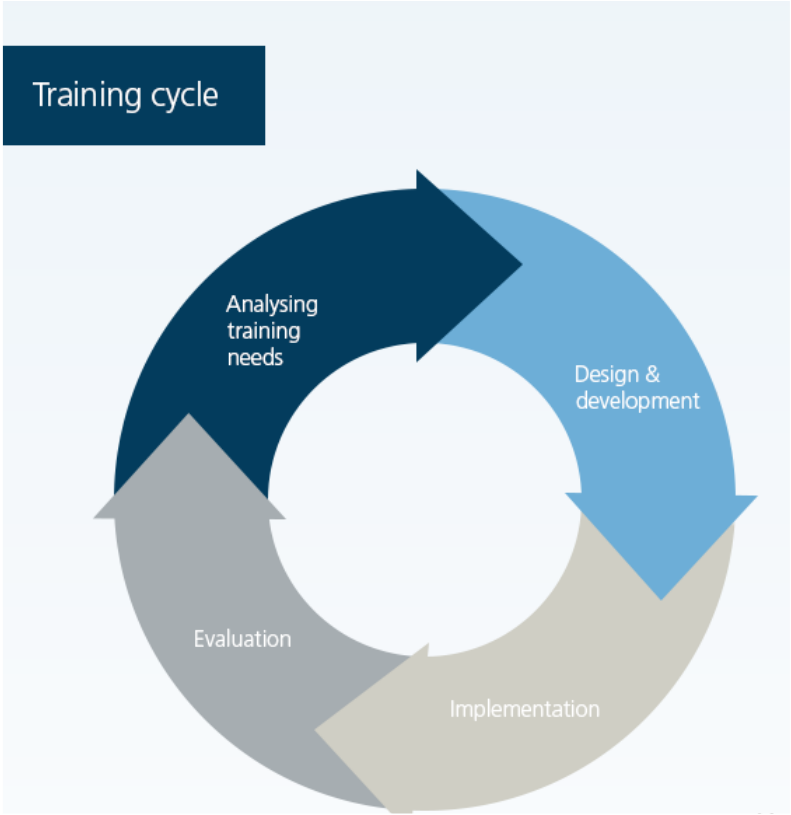

Figure 4: Training cycle

- ***Analysing strategic training needs***

An analysis of needs may be conducted by interviewing employees or customers. Observing the behaviours of employees and on that basis performing a gap analysis is also a good alternative. To best optimize the value of the program, it is important to align these needs with the organization's strategic goals.

- ***Design and development of training program***

Once the needs have been identified, measurable objectives can be set. These should include desired behavioral changes as well as the desired organizational impact. Once these are in place, the training program can be designed and developed.

- ***Delivery and implementation of training program***

The delivery of the training program is more than just employees attending a course. Effective training includes pre-training motivation for the course, a follow-up process with feedback on behavioral changes, involvement of customers and line managers in anchoring the training, and identification and removal of barriers to implementation of new behavior. The elements which are outside the actual course itself are more than 60 per cent of the success of any training program.

- ***Evaluation of training outcomes***

Measuring, tracking and evaluating the training program are key components in effective training program. To start off with, collecting base-line data before the beginning of the training is a necessity. Let's imagine the objective of the training is to get helpdesk request accuracy to 90 percent. To measure the improvement, you need to know which metrics to measure and what the current level is versus the after-training level. As part of an evaluation, you can then ask questions such as:

Was the training effective?

Did it change the behavior, improve the service value or any of the other strategic needs it intended?

Which parts of the training were effective, and which were not?

1.6 Measuring Training Effectiveness

One of the most widely used ways to evaluate training is the Kirkpatrick Model [13]. This approach, developed by Don Kirkpatrick in the 1950s, offers a four-level approach to evaluating any course or training programs.

The Kirkpatrick Model is probably the best known model for analyzing and evaluating the results of training and educational programs[14]. It takes into account any style of training, both informal or formal, to determine aptitude based on four levels criteria shown in Figure 5.

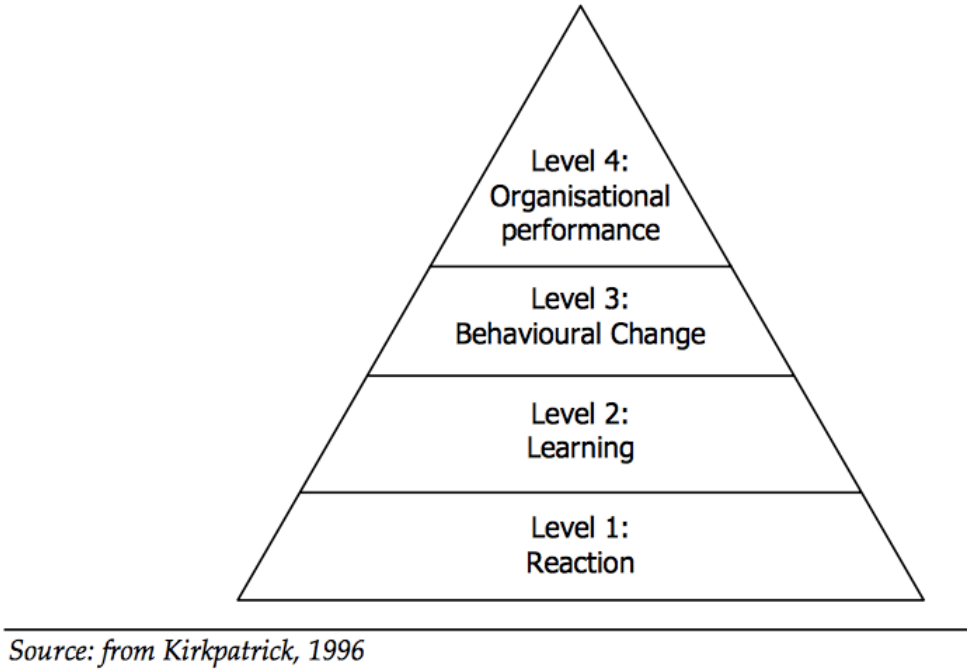

Figure 5: Four levels criteria for measuring effectiveness of training

The four levels are:

Level 1: Reaction

How did the participants react or respond to the training?

In what ways participants liked a particular program / training? How participants feel?

The objectives of this level are straightforward. It evaluates how individuals react to the training model by asking questions that establishes the trainees' thoughts. Questions will figure out if the participant enjoyed their experience and if they found the material in the program useful for their work. This particular form of evaluation is typically referred to as a "smile sheet."

As outlined by Kirkpatrick, each program needs to be assessed at this level to help improve the model for future use. On top of that, the participants' responses is essential for determining how invested they will be in learning the next level.

Examples of resources and techniques for level one:

- Online assessment that can be graded by delegates/evaluators.
- Interviews
- Can be done immediately after the training ends.
- Are the participants happy with the instructor(s)?
- Did the training meet the participant's needs?
- Are the attendee's happy with the educational tools employed (e.g., PowerPoint, handouts etc)
- Printed or oral reports provided by delegates/evaluators to supervisors at the participants' organizations.
- "Smile sheets".
- Comment forms determined by subjective individual reaction to the training course.
- Post-training program questionnaires.
- Verbal responses that can be taken into consideration and considered.
- Especially encourage written comments
- Try to get honest responses and feedbacks

Level 2: Learning

What did participants learn from the training?

New skills / knowledge / attitudes? What was learned? and What was not learned?

Evaluating at this level is meant to gauge the level participants have developed in expertise, knowledge, or mindset. Exploration at this level is far more challenging and time-consuming compared to level one.

Techniques vary from informal to formal tests and self-assessment to team assessment. If at all possible, individuals take the test or evaluation prior to the training (*pre-test*) and following training (*post-test*) to figure out how much the participant comprehended.

Examples of tools and procedures for level two:

- Measurement and evaluation is simple and straightforward for any group size.
- You may use a control group to compare.
- Exams, interviews or assessments prior to and immediately after the training.
- Observations by peers and instructors
- Strategies for assessment should be relevant to the goals of the training program.
- A distinct clear scoring process needs to be determined in order to reduce the possibility of inconsistent evaluation reports.
- Interview, printed, or electronic type examinations can be carried out.
- An interview can be carried out before and after the assessment, though this is time-consuming and unreliable.

Level 3: Behavior

Did the trainees take what they learned and put it into practice on-the-job?

Was the learning being applied by the attendees?

This level analyzes the differences in the participant's behavior at work after completing the program. Assessing the change makes it possible to figure out if the knowledge, mindset, or skills the program taught are being used the workplace.

For the majority of individuals this level offers the truest evaluation of a program's usefulness. Having said that, testing at this level is challenging since it is generally impossible to anticipate when a person will start to properly utilize what they've learned from the program, making it more difficult to determine when, how often, and exactly how to evaluate a participant post-assessment.

This level starts 3–6 months after training.

Examples of assessment resources and techniques for level three:

- This can be carried out through observations and interviews.
- Evaluations have to be subtle until change is noticeable, after which a more thorough examination tool can be used.

- Were the learned knowledge and gained skills used?
- Surveys and close observation after some time are necessary to evaluate significant change, importance of change, and how long this change will last.
- Online evaluations tend to be more challenging to integrate. Examinations are usually more successful when incorporated within present management and training methods at the participant's workplace.
- Quick examinations done immediately following the program are not going to be reliable since individuals change in various ways at different times.
- Assessments can be developed around applicable scenarios and distinct key efficiency indicators or requirements relevant to the participant's job.
- Observations should be made to minimize opinion-based views of the interviewer as this factor is far too variable, which can affect consistency and dependability of assessments.
- Taking into consideration the opinion of the participant can also be too variable of a factor as it makes evaluation very unreliable, so it is essential that assessments focus more defined factors such as results at work rather than opinions.
- Self-assessment can be handy, but only with an extensively designed set of guidelines.

Level 4: Results

Did the training meet the stakeholders' expectations? What was the return on these expectations (ROE)?

What are the final results of the training?

Commonly regarded as the primary goal of the program, level four determines the overall success of the training model by measuring factors such as lowered spending, higher returns on investments, improved quality of products, less accidents in the workplace, more efficient production times, and a higher quantity of sales.

From a business standpoint, the factors above are the main reason for the model, even so level four results are not usually considered.

Types of assessment strategies and tools used for level four:

- It should be discussed with the participant exactly what is going to be measured throughout and after the training program so that they know what to expect and to fully grasp what is being assessed.
- Use a control group
- Allow enough time to measure / evaluate
- No final results can be found unless a positive change takes place.
- Improper observations and the inability to make a connection with training input type will make it harder to see how the training program has made a difference in the workplace.
- The process is to determine which methods and how these procedures are relevant to the participant's feedback.
- For senior individuals in particular, yearly evaluations and regular arrangements of key business targets are essential in order to accurately evaluate business results that are because of the training program.

1.7 Introduction of NPO and it's activities

The Government of the People's Republic of Bangladesh established National Productivity Organization (NPO) under the Ministry of Industries in 1989 with a mission to create efficient manpower, improvement of systems, and improve product/service through different productive activities like training in factories and service oriented institutions for increasing productivity [15]. NPO is the only organization responsible for formulation and implementation of productivity policy of the Government. By this time it becomes one of the most important training organizations in our country. NPO also implements the plans and programs of the Tokyo based Asian Productivity Organization (APO) which is an inter-governmental body for the Asia Pacific region. It celebrates National Productivity Day on October 2 every year to develop awareness among the people and to improve productivity in the agriculture, industrial and other sectors.

1.7.1 Strategic Objectives of NPO

NPO is aimed at-

- ✓ Increasing productivity through creating efficient manpower.
- ✓ Recognition and assistance to improve industries.
- ✓ Increasing awareness about productivity.
- ✓ Emphasis on productivity oriented research.
- ✓ Productivity related policy adaptation and improvement.

1.7.2 Compulsory Strategic Objectives of NPO

- ✓ To improve dynamism in performance and increase the quality service.
- ✓ To ensure transparency and accountability in official activities.
- ✓ To improve resource management.

1.7.3 Functions of NPO

The functions of NPO are:

- ✓ To provide Consultancy to government about innovation of appropriate tools and techniques and policy adoptation in order to increase productivity.
- ✓ To conduct productivity related training program regularly in factories and organizations officials to increase productivity in different levels of national economy.
- ✓ Responsible as a catalyst through consultancy services in order to maintain the trend of productivity in factories and organizations.
- ✓ Making productivity oriented reports including data collection, compilation and analysis and to form a database for providing reports to different groups.
- ✓ Coordination to implement different programs of 'Asian Productivity Organization (APO)' in Bangladesh.
- ✓ Observe National Productivity Day across the country and National Productivity & Quality Excellence Award, and organize seminar.

Training programs of NPO

- ✓ The Services provided by NPO
- ✓ Basic Concept of Productivity.
- ✓ Productivity by Objectives.
- ✓ Improve Employee Productivity.
- ✓ Productivity Measurement and Analysis.
- ✓ 5s Technique.
- ✓ Suggestions Scheme (SS).
- ✓ Quality Control Circle (QCC).
- ✓ ISO-9000.
- ✓ Labor Management Co-operation (LMC).
- ✓ Entrepreneurship Development.
- ✓ Character and Challenge of Entrepreneurship.
- ✓ Value Added Productivity Measurement.

- ✓ KAIZEN Practice.
- ✓ Total Quality Management (TQM).
- ✓ Total Productive Maintenance (TPM).
- ✓ Human Resource Management (HRM).
- ✓ Customer Relation Management (CRM)
- ✓ Just in Time Manufacturing System (JIT).
- ✓ Material Flow and Cost Accounting (MFCA).
- ✓ Operation Management.
- ✓ Lean Manufacturing.
- ✓ Knowledge Management system.
- ✓ Industrial Engineering (IE).
- ✓ Productivity Improvement Cell (PIC).
- ✓ Problem Solving and Decision Making.
- ✓ Productivity Gain-sharing.
- ✓ Green Productivity (GP).
- ✓ Benchmarking.

Methods of NPO Training

Training methods of NPO is mostly based on Powerpoint presentation and on-job training.

1.8 Rationale of the Research

Now-a-days industries and organizations are facing increased competition due to globalization, changes in technology, political and economic environments [16]. So, it is important to train up the employees to prepare them to adjust to the increases above and thus enhance their performance. As is evident that employees are a crucial resource, it is important to optimize the contribution of employees to the company aims and goals as a means of sustaining effective performance. This therefore calls for managers to ensure an adequate supply of staff that is technically and socially competent and capable of career development into specialist departments or management positions [17].

Training is the process of enhancing the attitude, skills and abilities of an employee to perform a given job in an organization. National Productivity Organization (NPO) of Government of the People's Republic of Bangladesh is organizing many types of training programs to make potential employees for the development of the country. Although a lot of training programs has already been done, yet a low level of job performance is observed by the employees at different industries and organizations in Bangladesh. Therefore, this study will investigate the effects of training programs of employees in various organizations/industries in Bangladesh in detail.

1.9 Objectives of the Research

Primary Objective

- ✓ To evaluate the effectiveness of the productivity improvement training programs of NPO.

Secondary Objectives

- ✓ To identify the knowledge and skills required by employees to perform the job efficiently and effectively.
- ✓ To assess the satisfaction level of employees with regard to training of NPO.
- ✓ To find out the shortcomings of the training programs of NPO
- ✓ To understand the training needs of employees in the firm.
- ✓ To evaluate the effectiveness of productivity improvement training programs of NPO on employees' productivity of different industries and organizations in Bangladesh.
- ✓ To observe the relevance and usefulness of the skills and knowledge acquired by the employees on individual behavior at work place.
- ✓ To examine the contribution of training in achieving the organizational short and long term objectives.

1.10 Scope of the Research

The study of Effectiveness of Training programs of NPO has been carried out at different organizations in Bangladesh. This study is carried out using questionnaire which forms basis

for data collection. The scope of this research is to find out the effectiveness of training on employee's performance in industries and other organizations. Attempts were made to focus on the employee's professional and other qualifications, previous training programs attended, the sufficiency and relevance of such training courses to the personnel management. This study was mainly involved to evaluate the effectiveness of productivity improvement training program of NPO.

CHAPTER 2: RESEARCH METHODOLOGY

2. Research Methodology

Gathering of knowledge follows mostly two paradigms; (i) quantitative and (ii) qualitative approaches. Primary data were collected through field visit and questionnaire analysis. In this study, survey questionnaire was employed because it suited the descriptive and correlative nature of the study. The questionnaire was used to collect data of 310 employees who had their training by the NPO. Employees of different genders, ages, positions and of different industries or organizations were selected. The organization related data before and after the NPO training were also collected from the authority of the organizations. The descriptive analyses were done through Fisher's exact Chi-square test and the final model was analyzed by logistic regression. The statistical software Stata 14 was used to do the analysis on a Microsoft Windows 10 PC. The questionnaire was added to the report as annexure 1 and 2. Figure 3 shows a schematic Flow diagram of the methodology adopted in this study.

2.1 Methods of data collection

Primary Source

Primary data refers to the data that was collected first¬ hand, directly from the source. This consisted primarily of interviews and discussions with the managers, employees. The main data was collected through structured undisguised questionnaire.

Secondary Source

Secondary data refers to the data that was previously collected by others for another purpose.

It includes:

- ✓ Company Website
- ✓ Internet
- ✓ Manuals and Research Papers and Books.

2.2 Sampling Method

To carry out the research 310 respondents working at different organization had been chosen randomly. The authority of respective organization circulated a notice prior to our visit to take part in the questionnaire survey. The respondents attended the questionnaire survey willingly. The respondents were selected without any special emphasis and ignoring their position, academic status, gender, age etc.

2.3 Questionnaire Design

The questionnaire is well structured and it consists of closed ended questions. There are a total of 16 questions that aims to cover all aspects of the effectiveness of Training programs of NPO. A questionnaire for collecting data on production was also prepared.

Flow chart of the research work is shown in Figure 6.

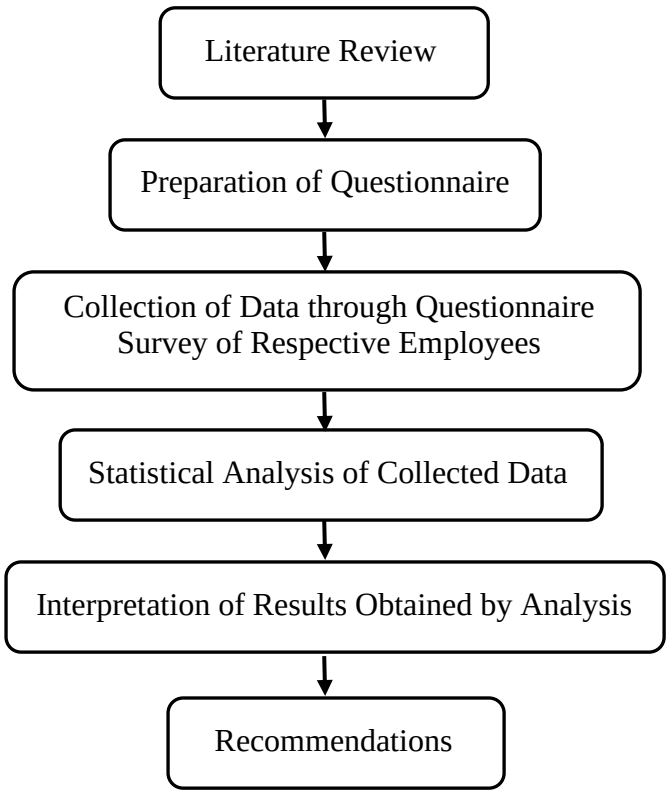

Figure 6. Flow Chart of works in this study

2.4 Methods of Data Analysis

The statistical software Stata 14 was used to perform the analysis on a Microsoft Windows 10 PC. The analytical results were presented with the help of tables, charts and diagrams. The data obtained were analyzed by the following methods.

- ✓ Simple percentage method
- ✓ Chi-square method
- ✓ Correlation
- ✓ Logistic regression

2.4.1 Simple Percentage Method

Simple percentage method refers to ratio percentage that is used for comparison between two or more series of data. Percentages are used to describe relationship.

2.4.2 Chi-Squared Method

C**hi-squared test**, also written as χ^2 **test**, is a statistical hypothesis test that is valid to perform when the test statistic is chi-squared distributed under the null hypothesis, specifically Pearson's chi-squared test and variants thereof [19]. Pearson's chi-squared test is used to determine whether there is a statistically significant difference between the expected frequencies and the observed frequencies in one or more categories of a contingency table.

The formula for calculating chi-square (2) is:

$$x^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where, O – Observed frequency E – Expected frequency

That is, chi-square is the sum of the squared difference between observed (o) and the expected (e) data (or the deviation, d), divided by the expected data in all possible categories.

2.4.3 Correlation Coefficient Method

Correlation can be defined as the degree of relationship between two variables. It needs pairs of points to be available for every set of values of each of the variable. In a two dimensional plot, the variables can be arbitrarily labelled as X and Y, where X mostly attains the independent variable, which is used for prediction, and Y attains the dependent variable, the value which is predicted. The correlation coefficient, sometimes also called the cross-correlation coefficient. A measure that determines the degree to which two variable's movements are associated. The correlation coefficient will vary from -1 to +1. In this case, -1 indicates perfect negative correlation, and +1 indicates perfect positive correlation. Formula for simple Correlation coefficient is given below,

If x & y are the two variables of discussion, then correlation coefficient r can be calculated using the formula

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[\, n\Sigma x^2 - (\Sigma x)^2 \,][\, n\Sigma y^2 - (\Sigma y)^2 \,]}}$$

N = Number of values or elements

X = First Score

Y = Second Score

ΣXY = Sum of the product of first and Second Scores

ΣX = Sum of First Scores

ΣY = Sum of Second Scores

ΣX^2 = Sum of square First Scores

2.4.4 Logistic Regression

Logistic regression is a statistical model that in its basic form uses a logistic function to model a binary dependent variable, although many more complex extensions exist. In regression analysis, Logistic regression is estimating the parameters of a logistic model (a

form of binary regression). Mathematically, a binary logistic model has a dependent variable with two possible values, such as pass/fail which is represented by an indicator variable, where the two values are labeled "0" and "1". In the logistic model, the log-odds (the logarithm of the odds) for the value labeled "1" is a linear combination of one or more independent variables ("predictors"); the independent variables can each be a binary variable (two classes, coded by an indicator variable) or a continuous variable (any real value). The corresponding probability of the value labeled "1" can vary between 0 (certainly the value "0") and 1 (certainly the value "1"), hence the labeling; the function that converts log-odds to probability is the logistic function, hence the name. The unit of measurement for the log-odds scale is called a *logit*, from ***log****istic un****it***, hence the alternative names. Analogous models with a different sigmoid function instead of the logistic function can also be used, such as the probit model; the defining characteristic of the logistic model is that increasing one of the independent variables multiplicatively scales the odds of the given outcome at a *constant* rate, with each independent variable having its own parameter; for a binary dependent variable this generalizes the odds ratio.

In a binary logistic regression model, the dependent variable has two levels (categorical). Outputs with more than two values are modeled by multinomial logistic regression and, if the multiple categories are ordered, by ordinal logistic regression (for example the proportional odds ordinal logistic model [18-19]. The logistic regression model itself simply models probability of output in terms of input and does not perform statistical classification (it is not a classifier), though it can be used to make a classifier, for instance by choosing a cutoff value and classifying inputs with probability greater than the cutoff as one class, below the cutoff as the other; this is a common way to make a binary classifier. The coefficients are generally not computed by a closed-form expression, unlike linear least squares; see § Model fitting. The logistic regression as a general statistical model was originally developed and popularized primarily by Joseph Berkson.

2.4.5 Summary of the variables and number of questions

In preparing the questionnaire some variables and questions were considered which are related to the training programs and its outcomes. The list of variables and number of questions are stated in the Table 1.

Table 1: Summary of the variables and number of questions/items

Variables	Questions
Comments on NPO training	7 questions
Achievements from the training of NPO	4 questions
Application of the achieved knowledge	1 question
Necessity of such training	1 question
Overall comments	1 question

CHAPTER 3: RESULTS AND DISCUSSIONS

3. Results and Discussions

Data collected from the employees of different industries and organizations who have been given training by NPO of Bangladesh were analyzed by thematic approach and statistical analysis. The themes included in this study were:

i) the kind of training that can motivate employee;

ii) the main factors that motivate the employee most.

Quantitative data were processed and analyzed by different statistical methods. In this study we visited 18 organizations under BCIC, BSCIC, BSFIC, Pharmaceuticals, Chemical industries, electrical and food industries. A total of 310 persons of different organizations of different positions, both public and private sectors have been interviewed to complete the research.

3.1 Data Analysis

3.1.1 Demographic details based on Gender, Age and Education

Out of the 310 respondents 271 (87.42%) were male and only 39 (12.58%) were female. Most of the respondents were male (Table 2).

Table 2: Number of respondents in terms of gender

Particular	No. of respondents	Percentage
Male	271	87.42
Female	39	12.58

Among the respondents 47% were between the age of 31-40 years old. Rest 27% were 18-30 years old, 14% were 41-50 years old and 12% were 51-59 years old (Figure 7). Thus most of the respondents belong to the middle age people who have a experience of working for a sufficient time to comment on questionnaire and will be in service for a satisfactory time. So,

training will help them to do their job effectively in the future and their evaluation will be certainly valuable and acceptable to us for statistical analysis.

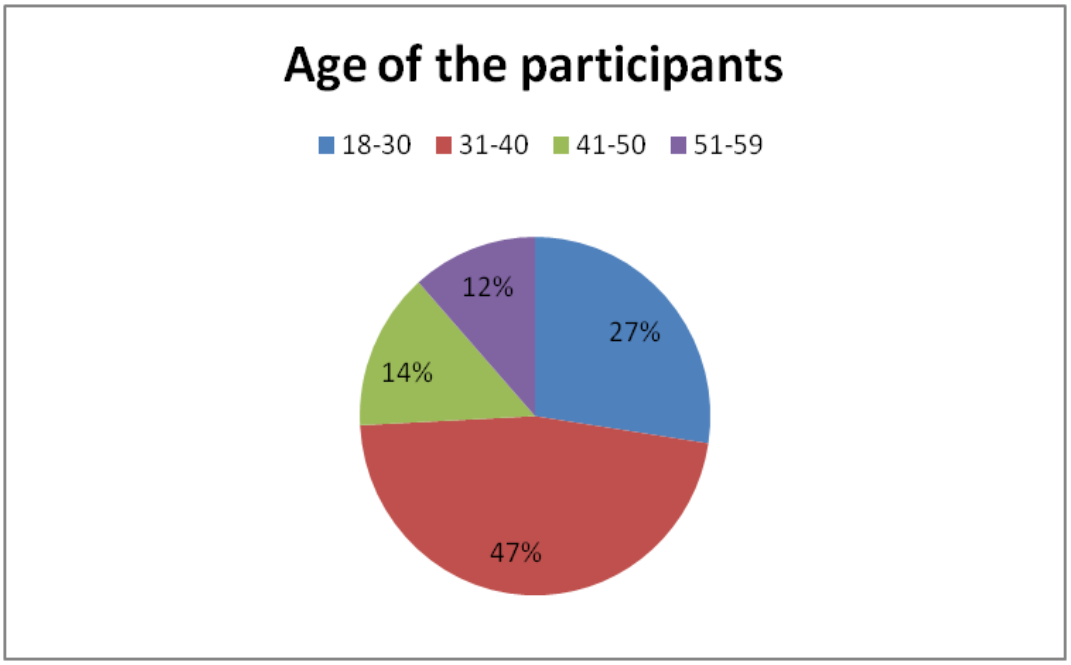

Figure 7: Demographic data of respondents based on their age

Academic qualification

Education is a process that not only increases the existing capabilities but also leads to the development of skills, knowledge and attitudes. The success of the organization is the product of abilities of its people. Development of human resources in working process so closely relates the education. So, academic background of interviewee were done in this study which shows that 34% of the interviewee were graduates (Master's), 32% completed undergraduates, 3% with Diploma Degree, 11% completed HSC, 9% completed their SSC and only 11% were below SSC (Figure 8). Thus majority of the interviewee were graduates. So, it is expected that they understood the questionnaire and their comments on it are certainly acceptable to us.

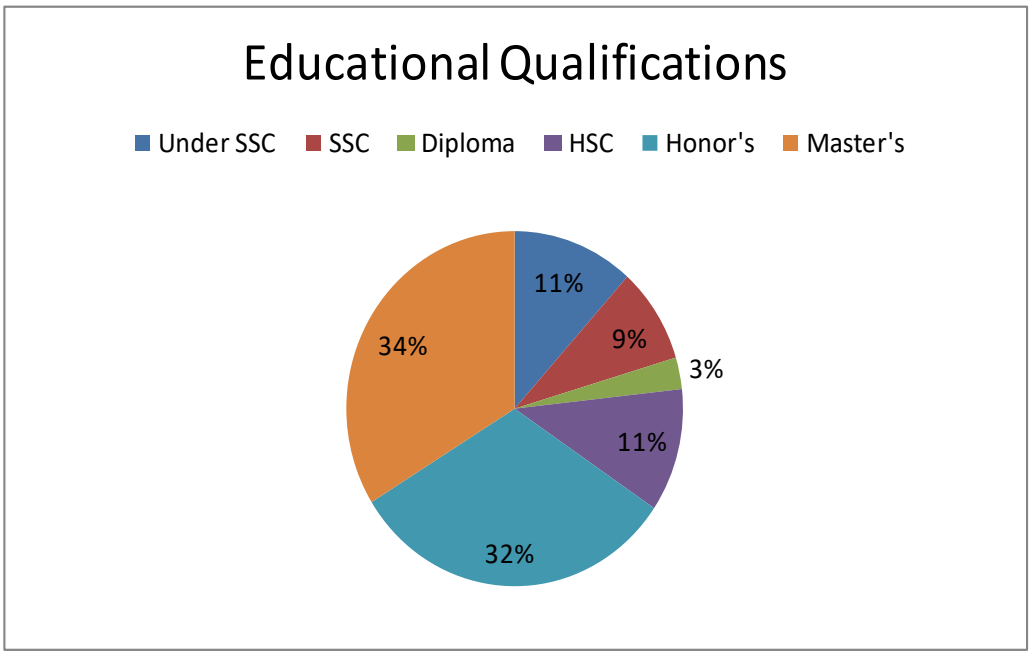

Figure 8: Demographic data of respondents based on their academic qualifications

Job Experience

Out of 310 respondents 11 persons did not mention their job experience. From the Table 3, it is found that only 34.11% have the training experience of more than 10 years. 41.14 % and 24.75% of the respondents have the training experience of 0-5 years and 5-10 years, respectively. Thus, most of the respondents have experience of very short time. So training is important for them and it will help them to work efficiently for longer time in the future.

Table 3: Demographic data of the respondents based on job experience

Job experience	Number of interviewee	Percentage
0-5 years	123	41.14
5-10 years	74	24.75
More than 10 years	102	34.11

3.2. Analysis of the data of respondents based on the number of trainings of the employees by NPO

Though a total of 310 respondents took part in the research, only 11% of the respondents had the opportunity to take two trainings of NPO (Table 4). Number of respondents having more than two training programs is very negligible. Most of the respondents (86.45%) had the opportunity to have only one training by NPO. So, more training programs from NPO are essential for the employees to develop their skills.

Table 4: Demographic data of the respondents based on number of training they had

Number of training from NPO	Number of interviewee	Percentage
1	268	86.45
2	36	11.61
3	1	0.32
4	4	1.29
5	1	0.32

3.3 Analysis of the opinions of the respondents regarding the training programs of NPO

Effectiveness of training program is only possible when the trainee is able to practise the theoretical aspects learned in training program in actual work environment. Therefore, the trainees were asked to comment on the effectiveness of the training programs of NPO.

The respondents were asked to comment on the subject matter of the training programs of NPO and the data are tabulated in Table 5. The analysis of the data shows that 61% of the respondents expressed “Excellent”, 34% said “Good”. Thus, the subject matters of the training programs were suitable for the trainees.

Table 5: Analysis of the comments on subject matter

Comments	Frequency	Percent	Cumulative
Medium	13	4.19	4.19
Good	106	34.19	38.39
Excellent	191	61.61	100.00
Total	310	100.00	

3.4 Analysis of the comments on Program Schedule

Program schedule is very important parameter of a training program and the data are tabulated in Table 6. Only 28% comments of the respondents were found to be Excellent while 59% comments of the respondents were ‘Good’. Thus the program schedule was also good.

Table 6: Analysis of the comments on program schedule

Comments	Frequency	Percent	Cumulative
Medium	38	12.26	12.26
Good	183	59.03	71.29
Excellent	89	28.71	100.00
Total	310	100.00	

3.5 Analysis of the comments on allocated time

Allocated time plays a vital role for both the trainer and the trainee. Optimum allocated time must be selected for success of a training program. So, the respondents were asked to comment on allocated time of the training programs carried out by NPO at different organizations and their responses are statistically analyzed and are shown in Table 7. Only 18% commented that as Excellent, 43% as Good and 35% as Medium and 2% as Poor. Therefore, there is a scope to reconsider the allocated time of the training programs for the development of the employees.

Table 7: Analysis of the comments on allocated time of the training

Comments	Frequency	Percent	Cumulative
Poor	5	1.61	1.61
Medium	111	35.81	37.42
Good	136	43.87	81.29
Excellent	58	18.71	100.00
Total	310	100.00	

3.6 Analysis of the comments on time management

There are mainly two types of training programs: short term and long term. The training programs conducted by NPO were mostly short term programs. In that case, time management is very vital for the trainer as well as trainee. Most of the respondents were satisfied (24% Excellent and 60% Good) about the time management of the trainers (Table 8).

Table 8: Analysis of the comments on time management

Comments	Frequency	Percent	Cumulative
Medium	49	15.81	15.81
Good	186	60.00	75.81
Excellent	75	24.19	100.00
Total	310	100.00	

3.7 Analysis of the comments on method of training

People prefer to learn in different ways: through visual stimuli, verbal instructions, and learning by doing. Therefore, offering a variety of training opportunities and training techniques is usually more effective than using only one approach. Training can be formal or informal, academic or applied, guided or self-directed. Anyway, most of the respondents (53% Good; 39% Excellent) expressed their satisfaction on method of the training programs of NPO as shown in Table 9.

Table 9: Analysis of the comments on method of training

Method of Training	Frequency	Percent	Cumulative
Medium	21	6.77	6.77
Good	123	39.68	46.45
Excellent	166	53.55	100.00
Total	310	100.00	

3.8 Analysis of the comments on knowledge of the trainer

The respondents were also asked about the knowledge of the trainers of NPO. Data shown in Table 10 reveal that the respondents were satisfied on the knowledge of the trainers.

Table 10: Analysis of the comments on knowledge of the trainers

Knowledge of the trainer	Frequency	Percent	Cumulative
Medium	21	6.77	6.77
Good	126	40.65	47.42
Excellent	163	52.58	100.00
Total	310	100.00	

3.9 Analysis of the comments on overall management

Most of the respondents who had their training from NPO expressed that the overall management was Good (56%) as found in Table 11. Again, 34% of the respondents said Excellent while only 10% respondents said that the overall management of the NPO training programs was medium. Thus, the trainees were satisfied with the overall management of the training programs of NPO.

Table 11: Analysis of the comments on overall management

Overall Management	Frequency	Percent	Cumulative
Medium	32	10.32	10.32
Good	173	55.81	66.13
Excellent	105	33.87	100.00
Total	310	100.00	

So, the analysis of the above data revealed that there is scope to improve the quality of training programs offered by NPO.

3.10 Analysis of the comments on duration of the training program

NPO conducts training programs for 1 or two days only. Unfortunately, no question was added to questionnaire of the survey regarding the comments of the respondents on the period of training programs. But, the respondents were asked about the period of training programs. Most of them commented on a little increase in training period up to 5 days i.e., one working week.

3.11 Analysis of achievements of the employee from training of NPO

The respondents were asked about their achievement from the training of NPO. They were asked about their achievement of knowledge, training method, work efficiency, confidence and overall achievement gained from the trainings of NPO. The data were analyzed statistically and represented in Tables 12-15. In the Tables 'Yes' is referred to as Satisfaction and 'No' is referred to as Poor satisfaction level.

Table 12: Achievement of knowledge

Knowledge/Experience gained	Only one training	At least two trainings	p-value*
Yes	263	42	1.000
No	5	0	

*Fisher's exact test

Table 13: Regarding training method

Training method	Only one training	At least two trainings	p-value*
Yes	229	41	0.025
No	39	1	

*Fisher's exact test

Table 14: Regarding work efficiency

Work efficiency	Only one training	At least two trainings	p-value*
Yes	259	42	0.615
No	9	0	

*Fisher's exact test

Table 15: Regarding confidence

Confidence	Only one training	At least two trainings	p-value*
Yes	263	40	0.242
No	5	2	

*Fisher's exact test

The analytical results in Tables 12-15 reveal that the trainings are helpful to increase knowledge/experience, learn special training method, work effectively and increase confidence though the association is not statistically significant except special training.

3.12 Analysis of data based on application of knowledge gained

Table 16: Analysis of data based on application of knowledge gained

Number of Training	Applicate			Total
	Enough	Medium	Suitable	
Only 1 training	68	144	56	268
More than 1 training	18	22	2	42
Total	86	166	58	310

Fisher's exact =0 .008

From the data stated in Table 16 it can be said that applying the knowledge gained from the training is positively associated with having more training.

Table 17: Achievement from the training

Particulars	Respondents (Total 310)	
	Yes	No
Knowledge	309 (99.68%)	1 (0.32%)
Special training method	271 (87.42%)	39 (12.58%)
Work with efficiency	302 (97.42%)	8 (2.58 %)
Confidence and reliability	304 (98.06 %)	6 (1.94 %)

All the achievements from training shown in Table 17 are inspiring for more training initiatives. So, more training programs of NPO should be organized to train up the employee's of different organizations/.

3.13 Logistic regression on type of comments

The primary data collected through questionnaire were statistically analyzed to find out the Logistic Regression on type of comments from the trainee with important covariates and presented in Table 18. The Logistic Regression from the comments of the respondents showed that who had at least two trainings were more significant at approximately 5% level of significance. So, training has important impact on employee performance and productivity.

Table 18: Logistic regression on type of comments (positive = 1, negative = 0) from the trainee with important covariates.

Covariates	Crude OR (p-value)	Adjusted OR (p-value)
Having at least 2 trainings	3.44 (**0.046**)	3.32 (**0.054**)
Age not more than 40	0.87 (0.685)	0.96 (0.917)
Female	0.64 (0.264)	0.70 (0.401)
Having higher education	1.79 (0.050)	1.70 (0.079)

The regression analysis of the data revealed that those who had attended at least two trainings are more likely to appreciate the training than who had attended only one training. This trend is found by both crude and adjusted models.

3.14 Summary of production of the Fiscal Year 2017, 2018 and 2019 of different industries

There was an attempt to collect data on the production of the industries before and after the training programs of the industries. Unfortunately, all the industries included in the list did not respond to this question. Anyway, data on production of only 11 industries have been obtained. Table 19 shows that the production of some industries increased after training; but also in some industries the production is decreased. It is assumed that it is not only due to training but also some other factors are also involved in it.

Table 19: Summary of production of the Fiscal Year 2017, 2018 and 2019 of different industries

Name of organizations	Total production (Taka in Lac)		
	2017	2018	2019
Shahjalal Fertilizer Co. Ltd.	356686	333674	397462
TSP Complex	100359	97186	103964
Noorjahan Agrofood (BSCIC, Bagerhat)	300	300	325
Resco Bread & Biscuit Ltd. (BSCIC, Jashore)	51	39	60
Setabganj Sugar Mills	2226.94	3471.51	2451.00
BRB Cables Industries Ltd	208277.74	268693.00	208897.62
Prince Chemicals (BSCIC, Pabna)	120	120	110
Chhatak Cement Company Ltd	3524.99	3199.56	2593.11
Thakurgaon Sugar Mills Ltd	2429.90	1580.00	2014.80
Chittagong Urea Fertilizer Ltd	14845.77	17540.82	1006.32
Panchagar Sugar Mills Ltd	2676.81	2218.11	1735.58

3.15 Comments on qualitative improvement of the employees of different aspects on receiving training from NPO

Comments of management of different organizations on the quantitative improvements of the employees were also collected, analyzed and presented in Table 20. The management of different organizations were asked about work environment, production management, machine maintenance, product/service quality and confidence. Most of them commented positively (Excellent and Good) which proved that on having training the quality and confidence of the trainee improved to perform better. Since the number of trainings they had was very poor, most of the organization suggested to organize more training programs in future.

Table 20: Summary of the comments of the management of different organization at which the research was conducted

Name of organizations	Comments on qualitative improvement of the employees of different aspects on receiving training from NPO					Remarks
	Work env.	Prodn. Mgt	Machine Mnt	Product /Service quality	Psychological	
Shahjalal F Co. Ltd.	4	4	4	5	4	
TSP Complex	5	5	5	4	5	
Noorjahan Agro. (BSCIC, Bagerhat)	3	3	3	3	3	
Resco Bread & Biscuit Ltd. (BSCIC, Jashore)	5	4	4	4	4	Emphasized on more tr.
Setabganj Sugar Mills	4	4	4	4	4	Emphasized on sp. Tr.
BRB Cables Ind. Ltd	4	4	4	4	4	Emphasized on more tr.
Prince Chemicals (BSCIC, Pabna)	5	4	5	5	5	
Chhatak Cement Company Ltd	4	4	4	3	4	Emphasized on more tr.
Thakugaon Sugar Mills Ltd.	4	5	4	4	4	Emphasized on more tr.
Chittagong Urea Fertilizer Ltd	4	4	4	4	4	Emphasized on more tr.
Panchagar Sugar Mills	4	4	4	4	4	Emphasized on more tr.

5 – Excellent; 4 – Good; 3 – Medium; 2 – Poor; 1 – Very good

CHAPTER 4: FINDINGS, RECOMMENDATIONS, LI MITATIONS AND CONCLUSION

4.1 Findings

The findings of the research are summarized below.

- This study revealed that 66% of the respondents were graduates. So, their comments on the questionnaire of the study were considered to be appropriate and valuable for such study.
- Most of the respondents (47%) were between the age of 30-41 years and had job experiences of less than 10 years. Therefore, training is very much essential for them to serve the nation for longer period.
- Most of the respondents were satisfied with the subject matter, program schedule, allocated time, management of time, method of training, knowledge of trainer and overall management of the training programs of NPO.
- Most of the respondents appreciate 5S training.
- The analysis of the data revealed that applying the knowledge gained from the training is positively associated with having more training.
- Comments on qualitative improvement e.g. work environment, production management, machine maintenance, product or service quality of the training programs of NPO were positive.
- The statistical analysis showed that those who have attended at least two trainings are more likely to appreciate the training than who have attended only one training.
- Statistical analysis by descriptive and inferential (Logistic Regression) also suggest for more proper training program.
- All the achievements of the employees from training programs of NPO are inspiring for more training initiatives.

4.2 Recommendations

- On the basis of comments of the respondents NPO is encouraged to organize more training programs to generate skilled manpower to serve the nation.
- NPO is suggested to organize need based training programs.
- Training program should be conducted on a regular basis.
- Follow up training programs can be arranged by NPO to find out the results of the previous training.
- IR 4 should be considered in designing the NPO training.
- Allocated time for training programs may be increased up to 5 days.
- NPO is encouraged to take necessary steps for offering Diploma Degree

4.3 Limitations

Perception constraint

Some employees have the tendency to underestimate their skills before training and over estimate their skills post training to validate their participation in the training program. That's why it is seen that it is difficult to comprehensively evaluate or capture the effectiveness of a training program.

Sample size constraint

The number of employees of the organizations included in this study was very large. So, it was very difficult to cover all the employees in this survey. Number of employee covered in this survey is limited to the sample size of 310 employees only. This limits the scope of the project study and the analysis may not represent the whole population.

Duration constraint

The time duration for the project is limited to six months only. Moreover, due to outbreak of Covid 19 pandemic the data collection was really difficult resulting in the delay of the completion of the research project.

Other Limitatuions

- ✓ This type of research finding depends on the responses the respondents on the questionnaire. Sometimes some respondents may not be serious which may result in wrong results.
- ✓ Collection of data, specially, the productivity data of the industries was difficult.

4.4 Concluding remarks

Training plays a vital role in improving the productivity of the employees as well as the organizations. But it is observed that most of the employees had the opportunity to have only one or two training programs from NPO. This trend is found by both crude and adjusted models. This research was a means by which the employees of different organizations express their comments on the effectiveness of the productivity improvement training programs of NPO. Therefore, it will be helpful for the policy makers to develop and implement the productivity improvement training programs in Bangladesh.

Finally, this research project was very valuable to me in terms of learning and exposure to the various training and development aspects of the country.

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Annexure 1. Questionnaire

Annexure 2: Statistical Analysis by Stata 14

-> tabulation of subjectmatters

Subject Matters	Freq.	Percent	Cum.
3	13	4.19	4.19
4	106	34.19	38.39
5	191	61.61	100.00
Total	310	100.00	

-> tabulation of programschedule

Program Schedule	Freq.	Percent	Cum.
3	38	12.26	12.26
4	183	59.03	71.29
5	89	28.71	100.00
Total	310	100.00	

-> tabulation of allocatedtime

Allocated Time	Freq.	Percent	Cum.
2	5	1.61	1.61
3	111	35.81	37.42
4	136	43.87	81.29
5	58	18.71	100.00
Total	310	100.00	

-> tabulation of timemanagement

Time Management	Freq.	Percent	Cum.
3	49	15.81	15.81
4	186	60.00	75.81
5	75	24.19	100.00
Total	310	100.00	

-> tabulation of methodoftraining

Method of Training	Freq.	Percent	Cum.
3	21	6.77	6.77
4	123	39.68	46.45
5	166	53.55	100.00
Total	310	100.00	

-> tabulation of knowledgeofthetrainner

Knowledge of the Trainner	Freq.	Percent	Cum.
3	21	6.77	6.77
4	126	40.65	47.42
5	163	52.58	100.00
Total	310	100.00	

-> tabulation of overallmanagement

Overall Management	Freq.	Percent	Cum.
3	32	10.32	10.32
4	173	55.81	66.13
5	105	33.87	100.00

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All the training comments indicate a lacking in the management.

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tab train knowledgeexperience, e

train	Knowledge/Experience N	Y	Total
0	5	263	268
1	0	42	42
Total	5	305	310

Fisher's exact = 1.000

1-sided Fisher's exact = 0.480

. tab train specialtrainingmethod, e //025

| Special Training
| Method
train | N Y | Total
-----------+----------------------+----------
0 | 39 229 | 268
1 | 1 41 | 42
-----------+----------------------+----------
Total | 40 270 | 310

Fisher's exact = 0.025
1-sided Fisher's exact = 0.016

tab train workeffectively, e

| Work Effectively
train | N Y | Total
-----------+----------------------+----------
0 | 9 259 | 268
1 | 0 42 | 42
-----------+----------------------+----------
Total | 9 301 | 310

Fisher's exact = 0.615
1-sided Fisher's exact = 0.265

. tab train confidence, e //242

Confidence		
train	**N**	**Y**	**Total**
0	**5**	**263**	**268**
1	**2**	**40**	**42**
Total	**7**	**303**	**310**

Fisher's exact = 0.242

1-sided Fisher's exact = 0.242

	applicate			
train	**1**	**2**	**3**	**Total**
0	**68**	**144**	**56**	**268**
1	**18**	**22**	**2**	**42**
Total	**86**	**166**	**58**	**310**

Fisher's exact = 0.008

Applying the knowledge from the training is positively associated with having more training

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