Research Report

On

CHALLENGE-BASED COMPARATIVE ANALYSIS OF ICT TRAINING PROGRAMS CONDUCTED BY ORGANIZATIONS LIKE NACTAR AND PREDICTING THE FUTURE NORMS OF ICT LABOR MARKET

Submitted to

The Director

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1.1. Introduction

Bangladesh went from being one of the poorest countries in the world when it was founded in 1971, with the tenth lowest per capita GDP in the world, to becoming a lower-middle-income country in 2015. Bangladesh's economy is now classified as a developing market economy (Riaz et al., 2016). In nominal terms, it is the world's 33rd largest economy, while in purchasing power parity, it is the 31st largest. It is a frontier market and one of the Next Eleven emerging market middle-income nations. Bangladesh's economy grew at an annual rate of 8.3 percent in the first quarter of 2019, making it the world's seventh fastest-growing economy (IMF, 2019). All of this was made possible by the Bangladesh government's 'Vision 2021' project, which aimed to realize Bangabandhu Sheikh Mujibur Rahman's 'Sonar Bangla' vision. Bangladesh's government now aims to establish its identity as a developed nation by 2041.

1.2. Background Study

To fulfill the above-mentioned goal, the government has already started taking drastic measures. Among them, two broad measures are worth mentioning. Firstly, Bangladesh is focusing on attaining the Sustainable Development Goals (SDGs) declared by the United Nations (UN) as specified in Table 1.1 (Assembly, 2015). It can be noticed that the 4th SDG of the UN is quality education. To ensure quality education two major steps are necessary: ensuring quality teaching by trained teachers and integrating the maximum usage of technology in the education sector which was also one of the main objectives of the 'Vision 2021' initiative. Moreover, it can be seen that the other SDGs are highly correlated with and some of them are highly dependent on quality education. Therefore, without the integration of maximum technology usage, the SDGs can't be achieved. Secondly, Bangladesh is focusing on the 4th Industrial Revolution (4IR) (Skilton, 2018) and is planning to lead this revolution in the same way that it led the 3rd. 4IR is a term used to describe the blurring of physical, digital, and biological barriers. In other words, it's a convergence of AI, robotics, Internet of Things (IoT), 3D printing, genetic engineering, quantum computing, and other technologies. It is clear that Bangladesh will not be able to lead the 4IR until ICT is integrated across all sectors.

Table 1.1: Sustainable Development Goals (SDGs) specified by United Nation in 2015.

Sl.	Goal Name	Description
1.	No Poverty	End poverty in all its forms everywhere.

2.	Zero Hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
3.	Good Health and Well-being	Ensure healthy lives and promote well-being for all at all ages.
4.	Quality Education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
5.	Gender Equality	Achieve gender equality and empower all women and girls.
6.	Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all.
7.	Affordable and clean energy	Ensure access to affordable, reliable, sustainable and modern energy for all.
8.	Decent work and economic growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
9.	Industry, innovation and infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
10.	Reduced Inequalities	Reduce inequality within and among countries.
11.	Sustainable cities and communities	Make cities and human settlements inclusive, safe, resilient and sustainable.
12.	Responsible Consumption and production	Ensure sustainable consumption and production patterns.
13.	Climate Action	Take urgent action to combat climate change and its impacts.
14.	Life Below Water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
15.	Life on Land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainable manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
16.	Peace, Justice and Strong Institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
17.	Partnerships for the Goals	Strengthen the means of implementation and revitalize the global partnership for sustainable development.

As a result of the preceding discussion, it is clear that technology integration in the education sector is required to achieve both the SDGs and the 4IR, as the modern economy is a knowledge-based economy that relies on people's knowledge and information to increase their skills, productivity, and ultimately, the country's growth rate (Norris 2001). That is why, in 2010, the government of Bangladesh included Information and Communication Technology (ICT) in the National Education Policy (National Education Policy, 2010). ICT as a complete

course was initially launched for grade 6 in 2012 in order to give computer literacy and skills, and it was subsequently expanded to cover additional grades of secondary and higher secondary levels in Bangladesh.

Information and Communication Technology (ICT) is a scientific, technical, and engineering discipline and management technique for handling information, as well as its application and connection to social, economic, and cultural issues (Semenov et al., 2002). It is becoming an increasingly important aspect of the educational system. ICTs have changed the way people work today, and they are now changing education institutions (Watson, 2001). All industrialized nations, as well as many developing countries, are adding computer labs and Internet connections in their classrooms (Lin et al., 2011). The fast adoption of ICT applications has resulted in significant technological, societal, and economic changes. These shifts have forced educational institutions, administrators, and teachers to reconsider their responsibilities, instructional methods, and long-term visions. However, many instructors lack the essential IT skills and are uncomfortable using the new materials in the classroom. They also lack the necessary training (Carnoy, 2004).

Table 1.2: School management type, enrollment, and teachers (BENBEIS, 2017). Here, SPI, PTR, and TPI denote student per institution, pupil-teacher ratio, and teacher per institution respectively.

Type of Education	Management	Number of Institutions	Number of Students	Number of Teachers	SPI	PTR	TPI
Primary	Public	63,982	12,781,249	382,262	200	37	5
	Private	69,919	4,470,101	275,702	64	16	4
	Total	**133,901**	**17,251,350**	**623,964**	**129**	**28**	**5**
Secondary	Public	987	409,135	8876	415	46	9
	Private	19,480	9,921,560	235,004	509	42	12
	Total	**20,467**	**10,330,695**	**243,880**	**505**	**42**	**12**
Higher Secondary	Public	328	1,436,718	14,467	4380	99	44
	Private	4091	2,436,242	106,467	596	23	26
	Total	**4419**	**3,872,960**	**120,934**	**876**	**32**	**27**

According to the statistics provided by BANBEIS, there were approximately 17.25 million primary, 10.33 million secondary, and 3.87 million higher secondary students in Bangladesh in 2017. And the total number of teachers in primary, secondary and higher secondary was

approximately 988 thousand. These statistics have been shown in Table 1.2 and the numbers have only increased in the past years. From these statistics, it is clear that there is a huge target audience in Bangladesh who needs proper ICT training every year.

Moreover, the information and communication technology (ICT) business is a relatively recent sector in the country's economy. It is an essential growing industry, even though it has yet to make meaningful contributions to the national economy. The Bangladesh Association of Software and Information Services (BASIS) was founded in 1997 to serve as the industry's national trade association. By 2009, the organization has expanded from 17 to 326 member firms. Bangladesh was placed first in software and IT services competitiveness and third in capabilities, after India and China, in research conducted by the Japan International Cooperation Agency in 2007-08 (Karim, 2010). In 2008 research, the World Bank predicted that Bangladesh's IT services and software exports will expand by triple digits (Karim, 2010). Gartner ranked Bangladesh as one of the top 30 countries for offshore services in 2010–2011 (Goasduff, 2012). In 2012, Internet penetration increased to 21.27 percent, up from 3.2 percent three years earlier (Bangladesh Sangbad Sangstha, 2013). Since 2009, the country's Information and Communications Technology (ICT) industry has averaged 57.21 percent export growth over the previous nine years (Latifee et al., 2018). In fiscal year (FY) 2016–17, Bangladesh's ICT sector generated export revenues of US$0.8 billion from the world market and US$1.54 billion from the local market, contributing roughly 1% to GDP (Latifee et al., 2018). So far, the ICT sector has generated roughly 300,000 job opportunities (Latifee et al., 2018). The government forecasts the IT industry to contribute 7.28 percent to GDP growth by 2021 as Internet usage grows (Bangladesh Sangbad Sangstha, 2013).

According to the statistics of Leveraging ICT for Growth Employment and Governance (LICT, website: lict.gov.bd), the total employment of IT-ITES industry has increased almost 3 times between 2013 and 2018 as shown in Table 1.3. According to LICT report of 2020, 5,85,000 people have been trained in ICT and among them 68,000 people have got jobs till 2020. According to the same report, by 2021 the number of total trained people will be 10 lakhs. Moreover, in 2020, 15,000 entrepreneurs have been introduced till 2020 and the number will increase to 65000 by 2021. Based on these statistics, it can be said that, training in ICT sectors is a very important aspect now.

Table 1.3: Total Employement of IT-ITES Industry (2013-18).

Year	2013	2014	2015	2016	2017	2018
Full Time Employment of IT/ITES Industry	23392	28615	35003	42817	52375	64067
Part Time Employment of IT/ITES Industry	22829	27925	34159	41785	51113	62524
Total Time Employment of IT/ITES Industry	46221	56540	69162	84602	103488	126591

Keeping this need in mind, to facilitate this huge audience, the National Academy for Computer Training and Research (NACTAR) is providing practical and pragmatic training on computer technology to create employability, skill development, and entrepreneurship under the Ministry of Education of the Government of People's Republic of Bangladesh. The institution has been established to develop technology and create skilled manpower through computer training in the context of the demands of the era. It offers various short-term and long-term courses for students as well as teachers in this sector. The objectives and activities of NACTAR clearly show how skill development efforts within the existing institutional arrangements are further linked to entrepreneurship, employability, and productivity.

In this research proposal, the work domains have been explored specified by NACTAR in the research conditions, and based on those objectives and conditions, a well-structured research plan has been proposed. In the later sections, the objectives of the study, objective-based research plan, methodology, research timeline, tentative budget, and limitations of the study will be presented one by one.

1.3. Research Objectives

This year, the research topic specified by NACTAR is the "Challenge-based comparative analysis of ICT training conducted by NACTAR and other organizations in the labor market". Based on the field of work specified by NACTAR in their research conditions, the main objectives of this work are:

a) Analyze the recent trends in ICT based labor market.
b) Recommend some proper measures that will be effective in providing ICT training for the labor market by addressing the current trends.

c) Labor market and challenge-based review of existing ICT training.

d) Propose an overall action plan to address the challenges of future ICT training.

1.4. The Team

For fulfilling the research objectives, we had to create a team. The team was formed with two major members:

a) Principal Researcher: Prof. Dr. Md. Rabiul Islam, Ph.D., Dept. of CSE, RUET

b) Assistant Researcher: Md. Azmain Yakin Srizon, Lecturer, Dept. of CSE RUET

The curriculum vitae of both principal researcher and assistant researcher are attached in Appendix A and Appendix B.

1.5. Organization of the Book

The following chapters are organized as follows:

a) **Chapter 2 – Objective Based Research Plans:** Contains research plans for all four objectives with proper illustration.

b) **Chapter 3 – Data Collection Sources:** Contains details on the data collection sources i.e., questionnaire-based surveys, personalized interviews, review of existing data, review of documents, websites, analytics and statistics etc.

c) **Chapter 4 – Methodology:** Contains details explanation on statistical analysis, data mining, feature selection, machine learning approaches and performance evaluation.

d) **Chapter 5 – Survey Forms Designing:** Contains the forms that have been utilized in this study.

e) **Chapter 6 – Experimental Analysis and Results:** Contains all the experimental results of this research.

f) **Chapter 7 – Research Timeline and Budget:** Contains the detailed timeline, budget and work breakdown structure of this research project.

g) **Chapter 8 – Conclusion:** Contains a summarized conclusion including the limitation of the study.

1.6. Conclusion

This chapter mainly the background study and research objectives have been discussed. In the next chapter, emphasis will be on the objective based research plans.

Objective Based Research Plans

Introduction

Objective 1 – Analyze the recent trends in ICT based labor market

Objective 2 – Recommend some proper measures that will be effective in providing ICT training for the labor market by addressing the current trends

Objective 3 – Labor market and challenge-based review of existing ICT training

Objective4 – Propose an overall action plan to address the challenges of future ICT training

Conclusion

2.1. Introduction

As mentioned earlier, we have made 4 objectives as per the objectives mentioned in NACTAR circular. To fulfill each of the objectives effectively, separate research plans have been designed.

2.2. Objective 1 – Analyze the recent trends in ICT based labor market

To correctly analyze the recent trends in ICT based labor market, first data will be collected to answer some crucial questions related to the current practice of ICT in the market place such as:

a) Which technologies are being prioritized in the market now?

b) What is the salary structure of the jobs that need such technologies?

c) Is NACTAR providing training on these technologies? If yes, how is the impact so far? Is it enough for getting the job or project in the labor market? If not, how to improve?

d) Are these technologies just a sudden boom and will perish within a few years? Or the future of these technologies is bright?

e) How were the trends in the last years? Is there any technology that is showing a similar pattern?

Specific questionnaires will be designed for survey-based data collection and personalized interviews will be arranged with the trainees for growth-based and development-based data collection. After that, the data will be encoded and by applying statistical and data mining processes, the current trends will be discovered. By applying the regression analysis, the future of the emerging technologies can be predicted as well. Moreover, the collected data and existing data of NACTAR and other institutions will also be utilized for discovering any other interesting patterns in the labor market such as the participation based on gender in a specific technological area, common skills recommended by the employers in job circulars, and so on. Figure 2.1 illustrates the workflow for objective 1.
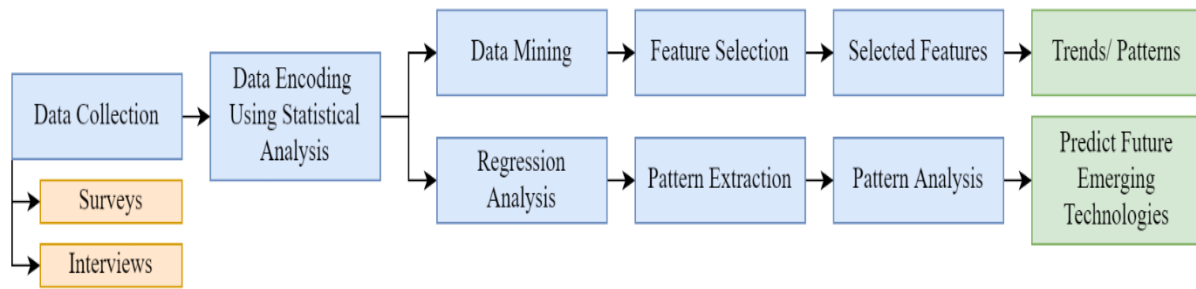
Figure 2.1: Workflow for objective 1 (i.e., Analyze the recent trends in ICT based labor market).

2.3. Objective 2 – Recommend some proper measures that will be effective in providing ICT training for the labor market by addressing the current trend

To find out the proper measures, data need to be collected that will answer some crucial questions related to the current ICT training such as:

a) How did the ICT training help the participants get a job or project and what were the characteristics (type, duration, budget, and so on) of the job and project?

b) Were the participants satisfied with the training courses? Were the exams fruitful and did the participants feel confident after taking the exams? Did these exams actually help them get a job or project?

c) What was the lacking of training programs in terms of curriculum, exam conditions, etc.?

d) Do the current ICT training programs reflect the trends discovered while achieving objective 1? If not, why? What are the reasons?

e) What do the participants and employers think about the lacking and how they can be resolved?

Alike objective 1, objective 2 will also need several data collection processes. Questionnaires and personalized interviews will provide an abstract view of the problems in current practice. By using proper analyzing tools, the problems will be found and listed for each of the participants. After that, the problems will be categorized as features. If a participant thinks that a particular problem or feature is responsible for the deficiency in current practice, the value of that feature for that specific participant will be 1, otherwise 0. In this way, a large sum of data can be generated. Next, by using several feature selection techniques, the actual problems behind the lacking in current practice will be identified. Based on the found problems, proper

measures will be recommended and these recommendations will be presented to the participants who talked about the issues. Question will be asked to them if the proposed measures are able to tackle the problems that he/she mentioned and if applied, does he/she think that the training program will be better? If not, the recommended measures will be updated even more and this cyclic process will be continued. Thus, the best possible recommendations can be achieved. Figure 2.2 illustrates the workflow for objective 2.
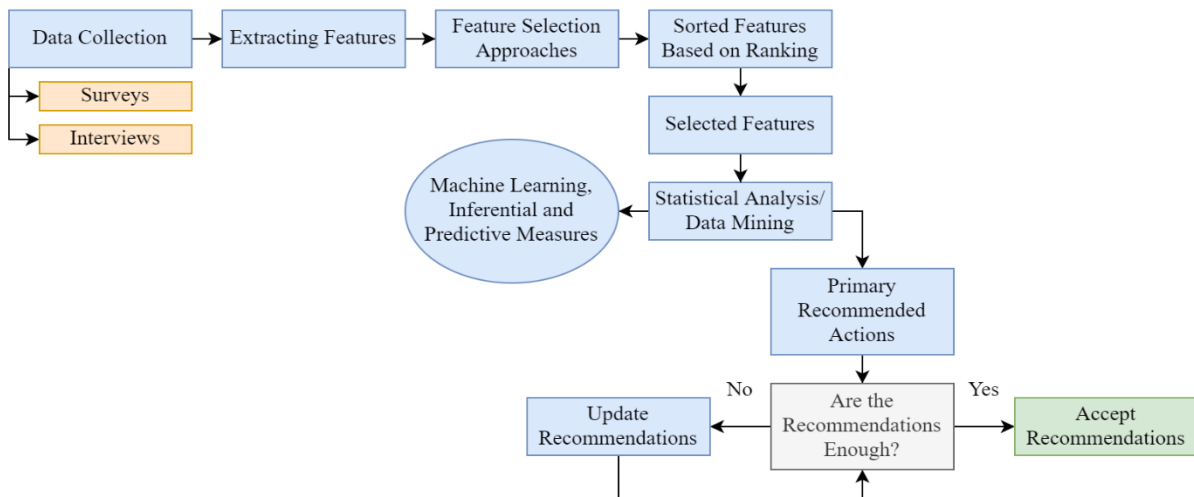
Figure 2.2: Workflow for objective 2 (i.e., Recommend some proper measures that will be effective in providing ICT training for the labor market by addressing the current trends).

2.4. Objective 3 – Labor market and challenge-based review of existing ICT training

Day by day the labor market is getting more and more challenging. Because of the current boom in technology and open access to the Internet, many low and low-middle-income countries are emerging as our competitors in the job market. The job market now not only requires furnished work but also requires the least possible time to fulfill the tasks. To understand the challenges of existing ICT training programs, the following questions need to be addressed:

a) What are the most competitive technologies in the job market and which countries or regions are leading those technologies?

b) Why can't Bangladesh be able to lead for a particular technology? What are the economic, social, geographical barriers that are causing this?

c) What are the measures that can be taken to tackle such barriers?

However, to address the above question, only questionnaires and interviews are not enough. Research papers, statistics, and data analysis will be done for different regions and countries for each of the training programs. Feature selection and machine learning techniques will be used to show that if certain measures and actions are taken, a country or region can lead in a particular technology. In this way, it will be easier to find out the measures for which other countries are leading in the corresponding technology, and based on these findings, recommendations will be provided. Figure 2.3 illustrates the workflow for objective 3.
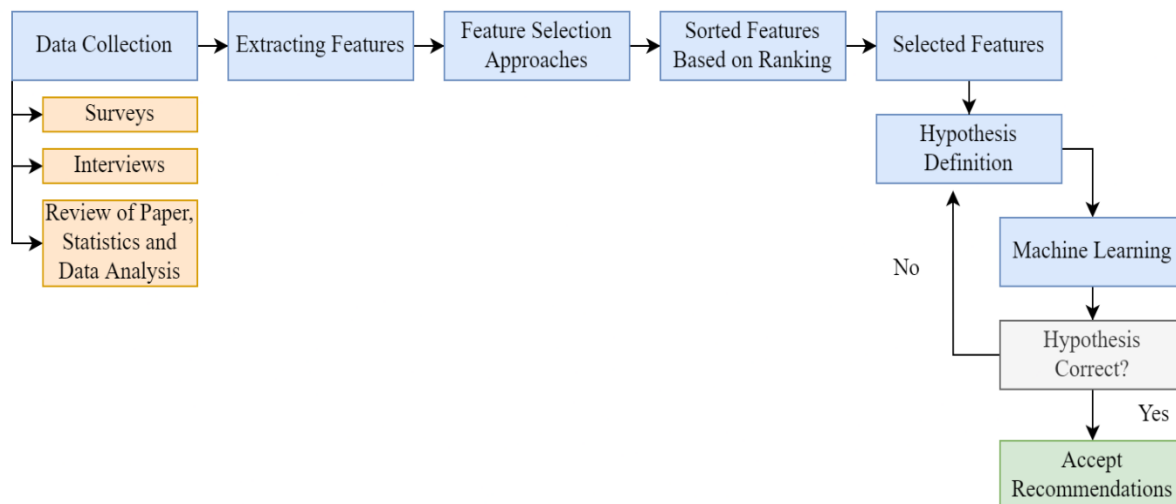
Figure 2.3: Workflow for objective 3 (i.e., Labor market and challenge-based review of existing ICT training).

2.5. Objective4 – Propose an overall action plan to address the challenges of future ICT training

Addressing challenges of the future ICT training is a very difficult task as none can tell with 100% certainty which technology will lead or die in the future. However, because of cutting-edge technology like machine learning, now, it's easier to predict the future trend of a particular technology, especially by using regression analysis. If the future trends can be figured out, then it'll be easier to find out the possible future challenges based on the patterns of the previous leading technologies. Moreover, surveys will be conducted to figure out what will be the future possibilities for a particular technology. For example,

a) Are there any major improvements needed? If yes, will the updated technology make the existing one obsolete? (i.e., python 2 was made obsolete by python 3)

b) What if the support for a particular technology gets halted? Will that technology survive?

c) Calculate the overall domain and market share of certain technologies to understand the overall future growth.

Now, proposing an overall action plan also contains backup ideas such as:

a) What if a technology becomes obsolete? How to act?

b) What if a new technology emerges? What will be the process by following which a curriculum and training program can be designed in the least timespan?

c) What if a technology receives a huge update? What will be the measures then?

Our work will also address these questions and recommend proper plans for such scenarios too. Figure 2.4 illustrates the workflow for objective 4.
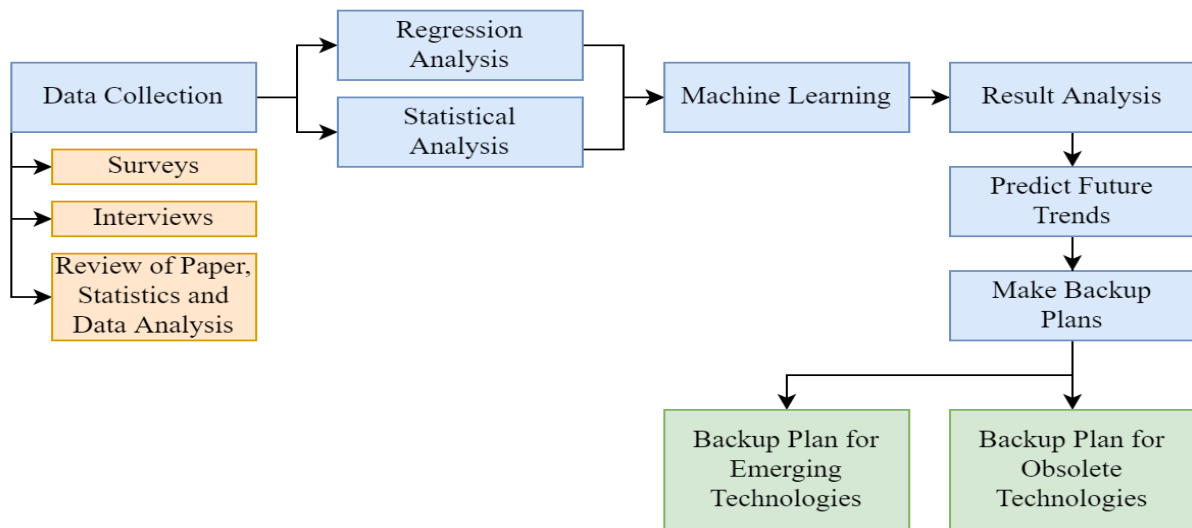
Figure 2.4: Workflow for objective 4 (i.e., Propose an overall action plan to address the challenges of future ICT training).

2.6. Conclusion

In this chapter, we discussed on the objective based research plans and presented workflow diagram for each of the research plans.

Data Collection Sources

Introduction

Questionnaire-based Surveys

Personalized Interviews

Review of Existing Data

Review of Documents, Websites, Analytics and Statistics

Qualitative vs. Quantitative Data Collection

Conclusion

3.1. Introduction

As specified in the objective-based research plan, for specific objectives, the data will be collected in different manners. For example, for objective 1, questionnaires-based survey, personalized interview and review of existing NACTAR documents will be utilized. For objective 2, only the questionnaires-based survey and personalized interview are enough. However, for objective 3, review of research articles and labor market is also necessary along with the questionnaire-based survey and interviews. For objective 4, review of documents is the main way of collecting data. However, if deemed necessary, some other methods of collecting data will be utilized as well.

As mentioned above, the data collection process has 4 major ways: questionnaires-based survey, personalized interviews, review of existing data of NACTAR along with other institutions and review of existing papers, certain websites, analytics and statistics. Details have been given in the following subsections.

3.2. Questionnaire-based Surveys

Surveys are one of the most popular means of collecting data. Surveys can be divided into two broad clusters: online-based surveys and offline-based surveys. Online surveys are easy relative to offline surveys as there is no hassle in moving or carrying papers to collect the necessary data. However, offline surveys are more effective as papers can reach many places where technology can't. Therefore, valuable information can be gathered utilizing offline surveys often. For this research, both online and offline surveys will be conducted based on the demand. Online surveys will be conducted via Google forms. Google forms are one of the most reliable and popular means of collecting data online and the best aspect of Google forms is that excel files can directly be generated from the collected data. Google form also provides a lot of analytics tools which can be very useful when dissecting the data primarily.

Survey questionnaires will be designed based on the objectives. That means, there will be separate surveys for the participants, employers, and instructors of NACTAR and other institutions who're providing training. To fulfill the objectives specified before, it is necessary to understand the view of all of the three types of target audiences. The number of samples to be collected is aimed initially at 400. However, our study will focus on increasing the sample size even more (if possible) as the more the data, the better will be the outcome of the analysis.

3.3. Personalized Interviews

Personalized interview refers to interviewing on a personal basis where a participant from a particular training program will cope with an interviewer and together, they'll resolve the key questions raised at the beginning of the interviews. The discussions of the interviews will later be summarized on a feature basis and encoded into numeric data that'll be utilized for answering the questions raised in the objectives via proper data analytics tools. As specified in the research conditions of NACTAR, personalized interviews will be done with at least 2 batches of NACTAR who have completed the training online or offline.

3.4. Review of Existing Data

Reviewing the existing data of NACTAR is one of the most crucial steps of this research as this will allow us to figure out trends in the existing system. Based on the findings of the existing data, the questionnaires for survey and interviews can be designed. Moreover, many correlations can be discovered from some simple data related to trainees and trainers. For example, what was the qualification of the trainees and trainers while the training took place? How were the examination results and did the participants get a job or project opportunity after the training? Based on the answers from the existing data, correlations can be discovered. Here are some possible correlation questions:

a) Do the participants have a high chance of getting an opportunity if they did well in the examination?
b) Do the curriculum and educational qualification of trainers of the training program have an impact on the possibility of getting an opportunity?
c) Does a higher secondary level trainee have a higher possibility of getting an opportunity than a secondary level trainee?

Such correlations can be made by reviewing the existing data of NACTAR and the other institutions that are conducting different training programs.

3.5. Review of Documents, Websites, Analytics and Statistics

As mentioned in the objectives, the study is focusing on figuring out the current trends and providing recommendations for tackling future challenges. To understand the common trends,

it is really important to find out what type of skills are being demanded by the industry currently. Fortunately, in the ICT sectors, most employers are now mentioning the skills they are looking for in their job circulars. Websites like BDJOBS, LinkedIn are now showcasing the job circulars with the specific skills mentioned by the employers. Our study will collect this valuable information as well. Reviewing such content will assist in finding out the current trends and patterns more easily. Moreover, there exist many studies, analytics, and statistics that have previously explored different critical questions regarding market trends and patterns. We believe that reviewing and summarizing these articles, analytics and statistics will create a better opportunity of obtaining more fruitful recommendations.

3.6. Qualitative vs. Quantitative Data Collection

As mentioned in the research conditions of NACTAR, our study will focus on both qualitative and quantitative data collection. When gathering and interpreting data, quantitative research works with numbers and statistics, while qualitative research works with words and intentions. In our research, it can be clearly understood that questionnaire-based surveys and review of existing data are both parts of the quantitative data collection process. On the other hand, personalized interviews and reviewing websites, articles, analytics, and statistics are part of the qualitative data collection process.

3.7. Conclusion

In this chapter, we focused on the description of the dataset collection sources. Each of the sources has been described here in details.

Methodology

Introduction

Statistical Analysis/Data Mining

Feature Selection

Machine Learning Approaches

Performance Evaluation

Conclusion

4.1. Introduction

In this chapter, different methodologies have been discussed including statistical analysis or data mining, feature selection, machine learning approaches and performance evaluation.

4.2. Statistical Analysis / Data Mining

Statistical analysis / data mining refers to the usage of the basic tools of statistics and different statistical algorithms to find out valuable information from data. For this research, different statistical analyses will be conducted. Some of them are described below:

a) **Descriptive Statistical Analysis:** It mainly focuses on organizing and summarizing the data (Hafner, 1998). It can turn a big chunk of data into a valuable piece of information by utilizing its simple yet powerful tools such as the population mean, the sample mean, weighted mean, the sample mean of grouped data, mean deviation, population variance, population covariance, correlations and so on. Here are some of the most popular methods of descriptive statistics with proper formulas:

  ➤ **Population Mean:** The population mean (μ) is an average of a group attribute. The group can be a human, object, or thing, like "all the Chinese persons living in the Bangladesh" or "all thecat owners in Dhaka". For example: In a class of 250 students, the average GPA is 4.2.

$$\mu = \frac{\sum X_i}{N} \qquad (1)$$

  Here, μ is population average, X_i is individual values of a population and N is the count of individual values.

  ➤ **Mean Deviation/ Standard Deviation:** A standard deviation (σ) is a measure of data dispersion in proportion to the mean. Data are grouped around the mean when the standard deviation is low, while data are more spread out when the standard deviation is large.

$$\sigma = \frac{\sum |X_i - \mu|}{N} \qquad (2)$$

Here, σ is the population mean deviation/standard deviation and the other signs hold the same meaning mentioned earlier.

➢ **Population Variance:** The population variance (σ^2) describes how data points in a given population are distributed. It's the squared sum of the distances between each data point in the population and the mean.

$$\sigma^2 = \frac{\sum(X_i - \mu)^2}{N} \qquad (3)$$

Here, σ^2 is the population variance and the other signs hold the same meaning mentioned earlier.

➢ **Correlation:** Correlation is a statistical word that refers to the degree to which two variables move in lockstep. When two variables move in the same direction, it is said that they have a positive correlation. A negative correlation exists when they move in opposite directions.

$$r = \frac{\sum(X_i - \mu_X)(Y_i - \mu_Y)}{\sqrt{\sum(X_i - \mu_X)^2 \sum(Y_i - \mu_Y)^2}} \qquad (4)$$

Here, r refers to correlation, X_i is the value of the X-variable, Y_i is the value of the Y-variable, μ_X is mean of the values of the X-variable and μ_Y is mean of the values of the Y-variable.

b) **Inferential Statistical Analysis:** When a hypothesis has to be evaluated, inferential statistical analysis is used to extract inferences using probabilities and create generalizations about the entire data set (Bingham et al., 1982). When the population data is large, this sort of technique is applied. Because there would be at least 400 samples in our scenario, doing inferential statistical analysis will be a wonderful option. Hypothesis testing, ANOVA, and other techniques are examples of such tools.

c) **Predictive Analysis:** As stated in the objectives, the study not only focuses on identifying current trends and patterns, but also on predicting future trends and patterns. Statistical approaches and machine learning algorithms are used in predictive analytics to characterize the likelihood of future outcomes, behavior, and trends based on recent and past data. Data mining, data modeling, artificial intelligence, machine learning, and

other approaches are commonly utilized in predictive analysis to create crucial predictions (Bos et al., 2014).

d) **Prescriptive Analysis:** For the purpose of making suggestions, a perspective analysis will be used (Fiet, 2007). Other statistical analyses may be used for driving exclusions, but this one delivers the real answer. Essentially, it is concerned with determining the best proposal for a decision-making process. It is, nonetheless, quite similar to descriptive and predictive analysis. Predictive analysis forecasts what could happen, whereas descriptive analysis explains data in terms of what has happened. And here, prescriptive analysis is concerned with making acceptable recommendations from among the given options.

e) **Exploratory Data Analysis (EDA):** EDA (Tukey, 1977), or exploratory data analysis, is a type of inferential statistics that is widely used by data analysts. It is usually the initial stage in the data analysis process, performed before any other statistical techniques are used. This strategy focuses entirely on studying data patterns in order to identify probable links. EDA may be used to find previously undiscovered correlations in data, evaluate missing data from gathered data for maximum insights, and test assumptions and hypotheses.

f) **Casual Analysis:** In general, causal analysis aids in understanding and discovering the reasons for "why" things happen or seem the way they do (Heise, 1975). For example, in today's commercial world, many ideas or enterprises fail as a result of unforeseen occurrences; in this situation, causal analysis determines the underlying cause of failures, or simply the basic reason why anything may occur.

4.3. Feature Selection

Feature selection is a big part of data mining. As mentioned earlier in the objectives-based research plan section, for obtaining different objectives, feature selections need to be done. It'll enable one to find out the most critical features that are responsible for a certain outcome. There are many approaches to feature selection in existence. These methods can be divided into 4 broad categories:

a) **Filter Methods:** In filter methods, first, the best subset is selected and then the learning algorithms are employed for performance measurement. Figure 4.1 illustrates the mechanism of filter methods. Some examples of filter methods are Pearson's Correlation/Correlation Coefficient (Sedgwick, 2012), Spearman's Rank Correlation Coefficient (Sedgwick, 2014), Chi-Square (McHugh, 2013), ANOVA Test (Cuevas et al. 2004), Variance Threshold, Mean Absolute Distance, Student's T-Test (Al-Achi et al., 2019), Wilcoxon Mann-Whitney Test (Fagerland et al., 2009), Kruskal-Wallis Test (Vargha et al., 1998), Fisher's Exact Test (Upton, 1992), Minimum Redundancy Maximum Relevance (mRMR) (Radovic et al., 2017), Kendall's Feature Selection, etc. Some of them have been described briefly in later sections.

Figure 4.1: Filter methods

b) **Wrapper Methods:** Wrapper methods (El Aboudi et al., 2016) select a subset of features and calculate the performance. Then, they select another subset of features and calculate the performance again. If the performance is better the latter is chosen, otherwise, the first one is chosen. There are different wrapper methods. Some of them are Forward Feature Selection, Backward Feature Elimination, Exhaustive Feature Selection, Recursive Feature Elimination, etc. Figure 4.2 illustrates wrapper methods.
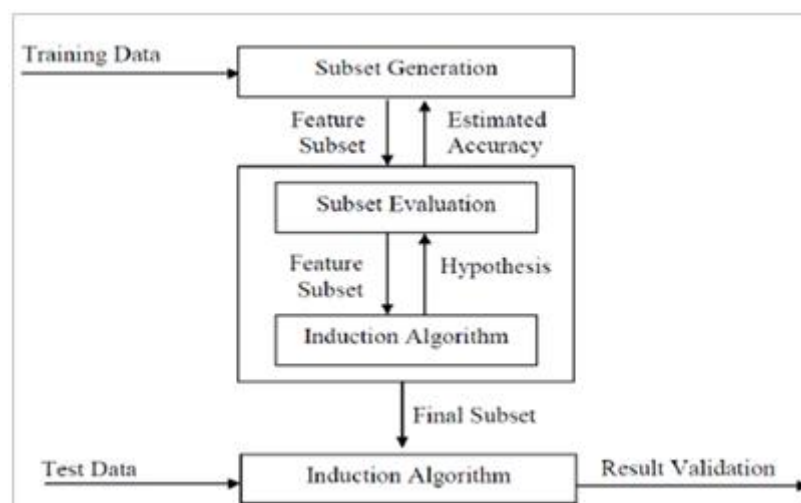
Figure 4.2: Wrapper methods

c) **Embedded Methods:** Embedded feature selection methods are those methods or techniques which has a feature selection technique embedded inside the algorithm. This type of method doesn't need any classification mechanisms. Rather, these are classification algorithms with feature selection embedded into them. In Figure 4.3, a diagram of embedded methods has been presented. Examples of such methods are ridge regression (Marquardt et al., 1975), lasso regression (Ranstam et al., 2018), decision tree (Myles et al., 2004), random forest (Rigatti, 2017), etc.
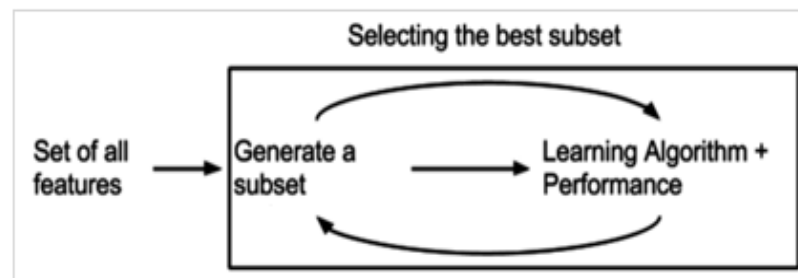
Figure 4.3: Embedded methods

d) **Hybrid Methods:** Hybrid feature selections refer to mixing multiple features together. It can be done in two ways. They are:
   i)   Apply sequential feature selection methods
   ii) Apply parallel feature selection methods

All these feature selection approaches will be visited while analyzing the existing and collected training data to find out the best possible features that are correlated with the outcomes.

4.4. Machine Learning Approaches

For some of the experiments, machine learning approaches need to be applied to prove the hypothesis. For this research, the following machine learning approaches will be utilized:

a) **Decision Tree Classifier:** A decision tree is one of the most reliable approaches for predicting and classifying data. It's a tree structure that looks like a flowchart. It's a supervised learning method. The method tries to answer the problem by utilizing tree illustration. Each interior node in the decision tree algorithm represents a test on a characteristic, each branch a result of the test, and each end or leaf node a class label.

b) **K-Nearest Neighbors Classifier:** It's a two-in-one approach that may be used for classification and regression (Peterson, 2009). This algorithm's main task is to categorize new objects based on their properties and to train humans. According to the k training samples, which are the closest near neighbors to the test person are determined, this algorithm predicts the test sample's level, and finds the outcome with the highest-level possible.

c) **Linear Discriminant Analysis Classifier:** LDA (Linear Discriminant Analysis) (Izenman, 2013), sometimes known as Normal Discriminant Analysis, is a dimensionality reduction technique. It's commonly used to represent organizational variations and supervised classification challenges. It's a compression of dimensions. It achieves an efficient linear transformation to optimize class separability.

d) **Logistic Regression Classifier:** Logistic Regression (Wright, 1995) is a classification methodology that may be used as a predictive analytic tool. It is based on the concept of probability. It's used to solve categorization problems. This method generates a discrete binary result between 0 and 1.

e) **Naïve Bayes Classifier:** Naïve Bayes (Webb et al., 2010) is a machine learning and data mining learning technique that is both efficient and powerful. This method is a set of Bayes Theorem-based classification approaches. It is a class conditional independent algorithm since it is not a single algorithm but a set of algorithms that all engage in a common law and each pair of features being studied is independent of the other.

f) **Random Forest Classifier:** Because it can handle missing conditions and handle continuous, categorical, and binary data, Random Forest is an approach for high-dimensional data modeling. It's a way of gathering data that involves putting together numerous decision trees. For bootstrapping and ensemble design, random forest is a strategy that overcomes the overfitting concern.

g) **Support Vector Machine Classifier:** Another categorization approach is the Support Vector Machine (SVM) (Noble, 2006). SVM is a supervised machine learning technique that outperforms other machine learning algorithms in real-world classification problems and nonlinear function prediction challenges.

h) **Convolutional Neural Network (CNN):** Unlike other traditional machine learning algorithms, a convolutional neural network doesn't need rigorous feature engineering (Albawi et al, 2017). Rather it discovers important features on its own. Experiments will be done based on CNN also and the results will be reported.

i) **Regression Analysis:** Regression analysis (Freund et al., 2006) is a collection of statistical techniques for evaluating the connections between dependent variables in statistical modeling. The most popular type of regression analysis is linear regression, which involves finding the line that best fits the data based on a set of mathematical criteria. Ordinary least squares, for example, finds the single line or hyperplane that minimizes the sum of squared differences between the genuine data and that line or hyperplane.

4.5. Performance Evaluation

The performances of the statistical analysis techniques are based on the numeric values of their corresponding aspects. For feature selections, the ranking will be used to calculate the importance of the features. And for the machine learning classifiers, different matrices such as sensitivity, specificity, precision, recall, accuracy, f1-score, etc. will be utilized.

4.6. Conclusion

In this chapter, we have discussed all the used methodologies in details. In the next chapter data collections forms have been presented.

Survey Forms Designing

Introduction

Designing Online Forms

Designing Offline Forms

Conclusion

5.1. Introduction

In this chapter, we have mentioned the forms we designed for this project. We have created both online forms and offline forms for proper data collection.

3.2. Online Forms

We created 3 separate forms for collecting data for all four objectives. For objective-1, the form contains:

a) Your division

b) What is the name of your company?

c) Your Position in the Mentioned Company

d) In which district the main branch of your company is situated?

e) Type of your participation in this survey

f) How many employees is there in your company?

g) How many branches of your company exist?

h) How many employees do you hire every year?

i) For how long your company is running?

j) What is the minimum educational level needed to get hired in your company?

k) What is the male female ratio in your company?

l) What is the age of most of your employees?

m) What is the type of your recruitment?

n) Which of the following are considered as entry-level jobs by your company?

o) Does your company have any training program for the employees?

p) Do you agree that companies should have their own training programs?

q) Agreeing or disagreeing with company standards.

r) Is your company using or planning to deploy any of these technologies internally or to conduct business with your customers?

s) Survey related to company policies.

t) What is the most used software in your company?

u) What are the most used programming languages in your company?

v) Survey of job requirements.

For objective-2, the form contains:

a) Name
b) Email
c) Phone Number
d) Division
e) Institution/Company/Industry/Enterprise
f) Position
g) In which course enrolled
h) Offline or online course?
i) Pretraining Preparation Judgement (Table)
j) Course Structure Judgement (Table)
k) Content Judgement (Table)
l) Delivery Judgement (Table)
m) Duration Judgement (Table)
n) Trainer Judgement (Table)
o) Technical Issues, Environment and Accessibility Judgement (Table)
p) Which parts were stressful?
q) Mark if the following problems existed.
r) Course rating (Table)

For objective-3 and objective 4, the form contains:

a) Summary of knowing technologies
b) Sources of Internet connection
c) Usage of technologies in common places
d) Main problems of ICT in the context of Bangladesh
e) Main problems of Internet in the context of Bangladesh
f) The parts of course to be assessed summary

Link of the sample forms are given below:

a) Sample form for objective-1:

https://docs.google.com/forms/d/e/1FAIpQLSeqQXdcRiJcLi_GT-

mbJKr1bnWDGSbAapnZnNFMJiI3G6kmDQ/viewform

b) Sample form for objective-2:
https://docs.google.com/forms/d/e/1FAIpQLScfpVf_gVdsbjfQ2q66b2K16_eQ2PTjPJ_oRvM5Jh-PLekqqg/viewform

c) Sample form for objective-3:
https://docs.google.com/forms/d/e/1FAIpQLScCKaQm3BN-TFBRAtC5tb16L2u8XuxQZAEcEQdsMXaSdwr1jw/viewform

3.3. Offline Forms

We designed two offline forms in our research. They are:

a) Offline form for the instructors

b) Offline form for the Technical School and College Teachers for the ICT training course

In the next pages, these forms have been presented.

জাতীয় কম্পিউটার প্রশিক্ষণ ও গবেষণা একাডেমী (নেকটার)

টেকনিক্যাল স্কুল ও কলেজ শিক্ষকদের আইসিটি প্রশিক্ষণ কোর্স সমীক্ষা, ব্যাচ-২১,২২,২৩

বিবরণঃ "নেকটার এবং অন্যান্য প্রতিষ্ঠান কর্তৃক পরিচালিত আইসিটি ট্রেনিংয়ের শ্রমবাজার ও চ্যালেঞ্জভিত্তিক তুলনামূলক বিশ্লেষণ" গবেষণা প্রকল্পের একটি ধাপ হিসেবে নিম্নোক্ত ফর্মটি প্রকাশ করা হয়েছে। এই গবেষণা প্রকল্পটির ফলাফল নেকটারকে আরো উন্নত করতে সহযোগিতা করবে। সুতরাং, নিম্নোক্ত সমীক্ষায় অংশ নিয়ে ও সঠিক তথ্য দিয়ে নেকটারকে সহযোগিতা করুন।

১। Your Name (আপনার নাম):

২। Your Email (আপনার ই-মেইল):

This will be kept confidential and will only be used to contact you if needed. (এটি গোপন রাখা হবে এবং প্রয়োজন হলে শুধুমাত্র আপনার সাথে যোগাযোগ করতে ব্যবহার করা হবে।)

৩। Your Phone Number (আপনার ফোন নম্বর):

This will be kept confidential and will only be used to contact you if needed. This field is optional. (এটি গোপন রাখা হবে এবং প্রয়োজন হলে শুধুমাত্র আপনার সাথে যোগাযোগ করতে ব্যবহার করা হবে। এটি ঐচ্ছিক।)

৪। Your Division (আপনার বিভাগ): [টিক (√) দিন]

	বরিশাল		ঢাকা		ময়মনসিংহ		রংপুর
	চট্টগ্রাম		খুলনা		রাজশাহী		সিলেট

৫। Your Institution / Company / Industry / Enterprise (আপনার প্রতিষ্ঠান/কোম্পানি/শিল্প/এন্টারপ্রাইজ):

If you're a student, write: Student (আপনি যদি একজন ছাত্র হন তবে লিখুন: Student)

৬। Was it an online/offline course? (এটি কি অনলাইন নাকি অফলাইন কোর্স ছিল?)

	Offline (অফলাইন)		Online (অনলাইন)

৭। **Pre-training Preparation. Complete the following table. (প্রাক-প্রশিক্ষণ প্রস্তুতি। নিম্নলিখিত টেবিলটি সম্পূর্ণ করুন।)**

সঠিক স্থানে টিক (√) দিন	Strongly Agreed (দৃঢ়ভাবে একমত)	Agreed (একমত)	Neutral (নিরপেক্ষ)	Disagree (অসম্মতি)	Strongly Disagree (দৃঢ়ভাবে অসম্মতি)
Training goals and objectives were clearly stated before you started the course. (আপনাকে কোর্স শুরু করার আগে প্রশিক্ষণের লক্ষ্য এবং উদ্দেশ্যগুলি স্পষ্টভাবে বলা হয়েছিল।)					
The course's title and description were easy to comprehend. (কোর্সের শিরোনাম এবং বর্ণনা বোঝা সহজ ছিল।)					
You felt confident enough before taking the course. (কোর্স করার আগে আপনি যথেষ্ট আত্মবিশ্বাসী বোধ করেছেন।)					

৮। **Course Structure. Complete the following table. (কোর্স স্ট্রাকচার। নিম্নলিখিত টেবিলটি সম্পূর্ণ করুন।)**

সঠিক স্থানে টিক (√) দিন	Strongly Agreed (দৃঢ়ভাবে একমত)	Agreed (একমত)	Neutral (নিরপেক্ষ)	Disagree (অসম্মতি)	Strongly Disagree (দৃঢ়ভাবে অসম্মতি)
The course's sequence and flow were satisfactory. (কোর্সের ক্রম এবং প্রবাহ সন্তোষজনক ছিল।)					
You felt equally engaged in each course section. (আপনি কোর্সের প্রতিটি বিভাগে সমানভাবে জড়িত বোধ করেছেন।)					
There was a clear separation between the course's units. (কোর্সের ইউনিটগুলির মধ্যে একটি স্পষ্ট বিচ্ছেদ ছিল।)					
You preferred more frequent assessments. (আপনি আরো ঘন ঘন মূল্যায়ন চেয়েছিলেন।)					

৯। **Content. Complete the following table. (বিষয়বস্তু। নিম্নলিখিত টেবিলটি সম্পূর্ণ করুন।)**

সঠিক স্থানে টিক (√) দিন	Strongly Agreed (দৃঢ়ভাবে একমত)	Agreed (একমত)	Neutral (নিরপেক্ষ)	Disagree (অসম্মতি)	Strongly Disagree (দৃঢ়ভাবে অসম্মতি)
There were enough audio-visual contents throughout the course. (পুরো কোর্স জুড়ে যথেষ্ট অডিও-ভিজ্যুয়াল বিষয়বস্তু ছিল।)					
The quality of the content was consistent throughout the course. (বিষয়বস্তুর মান কোর্স জুড়ে সামঞ্জস্যপূর্ণ ছিল।)					
There were enough variety in terms of course unit types. (কোর্স ইউনিটে ক্ষেত্রে যথেষ্ট বৈচিত্র্য ছিল।)					
The language was easy to understand. (ভাষা বোঝা সহজ ছিল।)					
The overall contents were highly engaging. (সামগ্রিক বিষয়বস্তু অত্যন্ত আকর্ষক ছিল।)					
The reading materials was presented in an interesting way. (পড়ার উপাদানগুলি একটি আকর্ষণীয় উপায়ে উপস্থাপন করা হয়েছিল।)					
The course's content was too challenging for an average learner to understand. (কোর্সের বিষয়বস্তু একজন গড় শিক্ষার্থীর বোঝার জন্য খুবই চ্যালেঞ্জিং ছিল।)					
The content was in-depth enough. (বিষয়বস্তু যথেষ্ট গভীর ছিল।)					
You liked the types of assessments used. (মূল্যায়নের ধরণগুলি আপনি পছন্দ করেছেন।)					
You notice any unnecessary repetitions in the content. (আপনি বিষয়বস্তুতে অপ্রয়োজনীয় পুনরাবৃত্তি লক্ষ্য করেছেন।)					
You, at some point, have to reread the content to understand it. (আপনাকে, কিছু সময়ে, বিষয়বস্তুটি বোঝার জন্য বার বার একই জিনিস পড়তে হয়েছে।)					
Sometimes you felt there are some lacking in the course in terms of contents or delivery.					

(কখনও কখনও আপনি অনুভব করেছেন যে বিষয়বস্তু বা বিতরণের ক্ষেত্রে কোর্সে কিছু অভাব রয়েছে।)					
The course was easy to follow. (কোর্সটি অনুসরণ করা সহজ ছিল।)					

১০। **Delivery. Complete the following table.** (ডেলিভারি। নিম্নলিখিত টেবিলটি সম্পূর্ণ করুন।)

সঠিক স্থানে টিক (√) দিন	Strongly Agreed (দৃঢ়ভাবে একমত)	Agreed (একমত)	Neutral (নিরপেক্ষ)	Disagree (অসম্মতি)	Strongly Disagree (দৃঢ়ভাবে অসম্মতি)
The course felt too rushed. (কোর্সটিতে খুব তাড়াহুড়ো অনুভূত হয়েছে।)					
The course felt too monotone. (কোর্স খুব একঘেয়ে অনুভূত হয়েছে।)					
The course felt too automated. (কোর্স খুব স্বয়ংক্রিয় অনুভূত হয়েছে।)					
The course was not interactive enough. (কোর্সটি যথেষ্ট ইন্টারেক্টিভ ছিল না।)					
The overall course delivery was satisfactory. (সার্বিক কোর্স বিতরণ সন্তোষজনক ছিল।)					

১১। **Duration. Complete the following table.** (সময়কাল। নিম্নলিখিত টেবিলটি সম্পূর্ণ করুন।)

সঠিক স্থানে টিক (√) দিন	Strongly Agreed (দৃঢ়ভাবে একমত)	Agreed (একমত)	Neutral (নিরপেক্ষ)	Disagree (অসম্মতি)	Strongly Disagree (দৃঢ়ভাবে অসম্মতি)
You had enough times to complete the assigned tasks, assignments and assessments. (আপনার কাছে নির্ধারিত কাজ, অ্যাসাইনমেন্ট এবং মূল্যায়ন সম্পূর্ণ করার জন্য যথেষ্ট সময় ছিল।)					
The duration of the course was satisfactory. (কোর্সের সময়কাল সন্তোষজনক ছিল।)					
All the units of the course had enough time allocated. (কোর্সের সকল ইউনিটের জন্য পর্যাপ্ত সময় বরাদ্দ ছিল।)					
Some of the units felt rushed. (কিছু ইউনিট ছুটে গেছে মনে হয়েছে।)					

	Strongly Agreed (দৃঢ়ভাবে একমত)	Agreed (একমত)	Neutral (নিরপেক্ষ)	Disagree (অসম্মতি)	Strongly Disagree (দৃঢ়ভাবে অসম্মতি)
In the beginning, time has been spent unnecessarily. (শুরুতে অযথা সময় ব্যয় করা হয়েছে।)					
The timeline of the course can be improved. (কোর্সের টাইমলাইন উন্নত করা যেতে পারে।)					

১২। Trainer. Complete the following table. (প্রশিক্ষক। নিম্নলিখিত টেবিলটি সম্পূর্ণ করুন।)

সঠিক স্থানে টিক (√) দিন	Strongly Agreed (দৃঢ়ভাবে একমত)	Agreed (একমত)	Neutral (নিরপেক্ষ)	Disagree (অসম্মতি)	Strongly Disagree (দৃঢ়ভাবে অসম্মতি)
Your trainer showed empathy and helped you in tackling problems. (আপনার প্রশিক্ষক সহানুভূতি দেখিয়েছেন এবং সমস্যা মোকাবেলায় আপনাকে সাহায্য করেছেন।)					
You felt that the trainer is an expert of the course. (আপনি অনুভব করেছেন যে প্রশিক্ষক কোর্সের একজন বিশেষজ্ঞ।)					
The communication skill of the trainer was satisfactory. (প্রশিক্ষকের যোগাযোগ দক্ষতা সন্তোষজনক ছিল।)					
The delivery skill of the trainer was satisfactory. (প্রশিক্ষকের ডেলিভারি দক্ষতা সন্তোষজনক ছিল।)					
Your trainer responded to your queries in a timely manner. (আপনার প্রশিক্ষক সময়মত আপনার প্রশ্নের উত্তর দিয়েছেন।)					
You felt comfortable expressing your problems to your trainer. (আপনি আপনার প্রশিক্ষকের কাছে আপনার সমস্যাগুলি প্রকাশ করতে স্বাচ্ছন্দ্য বোধ করেছেন।)					
You think your trainer was perfect for this course. (আপনি মনে করেন আপনার প্রশিক্ষক এই কোর্সের জন্য নিখুঁত ছিলেন।)					

১৩। **Technical Issues, Environment and Accessibility. Complete the following table. (প্রযুক্তিগত সমস্যা, পরিবেশ এবং অ্যাক্সেসযোগ্যতা। নিম্নলিখিত টেবিলটি সম্পূর্ণ করুন।)**

সঠিক স্থানে টিক (√) দিন	Strongly Agreed (দৃঢ়ভাবে একমত)	Agreed (একমত)	Neutral (নিরপেক্ষ)	Disagree (অসম্মতি)	Strongly Disagree (দৃঢ়ভাবে অসম্মতি)
You noticed delay in the delivery of the content sometimes. (আপনি মাঝে মাঝে বিষয়বস্তু বিতরণে বিলম্ব লক্ষ্য করেছেন।)					
Some of the course materials were not prepared with care. (কিছু কোর্সের উপকরণ যত্ন সহকারে প্রস্তুত করা হয়নি।)					
The support team did their job well. (সমর্থন দল তাদের কাজ ভালভাবে করেছেন।)					
The environment where training took place was satisfactory. (প্রশিক্ষণের পরিবেশ সন্তোষজনক ছিল।)					
There were no external distractions while taking the course. (কোর্স করার সময় কোন বাহ্যিক বিভ্রান্তি ছিল না।)					
The course was designed in a manner so that it can be conducted both in offline and online. (কোর্সটি এমনভাবে ডিজাইন করা হয়েছে যাতে এটি অফলাইন এবং অনলাইন উভয় ক্ষেত্রেই পরিচালিত হতে পারে।)					
The course materials are accessible from mobile devices. (কোর্সের উপকরণগুলি মোবাইল ডিভাইস থেকে অ্যাক্সেসযোগ্য।)					
Disable people can also take the course with ease. (পিছিয়ে পরা ব্যক্তিরাও স্বাচ্ছন্দ্যে কোর্সটি করতে পারেন।)					
Games were arranged to teach various topics of the course. (কোর্সের বিভিন্ন বিষয় শেখানোর জন্য গেমের ব্যবস্থা করা হয়েছিল।)					

১৪। Certificates, Training Outcome and Others. Complete the following table. (সার্টিফিকেট, প্রশিক্ষণের ফলাফল এবং অন্যান্য। নিম্নলিখিত টেবিলটি সম্পূর্ণ করুন।)

সঠিক স্থানে টিক (√) দিন	Strongly Agreed (দৃঢ়ভাবে একমত)	Agreed (একমত)	Neutral (নিরপেক্ষ)	Disagree (অসম্মতি)	Strongly Disagree (দৃঢ়ভাবে অসম্মতি)
Earning a certificate can make you feel more driven towards a course. (সার্টিফিকেট অর্জন আপনাকে একটি কোর্সে অংশ নিতে আপনাকে অনুপ্রেরণা দিতে পারে।)					
You love when a course offer certification along with training. (আপনি পছন্দ করেন যখন একটি কোর্স প্রশিক্ষণের সাথে সার্টিফিকেশন অফার করে।)					
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website. (প্রত্যয়িত হলে, আপনি আপনার সার্টিফিকেট সামাজিক মিডিয়া (যেমন, LinkedIn, Facebook ইত্যাদি) এবং আপনার ব্যক্তিগত ওয়েবসাইটে শেয়ার করবেন।)					
You believe that the certificate can help you get a job. (আপনি বিশ্বাস করেন সার্টিফিকেট আপনাকে চাকরি পেতে সাহায্য করতে পারে।)					
You will take similar course in the future if updates are added significantly. (উল্লেখযোগ্য আপডেট যোগ করা হলে আপনি ভবিষ্যতে অনুরূপ কোর্স গ্রহণ করবেন।)					
So far, you're satisfied with the course outcomes. (এখন পর্যন্ত, আপনি কোর্সের ফলাফল নিয়ে সন্তুষ্ট।)					
You would recommend this course to others. (আপনি অন্যদের এই কোর্স সুপারিশ করবেন)					
If asked, you will be able to summarize the goals and benefits of this course. (জিজ্ঞাসা করা হলে, আপনি এই কোর্সের লক্ষ্য এবং সুবিধাগুলি সংক্ষিপ্তভাবে ব্যাখ্যা করতে সক্ষম হবেন।)					
You think that the course materials can be improved for this course.					

(আপনি মনে করেন যে এই কোর্সের জন্য কোর্স উপকরণ উন্নত করা যেতে পারে।)					
You think the learning experience can be improved. (আপনি মনে করেন শেখার অভিজ্ঞতা উন্নত করা যেতে পারে।)					

১৫। Which parts of the course was stressful? (কোর্সের কোন কোন অংশগুলি চাপপূর্ণ ছিল?) [টিক (√) দিন]

	Content (বিষয়বস্তু)
	Lecture Delivery (বক্তৃতা বিতরণ)
	Number of Assessments (মূল্যায়নের সংখ্যা)
	Examination Style (পরীক্ষার শৈলী)
	The Course was not Stressful (কোর্সটি চাপযুক্ত ছিল না)
অন্যান্যঃ	

১৬। Mark if you think following problems existed for the course in which you have participated in: (আপনি যে কোর্সে অংশগ্রহণ করেছেন তার জন্য নিম্নলিখিত সমস্যা বিদ্যমান ছিল বলে মনে করলে চিহ্নিত করুন:) [টিক (√) দিন]

	Information overload or unnecessary information were taught. (তথ্য ওভারলোড বা অপ্রয়োজনীয় তথ্য শেখানো হয়েছিল।)
	There was a lack of course materials. More course materials are needed. (কোর্স উপকরণের অভাব ছিল। আরো কোর্স উপকরণ প্রয়োজন।)
	The duration of the training was too long. (প্রশিক্ষণের সময়কাল খুব দীর্ঘ ছিল।)
	The duration of the training was too short. (প্রশিক্ষণের সময়কাল খুব কম ছিল।)
	Poor/not enough assessment methods. (দুর্বল/পর্যাপ্ত মূল্যায়ন পদ্ধতি ছিল না।)
	The assessment methods or examination was stressful. (মূল্যায়ন পদ্ধতি বা পরীক্ষা চাপ ছিল।)
	The objective of the course was not clear to me. (কোর্সের উদ্দেশ্য আমার কাছে পরিষ্কার ছিল না।)
	I did not get what I expected from the course. (আমি কোর্স থেকে যা আশা করেছিলাম তা পাইনি।)

	The performance of the trainer was not satisfactory.
	(প্রশিক্ষকের কর্মক্ষমতা সন্তোষজনক ছিল না।)
	The lecture materials were not well designed.
	(বক্তৃতার উপকরণগুলি ভালভাবে ডিজাইন করা হয়েছিল না।)
	I didn't feel comfortable in the classroom while asking about a problem.
	(একটি সমস্যা সম্পর্কে জিজ্ঞাসা করার সময় আমি শ্রেণীকক্ষে স্বাচ্ছন্দ্য বোধ করিনি।)
	I didn't like the environment of the classroom.
	(আমি ক্লাসরুমের পরিবেশ পছন্দ করিনি।)
	Poor feedback and support system.
	(দুর্বল প্রতিক্রিয়া এবং সমর্থন সিস্টেম।)
	There was no problem in the course.
	(কোর্সে কোনো সমস্যা ছিল না।)
অন্যান্যঃ	

১৭। Rate the different aspects of course in a scale of 1-5 (১-৫ স্কেলে বিভিন্ন দিক রেট করুন)

সঠিক স্থানে টিক (√) দিন	1 (এক)	2 (দুই)	3 (তিন)	4 (চার)	5 (পাঁচ)
Pre-training Preparation (প্রাক-প্রশিক্ষণ প্রস্তুতি)					
Course Structure (কোর্সের কাঠামো)					
Course Contents (কোর্সের বিষয়বস্তু)					
Delivery Quality (ডেলিভারি গুণমান)					
Duration (সময়কাল)					
Trainer (প্রশিক্ষক)					
Support Team (সাপোর্ট টিম)					
Environment (পরিবেশ)					
Accessibility of Information (তথ্যের অ্যাক্সেসযোগ্যতা)					
Usage of Games (গেমের ব্যবহার)					
Expected Outcomes (প্রত্যাশিত ফলাফল)					
Learning Experience (শেখার অভিজ্ঞতা)					
Overall Rating (সামগ্রিক রেটিং)					

জাতীয় কম্পিউটার প্রশিক্ষণ ও গবেষণা একাডেমী (নেকটার)

নেকটারের সম্মানিত প্রশিক্ষকবৃন্দের জন্য আইসিটি সম্পর্কিত সমীক্ষা ২০২২

বিবরণঃ "নেকটার এবং অন্যান্য প্রতিষ্ঠান কর্তৃক পরিচালিত আইসিটি ট্রেনিংয়ের শ্রমবাজার ও চ্যালেঞ্জভিত্তিক তুলনামূলক বিশ্লেষণ" গবেষণা প্রকল্পের একটি ধাপ হিসেবে নিম্নোক্ত ফর্মটি প্রকাশ করা হয়েছে। এই গবেষণা প্রকল্পটির ফলাফল নেকটারকে আরো উন্নত করতে সহযোগিতা করবে। নেকটারের একজন সম্মানিত প্রশিক্ষক হিসেবে নিম্নোক্ত সমীক্ষায় অংশ নিয়ে ও সঠিক তথ্য দিয়ে নেকটারকে সহযোগিতা করুন।

১। Your Name (আপনার নাম):

_____

২। Your Email (আপনার ই-মেইল):

This will be kept confidential and will only be used to contact you if needed. (এটি গোপন রাখা হবে এবং প্রয়োজন হলে শুধুমাত্র আপনার সাথে যোগাযোগ করতে ব্যবহার করা হবে।)

_____

৩। Your Phone Number (আপনার ফোন নম্বর):

This will be kept confidential and will only be used to contact you if needed. This field is optional. (এটি গোপন রাখা হবে এবং প্রয়োজন হলে শুধুমাত্র আপনার সাথে যোগাযোগ করতে ব্যবহার করা হবে। এটি ঐচ্ছিক।)

_____

৪। Your Division (আপনার বিভাগ): [টিক (√) দিন]

	বরিশাল		ঢাকা		ময়মনসিংহ		রংপুর
	চট্টগ্রাম		খুলনা		রাজশাহী		সিলেট

৫। What is the name of your company or Institution? (আপনার কোম্পানি বা প্রতিষ্ঠানের নাম কি?):

If you're a student, write: Student (আপনি যদি একজন ছাত্র হন তবে লিখুন: Student)

_____

৬। Your Designation (আপনার উপাধি):

_____

৭। **Your Age (আপনার বয়স) [Example: 26]:**

_____

৮। **Your Highest Educational Qualification (আপনার সর্বোচ্চ শিক্ষাগত যোগ্যতা)**

	JSC or equivalent (জেএসসি বা সমমান)		M.Sc. or equivalent (এমএসসি বা সমমান)
	SSC or equivalent (এসএসসি বা সমমান)		Ph.D. or equivalent (পিএইচডি বা সমমান
	HSC or equivalent (এইচএসসি বা সমমান)		Post-Doc. or equivalent (পোস্ট ডক্টরেট বা সমমান)
	B.Sc. or equivalent (বিএসসি বা সমমান)		Others:

৯। **Your First Job Year (আপনার প্রথম চাকরির বছর)**

_____

১০। **Your Monthly Income in Taka (টাকায় আপনার মাসিক আয়)**

This field is optional and confidential. This will only be used for the purpose of predicting trends in ICT market. (এই ক্ষেত্রটি ঐচ্ছিক এবং গোপনীয়। এটি শুধুমাত্র আইসিটি বাজারের প্রবণতা পূর্বাভাসের উদ্দেশ্যে ব্যবহার করা হবে।)

_____

১১। **Your Gender (আপনার লিঙ্গ)**

	Male (পুরুষ)		Female (মহিলা)		Others (অন্যান্য)

১২। **How much do you know about the following technologies? (নিচের প্রযুক্তিগুলি সম্পর্কে আপনার জ্ঞান কিরূপ?)**

সঠিক স্থানে টিক (√) দিন	Excellent (চমৎকার)	Very Good (খুব ভালো)	Good (ভাল)	Weak (দুর্বল)	No previous knowledge and require training (কোন পূর্ববর্তী জ্ঞান নেই এবং প্রশিক্ষণ প্রয়োজন)
Mobile Phone (মোবাইল ফোন)					
Computer (কম্পিউটার)					
Internet (ইন্টারনেট)					
Fixed Telephone (টেলিফোন)					

১৩। **What is the source of your Internet Connection? (আপনার ইন্টারনেট সংযোগের উৎস কি?) [সঠিক স্থানে টিক (v) দিন]**

	BTCL Broadband (BTCL ব্রডব্যান্ড)
	Other Broadband (অন্যান্য ব্রডব্যান্ড)
	Grameenphone (গ্রামীণফোন)
	Banglalink (বাংলালিংক)
	Teletalk (টেলিটক)
	Airtel (এয়ারটেল)
	Robi (রবি)
Other:	

১৪। **How often do you use Mobile Phone in the common places? (সাধারণ জায়গায় আপনি কত ঘন ঘন মোবাইল ফোন ব্যবহার করেন?)**

সঠিক স্থানে টিক (v) দিন	Often (প্রায়ই)	Sometimes (কখনও কখনও)	Not at all (মোটেই না)
Home (হোম)			
Office (অফিস)			
Internet Café/Telecommunication Office (ইন্টারনেট ক্যাফে/টেলিকমিউনিকেশন অফিস)			
Other Places (অন্যান্য স্থান)			

১৫। **How often do you use Computer in the common places? (সাধারণ জায়গায় আপনি কত ঘন ঘন কম্পিউটার ব্যবহার করেন?)**

সঠিক স্থানে টিক (v) দিন	Often (প্রায়ই)	Sometimes (কখনও কখনও)	Not at all (মোটেই না)
Home (হোম)			
Office (অফিস)			
Internet Café/Telecommunication Office (ইন্টারনেট ক্যাফে/টেলিকমিউনিকেশন অফিস)			

Other Places (অন্যান্য স্থান)			

১৬। How often do you use Internet in the common places? (সাধারণ জায়গায় আপনি কত ঘন ঘন ইন্টারনেট ব্যবহার করেন?)

সঠিক স্থানে টিক (√) দিন	Often (প্রায়ই)	Sometimes (কখনও কখনও)	Not at all (মোটেই না)
Home (হোম)			
Office (অফিস)			
Internet Café/Telecommunication Office (ইন্টারনেট ক্যাফে/টেলিকমিউনিকেশন অফিস)			
Other Places (অন্যান্য স্থান)			

১৭। Please give an assessment of your personal trend for the use of ICT over the past 4 years.

(অনুগ্রহ করে গত 4 বছরে আইসিটি ব্যবহারের জন্য আপনার ব্যক্তিগত প্রবণতার একটি মূল্যায়ন দিন।)

সঠিক স্থানে টিক (√) দিন	Increase (বেড়েছে)	Decrease (কমেছে)	Constant (পরিবর্তন হয় নাই)
Mobile Phone Usage (মোবাইল ফোন ব্যবহার)			
Computer Usage (কম্পিউটার ব্যবহার)			
Internet Usage (ইন্টারনেট ব্যবহার)			
Fixed Telephone Usage (টেলিফোন ব্যবহার)			

১৮। How much money do you spend on Computer, Mobile Phone and Internet per month? (আপনি প্রতি মাসে কম্পিউটার, মোবাইল ফোন এবং ইন্টারনেটে কত টাকা খরচ করেন?)

১৯। How many hours do you spend on Computer, Mobile Phone and Internet per week? (আপনি প্রতি সপ্তাহে কম্পিউটার, মোবাইল ফোন এবং ইন্টারনেটে কত ঘন্টা সময় ব্যয় করেন?)

২০। **Please give your opinion if the cost of the following technologies should increase, decrease or be constant.** (অনুগ্রহ করে আপনার মতামত দিন, নিম্নলিখিত প্রযুক্তিগুলির খরচ বৃদ্ধি, হ্রাস বা ধ্রুবক হওয়া সম্পর্কে।)

সঠিক স্থানে টিক (√) দিন	Cost should increase (খরচ বাড়ানো উচিৎ)	Cost should decrease (খরচ কমানো উচিৎ)	Cost should be constant (খরচ যা আছে তাই ভাল)
Mobile Phone (মোবাইল ফোন)			
Computer (কম্পিউটার)			
Internet (ইন্টারনেট)			
Fixed Telephone (টেলিফোন)			

২১। **What are the main problems of ICT in the context of Bangladesh?** (বাংলাদেশের প্রেক্ষাপটে আইসিটির মূল সমস্যাগুলি কি কি?) [সঠিক স্থানে টিক (√) দিন]

	Lack of Govt. spending on ICT (আইসিটিতে সরকারি ব্যয়ের অভাব)
	Lack of adequate investment (পর্যাপ্ত বিনিয়োগের অভাব)
	Lack of infrastructure (অবকাঠামোর অভাব)
	Lack of Research & Development (গবেষণা ও উন্নয়নের অভাব)
	Inadequate capacity of services (পরিষেবার অপর্যাপ্ত ক্ষমতা)
	Slow speed of the services (সেবার মন্থর গতি)
	Interrupt/disconnection of services (পরিষেবার বিঘ্ন/সংযোগ বিচ্ছিন্ন)
	High costs of offering services (সেবা প্রদানের উচ্চ খরচ)
	Lack of networks (নেটওয়ার্কের অভাব)
	Uncertainty related to investment in ICT (আইসিটিতে বিনিয়োগ সংক্রান্ত অনিশ্চয়তা)
	Interrupt of electricity supply (বিদ্যুৎ সরবরাহ বিঘ্নিত)
	Low quality/efficiency of the services (পরিষেবার নিম্ন গুণমান/দক্ষতা)
	Lack of technical skills (প্রযুক্তিগত দক্ষতার অভাব)

	Lack of awareness of the importance of ICT in the new economy (নতুন অর্থনীতিতে আইসিটির গুরুত্ব সম্পর্কে সচেতনতার অভাব)
	High spread of electronic illiteracy (ইলেকট্রনিক নিরক্ষরতার উচ্চ বিস্তার)
	High spread of poverty (দারিদ্র্যের উচ্চ বিস্তার)
Others:	

২২। Assess how much Internet is important for following fields. (নিম্নলিখিত ক্ষেত্রেগুলির জন্য ইন্টারনেট কতটা গুরুত্বপূর্ণ তা মূল্যায়ন করুন।)

সঠিক স্থানে টিক (√) দিন	Unimportant (গুরুত্বহীন)	Slightly Important (সামান্য গুরুত্বপূর্ণ)	Moderately Important (মাঝারিভাবে গুরুত্বপূর্ণ)	Extremely Important (অত্যন্ত গুরুত্বপূর্ণ)
For Studying (অধ্যয়নের জন্য)				
For researching (গবেষণার জন্য)				
For network and communication (নেটওয়ার্ক এবং যোগাযোগের জন্য)				
For finding a job (চাকরি খোঁজার জন্য)				
For participation in seminars, conferences and workshops (সেমিনার, সম্মেলন এবং কর্মশালায় অংশগ্রহণের জন্য)				
For social and work contact (সামাজিক এবং কাজের যোগাযোগের জন্য)				
For encouraging and supporting the use of ICT (আইসিটি ব্যবহারে উৎসাহিত ও সমর্থনের জন্য)				

২৩। Which of the following problems are evident in internet usage? (ইন্টারনেট ব্যবহারের ক্ষেত্রে নিচের কোন সমস্যাগুলি প্রকট?) [সঠিক স্থানে টিক (√) দিন]

	Problem of access to scientific and technical information for creation and transfer of knowledge (জ্ঞান সৃষ্টি এবং স্থানান্তরের জন্য বৈজ্ঞানিক ও প্রযুক্তিগত তথ্য অ্যাক্সেসের সমস্যা)
	Lack of enthusiasm for electronic publications (ইলেকট্রনিক প্রকাশনার জন্য উৎসাহের অভাব)
	Risk of spread of electronic piracy (ইলেকট্রনিক পাইরেসি ছড়িয়ে পড়ার ঝুঁকি)

	Difficulty of overcoming the problem of high costs paid for using information (তথ্য ব্যবহারের জন্য প্রদত্ত উচ্চ খরচের সমস্যা কাটিয়ে উঠতে অসুবিধা)
	Lack of access to credit cards and lack of security in their use (ক্রেডিট কার্ড অ্যাক্সেসের অভাব এবং তাদের ব্যবহারে নিরাপত্তার অভাব)
	Lack of or inadequate regular budget adequate for universities libraries to pay for access to scientific, technical and arts information, authors rights and have licenses or subscription (বৈজ্ঞানিক, প্রযুক্তিগত এবং শিল্পকলা তথ্য, লেখকের অধিকার এবং লাইসেন্স বা সাবস্ক্রিপশনের অ্যাক্সেসের জন্য অর্থ প্রদানের জন্য বিশ্ববিদ্যালয়ের গ্রন্থাগারগুলির জন্য পর্যাপ্ত নিয়মিত বাজেটের অভাব বা অপর্যাপ্ততা)
	Gap (related to training and financial ability to communicate) between those who own and those who do not own the internet technology [যারা ইন্টারনেট প্রযুক্তির মালিক এবং যারা মালিক নয় তাদের মধ্যে ব্যবধান (প্রশিক্ষণ এবং যোগাযোগের আর্থিক ক্ষমতা সম্পর্কিত)]
	Lack of assessment policies and evaluation programs (মূল্যায়ন নীতি ও মূল্যায়ন কর্মসূচির অভাব)
	Limited and lack of modern available references (সীমিত এবং আধুনিক উপলব্ধ রেফারেন্সের অভাব)
	Poor or lack of services offered to users (ব্যবহারকারীদের দেওয়া পরিষেবার অভাব)
	High costs of acquiring licenses for access to electronic libraries for individuals and institutions (ব্যক্তি এবং প্রতিষ্ঠানের ক্ষেত্রে ইলেকট্রনিক লাইব্রেরি অ্যাক্সেসের জন্য লাইসেন্স অর্জনের উচ্চ খরচ)
	Creation of isolation for illiterate who do not know how to use the internet (নিরক্ষরদের জন্য বিচ্ছিন্নতা সৃষ্টি যারা ইন্টারনেট ব্যবহার করতে জানেন না)
	Difficulties of preventing programs of spy and spread of viruses (গুপ্তচর কর্মসূচি এবং ভাইরাসের বিস্তার প্রতিরোধে অসুবিধা)
	Increase worry of institutions of waste of working time of their workers on internet, personal e-mail and use for personal purposes (ইন্টারনেট, ব্যক্তিগত ই-মেইল এবং ব্যক্তিগত কাজে ব্যবহারের জন্য তাদের কর্মীদের কাজের সময় নষ্ট করার বিষয়ে প্রতিষ্ঠানের উদ্বেগ বৃদ্ধি)
	Increase demand for technical and engineering education related to ICT (আইসিটি সম্পর্কিত কারিগরি ও প্রকৌশল শিক্ষার চাহিদা বৃদ্ধি)
	Lack of the required technical skills (প্রয়োজনীয় প্রযুক্তিগত দক্ষতার অভাব)

	Difficulty of distinction between original and not original documents and risk for users to use wrong unreliable information (আসল এবং নকল নথির মধ্যে পার্থক্য করার অসুবিধা এবং ব্যবহারকারীদের ভুল, অবিশ্বস্ত তথ্য ব্যবহার করার ঝুঁকি)
Others:	

২৪। If you participate in a training course, which parts of the course you think should be assessed? (আপনি যদি একটি প্রশিক্ষণ কোর্সে অংশগ্রহণ করেন, তাহলে কোর্সের কোন অংশগুলি মূল্যায়ন করা উচিত বলে আপনি মনে করেন?) [সঠিক স্থানে টিক (√) দিন]

	Teaching Method Assessment (শিক্ষণ পদ্ধতি মূল্যায়ন)
	Instructor Assessment (প্রশিক্ষক মূল্যায়ন)
	Course Materials Assessment (কোর্স উপকরণ মূল্যায়ন)
	Student Engagement and Involvement Assessment (শিক্ষার্থীদের সম্পৃক্ততা মূল্যায়ন)
	Course Structure Assessment (কোর্স স্ট্রাকচার মূল্যায়ন)
	Course Outcomes Definition Assessment (কোর্স ফলাফল সংজ্ঞা মূল্যায়ন)
	Examination Process Assessment (পরীক্ষার প্রক্রিয়া মূল্যায়ন)
	Support Team Assessment (সমর্থন টিম মূল্যায়ন)
Others:	

5.4. Conclusion

In this chapter, we discussed on both the designed online and offline forms. In the next chapter, we have presented the experimental analysis and results.

Experimental Analysis and Results

Introduction

Descriptive Statistical Analysis

Hypothesis Testing

Predictive Analysis

Recommendations

Conclusion

6.1. Introduction

For this research, experiments have been conducted on the dataset for separate objectives. As mentioned before in this article, we have considered four objectives and to conduct experiments we have collected data via different forms. The forms can be divided into three broad categories. The first form serves the purpose of finding the outcomes for the objective 1. The second form will assist to find the outcomes of experiments for the objective 2. Lastly, the third form is designed to address the experiments for the objective 2 and objective 4.

In previous chapter, we described that for experiments, in this research, different techniques will be employed. Some of these techniques are: descriptive statistical analysis, hypothesis testing, predictive analysis, prescriptive analysis, exploratory data analysis and casual analysis. In this chapter, experiments have been conducted to address each of these techniques. Therefore, for each of these techniques a separate section has been created in this chapter.

For some of the techniques, there is a need of using different feature selection approaches as well as described in the previous chapters such as filter methods, wrapper methods, hybrid methods and embedded methods. Furthermore, some of the experiments involves different machine learning classifiers which has been addressed in previous chapters as well.

6.2. Descriptive Statistical Analysis

In this section, the experimental analysis and results of descriptive statistical analysis have been illustrated. After preparing the dataset, we applied different features of descriptive statistical analysis to figure out important information about the datasets. These experiments can be divided into two broad categories:

1. Bar charts illustrating the submitted answers
2. Mean, standard deviation, variance and correlation of different features

By utilizing the first method, the summary of the submitted answers can be illustrated. For example, just looking at the numbers, it's easier to say what's the intension of the majority. For example, if majority of the population thinks that the courses taken by NACTAR is helping them, it can be easily found out by using bar charts.

The second method, on the other hand, presents a characteristic view of the dataset and tells us how the dataset is behaving. For example, if the value of the variance is high, it denotes that the datapoints are spread out from the mean and from one another. Moreover, correlation

analysis can tell which features are correlated with which ones. This is important because, it can significantly reduce the work load of resolving issues. For example, if 2 events are correlated, solving one will solve the other. Therefore, among 100 features, if 50 are correlated with the other 50, the number of solutions needed is actually 50 which is 50% of the original problem domain.

In the next subsection, for each objective the summary of the submitted answers has been illustrated by using bar charts. In the later subsection, for each objective, the value of mean, standard deviation, variance and correlation has been presented.

6.2.1. Summary of Submitted Answers Using Bar Charts

In this section, the summary of the submitted answers has been illustrated by utilizing the bar charts. As mentioned earlier, it'll be illustrated for each of the objectives.

6.2.1.1. Summary of Submitted Answers Using Bar Charts for Objective 1

To address objective 1, we prepared 3 datasets. The datasets were:

a) Data collected from BJIT Employees (22 responses)
b) Data collected from Employers and Top Management of IT Industries (23 responses)
c) Data from Remote Job Holder or Freelancer (44 responses)

It can be noticed that a total of 89 responses were collected for objective 1. As the objective 1 was defined for employers, managements, remote job holders and freelancers, we expected a little number of responses. However, it was observed that we got a total of 89 responses from different companies that resonates the industry standards and needs. These are described in later subsections.

In Chapter 5, we described the form for objective 1. In the later section for each of the dataset we will illustrate the summaries of following topics:

a) Your division
b) What is the name of your company?
c) Your Position in the Mentioned Company
d) In which district the main branch of your company is situated?
e) Type of your participation in this survey

f) How many employees is there in your company?

g) How many branches of your company exist?

h) How many employees do you hire every year?

i) For how long your company is running?

j) What is the minimum educational level needed to get hired in your company?

k) What is the male female ratio in your company?

l) What is the age of most of your employees?

m) What is the type of your recruitment?

n) Which of the following are considered as entry-level jobs by your company?

o) Does your company have any training program for the employees?

p) Do you agree that companies should have their own training programs?

q) Agreeing or disagreeing with company standards.

r) Is your company using or planning to deploy any of these technologies internally or to conduct business with your customers?

s) Survey related to company policies.

t) What are the most used software in your company?

u) What are the most used programming languages in your company?

v) Survey of job requirements.

6.2.1.1.1. Data Collected from BJIT Employees

It was observed that among 22 responses, 13 responses were from Dhaka. However, there was no employee from Barisal. It is illustrated in Figure 6.1.
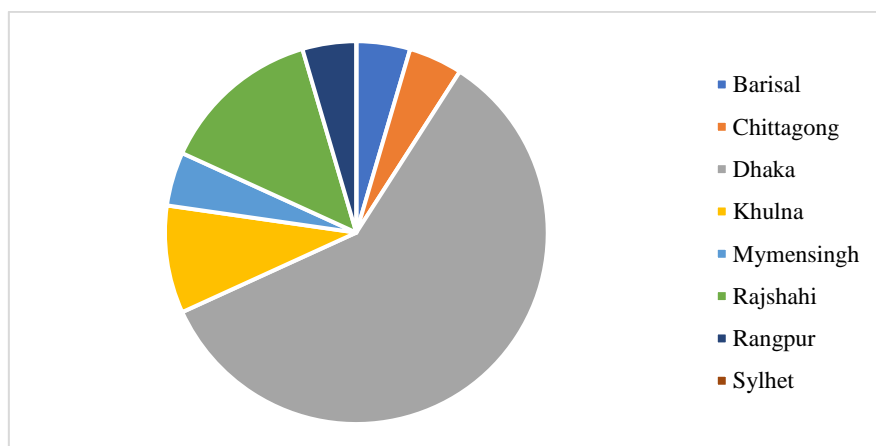
Figure 6.1: Division summary of the responses

As the form was designed for only the BJIT employees, all the responses were from BJIT company. However, there was a variety of positions the responders hold such as general manager, principal software engineer, product developer, senior product manager, senior software engineer, software engineer (Artificial Intelligence department). It was also observed that BJIT has 5-10 branches and all are situated at Dhaka.

All the responders who submitted their data were hired by BJIT and therefore, all were employed, not employers. We also found that BJIT has more than 150 employees in their company and 95.5% of the responses verified that (21 out of 22 responses). We found that BJIT hires about 10-300 employees per year. Moreover, the company is running for more than 10 years. It was mentioned by the responders that the minimum educational level needed to get hired in the company is Bachelor in science degree in relevant subjects.

We got interesting responses in male female ratio. Due to multiple branches, different responses were found here. Some mentioned a ratio of 70:30 whereas some mentioned a ratio of 30:70. However, if we consider the average, it can be found that the ratio is almost 50:50. It was observed that the age of the most of the employees of BJIT is in the range 21-40 and all the employees were offered a permanent or full-time job.

We asked the responders, which are considered as the entry-level jobs by them. Figure 6.2 illustrates the answers.

Figure 6.2: Summary of Entry Level Jobs

The responders mentioned that they have training program for the employees. However, not all of them think that the companies should have their own training programs. 50% responders strongly agreed that the companies should have their own training programs, 27.3% agreed, 4.5% were neutral and 18.2% strongly disagreed. This has been illustrated in Figure 6.3.

Figure 6.3: Summary of thinking among employees about training programs

We tried to ask the employers about some industry standards and they responded handsomely. It has been illustrated in Table 6.1.

TABLE 6.1: Survey of industry standards

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I think employees should have the chance to pursue higher education and the company should be the sponsor.	4	11	5	2	0
I think employees should have the chance to pursue higher education but company should not sponsor them.	2	2	9	6	3
I think companies should sign agreements with universities for conducting industry-based research.	8	12	2	0	0
I think companies should get involved in curriculum designing in the universities.	8	11	3	0	0
I think companies should arrange seminars, mega events and sponsor in	8	9	5	0	0

technological events or festivals arranged by educational institutes.					
I think companies should participate and recruit from job/career fairs.	6	12	3	0	0
I think companies should offer paid internships.	13	7	2	0	0
I think companies should offer internship but not paid.	0	0	2	11	9

We asked if their company is using or planning to deploy any of these technologies internally or to conduct business with their customers. The answers have been illustrated via Figure 6.4.

Figure 6.4: Deployment of technologies

We asked some questions about their current business model. The questions and the answers have been presented in Table 6.2.

TABLE 6.2: Survey of business.

Criteria	Yes	No	Not Applicable
Do you have any IT services running in the cloud?	10	6	5
Do you have dedicated IT staff to manage and maintain your IT infrastructure and Applications?	14	3	4
Given the choice for geographic expansion between opening physical branches outside Bangladesh or	12	3	5

deploying an eCommerce Portal, would you prefer the physical branch as your top choice?			
Do you have physical branches outside Bangladesh?	13	5	3
Are you now providing eCommerce purchase portal to your customers?	4	7	10

Finally, we asked if the responders think that the below-mentioned criteria in Table 6.2 are necessary requirements while recruiting. The responses have been presented in Table 6.3.

TABLE 6.3: Survey of requirements while recruiting

Criteria	I agree	I disagree	May be a plus point	I don't know
Work as a team member and participate in the development of on-going projects	20	0	1	1
Analyzing user requirements and contributing in development and customization of software applications	20	0	2	0
Writing and testing code, refining and rewriting it as necessary	19	1	2	0
Researching, designing and writing new software programs	17	1	4	0
Work on various frameworks like Visual Studio, .Net, SQL Server, SSRS Reports, Crystal reports etc.	12	2	8	0
Knowledge about Mobile App development	10	3	9	0
Knowledge about various file type. Example: XML, JSON	17	1	4	0
Knowledge about Software Development Life Cycle	19	1	2	0
Clear knowledge on Object Oriented Programming	20	1	1	0
Creating and maintaining technical design documents using industry standard languages, e.g., UML, Rich Diagram	12	2	8	0
Work in technology projects and contribute to its success	18	0	4	0
Ensuring compliance of design documents and development	17	0	5	0
Only males are allowed to apply	2	19	0	1
Candidates with experience in software development will have added advantage	13	2	6	0

Ability to work under dynamic environment and manage aggressive timelines	18	1	3	0
Excellent analytical and problem-solving skills	21	0	1	0
Ability to learn new skills and technologies quickly	19	0	3	0
Sound knowledge on web technologies. Example - HTML, CSS, JavaScript, AJAX, JQuery, Maven	18	1	2	1
Have knowledge on responsive web design	14	0	8	0
Hands-on experience of web service technologies, XML, SOAP, REST etc.	15	0	7	0
In-depth knowledge in query language, e.g., PL/SQL	12	0	9	0
Having experience of participating in programming contests	14	1	7	0

6.2.1.1.2. Data Collected from Employers and Top Management of IT Industry

It was observed that among 23 responses, 22 responses were from Rajshahi and Dhaka. And, one response was from Khulna. It is illustrated in Figure 6.5.
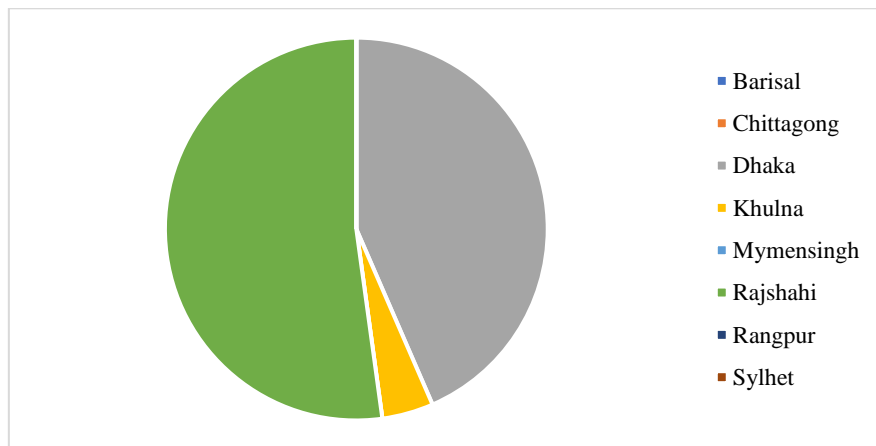
Figure 6.5: Division summary of the responses

As the form was designed for the employers and top management of IT industry, there were responses from different companies such as Naogaon Polytechnic Institute, Kolpolok Limited, Xplantr Ltd., Basic Starter, Sony Depthsensing Solutions, Union Capital Limited, Nerddevs Ltd. Rajshahi Krishi Unnayan Bank, BTCL, OSHNI software, Nuclear Power Plant Company Bangladesh Limited, Robi Axiata Limited, Aman Group, Texlab IT, Samsung R&D Institute

Bangladesh Ltd., Sonali Bank Ltd., Dohatec New Media, Mutual Trust Bank Ltd., Link3 Technologies Ltd. and UD Platforms Inc..

There was a variety of positions the responders hold such as Assistant Manager, CTO, CEO, Engineer, Instructor, manager, Managing Director, Officer, System Analyst, Chief Engineer, Support Engineer, System Administrator etc. It was also observed that for most companies the main branch is in Dhaka.

Among all the responders, 19 were employed and 4 were employers. We found that 12 responders work in companies with more than 150 employees where 7 works with companies with 1-25 employees and 4 works with 101-150 employees. Moreover, most of the companies are running for more than 10 years. It was mentioned by the most responders that the minimum educational level needed to get hired in the company is Bachelor in science degree in relevant subjects.

We got interesting responses in male female ratio. Due to different companies, different responses were found here. Some mentioned a ratio of 95:5 whereas some mentioned a ratio of 60:40. However, if we consider the average, it can be found that the ratio is almost 50:50. It was observed that the age of the most of the employees is in the range 21-40 and all the employees were offered a permanent or full-time job.

We asked the responders, which are considered as the entry-level jobs by them. Figure 6.6 illustrates the answers.
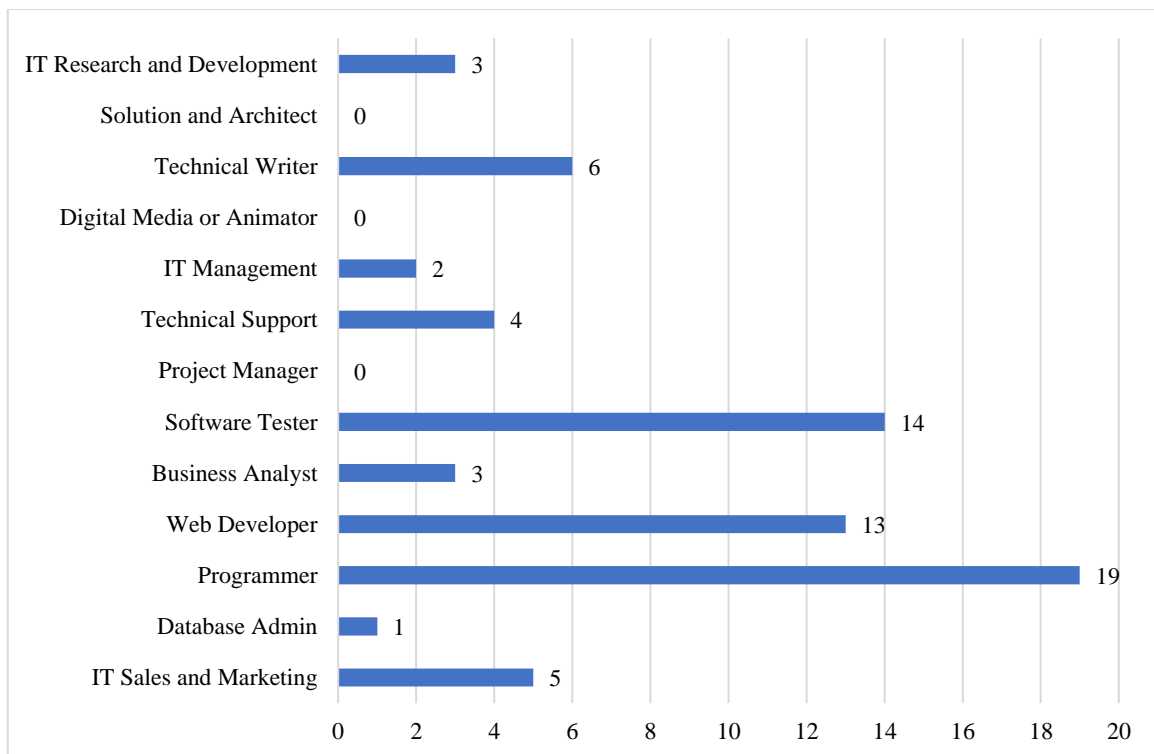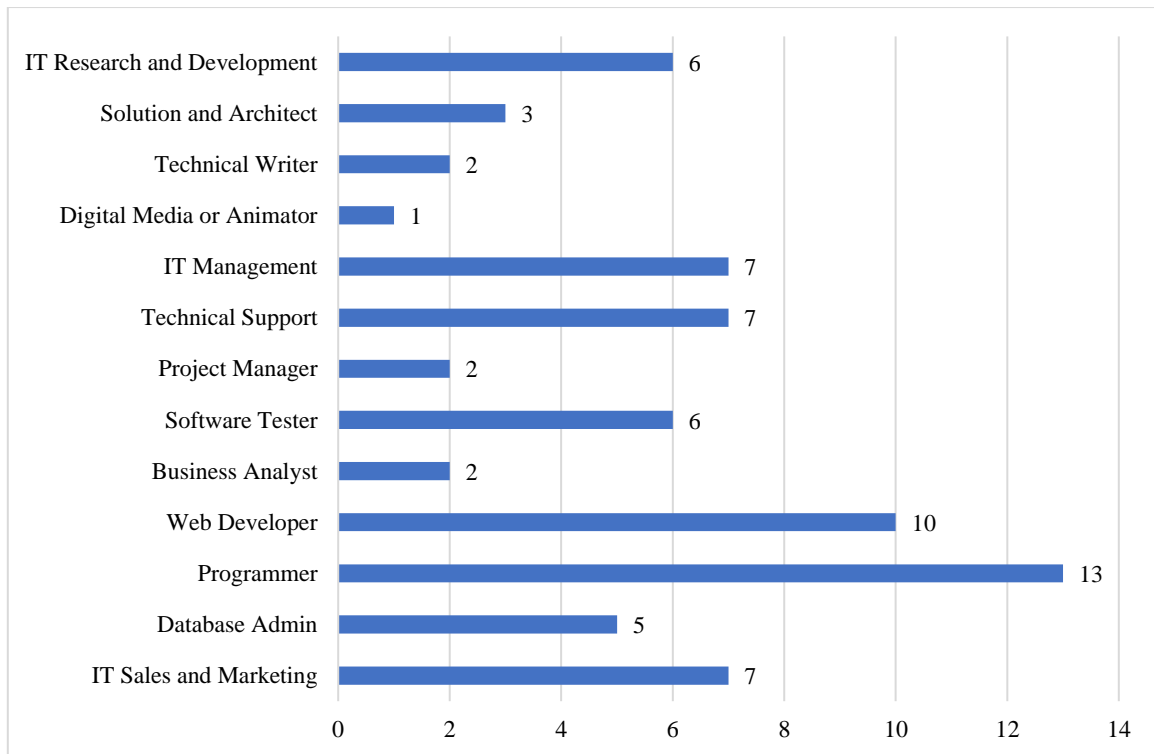
Figure 6.6: Summary of Entry Level Jobs

Most of the responders mentioned that they have training program for the employees. However, not all of them think that the companies should have their own training programs. 39.1% responders strongly agreed that the companies should have their own training programs, 26.1% agreed, 17.4% were neutral and 17.4% strongly disagreed. This has been illustrated in Figure 6.7.
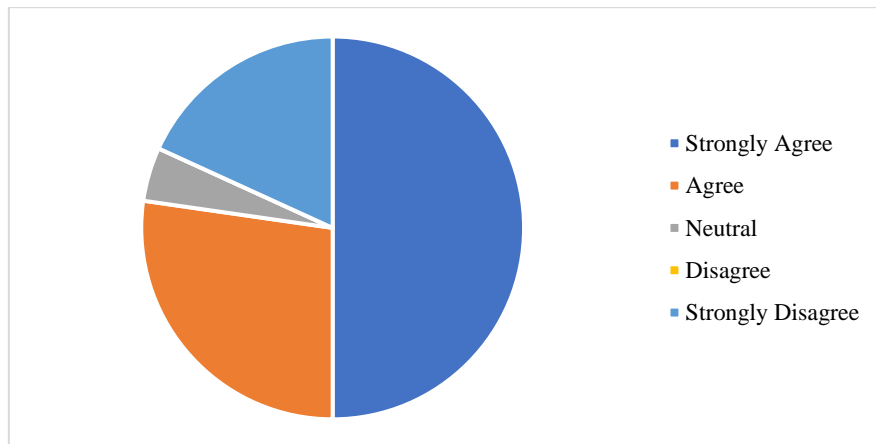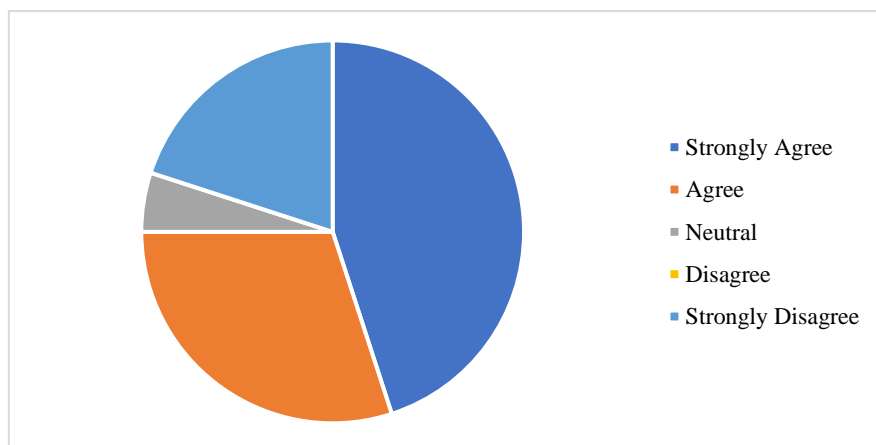

Figure 6.7: Summary of thinking among employees about training programs

We tried to ask the employers about some industry standards and they responded handsomely. It has been illustrated in Table 6.4.

TABLE 6.4: Survey of industry standards

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I think employees should have the chance to pursue higher education and the company should be the sponsor.	2	1	6	5	9
I think employees should have the chance to pursue higher education but company should not sponsor them.	5	8	4	4	2
I think companies should sign agreements with universities for conducting industry-based research.	2	0	3	8	10
I think companies should get involved in curriculum designing in the universities.	1	1	2	8	11
I think companies should arrange seminars, mega events and sponsor in technological events or festivals arranged by educational institutes.	2	0	1	11	9
I think companies should participate and recruit from job/career fairs.	1	0	2	13	7
I think companies should offer paid internships.	1	0	4	8	10
I think companies should offer internship but not paid.	9	8	2	3	1

We asked if their company is using or planning to deploy any of these technologies internally or to conduct business with their customers. The answers have been illustrated via Figure 6.8.
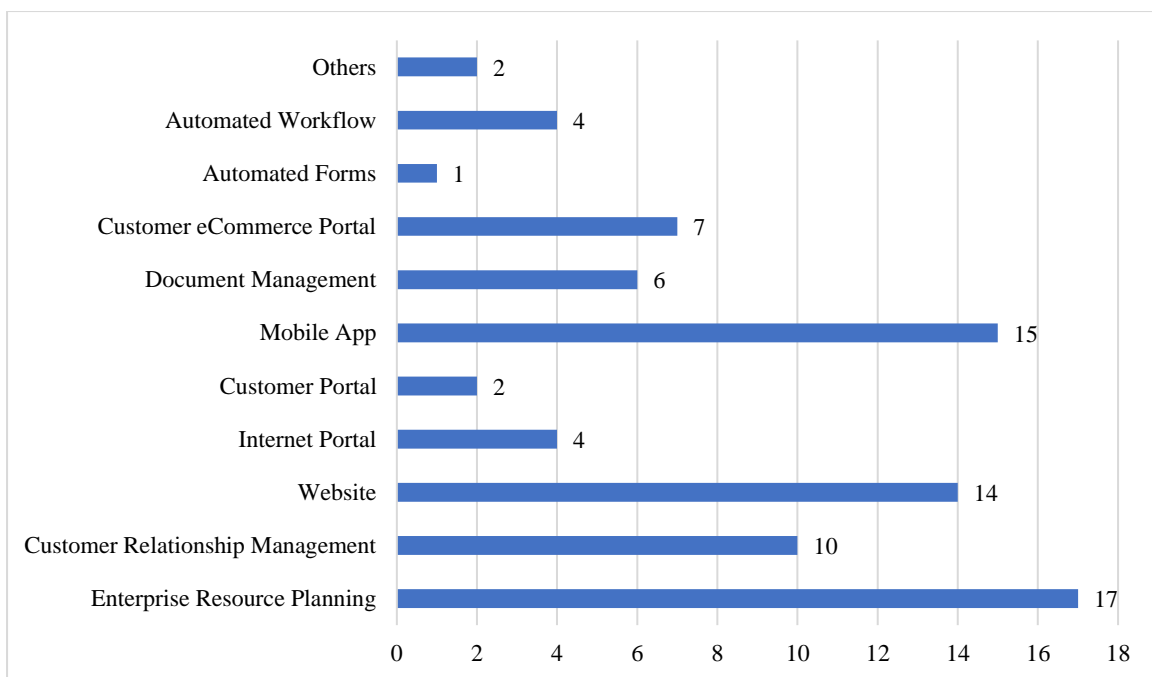
Figure 6.8: Deployment of technologies

We asked some questions about their current business model. The questions and the answers have been presented in Table 6.5.

TABLE 6.5: Survey of business.

Criteria	Yes	No	Not Applicable
Do you have any IT services running in the cloud?	14	8	1
Do you have dedicated IT staff to manage and maintain your IT infrastructure and Applications?	19	1	3
Given the choice for geographic expansion between opening physical branches outside Bangladesh or deploying an eCommerce Portal, would you prefer the physical branch as your top choice?	10	4	9
Do you have physical branches outside Bangladesh?	8	12	3
Are you now providing eCommerce purchase portal to your customers?	7	7	9

Finally, we asked if the responders think that the below-mentioned criteria in Table 6.6 are necessary requirements while recruiting. The responses have been presented in Table 6.6.

TABLE 6.6: Survey of requirements while recruiting

Criteria	I agree	I disagree	May be a plus point	I don't know

Work as a team member and participate in the development of on-going projects	20	0	3	0
Analyzing user requirements and contributing in development and customization of software applications	18	0	3	2
Writing and testing code, refining and rewriting it as necessary	18	1	4	0
Researching, designing and writing new software programs	13	0	9	1
Work on various frameworks like Visual Studio, .Net, SQL Server, SSRS Reports, Crystal reports etc.	12	0	10	1
Knowledge about Mobile App development	13	0	7	3
Knowledge about various file type. Example: XML, JSON	16	2	4	0
Knowledge about Software Development Life Cycle	19	0	4	0
Clear knowledge on Object Oriented Programming	21	0	2	0
Creating and maintaining technical design documents using industry standard languages, e.g., UML, Rich Diagram	13	1	8	1
Work in technology projects and contribute to its success	17	0	5	0
Ensuring compliance of design documents and development	13	1	9	0
Only males are allowed to apply	2	18	1	2
Candidates with experience in software development will have added advantage	15	1	7	0
Ability to work under dynamic environment and manage aggressive timelines	17	1	5	0
Excellent analytical and problem-solving skills	16	1	5	0
Ability to learn new skills and technologies quickly	18	1	2	1
Sound knowledge on web technologies. Example - HTML, CSS, JavaScript, AJAX, JQuery, Maven	16	0	5	2
Have knowledge on responsive web design	13	1	6	3
Hands-on experience of web service technologies, XML, SOAP, REST etc.	13	1	6	2
In-depth knowledge in query language, e.g., PL/SQL	15	1	5	2

Having experience of participating in programming contests	6	5	10	2

6.2.1.1.3. Data Collected from Remote Job Holder/Freelancer

It was observed that among 44 responses, 35 responses were from Dhaka and Rajshahi. It is illustrated in Figure 6.9.
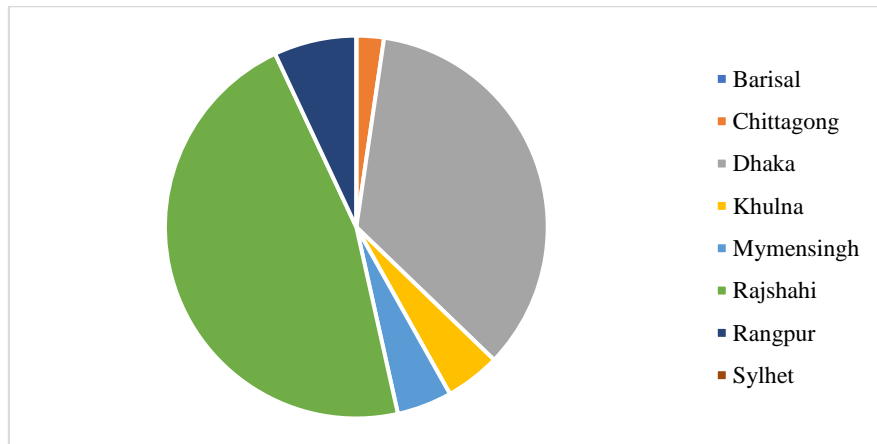
Figure 6.9: Division summary of the responses

As the form was designed for remote job holders and freelancers, some of the responders have no companies whereas some are from diverse companies such as Link3 Tech Ltd., Brain Station, Captain Earth Ltd, Code Studio, Inovi Solutions, Jackal IT, Kite Games Studio, Leads, LLIILab, Lexoro GmbH, M.S Habu Traders, MyMedicalHUB, Nirvik Technology, Qubitech Solutions, Samurai Geeks, Triangle Service Limited, Wycorp and so on.

Among all responders, 84.1% were employed and 15.9 were employers. We found that 40% of the companies are running for 1-3 years whereas 40% companies are running for more than 10 years. It was mentioned by most of the responders that the minimum educational level needed to get hired in the company is Bachelor in science degree in relevant subjects.

We got interesting responses in male female ratio. Due to multiple branches, different responses were found here. Some mentioned a ratio of 70:30 whereas some mentioned a ratio of 30:70. However, if we consider the average, it can be found that the ratio is almost 50:50. It was observed that the age of the most of the employees of BJIT is in the range 21-40 and all the employees were offered a permanent or full-time job.

We asked the responders, which are considered as the entry-level jobs by them. Figure 6.10 illustrates the answers.
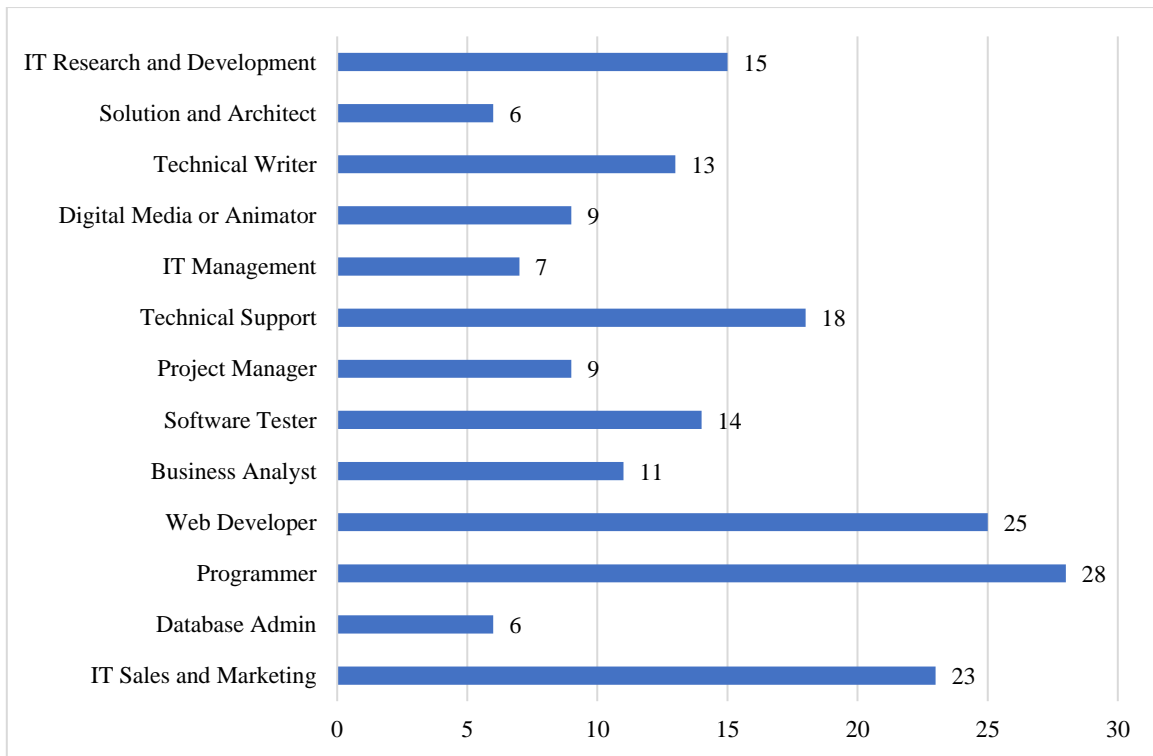
Figure 6.10: Summary of Entry Level Jobs

The responders mentioned that they have training program for the employees. However, not all of them think that the companies should have their own training programs. 54.8% responders strongly agreed that the companies should have their own training programs, 31% agreed, 4.8% were neutral and 9.5% strongly disagreed. This has been illustrated in Figure 6.3.
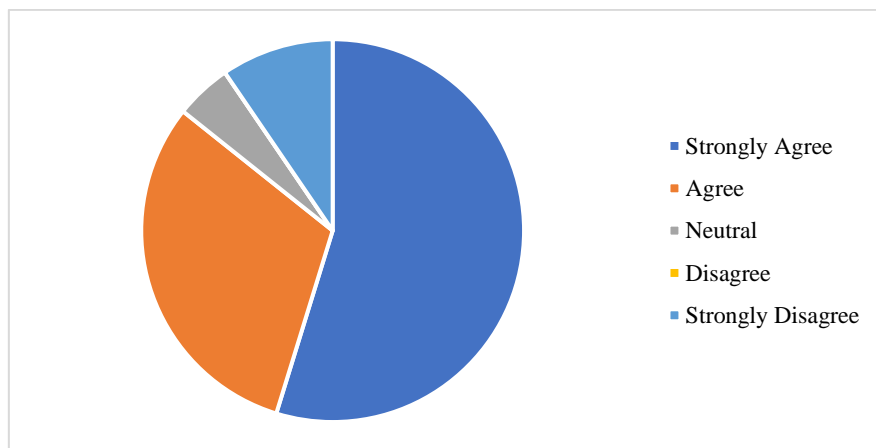
Figure 6.3: Summary of thinking among employees about training programs

We tried to ask the employers about some industry standards and they responded handsomely. It has been illustrated in Table 6.7.

TABLE 6.7: Survey of industry standards

| Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I think employees should have the chance to pursue higher education and the company should be the sponsor.	7	3	5	13	13
I think employees should have the chance to pursue higher education but company should not sponsor them.	7	14	9	9	2
I think companies should sign agreements with universities for conducting industry-based research.	5	0	5	11	20
I think companies should get involved in curriculum designing in the universities.	5	2	2	14	18
I think companies should arrange seminars, mega events and sponsor in technological events or festivals arranged by educational institutes.	5	0	1	15	20
I think companies should participate and recruit from job/career fairs.	6	0	1	16	18
I think companies should offer paid internships.	4	1	6	10	20
I think companies should offer internship but not paid.	19	11	3	6	2

We asked if their company is using or planning to deploy any of these technologies internally or to conduct business with their customers. The answers have been illustrated via Figure 6.11.
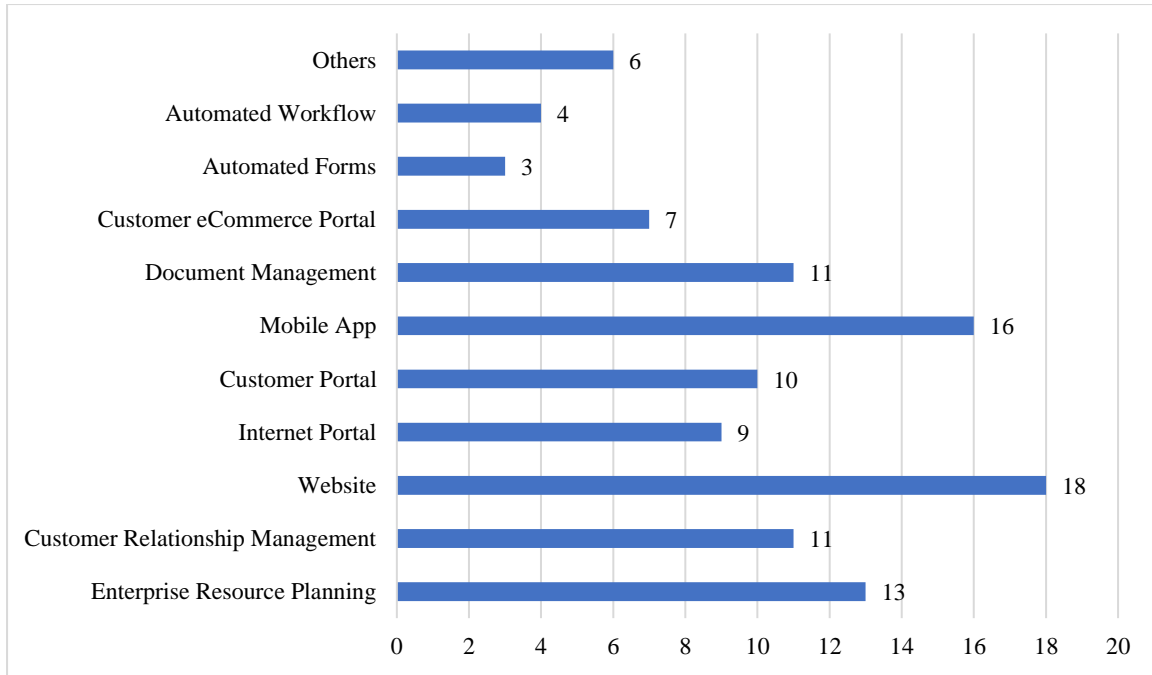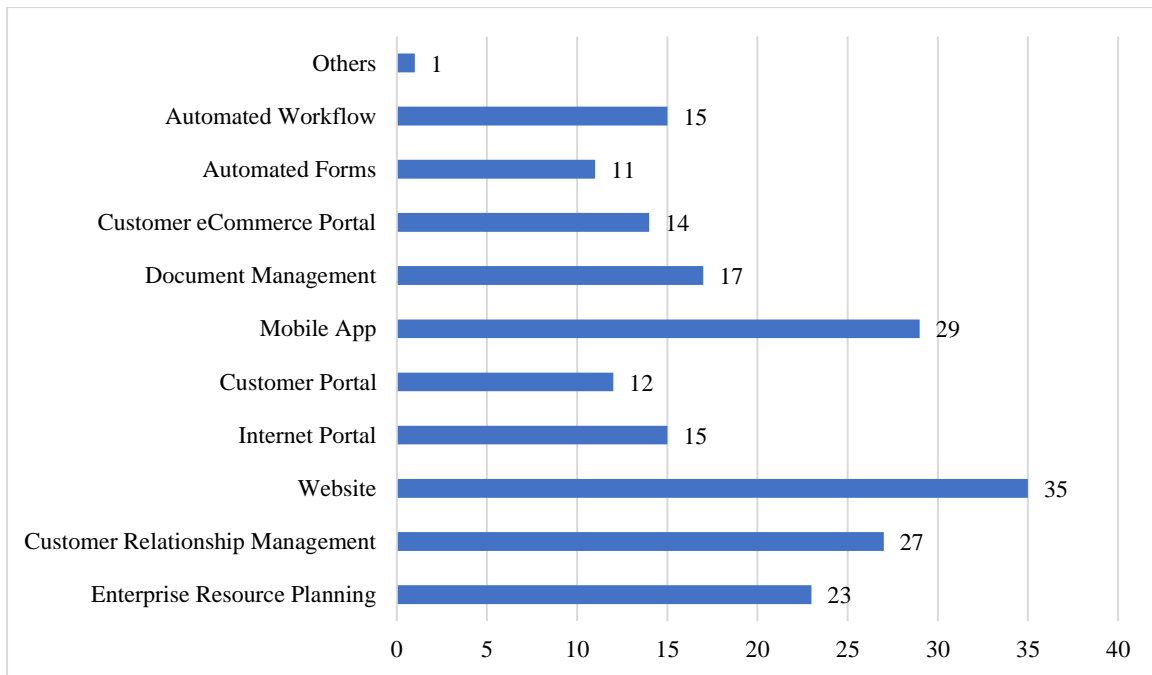
Figure 6.11: Deployment of technologies

We asked some questions about their current business model. The questions and the answers have been presented in Table 6.8.

TABLE 6.8: Survey of business.

Criteria	Yes	No	Not Applicable
Do you have any IT services running in the cloud?	26	12	2
Do you have dedicated IT staff to manage and maintain your IT infrastructure and Applications?	26	11	4
Given the choice for geographic expansion between opening physical branches outside Bangladesh or deploying an eCommerce Portal, would you prefer the physical branch as your top choice?	24	5	9
Do you have physical branches outside Bangladesh?	8	22	8
Are you now providing eCommerce purchase portal to your customers?	10	19	10

Finally, we asked if the responders think that the below-mentioned criteria in Table 6.9 are necessary requirements while recruiting. The responses have been presented in Table 6.9.

TABLE 6.9: Survey of requirements while recruiting

Criteria	I agree	I disagree	May be a plus point	I don't know

Work as a team member and participate in the development of on-going projects	38	0	1	0
Analyzing user requirements and contributing in development and customization of software applications	36	0	3	0
Writing and testing code, refining and rewriting it as necessary	34	0	4	0
Researching, designing and writing new software programs	30	0	9	0
Work on various frameworks like Visual Studio, .Net, SQL Server, SSRS Reports, Crystal reports etc.	23	2	11	2
Knowledge about Mobile App development	22	3	13	1
Knowledge about various file type. Example: XML, JSON	25	2	11	0
Knowledge about Software Development Life Cycle	33	1	5	0
Clear knowledge on Object Oriented Programming	33	1	4	0
Creating and maintaining technical design documents using industry standard languages, e.g., UML, Rich Diagram	20	3	12	3
Work in technology projects and contribute to its success	27	2	10	1
Ensuring compliance of design documents and development	21	2	11	4
Only males are allowed to apply	8	27	0	3
Candidates with experience in software development will have added advantage	27	6	5	1
Ability to work under dynamic environment and manage aggressive timelines	24	5	8	1
Excellent analytical and problem-solving skills	32	1	4	1
Ability to learn new skills and technologies quickly	35	1	3	1
Sound knowledge on web technologies. Example - HTML, CSS, JavaScript, AJAX, JQuery, Maven	28	1	8	1
Have knowledge on responsive web design	26	2	10	0
Hands-on experience of web service technologies, XML, SOAP, REST etc.	22	3	11	2
In-depth knowledge in query language, e.g., PL/SQL	23	3	11	1

Having experience of participating in programming contests	20	6	12	1

6.2.1.2. Summary of Submitted Answers Using Bar Charts for Objective 2

The datasets considered here were prepared from the responses of the following organizations:

1. Rajshahi Polytechnic CMT Shift-1 (4 samples)
2. Rajshahi Polytechnic CMT Shift-2 (3 samples)
3. Trainees of BCC (10 samples)
4. Trainees of BMET (26 samples)
5. Trainees of ITEE (18 samples)
6. Bangladesh Army University of Engineering & Technology (BAUET) (4 samples)
7. Offline Advanced Certificate Course on Computer Training, Batch-54 (77 samples)
8. Android App Development, Batch-4 (11 samples)
9. IT Training Course for Technical School and College Teachers, Batch: 3, 4 (3 samples)
10. IT Training Course for Technical School and College Teachers, Batch: 5 (3 samples)
11. IT Training Course for Technical School and College Teachers, Batch: 6, 7, 8 (7 samples)
12. IT Training Course for Technical School and College Teachers, Batch: 9, 10, 11 (2 samples)
13. IT Training Course for Technical School and College Teachers, Batch: 12, 13, 14 (6 samples)
14. IT Training Course for Technical School and College Teachers, Batch: 15, 16 (6 samples)
15. IT Training Course for Technical School and College Teachers, Batch: 17, 18 (4 samples)
16. IT Training Course for Technical School and College Teachers, Batch: 19, 20 (34 samples)
17. ICT Training for Teachers, Batch: 31 (21 samples)
18. ICT Training for Teachers, Batch: 32 (10 samples)
19. ICT Training for Teachers, Batch: 33 (31 samples)
20. ICT Training for Teachers, Batch: 34 (34 samples)
21. ICT Training for Teachers, Batch: 35 (73 samples)
22. Programming Essential in Python, Batch: 1, 2 (32 samples)

23. Programming Essential in C (9 samples)

24. Jubo Unnayan Web Development Course (20 samples)

25. C-Programming Language Course, Batch: 53 (10 samples)

26. C-Programming Language Course, Batch: 60 (15 samples)

27. CCNA Course, Batch: 1, 2 (35 samples)

28. Others, Collected via a General Form (603 samples)

That means, for objective-2, a total of 1113 samples were collected.

For each of the dataset, the following were recorded:

a) Name

b) Email

c) Phone Number

d) Division

e) Institution/Company/Industry/Enterprise

f) Position

g) In which course enrolled

h) Offline or online course?

i) Pretraining Preparation Judgement (Table)

j) Course Structure Judgement (Table)

k) Content Judgement (Table)

l) Delivery Judgement (Table)

m) Duration Judgement (Table)

n) Trainer Judgement (Table)

o) Technical Issues, Environment and Accessibility Judgement (Table)

p) Which parts were stressful?

q) Mark if the following problems existed.

r) Course rating (Table)

For each of the dataset, the bar charts summary is given below.

6.2.1.2.1. Data Collected from Rajshahi Polytechnic CMT Shift-1

A total of 4 people submitted the form among which all of them were from Rajshahi. Figure 6.12 shows the distribution of division.

Figure 6.12: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.10.

Table 6.10: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	0	1	2	0	0
The course's title and description were easy to comprehend.	1	1	1	0	0
You felt confident enough before taking the course.	1	2	0	0	0
The course's sequence and flow were satisfactory.	0	1	1	1	0
You felt equally engaged in each course section.	0	0	1	2	0
There was a clear separation between the course's units.	0	3	0	0	0
You preferred more frequent assessments.	2	1	0	0	0
There were enough audio-visual contents throughout the course.	0	1	0	1	1
The quality of the content was consistent throughout the course.	0	0	2	0	1
There were enough variety in terms of course unit types.	0	0	1	1	1
The language was easy to understand.	1	2	0	0	0

The overall contents were highly engaging.	0	2	0	1	0
The reading materials was presented in an interesting way.	0	1	0	0	2
The course's content was too challenging for an average learner to understand.	0	1	2	0	0
The content was in-depth enough.	1	0	2	0	0
You liked the types of assessments used.	0	0	2	0	1
You notice any unnecessary repetitions in the content.	0	0	2	1	0
You, at some point, have to reread the content to understand it.	1	2	0	0	0
The course was easy to follow.	0	1	2	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	2	1	0	0	0
The course felt too rushed.	2	0	1	0	0
The course felt too monotone.	2	0	1	0	0
The course felt too automated.	1	0	1	0	1
The course was not interactive enough.	2	1	0	0	0
The overall course delivery was satisfactory.	0	1	0	2	0
You had enough times to complete the assigned tasks, assignments and assessments.	0	1	0	0	2
The duration of the course was satisfactory.	0	1	0	1	1
All the units of the course had enough time allocated.	0	1	1	0	1
Some of the units felt rushed.	0	1	1	1	0
In the beginning, time has been spent unnecessarily.	1	1	0	1	0
The timeline of the course can be improved.	2	0	1	0	0
Your trainer showed empathy and helped you in tackling problems.	0	1	2	0	0
You felt that the trainer is an expert of the course.	1	0	0	2	0
The communication skill of the trainer was satisfactory.	0	1	1	1	0

The delivery skill of the trainer was satisfactory.	1	0	1	1	0
Your trainer responded to your queries in a timely manner.	0	2	1	0	0
You felt comfortable expressing your problems to your trainer.	0	1	1	0	1
You think your trainer was perfect for this course.	0	1	1	1	0
Earning a certificate can make you feel more driven towards a course.	2	0	1	0	0
You love when a course offer certification along with training.	2	1	0	0	0
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	0	1	1	0	1
You believe that the certificate can help you get a job.	1	1	1	0	1
You will take similar course in the future if updates are added significantly.	0	2	2	0	0
So far, you're satisfied with the course outcomes.	0	2	1	1	0
You would recommend this course to others.	1	1	2	0	0
If asked, you will be able to summarize the goals and benefits of this course.	0	0	2	1	1
You think that the course materials can be improved for this course.	0	1	0	1	2
You think the learning experience can be improved.	2	2	0	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.13.
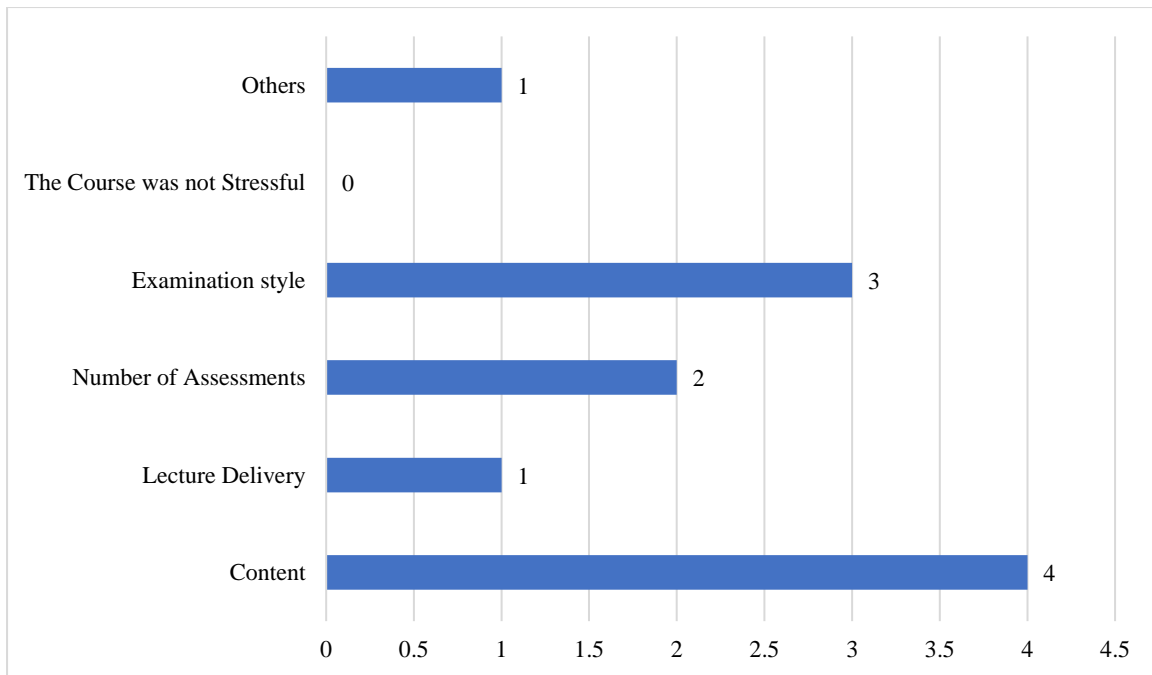
Figure 6.13: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.11.

Table 6.11: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	2
There was a lack of course materials. More course materials are needed.	3
The duration of the training was too long.	0
The duration of the training was too short.	2
Poor/not enough assessment methods.	2
The assessment methods or examination was stressful.	1
The objective of the course was not clear to me.	0
I did not get what I expected from the course.	3
The performance of the trainer was not satisfactory.	2
The lecture materials were not well designed.	3
I didn't feel comfortable in the classroom while asking about a problem.	2
I didn't like the environment of the classroom.	0
Poor feedback and support system.	1
There was no problem in the course.	0

Finally, Table 6.12 shows the rating of the course submitted by the participants.

Table 6.12: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	1	1	0	0	0
Course Structure	0	2	0	0	0
Course Contents	0	2	0	0	0
Delivery Quality	1	1	0	0	0
Duration	0	2	0	0	0
Trainer	0	2	0	0	0
Support Team	2	0	0	0	0
Environment	1	0	0	0	0
Accessibility of Information	1	1	0	0	0
Usage of Games	1	1	0	0	0
Expected Outcomes	1	0	0	0	0
Learning Experience	1	0	0	0	0
Overall Rating	0	1	0	0	0

6.2.1.2.2. Data Collected from Rajshahi Polytechnic CMT Shift-2

A total of 3 people submitted the form among which all of them were from Rajshahi. Figure 6.14 shows the distribution of division.

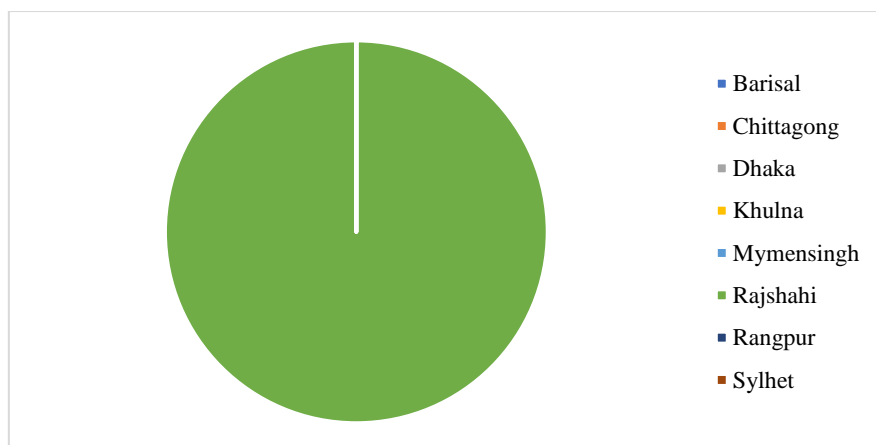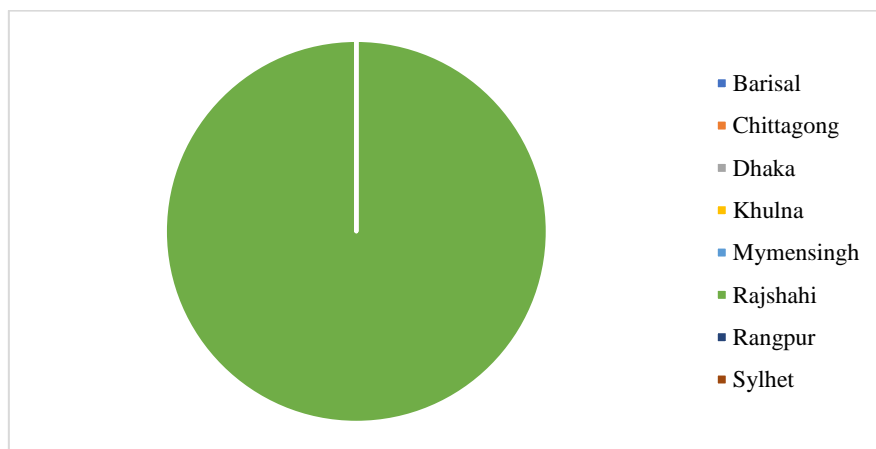Figure 6.14: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.13.

Table 6.13: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	2	1	0	0	0

The course's title and description were easy to comprehend.	1	2	0	0	0
You felt confident enough before taking the course.	1	1	1	0	0
The course's sequence and flow were satisfactory.	1	2	0	0	0
You felt equally engaged in each course section.	0	2	1	0	0
There was a clear separation between the course's units.	0	2	1	0	0
You preferred more frequent assessments.	0	3	0	0	0
There were enough audio-visual contents throughout the course.	0	2	1	0	0
The quality of the content was consistent throughout the course.	0	3	0	0	0
There were enough variety in terms of course unit types.	0	3	0	0	0
The language was easy to understand.	1	2	0	0	0
The overall contents were highly engaging.	2	1	0	0	0
The reading materials was presented in an interesting way.	2	1	0	0	0
The course's content was too challenging for an average learner to understand.	1	0	1	1	0
The content was in-depth enough.	1	1	0	1	0
You liked the types of assessments used.	2	1	0	0	0
You notice any unnecessary repetitions in the content.	1	1	0	1	0
You, at some point, have to reread the content to understand it.	0	2	0	1	0
The course was easy to follow.	0	2	1	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	0	1	1	1	0
The course felt too rushed.	0	0	0	3	0
The course felt too monotone.	0	0	0	3	0
The course felt too automated.	0	2	0	1	0
The course was not interactive enough.	0	1	0	2	0

The overall course delivery was satisfactory.	0	2	0	1	0
You had enough times to complete the assigned tasks, assignments and assessments.	1	2	0	0	0
The duration of the course was satisfactory.	1	2	0	0	0
All the units of the course had enough time allocated.	1	2	0	0	0
Some of the units felt rushed.	1	1	0	1	0
In the beginning, time has been spent unnecessarily.	1	0	0	2	0
The timeline of the course can be improved.	1	2	0	0	0
Your trainer showed empathy and helped you in tackling problems.	3	0	0	0	0
You felt that the trainer is an expert of the course.	2	1	0	0	0
The communication skill of the trainer was satisfactory.	1	2	0	0	0
The delivery skill of the trainer was satisfactory.	0	3	0	0	0
Your trainer responded to your queries in a timely manner.	0	3	0	0	0
You felt comfortable expressing your problems to your trainer.	0	3	0	0	0
You think your trainer was perfect for this course.	1	2	0	0	0
Earning a certificate can make you feel more driven towards a course.	0	1	1	1	0
You love when a course offer certification along with training.	0	1	0	2	0
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	0	3	0	0	0
You believe that the certificate can help you get a job.	1	2	0	0	0
You will take similar course in the future if updates are added significantly.	1	1	0	1	0
So far, you're satisfied with the course outcomes.	1	2	0	0	0

You would recommend this course to others.	1	1	1	0	0
If asked, you will be able to summarize the goals and benefits of this course.	1	1	1	0	0
You think that the course materials can be improved for this course.	1	1	1	0	0
You think the learning experience can be improved.	1	1	1	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.15.
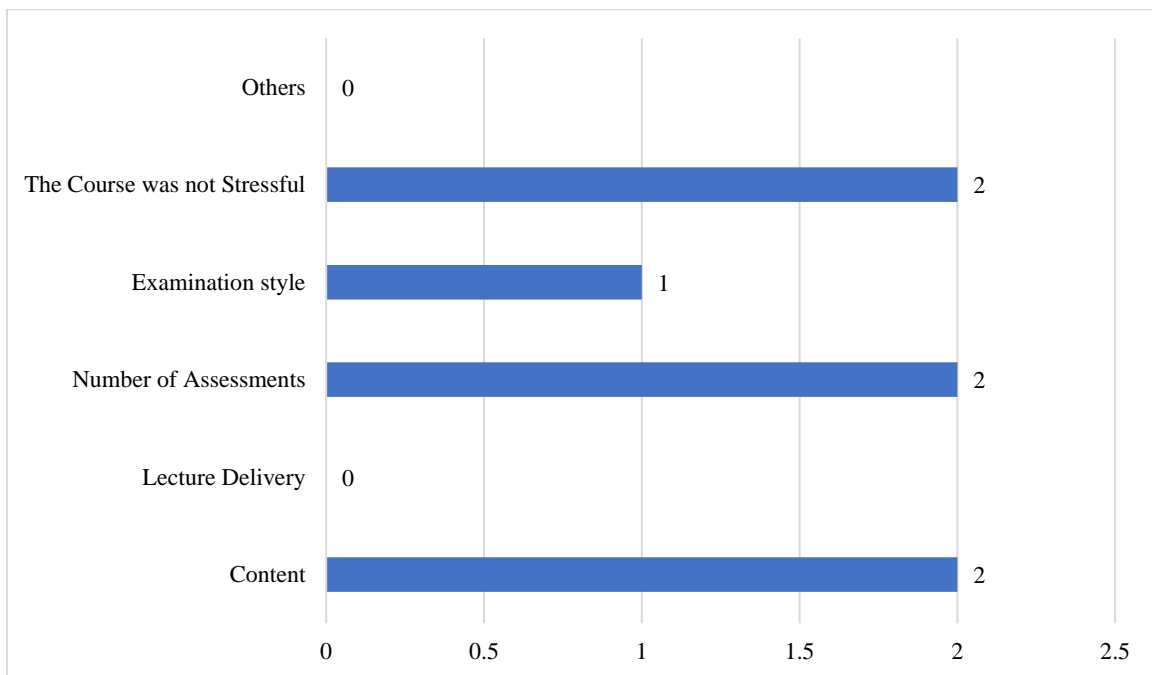
Figure 6.15: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.14.

Table 6.14: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	0
There was a lack of course materials. More course materials are needed.	1
The duration of the training was too long.	1
The duration of the training was too short.	1
Poor/not enough assessment methods.	2
The assessment methods or examination was stressful.	0

The objective of the course was not clear to me.	0
I did not get what I expected from the course.	1
The performance of the trainer was not satisfactory.	1
The lecture materials were not well designed.	0
I didn't feel comfortable in the classroom while asking about a problem.	1
I didn't like the environment of the classroom.	0
Poor feedback and support system.	1
There was no problem in the course.	3

Finally, Table 6.15 shows the rating of the course submitted by the participants.

Table 6.15: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	1	0	1	1	0
Course Structure	1	1	0	1	0
Course Contents	1	0	0	2	0
Delivery Quality	0	2	0	1	0
Duration	0	2	0	1	0
Trainer	1	0	1	0	1
Support Team	2	0	1	0	0
Environment	0	2	0	0	1
Accessibility of Information	0	2	0	0	1
Usage of Games	0	1	2	0	0
Expected Outcomes	0	2	0	1	0
Learning Experience	1	0	1	1	0
Overall Rating	1	0	1	0	1

6.2.1.2.3. Data Collected from Trainees of BCC

A total of 10 people submitted the form among which all of them were from Rajshahi. Figure 6.16 shows the distribution of division.

Figure 6.16: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.16.

Table 6.16: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	5	4	1	0	0
The course's title and description were easy to comprehend.	6	4	0	0	0
You felt confident enough before taking the course.	8	2	0	0	0
The course's sequence and flow were satisfactory.	4	4	2	0	0
You felt equally engaged in each course section.	5	4	1	0	0
There was a clear separation between the course's units.	3	5	1	1	0
You preferred more frequent assessments.	4	2	3	1	0
There were enough audio-visual contents throughout the course.	6	2	2	0	0
The quality of the content was consistent throughout the course.	7	2	1	0	0
There were enough variety in terms of course unit types.	4	5	1	0	0
The language was easy to understand.	6	3	1	0	0

Statement					
The overall contents were highly engaging.	5	4	1	0	0
The reading materials was presented in an interesting way.	3	6	1	0	0
The course's content was too challenging for an average learner to understand.	1	2	6	1	0
The content was in-depth enough.	3	7	0	0	0
You liked the types of assessments used.	2	7	1	0	0
You notice any unnecessary repetitions in the content.	1	1	5	2	1
You, at some point, have to reread the content to understand it.	1	7	2	0	0
The course was easy to follow.	4	5	1	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	1	3	4	2	0
The course felt too rushed.	0	2	4	3	1
The course felt too monotone.	0	1	5	4	0
The course felt too automated.	1	5	2	2	0
The course was not interactive enough.	1	0	5	3	1
The overall course delivery was satisfactory.	4	6	0	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	3	4	3	0	0
The duration of the course was satisfactory.	3	3	4	0	0
All the units of the course had enough time allocated.	2	2	6	0	0
Some of the units felt rushed.	1	4	2	3	0
In the beginning, time has been spent unnecessarily.	1	1	5	1	2
The timeline of the course can be improved.	2	8	0	0	0
Your trainer showed empathy and helped you in tackling problems.	6	4	0	0	0
You felt that the trainer is an expert of the course.	6	3	1	0	0
The communication skill of the trainer was satisfactory.	6	4	0	0	0

The delivery skill of the trainer was satisfactory.	5	5	0	0	0
Your trainer responded to your queries in a timely manner.	6	4	0	0	0
You felt comfortable expressing your problems to your trainer.	5	5	0	0	0
You think your trainer was perfect for this course.	4	5	1	0	0
Earning a certificate can make you feel more driven towards a course.	2	5	1	2	0
You love when a course offer certification along with training.	1	3	3	2	1
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	3	6	1	0	0
You believe that the certificate can help you get a job.	5	5	0	0	0
You will take similar course in the future if updates are added significantly.	4	5	0	0	1
So far, you're satisfied with the course outcomes.	5	4	0	1	0
You would recommend this course to others.	4	4	1	0	1
If asked, you will be able to summarize the goals and benefits of this course.	3	2	3	2	0
You think that the course materials can be improved for this course.	1	0	6	2	1
You think the learning experience can be improved.	5	3	1	1	0

We asked which parts of the course was stressful. The answers have been presented in 6.17.
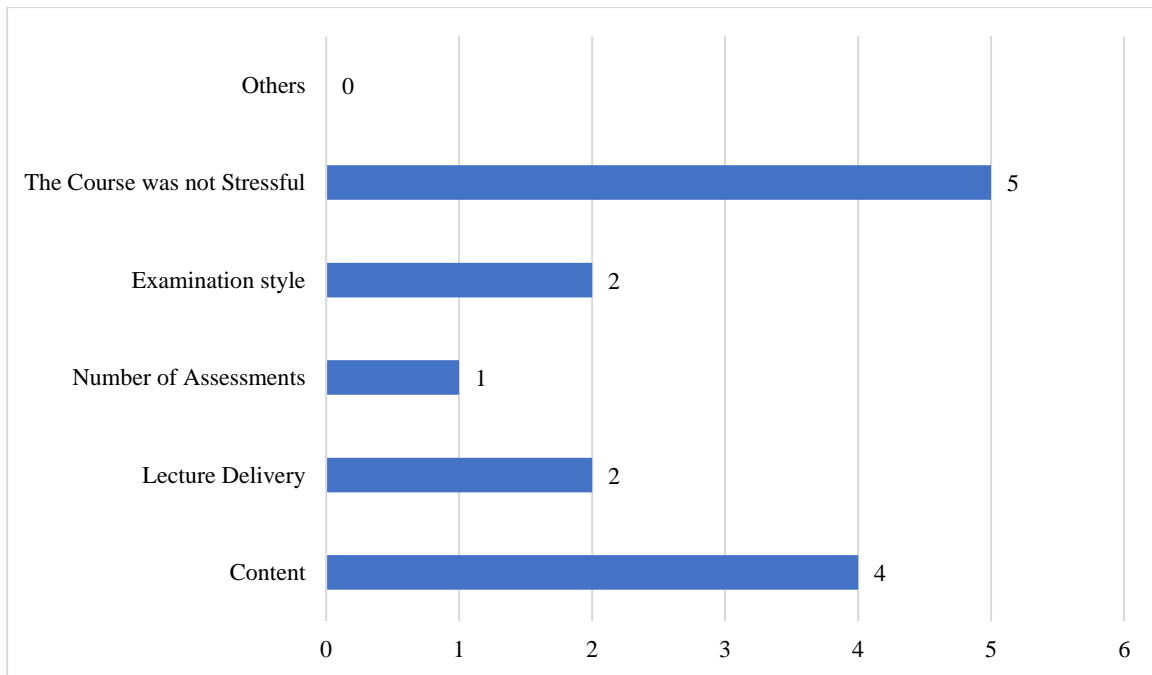
Figure 6.17: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.17.

Table 6.17: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	1
There was a lack of course materials. More course materials are needed.	3
The duration of the training was too long.	1
The duration of the training was too short.	1
Poor/not enough assessment methods.	1
The assessment methods or examination was stressful.	2
The objective of the course was not clear to me.	0
I did not get what I expected from the course.	0
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	1
I didn't feel comfortable in the classroom while asking about a problem.	1
I didn't like the environment of the classroom.	0
Poor feedback and support system.	1
There was no problem in the course.	3

Finally, Table 6.18 shows the rating of the course submitted by the participants.

Table 6.18: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	1	3	1	1	3
Course Structure	0	2	3	2	3
Course Contents	0	2	2	2	4
Delivery Quality	0	1	3	3	3
Duration	0	0	5	3	2
Trainer	0	0	3	3	4
Support Team	1	0	3	3	3
Environment	0	1	2	3	4
Accessibility of Information	0	3	0	2	5
Usage of Games	3	5	0	1	1
Expected Outcomes	0	1	2	6	1
Learning Experience	0	1	2	6	1
Overall Rating	0	1	2	5	2

6.2.1.2.4. Data Collected from Trainees of BMET

A total of 26 people submitted the form among which all of them were from Rajshahi. Figure 6.18 shows the distribution of division.

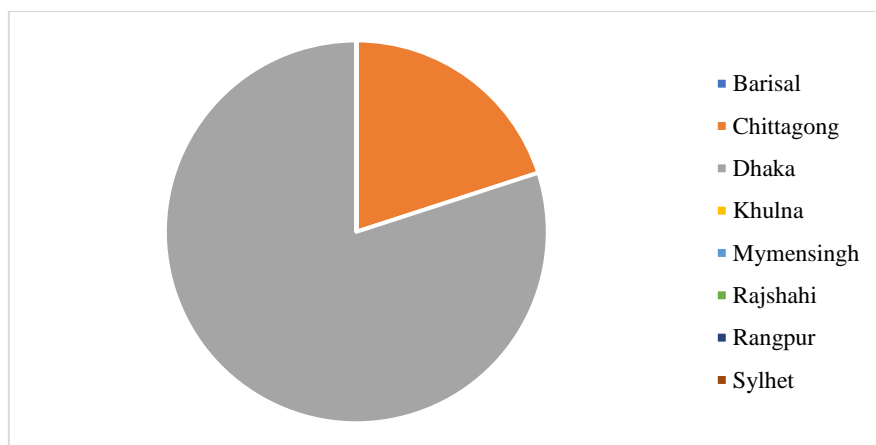Figure 6.18: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.19.

Table 6.19: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	19	7	0	0	0

The course's title and description were easy to comprehend.	16	10	0	0	0
You felt confident enough before taking the course.	17	5	4	0	0
The course's sequence and flow were satisfactory.	15	10	1	0	0
You felt equally engaged in each course section.	15	6	5	0	0
There was a clear separation between the course's units.	14	6	5	1	0
You preferred more frequent assessments.	8	11	7	0	0
There were enough audio-visual contents throughout the course.	14	8	2	1	0
The quality of the content was consistent throughout the course.	15	11	0	0	0
There were enough variety in terms of course unit types.	13	11	2	0	0
The language was easy to understand.	19	7	0	0	0
The overall contents were highly engaging.	15	11	0	0	0
The reading materials was presented in an interesting way.	15	11	0	0	0
The course's content was too challenging for an average learner to understand.	6	7	8	4	1
The content was in-depth enough.	11	8	6	0	0
You liked the types of assessments used.	17	7	1	0	0
You notice any unnecessary repetitions in the content.	4	4	8	6	2
You, at some point, have to reread the content to understand it.	7	9	7	1	0
The course was easy to follow.	14	9	1	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	4	4	9	6	1
The course felt too rushed.	4	2	9	8	1
The course felt too monotone.	4	1	5	12	2
The course felt too automated.	8	6	6	4	0
The course was not interactive enough.	5	3	6	7	3

The overall course delivery was satisfactory.	15	9	0	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	12	9	3	0	0
The duration of the course was satisfactory.	9	9	1	5	0
All the units of the course had enough time allocated.	8	12	2	2	0
Some of the units felt rushed.	6	2	10	4	2
In the beginning, time has been spent unnecessarily.	5	1	4	10	4
The timeline of the course can be improved.	9	9	6	0	0
Your trainer showed empathy and helped you in tackling problems.	18	6	0	0	0
You felt that the trainer is an expert of the course.	20	4	0	0	0
The communication skill of the trainer was satisfactory.	15	8	0	1	0
The delivery skill of the trainer was satisfactory.	16	7	1	0	0
Your trainer responded to your queries in a timely manner.	16	8	0	0	0
You felt comfortable expressing your problems to your trainer.	15	9	0	0	0
You think your trainer was perfect for this course.	16	7	1	0	0
Earning a certificate can make you feel more driven towards a course.	5	0	11	7	1
You love when a course offer certification along with training.	4	0	7	12	1
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	8	11	5	0	0
You believe that the certificate can help you get a job.	16	8	0	0	0
You will take similar course in the future if updates are added significantly.	13	5	3	3	0
So far, you're satisfied with the course outcomes.	12	8	4	0	0

You would recommend this course to others.	7	5	8	3	1
If asked, you will be able to summarize the goals and benefits of this course.	9	8	6	1	0
You think that the course materials can be improved for this course.	7	4	5	7	1
You think the learning experience can be improved.	14	10	1	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.19.

Figure 6.19: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.20.

Table 6.20: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	1
There was a lack of course materials. More course materials are needed.	3
The duration of the training was too long.	1
The duration of the training was too short.	11
Poor/not enough assessment methods.	0
The assessment methods or examination was stressful.	1

The objective of the course was not clear to me.	1
I did not get what I expected from the course.	1
The performance of the trainer was not satisfactory.	1
The lecture materials were not well designed.	2
I didn't feel comfortable in the classroom while asking about a problem.	1
I didn't like the environment of the classroom.	1
Poor feedback and support system.	1
There was no problem in the course.	18

Finally, Table 6.21 shows the rating of the course submitted by the participants.

Table 6.21: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	4	3	2	5	9
Course Structure	5	1	3	5	8
Course Contents	6	1	1	6	9
Delivery Quality	4	1	4	3	10
Duration	5	2	10	3	3
Trainer	3	2	0	2	14
Support Team	3	0	3	7	8
Environment	5	1	1	6	9
Accessibility of Information	3	2	3	5	8
Usage of Games	9	4	5	1	2
Expected Outcomes	4	3	2	8	6
Learning Experience	4	2	2	6	9
Overall Rating	3	1	4	6	7

6.2.1.2.5. Data Collected from Trainees of ITEE

A total of 18 people submitted the form among which all of them were from Rajshahi. Figure 6.20 shows the distribution of division.
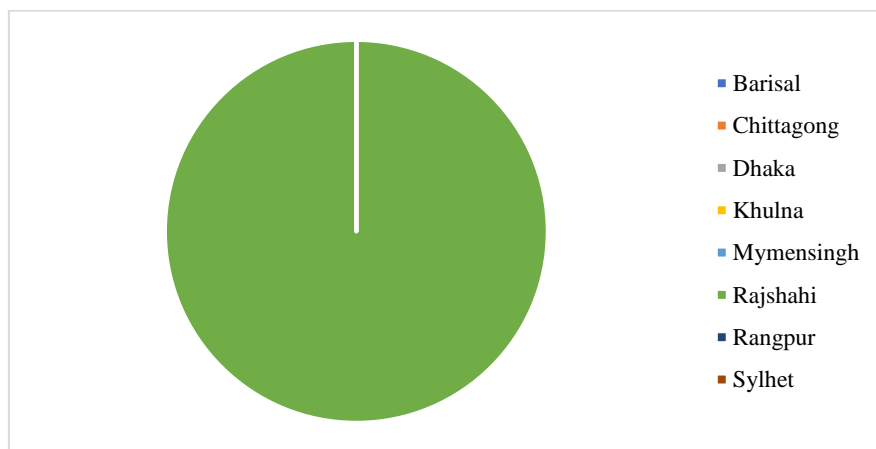
Figure 6.20: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.22.

Table 6.22: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	9	7	2	0	0
The course's title and description were easy to comprehend.	10	7	1	0	0
You felt confident enough before taking the course.	4	10	4	0	0
The course's sequence and flow were satisfactory.	2	13	3	0	0
You felt equally engaged in each course section.	2	11	3	2	0
There was a clear separation between the course's units.	2	10	5	1	0
You preferred more frequent assessments.	3	6	7	1	0
There were enough audio-visual contents throughout the course.	8	6	2	1	0
The quality of the content was consistent throughout the course.	7	8	1	2	0
There were enough variety in terms of course unit types.	4	8	4	1	0
The language was easy to understand.	7	8	3	0	0

The overall contents were highly engaging.	6	8	3	1	0
The reading materials was presented in an interesting way.	5	5	7	0	0
The course's content was too challenging for an average learner to understand.	2	4	6	5	1
The content was in-depth enough.	4	5	8	1	0
You liked the types of assessments used.	4	7	6	1	0
You notice any unnecessary repetitions in the content.	1	2	6	9	0
You, at some point, have to reread the content to understand it.	2	7	6	3	0
The course was easy to follow.	5	8	4	1	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	3	7	3	5	0
The course felt too rushed.	5	7	2	3	1
The course felt too monotone.	2	2	5	7	2
The course felt too automated.	2	4	10	1	0
The course was not interactive enough.	2	2	3	6	5
The overall course delivery was satisfactory.	5	10	3	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	3	7	4	4	0
The duration of the course was satisfactory.	3	6	5	4	0
All the units of the course had enough time allocated.	2	7	3	6	0
Some of the units felt rushed.	1	8	7	1	1
In the beginning, time has been spent unnecessarily.	1	2	4	9	2
The timeline of the course can be improved.	7	5	5	1	0
Your trainer showed empathy and helped you in tackling problems.	7	7	2	0	0
You felt that the trainer is an expert of the course.	6	7	2	1	0
The communication skill of the trainer was satisfactory.	7	6	3	0	0

The delivery skill of the trainer was satisfactory.	5	9	2	0	0
Your trainer responded to your queries in a timely manner.	6	8	2	0	0
You felt comfortable expressing your problems to your trainer.	5	9	2	0	0
You think your trainer was perfect for this course.	8	5	2	1	0
Earning a certificate can make you feel more driven towards a course.	1	3	5	6	1
You love when a course offer certification along with training.	1	5	3	6	1
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	5	7	3	1	0
You believe that the certificate can help you get a job.	4	11	1	0	0
You will take similar course in the future if updates are added significantly.	3	10	3	0	0
So far, you're satisfied with the course outcomes.	2	10	2	2	0
You would recommend this course to others.	2	11	2	1	0
If asked, you will be able to summarize the goals and benefits of this course.	3	8	3	2	0
You think that the course materials can be improved for this course.	3	2	5	6	0
You think the learning experience can be improved.	9	4	3	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.21.
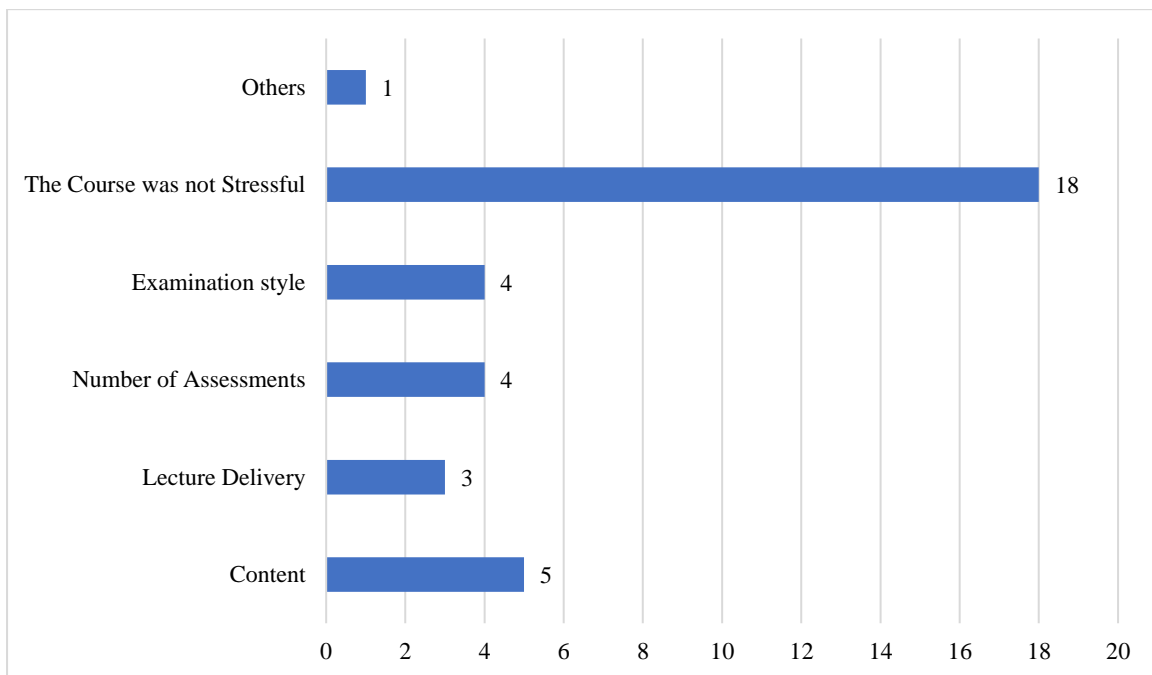
Figure 6.21: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.23.

Table 6.23: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	1
There was a lack of course materials. More course materials are needed.	5
The duration of the training was too long.	3
The duration of the training was too short.	9
Poor/not enough assessment methods.	6
The assessment methods or examination was stressful.	3
The objective of the course was not clear to me.	2
I did not get what I expected from the course.	5
The performance of the trainer was not satisfactory.	1
The lecture materials were not well designed.	3
I didn't feel comfortable in the classroom while asking about a problem.	2
I didn't like the environment of the classroom.	1
Poor feedback and support system.	2
There was no problem in the course.	4

Finally, Table 6.24 shows the rating of the course submitted by the participants.

Table 6.24: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	0	2	4	9	3
Course Structure	0	3	0	10	5
Course Contents	0	2	1	7	8
Delivery Quality	0	2	3	4	9
Duration	1	4	4	5	4
Trainer	0	1	0	4	11
Support Team	1	3	3	6	5
Environment	0	2	2	8	6
Accessibility of Information	0	3	1	8	6
Usage of Games	4	5	1	4	3
Expected Outcomes	0	3	2	8	4
Learning Experience	0	2	1	5	10
Overall Rating	0	2	1	10	5

6.2.1.2.6. Data Collected from BAUET Students

A total of 4 people submitted the form among which all of them were from Rajshahi. Figure 6.22 shows the distribution of division.

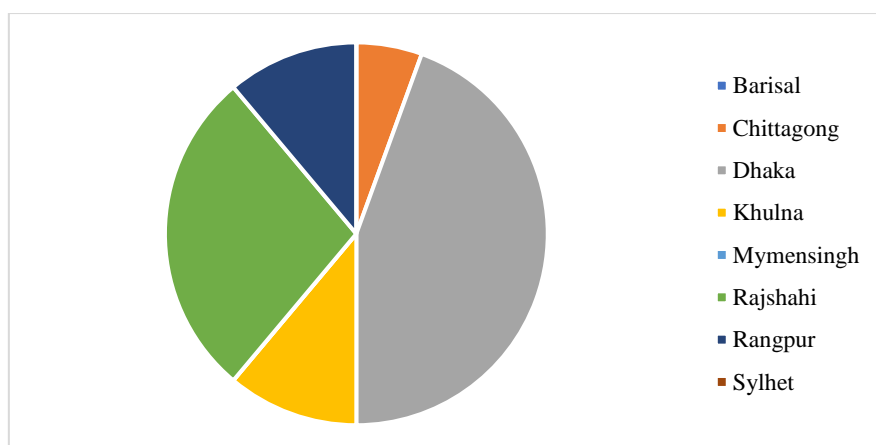Figure 6.22: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.25.

Table 6.25: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	0	2	0	0	0

The course's title and description were easy to comprehend.	0	1	1	0	0
You felt confident enough before taking the course.	0	2	0	0	0
The course's sequence and flow were satisfactory.	0	1	1	0	0
You felt equally engaged in each course section.	0	1	1	0	0
There was a clear separation between the course's units.	0	2	0	0	0
You preferred more frequent assessments.	0	2	0	0	0
There were enough audio-visual contents throughout the course.	0	0	1	1	0
The quality of the content was consistent throughout the course.	0	2	0	0	0
There were enough variety in terms of course unit types.	0	0	1	1	0
The language was easy to understand.	0	2	0	0	0
The overall contents were highly engaging.	0	1	1	0	0
The reading materials was presented in an interesting way.	0	2	0	0	0
The course's content was too challenging for an average learner to understand.	0	0	1	1	0
The content was in-depth enough.	0	1	1	0	0
You liked the types of assessments used.	0	0	2	0	0
You notice any unnecessary repetitions in the content.	0	1	0	1	0
You, at some point, have to reread the content to understand it.	1	0	1	0	0
The course was easy to follow.	0	2	0	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	0	1	1	0	0
The course felt too rushed.	0	2	0	0	0
The course felt too monotone.	0	1	1	0	0
The course felt too automated.	0	1	1	0	0
The course was not interactive enough.	0	0	2	0	0

The overall course delivery was satisfactory.	0	1	1	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	0	1	1	0	0
The duration of the course was satisfactory.	0	2	0	0	0
All the units of the course had enough time allocated.	0	0	2	0	0
Some of the units felt rushed.	1	1	0	0	0
In the beginning, time has been spent unnecessarily.	1	0	1	0	0
The timeline of the course can be improved.	1	1	0	0	0
Your trainer showed empathy and helped you in tackling problems.	1	1	0	0	0
You felt that the trainer is an expert of the course.	0	0	1	1	0
The communication skill of the trainer was satisfactory.	0	1	0	1	0
The delivery skill of the trainer was satisfactory.	0	0	1	1	0
Your trainer responded to your queries in a timely manner.	0	2	0	0	0
You felt comfortable expressing your problems to your trainer.	0	1	1	0	0
You think your trainer was perfect for this course.	0	1	0	1	0
Earning a certificate can make you feel more driven towards a course.	0	0	1	1	0
You love when a course offer certification along with training.	0	1	0	1	0
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	0	1	1	0	0
You believe that the certificate can help you get a job.	0	2	0	0	0
You will take similar course in the future if updates are added significantly.	0	0	1	1	0
So far, you're satisfied with the course outcomes.	0	2	0	0	0

You would recommend this course to others.	0	1	1	0	0
If asked, you will be able to summarize the goals and benefits of this course.	0	2	0	0	0
You think that the course materials can be improved for this course.	0	1	0	0	1
You think the learning experience can be improved.	0	1	1	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.23.
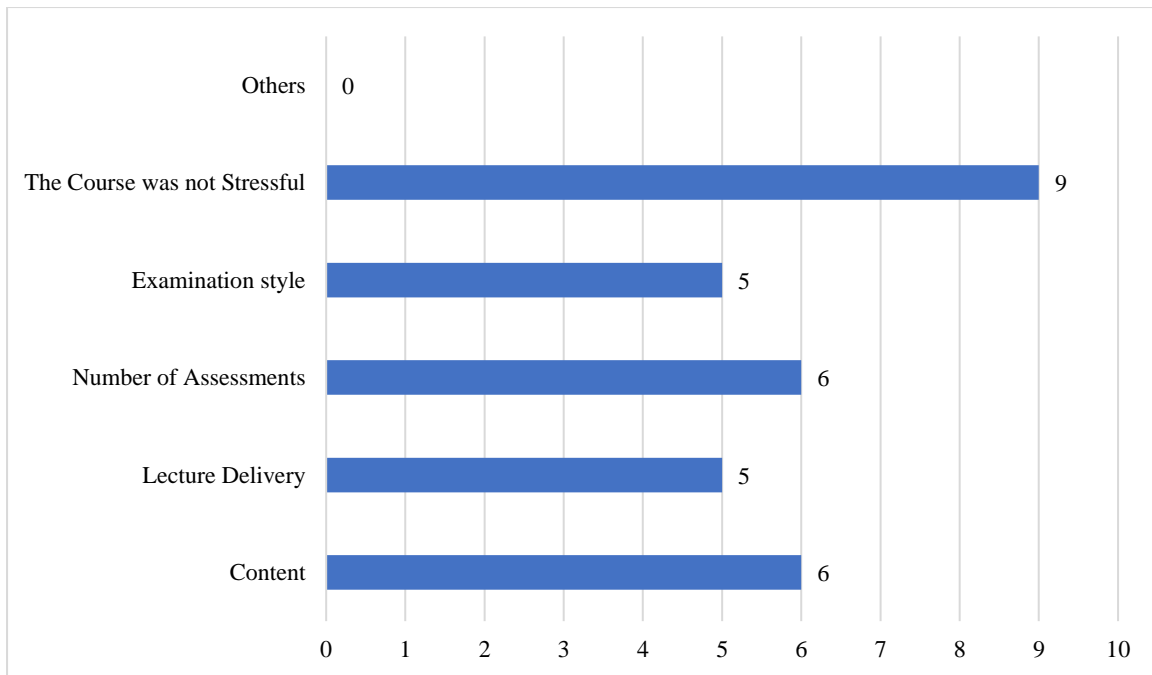

Figure 6.23: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.26.

Table 6.26: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	0
There was a lack of course materials. More course materials are needed.	1
The duration of the training was too long.	1
The duration of the training was too short.	1
Poor/not enough assessment methods.	1
The assessment methods or examination was stressful.	0

The objective of the course was not clear to me.	0
I did not get what I expected from the course.	0
The performance of the trainer was not satisfactory.	1
The lecture materials were not well designed.	0
I didn't feel comfortable in the classroom while asking about a problem.	0
I didn't like the environment of the classroom.	0
Poor feedback and support system.	1
There was no problem in the course.	0

Finally, Table 6.27 shows the rating of the course submitted by the participants.

Table 6.27: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	1	0	1	0	0
Course Structure	0	1	1	0	0
Course Contents	0	0	2	0	0
Delivery Quality	0	1	0	1	0
Duration	0	0	1	0	1
Trainer	0	1	0	1	0
Support Team	0	0	2	0	0
Environment	0	1	1	0	0
Accessibility of Information	1	0	1	0	0
Usage of Games	1	1	0	0	0
Expected Outcomes	0	0	2	0	0
Learning Experience	0	0	1	1	0
Overall Rating	0	0	1	0	1

6.2.1.2.7. Data Collected from Offline Advanced Course on Computer Training, Batch:54

A total of 77 people submitted the form among which all of them were from Rajshahi. Figure 6.24 shows the distribution of division.
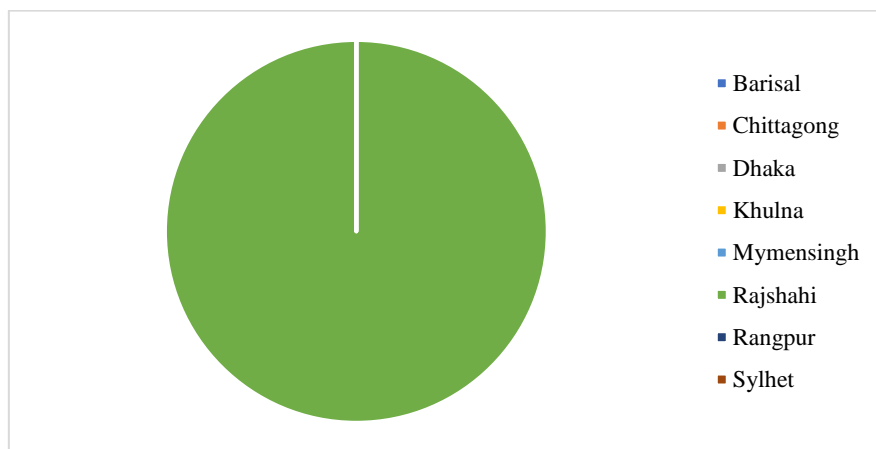
Figure 6.24: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.28.

Table 6.28: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	33	39	3	0	0
The course's title and description were easy to comprehend.	29	40	5	0	0
You felt confident enough before taking the course.	35	29	10	0	1
The course's sequence and flow were satisfactory.	30	40	4	0	1
You felt equally engaged in each course section.	25	39	8	3	0
There was a clear separation between the course's units.	9	30	25	7	1
You preferred more frequent assessments.	12	25	20	11	2
There were enough audio-visual contents throughout the course.	15	43	6	5	2
The quality of the content was consistent throughout the course.	29	41	4	0	0
There were enough variety in terms of course unit types.	19	45	5	4	2
The language was easy to understand.	37	36	1	1	0

The overall contents were highly engaging.	40	32	4	0	0
The reading materials was presented in an interesting way.	33	36	5	0	1
The course's content was too challenging for an average learner to understand.	7	15	21	27	4
The content was in-depth enough.	11	35	10	17	1
You liked the types of assessments used.	26	45	3	2	0
You notice any unnecessary repetitions in the content.	6	6	16	37	9
You, at some point, have to reread the content to understand it.	10	29	10	21	3
The course was easy to follow.	22	42	9	1	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	4	10	22	28	11
The course felt too rushed.	2	3	12	43	16
The course felt too monotone.	4	7	10	40	14
The course felt too automated.	16	35	12	10	1
The course was not interactive enough.	4	9	15	35	11
The overall course delivery was satisfactory.	29	42	2	1	1
You had enough times to complete the assigned tasks, assignments and assessments.	23	41	7	3	1
The duration of the course was satisfactory.	27	41	7	1	0
All the units of the course had enough time allocated.	22	43	4	5	1
Some of the units felt rushed.	2	4	31	32	7
In the beginning, time has been spent unnecessarily.	1	2	12	46	14
The timeline of the course can be improved.	13	30	17	9	3
Your trainer showed empathy and helped you in tackling problems.	42	30	2	1	1
You felt that the trainer is an expert of the course.	38	35	2	1	0
The communication skill of the trainer was satisfactory.	34	37	2	2	1

The delivery skill of the trainer was satisfactory.	31	42	0	2	0
Your trainer responded to your queries in a timely manner.	36	36	3	0	1
You felt comfortable expressing your problems to your trainer.	36	37	1	1	0
You think your trainer was perfect for this course.	34	31	9	0	0
Earning a certificate can make you feel more driven towards a course.	1	6	23	37	9
You love when a course offer certification along with training.	3	3	11	50	9
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	18	45	6	2	1
You believe that the certificate can help you get a job.	38	31	3	1	1
You will take similar course in the future if updates are added significantly.	24	37	7	7	0
So far, you're satisfied with the course outcomes.	19	35	12	6	3
You would recommend this course to others.	12	18	24	14	2
If asked, you will be able to summarize the goals and benefits of this course.	20	36	9	8	0
You think that the course materials can be improved for this course.	13	17	12	27	2
You think the learning experience can be improved.	35	29	9	2	0

We asked which parts of the course was stressful. The answers have been presented in 6.25.
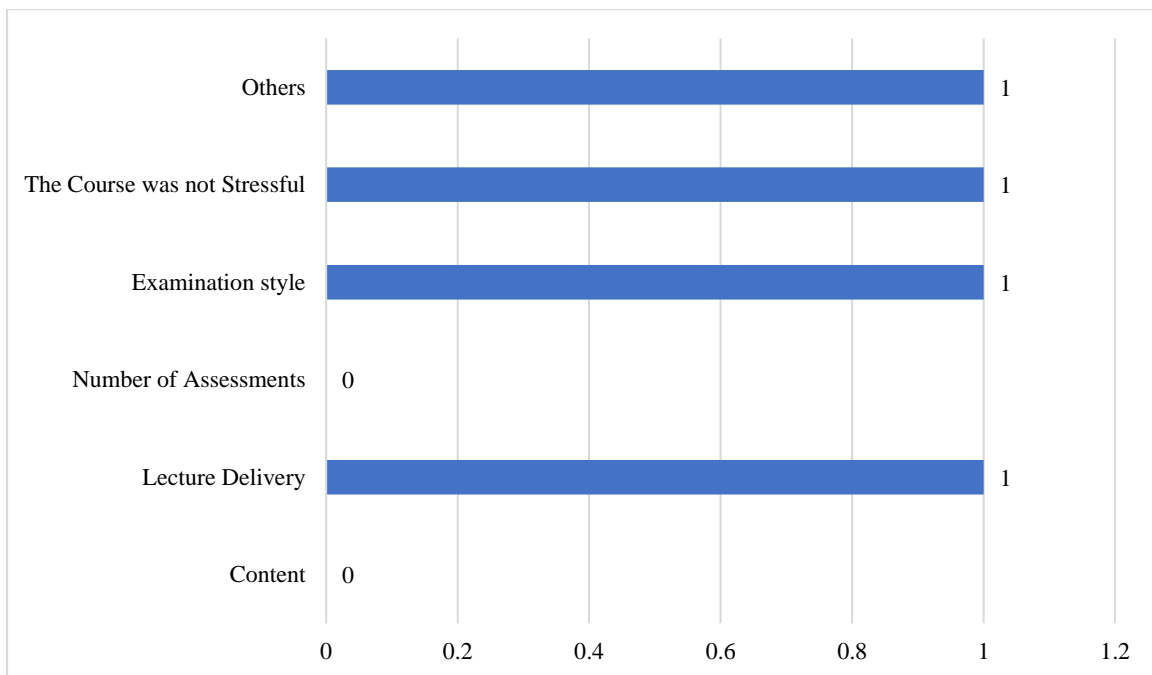
Figure 6.25: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.29.

Table 6.29: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	2
There was a lack of course materials. More course materials are needed.	3
The duration of the training was too long.	6
The duration of the training was too short.	3
Poor/not enough assessment methods.	5
The assessment methods or examination was stressful.	6
The objective of the course was not clear to me.	2
I did not get what I expected from the course.	1
The performance of the trainer was not satisfactory.	4
The lecture materials were not well designed.	5
I didn't feel comfortable in the classroom while asking about a problem.	4
I didn't like the environment of the classroom.	1
Poor feedback and support system.	3
There was no problem in the course.	57

Finally, Table 6.30 shows the rating of the course submitted by the participants.

Table 6.30: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	3	3	11	17	39
Course Structure	1	3	8	22	39
Course Contents	0	1	6	14	51
Delivery Quality	2	5	7	20	39
Duration	2	0	12	12	44
Trainer	1	2	7	9	52
Support Team	2	3	3	20	44
Environment	2	0	0	8	62
Accessibility of Information	1	5	6	20	39
Usage of Games	20	10	11	15	14
Expected Outcomes	5	3	6	19	41
Learning Experience	5	0	4	19	46
Overall Rating	2	2	7	19	42

6.2.1.2.8. Data Collected from Android App Development, Batch: 4

A total of 11 people submitted the form among which all of them were from Rajshahi. Figure 6.26 shows the distribution of division.
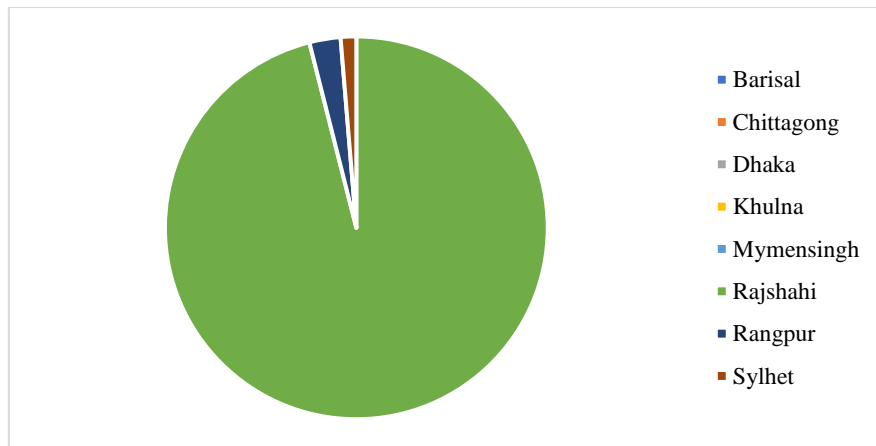

Figure 6.26: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.31.

Table 6.31: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	4	5	0	1	1

The course's title and description were easy to comprehend.	3	5	3	0	0
You felt confident enough before taking the course.	6	5	0	0	0
The course's sequence and flow were satisfactory.	3	4	2	2	0
You felt equally engaged in each course section.	3	5	2	1	0
There was a clear separation between the course's units.	3	3	3	1	1
You preferred more frequent assessments.	2	5	4	0	0
There were enough audio-visual contents throughout the course.	2	4	5	0	0
The quality of the content was consistent throughout the course.	2	3	4	1	1
There were enough variety in terms of course unit types.	3	3	3	2	0
The language was easy to understand.	2	6	1	2	0
The overall contents were highly engaging.	3	2	2	4	0
The reading materials was presented in an interesting way.	3	3	3	2	0
The course's content was too challenging for an average learner to understand.	1	5	2	1	1
The content was in-depth enough.	0	5	1	4	1
You liked the types of assessments used.	2	6	0	2	0
You notice any unnecessary repetitions in the content.	1	4	3	1	2
You, at some point, have to reread the content to understand it.	0	4	4	2	1
The course was easy to follow.	3	4	3	1	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	4	3	0	3	1
The course felt too rushed.	3	5	1	2	0
The course felt too monotone.	2	5	3	1	0
The course felt too automated.	3	5	3	0	0
The course was not interactive enough.	2	3	2	2	2

The overall course delivery was satisfactory.	2	4	3	1	1
You had enough times to complete the assigned tasks, assignments and assessments.	2	6	2	1	0
The duration of the course was satisfactory.	1	5	1	3	1
All the units of the course had enough time allocated.	1	4	2	3	1
Some of the units felt rushed.	1	6	2	2	0
In the beginning, time has been spent unnecessarily.	2	6	0	1	2
The timeline of the course can be improved.	5	6	0	0	0
Your trainer showed empathy and helped you in tackling problems.	5	6	0	0	0
You felt that the trainer is an expert of the course.	3	5	2	0	1
The communication skill of the trainer was satisfactory.	5	3	2	0	1
The delivery skill of the trainer was satisfactory.	5	3	2	0	1
Your trainer responded to your queries in a timely manner.	4	5	2	0	0
You felt comfortable expressing your problems to your trainer.	4	3	1	2	0
You think your trainer was perfect for this course.	3	4	2	1	1
Earning a certificate can make you feel more driven towards a course.	1	6	1	3	0
You love when a course offer certification along with training.	1	6	2	2	0
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	2	5	3	0	1
You believe that the certificate can help you get a job.	2	8	1	0	0
You will take similar course in the future if updates are added significantly.	2	5	0	4	0
So far, you're satisfied with the course outcomes.	3	3	2	2	1

You would recommend this course to others.	2	8	0	1	0
If asked, you will be able to summarize the goals and benefits of this course.	2	6	3	0	0
You think that the course materials can be improved for this course.	1	4	3	3	0
You think the learning experience can be improved.	5	5	0	1	0

We asked which parts of the course was stressful. The answers have been presented in 6.27.
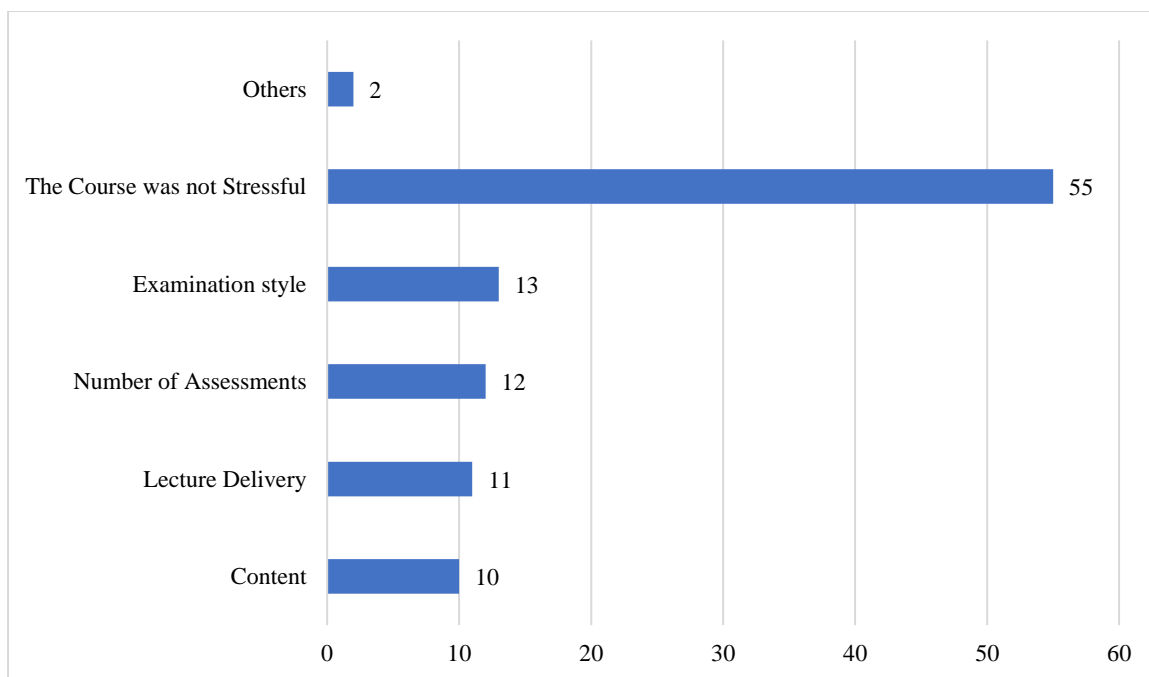

Figure 6.27: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.32.

Table 6.32: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	6
There was a lack of course materials. More course materials are needed.	2
The duration of the training was too long.	1
The duration of the training was too short.	7
Poor/not enough assessment methods.	4
The assessment methods or examination was stressful.	2

The objective of the course was not clear to me.	2
I did not get what I expected from the course.	6
The performance of the trainer was not satisfactory.	1
The lecture materials were not well designed.	2
I didn't feel comfortable in the classroom while asking about a problem.	0
I didn't like the environment of the classroom.	0
Poor feedback and support system.	1
There was no problem in the course.	2

Finally, Table 6.33 shows the rating of the course submitted by the participants.

Table 6.33: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	3	3	4	0	1
Course Structure	1	4	4	0	2
Course Contents	1	4	3	1	2
Delivery Quality	3	3	2	1	2
Duration	1	6	2	0	1
Trainer	2	2	2	2	3
Support Team	0	4	3	0	3
Environment	0	4	1	2	4
Accessibility of Information	2	2	4	1	2
Usage of Games	3	5	2	1	0
Expected Outcomes	2	3	3	2	1
Learning Experience	2	2	2	2	2
Overall Rating	0	5	4	0	2

6.2.1.2.9. Data Collected from Technical School & College ICT Training, Batch: 3, 4

A total of 3 people submitted the form among which all of them were from Rajshahi. Figure 6.28 shows the distribution of division.
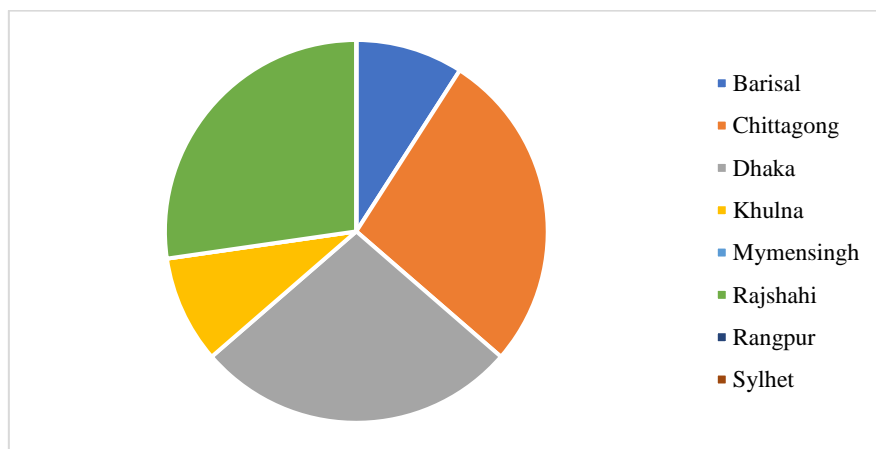
Figure 6.28: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.34.

Table 6.34: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	1	1	0	0	0
The course's title and description were easy to comprehend.	1	0	1	0	0
You felt confident enough before taking the course.	1	0	1	0	0
The course's sequence and flow were satisfactory.	0	0	1	1	0
You felt equally engaged in each course section.	0	0	2	0	0
There was a clear separation between the course's units.	0	1	1	0	0
You preferred more frequent assessments.	2	0	0	0	0
There were enough audio-visual contents throughout the course.	1	1	0	0	0
The quality of the content was consistent throughout the course.	1	0	0	0	1
There were enough variety in terms of course unit types.	1	0	0	0	0
The language was easy to understand.	2	0	0	0	0

The overall contents were highly engaging.	1	1	0	0	0
The reading materials was presented in an interesting way.	1	0	0	0	1
The course's content was too challenging for an average learner to understand.	1	1	0	0	0
The content was in-depth enough.	1	1	0	0	0
You liked the types of assessments used.	1	0	1	0	0
You notice any unnecessary repetitions in the content.	1	0	0	1	0
You, at some point, have to reread the content to understand it.	2	0	0	0	0
The course was easy to follow.	1	0	0	1	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	2	0	0	0	0
The course felt too rushed.	2	0	0	0	0
The course felt too monotone.	1	1	0	0	0
The course felt too automated.	0	1	1	0	0
The course was not interactive enough.	1	1	0	0	0
The overall course delivery was satisfactory.	1	0	1	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	0	0	1	1	0
The duration of the course was satisfactory.	0	0	0	2	0
All the units of the course had enough time allocated.	0	0	0	2	0
Some of the units felt rushed.	0	1	0	1	0
In the beginning, time has been spent unnecessarily.	0	0	1	0	1
The timeline of the course can be improved.	2	0	0	0	0
Your trainer showed empathy and helped you in tackling problems.	1	1	0	0	0
You felt that the trainer is an expert of the course.	1	1	0	0	0
The communication skill of the trainer was satisfactory.	1	1	0	0	0

The delivery skill of the trainer was satisfactory.	1	1	0	0	0
Your trainer responded to your queries in a timely manner.	1	1	0	0	0
You felt comfortable expressing your problems to your trainer.	1	1	0	0	0
You think your trainer was perfect for this course.	1	0	1	0	0
Earning a certificate can make you feel more driven towards a course.	0	0	0	1	1
You love when a course offer certification along with training.	0	0	1	1	0
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	0	1	1	0	0
You believe that the certificate can help you get a job.	1	1	0	0	0
You will take similar course in the future if updates are added significantly.	2	0	0	0	0
So far, you're satisfied with the course outcomes.	1	1	0	0	0
You would recommend this course to others.	1	0	1	0	0
If asked, you will be able to summarize the goals and benefits of this course.	0	0	2	0	0
You think that the course materials can be improved for this course.	0	0	1	1	0
You think the learning experience can be improved.	1	1	0	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.29.
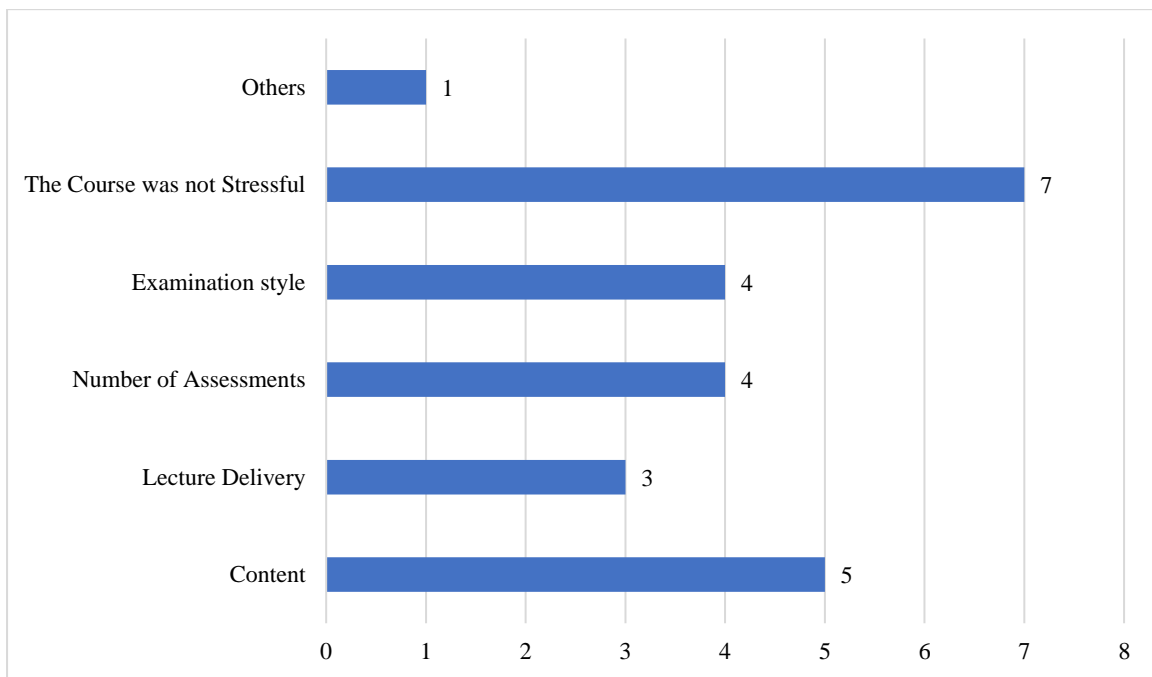
Figure 6.29: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.35.

Table 6.35: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	2
There was a lack of course materials. More course materials are needed.	1
The duration of the training was too long.	0
The duration of the training was too short.	2
Poor/not enough assessment methods.	1
The assessment methods or examination was stressful.	1
The objective of the course was not clear to me.	1
I did not get what I expected from the course.	0
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	0
I didn't feel comfortable in the classroom while asking about a problem.	0
I didn't like the environment of the classroom.	0
Poor feedback and support system.	0
There was no problem in the course.	0

Finally, Table 6.36 shows the rating of the course submitted by the participants.

Table 6.36: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	1	0	0	0	1
Course Structure	0	1	1	0	0
Course Contents	0	0	1	0	1
Delivery Quality	0	0	2	0	0
Duration	1	0	1	0	0
Trainer	0	0	1	1	0
Support Team	0	0	2	0	0
Environment	0	0	0	1	1
Accessibility of Information	0	0	2	0	0
Usage of Games	1	0	1	0	0
Expected Outcomes	0	1	0	1	0
Learning Experience	0	1	0	1	0
Overall Rating	0	0	1	1	0

6.2.1.2.10. Data Collected from Technical School & College ICT Training, Batch: 5

A total of 3 people submitted the form among which all of them were from Rajshahi. Figure 6.30 shows the distribution of division.
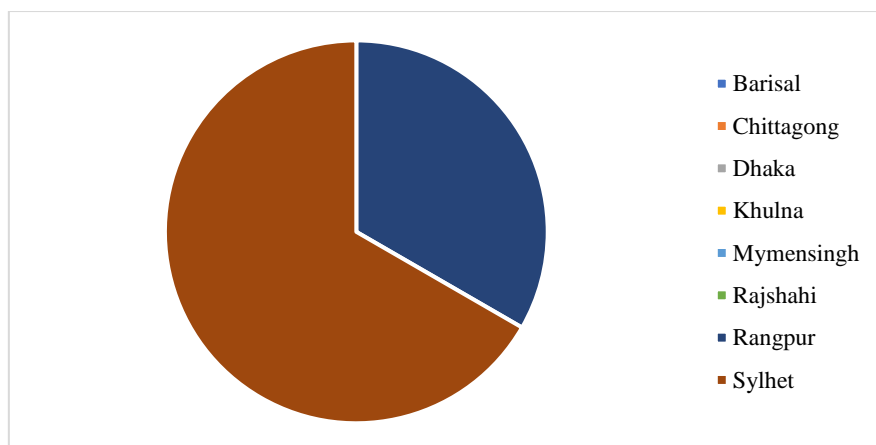

Figure 6.30: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.37.

Table 6.37: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	1	2	0	0	0

The course's title and description were easy to comprehend.	1	2	0	0	0
You felt confident enough before taking the course.	1	1	1	0	0
The course's sequence and flow were satisfactory.	1	2	0	0	0
You felt equally engaged in each course section.	1	2	0	0	0
There was a clear separation between the course's units.	0	1	1	1	0
You preferred more frequent assessments.	0	2	1	0	0
There were enough audio-visual contents throughout the course.	1	1	1	0	0
The quality of the content was consistent throughout the course.	2	0	1	0	0
There were enough variety in terms of course unit types.	0	2	1	0	0
The language was easy to understand.	0	3	0	0	0
The overall contents were highly engaging.	1	2	0	0	0
The reading materials was presented in an interesting way.	1	1	1	0	0
The course's content was too challenging for an average learner to understand.	0	2	0	1	0
The content was in-depth enough.	0	3	0	0	0
You liked the types of assessments used.	0	3	0	0	0
You notice any unnecessary repetitions in the content.	0	0	2	1	0
You, at some point, have to reread the content to understand it.	0	0	3	0	0
The course was easy to follow.	1	2	0	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	0	2	0	1	0
The course felt too rushed.	1	2	0	0	0
The course felt too monotone.	0	1	1	1	0
The course felt too automated.	0	0	3	0	0
The course was not interactive enough.	0	1	2	0	0

The overall course delivery was satisfactory.	1	2	0	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	0	1	2	0	0
The duration of the course was satisfactory.	0	1	2	0	0
All the units of the course had enough time allocated.	0	1	1	1	0
Some of the units felt rushed.	0	1	2	0	0
In the beginning, time has been spent unnecessarily.	0	0	2	1	0
The timeline of the course can be improved.	0	3	0	0	0
Your trainer showed empathy and helped you in tackling problems.	2	1	0	0	0
You felt that the trainer is an expert of the course.	0	3	0	0	0
The communication skill of the trainer was satisfactory.	0	3	0	0	0
The delivery skill of the trainer was satisfactory.	0	3	0	0	0
Your trainer responded to your queries in a timely manner.	0	3	0	0	0
You felt comfortable expressing your problems to your trainer.	0	3	0	0	0
You think your trainer was perfect for this course.	0	3	0	0	0
Earning a certificate can make you feel more driven towards a course.	0	1	1	1	0
You love when a course offer certification along with training.	0	1	0	1	0
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	1	2	0	0	0
You believe that the certificate can help you get a job.	2	1	0	0	0
You will take similar course in the future if updates are added significantly.	1	2	0	0	0
So far, you're satisfied with the course outcomes.	0	1	1	1	0

You would recommend this course to others.	0	0	3	0	0
If asked, you will be able to summarize the goals and benefits of this course.	1	2	0	0	0
You think that the course materials can be improved for this course.	0	1	2	0	0
You think the learning experience can be improved.	0	3	0	0	0

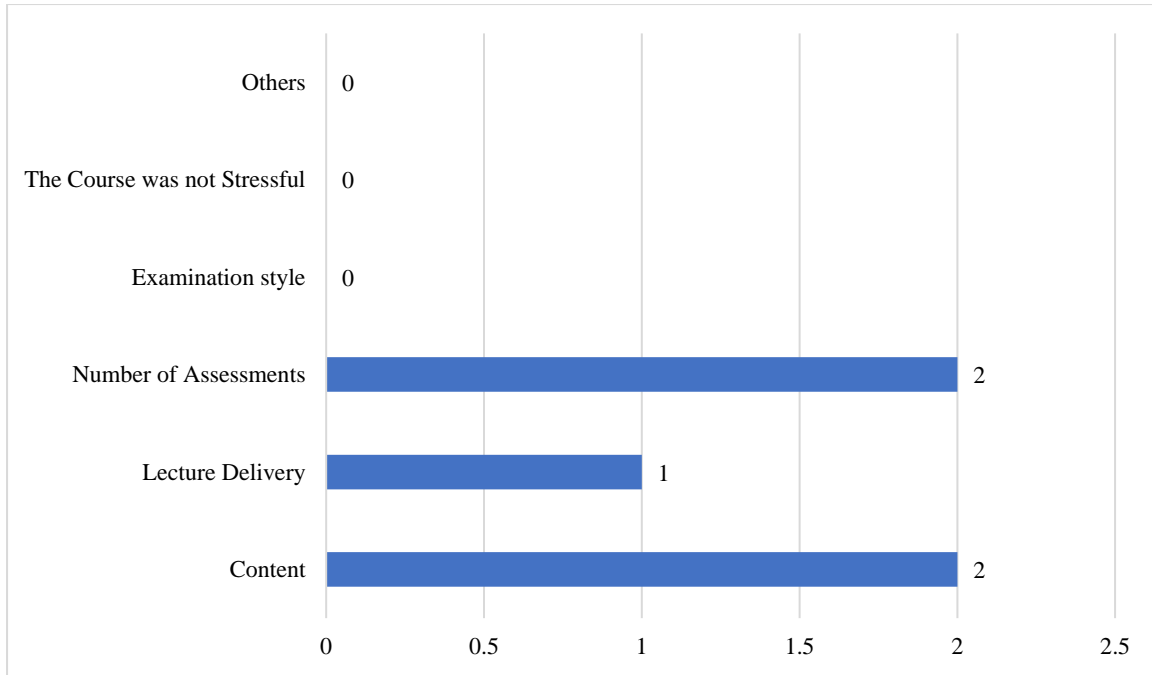We asked which parts of the course was stressful. The answers have been presented in 6.31.

Figure 6.31: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.38.

Table 6.38: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	0
There was a lack of course materials. More course materials are needed.	0
The duration of the training was too long.	0
The duration of the training was too short.	2
Poor/not enough assessment methods.	0
The assessment methods or examination was stressful.	0

The objective of the course was not clear to me.	0
I did not get what I expected from the course.	0
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	0
I didn't feel comfortable in the classroom while asking about a problem.	0
I didn't like the environment of the classroom.	0
Poor feedback and support system.	0
There was no problem in the course.	1

Finally, Table 6.39 shows the rating of the course submitted by the participants.

Table 6.39: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	0	0	1	1	1
Course Structure	0	1	0	2	0
Course Contents	0	1	0	1	1
Delivery Quality	0	1	0	1	1
Duration	2	0	1	0	0
Trainer	0	1	0	1	1
Support Team	0	0	1	1	1
Environment	0	1	0	0	2
Accessibility of Information	0	1	0	1	1
Usage of Games	1	1	0	1	0
Expected Outcomes	0	1	0	1	1
Learning Experience	0	1	0	1	1
Overall Rating	0	1	0	2	0

6.2.1.2.11. Data Collected from Technical School & College ICT Training, Batch: 6-8

A total of 7 people submitted the form among which all of them were from Rajshahi. Figure 6.32 shows the distribution of division.
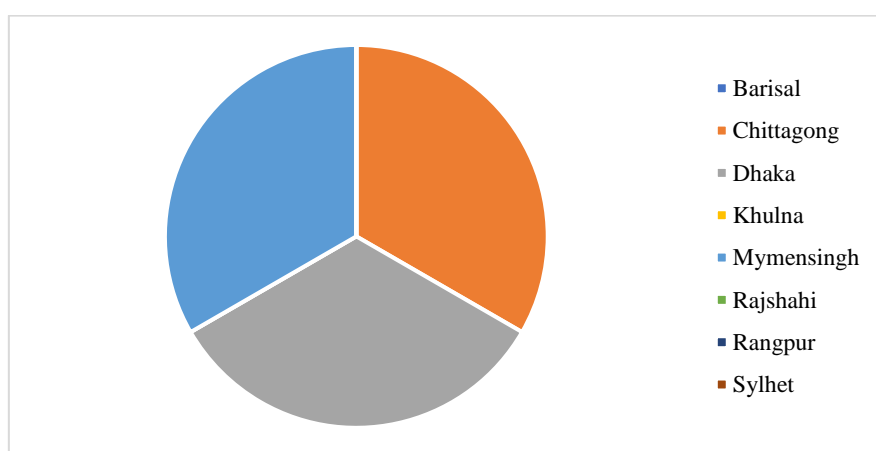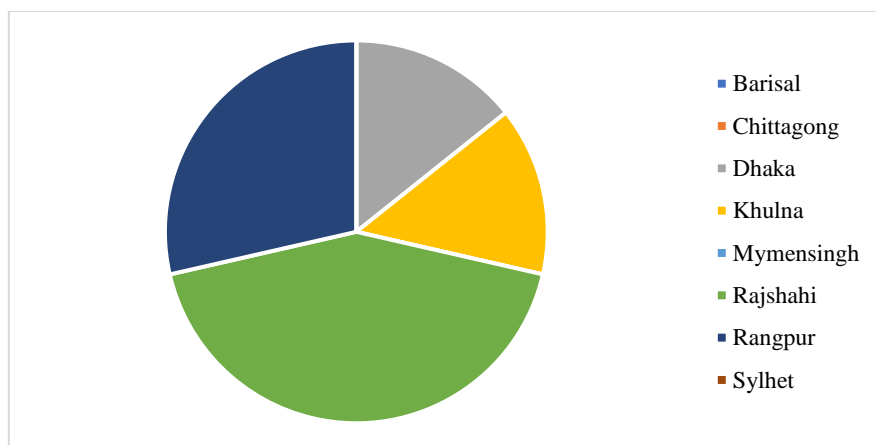
Figure 6.32: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.40.

Table 6.40: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	2	2	2	0	0
The course's title and description were easy to comprehend.	1	5	0	0	0
You felt confident enough before taking the course.	2	3	1	0	0
The course's sequence and flow were satisfactory.	2	4	1	0	0
You felt equally engaged in each course section.	2	5	0	0	0
There was a clear separation between the course's units.	2	4	1	0	0
You preferred more frequent assessments.	2	2	2	1	0
There were enough audio-visual contents throughout the course.	2	3	1	1	0
The quality of the content was consistent throughout the course.	2	5	0	0	0
There were enough variety in terms of course unit types.	2	2	3	0	0
The language was easy to understand.	3	4	0	0	0

The overall contents were highly engaging.	2	4	1	0	0
The reading materials was presented in an interesting way.	2	4	1	0	0
The course's content was too challenging for an average learner to understand.	2	1	2	2	0
The content was in-depth enough.	2	0	4	1	0
You liked the types of assessments used.	2	1	3	1	0
You notice any unnecessary repetitions in the content.	2	0	3	2	0
You, at some point, have to reread the content to understand it.	3	1	2	1	0
The course was easy to follow.	3	4	0	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	3	2	2	0	0
The course felt too rushed.	2	3	0	1	0
The course felt too monotone.	1	1	3	1	0
The course felt too automated.	1	1	3	1	0
The course was not interactive enough.	2	1	1	2	0
The overall course delivery was satisfactory.	1	5	0	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	2	3	1	1	0
The duration of the course was satisfactory.	1	2	1	2	1
All the units of the course had enough time allocated.	1	2	0	4	0
Some of the units felt rushed.	3	4	0	0	0
In the beginning, time has been spent unnecessarily.	1	1	3	2	0
The timeline of the course can be improved.	4	3	0	0	0
Your trainer showed empathy and helped you in tackling problems.	4	3	0	0	0
You felt that the trainer is an expert of the course.	3	4	0	0	0
The communication skill of the trainer was satisfactory.	3	4	0	0	0

The delivery skill of the trainer was satisfactory.	3	4	0	0	0
Your trainer responded to your queries in a timely manner.	4	3	0	0	0
You felt comfortable expressing your problems to your trainer.	4	3	0	0	0
You think your trainer was perfect for this course.	3	2	2	0	0
Earning a certificate can make you feel more driven towards a course.	1	2	4	0	0
You love when a course offer certification along with training.	1	5	0	1	0
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	2	3	2	0	0
You believe that the certificate can help you get a job.	2	4	0	1	0
You will take similar course in the future if updates are added significantly.	2	4	0	1	0
So far, you're satisfied with the course outcomes.	2	0	2	2	1
You would recommend this course to others.	3	3	0	1	0
If asked, you will be able to summarize the goals and benefits of this course.	2	3	2	0	0
You think that the course materials can be improved for this course.	2	0	0	5	0
You think the learning experience can be improved.	4	3	0	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.33.
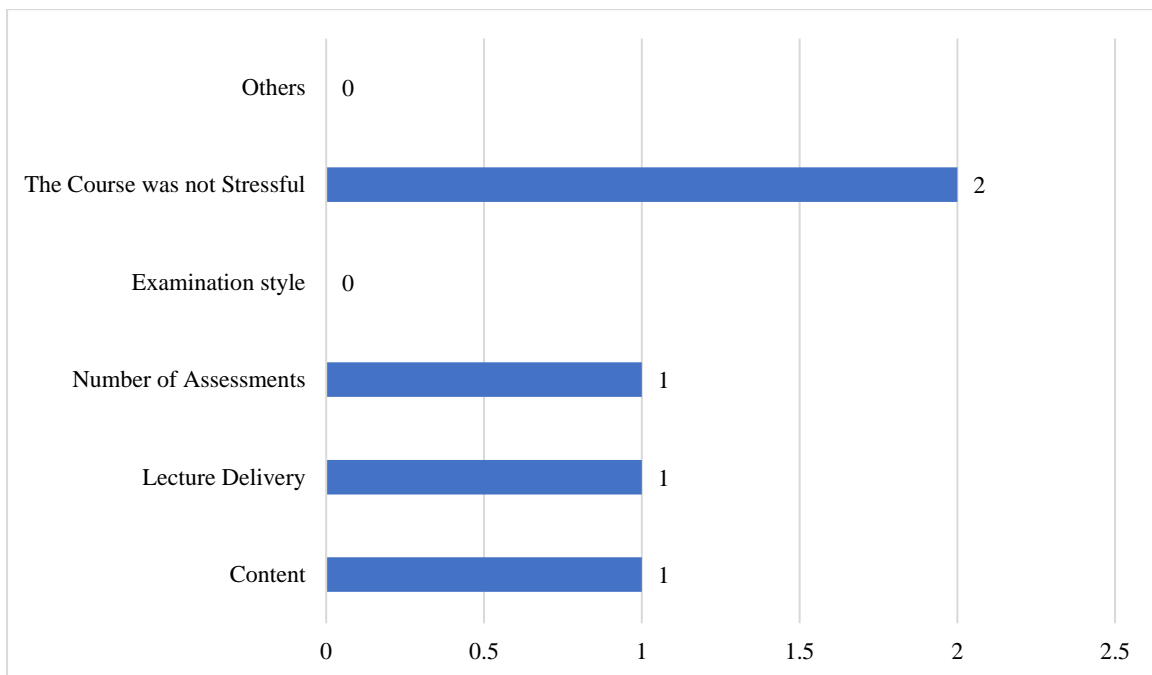
Figure 6.33: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.41.

Table 6.41: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	1
There was a lack of course materials. More course materials are needed.	4
The duration of the training was too long.	0
The duration of the training was too short.	6
Poor/not enough assessment methods.	2
The assessment methods or examination was stressful.	0
The objective of the course was not clear to me.	0
I did not get what I expected from the course.	1
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	1
I didn't feel comfortable in the classroom while asking about a problem.	0
I didn't like the environment of the classroom.	1
Poor feedback and support system.	0
There was no problem in the course.	2

Finally, Table 6.42 shows the rating of the course submitted by the participants.

Table 6.42: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	0	1	2	1	2
Course Structure	0	0	2	3	1
Course Contents	0	0	1	3	2
Delivery Quality	0	0	0	4	2
Duration	1	1	1	2	1
Trainer	0	0	0	2	4
Support Team	0	0	1	3	2
Environment	1	0	1	2	2
Accessibility of Information	0	0	1	3	2
Usage of Games	2	1	1	1	1
Expected Outcomes	0	0	2	3	1
Learning Experience	0	0	2	2	2
Overall Rating	0	0	1	4	1

6.2.1.2.12. Data Collected from Technical School & College ICT Training, Batch: 9-11

A total of 2 people submitted the form among which all of them were from Rajshahi. Figure 6.34 shows the distribution of division.
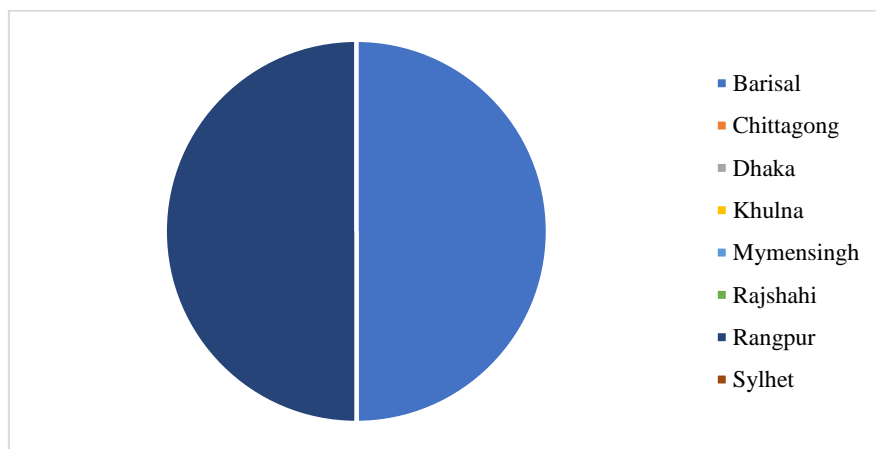
Figure 6.34: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.43.

Table 6.43: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	0	2	0	0	0

The course's title and description were easy to comprehend.	0	2	0	0	0
You felt confident enough before taking the course.	0	1	0	1	0
The course's sequence and flow were satisfactory.	0	2	0	0	0
You felt equally engaged in each course section.	0	0	2	0	0
There was a clear separation between the course's units.	0	1	1	0	0
You preferred more frequent assessments.	1	1	0	0	0
There were enough audio-visual contents throughout the course.	1	1	0	0	0
The quality of the content was consistent throughout the course.	1	1	0	0	0
There were enough variety in terms of course unit types.	1	1	0	0	0
The language was easy to understand.	1	1	0	0	0
The overall contents were highly engaging.	0	2	0	0	0
The reading materials was presented in an interesting way.	0	2	0	0	0
The course's content was too challenging for an average learner to understand.	0	1	1	0	0
The content was in-depth enough.	0	2	0	0	0
You liked the types of assessments used.	0	1	1	0	0
You notice any unnecessary repetitions in the content.	0	0	2	0	0
You, at some point, have to reread the content to understand it.	0	2	0	0	0
The course was easy to follow.	0	2	0	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	1	1	0	0	0
The course felt too rushed.	2	0	0	0	0
The course felt too monotone.	1	0	1	0	0
The course felt too automated.	0	1	1	0	0
The course was not interactive enough.	0	0	2	0	0

The overall course delivery was satisfactory.	1	1	0	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	0	0	2	0	0
The duration of the course was satisfactory.	0	0	1	1	0
All the units of the course had enough time allocated.	0	0	1	1	0
Some of the units felt rushed.	1	0	1	0	0
In the beginning, time has been spent unnecessarily.	0	0	1	1	0
The timeline of the course can be improved.	0	2	0	0	0
Your trainer showed empathy and helped you in tackling problems.	1	1	0	0	0
You felt that the trainer is an expert of the course.	1	1	0	0	0
The communication skill of the trainer was satisfactory.	0	1	1	0	0
The delivery skill of the trainer was satisfactory.	0	2	0	0	0
Your trainer responded to your queries in a timely manner.	0	2	0	0	0
You felt comfortable expressing your problems to your trainer.	0	2	0	0	0
You think your trainer was perfect for this course.	0	1	1	0	0
Earning a certificate can make you feel more driven towards a course.	0	0	2	0	0
You love when a course offer certification along with training.	0	1	1	0	0
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	0	1	1	0	0
You believe that the certificate can help you get a job.	0	2	0	0	0
You will take similar course in the future if updates are added significantly.	0	2	0	0	0
So far, you're satisfied with the course outcomes.	0	1	1	0	0

You would recommend this course to others.	0	1	1	0	0
If asked, you will be able to summarize the goals and benefits of this course.	0	1	1	0	0
You think that the course materials can be improved for this course.	0	2	0	0	0
You think the learning experience can be improved.	1	1	0	0	0

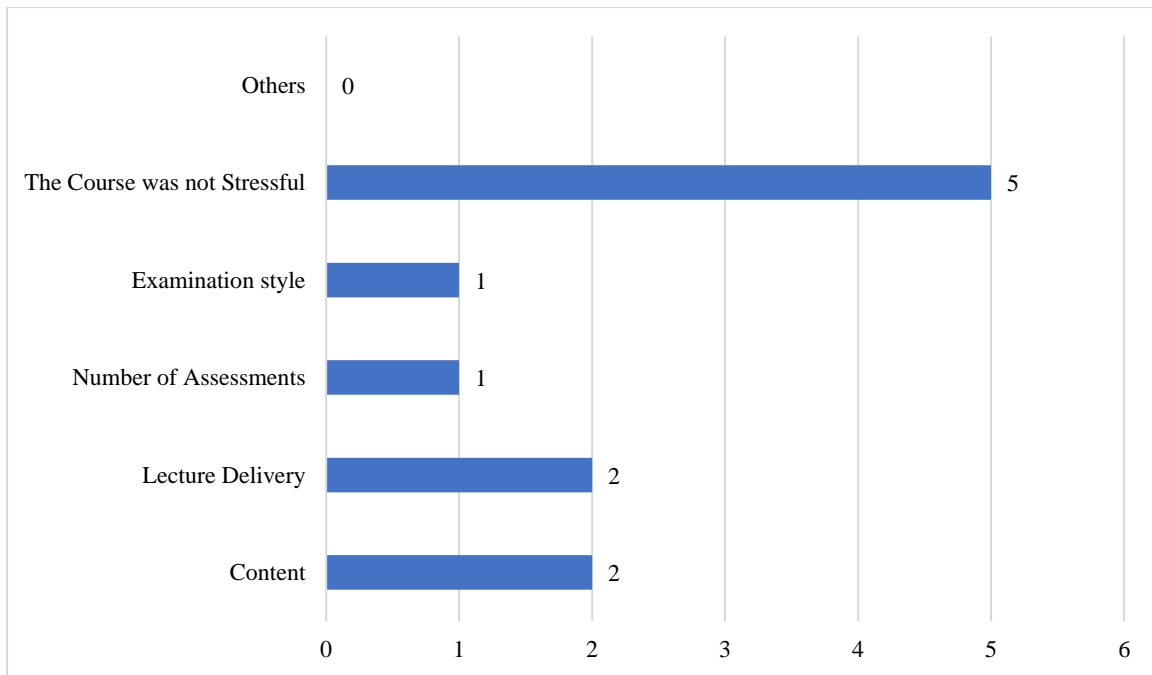We asked which parts of the course was stressful. The answers have been presented in 6.35.
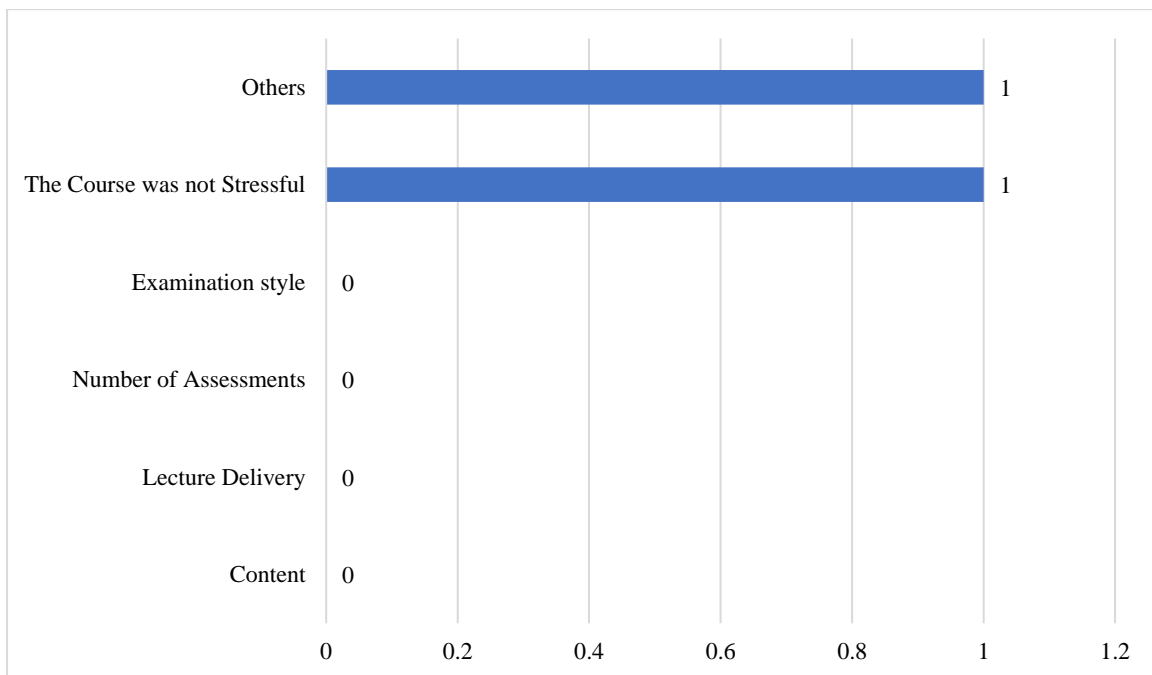
Figure 6.35: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.44.

Table 6.44: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	0
There was a lack of course materials. More course materials are needed.	1
The duration of the training was too long.	0
The duration of the training was too short.	2
Poor/not enough assessment methods.	0
The assessment methods or examination was stressful.	0

The objective of the course was not clear to me.	0
I did not get what I expected from the course.	1
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	0
I didn't feel comfortable in the classroom while asking about a problem.	2
I didn't like the environment of the classroom.	0
Poor feedback and support system.	0
There was no problem in the course.	0

Finally, Table 6.45 shows the rating of the course submitted by the participants.

Table 6.45: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	1	0	1	0	0
Course Structure	0	0	2	0	0
Course Contents	0	0	2	0	0
Delivery Quality	0	0	1	1	0
Duration	2	0	0	0	0
Trainer	0	0	0	1	1
Support Team	0	0	1	1	0
Environment	0	0	0	1	1
Accessibility of Information	0	0	1	0	1
Usage of Games	0	1	1	0	0
Expected Outcomes	0	1	1	0	0
Learning Experience	0	0	1	1	0
Overall Rating	0	0	1	1	0

6.2.1.2.13. Data Collected from Technical School & College ICT Training, Batch: 12-14

A total of 7 people submitted the form among which all of them were from Rajshahi. Figure 6.36 shows the distribution of division.
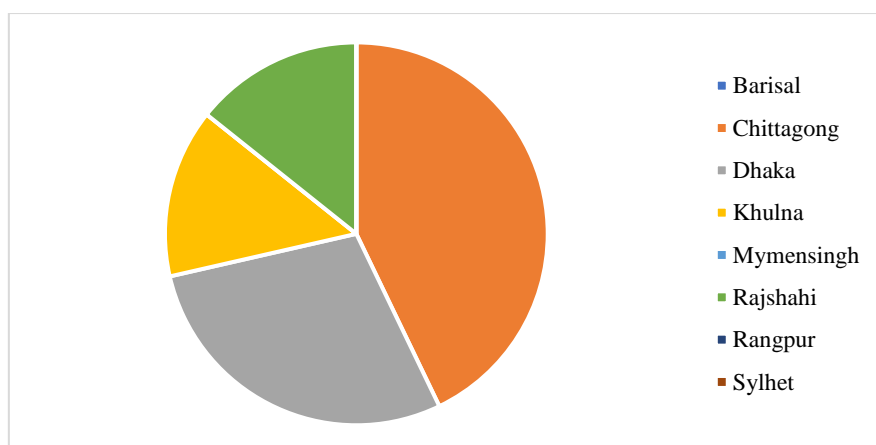
Figure 6.36: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.46.

Table 6.46: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	4	2	0	0	0
The course's title and description were easy to comprehend.	4	2	0	0	0
You felt confident enough before taking the course.	4	1	0	1	0
The course's sequence and flow were satisfactory.	2	4	0	0	0
You felt equally engaged in each course section.	2	3	0	1	0
There was a clear separation between the course's units.	3	1	1	1	0
You preferred more frequent assessments.	2	2	1	1	0
There were enough audio-visual contents throughout the course.	2	3	1	0	0
The quality of the content was consistent throughout the course.	2	4	0	0	0
There were enough variety in terms of course unit types.	2	4	0	0	0
The language was easy to understand.	3	3	0	0	0

The overall contents were highly engaging.	2	4	0	0	0
The reading materials was presented in an interesting way.	1	5	0	0	0
The course's content was too challenging for an average learner to understand.	1	2	2	1	0
The content was in-depth enough.	2	2	1	1	0
You liked the types of assessments used.	1	5	0	0	0
You notice any unnecessary repetitions in the content.	1	1	3	1	0
You, at some point, have to reread the content to understand it.	0	6	0	0	0
The course was easy to follow.	2	4	0	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	0	6	0	0	0
The course felt too rushed.	2	2	2	0	0
The course felt too monotone.	0	0	4	2	0
The course felt too automated.	1	3	2	0	0
The course was not interactive enough.	1	0	3	2	0
The overall course delivery was satisfactory.	3	2	0	1	0
You had enough times to complete the assigned tasks, assignments and assessments.	0	4	1	1	0
The duration of the course was satisfactory.	0	3	2	1	0
All the units of the course had enough time allocated.	0	2	3	1	0
Some of the units felt rushed.	1	4	1	0	0
In the beginning, time has been spent unnecessarily.	0	3	2	1	0
The timeline of the course can be improved.	4	2	0	0	0
Your trainer showed empathy and helped you in tackling problems.	5	1	0	0	0
You felt that the trainer is an expert of the course.	4	1	0	1	0
The communication skill of the trainer was satisfactory.	3	3	0	0	0

The delivery skill of the trainer was satisfactory.	4	2	0	0	0
Your trainer responded to your queries in a timely manner.	4	2	0	0	0
You felt comfortable expressing your problems to your trainer.	5	1	0	0	0
You think your trainer was perfect for this course.	2	3	1	0	0
Earning a certificate can make you feel more driven towards a course.	0	3	2	1	0
You love when a course offer certification along with training.	0	2	4	0	0
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	1	4	1	0	0
You believe that the certificate can help you get a job.	4	1	1	0	0
You will take similar course in the future if updates are added significantly.	3	1	2	0	0
So far, you're satisfied with the course outcomes.	2	2	1	1	0
You would recommend this course to others.	1	3	1	1	0
If asked, you will be able to summarize the goals and benefits of this course.	2	2	2	0	0
You think that the course materials can be improved for this course.	1	1	2	1	1
You think the learning experience can be improved.	5	0	1	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.37.
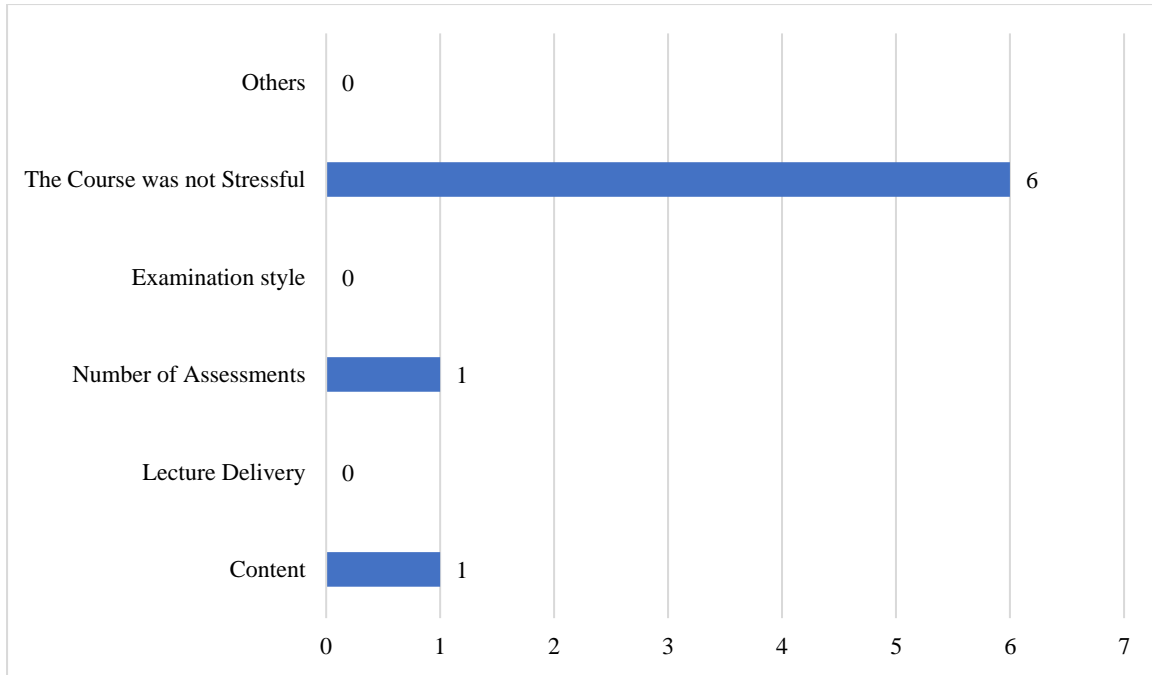
Figure 6.37: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.47.

Table 6.47: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	0
There was a lack of course materials. More course materials are needed.	1
The duration of the training was too long.	0
The duration of the training was too short.	7
Poor/not enough assessment methods.	2
The assessment methods or examination was stressful.	1
The objective of the course was not clear to me.	0
I did not get what I expected from the course.	0
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	0
I didn't feel comfortable in the classroom while asking about a problem.	1
I didn't like the environment of the classroom.	0
Poor feedback and support system.	0
There was no problem in the course.	1

Finally, Table 6.48 shows the rating of the course submitted by the participants.

Table 6.48: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	1	1	2	1	1
Course Structure	1	0	2	2	1
Course Contents	1	1	1	2	1
Delivery Quality	0	1	2	1	2
Duration	1	3	2	0	0
Trainer	1	0	2	0	3
Support Team	1	1	0	1	3
Environment	1	0	1	0	4
Accessibility of Information	1	0	1	2	2
Usage of Games	1	2	2	1	0
Expected Outcomes	0	1	3	2	0
Learning Experience	0	1	2	3	0
Overall Rating	1	0	3	2	0

6.2.1.2.14. Data Collected from Technical School & College ICT Training, Batch: 15, 16

A total of 6 people submitted the form among which all of them were from Rajshahi. Figure 6.38 shows the distribution of division.
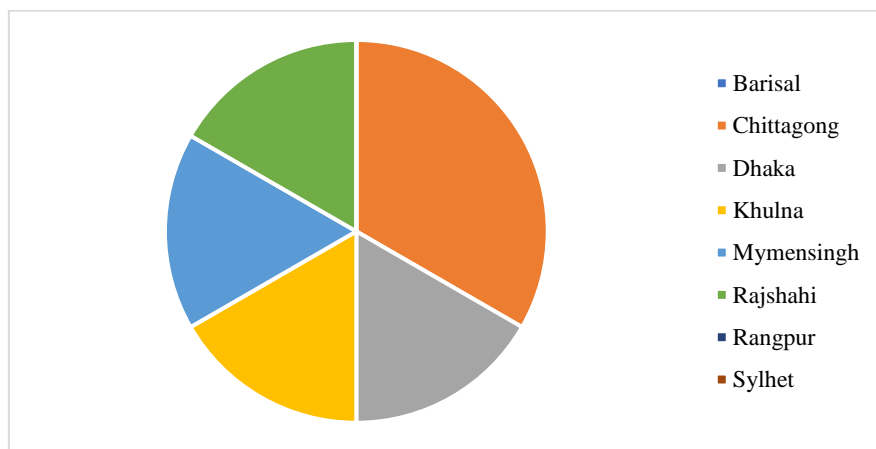
Figure 6.38: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.49.

Table 6.49: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	4	2	0	0	0

The course's title and description were easy to comprehend.	5	1	0	0	0
You felt confident enough before taking the course.	5	0	1	0	0
The course's sequence and flow were satisfactory.	4	2	0	0	0
You felt equally engaged in each course section.	4	2	0	0	0
There was a clear separation between the course's units.	4	1	1	0	0
You preferred more frequent assessments.	2	1	2	1	0
There were enough audio-visual contents throughout the course.	4	2	0	0	0
The quality of the content was consistent throughout the course.	5	1	0	0	0
There were enough variety in terms of course unit types.	5	1	0	0	0
The language was easy to understand.	6	0	0	0	0
The overall contents were highly engaging.	5	1	0	0	0
The reading materials was presented in an interesting way.	2	4	0	0	0
The course's content was too challenging for an average learner to understand.	2	3	1	0	0
The content was in-depth enough.	2	4	0	0	0
You liked the types of assessments used.	6	0	0	0	0
You notice any unnecessary repetitions in the content.	0	1	3	1	1
You, at some point, have to reread the content to understand it.	1	4	1	0	0
The course was easy to follow.	3	3	0	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	1	3	2	0	0
The course felt too rushed.	1	3	2	0	0
The course felt too monotone.	0	2	3	0	1
The course felt too automated.	2	3	1	0	0
The course was not interactive enough.	1	0	3	1	1

The overall course delivery was satisfactory.	6	0	0	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	1	5	0	0	0
The duration of the course was satisfactory.	1	2	3	0	0
All the units of the course had enough time allocated.	1	2	3	0	0
Some of the units felt rushed.	1	3	2	0	0
In the beginning, time has been spent unnecessarily.	1	1	2	0	2
The timeline of the course can be improved.	5	1	0	0	0
Your trainer showed empathy and helped you in tackling problems.	5	1	0	0	0
You felt that the trainer is an expert of the course.	3	2	1	0	0
The communication skill of the trainer was satisfactory.	4	2	0	0	0
The delivery skill of the trainer was satisfactory.	4	2	0	0	0
Your trainer responded to your queries in a timely manner.	3	3	0	0	0
You felt comfortable expressing your problems to your trainer.	4	2	0	0	0
You think your trainer was perfect for this course.	3	3	0	0	0
Earning a certificate can make you feel more driven towards a course.	1	0	2	3	0
You love when a course offer certification along with training.	1	3	0	1	1
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	4	2	0	0	0
You believe that the certificate can help you get a job.	4	2	0	0	0
You will take similar course in the future if updates are added significantly.	4	2	0	0	0
So far, you're satisfied with the course outcomes.	2	3	1	0	0

You would recommend this course to others.	0	4	2	0	0
If asked, you will be able to summarize the goals and benefits of this course.	1	4	1	0	0
You think that the course materials can be improved for this course.	0	1	3	0	2
You think the learning experience can be improved.	6	0	0	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.39.
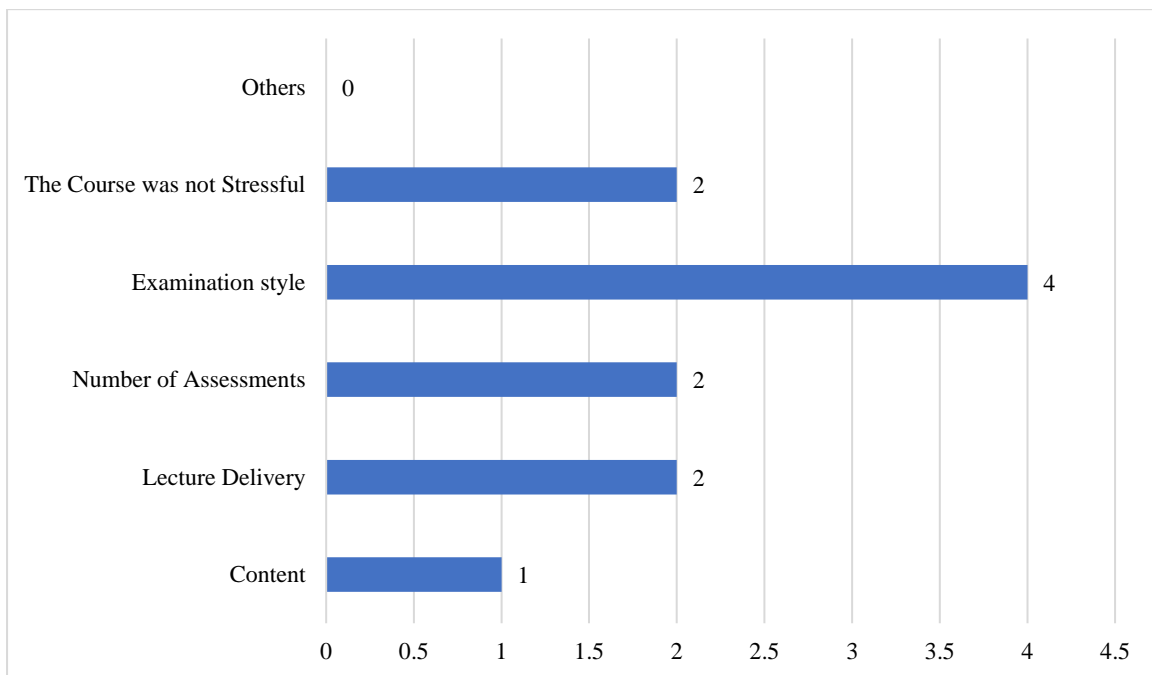
Figure 6.39: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.50.

Table 6.50: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	0
There was a lack of course materials. More course materials are needed.	0
The duration of the training was too long.	0
The duration of the training was too short.	5
Poor/not enough assessment methods.	1
The assessment methods or examination was stressful.	2

The objective of the course was not clear to me.	0
I did not get what I expected from the course.	1
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	0
I didn't feel comfortable in the classroom while asking about a problem.	0
I didn't like the environment of the classroom.	0
Poor feedback and support system.	0
There was no problem in the course.	1

Finally, Table 6.51 shows the rating of the course submitted by the participants.

Table 6.51: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	1	0	3	0	2
Course Structure	1	1	1	2	1
Course Contents	1	0	2	1	2
Delivery Quality	0	2	1	1	2
Duration	1	0	1	1	3
Trainer	0	1	2	0	3
Support Team	1	0	2	1	2
Environment	1	0	2	1	2
Accessibility of Information	1	0	3	1	1
Usage of Games	2	0	3	0	1
Expected Outcomes	0	0	2	2	2
Learning Experience	0	1	2	2	1
Overall Rating	0	0	2	2	1

6.2.1.2.15. Data Collected from Technical School & College ICT Training, Batch: 17, 18

A total of 4 people submitted the form among which all of them were from Rajshahi. Figure 6.40 shows the distribution of division.
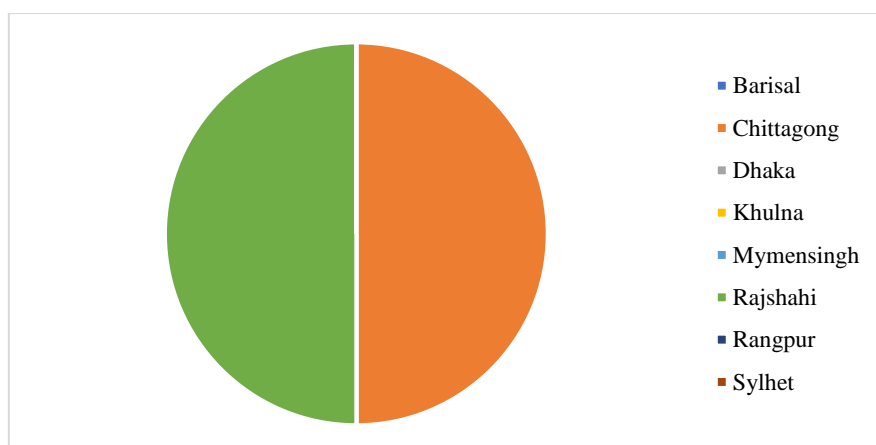
Figure 6.40: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.52.

Table 6.52: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	3	1	0	0	0
The course's title and description were easy to comprehend.	1	3	0	0	0
You felt confident enough before taking the course.	2	2	0	0	0
The course's sequence and flow were satisfactory.	1	3	0	0	0
You felt equally engaged in each course section.	2	2	0	0	0
There was a clear separation between the course's units.	0	3	1	0	0
You preferred more frequent assessments.	0	2	2	0	0
There were enough audio-visual contents throughout the course.	1	2	1	0	0
The quality of the content was consistent throughout the course.	1	3	0	0	0
There were enough variety in terms of course unit types.	1	3	0	0	0
The language was easy to understand.	3	1	0	0	0

Statement					
The overall contents were highly engaging.	2	1	1	0	0
The reading materials was presented in an interesting way.	2	1	1	0	0
The course's content was too challenging for an average learner to understand.	0	2	2	0	0
The content was in-depth enough.	1	2	0	1	0
You liked the types of assessments used.	3	0	1	0	0
You notice any unnecessary repetitions in the content.	1	1	2	0	0
You, at some point, have to reread the content to understand it.	0	2	1	1	0
The course was easy to follow.	2	2	0	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	1	1	2	0	0
The course felt too rushed.	1	1	1	1	0
The course felt too monotone.	1	1	1	1	0
The course felt too automated.	1	1	2	0	0
The course was not interactive enough.	0	2	1	0	1
The overall course delivery was satisfactory.	1	3	0	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	2	2	0	0	0
The duration of the course was satisfactory.	2	1	0	1	0
All the units of the course had enough time allocated.	1	2	1	0	0
Some of the units felt rushed.	0	3	0	0	1
In the beginning, time has been spent unnecessarily.	0	3	0	0	1
The timeline of the course can be improved.	0	4	0	0	0
Your trainer showed empathy and helped you in tackling problems.	1	3	0	0	0
You felt that the trainer is an expert of the course.	1	2	0	1	0
The communication skill of the trainer was satisfactory.	2	1	1	0	0

The delivery skill of the trainer was satisfactory.	1	3	0	0	0
Your trainer responded to your queries in a timely manner.	1	2	1	0	0
You felt comfortable expressing your problems to your trainer.	2	2	0	0	0
You think your trainer was perfect for this course.	2	1	1	0	0
Earning a certificate can make you feel more driven towards a course.	0	2	0	1	1
You love when a course offer certification along with training.	0	2	1	1	0
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	2	1	1	0	0
You believe that the certificate can help you get a job.	3	1	0	0	0
You will take similar course in the future if updates are added significantly.	2	1	1	0	0
So far, you're satisfied with the course outcomes.	1	2	0	1	0
You would recommend this course to others.	1	2	1	0	0
If asked, you will be able to summarize the goals and benefits of this course.	1	2	0	1	0
You think that the course materials can be improved for this course.	1	2	0	1	0
You think the learning experience can be improved.	2	2	0	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.41.
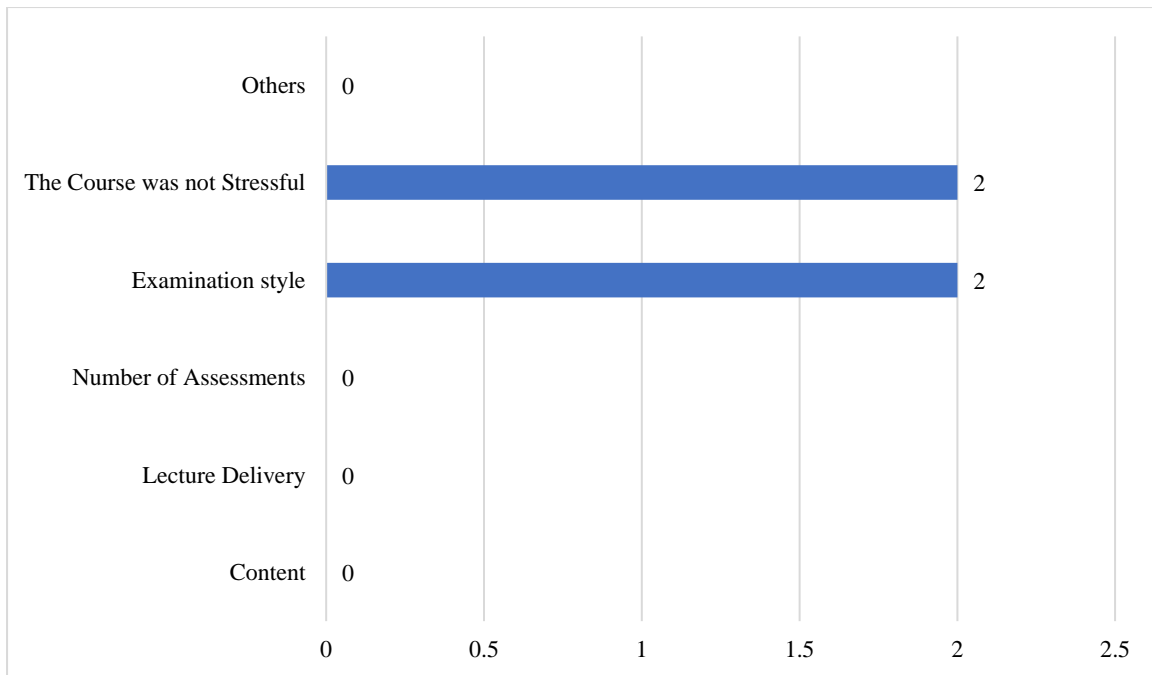
Figure 6.41: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.53.

Table 6.53: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	1
There was a lack of course materials. More course materials are needed.	1
The duration of the training was too long.	0
The duration of the training was too short.	2
Poor/not enough assessment methods.	0
The assessment methods or examination was stressful.	2
The objective of the course was not clear to me.	0
I did not get what I expected from the course.	1
The performance of the trainer was not satisfactory.	1
The lecture materials were not well designed.	0
I didn't feel comfortable in the classroom while asking about a problem.	0
I didn't like the environment of the classroom.	0
Poor feedback and support system.	0
There was no problem in the course.	2

Finally, Table 6.54 shows the rating of the course submitted by the participants.

Table 6.54: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	1	1	1	1	0
Course Structure	0	0	1	3	0
Course Contents	1	0	1	1	0
Delivery Quality	0	0	2	0	1
Duration	0	0	2	0	2
Trainer	0	0	2	0	1
Support Team	0	0	1	0	1
Environment	0	0	1	1	1
Accessibility of Information	0	0	1	1	1
Usage of Games	0	0	2	0	1
Expected Outcomes	0	1	0	1	2
Learning Experience	0	0	1	1	2
Overall Rating	0	0	1	1	2

6.2.1.2.16. Data Collected from Technical School & College ICT Training, Batch: 19, 20

A total of 34 people submitted the form among which all of them were from Rajshahi. Figure 6.42 shows the distribution of division.
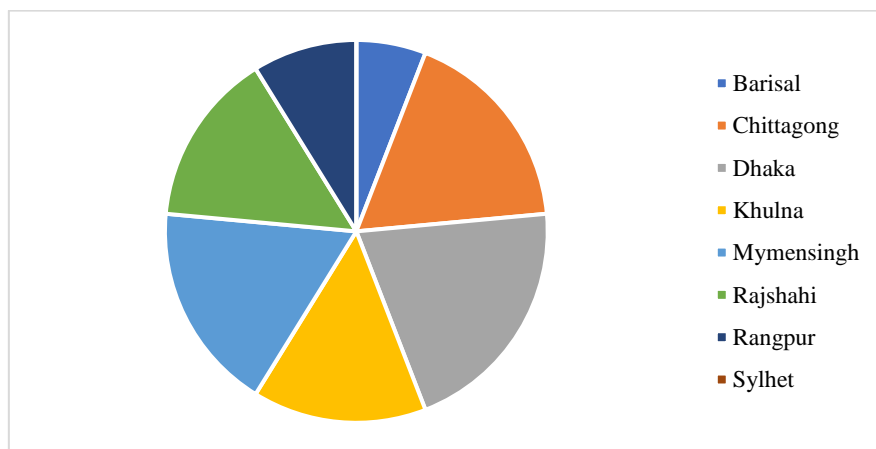
Figure 6.42: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.55.

Table 6.55: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	21	13	0	0	0

The course's title and description were easy to comprehend.	19	14	0	1	0
You felt confident enough before taking the course.	18	13	1	2	0
The course's sequence and flow were satisfactory.	13	19	1	1	0
You felt equally engaged in each course section.	17	14	2	1	0
There was a clear separation between the course's units.	6	16	5	5	2
You preferred more frequent assessments.	10	11	3	8	2
There were enough audio-visual contents throughout the course.	16	14	1	3	0
The quality of the content was consistent throughout the course.	16	17	0	1	0
There were enough variety in terms of course unit types.	14	16	3	0	0
The language was easy to understand.	15	19	0	0	0
The overall contents were highly engaging.	16	15	3	0	0
The reading materials was presented in an interesting way.	16	17	1	0	0
The course's content was too challenging for an average learner to understand.	4	16	4	9	1
The content was in-depth enough.	6	20	7	1	0
You liked the types of assessments used.	8	22	3	1	0
You notice any unnecessary repetitions in the content.	1	7	11	12	3
You, at some point, have to reread the content to understand it.	4	14	7	7	2
The course was easy to follow.	8	23	2	1	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	4	15	4	9	2
The course felt too rushed.	8	16	4	5	1
The course felt too monotone.	1	5	8	15	5
The course felt too automated.	4	19	6	5	0
The course was not interactive enough.	2	4	5	16	7

The overall course delivery was satisfactory.	10	24	0	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	3	15	3	11	2
The duration of the course was satisfactory.	2	11	2	14	5
All the units of the course had enough time allocated.	2	9	3	14	5
Some of the units felt rushed.	5	17	3	7	2
In the beginning, time has been spent unnecessarily.	2	0	6	20	6
The timeline of the course can be improved.	17	16	0	1	0
Your trainer showed empathy and helped you in tackling problems.	24	10	0	0	0
You felt that the trainer is an expert of the course.	18	16	0	0	0
The communication skill of the trainer was satisfactory.	20	13	0	0	0
The delivery skill of the trainer was satisfactory.	19	15	0	0	0
Your trainer responded to your queries in a timely manner.	18	14	1	0	0
You felt comfortable expressing your problems to your trainer.	19	14	0	0	0
You think your trainer was perfect for this course.	18	13	2	0	0
Earning a certificate can make you feel more driven towards a course.	3	5	4	18	3
You love when a course offer certification along with training.	3	11	2	12	5
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	13	19	1	0	0
You believe that the certificate can help you get a job.	17	16	0	0	0
You will take similar course in the future if updates are added significantly.	13	17	3	0	0
So far, you're satisfied with the course outcomes.	11	15	2	3	2

You would recommend this course to others.	12	16	1	4	0
If asked, you will be able to summarize the goals and benefits of this course.	8	18	3	3	1
You think that the course materials can be improved for this course.	3	6	4	12	8
You think the learning experience can be improved.	13	15	5	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.43.
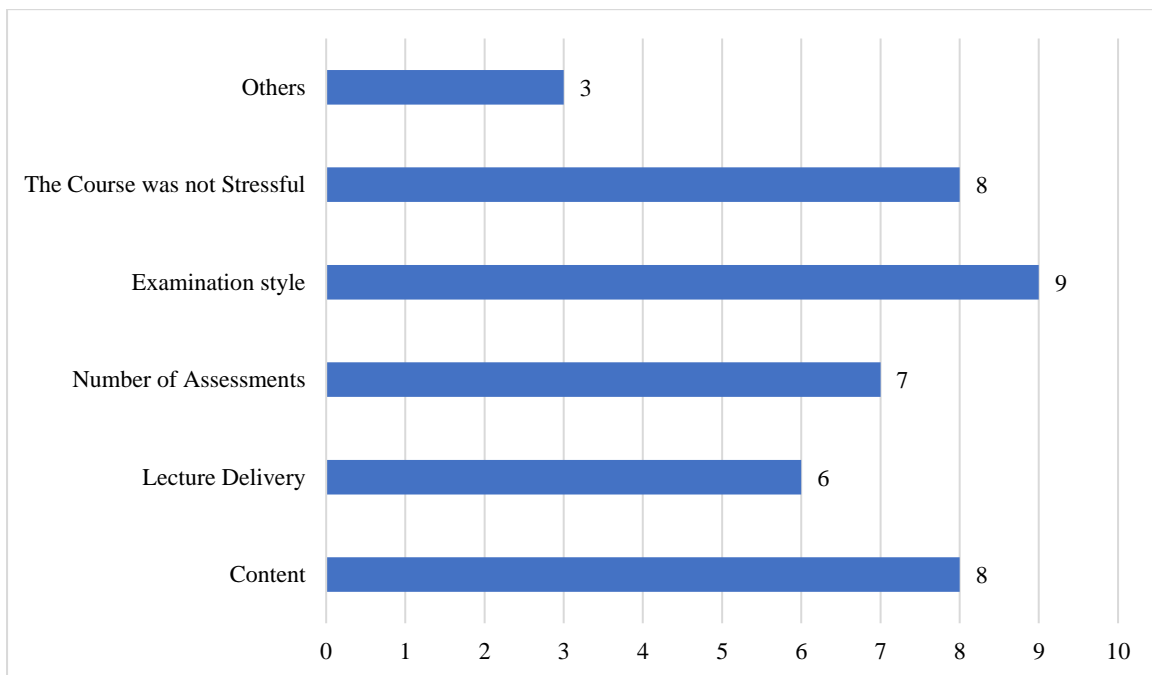
Figure 6.43: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.56.

Table 6.56: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	2
There was a lack of course materials. More course materials are needed.	3
The duration of the training was too long.	1
The duration of the training was too short.	21
Poor/not enough assessment methods.	8
The assessment methods or examination was stressful.	11

The objective of the course was not clear to me.	1
I did not get what I expected from the course.	0
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	1
I didn't feel comfortable in the classroom while asking about a problem.	2
I didn't like the environment of the classroom.	0
Poor feedback and support system.	2
There was no problem in the course.	8

Finally, Table 6.57 shows the rating of the course submitted by the participants.

Table 6.57: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	7	0	6	9	8
Course Structure	0	4	6	8	9
Course Contents	1	4	4	7	12
Delivery Quality	2	1	5	9	11
Duration	4	4	10	7	3
Trainer	3	0	3	8	14
Support Team	3	0	3	10	12
Environment	3	0	3	10	11
Accessibility of Information	3	2	2	11	10
Usage of Games	12	2	6	5	3
Expected Outcomes	5	1	6	9	7
Learning Experience	3	0	3	11	10
Overall Rating	2	2	4	11	9

6.2.1.2.17. Data Collected from ICT Teachers Training, Batch: 31

A total of 21 people submitted the form among which all of them were from Rajshahi. Figure 6.44 shows the distribution of division.
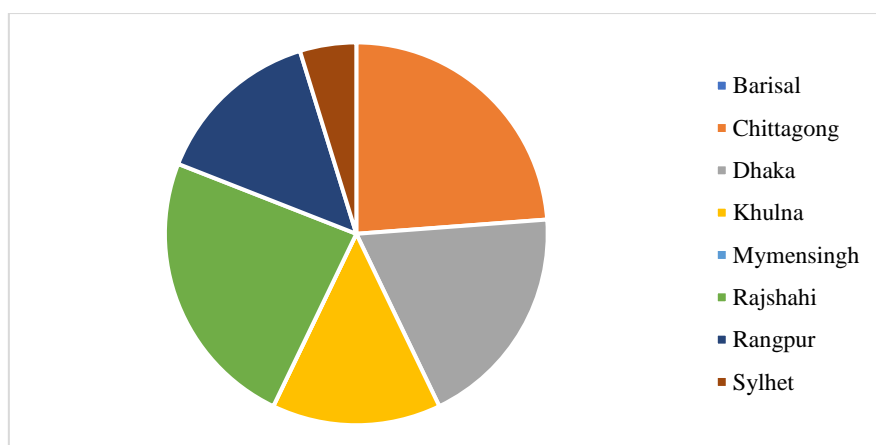
Figure 6.44: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.58.

Table 6.58: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	10	10	0	0	0
The course's title and description were easy to comprehend.	11	8	1	0	0
You felt confident enough before taking the course.	8	8	4	0	0
The course's sequence and flow were satisfactory.	12	6	1	1	0
You felt equally engaged in each course section.	9	7	4	0	0
There was a clear separation between the course's units.	4	7	7	1	1
You preferred more frequent assessments.	7	7	2	3	0
There were enough audio-visual contents throughout the course.	7	8	2	3	0
The quality of the content was consistent throughout the course.	7	10	2	1	0
There were enough variety in terms of course unit types.	7	10	3	0	0
The language was easy to understand.	14	4	2	0	0

Statement					
The overall contents were highly engaging.	12	8	0	0	0
The reading materials was presented in an interesting way.	7	9	2	1	0
The course's content was too challenging for an average learner to understand.	1	8	6	4	1
The content was in-depth enough.	5	7	5	3	0
You liked the types of assessments used.	5	11	3	0	1
You notice any unnecessary repetitions in the content.	3	2	3	9	3
You, at some point, have to reread the content to understand it.	2	10	5	3	0
The course was easy to follow.	6	11	3	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	3	12	3	2	0
The course felt too rushed.	7	7	3	3	0
The course felt too monotone.	1	1	9	7	2
The course felt too automated.	5	10	4	1	0
The course was not interactive enough.	0	5	6	7	1
The overall course delivery was satisfactory.	6	12	2	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	4	8	3	5	0
The duration of the course was satisfactory.	3	6	5	3	3
All the units of the course had enough time allocated.	3	5	3	6	3
Some of the units felt rushed.	2	12	3	2	1
In the beginning, time has been spent unnecessarily.	2	2	4	7	4
The timeline of the course can be improved.	7	11	1	1	0
Your trainer showed empathy and helped you in tackling problems.	14	6	0	0	0
You felt that the trainer is an expert of the course.	8	9	3	0	0
The communication skill of the trainer was satisfactory.	6	13	1	0	0

The delivery skill of the trainer was satisfactory.	7	13	0	0	0
Your trainer responded to your queries in a timely manner.	7	11	2	0	0
You felt comfortable expressing your problems to your trainer.	9	9	2	0	0
You think your trainer was perfect for this course.	6	9	3	2	0
Earning a certificate can make you feel more driven towards a course.	2	7	5	6	0
You love when a course offer certification along with training.	2	6	7	3	2
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	7	8	5	0	0
You believe that the certificate can help you get a job.	13	7	0	0	0
You will take similar course in the future if updates are added significantly.	5	12	2	1	0
So far, you're satisfied with the course outcomes.	7	9	3	1	0
You would recommend this course to others.	4	13	3	0	0
If asked, you will be able to summarize the goals and benefits of this course.	6	10	3	1	0
You think that the course materials can be improved for this course.	1	6	5	8	0
You think the learning experience can be improved.	13	7	0	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.45.
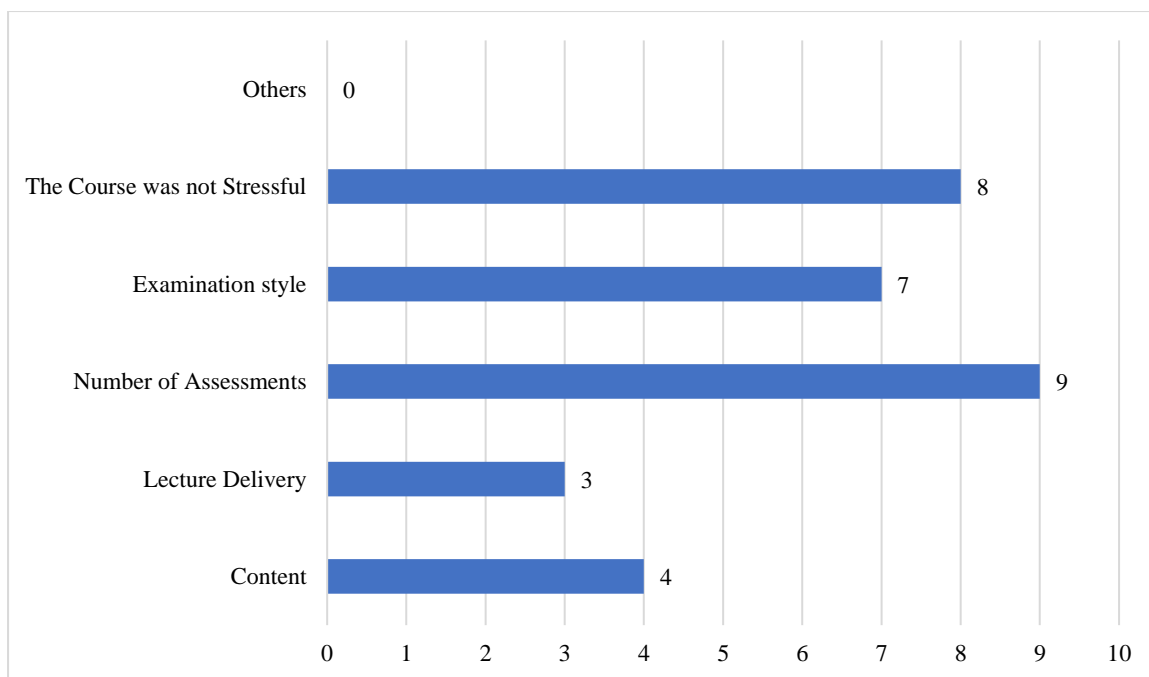
Figure 6.45: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.59.

Table 6.59: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	1
There was a lack of course materials. More course materials are needed.	6
The duration of the training was too long.	0
The duration of the training was too short.	13
Poor/not enough assessment methods.	5
The assessment methods or examination was stressful.	7
The objective of the course was not clear to me.	1
I did not get what I expected from the course.	2
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	3
I didn't feel comfortable in the classroom while asking about a problem.	1
I didn't like the environment of the classroom.	0
Poor feedback and support system.	0
There was no problem in the course.	6

Finally, Table 6.60 shows the rating of the course submitted by the participants.

Table 6.60: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	4	1	4	5	5
Course Structure	2	1	1	8	7
Course Contents	2	2	2	3	10
Delivery Quality	1	3	3	8	4
Duration	3	6	3	3	4
Trainer	1	1	4	6	7
Support Team	2	0	4	3	10
Environment	2	1	1	2	13
Accessibility of Information	1	2	1	9	6
Usage of Games	4	6	7	2	0
Expected Outcomes	2	2	4	6	5
Learning Experience	1	2	3	7	5
Overall Rating	1	1	4	6	7

6.2.1.2.18. Data Collected from ICT Teachers Training, Batch: 32

A total of 11 people submitted the form among which all of them were from Rajshahi. Figure 6.46 shows the distribution of division.
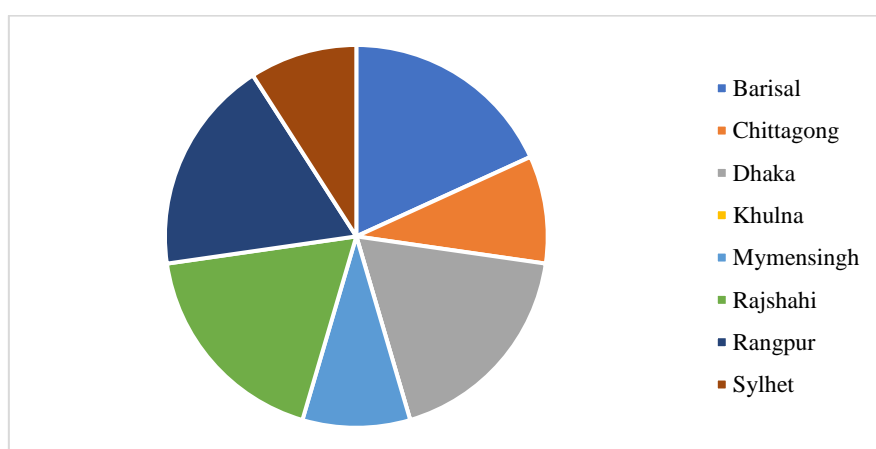
Figure 6.46: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.61.

Table 6.61: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	7	2	1	0	0

The course's title and description were easy to comprehend.	7	2	1	0	0
You felt confident enough before taking the course.	5	3	2	0	0
The course's sequence and flow were satisfactory.	6	4	0	0	0
You felt equally engaged in each course section.	5	5	0	0	0
There was a clear separation between the course's units.	4	4	0	1	1
You preferred more frequent assessments.	4	4	2	0	0
There were enough audio-visual contents throughout the course.	7	3	0	0	0
The quality of the content was consistent throughout the course.	7	3	0	0	0
There were enough variety in terms of course unit types.	3	6	0	0	1
The language was easy to understand.	8	2	0	0	0
The overall contents were highly engaging.	6	4	0	0	0
The reading materials was presented in an interesting way.	4	6	0	0	0
The course's content was too challenging for an average learner to understand.	2	6	2	0	0
The content was in-depth enough.	3	7	0	0	0
You liked the types of assessments used.	7	3	0	0	0
You notice any unnecessary repetitions in the content.	1	3	3	3	0
You, at some point, have to reread the content to understand it.	3	2	4	0	1
The course was easy to follow.	5	4	0	1	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	3	4	1	2	0
The course felt too rushed.	3	4	2	0	1
The course felt too monotone.	2	2	2	4	0
The course felt too automated.	3	6	1	0	0
The course was not interactive enough.	3	3	3	1	0

The overall course delivery was satisfactory.	8	2	0	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	5	4	0	1	0
The duration of the course was satisfactory.	3	5	2	0	0
All the units of the course had enough time allocated.	2	6	1	1	0
Some of the units felt rushed.	3	5	0	2	0
In the beginning, time has been spent unnecessarily.	1	3	2	3	1
The timeline of the course can be improved.	7	3	0	0	0
Your trainer showed empathy and helped you in tackling problems.	6	4	0	0	0
You felt that the trainer is an expert of the course.	7	2	1	0	0
The communication skill of the trainer was satisfactory.	7	2	1	0	0
The delivery skill of the trainer was satisfactory.	8	2	0	0	0
Your trainer responded to your queries in a timely manner.	9	1	0	0	0
You felt comfortable expressing your problems to your trainer.	8	2	0	0	0
You think your trainer was perfect for this course.	5	5	0	0	0
Earning a certificate can make you feel more driven towards a course.	0	7	2	0	1
You love when a course offer certification along with training.	2	3	2	2	1
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	3	7	0	0	0
You believe that the certificate can help you get a job.	6	4	0	0	0
You will take similar course in the future if updates are added significantly.	4	5	1	0	0
So far, you're satisfied with the course outcomes.	6	4	0	0	0

You would recommend this course to others.	4	5	1	0	0
If asked, you will be able to summarize the goals and benefits of this course.	5	5	0	0	0
You think that the course materials can be improved for this course.	1	5	3	1	0
You think the learning experience can be improved.	8	2	0	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.47.
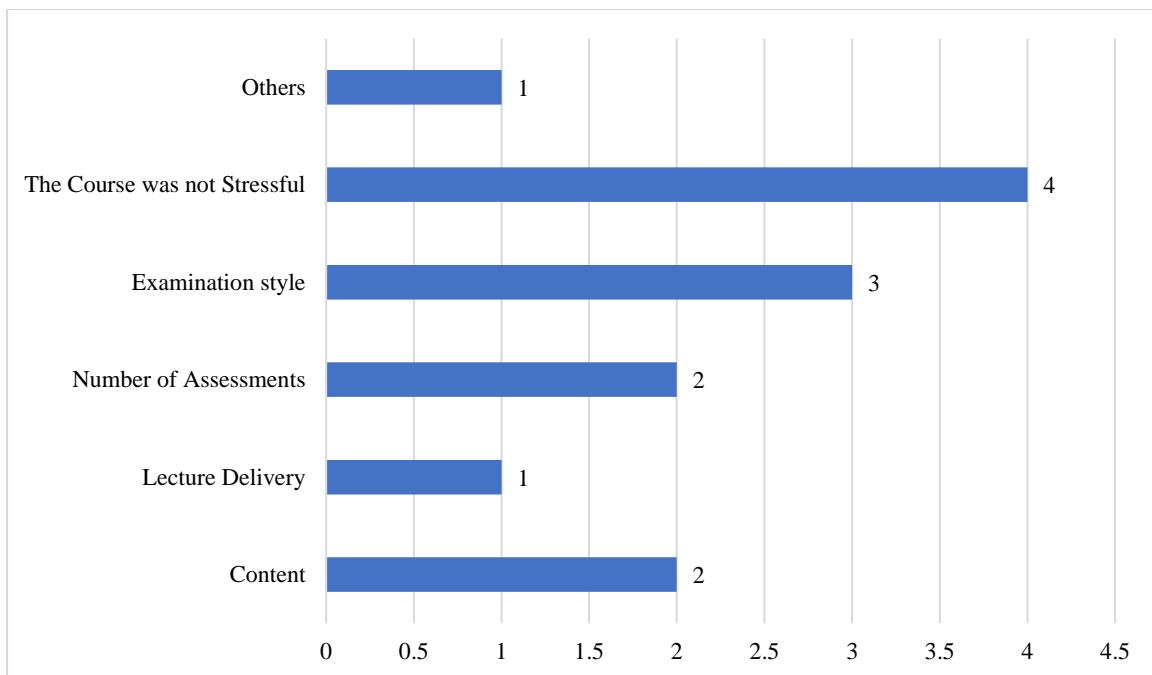
Figure 6.47: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.62.

Table 6.62: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	1
There was a lack of course materials. More course materials are needed.	1
The duration of the training was too long.	0
The duration of the training was too short.	5
Poor/not enough assessment methods.	2
The assessment methods or examination was stressful.	3

The objective of the course was not clear to me.	0
I did not get what I expected from the course.	0
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	1
I didn't feel comfortable in the classroom while asking about a problem.	0
I didn't like the environment of the classroom.	0
Poor feedback and support system.	1
There was no problem in the course.	5

Finally, Table 6.63 shows the rating of the course submitted by the participants.

Table 6.63: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	1	3	2	1	3
Course Structure	1	2	1	4	2
Course Contents	2	1	1	2	4
Delivery Quality	3	1	0	1	5
Duration	3	0	3	2	2
Trainer	3	1	0	0	6
Support Team	2	1	1	3	3
Environment	3	0	1	1	5
Accessibility of Information	2	1	2	2	3
Usage of Games	4	3	2	0	1
Expected Outcomes	2	2	1	1	3
Learning Experience	3	0	1	2	4
Overall Rating	3	0	1	2	4

6.2.1.2.19. Data Collected from ICT Teachers Training, Batch: 33

A total of 31 people submitted the form among which all of them were from Rajshahi. Figure 6.48 shows the distribution of division.
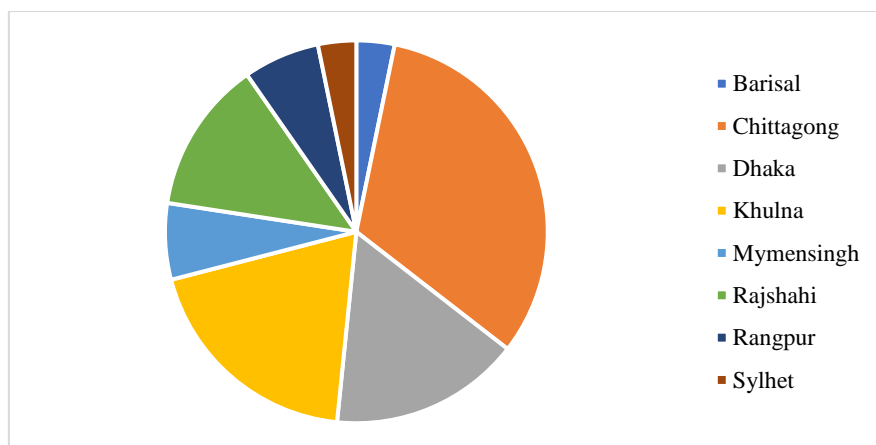
Figure 6.48: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.64.

Table 6.64: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	20	8	1	0	1
The course's title and description were easy to comprehend.	23	6	0	0	1
You felt confident enough before taking the course.	16	8	2	2	2
The course's sequence and flow were satisfactory.	16	10	4	0	1
You felt equally engaged in each course section.	17	10	1	2	1
There was a clear separation between the course's units.	10	6	7	5	3
You preferred more frequent assessments.	12	8	4	4	2
There were enough audio-visual contents throughout the course.	12	12	1	5	1
The quality of the content was consistent throughout the course.	12	16	0	2	1
There were enough variety in terms of course unit types.	17	13	0	0	1
The language was easy to understand.	22	8	0	0	1

The overall contents were highly engaging.	20	8	1	0	1
The reading materials was presented in an interesting way.	21	8	1	0	1
The course's content was too challenging for an average learner to understand.	12	8	6	3	1
The content was in-depth enough.	17	6	4	3	1
You liked the types of assessments used.	13	13	2	2	1
You notice any unnecessary repetitions in the content.	5	3	5	12	6
You, at some point, have to reread the content to understand it.	6	17	1	6	1
The course was easy to follow.	13	14	1	2	1
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	10	12	2	3	4
The course felt too rushed.	13	7	4	5	2
The course felt too monotone.	3	2	7	10	9
The course felt too automated.	10	13	6	1	1
The course was not interactive enough.	4	2	8	8	8
The overall course delivery was satisfactory.	18	9	3	0	1
You had enough times to complete the assigned tasks, assignments and assessments.	13	8	2	7	1
The duration of the course was satisfactory.	9	9	4	6	3
All the units of the course had enough time allocated.	5	6	3	12	5
Some of the units felt rushed.	7	15	4	3	2
In the beginning, time has been spent unnecessarily.	4	1	9	11	6
The timeline of the course can be improved.	18	11	1	0	1
Your trainer showed empathy and helped you in tackling problems.	24	5	0	0	2
You felt that the trainer is an expert of the course.	21	9	0	0	1
The communication skill of the trainer was satisfactory.	21	9	0	0	1

The delivery skill of the trainer was satisfactory.	20	10	0	0	1
Your trainer responded to your queries in a timely manner.	23	6	1	0	1
You felt comfortable expressing your problems to your trainer.	20	10	0	0	1
You think your trainer was perfect for this course.	19	10	1	0	1
Earning a certificate can make you feel more driven towards a course.	5	6	5	11	4
You love when a course offer certification along with training.	5	6	3	12	5
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	13	13	4	0	1
You believe that the certificate can help you get a job.	24	6	0	0	1
You will take similar course in the future if updates are added significantly.	18	10	1	1	1
So far, you're satisfied with the course outcomes.	12	13	4	1	1
You would recommend this course to others.	9	15	3	3	1
If asked, you will be able to summarize the goals and benefits of this course.	11	9	4	5	2
You think that the course materials can be improved for this course.	8	5	6	8	4
You think the learning experience can be improved.	22	7	1	0	1

We asked which parts of the course was stressful. The answers have been presented in 6.49.
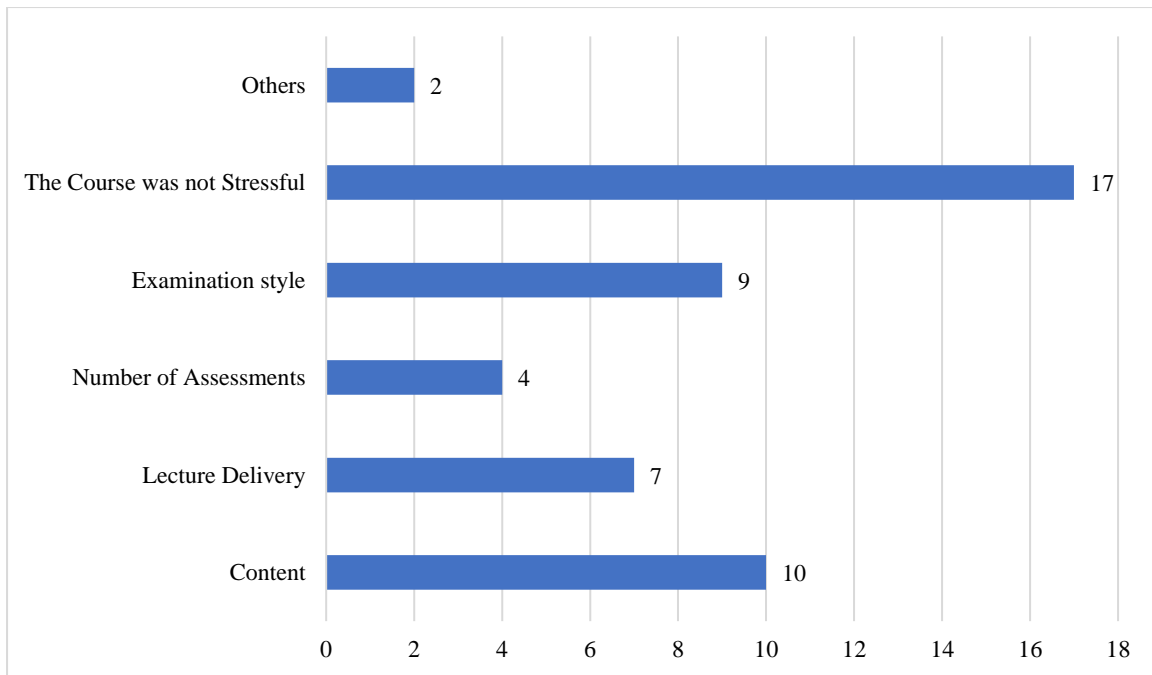
Figure 6.49: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.65.

Table 6.65: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	4
There was a lack of course materials. More course materials are needed.	4
The duration of the training was too long.	1
The duration of the training was too short.	16
Poor/not enough assessment methods.	3
The assessment methods or examination was stressful.	8
The objective of the course was not clear to me.	0
I did not get what I expected from the course.	4
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	3
I didn't feel comfortable in the classroom while asking about a problem.	0
I didn't like the environment of the classroom.	0
Poor feedback and support system.	2
There was no problem in the course.	14

Finally, Table 6.66 shows the rating of the course submitted by the participants.

Table 6.66: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	3	2	6	9	11
Course Structure	2	0	4	10	15
Course Contents	1	1	5	5	18
Delivery Quality	0	1	2	9	19
Duration	5	2	7	9	8
Trainer	1	0	2	6	22
Support Team	0	1	3	5	22
Environment	1	0	1	3	26
Accessibility of Information	0	2	4	8	17
Usage of Games	4	5	10	8	4
Expected Outcomes	0	1	5	10	15
Learning Experience	1	0	2	7	21
Overall Rating	1	0	4	8	18

6.2.1.2.20. Data Collected from ICT Teachers Training, Batch: 34

A total of 34 people submitted the form among which all of them were from Rajshahi. Figure 6.50 shows the distribution of division.

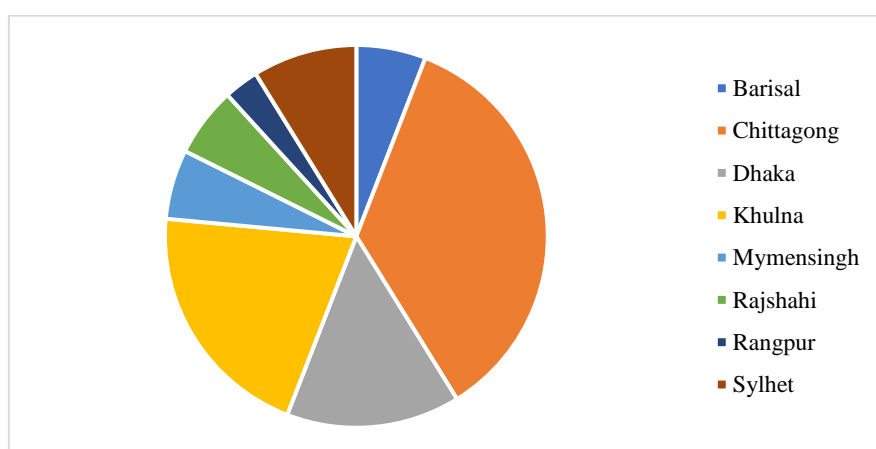Figure 6.50: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.67.

Table 6.67: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	20	14	0	0	0

The course's title and description were easy to comprehend.	28	6	0	0	0
You felt confident enough before taking the course.	27	7	0	0	0
The course's sequence and flow were satisfactory.	22	11	1	0	0
You felt equally engaged in each course section.	22	12	0	0	0
There was a clear separation between the course's units.	13	11	4	3	2
You preferred more frequent assessments.	5	8	9	8	4
There were enough audio-visual contents throughout the course.	19	11	2	2	0
The quality of the content was consistent throughout the course.	23	11	0	0	0
There were enough variety in terms of course unit types.	23	8	2	0	0
The language was easy to understand.	27	7	0	0	0
The overall contents were highly engaging.	22	11	0	0	0
The reading materials was presented in an interesting way.	24	9	0	0	0
The course's content was too challenging for an average learner to understand.	8	12	9	5	0
The content was in-depth enough.	10	17	4	3	0
You liked the types of assessments used.	19	12	1	2	0
You notice any unnecessary repetitions in the content.	6	5	12	5	6
You, at some point, have to reread the content to understand it.	7	18	6	2	1
The course was easy to follow.	15	18	1	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	1	13	12	6	2
The course felt too rushed.	7	10	9	4	3
The course felt too monotone.	1	5	12	12	4
The course felt too automated.	12	16	1	4	0
The course was not interactive enough.	4	6	9	9	5

The overall course delivery was satisfactory.	21	11	0	1	0
You had enough times to complete the assigned tasks, assignments and assessments.	15	12	3	4	0
The duration of the course was satisfactory.	11	16	1	5	1
All the units of the course had enough time allocated.	10	9	5	9	1
Some of the units felt rushed.	3	16	7	6	2
In the beginning, time has been spent unnecessarily.	1	6	10	7	10
The timeline of the course can be improved.	14	15	4	0	0
Your trainer showed empathy and helped you in tackling problems.	26	6	0	0	0
You felt that the trainer is an expert of the course.	26	5	0	1	0
The communication skill of the trainer was satisfactory.	22	9	0	0	0
The delivery skill of the trainer was satisfactory.	26	6	0	0	0
Your trainer responded to your queries in a timely manner.	24	6	2	0	0
You felt comfortable expressing your problems to your trainer.	23	9	0	0	0
You think your trainer was perfect for this course.	23	7	1	1	0
Earning a certificate can make you feel more driven towards a course.	1	5	10	10	4
You love when a course offer certification along with training.	4	6	7	11	2
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	14	15	1	1	0
You believe that the certificate can help you get a job.	26	6	0	0	0
You will take similar course in the future if updates are added significantly.	22	9	1	0	0
So far, you're satisfied with the course outcomes.	18	10	3	1	0

You would recommend this course to others.	10	12	4	4	2
If asked, you will be able to summarize the goals and benefits of this course.	13	15	4	0	0
You think that the course materials can be improved for this course.	5	8	9	8	2
You think the learning experience can be improved.	23	8	1	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.51.
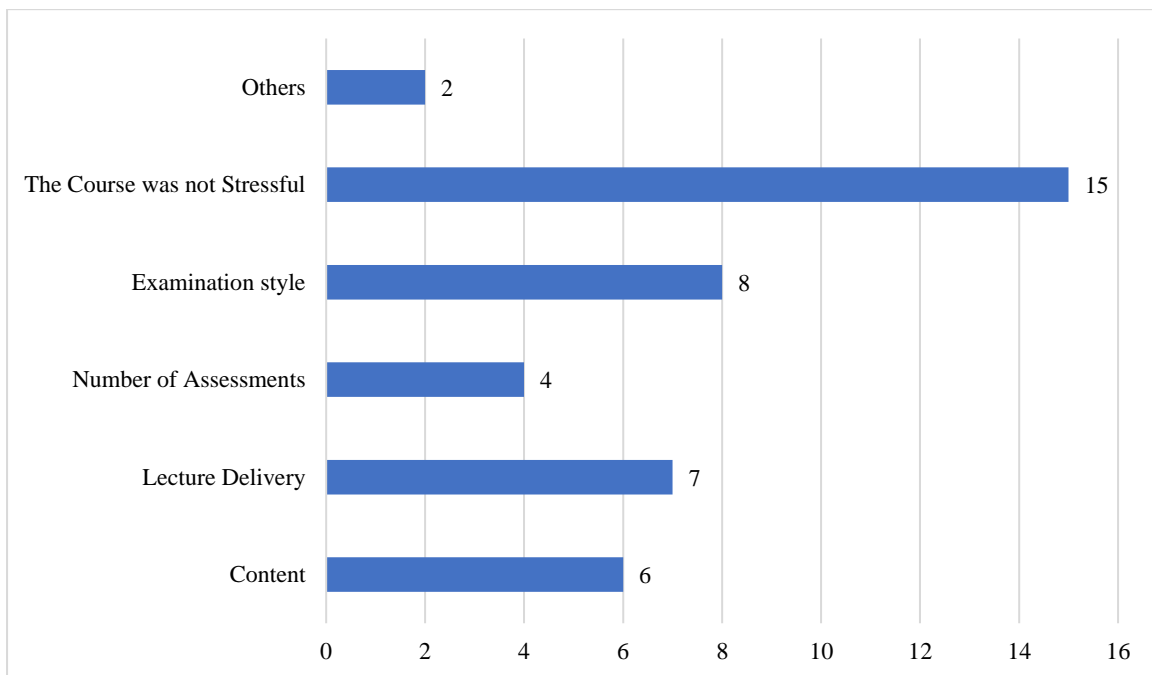
Figure 6.51: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.68.

Table 6.68: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	2
There was a lack of course materials. More course materials are needed.	0
The duration of the training was too long.	0
The duration of the training was too short.	16
Poor/not enough assessment methods.	0
The assessment methods or examination was stressful.	8

The objective of the course was not clear to me.	1
I did not get what I expected from the course.	1
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	0
I didn't feel comfortable in the classroom while asking about a problem.	2
I didn't like the environment of the classroom.	0
Poor feedback and support system.	2
There was no problem in the course.	16

Finally, Table 6.69 shows the rating of the course submitted by the participants.

Table 6.69: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	3	7	6	4	12
Course Structure	5	4	4	7	12
Course Contents	8	0	5	8	11
Delivery Quality	8	1	4	2	18
Duration	6	3	11	4	9
Trainer	8	0	3	2	20
Support Team	5	3	5	3	17
Environment	7	0	4	1	21
Accessibility of Information	6	2	6	3	16
Usage of Games	5	6	9	6	5
Expected Outcomes	5	5	6	7	10
Learning Experience	6	3	4	6	15
Overall Rating	5	3	4	7	14

6.2.1.2.21. Data Collected from ICT Teachers Training, Batch: 35

A total of 73 people submitted the form among which all of them were from Rajshahi. Figure 6.52 shows the distribution of division.
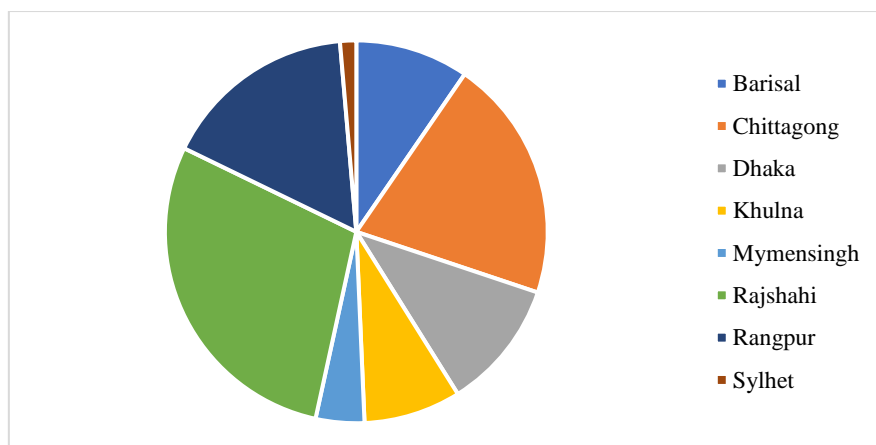
Figure 6.52: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.67.

Table 6.67: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	33	28	7	4	0
The course's title and description were easy to comprehend.	27	38	7	0	1
You felt confident enough before taking the course.	35	26	10	2	0
The course's sequence and flow were satisfactory.	27	34	5	3	3
You felt equally engaged in each course section.	27	35	5	5	0
There was a clear separation between the course's units.	12	24	15	14	3
You preferred more frequent assessments.	7	8	10	40	3
There were enough audio-visual contents throughout the course.	32	28	3	4	3
The quality of the content was consistent throughout the course.	32	28	5	6	2
There were enough variety in terms of course unit types.	26	30	12	1	0
The language was easy to understand.	41	26	3	0	1

The overall contents were highly engaging.	24	31	14	1	0
The reading materials was presented in an interesting way.	28	33	8	2	1
The course's content was too challenging for an average learner to understand.	17	24	15	11	5
The content was in-depth enough.	21	32	12	7	0
You liked the types of assessments used.	23	32	7	7	3
You notice any unnecessary repetitions in the content.	2	6	13	34	13
You, at some point, have to reread the content to understand it.	10	36	12	11	2
The course was easy to follow.	8	25	15	19	3
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	13	36	11	10	1
The course felt too rushed.	26	23	6	14	3
The course felt too monotone.	8	11	15	30	7
The course felt too automated.	7	33	21	5	2
The course was not interactive enough.	3	17	13	29	7
The overall course delivery was satisfactory.	16	42	5	4	2
You had enough times to complete the assigned tasks, assignments and assessments.	4	16	11	31	9
The duration of the course was satisfactory.	9	23	11	21	7
All the units of the course had enough time allocated.	4	19	11	28	8
Some of the units felt rushed.	5	26	14	20	3
In the beginning, time has been spent unnecessarily.	1	4	11	33	19
The timeline of the course can be improved.	33	23	8	3	3
Your trainer showed empathy and helped you in tackling problems.	46	24	2	0	1
You felt that the trainer is an expert of the course.	30	33	9	1	0
The communication skill of the trainer was satisfactory.	34	29	8	0	0

The delivery skill of the trainer was satisfactory.	27	39	5	0	0
Your trainer responded to your queries in a timely manner.	34	37	2	0	0
You felt comfortable expressing your problems to your trainer.	31	32	7	3	0
You think your trainer was perfect for this course.	22	33	15	0	0
Earning a certificate can make you feel more driven towards a course.	6	22	15	23	5
You love when a course offer certification along with training.	6	18	17	24	6
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	14	41	11	3	1
You believe that the certificate can help you get a job.	39	30	0	1	0
You will take similar course in the future if updates are added significantly.	32	32	4	3	1
So far, you're satisfied with the course outcomes.	22	31	12	5	2
You would recommend this course to others.	15	32	12	12	0
If asked, you will be able to summarize the goals and benefits of this course.	13	33	6	13	3
You think that the course materials can be improved for this course.	3	7	19	23	17
You think the learning experience can be improved.	27	25	5	9	4

We asked which parts of the course was stressful. The answers have been presented in 6.53.
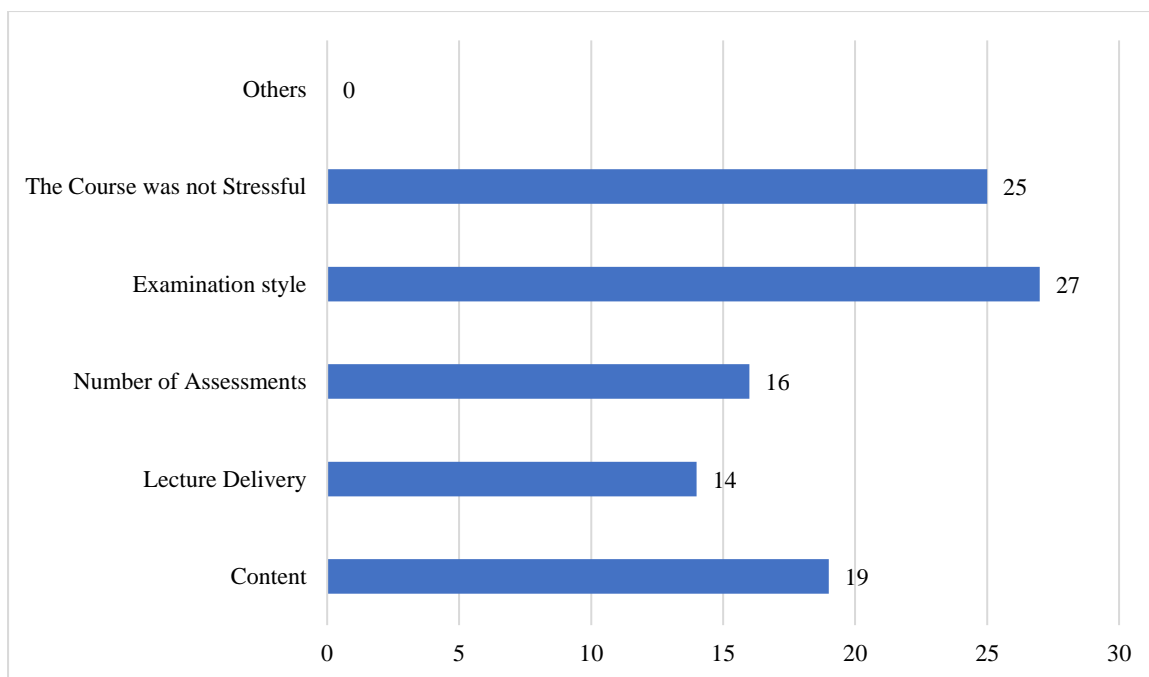
Figure 6.53: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.68.

Table 6.68: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	19
There was a lack of course materials. More course materials are needed.	19
The duration of the training was too long.	7
The duration of the training was too short.	34
Poor/not enough assessment methods.	14
The assessment methods or examination was stressful.	37
The objective of the course was not clear to me.	4
I did not get what I expected from the course.	9
The performance of the trainer was not satisfactory.	2
The lecture materials were not well designed.	7
I didn't feel comfortable in the classroom while asking about a problem.	3
I didn't like the environment of the classroom.	0
Poor feedback and support system.	5
There was no problem in the course.	24

Finally, Table 6.69 shows the rating of the course submitted by the participants.

Table 6.69: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	5	4	14	12	35
Course Structure	0	7	15	25	25
Course Contents	1	5	17	19	30
Delivery Quality	2	4	14	25	27
Duration	6	13	21	19	11
Trainer	0	2	8	15	46
Support Team	1	7	9	15	37
Environment	0	1	3	13	54
Accessibility of Information	0	5	16	23	25
Usage of Games	25	15	14	12	3
Expected Outcomes	1	2	13	39	14
Learning Experience	0	1	13	28	30
Overall Rating	0	0	13	29	29

6.2.1.2.22. Data Collected from Programming Essential in Python, Batch: 1, 2

A total of 32 people submitted the form among which all of them were from Rajshahi. Figure 6.54 shows the distribution of division.

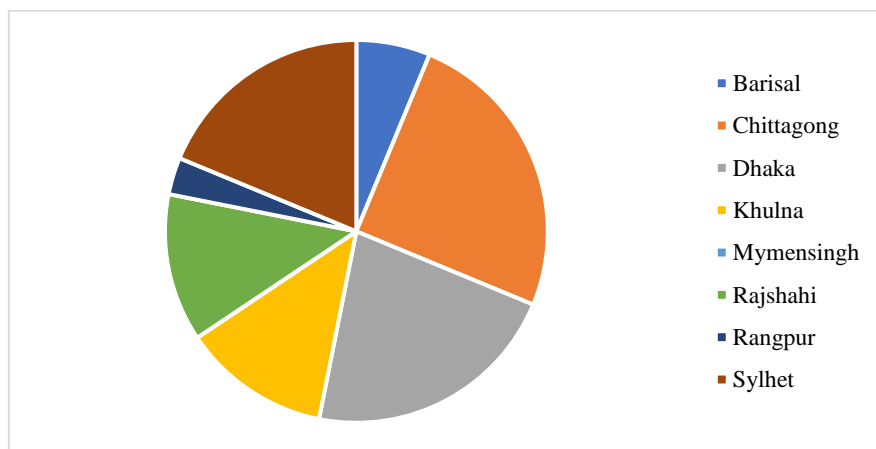Figure 6.54: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.73.

Table 6.73: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	19	11	1	1	0

The course's title and description were easy to comprehend.	19	11	1	1	0
You felt confident enough before taking the course.	20	6	3	2	1
The course's sequence and flow were satisfactory.	19	10	2	0	1
You felt equally engaged in each course section.	10	16	4	2	0
There was a clear separation between the course's units.	5	12	12	3	0
You preferred more frequent assessments.	7	8	12	5	0
There were enough audio-visual contents throughout the course.	15	5	7	5	0
The quality of the content was consistent throughout the course.	16	14	2	0	0
There were enough variety in terms of course unit types.	13	13	4	2	0
The language was easy to understand.	18	10	2	0	1
The overall contents were highly engaging.	15	12	4	1	0
The reading materials was presented in an interesting way.	14	14	3	0	1
The course's content was too challenging for an average learner to understand.	7	11	6	8	0
The content was in-depth enough.	12	13	5	1	0
You liked the types of assessments used.	15	13	2	1	1
You notice any unnecessary repetitions in the content.	4	4	10	11	3
You, at some point, have to reread the content to understand it.	5	14	9	1	2
The course was easy to follow.	16	11	3	1	1
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	6	9	9	7	1
The course felt too rushed.	7	6	4	12	2
The course felt too monotone.	1	7	6	13	4
The course felt too automated.	9	7	8	6	1
The course was not interactive enough.	5	2	9	12	3

The overall course delivery was satisfactory.	12	16	1	2	0
You had enough times to complete the assigned tasks, assignments and assessments.	8	10	8	4	1
The duration of the course was satisfactory.	8	11	4	6	2
All the units of the course had enough time allocated.	8	7	8	8	0
Some of the units felt rushed.	2	10	11	8	0
In the beginning, time has been spent unnecessarily.	2	3	10	6	10
The timeline of the course can be improved.	16	11	3	0	1
Your trainer showed empathy and helped you in tackling problems.	21	9	1	0	0
You felt that the trainer is an expert of the course.	24	5	2	0	0
The communication skill of the trainer was satisfactory.	19	7	3	0	1
The delivery skill of the trainer was satisfactory.	19	9	3	0	0
Your trainer responded to your queries in a timely manner.	19	8	3	0	1
You felt comfortable expressing your problems to your trainer.	20	7	3	0	1
You think your trainer was perfect for this course.	19	8	4	0	0
Earning a certificate can make you feel more driven towards a course.	3	7	8	11	2
You love when a course offer certification along with training.	1	10	7	9	4
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	9	14	3	4	0
You believe that the certificate can help you get a job.	13	12	3	1	0
You will take similar course in the future if updates are added significantly.	13	13	2	3	0
So far, you're satisfied with the course outcomes.	17	10	3	0	1

You would recommend this course to others.	10	17	4	0	0
If asked, you will be able to summarize the goals and benefits of this course.	13	8	7	2	1
You think that the course materials can be improved for this course.	4	4	9	8	5
You think the learning experience can be improved.	18	11	1	1	0

We asked which parts of the course was stressful. The answers have been presented in 6.55.
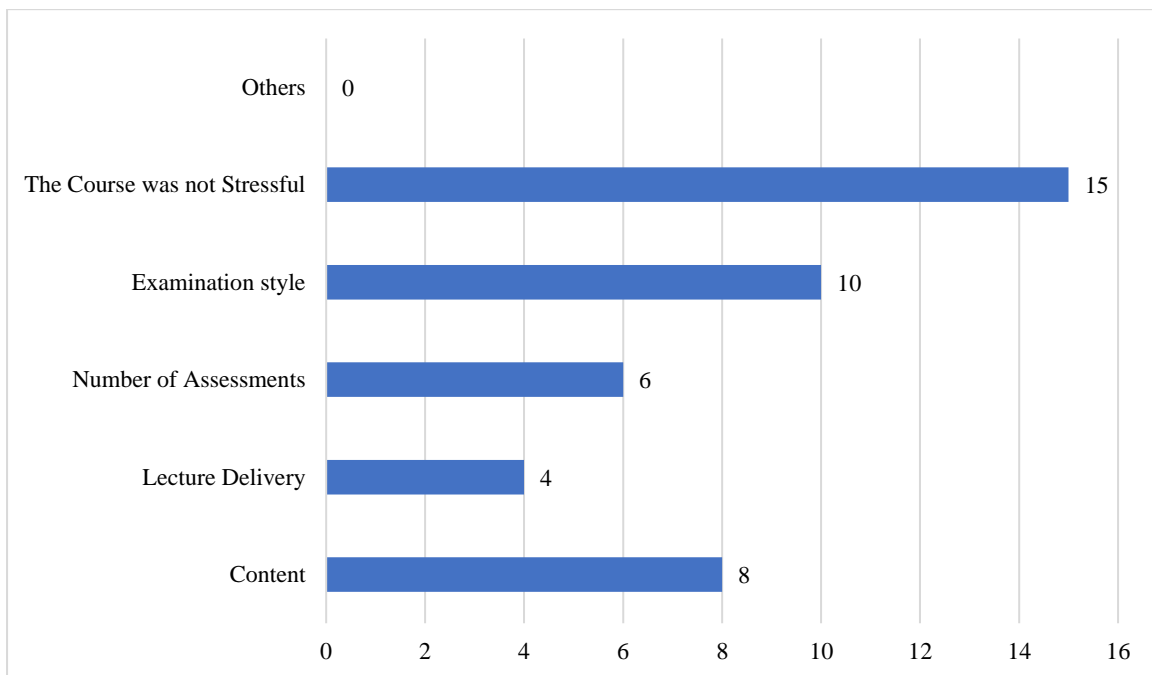
Figure 6.55: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.74.

Table 6.74: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	4
There was a lack of course materials. More course materials are needed.	12
The duration of the training was too long.	3
The duration of the training was too short.	15
Poor/not enough assessment methods.	3
The assessment methods or examination was stressful.	8

The objective of the course was not clear to me.	1
I did not get what I expected from the course.	5
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	2
I didn't feel comfortable in the classroom while asking about a problem.	1
I didn't like the environment of the classroom.	0
Poor feedback and support system.	5
There was no problem in the course.	12

Finally, Table 6.75 shows the rating of the course submitted by the participants.

Table 6.75: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	2	4	8	10	8
Course Structure	1	5	5	6	14
Course Contents	2	4	5	6	15
Delivery Quality	1	4	5	9	13
Duration	4	10	8	5	5
Trainer	2	2	5	4	19
Support Team	2	5	8	7	9
Environment	3	1	6	9	12
Accessibility of Information	3	1	4	7	16
Usage of Games	10	8	5	4	4
Expected Outcomes	3	4	6	8	11
Learning Experience	2	1	7	9	13
Overall Rating	2	4	8	10	8

6.2.1.2.23. Data Collected from Programming Essential in C

A total of 9 people submitted the form among which all of them were from Rajshahi. Figure 6.56 shows the distribution of division.
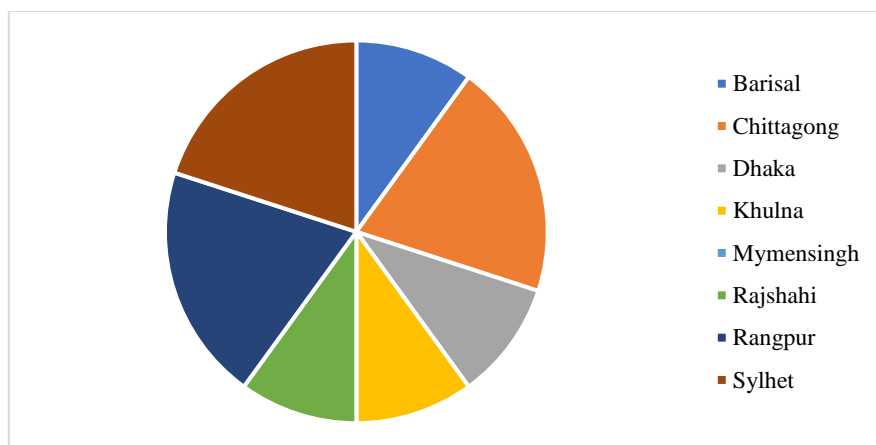
Figure 6.56: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.76.

Table 6.76: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	7	1	1	0	0
The course's title and description were easy to comprehend.	6	2	0	1	0
You felt confident enough before taking the course.	6	3	0	0	0
The course's sequence and flow were satisfactory.	5	3	1	0	0
You felt equally engaged in each course section.	3	4	2	0	0
There was a clear separation between the course's units.	0	3	4	2	0
You preferred more frequent assessments.	1	1	4	3	0
There were enough audio-visual contents throughout the course.	1	6	1	1	0
The quality of the content was consistent throughout the course.	2	6	1	0	0
There were enough variety in terms of course unit types.	2	5	2	0	0
The language was easy to understand.	4	4	0	1	0

The overall contents were highly engaging.	1	6	1	1	0
The reading materials was presented in an interesting way.	3	5	0	1	0
The course's content was too challenging for an average learner to understand.	1	3	2	2	1
The content was in-depth enough.	1	4	4	0	0
You liked the types of assessments used.	3	6	0	0	0
You notice any unnecessary repetitions in the content.	1	0	3	5	0
You, at some point, have to reread the content to understand it.	1	2	3	2	1
The course was easy to follow.	2	5	1	0	1
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	2	1	4	1	1
The course felt too rushed.	2	2	0	5	0
The course felt too monotone.	0	0	2	5	1
The course felt too automated.	0	2	5	2	0
The course was not interactive enough.	0	1	3	4	1
The overall course delivery was satisfactory.	1	5	2	1	0
You had enough times to complete the assigned tasks, assignments and assessments.	2	6	0	0	1
The duration of the course was satisfactory.	2	3	1	2	1
All the units of the course had enough time allocated.	2	1	3	2	1
Some of the units felt rushed.	0	0	7	2	0
In the beginning, time has been spent unnecessarily.	1	0	2	5	1
The timeline of the course can be improved.	4	3	2	0	0
Your trainer showed empathy and helped you in tackling problems.	7	2	0	0	0
You felt that the trainer is an expert of the course.	7	2	0	0	0
The communication skill of the trainer was satisfactory.	6	3	0	0	0

The delivery skill of the trainer was satisfactory.	6	3	0	0	0
Your trainer responded to your queries in a timely manner.	7	2	0	0	0
You felt comfortable expressing your problems to your trainer.	7	1	0	1	0
You think your trainer was perfect for this course.	6	2	0	1	0
Earning a certificate can make you feel more driven towards a course.	1	2	2	4	0
You love when a course offer certification along with training.	1	1	2	5	0
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	1	6	1	0	0
You believe that the certificate can help you get a job.	2	7	0	0	0
You will take similar course in the future if updates are added significantly.	1	6	1	1	0
So far, you're satisfied with the course outcomes.	1	7	0	0	1
You would recommend this course to others.	1	6	1	1	0
If asked, you will be able to summarize the goals and benefits of this course.	1	6	1	0	1
You think that the course materials can be improved for this course.	1	2	4	2	0
You think the learning experience can be improved.	4	5	0	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.57.
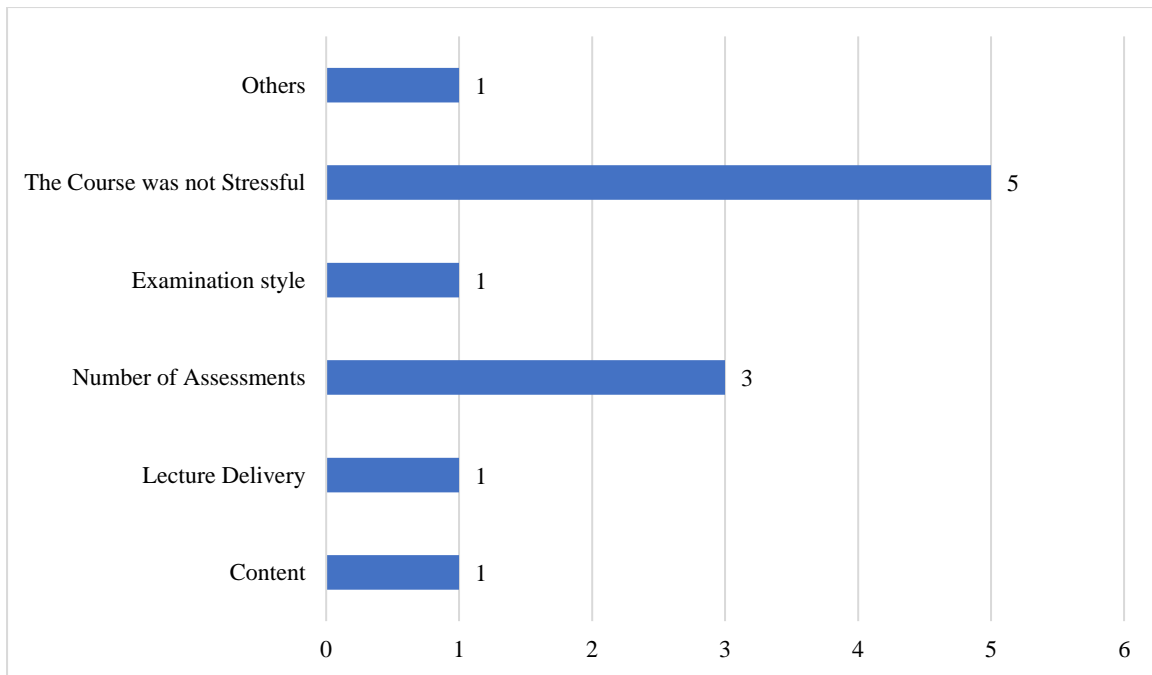
Figure 6.57: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.77.

Table 6.77: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	1
There was a lack of course materials. More course materials are needed.	1
The duration of the training was too long.	1
The duration of the training was too short.	6
Poor/not enough assessment methods.	2
The assessment methods or examination was stressful.	2
The objective of the course was not clear to me.	1
I did not get what I expected from the course.	1
The performance of the trainer was not satisfactory.	1
The lecture materials were not well designed.	1
I didn't feel comfortable in the classroom while asking about a problem.	1
I didn't like the environment of the classroom.	1
Poor feedback and support system.	1
There was no problem in the course.	5

Finally, Table 6.78 shows the rating of the course submitted by the participants.

Table 6.78: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	2	1	2	2	2
Course Structure	2	1	1	1	4
Course Contents	1	1	2	1	4
Delivery Quality	1	1	0	3	4
Duration	0	3	2	1	3
Trainer	2	0	1	2	4
Support Team	1	3	1	0	4
Environment	1	1	1	3	3
Accessibility of Information	2	2	2	1	2
Usage of Games	3	2	1	2	1
Expected Outcomes	1	0	4	1	3
Learning Experience	0	2	2	2	3
Overall Rating	1	1	2	2	3

6.2.1.2.24. Data Collected from Jubo Unnayan Web Development Course

A total of 20 people submitted the form among which all of them were from Rajshahi. Figure 6.58 shows the distribution of division.

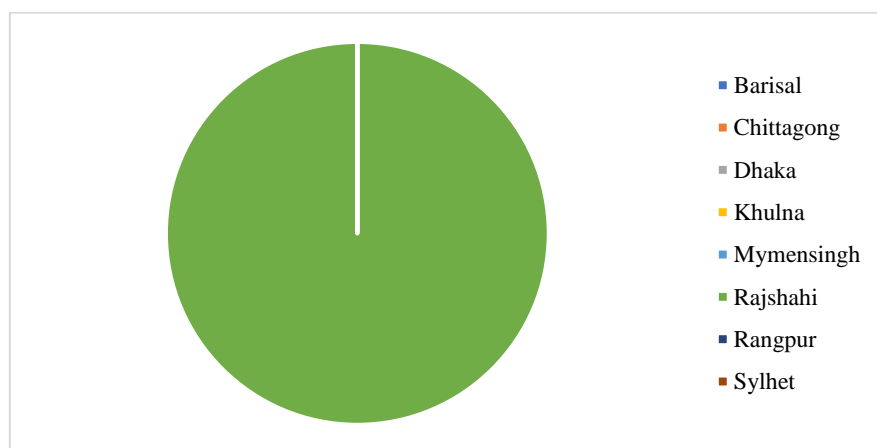Figure 6.58: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.79.

Table 6.79: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	14	6	0	0	0

The course's title and description were easy to comprehend.	15	3	2	0	0
You felt confident enough before taking the course.	11	6	1	2	0
The course's sequence and flow were satisfactory.	13	5	1	1	0
You felt equally engaged in each course section.	13	6	0	0	0
There was a clear separation between the course's units.	6	4	2	6	1
You preferred more frequent assessments.	3	8	5	2	1
There were enough audio-visual contents throughout the course.	10	8	1	0	0
The quality of the content was consistent throughout the course.	12	8	0	0	0
There were enough variety in terms of course unit types.	9	7	3	1	0
The language was easy to understand.	14	6	0	0	0
The overall contents were highly engaging.	14	5	1	0	0
The reading materials was presented in an interesting way.	15	5	0	0	0
The course's content was too challenging for an average learner to understand.	4	7	6	1	2
The content was in-depth enough.	8	8	3	1	0
You liked the types of assessments used.	11	8	1	0	0
You notice any unnecessary repetitions in the content.	0	1	6	10	3
You, at some point, have to reread the content to understand it.	4	11	2	2	1
The course was easy to follow.	10	8	2	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	6	5	4	5	0
The course felt too rushed.	11	8	0	0	1
The course felt too monotone.	0	2	5	7	6
The course felt too automated.	7	8	4	1	0
The course was not interactive enough.	1	1	6	7	4

The overall course delivery was satisfactory.	11	7	2	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	7	7	1	5	0
The duration of the course was satisfactory.	3	4	1	6	6
All the units of the course had enough time allocated.	2	1	3	6	7
Some of the units felt rushed.	5	5	4	4	1
In the beginning, time has been spent unnecessarily.	2	3	4	10	1
The timeline of the course can be improved.	11	6	2	1	0
Your trainer showed empathy and helped you in tackling problems.	15	3	2	0	0
You felt that the trainer is an expert of the course.	15	4	1	0	0
The communication skill of the trainer was satisfactory.	16	3	1	0	0
The delivery skill of the trainer was satisfactory.	16	3	1	0	0
Your trainer responded to your queries in a timely manner.	15	5	0	0	0
You felt comfortable expressing your problems to your trainer.	14	4	1	1	0
You think your trainer was perfect for this course.	16	4	0	0	0
Earning a certificate can make you feel more driven towards a course.	1	1	6	9	2
You love when a course offer certification along with training.	0	0	8	10	2
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	10	8	2	0	0
You believe that the certificate can help you get a job.	12	8	0	0	0
You will take similar course in the future if updates are added significantly.	8	8	3	0	1
So far, you're satisfied with the course outcomes.	6	5	7	2	0

You would recommend this course to others.	4	5	6	4	1
If asked, you will be able to summarize the goals and benefits of this course.	8	6	3	1	1
You think that the course materials can be improved for this course.	1	1	5	8	5
You think the learning experience can be improved.	7	5	5	2	1

We asked which parts of the course was stressful. The answers have been presented in 6.59.
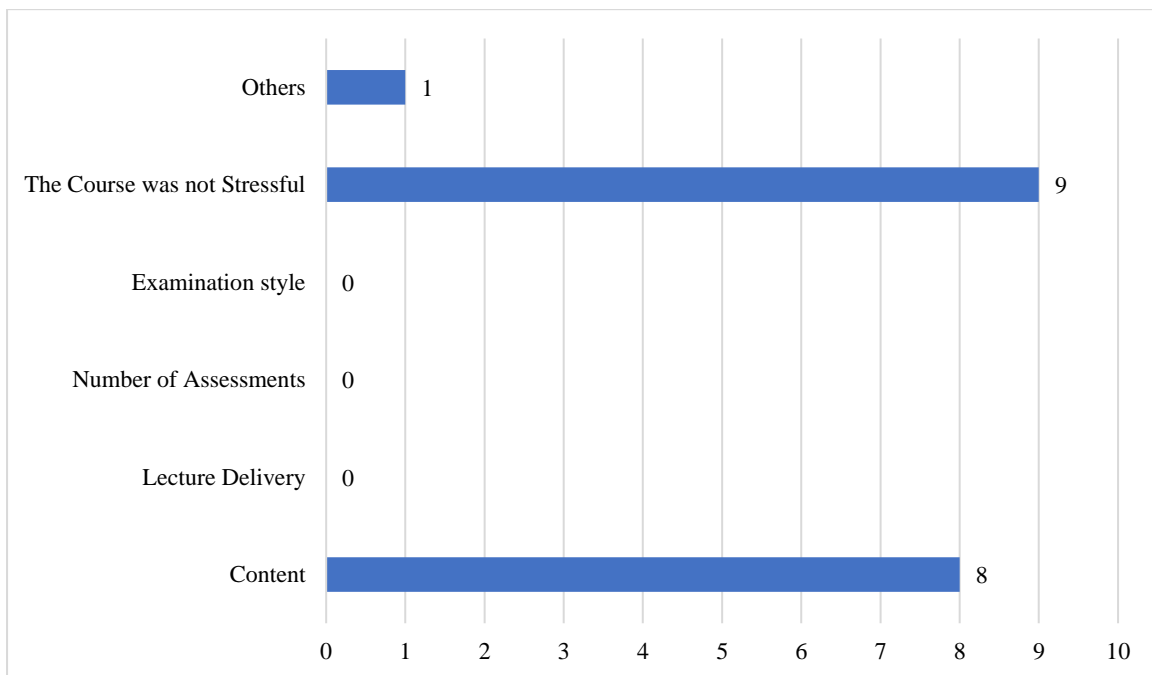

Figure 6.59: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.80.

Table 6.80: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	0
There was a lack of course materials. More course materials are needed.	2
The duration of the training was too long.	0
The duration of the training was too short.	19
Poor/not enough assessment methods.	0
The assessment methods or examination was stressful.	0

The objective of the course was not clear to me.	1
I did not get what I expected from the course.	0
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	1
I didn't feel comfortable in the classroom while asking about a problem.	0
I didn't like the environment of the classroom.	0
Poor feedback and support system.	0
There was no problem in the course.	5

Finally, Table 6.81 shows the rating of the course submitted by the participants.

Table 6.81: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	1	5	4	2	8
Course Structure	2	5	2	9	2
Course Contents	1	1	10	4	4
Delivery Quality	3	1	2	2	12
Duration	9	4	3	1	2
Trainer	1	1	1	0	16
Support Team	1	1	5	5	7
Environment	1	1	3	5	9
Accessibility of Information	1	1	4	4	8
Usage of Games	11	2	2	2	1
Expected Outcomes	1	2	5	4	7
Learning Experience	1	1	1	7	9
Overall Rating	1	0	7	6	5

6.2.1.2.25. Data Collected from C Programming Language Course, Batch: 53

A total of 10 people submitted the form among which all of them were from Rajshahi. Figure 6.60 shows the distribution of division.
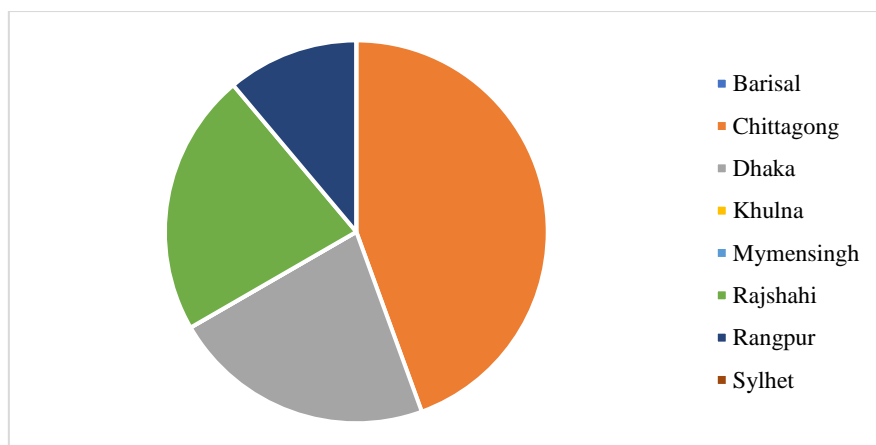
Figure 6.60: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.82.

Table 6.82: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	6	4	0	0	0
The course's title and description were easy to comprehend.	6	3	0	1	0
You felt confident enough before taking the course.	8	2	0	0	0
The course's sequence and flow were satisfactory.	7	3	0	0	0
You felt equally engaged in each course section.	3	5	1	1	0
There was a clear separation between the course's units.	2	2	3	1	2
You preferred more frequent assessments.	5	2	1	2	0
There were enough audio-visual contents throughout the course.	7	2	0	1	0
The quality of the content was consistent throughout the course.	5	5	0	0	0
There were enough variety in terms of course unit types.	7	2	0	0	0
The language was easy to understand.	10	0	0	0	0

The overall contents were highly engaging.	9	1	0	0	0
The reading materials was presented in an interesting way.	7	2	0	1	0
The course's content was too challenging for an average learner to understand.	1	4	1	1	3
The content was in-depth enough.	5	2	1	2	0
You liked the types of assessments used.	7	3	0	0	0
You notice any unnecessary repetitions in the content.	0	1	4	2	3
You, at some point, have to reread the content to understand it.	1	7	0	2	0
The course was easy to follow.	6	4	0	0	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	1	3	3	2	1
The course felt too rushed.	0	0	5	4	1
The course felt too monotone.	0	1	4	3	2
The course felt too automated.	5	2	3	0	0
The course was not interactive enough.	1	0	2	4	3
The overall course delivery was satisfactory.	6	3	1	0	0
You had enough times to complete the assigned tasks, assignments and assessments.	6	1	1	2	0
The duration of the course was satisfactory.	4	2	0	4	0
All the units of the course had enough time allocated.	3	2	2	2	1
Some of the units felt rushed.	1	6	2	0	1
In the beginning, time has been spent unnecessarily.	1	2	3	2	2
The timeline of the course can be improved.	5	5	0	0	0
Your trainer showed empathy and helped you in tackling problems.	9	1	0	0	0
You felt that the trainer is an expert of the course.	8	1	0	1	0
The communication skill of the trainer was satisfactory.	10	0	0	0	0

The delivery skill of the trainer was satisfactory.	7	3	0	0	0
Your trainer responded to your queries in a timely manner.	8	1	0	0	0
You felt comfortable expressing your problems to your trainer.	8	2	0	0	0
You think your trainer was perfect for this course.	8	1	1	0	0
Earning a certificate can make you feel more driven towards a course.	0	2	2	6	0
You love when a course offer certification along with training.	0	2	2	5	1
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	5	5	0	0	0
You believe that the certificate can help you get a job.	5	5	0	0	0
You will take similar course in the future if updates are added significantly.	4	5	0	1	0
So far, you're satisfied with the course outcomes.	7	3	0	0	0
You would recommend this course to others.	5	3	2	0	0
If asked, you will be able to summarize the goals and benefits of this course.	6	3	1	0	0
You think that the course materials can be improved for this course.	2	3	1	2	2
You think the learning experience can be improved.	6	2	0	0	2

We asked which parts of the course was stressful. The answers have been presented in 6.61.
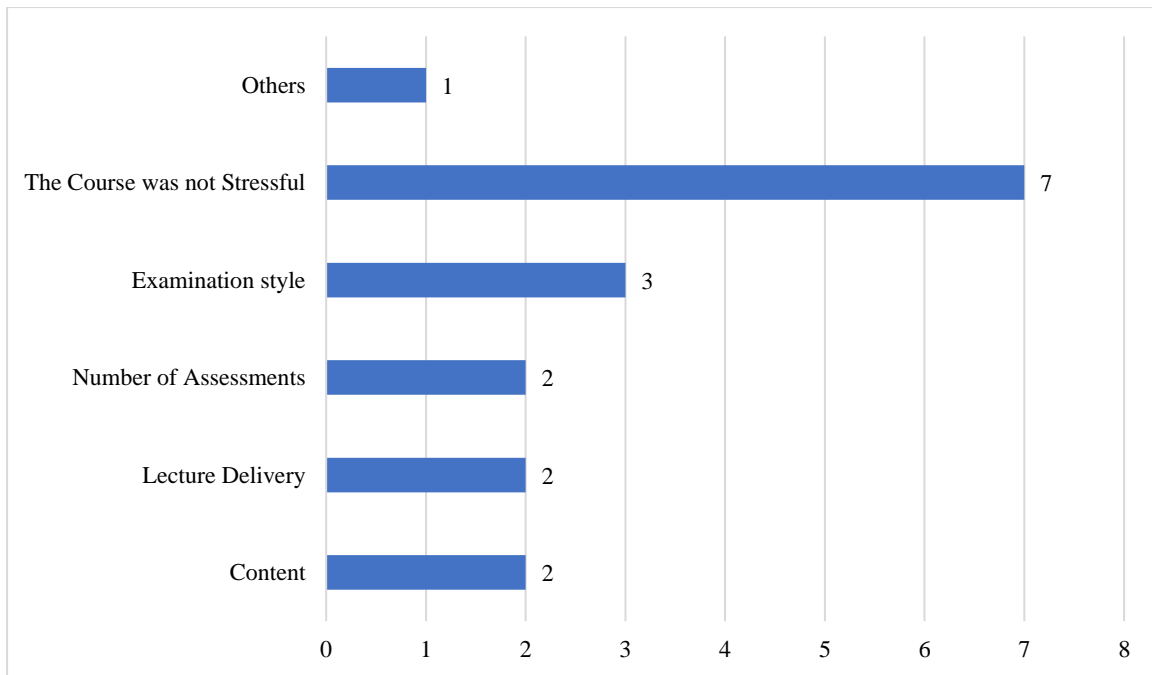
Figure 6.61: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.83.

Table 6.83: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	0
There was a lack of course materials. More course materials are needed.	1
The duration of the training was too long.	0
The duration of the training was too short.	8
Poor/not enough assessment methods.	1
The assessment methods or examination was stressful.	1
The objective of the course was not clear to me.	0
I did not get what I expected from the course.	0
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	1
I didn't feel comfortable in the classroom while asking about a problem.	0
I didn't like the environment of the classroom.	0
Poor feedback and support system.	0
There was no problem in the course.	3

Finally, Table 6.84 shows the rating of the course submitted by the participants.

Table 6.84: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	2	0	1	3	3
Course Structure	2	0	1	5	1
Course Contents	2	0	1	3	3
Delivery Quality	2	0	0	0	6
Duration	2	3	2	1	1
Trainer	2	1	0	0	6
Support Team	3	0	1	2	2
Environment	3	0	1	2	3
Accessibility of Information	3	0	1	1	4
Usage of Games	5	1	1	0	1
Expected Outcomes	3	0	1	2	3
Learning Experience	2	0	0	3	4
Overall Rating	4	0	0	1	5

6.2.1.2.26. Data Collected from C Programming Language Course, Batch: 60

A total of 15 people submitted the form among which all of them were from Rajshahi. Figure 6.62 shows the distribution of division.
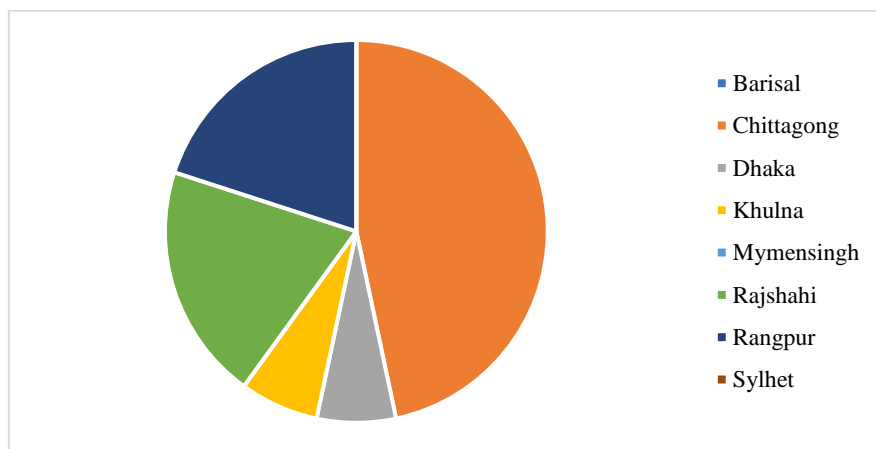

Figure 6.62: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.85.

Table 6.85: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	9	5	0	0	1

The course's title and description were easy to comprehend.	10	4	0	0	1
You felt confident enough before taking the course.	5	5	4	0	1
The course's sequence and flow were satisfactory.	9	4	1	0	1
You felt equally engaged in each course section.	5	9	0	1	0
There was a clear separation between the course's units.	3	6	3	2	1
You preferred more frequent assessments.	5	4	5	1	0
There were enough audio-visual contents throughout the course.	6	3	4	0	2
The quality of the content was consistent throughout the course.	7	6	1	0	1
There were enough variety in terms of course unit types.	7	6	0	1	1
The language was easy to understand.	10	3	0	0	1
The overall contents were highly engaging.	10	4	0	0	1
The reading materials was presented in an interesting way.	10	3	0	0	1
The course's content was too challenging for an average learner to understand.	3	2	4	4	2
The content was in-depth enough.	3	4	6	1	0
You liked the types of assessments used.	7	6	0	2	0
You notice any unnecessary repetitions in the content.	3	0	5	6	1
You, at some point, have to reread the content to understand it.	4	3	4	3	1
The course was easy to follow.	6	7	1	0	1
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	4	0	7	2	2
The course felt too rushed.	3	2	3	4	3
The course felt too monotone.	1	2	4	3	5
The course felt too automated.	1	8	4	1	1
The course was not interactive enough.	1	1	4	4	5

The overall course delivery was satisfactory.	9	4	1	0	1
You had enough times to complete the assigned tasks, assignments and assessments.	6	8	1	0	0
The duration of the course was satisfactory.	3	6	4	1	1
All the units of the course had enough time allocated.	4	7	2	1	1
Some of the units felt rushed.	5	2	3	3	2
In the beginning, time has been spent unnecessarily.	3	2	3	5	2
The timeline of the course can be improved.	3	6	4	1	0
Your trainer showed empathy and helped you in tackling problems.	10	4	0	0	1
You felt that the trainer is an expert of the course.	12	2	0	0	1
The communication skill of the trainer was satisfactory.	9	5	0	0	1
The delivery skill of the trainer was satisfactory.	11	3	0	0	1
Your trainer responded to your queries in a timely manner.	11	3	0	0	1
You felt comfortable expressing your problems to your trainer.	10	4	0	0	1
You think your trainer was perfect for this course.	10	4	0	0	1
Earning a certificate can make you feel more driven towards a course.	1	2	4	3	4
You love when a course offer certification along with training.	1	1	5	5	3
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	3	10	2	0	0
You believe that the certificate can help you get a job.	8	6	1	0	0
You will take similar course in the future if updates are added significantly.	4	7	3	0	0
So far, you're satisfied with the course outcomes.	5	7	1	1	0

You would recommend this course to others.	2	9	1	2	1
If asked, you will be able to summarize the goals and benefits of this course.	7	5	1	1	1
You think that the course materials can be improved for this course.	0	3	7	3	2
You think the learning experience can be improved.	7	6	1	0	1

We asked which parts of the course was stressful. The answers have been presented in 6.63.
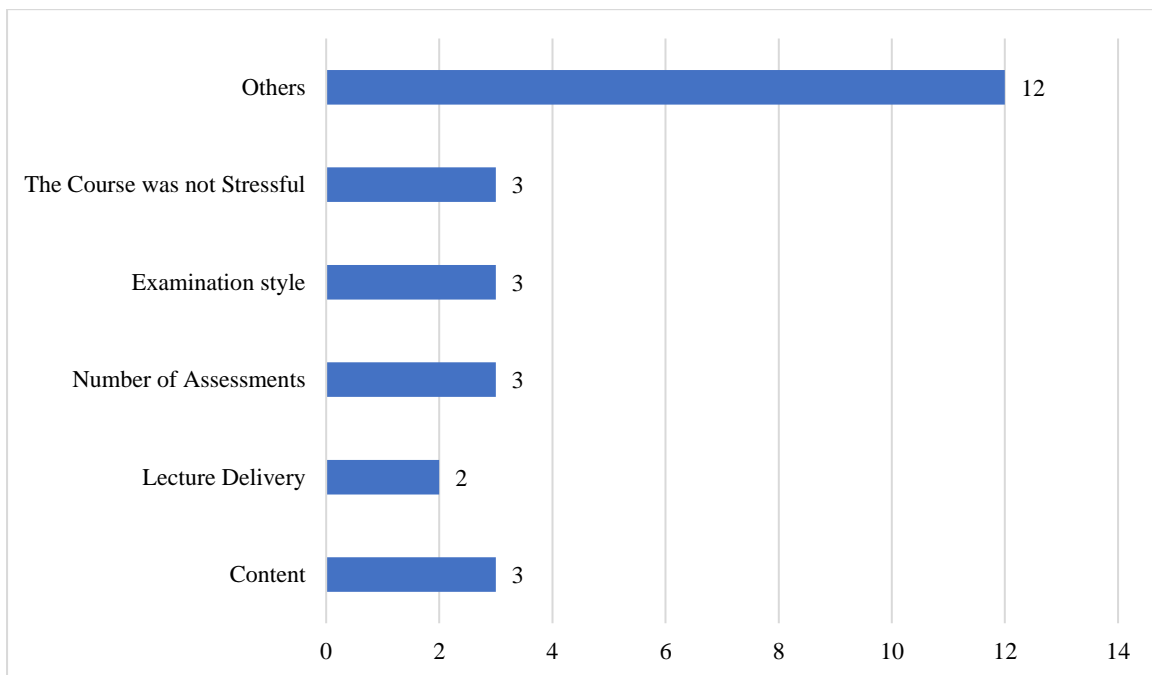

Figure 6.63: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.86.

Table 6.86: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	0
There was a lack of course materials. More course materials are needed.	1
The duration of the training was too long.	1
The duration of the training was too short.	6
Poor/not enough assessment methods.	3
The assessment methods or examination was stressful.	0

The objective of the course was not clear to me.	0
I did not get what I expected from the course.	1
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	0
I didn't feel comfortable in the classroom while asking about a problem.	0
I didn't like the environment of the classroom.	0
Poor feedback and support system.	0
There was no problem in the course.	10

Finally, Table 6.87 shows the rating of the course submitted by the participants.

Table 6.87: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	6	2	1	3	1
Course Structure	3	1	3	5	2
Course Contents	4	1	2	4	3
Delivery Quality	3	1	3	0	7
Duration	2	1	4	4	3
Trainer	2	1	1	1	9
Support Team	1	1	2	4	5
Environment	1	1	2	5	5
Accessibility of Information	1	1	0	4	7
Usage of Games	6	4	1	1	1
Expected Outcomes	1	0	3	4	5
Learning Experience	1	1	2	4	6
Overall Rating	0	3	2	5	4

6.2.1.2.27. Data Collected from CCNA Course, Batch: 1, 2

A total of 35 people submitted the form among which all of them were from Rajshahi. Figure 6.64 shows the distribution of division.
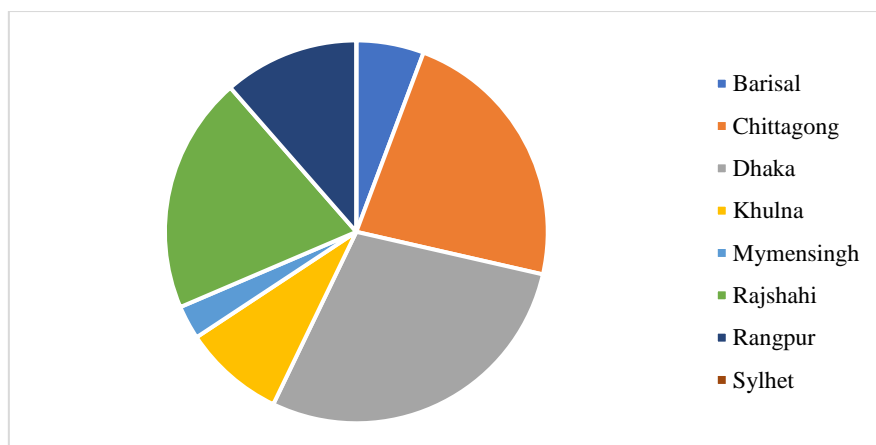
Figure 6.64: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.88.

Table 6.88: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	23	10	0	1	0
The course's title and description were easy to comprehend.	19	13	1	0	0
You felt confident enough before taking the course.	20	10	4	0	0
The course's sequence and flow were satisfactory.	13	18	3	0	0
You felt equally engaged in each course section.	8	23	3	0	0
There was a clear separation between the course's units.	10	11	9	2	2
You preferred more frequent assessments.	4	10	15	5	0
There were enough audio-visual contents throughout the course.	18	10	6	0	0
The quality of the content was consistent throughout the course.	13	19	2	0	0
There were enough variety in terms of course unit types.	12	18	4	0	0
The language was easy to understand.	12	21	1	0	0

The overall contents were highly engaging.	13	17	4	0	0
The reading materials was presented in an interesting way.	13	16	5	0	0
The course's content was too challenging for an average learner to understand.	6	9	11	6	2
The content was in-depth enough.	9	18	5	2	0
You liked the types of assessments used.	13	17	3	0	0
You notice any unnecessary repetitions in the content.	4	4	13	10	3
You, at some point, have to reread the content to understand it.	9	15	6	3	1
The course was easy to follow.	11	15	7	1	0
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	5	7	12	7	3
The course felt too rushed.	4	4	9	14	2
The course felt too monotone.	2	1	12	14	4
The course felt too automated.	4	9	12	6	2
The course was not interactive enough.	2	1	10	15	5
The overall course delivery was satisfactory.	8	21	3	0	1
You had enough times to complete the assigned tasks, assignments and assessments.	8	13	6	5	1
The duration of the course was satisfactory.	9	12	9	2	1
All the units of the course had enough time allocated.	6	15	10	2	0
Some of the units felt rushed.	2	6	13	7	5
In the beginning, time has been spent unnecessarily.	1	2	8	14	8
The timeline of the course can be improved.	5	15	9	2	2
Your trainer showed empathy and helped you in tackling problems.	19	13	1	0	0
You felt that the trainer is an expert of the course.	17	13	2	0	0
The communication skill of the trainer was satisfactory.	19	12	2	0	0

The delivery skill of the trainer was satisfactory.	19	12	2	0	0
Your trainer responded to your queries in a timely manner.	18	13	2	0	0
You felt comfortable expressing your problems to your trainer.	15	16	2	0	0
You think your trainer was perfect for this course.	14	15	4	0	0
Earning a certificate can make you feel more driven towards a course.	3	3	11	11	5
You love when a course offer certification along with training.	2	3	10	13	5
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	10	14	7	1	0
You believe that the certificate can help you get a job.	10	19	2	0	0
You will take similar course in the future if updates are added significantly.	12	17	1	2	0
So far, you're satisfied with the course outcomes.	14	17	1	1	0
You would recommend this course to others.	10	10	5	7	1
If asked, you will be able to summarize the goals and benefits of this course.	9	10	11	3	0
You think that the course materials can be improved for this course.	5	4	16	6	2
You think the learning experience can be improved.	22	8	3	0	0

We asked which parts of the course was stressful. The answers have been presented in 6.65.
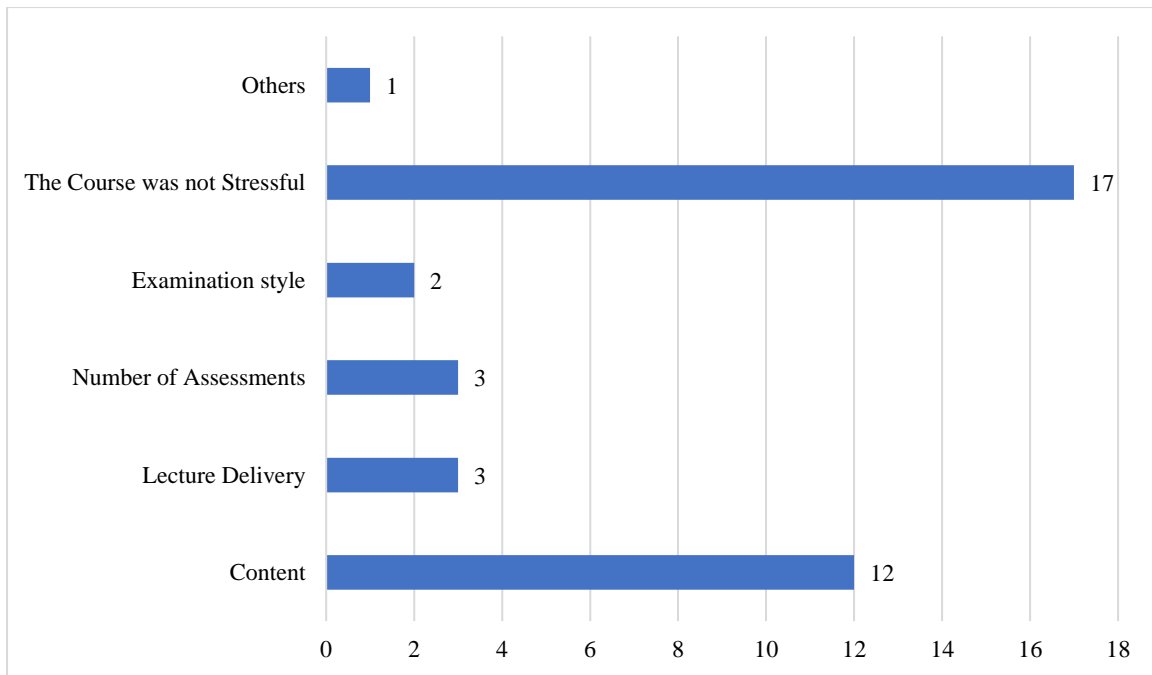
Figure 6.65: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.89.

Table 6.89: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	3
There was a lack of course materials. More course materials are needed.	1
The duration of the training was too long.	2
The duration of the training was too short.	9
Poor/not enough assessment methods.	2
The assessment methods or examination was stressful.	5
The objective of the course was not clear to me.	1
I did not get what I expected from the course.	2
The performance of the trainer was not satisfactory.	0
The lecture materials were not well designed.	1
I didn't feel comfortable in the classroom while asking about a problem.	0
I didn't like the environment of the classroom.	0
Poor feedback and support system.	2
There was no problem in the course.	24

Finally, Table 6.90 shows the rating of the course submitted by the participants.

Table 6.90: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	2	1	9	7	15
Course Structure	1	1	5	12	15
Course Contents	1	0	5	11	17
Delivery Quality	1	0	7	12	14
Duration	1	2	10	14	7
Trainer	1	0	5	9	19
Support Team	1	2	10	7	14
Environment	1	0	5	13	14
Accessibility of Information	1	0	7	10	16
Usage of Games	6	8	11	5	4
Expected Outcomes	2	1	6	11	14
Learning Experience	1	1	6	10	15
Overall Rating	1	0	6	13	14

6.2.1.2.28. Data Collected from Other NACTAR Courses

A total of 618 people submitted the form among which all of them were from Rajshahi. Figure 6.66 shows the distribution of division.
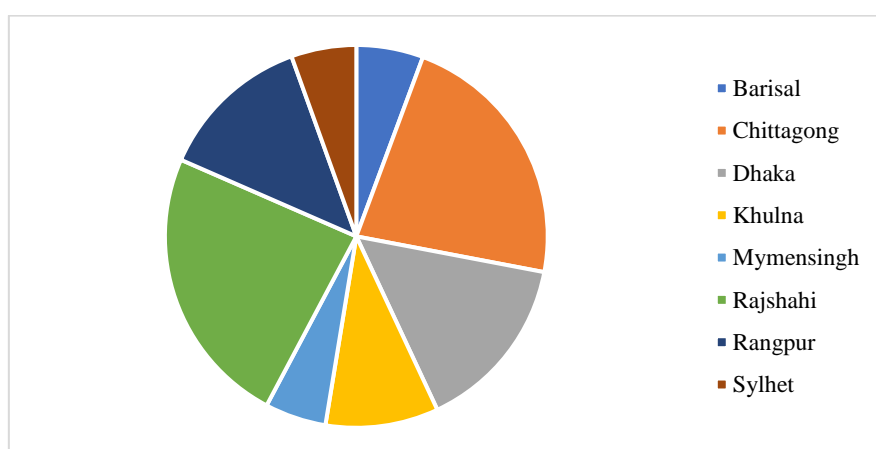

Figure 6.66: Division summary of the responses

We asked about course judgement from the responders. The responses have been shown in Table 6.91.

Table 6.91: Responses regarding course judgement

Criteria	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training goals and objectives were clearly stated before you started the course.	435	138	15	3	3

The course's title and description were easy to comprehend.	436	142	9	3	2
You felt confident enough before taking the course.	366	176	38	8	3
The course's sequence and flow were satisfactory.	355	196	31	9	2
You felt equally engaged in each course section.	317	210	46	15	0
There was a clear separation between the course's units.	171	189	147	54	23
You preferred more frequent assessments.	149	202	155	59	20
There were enough audio-visual contents throughout the course.	283	228	61	18	1
The quality of the content was consistent throughout the course.	326	214	34	11	1
There were enough variety in terms of course unit types.	301	219	52	11	2
The language was easy to understand.	425	145	13	1	1
The overall contents were highly engaging.	397	157	29	5	1
The reading materials was presented in an interesting way.	366	181	35	6	1
The course's content was too challenging for an average learner to understand.	119	193	166	75	33
The content was in-depth enough.	211	251	94	27	1
You liked the types of assessments used.	328	206	40	9	6
You notice any unnecessary repetitions in the content.	87	108	209	109	70
You, at some point, have to reread the content to understand it.	108	211	159	69	36
The course was easy to follow.	315	216	38	14	2
Sometimes you felt there are some lacking in the course in terms of contents or delivery.	109	186	176	82	29
The course felt too rushed.	133	167	145	103	35
The course felt too monotone.	40	80	200	180	82
The course felt too automated.	158	245	117	44	17
The course was not interactive enough.	65	77	191	161	85

The overall course delivery was satisfactory.	313	220	35	9	7
You had enough times to complete the assigned tasks, assignments and assessments.	224	236	71	41	11
The duration of the course was satisfactory.	179	180	104	79	38
All the units of the course had enough time allocated.	160	179	120	91	31
Some of the units felt rushed.	111	160	184	93	32
In the beginning, time has been spent unnecessarily.	60	69	206	153	91
The timeline of the course can be improved.	261	234	58	22	6
Your trainer showed empathy and helped you in tackling problems.	411	143	22	3	1
You felt that the trainer is an expert of the course.	387	165	22	6	1
The communication skill of the trainer was satisfactory.	379	174	22	2	2
The delivery skill of the trainer was satisfactory.	372	177	26	1	1
Your trainer responded to your queries in a timely manner.	377	170	21	6	2
You felt comfortable expressing your problems to your trainer.	367	179	30	3	2
You think your trainer was perfect for this course.	336	192	42	8	2
Earning a certificate can make you feel more driven towards a course.	62	149	191	132	41
You love when a course offer certification along with training.	78	138	175	139	44
If certified, you will share your certificate in social media (i.e., LinkedIn, Facebook etc.) and your personal website.	225	271	65	13	2
You believe that the certificate can help you get a job.	375	171	24	6	1
You will take similar course in the future if updates are added significantly.	290	194	70	18	4
So far, you're satisfied with the course outcomes.	258	217	80	21	2

You would recommend this course to others.	206	204	119	36	13
If asked, you will be able to summarize the goals and benefits of this course.	258	224	61	25	8
You think that the course materials can be improved for this course.	112	142	161	113	48
You think the learning experience can be improved.	384	149	36	10	3

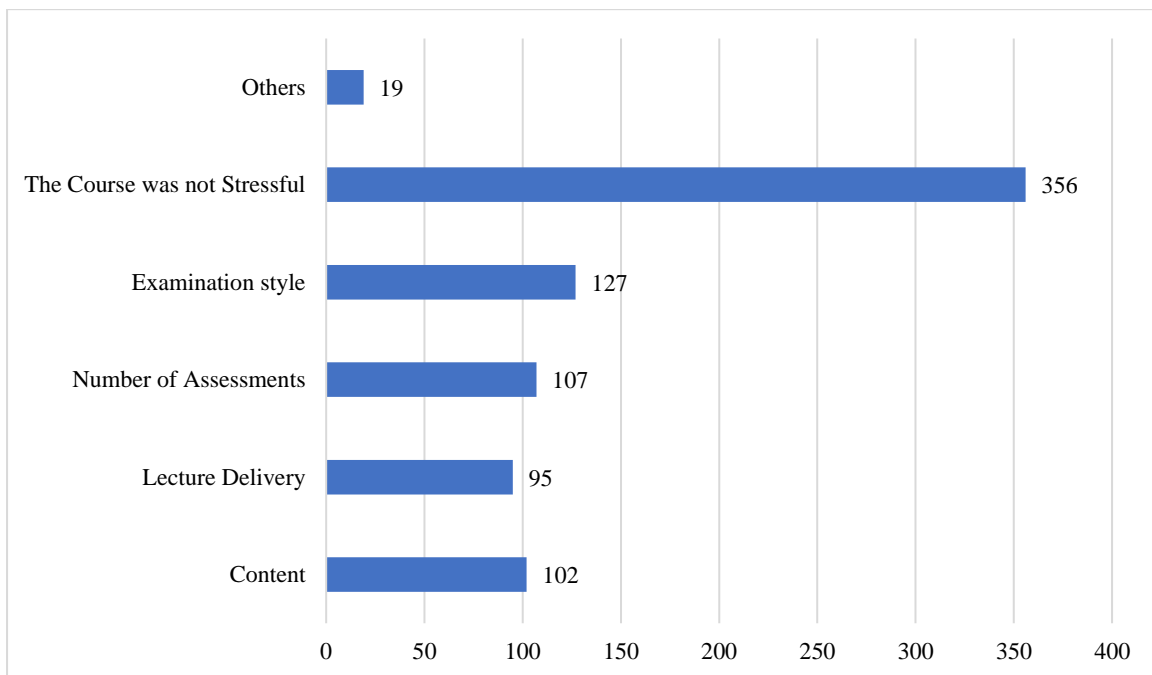We asked which parts of the course was stressful. The answers have been presented in 6.67.

Figure 6.67: Summary of which parts of the course was stressful

We asked the responders to mark if the following problems existed for the course in which they participated. The answers are illustrated in Table 6.92.

Table 6.92: Summary of problems.

Criteria	Frequency
Information overload or unnecessary information were taught.	31
There was a lack of course materials. More course materials are needed.	119
The duration of the training was too long.	24
The duration of the training was too short.	332
Poor/not enough assessment methods.	84
The assessment methods or examination was stressful.	100

The objective of the course was not clear to me.	23
I did not get what I expected from the course.	48
The performance of the trainer was not satisfactory.	20
The lecture materials were not well designed.	42
I didn't feel comfortable in the classroom while asking about a problem.	26
I didn't like the environment of the classroom.	16
Poor feedback and support system.	21
There was no problem in the course.	287

Finally, Table 6.93 shows the rating of the course submitted by the participants.

Table 6.93: Summary of course rating.

Criteria	1	2	3	4	5
Pre-training Preparation	104	90	135	76	175
Course Structure	86	89	129	95	183
Course Contents	88	76	120	85	210
Delivery Quality	94	77	111	100	198
Duration	113	120	155	80	110
Trainer	86	55	103	87	245
Support Team	92	79	111	84	211
Environment	98	41	116	53	265
Accessibility of Information	76	86	106	114	196
Usage of Games	173	120	152	68	55
Expected Outcomes	79	92	106	134	167
Learning Experience	81	72	100	107	217
Overall Rating	85	62	117	112	206

6.2.1.3. Summary of Submitted Answers Using Bar Charts for Objective 3

To address objective 3, we prepared 10 datasets. They are:

1. Data collected from NACTAR instructors

2. Data collected from RUET CSE M.Sc. students

3. Data collected from RUET CSE 12 students

4. Data collected from RUET CSE 13 students

5. Data collected from RUET CSE 14 students

6. Data collected from RUET CSE 15 students

7. Data collected from RUET CSE 16 students

8. Data collected from RUET CSE 17 students

9. Data collected from university teachers
10. Data collected from others

6.2.1.3.1. Data Collected from Other NACTAR instructors

A total of 22 people responded. The division distribution of them is shown in Figure 6.68.
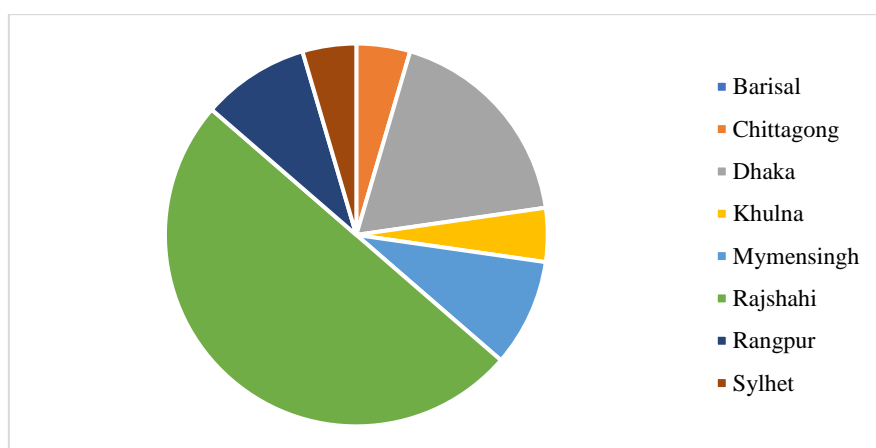

Figure 6.68: Division Distribution

We asked how well they know about recent technologies. Their answers are shown in Table 6.98.

Table 6.98: Summary of knowing technologies

Technologies	Excellent	Very Good	Good	Weak
Mobile Phone	10	4	7	0
Computer	12	5	5	0
Internet	11	3	8	0
Fixed Telephone	4	1	10	3

We asked them the source of their Internet connection. Their replies are illustrated in Table 6.99.

Table 6.99: Sources of Internet connection

Criteria	Frequency
BTCL Broadband	15
Other Broadband	7
Grameenphone	7
Banglalink	1
Teletalk	6

Airtel	1
Robi	3
Others	1

We recorded the usage of Mobile Phone, Computer and Internet in common places. The answers are shown in Table 6.100.

Table 6.100: Usage of technologies in common places

Technologies	Often	Sometimes	Not at all
Mobile Phone (Home)	11	10	0
Mobile Phone (Office)	8	13	0
Mobile Phone (Internet Café)	2	5	9
Mobile Phone (Other Places)	4	9	3
Computer (Home)	10	9	2
Computer (Office)	17	4	0
Computer (Internet Café)	1	2	14
Computer (Other Places)	1	8	7
Internet (Home)	12	9	1
Internet (Office)	17	4	1
Internet (Internet Café)	4	3	11
Internet (Other Places)	4	8	6

We asked what are the main problems of ICT in context of Bangladesh. Table 6.101 shows the answers.

Table 6.101: Main problems of ICT in the context of Bangladesh

Criteria	Frequency
Lack of Govt. spending on ICT	6
Lack of adequate investment	10
Lack of infrastructure	14
Lack of Research & Development	20
Inadequate capacity of services	7
Slow speed of the services	14
Interrupt/disconnection of services	9
High costs of offering services	10
Lack of networks	18
Uncertainty related to investment in ICT	6
Interrupt of electricity supply	10
Low quality/efficiency of the services	6

Lack of technical skills	18
Lack of awareness of the importance of ICT in the new economy	15
High spread of electronic illiteracy	7
High spread of poverty	7

We asked what are the main problems of Internet in context of Bangladesh. Table 6.102 shows the answers.

Table 6.102: Main problems of Internet in the context of Bangladesh

Criteria	Frequency
Problem of access to scientific and technical information for creation and transfer of knowledge	12
Lack of enthusiasm for electronic publications	8
Risk of spread of electronic piracy	11
Difficulty of overcoming the problem of high costs paid for using information	11
Lack of access to credit cards and lack of security in their use	11
Lack of or inadequate regular budget adequate for universities libraries to pay for access to scientific, technical and arts information, authors rights and have licenses or subscription	10
Gap (related to training and financial ability to communicate) between those who own and those who do not own the internet technology	9
Lack of assessment policies and evaluation programs	8
Limited and lack of modern available references	9
Poor or lack of services offered to users	8
High costs of acquiring licenses for access to electronic libraries for individuals and institutions	6
Creation of isolation for illiterate who do not know how to use the internet	11
Difficulties of preventing programs of spy and spread of viruses	11
Increase worry of institutions of waste of working time of their workers on internet, personal e-mail and use for personal purposes	6
Increase demand for technical and engineering education related to ICT	11
Lack of the required technical skills	13
Difficulty of distinction between original and not original documents and risk for users to use wrong unreliable information	9

6.2.1.3.2. Data Collected from RUET CSE M.Sc. Students

A total of 11 people responded. The division distribution of them is shown in Figure 6.69.
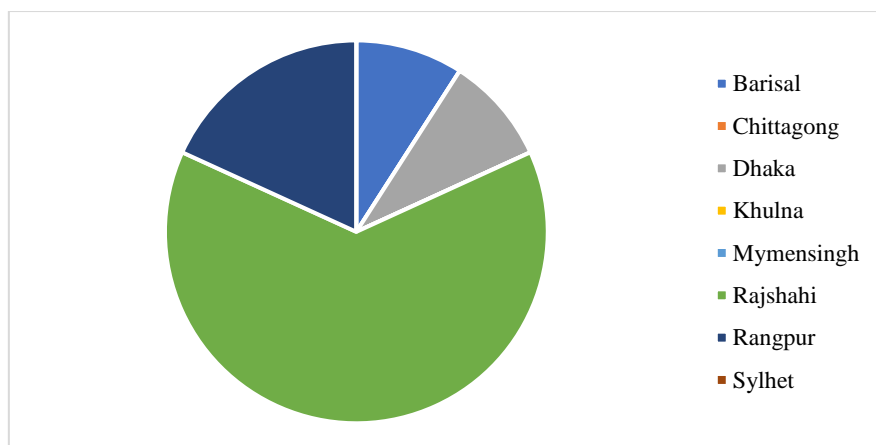
Figure 6.69: Division Distribution

We asked how well they know about recent technologies. Their answers are shown in Table 6.103.

Table 6.103: Summary of knowing technologies

Technologies	Excellent	Very Good	Good	Weak
Mobile Phone	6	3	1	1
Computer	6	3	1	1
Internet	6	3	1	1
Fixed Telephone	2	3	5	1

We asked them the source of their Internet connection. Their replies are illustrated in Table 6.104.

Table 6.104: Sources of Internet connection

Criteria	Frequency
BTCL Broadband	3
Other Broadband	7
Grameenphone	5
Banglalink	0
Teletalk	1
Airtel	0
Robi	2
Others	0

We recorded the usage of Mobile Phone, Computer and Internet in common places. The answers are shown in Table 6.105.

Table 6.105: Usage of technologies in common places

Technologies	Often	Sometimes	Not at all
Mobile Phone (Home)	11	0	0
Mobile Phone (Office)	2	8	0
Mobile Phone (Internet Café)	2	4	4
Mobile Phone (Other Places)	1	8	2
Computer (Home)	10	1	0
Computer (Office)	8	2	0
Computer (Internet Café)	1	3	6
Computer (Other Places)	0	3	7
Internet (Home)	11	0	0
Internet (Office)	7	3	0
Internet (Internet Café)	1	4	5
Internet (Other Places)	1	5	3

We asked what are the main problems of ICT in context of Bangladesh. Table 6.106 shows the answers.

Table 6.106: Main problems of ICT in the context of Bangladesh

Criteria	Frequency
Lack of Govt. spending on ICT	6
Lack of adequate investment	8
Lack of infrastructure	6
Lack of Research & Development	8
Inadequate capacity of services	6
Slow speed of the services	9
Interrupt/disconnection of services	7
High costs of offering services	8
Lack of networks	5
Uncertainty related to investment in ICT	4
Interrupt of electricity supply	7
Low quality/efficiency of the services	5
Lack of technical skills	8
Lack of awareness of the importance of ICT in the new economy	6
High spread of electronic illiteracy	3
High spread of poverty	2

We asked what are the main problems of Internet in context of Bangladesh. Table 6.107 shows the answers.

Table 6.107: Main problems of Internet in the context of Bangladesh

Criteria	Frequency
Problem of access to scientific and technical information for creation and transfer of knowledge	4
Lack of enthusiasm for electronic publications	6
Risk of spread of electronic piracy	6
Difficulty of overcoming the problem of high costs paid for using information	6
Lack of access to credit cards and lack of security in their use	5
Lack of or inadequate regular budget adequate for universities libraries to pay for access to scientific, technical and arts information, authors rights and have licenses or subscription	7
Gap (related to training and financial ability to communicate) between those who own and those who do not own the internet technology	5
Lack of assessment policies and evaluation programs	3
Limited and lack of modern available references	2
Poor or lack of services offered to users	5
High costs of acquiring licenses for access to electronic libraries for individuals and institutions	5
Creation of isolation for illiterate who do not know how to use the internet	3
Difficulties of preventing programs of spy and spread of viruses	1
Increase worry of institutions of waste of working time of their workers on internet, personal e-mail and use for personal purposes	3
Increase demand for technical and engineering education related to ICT	2
Lack of the required technical skills	5
Difficulty of distinction between original and not original documents and risk for users to use wrong unreliable information	5

6.2.1.3.3. Data Collected from RUET CSE 12 Students

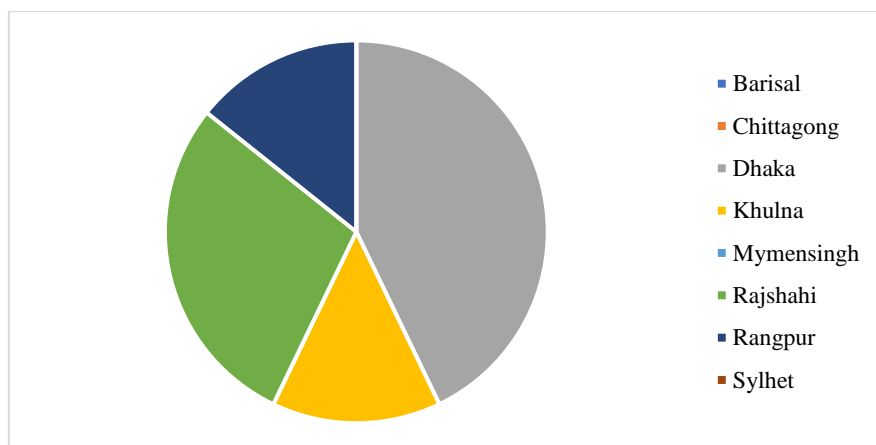A total of 7 people responded. The division distribution of them is shown in Figure 6.70.

Figure 6.70: Division Distribution

We asked how well they know about recent technologies. Their answers are shown in Table 6.108.

Table 6.108: Summary of knowing technologies

Technologies	Excellent	Very Good	Good	Weak
Mobile Phone	6	1	0	0
Computer	6	0	1	0
Internet	6	0	1	0
Fixed Telephone	2	0	4	0

We asked them the source of their Internet connection. Their replies are illustrated in Table 6.109.

Table 6.109: Sources of Internet connection

Criteria	Frequency
BTCL Broadband	2
Other Broadband	4
Grameenphone	4
Banglalink	1
Teletalk	1
Airtel	0
Robi	1
Others	1

We recorded the usage of Mobile Phone, Computer and Internet in common places. The answers are shown in Table 6.110.

Table 6.110: Usage of technologies in common places

Technologies	Often	Sometimes	Not at all
Mobile Phone (Home)	6	1	0
Mobile Phone (Office)	5	1	1
Mobile Phone (Internet Café)	3	2	2
Mobile Phone (Other Places)	3	3	1
Computer (Home)	5	1	1
Computer (Office)	6	1	0
Computer (Internet Café)	1	3	3
Computer (Other Places)	1	2	4
Internet (Home)	6	1	0
Internet (Office)	6	0	1
Internet (Internet Café)	1	5	1
Internet (Other Places)	3	4	0

We asked what are the main problems of ICT in context of Bangladesh. Table 6.111 shows the answers.

Table 6.111: Main problems of ICT in the context of Bangladesh

Criteria	Frequency
Lack of Govt. spending on ICT	4
Lack of adequate investment	3
Lack of infrastructure	5
Lack of Research & Development	6
Inadequate capacity of services	5
Slow speed of the services	5
Interrupt/disconnection of services	4
High costs of offering services	2
Lack of networks	4
Uncertainty related to investment in ICT	2
Interrupt of electricity supply	0
Low quality/efficiency of the services	6
Lack of technical skills	4
Lack of awareness of the importance of ICT in the new economy	3
High spread of electronic illiteracy	2
High spread of poverty	1

We asked what are the main problems of Internet in context of Bangladesh. Table 6.112 shows the answers.

Table 6.112: Main problems of Internet in the context of Bangladesh

Criteria	Frequency
Problem of access to scientific and technical information for creation and transfer of knowledge	1
Lack of enthusiasm for electronic publications	1
Risk of spread of electronic piracy	2
Difficulty of overcoming the problem of high costs paid for using information	3
Lack of access to credit cards and lack of security in their use	2
Lack of or inadequate regular budget adequate for universities libraries to pay for access to scientific, technical and arts information, authors rights and have licenses or subscription	3
Gap (related to training and financial ability to communicate) between those who own and those who do not own the internet technology	2
Lack of assessment policies and evaluation programs	0
Limited and lack of modern available references	0
Poor or lack of services offered to users	3
High costs of acquiring licenses for access to electronic libraries for individuals and institutions	2
Creation of isolation for illiterate who do not know how to use the internet	1
Difficulties of preventing programs of spy and spread of viruses	2
Increase worry of institutions of waste of working time of their workers on internet, personal e-mail and use for personal purposes	1
Increase demand for technical and engineering education related to ICT	0
Lack of the required technical skills	3
Difficulty of distinction between original and not original documents and risk for users to use wrong unreliable information	3

6.2.1.3.4. Data Collected from RUET CSE 13 Students

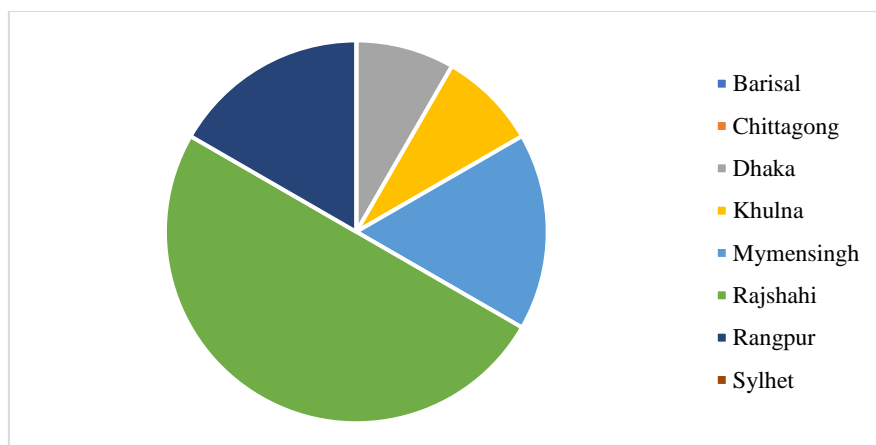A total of 12 people responded. The division distribution of them is shown in Figure 6.71.

Figure 6.71: Division Distribution

We asked how well they know about recent technologies. Their answers are shown in Table 6.113.

Table 6.113: Summary of knowing technologies

Technologies	Excellent	Very Good	Good	Weak
Mobile Phone	8	2	2	0
Computer	8	2	2	0
Internet	8	3	1	0
Fixed Telephone	1	5	5	1

We asked them the source of their Internet connection. Their replies are illustrated in Table 6.114.

Table 6.114: Sources of Internet connection

Criteria	Frequency
BTCL Broadband	0
Other Broadband	9
Grameenphone	5
Banglalink	0
Teletalk	0
Airtel	0
Robi	0
Others	1

We recorded the usage of Mobile Phone, Computer and Internet in common places. The answers are shown in Table 6.115.

Table 6.115: Usage of technologies in common places

Technologies	Often	Sometimes	Not at all
Mobile Phone (Home)	11	1	0
Mobile Phone (Office)	4	6	1
Mobile Phone (Internet Café)	2	4	5
Mobile Phone (Other Places)	3	7	1
Computer (Home)	10	2	0
Computer (Office)	10	2	0
Computer (Internet Café)	1	3	7
Computer (Other Places)	1	6	4
Internet (Home)	12	0	0
Internet (Office)	10	2	0
Internet (Internet Café)	2	3	6
Internet (Other Places)	2	8	1

We asked what are the main problems of ICT in context of Bangladesh. Table 6.116 shows the answers.

Table 6.116: Main problems of ICT in the context of Bangladesh

Criteria	Frequency
Lack of Govt. spending on ICT	7
Lack of adequate investment	8
Lack of infrastructure	10
Lack of Research & Development	10
Inadequate capacity of services	6
Slow speed of the services	9
Interrupt/disconnection of services	7
High costs of offering services	8
Lack of networks	4
Uncertainty related to investment in ICT	4
Interrupt of electricity supply	6
Low quality/efficiency of the services	5
Lack of technical skills	10
Lack of awareness of the importance of ICT in the new economy	6
High spread of electronic illiteracy	4
High spread of poverty	1

We asked what are the main problems of Internet in context of Bangladesh. Table 6.117 shows the answers.

Table 6.117: Main problems of Internet in the context of Bangladesh

Criteria	Frequency
Problem of access to scientific and technical information for creation and transfer of knowledge	4
Lack of enthusiasm for electronic publications	6
Risk of spread of electronic piracy	6
Difficulty of overcoming the problem of high costs paid for using information	7
Lack of access to credit cards and lack of security in their use	7
Lack of or inadequate regular budget adequate for universities libraries to pay for access to scientific, technical and arts information, authors rights and have licenses or subscription	5
Gap (related to training and financial ability to communicate) between those who own and those who do not own the internet technology	6
Lack of assessment policies and evaluation programs	2
Limited and lack of modern available references	5
Poor or lack of services offered to users	6
High costs of acquiring licenses for access to electronic libraries for individuals and institutions	5
Creation of isolation for illiterate who do not know how to use the internet	4
Difficulties of preventing programs of spy and spread of viruses	4
Increase worry of institutions of waste of working time of their workers on internet, personal e-mail and use for personal purposes	2
Increase demand for technical and engineering education related to ICT	5
Lack of the required technical skills	7
Difficulty of distinction between original and not original documents and risk for users to use wrong unreliable information	6

6.2.1.3.5. Data Collected from RUET CSE 14 Students

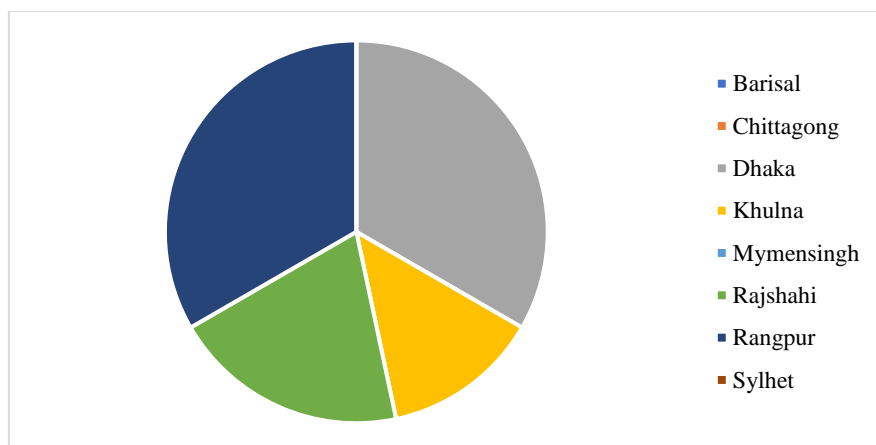A total of 15 people responded. The division distribution of them is shown in Figure 6.72.

Figure 6.72: Division Distribution

We asked how well they know about recent technologies. Their answers are shown in Table 6.118.

Table 6.118: Summary of knowing technologies

Technologies	Excellent	Very Good	Good	Weak
Mobile Phone	8	6	0	1
Computer	9	4	1	1
Internet	7	6	1	1
Fixed Telephone	5	0	5	5

We asked them the source of their Internet connection. Their replies are illustrated in Table 6.119.

Table 6.119: Sources of Internet connection

Criteria	Frequency
BTCL Broadband	0
Other Broadband	13
Grameenphone	6
Banglalink	0
Teletalk	1
Airtel	1
Robi	0
Others	1

We recorded the usage of Mobile Phone, Computer and Internet in common places. The answers are shown in Table 6.120.

Table 6.120: Usage of technologies in common places

Technologies	Often	Sometimes	Not at all
Mobile Phone (Home)	13	2	0
Mobile Phone (Office)	4	9	2
Mobile Phone (Internet Café)	0	6	7
Mobile Phone (Other Places)	3	9	1
Computer (Home)	10	5	0
Computer (Office)	12	3	0
Computer (Internet Café)	1	2	10
Computer (Other Places)	0	5	8
Internet (Home)	13	2	0
Internet (Office)	11	3	1
Internet (Internet Café)	4	4	5
Internet (Other Places)	6	4	3

We asked what are the main problems of ICT in context of Bangladesh. Table 6.121 shows the answers.

Table 6.121: Main problems of ICT in the context of Bangladesh

Criteria	Frequency
Lack of Govt. spending on ICT	7
Lack of adequate investment	9
Lack of infrastructure	12
Lack of Research & Development	13
Inadequate capacity of services	8
Slow speed of the services	11
Interrupt/disconnection of services	5
High costs of offering services	6
Lack of networks	6
Uncertainty related to investment in ICT	8
Interrupt of electricity supply	4
Low quality/efficiency of the services	10
Lack of technical skills	12
Lack of awareness of the importance of ICT in the new economy	8
High spread of electronic illiteracy	4
High spread of poverty	2

We asked what are the main problems of Internet in context of Bangladesh. Table 6.122 shows the answers.

Table 6.122: Main problems of Internet in the context of Bangladesh

Criteria	Frequency
Problem of access to scientific and technical information for creation and transfer of knowledge	9
Lack of enthusiasm for electronic publications	6
Risk of spread of electronic piracy	9
Difficulty of overcoming the problem of high costs paid for using information	7
Lack of access to credit cards and lack of security in their use	9
Lack of or inadequate regular budget adequate for universities libraries to pay for access to scientific, technical and arts information, authors rights and have licenses or subscription	9
Gap (related to training and financial ability to communicate) between those who own and those who do not own the internet technology	6
Lack of assessment policies and evaluation programs	7
Limited and lack of modern available references	8
Poor or lack of services offered to users	6
High costs of acquiring licenses for access to electronic libraries for individuals and institutions	5
Creation of isolation for illiterate who do not know how to use the internet	7
Difficulties of preventing programs of spy and spread of viruses	7
Increase worry of institutions of waste of working time of their workers on internet, personal e-mail and use for personal purposes	7
Increase demand for technical and engineering education related to ICT	6
Lack of the required technical skills	8
Difficulty of distinction between original and not original documents and risk for users to use wrong unreliable information	10

6.2.1.3.6. Data Collected from RUET CSE 15 Students

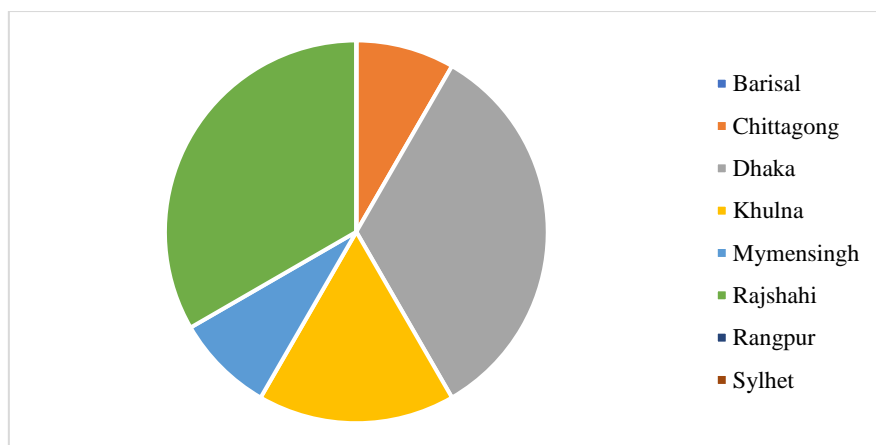A total of 12 people responded. The division distribution of them is shown in Figure 6.73.

Figure 6.73: Division Distribution

We asked how well they know about recent technologies. Their answers are shown in Table 6.123.

Table 6.123: Summary of knowing technologies

Technologies	Excellent	Very Good	Good	Weak
Mobile Phone	9	2	1	0
Computer	7	4	1	0
Internet	7	4	1	0
Fixed Telephone	0	1	7	4

We asked them the source of their Internet connection. Their replies are illustrated in Table 6.124.

Table 6.124: Sources of Internet connection

Criteria	Frequency
BTCL Broadband	5
Other Broadband	8
Grameenphone	6
Banglalink	0
Teletalk	0
Airtel	0
Robi	1
Others	0

We recorded the usage of Mobile Phone, Computer and Internet in common places. The answers are shown in Table 6.125.

Table 6.125: Usage of technologies in common places

Technologies	Often	Sometimes	Not at all
Mobile Phone (Home)	10	2	0
Mobile Phone (Office)	1	10	0
Mobile Phone (Internet Café)	1	5	6
Mobile Phone (Other Places)	2	9	1
Computer (Home)	12	0	0
Computer (Office)	11	0	0
Computer (Internet Café)	0	4	7
Computer (Other Places)	0	8	4
Internet (Home)	12	0	0
Internet (Office)	11	0	0
Internet (Internet Café)	3	5	4
Internet (Other Places)	2	8	2

We asked what are the main problems of ICT in context of Bangladesh. Table 6.126 shows the answers.

Table 6.126: Main problems of ICT in the context of Bangladesh

Criteria	Frequency
Lack of Govt. spending on ICT	8
Lack of adequate investment	8
Lack of infrastructure	10
Lack of Research & Development	11
Inadequate capacity of services	7
Slow speed of the services	10
Interrupt/disconnection of services	8
High costs of offering services	8
Lack of networks	5
Uncertainty related to investment in ICT	4
Interrupt of electricity supply	8
Low quality/efficiency of the services	9
Lack of technical skills	10
Lack of awareness of the importance of ICT in the new economy	7
High spread of electronic illiteracy	4
High spread of poverty	6

We asked what are the main problems of Internet in context of Bangladesh. Table 6.127 shows the answers.

Table 6.127: Main problems of Internet in the context of Bangladesh

Criteria	Frequency
Problem of access to scientific and technical information for creation and transfer of knowledge	10
Lack of enthusiasm for electronic publications	3
Risk of spread of electronic piracy	5
Difficulty of overcoming the problem of high costs paid for using information	7
Lack of access to credit cards and lack of security in their use	5
Lack of or inadequate regular budget adequate for universities libraries to pay for access to scientific, technical and arts information, authors rights and have licenses or subscription	6
Gap (related to training and financial ability to communicate) between those who own and those who do not own the internet technology	7
Lack of assessment policies and evaluation programs	7
Limited and lack of modern available references	4
Poor or lack of services offered to users	3
High costs of acquiring licenses for access to electronic libraries for individuals and institutions	7
Creation of isolation for illiterate who do not know how to use the internet	2
Difficulties of preventing programs of spy and spread of viruses	3
Increase worry of institutions of waste of working time of their workers on internet, personal e-mail and use for personal purposes	3
Increase demand for technical and engineering education related to ICT	2
Lack of the required technical skills	7
Difficulty of distinction between original and not original documents and risk for users to use wrong unreliable information	2

6.2.1.3.7. Data Collected from RUET CSE 16 Students

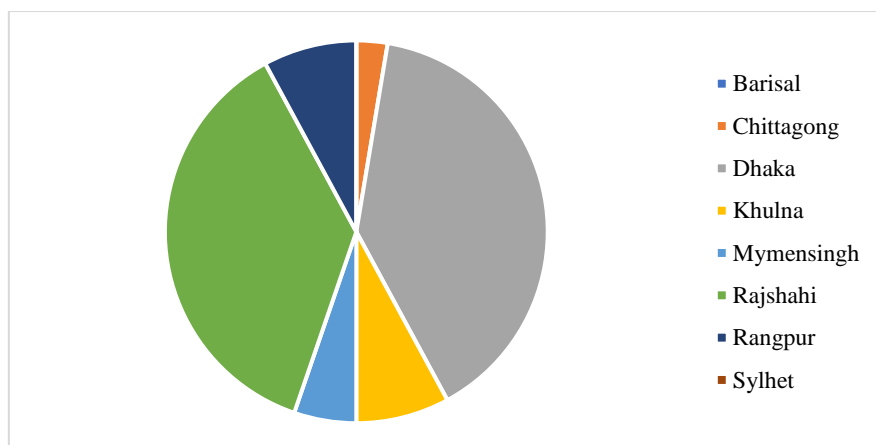A total of 38 people responded. The division distribution of them is shown in Figure 6.74.

Figure 6.74: Division Distribution

We asked how well they know about recent technologies. Their answers are shown in Table 6.128.

Table 6.128: Summary of knowing technologies

Technologies	Excellent	Very Good	Good	Weak
Mobile Phone	26	11	1	0
Computer	26	11	1	0
Internet	26	11	1	0
Fixed Telephone	8	4	17	9

We asked them the source of their Internet connection. Their replies are illustrated in Table 6.129.

Table 6.129: Sources of Internet connection

Criteria	Frequency
BTCL Broadband	8
Other Broadband	30
Grameenphone	19
Banglalink	8
Teletalk	9
Airtel	5
Robi	7
Others	0

We recorded the usage of Mobile Phone, Computer and Internet in common places. The answers are shown in Table 6.130.

Table 6.130: Usage of technologies in common places

Technologies	Often	Sometimes	Not at all
Mobile Phone (Home)	33	4	1
Mobile Phone (Office)	5	20	6
Mobile Phone (Internet Café)	9	13	14
Mobile Phone (Other Places)	12	22	4
Computer (Home)	33	4	0
Computer (Office)	18	8	3
Computer (Internet Café)	12	7	15
Computer (Other Places)	5	24	6
Internet (Home)	37	0	1
Internet (Office)	21	7	2
Internet (Internet Café)	13	11	11
Internet (Other Places)	16	19	1

We asked what are the main problems of ICT in context of Bangladesh. Table 6.131 shows the answers.

Table 6.131: Main problems of ICT in the context of Bangladesh

Criteria	Frequency
Lack of Govt. spending on ICT	18
Lack of adequate investment	24
Lack of infrastructure	26
Lack of Research & Development	36
Inadequate capacity of services	25
Slow speed of the services	32
Interrupt/disconnection of services	28
High costs of offering services	31
Lack of networks	28
Uncertainty related to investment in ICT	17
Interrupt of electricity supply	21
Low quality/efficiency of the services	32
Lack of technical skills	32
Lack of awareness of the importance of ICT in the new economy	22
High spread of electronic illiteracy	17
High spread of poverty	11

We asked what are the main problems of Internet in context of Bangladesh. Table 6.132 shows the answers.

Table 6.132: Main problems of Internet in the context of Bangladesh

Criteria	Frequency
Problem of access to scientific and technical information for creation and transfer of knowledge	22
Lack of enthusiasm for electronic publications	18
Risk of spread of electronic piracy	21
Difficulty of overcoming the problem of high costs paid for using information	27
Lack of access to credit cards and lack of security in their use	23
Lack of or inadequate regular budget adequate for universities libraries to pay for access to scientific, technical and arts information, authors rights and have licenses or subscription	29
Gap (related to training and financial ability to communicate) between those who own and those who do not own the internet technology	23
Lack of assessment policies and evaluation programs	21
Limited and lack of modern available references	11
Poor or lack of services offered to users	21
High costs of acquiring licenses for access to electronic libraries for individuals and institutions	21
Creation of isolation for illiterate who do not know how to use the internet	16
Difficulties of preventing programs of spy and spread of viruses	19
Increase worry of institutions of waste of working time of their workers on internet, personal e-mail and use for personal purposes	14
Increase demand for technical and engineering education related to ICT	15
Lack of the required technical skills	27
Difficulty of distinction between original and not original documents and risk for users to use wrong unreliable information	19

6.2.1.3.8. Data Collected from RUET CSE 17 Students

A total of 33 people responded. The division distribution of them is shown in Figure 6.75.
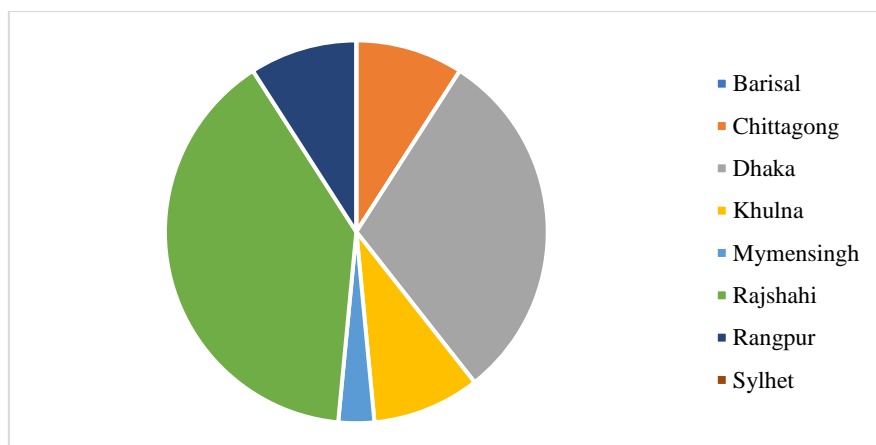
Figure 6.75: Division Distribution

We asked how well they know about recent technologies. Their answers are shown in Table 6.133.

Table 6.133: Summary of knowing technologies

Technologies	Excellent	Very Good	Good	Weak
Mobile Phone	21	7	4	1
Computer	14	13	5	1
Internet	13	11	7	2
Fixed Telephone	7	4	11	10

We asked them the source of their Internet connection. Their replies are illustrated in Table 6.134.

Table 6.134: Sources of Internet connection

Criteria	Frequency
BTCL Broadband	9
Other Broadband	24
Grameenphone	12
Banglalink	5
Teletalk	2
Airtel	6
Robi	3
Others	0

We recorded the usage of Mobile Phone, Computer and Internet in common places. The answers are shown in Table 6.135.

Table 6.135: Usage of technologies in common places

Technologies	Often	Sometimes	Not at all
Mobile Phone (Home)	31	2	0
Mobile Phone (Office)	5	11	7
Mobile Phone (Internet Café)	8	9	10
Mobile Phone (Other Places)	11	17	4
Computer (Home)	28	5	0
Computer (Office)	11	6	5
Computer (Internet Café)	5	5	18
Computer (Other Places)	3	22	7
Internet (Home)	33	0	0
Internet (Office)	14	4	5
Internet (Internet Café)	14	3	10
Internet (Other Places)	17	13	2

We asked what are the main problems of ICT in context of Bangladesh. Table 6.136 shows the answers.

Table 6.136: Main problems of ICT in the context of Bangladesh

Criteria	Frequency
Lack of Govt. spending on ICT	18
Lack of adequate investment	20
Lack of infrastructure	22
Lack of Research & Development	29
Inadequate capacity of services	19
Slow speed of the services	28
Interrupt/disconnection of services	17
High costs of offering services	22
Lack of networks	18
Uncertainty related to investment in ICT	14
Interrupt of electricity supply	17
Low quality/efficiency of the services	19
Lack of technical skills	22
Lack of awareness of the importance of ICT in the new economy	15
High spread of electronic illiteracy	14
High spread of poverty	9

We asked what are the main problems of Internet in context of Bangladesh. Table 6.137 shows the answers.

Table 6.137: Main problems of Internet in the context of Bangladesh

Criteria	Frequency
Problem of access to scientific and technical information for creation and transfer of knowledge	17
Lack of enthusiasm for electronic publications	13
Risk of spread of electronic piracy	22
Difficulty of overcoming the problem of high costs paid for using information	23
Lack of access to credit cards and lack of security in their use	18
Lack of or inadequate regular budget adequate for universities libraries to pay for access to scientific, technical and arts information, authors rights and have licenses or subscription	14
Gap (related to training and financial ability to communicate) between those who own and those who do not own the internet technology	17
Lack of assessment policies and evaluation programs	14
Limited and lack of modern available references	13
Poor or lack of services offered to users	17
High costs of acquiring licenses for access to electronic libraries for individuals and institutions	14
Creation of isolation for illiterate who do not know how to use the internet	12
Difficulties of preventing programs of spy and spread of viruses	12
Increase worry of institutions of waste of working time of their workers on internet, personal e-mail and use for personal purposes	6
Increase demand for technical and engineering education related to ICT	14
Lack of the required technical skills	27
Difficulty of distinction between original and not original documents and risk for users to use wrong unreliable information	22

6.2.1.3.9. Data Collected from University Teachers

A total of 21 people responded. The division distribution of them is shown in Figure 6.76.
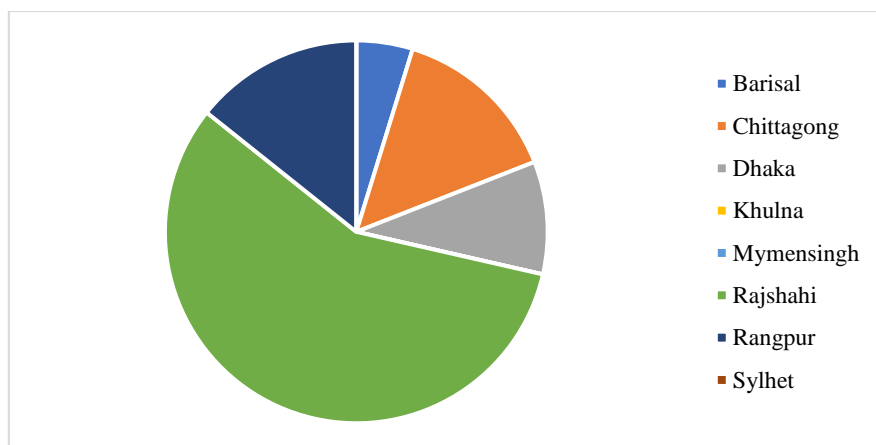
Figure 6.76: Division Distribution

We asked how well they know about recent technologies. Their answers are shown in Table 6.138.

Table 6.138: Summary of knowing technologies

Technologies	Excellent	Very Good	Good	Weak
Mobile Phone	12	6	3	0
Computer	15	4	2	0
Internet	12	7	2	0
Fixed Telephone	2	1	11	7

We asked them the source of their Internet connection. Their replies are illustrated in Table 6.139.

Table 6.139: Sources of Internet connection

Criteria	Frequency
BTCL Broadband	6
Other Broadband	12
Grameenphone	10
Banglalink	0
Teletalk	0
Airtel	0
Robi	3
Others	1

We recorded the usage of Mobile Phone, Computer and Internet in common places. The answers are shown in Table 6.140.

Table 6.140: Usage of technologies in common places

Technologies	Often	Sometimes	Not at all
Mobile Phone (Home)	19	2	0
Mobile Phone (Office)	7	13	0
Mobile Phone (Internet Café)	5	7	9
Mobile Phone (Other Places)	3	16	1
Computer (Home)	18	3	0
Computer (Office)	18	3	0
Computer (Internet Café)	3	4	13
Computer (Other Places)	1	12	7
Internet (Home)	17	4	0
Internet (Office)	16	5	0
Internet (Internet Café)	6	7	7
Internet (Other Places)	4	15	2

We asked what are the main problems of ICT in context of Bangladesh. Table 6.141 shows the answers.

Table 6.141: Main problems of ICT in the context of Bangladesh

Criteria	Frequency
Lack of Govt. spending on ICT	10
Lack of adequate investment	10
Lack of infrastructure	16
Lack of Research & Development	20
Inadequate capacity of services	15
Slow speed of the services	20
Interrupt/disconnection of services	14
High costs of offering services	15
Lack of networks	15
Uncertainty related to investment in ICT	8
Interrupt of electricity supply	12
Low quality/efficiency of the services	12
Lack of technical skills	18
Lack of awareness of the importance of ICT in the new economy	12
High spread of electronic illiteracy	6
High spread of poverty	6

We asked what are the main problems of Internet in context of Bangladesh. Table 6.142 shows the answers.

Table 6.142: Main problems of Internet in the context of Bangladesh

Criteria	Frequency
Problem of access to scientific and technical information for creation and transfer of knowledge	15
Lack of enthusiasm for electronic publications	10
Risk of spread of electronic piracy	9
Difficulty of overcoming the problem of high costs paid for using information	16
Lack of access to credit cards and lack of security in their use	7
Lack of or inadequate regular budget adequate for universities libraries to pay for access to scientific, technical and arts information, authors rights and have licenses or subscription	14
Gap (related to training and financial ability to communicate) between those who own and those who do not own the internet technology	11
Lack of assessment policies and evaluation programs	10
Limited and lack of modern available references	7
Poor or lack of services offered to users	10
High costs of acquiring licenses for access to electronic libraries for individuals and institutions	11
Creation of isolation for illiterate who do not know how to use the internet	9
Difficulties of preventing programs of spy and spread of viruses	8
Increase worry of institutions of waste of working time of their workers on internet, personal e-mail and use for personal purposes	5
Increase demand for technical and engineering education related to ICT	12
Lack of the required technical skills	16
Difficulty of distinction between original and not original documents and risk for users to use wrong unreliable information	9

6.2.1.3.10. Data Collected from Others

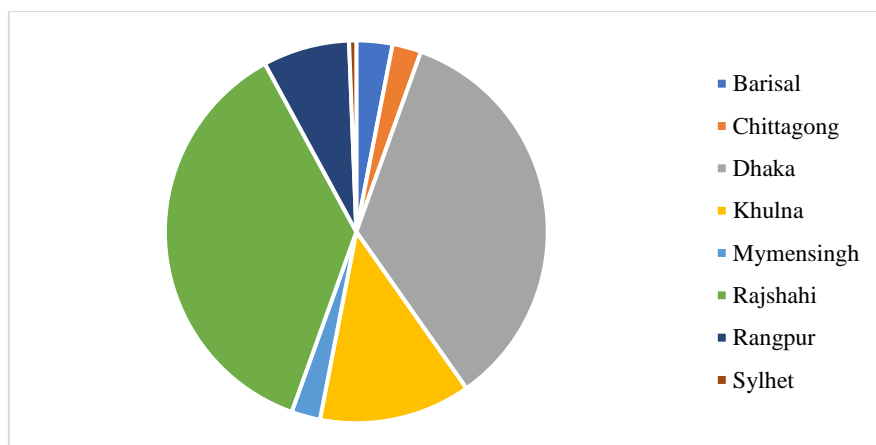A total of 164 people responded. The division distribution of them is shown in Figure 6.77.

Figure 6.77: Division Distribution

We asked how well they know about recent technologies. Their answers are shown in Table 6.143.

Table 6.143: Summary of knowing technologies

Technologies	Excellent	Very Good	Good	Weak
Mobile Phone	96	43	22	2
Computer	88	38	33	3
Internet	91	42	26	2
Fixed Telephone	23	36	63	33

We asked them the source of their Internet connection. Their replies are illustrated in Table 6.144.

Table 6.144: Sources of Internet connection

Criteria	Frequency
BTCL Broadband	43
Other Broadband	98
Grameenphone	62
Banglalink	16
Teletalk	15
Airtel	15
Robi	18
Others	2

We recorded the usage of Mobile Phone, Computer and Internet in common places. The answers are shown in Table 6.145.

Table 6.146: Usage of technologies in common places

Technologies	Often	Sometimes	Not at all
Mobile Phone (Home)	131	32	0
Mobile Phone (Office)	16	76	27
Mobile Phone (Internet Café)	38	60	32
Mobile Phone (Other Places)	36	95	6
Computer (Home)	139	24	0
Computer (Office)	70	39	14
Computer (Internet Café)	34	56	43
Computer (Other Places)	21	79	37
Internet (Home)	145	17	0
Internet (Office)	69	40	12
Internet (Internet Café)	57	53	26
Internet (Other Places)	51	81	10

We asked what are the main problems of ICT in context of Bangladesh. Table 6.147 shows the answers.

Table 6.148: Main problems of ICT in the context of Bangladesh

Criteria	Frequency
Lack of Govt. spending on ICT	89
Lack of adequate investment	104
Lack of infrastructure	106
Lack of Research & Development	126
Inadequate capacity of services	52
Slow speed of the services	119
Interrupt/disconnection of services	77
High costs of offering services	101
Lack of networks	107
Uncertainty related to investment in ICT	67
Interrupt of electricity supply	70
Low quality/efficiency of the services	79
Lack of technical skills	112
Lack of awareness of the importance of ICT in the new economy	92
High spread of electronic illiteracy	61
High spread of poverty	71

We asked what are the main problems of Internet in context of Bangladesh. Table 6.149 shows the answers.

Table 6.149: Main problems of Internet in the context of Bangladesh

Criteria	Frequency
Problem of access to scientific and technical information for creation and transfer of knowledge	88
Lack of enthusiasm for electronic publications	75
Risk of spread of electronic piracy	85
Difficulty of overcoming the problem of high costs paid for using information	96
Lack of access to credit cards and lack of security in their use	72
Lack of or inadequate regular budget adequate for universities libraries to pay for access to scientific, technical and arts information, authors rights and have licenses or subscription	95
Gap (related to training and financial ability to communicate) between those who own and those who do not own the internet technology	62
Lack of assessment policies and evaluation programs	82
Limited and lack of modern available references	56
Poor or lack of services offered to users	72
High costs of acquiring licenses for access to electronic libraries for individuals and institutions	54
Creation of isolation for illiterate who do not know how to use the internet	71
Difficulties of preventing programs of spy and spread of viruses	52
Increase worry of institutions of waste of working time of their workers on internet, personal e-mail and use for personal purposes	55
Increase demand for technical and engineering education related to ICT	73
Lack of the required technical skills	87
Difficulty of distinction between original and not original documents and risk for users to use wrong unreliable information	71

6.2.1.4. Summary of Submitted Answers Using Bar Charts for Objective 4

To address objective 3, we prepared 10 datasets. They are:

1. Data collected from NACTAR instructors
2. Data collected from RUET CSE M.Sc. students
3. Data collected from RUET CSE 12 students
4. Data collected from RUET CSE 13 students
5. Data collected from RUET CSE 14 students
6. Data collected from RUET CSE 15 students
7. Data collected from RUET CSE 16 students
8. Data collected from RUET CSE 17 students

9. Data collected from university teachers

10. Data collected from others

6.2.1.4.1. Data Collected from Other NACTAR instructors

We asked the responders of objective 3 to tell us which parts of a course should be assessed. The answers are illustrated in Table 6.150.

Table 6.150: The parts of course to be assessed summary

Criteria	Frequency
Teaching Method Assessment	21
Instructor Assessment	16
Course Materials Assessment	16
Student Engagement and Involvement Assessment	17
Course Structure Assessment	12
Course Outcomes Definition Assessment	8
Examination Process Assessment	12
Support Team Assessment	11

6.2.1.4.2. Data Collected from RUET CSE M.Sc. Students

We asked the responders of objective 3 to tell us which parts of a course should be assessed. The answers are illustrated in Table 6.151.

Table 6.151: The parts of course to be assessed summary

Criteria	Frequency
Teaching Method Assessment	9
Instructor Assessment	8
Course Materials Assessment	8
Student Engagement and Involvement Assessment	10
Course Structure Assessment	8
Course Outcomes Definition Assessment	5
Examination Process Assessment	7
Support Team Assessment	4

6.2.1.4.3. Data Collected from RUET CSE 12 Students

We asked the responders of objective 3 to tell us which parts of a course should be assessed. The answers are illustrated in Table 6.152.

Table 6.152: The parts of course to be assessed summary

Criteria	Frequency
Teaching Method Assessment	5
Instructor Assessment	6
Course Materials Assessment	5
Student Engagement and Involvement Assessment	3
Course Structure Assessment	5
Course Outcomes Definition Assessment	3
Examination Process Assessment	2
Support Team Assessment	3

6.2.1.4.4. Data Collected from RUET CSE 13 Students

We asked the responders of objective 3 to tell us which parts of a course should be assessed. The answers are illustrated in Table 6.153.

Table 6.153: The parts of course to be assessed summary

Criteria	Frequency
Teaching Method Assessment	11
Instructor Assessment	10
Course Materials Assessment	11
Student Engagement and Involvement Assessment	8
Course Structure Assessment	6
Course Outcomes Definition Assessment	6
Examination Process Assessment	7
Support Team Assessment	4

6.2.1.4.5. Data Collected from RUET CSE 14 Students

We asked the responders of objective 3 to tell us which parts of a course should be assessed. The answers are illustrated in Table 6.154.

Table 6.154: The parts of course to be assessed summary

Criteria	Frequency
Teaching Method Assessment	14
Instructor Assessment	10

Criteria	Frequency
Course Materials Assessment	13
Student Engagement and Involvement Assessment	12
Course Structure Assessment	14
Course Outcomes Definition Assessment	6
Examination Process Assessment	10
Support Team Assessment	6

6.2.1.4.6. Data Collected from RUET CSE 15 Students

We asked the responders of objective 3 to tell us which parts of a course should be assessed. The answers are illustrated in Table 6.155.

Table 6.155: The parts of course to be assessed summary

Criteria	Frequency
Teaching Method Assessment	8
Instructor Assessment	7
Course Materials Assessment	7
Student Engagement and Involvement Assessment	6
Course Structure Assessment	9
Course Outcomes Definition Assessment	7
Examination Process Assessment	6
Support Team Assessment	5

6.2.1.4.7. Data Collected from RUET CSE 16 Students

We asked the responders of objective 3 to tell us which parts of a course should be assessed. The answers are illustrated in Table 6.156.

Table 6.156: The parts of course to be assessed summary

Criteria	Frequency
Teaching Method Assessment	35
Instructor Assessment	33
Course Materials Assessment	34
Student Engagement and Involvement Assessment	35
Course Structure Assessment	32
Course Outcomes Definition Assessment	26
Examination Process Assessment	30
Support Team Assessment	24

6.2.1.4.8. Data Collected from RUET CSE 17 Students

We asked the responders of objective 3 to tell us which parts of a course should be assessed. The answers are illustrated in Table 6.157.

Table 6.157: The parts of course to be assessed summary

Criteria	Frequency
Teaching Method Assessment	27
Instructor Assessment	22
Course Materials Assessment	22
Student Engagement and Involvement Assessment	28
Course Structure Assessment	25
Course Outcomes Definition Assessment	22
Examination Process Assessment	18
Support Team Assessment	15

6.2.1.4.9. Data Collected from University Teachers

We asked the responders of objective 3 to tell us which parts of a course should be assessed. The answers are illustrated in Table 6.158.

Table 6.158: The parts of course to be assessed summary

Criteria	Frequency
Teaching Method Assessment	21
Instructor Assessment	17
Course Materials Assessment	19
Student Engagement and Involvement Assessment	19
Course Structure Assessment	16
Course Outcomes Definition Assessment	14
Examination Process Assessment	18
Support Team Assessment	8

6.2.1.4.10. Data Collected from Others

We asked the responders of objective 3 to tell us which parts of a course should be assessed. The answers are illustrated in Table 6.159.

Table 6.159: The parts of course to be assessed summary

Criteria	Frequency
Teaching Method Assessment	136

Instructor Assessment	121
Course Materials Assessment	119
Student Engagement and Involvement Assessment	118
Course Structure Assessment	118
Course Outcomes Definition Assessment	90
Examination Process Assessment	104
Support Team Assessment	91

6.2.2. Mean, standard deviation, variance and correlation of different features

It was observed that the mean, standard deviation, variance and correlation of different features were not in critical range. It can be calculated separately in the corresponding excel sheets provided with this document.

6.3. Hypothesis Testing

For each of the objectives, we applied several hypothesis testing techniques. For the experiments, we applied, correlation analysis, ANOVA, T-Test, Wilcoxon Test, Kruskal Wallis Test, RFE and mRMR + RFE.

For objective-1, the most important industry standard was selected via the above-mentioned hypothesis testing methods. The findings have been illustrated via Table 6.160.

Table 6.160: Most important industry standards

Method	Selected Features
Correlation Analysis	• I think companies should offer paid internships. (Strongly Agree) • I think companies should participate and recruit from job/career fairs. (Agree) • I think companies should sign agreements with universities for conducting industry-based research. (Agree) • I think employees should have the chance to pursue higher education and the company should be the sponsor. (Agree) • I think companies should get involved in curriculum designing in the universities. (Agree)
ANOVA	• I think companies should offer paid internships. (Strongly Agree) • I think companies should participate and recruit from job/career fairs. (Agree)

	• I think companies should sign agreements with universities for conducting industry-based research. (Agree) • I think employees should have the chance to pursue higher education and the company should be the sponsor. (Agree) • I think companies should get involved in curriculum designing in the universities. (Agree)
T-Test	• I think companies should offer paid internships. (Strongly Agree) • I think companies should participate and recruit from job/career fairs. (Agree) • I think companies should sign agreements with universities for conducting industry-based research. (Agree) • I think employees should have the chance to pursue higher education and the company should be the sponsor. (Agree) • I think companies should get involved in curriculum designing in the universities. (Agree)
Wilcoxon Test	• I think companies should offer paid internships. (Strongly Agree) • I think companies should participate and recruit from job/career fairs. (Agree) • I think companies should sign agreements with universities for conducting industry-based research. (Agree) • I think employees should have the chance to pursue higher education and the company should be the sponsor. (Agree) • I think companies should offer internship but not paid. (Disagree)
Kruskal Wallis Test	• I think companies should offer paid internships. (Strongly Agree) • I think companies should participate and recruit from job/career fairs. (Agree) • I think companies should sign agreements with universities for conducting industry-based research. (Agree) • I think employees should have the chance to pursue higher education and the company should be the sponsor. (Agree) • I think companies should get involved in curriculum designing in the universities. (Agree)
RFE	• I think companies should offer paid internships. (Strongly Agree) • I think companies should participate and recruit from job/career fairs. (Agree) • I think companies should sign agreements with universities for conducting industry-based research. (Agree)

Method	Selected Features
	• I think employees should have the chance to pursue higher education and the company should be the sponsor. (Agree) • I think companies should offer internship but not paid. (Disagree)
mRMR + RFE	• I think companies should offer paid internships. (Strongly Agree) • I think companies should participate and recruit from job/career fairs. (Agree) • I think companies should sign agreements with universities for conducting industry-based research. (Agree) • I think employees should have the chance to pursue higher education and the company should be the sponsor. (Agree) • I think companies should get involved in curriculum designing in the universities. (Agree)

For objective-2, the most important aspects of course judgement were illustrated in Table 6.161.

Table 6.161: Most Important aspects of Course Judgement

Method	Selected Features
Correlation Analysis	• Training goals and objectives were clearly stated before you started the course. (Strongly Agree) • The course's title and description were easy to comprehend. (Strongly Agree) • The language was easy to understand. (Strongly Agree) • Your trainer showed empathy and helped you in tackling problems. (Strongly Agree) • You felt that the trainer is an expert of the course. (Strongly Agree)
ANOVA	• Training goals and objectives were clearly stated before you started the course. (Strongly Agree) • The course's title and description were easy to comprehend. (Strongly Agree) • The language was easy to understand. (Strongly Agree) • Your trainer showed empathy and helped you in tackling problems. (Strongly Agree) • The communication skill of the trainer was satisfactory. (Strongly Agree)
T-Test	• Training goals and objectives were clearly stated before you started the course. (Strongly Agree)

	• The course's title and description were easy to comprehend. (Strongly Agree) • The language was easy to understand. (Strongly Agree) • Your trainer showed empathy and helped you in tackling problems. (Strongly Agree) • Your trainer responded to your queries in a timely manner. (Strongly Agree)
Wilcoxon Test	• Training goals and objectives were clearly stated before you started the course. (Strongly Agree) • The course's title and description were easy to comprehend. (Strongly Agree) • The language was easy to understand. (Strongly Agree) • Your trainer showed empathy and helped you in tackling problems. (Strongly Agree) • You think your trainer was perfect for this course. (Strongly Agree)
Kruskal Wallis Test	• Training goals and objectives were clearly stated before you started the course. (Strongly Agree) • The course's title and description were easy to comprehend. (Strongly Agree) • The language was easy to understand. (Strongly Agree) • Your trainer showed empathy and helped you in tackling problems. (Strongly Agree) • You believe that the certificate can help you get a job. (Strongly Agree)
RFE	• Training goals and objectives were clearly stated before you started the course. (Strongly Agree) • The course's title and description were easy to comprehend. (Strongly Agree) • The language was easy to understand. (Strongly Agree) • Your trainer showed empathy and helped you in tackling problems. (Strongly Agree) • You felt that the trainer is an expert of the course. (Strongly Agree)
mRMR + RFE	• Training goals and objectives were clearly stated before you started the course. (Strongly Agree) • The course's title and description were easy to comprehend. (Strongly Agree) • The language was easy to understand. (Strongly Agree) • Your trainer showed empathy and helped you in tackling problems. (Strongly Agree) • You think the learning experience can be improved. (Strongly Agree)

For objective-3, hypothesis testing revealed that the following major problems exist in ICT:

a) Lack of Research & Development

b) Lack of technical skills

c) Lack of networks

d) Slow speed of the services

e) Lack of infrastructure

f) Lack of adequate investment

g) High costs of offering services

Also, it revealed that the following problems of Internet exist:

a) Difficulty of overcoming the problem of high costs paid for using information

b) Lack of or inadequate regular budget adequate for universities libraries to pay for access to scientific, technical and arts information, authors rights and have licenses or subscription

c) Problem of access to scientific and technical information for creation and transfer of knowledge

d) Lack of the required technical skills

e) Risk of spread of electronic piracy

For objective-4, the following major criteria of assessment was selected:

a) Teaching Method Assessment

b) Instructor Assessment

c) Course Materials Assessment

d) Student Engagement and Involvement Assessment

e) Course Structure Assessment

6.4. Predictive Analysis

We applied machine learning classifiers for objective-2 for verifying the outputs. And here are the results illustrated in Table 6.162.

Table 6.162: Results for Machine Learning Classifiers

Algorithms	Accuracy

Decision Tree	70.38%
K-Nearest Neighbors	80.25%
Naïve Bayes	70.06%
Linear Discriminant Analysis	72.81%
Logistic Regression	71.52%
Support Vector Machine	93.53%
Random Forest	90.77%
Convolutional Neural Network	96.92%

6.5. Recommendations

After analyzing the results, we are providing the following recommendations:

a) Focus on specific criteria for specific training according to the dataset findings

b) Create an outcome-based curriculum system for quality enhancement

c) Update the syllabus on regular basis

d) Create a feedback system

e) Analyze the dataset for further improvement of NACTAR

f) Ensure direction-wise training for potential training path of trainees

g) Specialized and direction-wise training for the instructors

h) Introduce specialized/highly skilled courses

i) Increase connectivity

j) Increase NACTAR branding

k) Proper blending of offline and online courses

l) Introduce fragmented long courses

m) Include industrial attachment

n) NACTAR collaboration with international institutions

o) Continue research and development process

6.6. Conclusion

In this chapter, we discussed about the collected datasets and showed all experimental results. Finally, we presented all the results and recommendations as well.

Research Timeline and Budget

Introduction

Research Timeline

Budget

Work Breakdown Structure (WBS)

Conclusion

7.1. Introduction

In this chapter, we have discussed on the research timeline, budget and work breakdown structure with proper illustration.

7.2. Research Timeline

As per the research conditions of NACTAR, the research needs to be conducted within 60 days. To distribute the workload efficiently, the period of 60 days has been divided into 10 modules where each module has 6 days in it. Based on this calculation, the following gantt chart has been prepared:

Sl.	Research Activities	Modules (6 days per one module)									
		1	2	3	4	5	6	7	8	9	10
1.	Monitor and Control all of the Project Activities	■	■	■	■	■	■	■	■	■	■
2.	Seminar with Stockholders	■									
3.	Project Planning and Prepare Inception Report	■	■								
4.	Questionnaires Preparation for both Surveys and Interviews			■							
5.	Online and Offline Surveys				■	■					
6.	Conduct Interviews					■					
7.	Data Entry and Data Preprocessing						■				
8.	Data Analysis						■	■			
9.	Seminars with Stakeholders								■		
10.	Draft Report Writing								■		
11.	Final Report and Research Papers Preparation and Submission									■	■

7.3. Budget

The budget of the research is given below: *(Including all VAT and taxes)*

Sl.	Cost Criteria	Cost
1.	Honorarium of Principal Researcher	80,000/-
2.	Honorarium of Assistant Researcher	50,000/-

3.	Data Collection Cost (Surveys, Interviews)	50,000/-
4.	Data Entry and Data Analysis Cost	70,000/-
5.	Stationary Cost	10,000/-
6.	Documents/Material Collection Cost	50,000/-
7.	Draft Report Preparation and Printing Cost	15,000/-
8.	First Seminar Cost	40,000/-
9.	Second Seminar Cost	60,000/-
10.	Traveling Cost	20,000/-
11.	Miscellaneous	5,000/-
Total Cost		4,50,000/-
In word: Four Lac Fifty Thousand Taka Only		

7.4. Work Breakdown Structure (WBS)

A typical productivity tip for making work more manageable and accessible is to break it down into smaller tasks. The Work Breakdown Structure (WBS), which is one of the most essential project management tools, is the instrument that employs this method for projects. It combines scope, cost, and schedule baselines on its own, ensuring that project plans are in sync. Figure 7.1 illustrates the work breakdown structure (WBS) of the proposed study.
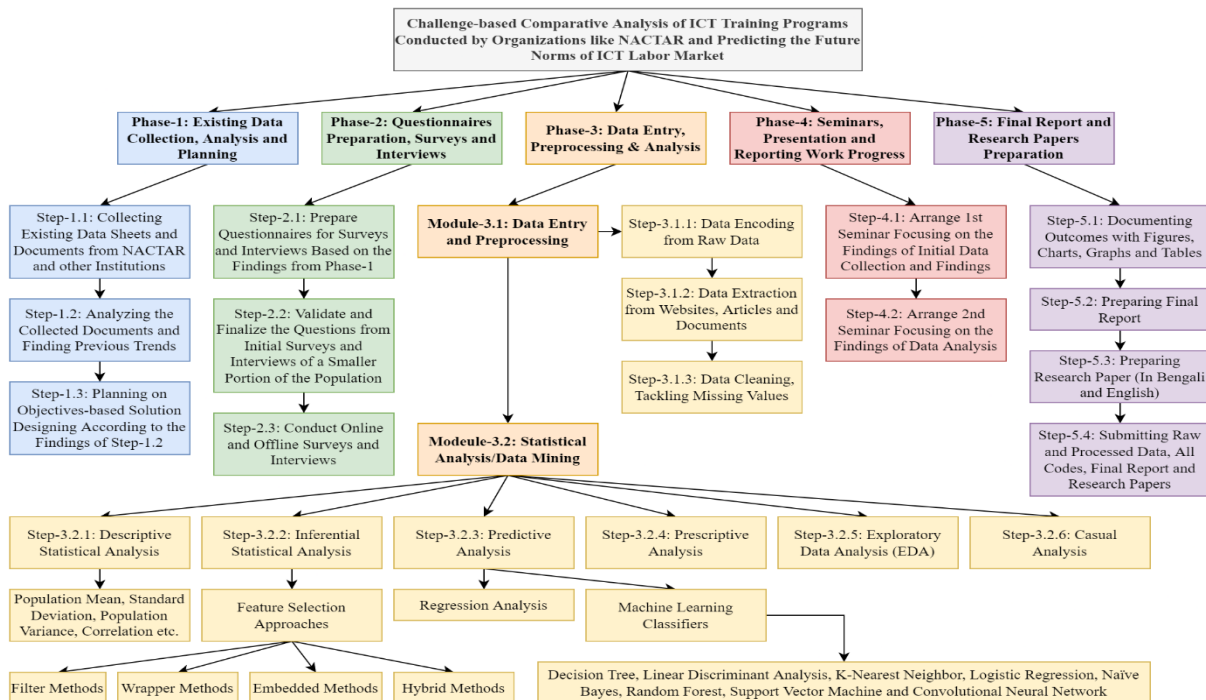

Figure 7.1: Work Breakdown Structure (WBS) of the proposed study

7.5. Conclusion

In this chapter, we illustrated our planning through work breakdown structure and presented the financial information along with research timeline.

Conclusion

Limitations of the Study

Conclusion and Future Works

8.1. Limitations of the Study

No research can be done without limitation. This research also has some drawbacks:

a) The dataset will be formed based on the data collected from the participants. It should bear in mind that participants will need to recall their memories and answer the questionnaires on surveys and interviews. Thus, the answers to the questions are crucial and there's always a chance of getting some outliers that can affect the different sectors of data analysis.

b) Due to the Covid restrictions, everything was shifted online. Therefore, it was a new system to adapt and many aspects of physical training will be missed for the first online training programs. Thus, it will be challenging to figure out if a deficiency was caused due to Covid or due to some other means.

c) The participants need to be honest while answering the questions of surveys and interviews as the faulty answers will negatively impact the data analysis part. There are several methods to find out if an answer is faulty but there is always a 1% chance where a participant may convince the surveyor or interviewer with the faulty answer.

d) The research timeline was very small. If more time was provided, the outcomes could be much more organized and structured.

8.2. Conclusion and Future Works

In this research proposal, at first, the motivation of the work has been presented. Next, the problem domain is specified and objectives were fixed. After that, research plans were made based on each of the four objectives. Then, based on each of the objectives, data collection processes have been described. Here, four different data collection mechanisms have been proposed. Based on the data obtained, statistical analysis or data mining will be done. In this proposal, 6 types of analysis along with feature selection techniques and machine learning processes have been proposed as well. At the end of the research, NACTAR will receive objective-based outcomes, a draft report, and a research paper suitable for publishing in the international journal along with all the raw data, processed data, and snippets. We believe, with proper data collection and analysis, it will be a well-structured and fruitful research. We also

believe that this research work will create a high positive impact on IT based training education conducted through NACTAR which will further produce skilled manpower to face the challenge of 4th Industrial Revolution and no major threat has been predicted during survey and/or implementation. Therefore, it has no adverse environmental impact. In future, there is much scope of work. The dataset itself can be utilized to discover so many information and further datasets can be formed for more sophisticated research outcomes.

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