Survey on identifying the factors that influenced the usability of TVEC's web-based information system

Group Members:

1. **K.D.L.P. Karunadasa, Assistant Director, TVEC**
2. **D.N.I.D. Des Silva, Assistant Director, TVEC**

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Executive Summary

This report evaluates the performance and user satisfaction of a web-based NVQ system across several key dimensions, including attractiveness, controllability, efficiency, helpfulness, and learnability. These aspects were assessed through user feedback on different indicators, providing insights into areas of strength and those needing improvement. The visual appeal of the system was evaluated using indicators such as color schemes, typography, layout, and overall modernity. While 31% of users found the color scheme appealing, only 20% agreed that the system has a modern appearance. The overall visual appeal received a 27% agreement rate, highlighting significant room for improvement, particularly in enhancing the system's modernity and visual coherence to better meet user expectations. User experience with navigation and system control showed a mixed response. Although 27% of users found menu navigation satisfactory, only 18% understood how to cancel actions easily, indicating a need for better control mechanisms. Improving the feedback system, which only garnered a 21% agreement rate, and designing more intuitive features would enhance the overall user experience. The system's efficiency, particularly in accessing information and loading times, was a key concern. Only 33% of users were able to access necessary information within 5 seconds, and 31% found the report loading times satisfactory. These numbers suggest that improvements in speed and system responsiveness are needed to better serve users, especially in time-sensitive tasks. Indicators for system helpfulness, such as the availability of support resources and feedback mechanisms, showed low user satisfaction. Only 24% of users found the provided resources (e.g., documents, videos) helpful, and the feedback process received similar criticism. Additionally, support features like forums and notifications were found lacking, with just 14% of users finding the email and SMS reminders helpful. There is a clear need to enhance support features and improve communication tools to aid users effectively. Learnability, or the ease of using and understanding the system, was moderately rated. While 27% of users found the interfaces easy to navigate, 32% agreed that manuals were somewhat effective. The low 15% agreement on interactive tutorials and onboarding for new features underscores the necessity for better learning aids and clearer instructions to improve user confidence and adaptability. Overall, the web-based NVQ system demonstrates some positive features but also significant areas requiring improvement. Addressing issues related to modernity, controllability, speed, support resources, and learning aids will be crucial in enhancing user satisfaction and the system's overall effectiveness.

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Chapter 01

1. Introduction

1.1 Background of the Study

Online Registration, Accreditation, and certification information systems is the key components in public and private training institutions that provide tertiary and vocational education in Sri Lanka. Through this web-based information system a new vocational training provider can apply for institute registration, enroll students for batches under registered courses, get accredited non-NVQ courses to NVQ courses, request for assessment conducting and finally delivery of NVQ certificate to competent student in relevant occupations.

Today public and private institution and TVEC use this web-based information system to access thousands of records in a short time which is beyond the capacity of the any manual system. On-time report generating is also a very important factor at the web-based information system. Through this system, it enables generating reports; thereby various reports can be made available on time such as trainee registration, approved registration, registered trainees, registration payment etc.

The web-based information system gets added new features to the system, called as functional requirements, on the request of training institutions and other variety of needs of different type of industries in the country. As a result, TVEC focuses on a major role in enhancing the functional requirements as well as non-functional requirements of the web-based information system.

web-based information System can enhance the software quality attributes in two broad categories expected from software system in developer's point of view as well as user's point of view. Most of the functional requirements are checked at the developments point of view and customer has to be accepted the system and to be used it under operational level. Therefore, in this context, the research is more focused on the non-functional requirements of the web-based information system of software quality attribute.

In every software system the following non-functional recrements can be identified;

- Correctness: The degree with which software adheres to its specified requirements
- Efficiency: Ability of the software to do the required processing on least amount of hardware

- Maintainability: Ability of a software to adapt to changes, improve over time, correct any bugs and be proactively fixed
- Robustness: Ability of a software product to cope with unusual situation
- Security/Accuracy: Ability of the software to remain protected from unauthorized access, Credit card transactions must be secure/accurate.
- Reliability: High Reliability is the measure of how a product behaves in varying circumstances
- ✓ **Usability: Ease of use. This means that it should have an appropriate user interface and adequate documentation.**

Although, above non-functional requirements directly affect the quality of the web-based information system, this research is only focused on the usability of the TVEC's web-based information system in-user's point of view.

1.2 Problem Statement

The current web-based information system faces several inadequacies that hinder its effectiveness in delivering services. These challenges pose significant obstacles for training centers, and administrators, limiting the system's ability to provide a seamless and high-quality support service. It is making a challenge for users to navigate the web-based information system effectively. This can lead to frustration, decreased engagement, and hinder the adoption of web-based information system. Digital literacy and skills play a crucial role in enhancing the web-based information system. By equipping training centers and administrators with the necessary digital competencies, the web-based information system can become more accessible, engaging, and effective in delivering system functionalities. Providing effective training and support to all stakeholders is crucial to enhance the web-based information system. This includes training centers, administrators, and technical support staff. Therefore, it needs to find the current usability of TVEC's web-based information system.

This research identifies the usability of the TVEC's web-based information system by associating it with attractiveness, controllability, efficiency, helpfulness, and learnability. Also, it provides strategies to improve usability.

1.3 Research Question

a) How the attractiveness, controllability, efficiency, helpfulness, and learnability of TVEC's web-based information system affect its usability?

b) What are the strategies for increasing the usability of the TVEC's web-based information system by improving attractiveness, controllability, efficiency, helpfulness, and learnability of that system?

1.4 Objectives of the Research

Main Objective

To assess how the attractiveness, controllability, efficiency, helpfulness, and learnability of TVEC's web-based information system affect its usability.

Sub Objectives

At the end of the research study, the following objectives will be achieved.

1. To identify the **influence of the attractiveness** to the usability of web-based NVQ system of the TVEC.
2. To identify the **influence of controllability** to the usability of web-based NVQ system of the TVEC.
3. To identify the **influence of efficiency** to the usability of web-based NVQ system of the TVEC.
4. To identify the **influence of helpfulness** to the usability of web-based NVQ system of the TVEC.
5. To identify the **influence of learnability** to the usability of web-based NVQ system of the TVEC.

1.5. Hypothesis of the Study

The following five alternative hypotheses are tested against the null hypothesis "usability of the web-based information system of TVEC is not influenced by *each factor mentioned in relevant hypothesis*" to achieve above mentioned objectives;

1. H1: Usability of the web-based information system of TVEC is influenced by its attractiveness.
2. H1: Usability of the web-based information system of TVEC is influenced by its controllability.
3. H1: Usability of the web-based information system of TVEC is influenced by its efficiency.
4. H1: Usability of the web-based information system of TVEC is influenced by its helpfulness.
5. H1: Usability of the web-based information system of TVEC is influenced by its learnability.

1.6. Outline of Chapters in the Report

Chapter 01

Chapter one includes the introduction, background of the study, and problem statement. Also, it includes the objectives, hypothesis, and outline of the report.

Chapter 02

In this chapter, it has been mentioned on previous researches done about the usability of web-based information systems and their findings as well as how this study differ from those researches.

Chapter 03

This chapter presents on methodologies those have been applied to do this study. Methodologies used for data collection, analysis of data and all methods used to complete this study.

Chapter 04

Presentation of data and results of descriptive analysis and inferential analysis have been included in this chapter.

Chapter 05

Chapter 05 includes summery and general discussion of the whole study and recommendations and conclusions have been found by end of this study.

Chapter 02

2. Literature Review

2.1. Introduction

Human Computer Interaction (HCI) is continuously evolving with the fast change in technology. The use of internet becomes a way of life for most individuals. Internet is used for various purposes such as a means of communication through emails and social networking, getting online education and doing research activities, online marketing and making financial transactions among other activities. It continues to expand and develop various websites where most users are expected to benefit from. The more websites created, the more options to choose. The users now have the freedom to influence the existence of the websites. For a website to be successful, the level of usability must be very high.

2.2. Usability

Usability is a term that is derived from the term ‘user friendly’, but ISO 9241-11 provides a standard definition of the term. Usability is referred to as the extent to which product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction (Teoh, Ong, Lim, Liong, & Yap, 2009).

Usability is defined in different terms by multiple researchers. Shackel (2009) describes usability as “a technology's capability to be used easily and effectively by the specified range of users, given specified training and user support, to fulfill the specified range of tasks, within the specified range of environmental scenarios”. According to Preece (1994) “usability is measured of in which a system can be learned and used, its safety, effectiveness and efficiency and the attitude of its users towards it.” Zaphiris and Darin (2001) define web usability as “anyone using any kind of web browsing technology must be able to visit any site and get a complete understanding of the information, as well as have the full and complete ability to interact with the site if that is necessary.”

Usability refers to terms such as ease of use and ease of learning that implied providing users with systems requiring minimum cognitive and physical effort to accomplish users’ needs and expectations (Sindhuja and Surajith, 2009). Powell (2000) argues the web site usability as "the extent to which a site can be used by a specified group of users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use”.

In other words, the web site usability is a test on the successfulness of web site's user in doing some tasks or finding information in the web site. (Yusof et. al, 2010).

There are numerous tests for evaluating the website usability. Some examples are, QUIS (Questionnaire for User Interface Satisfaction), SUMI (Software Usability Measurement Inventory). More recently developed questionnaires to measure the user satisfaction of web sites are MUMMS (Measuring the Usability of Multi-Media) to assess multimedia software and WAMMI to assess web sites (Levi and Conrad, 2001). As mentioned previously WAMMI proposes five factors to assess the usability of websites. Brief explanations for the WAMMI factors are as follows (http://www.wammi.com/demo/graph.html):

2.3. Factors for Website Analysis and Measurement Inventory (WAMMI) Questionnaires

- **Attractiveness**

Attractiveness is one of the key factors to a successful website (Liu and Arnett, 2000). Attractiveness is the capability of the software product to be attractive to the user (e.g., through use of color or graphic design; ISO/IEC 9126-1, 2001). Attractive websites are visually pleasant, and appeal the interest of the users, whether it is functionality or information. Tan and Wei (2006) argue that the appearance of a website is a crucial factor that improves the perception of information in order for subjects to perform better cognitive mapping and assessment of decisions for execution. The same study suggests that the graphical representations such as icons, colors, images and animations, give website a higher attractiveness. This could improve the degree of users' satisfaction with the website (Zhang et. al, 2000).

- **Controllability**

The degree of control a person reports has over his/her interaction with a particular website. In other words, controllability is whether users feel that they are in control of the software product (Seffah et.al. 2006). If a site is well on controllability the users most probably feel they can navigate around it with ease and do the things they want to do. Poor controllability of a website usually means a poorly organized site that disrupts the way they normally expect to do things.

- **Efficiency**

According to International Organization for Standardization (ISO) efficiency refers to the resources used in completing a task (ISO,1998). Lee and Kozar (2011) define website efficiency as a representation of resources expended in relation to achieving goals while visiting a website. The users perceive efficiency when they can achieve goals with a quick visit without putting forth much cognitive effort. When site users give a high efficiency rating, they feel they can quickly locate and do what is of interest to them in an effective and economical manner. They feel that the web site responds at a reasonable speed. Disorientation, or the tendency to lose one's sense of location in a Web site, can cause users to become frustrated, lose interest, and experience a measurable decline in efficiency (McDonald and Stevenson, 1998).

- **Helpfulness**

Paul Siegel argues that helpfulness is the key to web success. Finding ways to help users for every step of their visit: before they reach the site, during their visit, and after the visit play a crucial role on the usability (http://www.insiderreports.com). A website which is high on helpfulness corresponds with the users' expectations about its content and structure. A site with a low level of helpfulness can be misleading about its layout and content.

- **Learnability**

In order to achieve the best efficiency and effectiveness possible while using a device, users must first learn how to interact with the device. Learnability is related to achieving a sufficient level of competence with the device to be able to complete goals in an efficient and effective manner. The ease, in time or effort, with which users can learn a device, is its learnability. Learnability or the ease with which the features required for achieving particular goals can be mastered. It is the capability of the software product to enable users to feel that they can productively use the software product right away and then quickly learn other new (for them) functionalities (Seffah et.al. 2006). There are numerous studies that identify learnability as a key attribute of the usability (Brink et al., 2002; Guenther, 2003; Nielson, 1993). Based on Nielson's usability model (1993), learnability refers to how easy it is for casual users to learn a system. In the websites with high learnability users feel they are able to start using the site with the minimum of introductions and everything is easy to understand from the start. In the websites with low learnability users feel that the

site may be using concepts or terminologies which are unfamiliar and need more explanations.

Chapter 03

3. Methodology

3.1. Method of Sample Secretion

Sample was selected using the stratified random sampling technic. The sample frame is total number of vocational training providers which were registered under the TVEC by 31st of December 2022. 50% of that sample frame was selected proportionately from each district in the country. Sampling among the district was done using the simple random sampling technic. Details of sampling are mentioned in the Table 3.1.

Table 3.1: Selection of the sample

District	No. of Training Centers Registered under the TVEC	No. of Institutes, Questionnaire was sent to (50% of each District)
Colombo	346	173
Gampaha	150	75
Kalutara	49	25
Kandy	82	41
Matale	26	13
Nuwara Eliya	21	11
Galle	39	20
Matara	22	11
Hambantota	23	12
Jaffna	24	12
Mannar	8	4
Vavuniya	11	6
Mullaitivu	5	3
Kilinochchi	9	5
Batticaloa	35	18
Ampara	32	16
Trincomalee	22	11
Kurunegala	74	37
Puttalam	39	20
Anuradhapura	38	19
Polonnaruwa	11	6

District	No. of Training Centers Registered under the TVEC	No. of Institutes, Questionnaire was sent to (50% of each District)
Badulla	24	12
Monaragala	24	12
Ratnapura	42	21
Kegalle	26	13
Total	**1182**	**596**

3.2. Data Collection

Primary data was collected using a structured questionnaire which included both open ended questions to which respondent should write their own answers and close ended questions that provide respondent with fix set of alternatives from which to choose. The questionnaire was consisted of three sections; Demographic information, Information on web-based information system usage, and Key factors to be focused. Data for section three was collected using five-point Likert scale questions.

Stratified Sampling Method.

In stratified sampling population of 'N' units is first divided in to sub population of N1, N2,…,NL units respectively. These sub populations are non overlapping, and together they comprise the whole of the population. So that N1 + N2 + ----- + NL = 'N'. The subpopulations are called strata. To obtain full benefit from stratification, the values of the total number of units must be known. When the strata have been determined, a sample is drawn from each, the drawing being made independently in different strata. If a simple random sample is taken in each stratum, the whole procedure is described as stratified random sampling.

Simple Random Sampling Method.

Simple random sampling is a method of selecting n units out of the N such that every one of the ${}^{N}C_{n}$ distinct samples has an equal chance of being drawn. In practice a simple random sample is drawn unit by unit.

3.3. Variable Description

Data was collected through a structured questionnaire and it was consisted of three sections;

I. Demographic Information

- Gender 1=Male 2=Female
- Age (years)
- Designation
- Status of designation 1=Full time 2=Part time
- Category of the designation 1=Permeant 2=Temporary
- Highest education qualification 1=Degree and above 2=G.C.E. A/L 3=G.C.E. O/L 4=Below O/L
- Highest professional qualification
- District in which the institution is located

II. Web-based information system usage

- Do you use web-based information system daily? 1=Yes 2=No
- If yes, how many times a day?
- If no, how many days a week?
- How many days a month?
- How long have you been using the web-based NVQ system?
- Does your organization conduct any ICT-related training courses? 1=Yes 2=No

III. Factors to be focused

Under this section, five-point likert scale questions were asked under each factor (1 = Strongly Agree, 2= Agree, 3= Neutral, 4= Disagree, 5 = Strongly Disagree)

Attractiveness of the web-based information system

- The colors on the NVQ system web pages are pleasing to my eye.
- The typography and font choices of the system make the content can understand.
- The layout and organization of information on the system dashboard are clear and able to understand.
- The images and graphics used in web pages are relevant and contribute to its attractiveness.

- Compared to other systems I have used this system has a modern and up-to-date visual appearance.

Controllability of the web-based information system

- I can navigate through the menus and options of the web-based NVQ system by simply hovering the mouse.
- The system gives users feedback and confirmation, keeping them in control of their actions.
- Users have a clear understanding of how to cancel actions if needed.
- The system responds to user inputs in less than 30 seconds, which is satisfactory and predictable.
- Interfaces of the web pages in the system are designed to help users recover from errors without any difficulty.

Efficiency of the web-based information system

- Web-based NVQ system's main user interface allows me to access the necessary NVQ-related information within 5 seconds.
- The system's navigation is simple, enabling me to find web link separately for the login credentials for xxxxxxxIN and xxxxxxxRG.
- The system loads reports within a reasonable time frame of 5 seconds, avoiding significant delays.
- I can track my centre progress through dashboard, allowing me to view enrollments compared to completions for NVQ assessments.
- The system is compatible with different devices (e.g., desktop, mobile, tablet).

Helpfulness of the web-based information system

- Web-based NVQ system offers relevant resources such as documents and videos to assist with understanding the web-based system functionalities.
- The system user guides and tutorials explain how to navigate and use its features.
- Within the Trainee/Certificate Search module (https://nvq.gov.lk), provides thorough and constructive feedback on assessments completed by students pursuing National Vocational Qualifications (NVQ).
- The system offers additional support, such as online forums or discussions, to enhance my understanding of new modules in the system.

- I find the system's Email notifications and SMS reminders helpful in keeping me on track with related tasks and deadlines.

Learnability of the web-based information system

- Web-based NVQ system's user interfaces are easy to understand and navigate.
- The system offers step-by-step guidance for using its features through user manuals.
- I can learn how to use the system to complete renewal of center registration.
- The system provides interactive tutorials or onboarding that aid in learning when new modules added to the system.
- I feel confident in exploring new features or options within the system.

Usability of the web-based information system

- I am very interested in using the TVEC's web-based NVQ system frequently, as it allows me to generate progress reports by saving me a lot of time and effort.
- I found the process for login to the web-based system to be unnecessarily complex, such as Web address for the PxxxxxIN account and web address for the PxxxxxxRG are totally separate link to login to the same TVEC's web-based NVQ system.
- I appreciate the fact that the system is available 24/7, so I can work on my PxxxxxIN account at my own convenience.
- I think that using the TVEC's NVQ system is convenient for me, because I could access the system from anywhere with an internet connection.
- This system is much easier to learn than other systems I've used. It's more user-friendly.
- It was difficult to find the functionality I needed. Such as updating pre-assessment result, it took me much longer to complete tasks than it should have.
- I felt very confident using the system. For Example; I can easily access student batch entry details reports, assessment scheduled reports.
- I regularly need the technical support from TVEC to navigate through the web-based system.
- I found the various functions in this system well integrated, such as the ability to export data to an Excel file.

3.4. Analysis of Data

Data analysis consisted of main two parts; descriptive analysis and inferential analysis. Descriptive analytics is the process of using current and historical data to identify trends and relationships. It's sometimes called the simplest form of data analysis because it describes trends and relationships but doesn't dig deeper. Inferential statistics makes the use of various analytical tools to draw inferences about the population data from sample data. Inferential statistics help to draw conclusions about the population. Inferential statistics can be classified into hypothesis testing and regression analysis. In this study hypothesis testing has been done using Structural Equation Modeling (SEM) through Analysis of Movement Structure (AMOS) software.

The following technics have been applied to fit the Structural Equation Model (SEM), mentioned in the chapter for of this report

3.4.1. Structural Equation Modeling (SEM)

Structural equation modeling (SEM) is a linear model framework that models both simultaneous regression equations with latent variables. Models such as linear regression, multivariate regression, path analysis, confirmatory factor analysis, and structural regression can be thought of as special cases of SEM. Following requirements should be fulfilled when apply the SEM.

- **Assessing Normality**

Univariate and multivariate normality requirement of the data for SEM is estimated using the distributional indicative measures; Skewness and Kurtosis. Skewness is the tilt in the distribution. Maybe on the left or on the right. Kurtosis is the peakedness of a distribution. This heaviness or lightness in the tails usually means that the data looks flatter to the normal distribution. The absolute value of skewness 1.0 or lower indicates the data is normally distributed. However, SEM using the maximum likelihood estimator (MLE) like AMOS is fairly robust to skewness greater than 1.0 in absolute value if the sample size is large and the critical region (CR) for the skewness does not exceed 8.0. For kurtosis the range is -10 to +10 considered as the presence of normality.

- **Construct Reliability**

Construct reliability assessment allows the evaluation of the extent to which a variable or set of variables is consistent in what it intends to measure (Straub, Boudreau, and Gafen, 2004). Construct reliability is usually assessed using composite reliability (CR) and Cronbach's alpha.

i. Cronbach's alpha

Cronbach's alpha is a way of assessing reliability by comparing the amount of shared variance, or covariance, among the items making up an instrument to the amount of overall variance. The idea is that if the instrument is reliable, there should be a great deal of covariance among the items relative to the variance. The general rule of thumb is that a Cronbach's alpha of 0.70 and above is good, 0.80 and above is better, and 0.90 and above is best.

ii. Composite Reliability

This is another way a researcher can measure the internal consistency of his items. It is recommended that the reliability of a construct is at least 0.70. High composite reliability is a very good indication that all your items constantly measure the same construct. Composite reliability can be calculated using following formula;

$$CR = \frac{(\sum \lambda)^2}{\left[(\sum \lambda)^2 + \sum(1-\lambda^2)\right]}$$

- **Construct Validity**

Construct validity is the measures of how well the items selected for the construct actually measures the construct. Construct validity is established through two forms validity; convergent validity and discriminant validity.

i. Convergent Validity

Convergent validity refers to the degree to which multiple measures of a construct that theoretically should be related, are in fact related (Gafen, Straub & Boudreau, 2000). Convergent validity is assessed using Average Variance Extracted (AVE). the AVE indicates how much of the indicators' variance can be explained by the latent unobserved variable.

An AVE greater than 0.50 provides empirical evidence for convergent validity (Bagozzi & Yi, 1988), as the corresponding latent variable explains more than half of the variance in the belonging indicator. AVE can be calculated using following formula;

$$AVE = \frac{\sum \lambda^2}{n}$$

ii. Discriminant Validity

Discriminant validity refers to the degree to which the measures should not be very highly correlated with each other are actually distinct. Discriminant validity is assessed using Heterotrait- Monotrait Ratio (HTMT). If the HTMT value is below 0.90, discriminant validity has been established between two reflective constructs.

- **Measurement Model**

The measurement model, which specifies how the latent constructs are indicated by their observed indicators, describes these indicators' measurement properties (reliabilities and validities) and is analogous to Confirmatory Factor Analysis (CFA).

- **Confirmatory Factor Analysis (CFA)**

Confirmatory Factor Analysis (CFA) is a sophisticated statistical technique used to verify the factor structure of a set of observed variables. It allows researchers to test the hypothesis that a relationship between observed variables and their underlying latent constructs exists. The primary goal of CFA is to confirm whether the data fits a hypothesized measurement model based on theory or prior research.

- **Model Fit Indices**

i. Absolute Fit

Absolute fit indices are simply derived from the fit of the obtained and implied covariance matrices and the ML minimization function. Important model fit indexes to measure absolute fit are;

Root Mean Square Error of Approximation (RMSEA)

Root Mean Square Error of Approximation (RMSEA) is a goodness-of-fit index in SEM that assesses the discrepancy between the observed covariance matrix and the model-implied covariance matrix, taking into account model complexity. Interpretation: The smaller the RMSEA value, the better the model fit (threshold; RMSEA < 0.08).

Goodness of Fit Index (GFI)

The Goodness-of-Fit statistic (GFI) was created by Joreskog and Sorbom as an alternative to the Chi-Square test and calculates the proportion of variance that is accounted for by the estimated population covariance (Tabachnick and Fidell, 2007). (threshold; GFI > 0.09)

ii. Incremental Fit

Adjusted Goodness of Fit Index (AGFI)

Adjusted Goodness of fit Index and indicates the degree of freedom (df) for testing the model. A value of 1 indicates a perfect fit. Unlike GFI, AGFI values do not stop at 0. (threshold; AGFI > 0.90).

Normed Fit Index (NFI)

One of the first fit measures proposed in the SEM literature is the normed fit index by Bentler and Bonett (1980). It computes the Chi^2 value of the proposed model and compares it against a meaningful benchmark. (threshold; NFI > 0.90)

Comparative Fit Index (CFI)

CFI statistic assumes that all latent variables are uncorrelated (null/independence model) and compares the sample covariance matrix with this null model. As with the NFI, values for this statistic range between 0.0 and 1.0 with values closer to 1.0 indicating good fit. (threshold; NFI > 0.90)

Tucker–Lewis index (TLI)

The Tucker–Lewis index (TLI; Tucker & Lewis, 1973), also known as the non-normed fit index (NNFI; Bentler & Bonett, 1980), is one of the numerous incremental fit indices

widely used in linear mean and covariance structure modeling, particularly in exploratory factor analysis, tools popular in prevention research. (threshold; NFI > 0.90).

iii. Parsimonious Fit

CMIN/df

CMIN/DF or (χ2/df) is the relative chi-square index, and it is how much the fit of the data to the model is reduced by dropping one or more paths. If the CMIN/DF value is ≤ 5 it indicates a reasonable fit (Wheaton et al, 1977, S).

Chapter 04

4. Analysis of Data

4.1: Participants for the Survey

Table 4.1: Sample Distribution and Response Rate by District

District	No. of Training Centers Registered under the TVEC	No. of Institutes, Questionnaire was sent to (50% of each District)	Number Responded	Response Rate
Colombo	346	173	159	92%
Gampaha	150	75	65	87%
Kalutara	49	25	22	88%
Kandy	82	41	31	76%
Matale	26	13	6	46%
Nuwara Eliya	21	11	7	64%
Galle	39	20	16	80%
Matara	22	11	9	82%
Hambantota	23	12	6	50%
Jaffna	24	12	10	83%
Mannar	8	4	2	50%
Vavuniya	11	6	2	33%
Mullaitivu	5	3	2	67%
Kilinochchi	9	5	4	80%
Batticaloa	35	18	15	83%
Ampara	32	16	10	63%
Trincomalee	22	11	8	73%
Kurunegala	74	37	34	92%
Puttalam	39	20	18	90%
Anuradhapura	38	19	15	79%
Polonnaruwa	11	6	3	50%
Badulla	24	12	8	67%
Monaragala	24	12	6	50%
Ratnapura	42	21	12	57%
Kegalle	26	13	12	92%
Total	**1182**	**596**	**482**	**81%**

Table 4.1 shows the sample distribution and the response rate by district. The total number of training providers registered under the Tertiary and Vocational Education Commission (TVEC) was 1182 as of the 30th of June 2023. According to the Krejcie and Morgan sample size determination table, the sample size for a population of 1200 is 291. Since Microsoft's online form was used to collect the data, forms were emailed to 50% (proportionately for each district) of registered training providers to get a high response and improve the sample. 482 have responded from 596 training providers. The overall response rate for the online questionnaire was 81%.

4.2: Descriptive Statistics of Sample Respondents

Table 4.2: Sample Distribution of Gender

Gender	Number of Users	Percentage
Male	253	52.5
Female	229	47.5
Total	**482**	**100.0**

The sample distribution of gender is shown in the table 4.2. it shows that there is noticeable difference between male and female in the sample. That means, 52.5% of operators utilizing the TVEC's online information system are male, and 47.5% are female.

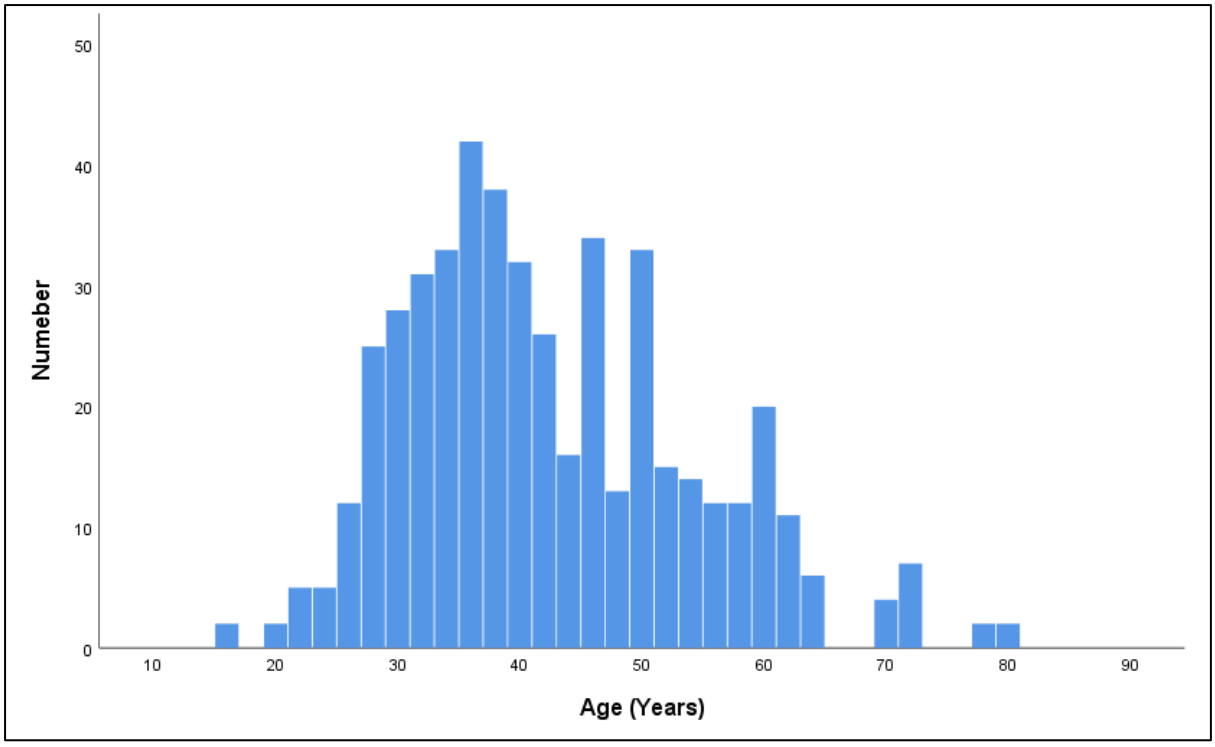

Figure 4.1: Histogram of Age of Employees who operate the TVEC's Web-based Online System

As per graph 4.1, the age of the TVEC's web-based online system operators in most training institutes lies between 28 and 50 years. Also, a considerable number of operators are in age between 50 to 60 years.

Table 4.3: Sample Distribution by Age Group of TVEC's Web-based Online System Operators

Age Category	Number of Users	Percentage
Less than or equal 20	4	0.8
21 - 30	75	15.6
31 - 40	176	36.5
41 - 50	122	25.3
51 - 60	73	15.1
More than 60	32	6.6
Total	**482**	**100.0**

Table 4.3 shows the age groups of TVEC's web-based online system operators. 31 to 40 age group has the highest number of operators. It comprised 36.5% of the sample. 6.6% of the sample represented operators over 60 years of age.

Table 4.4: Status of the designation of TVEC's web-based online system operators

Status of the Designation	Number of Users	Percentage
Full Time	451	93.6
Part Time	31	6.4
Total	**482**	**100**

Table 4.4 shows that 93.6% of TVEC's web-based information system operators who work in training institutes are full-time workers. The percentage of operators who work part-time is just 6.4%.

Table 4.5: Category of the designation of TVEC's web-based online system operators

Category of the Designation	Number of Users	Percentage
Permanent	450	93.4
Temporary	18	3.7
Visiting	14	2.9
Total	**482**	**100.0**

As per table 4.5, 93.4% of employees who cover the duties related to the TVEC's web-based online system are permanent workers. That situation is a good practice for an organization because operating the TVEC's web-based online system by a permanent employee will help to adhere well with continuous systems updates.

Table 4.6: Highest education qualification of TVEC's web-based online system operators

Highest Education Qualification	Number of Users	Percentage
Degree or above	331	68.7
G.C.E. A/L	128	26.6
G.C.E. O/L	19	3.9
Below O/L	4	0.8
Total	**482**	**100**

Considering the highest education qualification of employees in training institutes who engage in work on TVEC's web-based online system, 68.7% of employees have a degree and above qualification. Furthermore, 26.6% of employees have G.C.E. A/L qualification as the highest education qualification.

Table 4.7: Highest qualification of TVEC's web-based online system operators in related to the Information Technology

Highest qualification in related to the Information Technology (IT)	Number of Users	Percentage
Certificate	67	13.9
Diploma	138	28.6
Degree	184	38.2
Other	93	19.3
Total	**482**	**100.0**

As per table 4.7, 66.8% of TVEC's web-based online system operators in training institutes have degree or diploma related to the field of information technology.

Table 4.8: Daily use of TVEC's Web-based Information System

Daily use of TVEC's Web-based Information System	Number of Users	Percentage
Yes	219	45.4
No	263	54.6
Total	**482**	**100.0**

According to the table 4.8, 45.4% of TVEC's web-based online system operators in training institutes daily use the system while 54.6% of operators do not use the system daily.

Table 4.9: If daily use of TVEC's web-based information system, how many times per day

If daily use of TVEC's web-based information system, how many times per day	Number of Users	Percentage
1 - 3 Times	124	56.6
4 - 6 Times	68	31.1
7 - 9 Times	7	3.2
More than 10 Times	20	9.1
Total	**219**	**100.0**

Table 4.9 reveals that around 57% of operators who utilize TVEC's web-based online system daily do so one to three times a day. Additionally, 31% of operators utilize it four to six times a day. Moreover, around 9% of operators utilize the system over ten times per day.

Table 4.10: If do not daily use of TVEC's web-based information system, how many days per month

If do not daily use of TVEC's web-based information system, how many days per month	Number of Users	Percentage
1 - 5 Days	134	51.0
6 - 10 Days	86	32.7
11 - 15 Days	29	11.0
16 - 20 Days	12	4.6

If do not daily use of TVEC's web-based information system, how many days per month	Number of Users	Percentage
21 - 25 Days	2	0.8
Total	**263**	**100.0**

Considering system operators in TVET institutes who don't utilize TVEC's web-based online system daily, more than 50% of operators utilize TVEC's web-based online system 1 to 5 days per month. That percentage for 6 to 10 days is about 30%. In other words, operators who utilize TVEC's web-based online system for 11 to 25 days per month is less than 20%.

Table 4.11: Experience of Operators using the web-based information system

Number of Years	Number of Users	Percentage
1 Year	101	21.0
2 Years	70	14.5
3 Years	57	11.8
4 Years	45	9.3
5 Years	88	18.3
6 Years	40	8.3
7 Years	25	5.2
8 Years	14	2.9
9 Years	42	8.7
Total	**482**	**100.0**

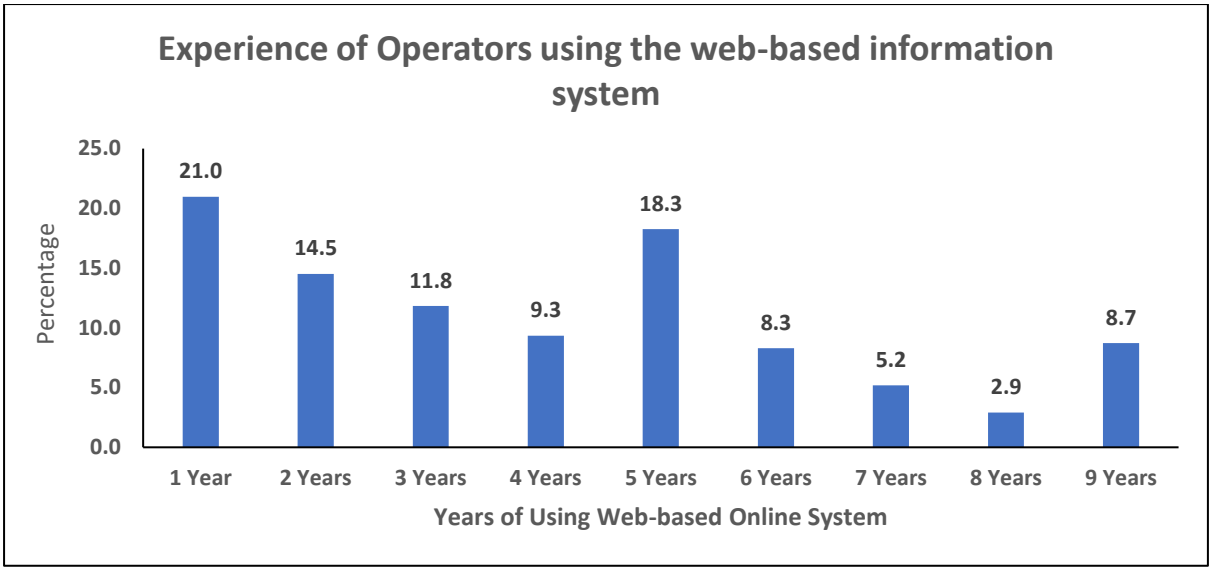

Figure 4.2: Experience of Operators using the web-based information system

According to Table 4.12 and Figure 4.2, experience in using TVEC's web-based online system for system operators in TVET institutes is presented. Only 18% of operators have used TVEC's web-based online system for five years. On the other hand, the majority of operators lack familiarity with TVEC's web-based online system. Furthermore, just 25% of operators have used this online system for more than five years.

Table 4.12: Conducting IT-related coures in the organization

Conducting IT related Courses	Number of Users	Percentage
Yes	163	33.6
No	319	66.4
Total	**482**	**100.0**

Table 4.2 depicts conduct of Information Technology (IT) related courses by TVEC institutions. It reveals that about 34% of TVET institutes conduct Information Technology (IT) related courses.

4.3: Descriptive Statistics of Latent Variables

All latent variables, viz., usability, attractiveness, controllability, efficiency, helpfulness, and learnability, were measured using a five-point Lickert scale ranging from strongly agree (1) to strongly disagree (5). However, the points strongly agree and agree were combined

to create the single response *Agree.* Table 4.13 shows the percentages of responses for each indicator variable measured under the six latent constructs. Only responses for agree are recorded.

Table 4.13: Descriptive Statistics of Latent Variables

Indicator	**Attractiveness of the Web-Based Information System**	**Agree**	
		No. of Responses	**%**
AWBIS 1	The colors on the NVQ system web pages are pleasing to my eye.	149	31%
AWBIS 2	The typography and font choices of the system make the content can understand.	123	26%
AWBIS 3	The layout and organization of information on the system dashboard are clear and able to understand.	152	31%
AWBIS 4	The images and graphics used in web pages are relevant and contribute to its attractiveness.	127	26%
AWBIS 5	Compared to other systems I have used this system has a modern and up-to-date visual appearance.	97	20%
AWBIS 6	Overall, I find the web-based system to be visually appealing and attractive.	128	27%
Indicator	**Controllability of the web-based NVQ system**	**Agree**	
		No. of Responses	**%**
CWBIS 1	I can navigate through the menus and options of the web-based NVQ system by simply hovering the mouse.	130	27%
CWBIS 2	The system gives users feedback and confirmation, keeping them in control of their actions.	103	21%
CWBIS 3	Users have a clear understanding of how to cancel actions if needed.	85	18%
CWBIS 4	The system responds to user inputs in less than 30 seconds, which is satisfactory and predictable.	150	31%
CWBIS 5	Interfaces of the web pages in the system are designed to help users recover from errors without any difficulty.	85	18%
CWBIS 6	Overall, I find the web-based system to provide a high level of controllability to training centers.	95	20%
Indicator	**Efficiency of the web-based NVQ system**	**Agree**	
		No. of Responses	**%**
EWBIS 1	Web-based NVQ system's main user interface allows me to access the necessary NVQ-related information within 5 seconds.	158	33%
EWBIS 2	The system's navigation is simple, enabling me to find web link separately for the login credentials for xxxxxxxIN and xxxxxxxRG.	178	36%

EWBIS 3	The system loads reports within a reasonable time frame of 5 seconds, avoiding significant delays.	149	31%
EWBIS 4	I can track my centre progress through dashboard, allowing me to view enrollments compared to completions for NVQ assessments.	155	32%
EWBIS 5	The system is compatible with different devices (e.g., desktop, mobile, tablet).	160	33%
EWBIS 6	Overall, I find the web-based NVQ system to be efficient in supporting student batch registration.	163	34%
Indicator	**Helpfulness of the web-based NVQ system**	**Agree**	
		No. of Responses	**%**
HWBIS 1	Web-based NVQ system offers relevant resources such as documents and videos to assist with understanding the web-based system functionalities.	114	24%
HWBIS 2	The system user guides and tutorials explain how to navigate and use its features.	94	20%
HWBIS 3	Within the Trainee/Certificate Search module (https://nvq.gov.lk), provides thorough and constructive feedback on assessments completed by students pursuing National Vocational Qualifications (NVQ)	116	24%
HWBIS 4	The system offers additional support, such as online forums or discussions, to enhance my understanding of new modules in the system.	84	17%
HWBIS 5	I find the system's Email notifications and SMS reminders helpful in keeping me on track with related tasks and deadlines.	65	14%
HWBIS 6	Overall, I find the web-based NVQ system to be helpful in supporting under student registration, assessment request and evaluating the students' results.	158	33%
Indicator	**Learnability of the web-based NVQ system**	**Agree**	
		No. of Responses	**%**
LWBIS 1	Web-based NVQ system's user interfaces are easy to understand and navigate.	128	27%
LWBIS 2	The system offers step-by-step guidance for using its features through user manuals.	153	32%
LWBIS 3	I can learn how to use the system to complete renewal of centre registration.	164	34%
LWBIS 4	The system provides interactive tutorials or onboarding that aid in learning when new modules added to the system.	73	15%
LWBIS 5	I feel confident in exploring new features or options within the system.	159	33%
LWBIS 6	Overall, I find the web-based system to be easy to learn and use in a positive user experience.	122	32%
Indicator	**Usability of the web-based NVQ system**	**Agree**	

		No. of Responses	%
UWBIS 1	I am very interested in using the TVEC's web-based NVQ system frequently, as it allows me to generate progress reports by saving me a lot of time and effort.	124	26%
UWBIS 2	I found the process for login to the web-based system to be unnecessarily complex, such as Web address for the PxxxxxIN account and web address for the PxxxxxRG are totally separate link to login to the same TVEC's web-based NVQ system.	63	13%
UWBIS 3	I appreciate the fact that the system is available 24/7, so I can work on my PxxxxxIN account at my own convenience.	212	44%
UWBIS 4	I think that using the TVEC's NVQ system is convenient for me, because I could access the system from anywhere with an internet connection.	173	36%
UWBIS 5	This system is much easier to learn than other systems I've used. It's more user-friendly.	63	14%
UWBIS 6	It was difficult to find the functionality I needed. Such as updating pre-assessment result, it took me much longer to complete tasks than it should have.	60	12%
UWBIS 7	I felt very confident using the system. For Example; I can easily access student batch entry details reports, assessment scheduled reports.	110	23%
UWBIS 8	I regularly do not need the technical support from TVEC to navigate through the web-based system.	49	10%
UWBIS 9	I found the various functions in this system well integrated, such as the ability to export data to an Excel file.	149	31%
UWBIS 10	I found that the navigation is the same on every page, and the same design elements are used throughout the site. This makes the system easy to learn and use.	62	13%

According to Table 4.13, the percentage of agree for all the indicators under each latent construct is less than 45 percent. As far as the dependent variable, usability, the table reveals that the highest percentage of responses (44%) is recorded for web-based online system availability in 24/7, indicating that they can work using their user accounts (PxxxxxIN) at their convenience. Meanwhile, the responses received for regularly do not need the technical support from TVEC to navigate through the web-based system is the lowest among all (10%), implying that a large number of users are not satisfied with that statement since they regularly need the technical support from TVEC to navigate through the web-based online system. Also, considering the user-friendliness of the system, only 14 percent of all responses have agreed that the system is much easier to learn than other systems they

have used. In other words, 86 percent of users have responded that they are not satisfied with the user-friendliness of the TVEC's web-based online system.

When it comes to the variable Attractiveness, the statements "the colors on the TVEC's online system web pages are pleasing to the eye" and "the layout & organization of information on the TVEC's online system dashboard are clear and able to understand" have the highest percentage of users agreeing (31% each). The lowest percentage of users' agreement (20%) is recorded for "TVEC's web-based online system has modern and up-to-date visual appearance when compared to other systems".

Considering the variable controllability, the statement " TVEC's web-based system responds to user inputs in less than 30 seconds, which is satisfactory and predictable" is recorded as the highest percentage (31%) of users' agreements while the users agreements for the statement "users have a clear understanding of how to cancel action if needed" and "interfaces of the web pages in the system are designed to help the user recover from errors without any difficulty" record the lowest percentage (18% each).

As far as concerned the variable efficiency, the percentage of users' agreements for all the statements under the variable efficiency has exceeded 30 percent. Among those, the statement "System's navigation is simple, enabling me to find web link separately for the loging credentials for user login (xxxxxxxIN and xxxxxxxxRG) has recorded the highest percentage of users' agreement (36%).

Under the another key variable helpfulness, the highest percentage of users' agreements is recorded (24% per each) for statements "web-based information system offers relevant resources such as documents and videos to assist with understanding the web-based system functionalities" and "withing the trainee/certificate search module (http://nvq.gov.lk), provides through and constructive feedback on assessment completed by students pursuing National Vocational Qualification (NVQ)" while the lowest percentage of users' agreements is recorded (14%) for the statement "I find the system's email notifications and SMS reminders helpful in keeping me on track with related tasks and deadlines" indicating that the majority of the TVEC's web-based information system's users do not satisfy with the helpfulness of system's email notification and SMS reminders.

Regarding the variable learnability, the highest percentage of users' agreement is recorded (34%) for completion of renewal of center registration, implying that users can learn how to use the TVEC's web-based system to renew center registration. Also, the lowest

percentage is recorded (15%) for the statement "system provides interactive tutorials or onboarding that aid in learning when new modules are added to the system".

However, the result mentioned in Table 4.13 reveals that the percentage of users' agreement for all the statements under each latent construct is less than 45 percent implying that users are less satisfied with the facilities provided on the TVEC's web-based online system. This condition can be checked and verified through further analysis mentioned below (inferential Analysis).

4.4: Assessment of the Measurement Model

4.4.1: Reliability of Latent Constructs

Table 4.14: Reliability of Latent Constructs

Construct	No. of Items	Alpha (α)	Status
Attractiveness **(AWBIS)**	5	0.844	Excellent
Controllability **(CWBIS)**	5	0.769	Good
Efficiency **(EWBIS)**	5	0.957	Excellent
Helpfulness **(HWBIS)**	4	0.701	Good
Learnability **(LWBIS)**	5	0.903	Excellent
Usability **(UWBIS)**	9	0.878	Excellent

The reliability of all structural measurements is estimated using Cronbach's Alpha. Reliability, which explores the internal consistency and properties of the measuring scale. Table 4.14 provides a summary of Cronbach's Alpha for each of the constructs measured. According to the George Milley (2003) [65], alpha frequencies indicate a more reliable level at 0.7 while a value greater than 0.8 indicates a higher level of reliability. As the table 4.14 shows, the alpha coefficients for AWBIS, EWBIS, LWBIS, and UWBIS are above 0.8, thus indicating excellent internal consistency for those variables. Meanwhile, CWBIS and HWBIS are show the alpha coefficient above 0.7 indicating an adequate internal consistency. Therefore, it can be concluded that all the latent constructs were categorized by good internal consistency allowing further analysis. One indicator from each HWBIS and UWBIS had to be removed to improve the alpha coefficient for those constructs.

4.4.2: Model Requirements

Table 4.15: Normality Measures for Indicator Variables.

Variable	Skew	CR	Kurtosis	CR
UWBIS1	-0.56	-5.06	-0.74	-3.31
UWBIS3	-0.10	-0.91	-1.45	-6.48
UWBIS4	-0.26	-2.37	-1.20	-5.40
UWBIS7	-0.86	-7.70	-0.25	-1.12
UWBIS9	-0.23	-2.04	-0.93	-4.17
LWBIS1	-0.53	-4.78	-0.82	-3.67
LWBIS2	-0.22	-1.99	-0.96	-4.31
LWBIS3	-0.24	-2.15	-1.07	-4.80
LWBIS5	-0.23	-2.08	-1.02	-4.58
HWBIS1	-0.47	-4.17	-0.77	-3.45
HWBIS2	-0.61	-5.50	-0.46	-2.07
HWBIS3	-0.50	-4.46	-0.70	-3.14
EWBIS1	-0.23	-2.04	-1.01	-4.53
EWBIS2	-0.14	-1.28	-1.07	-4.80
EWBIS3	-0.23	-2.10	-0.94	-4.23
EWBIS4	-0.23	-2.05	-0.99	-4.42
EWBIS5	-0.20	-1.76	-1.01	-4.54
CWBIS1	-0.43	-3.87	-0.91	-4.08
CWBIS2	-0.48	-4.26	-0.66	-2.95
CWBIS4	-0.22	-1.92	-0.93	-4.17
AWBIS1	-0.49	-4.43	-0.98	-4.38
AWBIS2	-0.61	-5.50	-0.69	-3.08
AWBIS3	-0.33	-2.95	-1.03	-4.60
AWBIS4	-0.52	-4.63	-0.79	-3.54
Multivariate			**47.99**	**28.13**

Univariate and multivariate normality requirements of the data for SEM in this study were estimated using the distributional indicative measures, Skewness and Kurtosis. The absolute skewness values for all the indicator variables ranged from 0.10 to 0.85 recording all the absolute skewness values are less than 1. Meanwhile, kurtosis values are less than 7 for all the indicator variables showing univariate normality. Multivariate normality was measured using Mardia's coefficient. Mardia's value recorded for this study is at 47.99, which is well below the recommended cut-off of 482 with 24 observed variables meeting multivariate normality. Accordingly, the univariate and the multivariate normality are satisfied in this study (refer to Table 4.15).

Table 4.16: Functional forms between Dependent and Independent Variables: Linearity.

Equation *	F Value **				
	AWBIS	CWBIS	EWBIS	HWBIS	LWBIS
Linear	888.199	990.326	1320.215	371.737	1508.207
Quadratic	535.39	534.088	776.809	331.917	869.774
Cubic	356.331	366.618	522.417	293.112	582.447

Dependent UWBIS, p value < 0.001.

Meanwhile, the linearity among variables was tested by using the regression method. The dependent variable *Usability of web-based information system (UWBIS)* was regressed concerning each independent variable and curve fitting were tested as reported in Table 4.16. AWBIS and UWBIS were related linearly with an F-value of 888.199 at one percent level of significance. CWBIS was linearly connected to UWBIS recording a significant F-value of 990.326 while the curve fitting between EWBIS and UWBIS provides an F-value of 1320.215 for the linear relationship. Also, HWBIS and LWBIS are linearly connected with UWBIS under one percent level of significance with an F-values of 371.737 and 1508.207 respectively. All the other forms such as quadratic and cubic forms recorded lower F-values than those for all variables. Hence, all independent latent constructs and the dependent variable reported a satisfactory level of linearity between each pair and this satisfied this study's linearity assumption.

Table 4.17: Collinearity Diagnosis; Tolerance and VIF Values.

Coefficients			
Observed Variable		Collinearity Statistics	
		Tolerance	VIF
	AWBIS1	.485	2.062
	AWBIS2	.598	1.671
	AWBIS3	.372	2.686
	AWBIS4	.426	2.345
	CWBIS1	.580	1.725
	CWBIS2	.749	1.335
	CWBIS4	.500	1.998
	EWBIS1	.682	1.465
	EWBIS2	.485	2.062
	EWBIS3	.566	1.766

Coefficients			
Observed Variable		Collinearity Statistics	
		Tolerance	VIF
	EWBIS4	.724	1.381
	EWBIS5	.449	2.227
	HWBIS1	.717	1.395
	HWBIS2	.677	1.478
	HWBIS3	.601	1.664
	LWBIS1	.532	1.879
	LWBIS2	.447	2.239
	LWBIS4	.736	1.358
	LWBIS5	.430	2.323

Pearson correlation, variance inflation factor (VIF), and tolerance were used to identify the collinearity diagnosis. The highest Pearson correlation value reported was 0.603 between learnability of web-based information system (LWBIS) and efficiency of web-based information system (EWBIS). As reported in table 4.17, the variance inflation factor (VIF) which assess the extent to which the variance of an estimated regression weight increases when predictors are correlated, range from 1 to 3. This confirmed that there were no serious collinearity issues among the predictors of the model. Tolerance values for all the observed variables which are shown in the second column of the same table report values greater than 0.10 indicating the non-existence of multicollinearity.

Table 4.18: Estimated Pearson's Correlation among Latent Constructs.

	UWBIS	AWBIS	CWBIS	EWBIS	HWBIS	LWBIS
UWBIS	**1**					
AWBIS	0.520	**1**				
CWBIS	0.535	0.527	**1**			
EWBIS	0.570	0.578	0.585	**1**		
HWBIS	0.375	0.353	0.410	0.470	**1**	
LWBIS	0.585	0.586	0.585	0.603	0.508	**1**

4.4.3: Model fit Indices

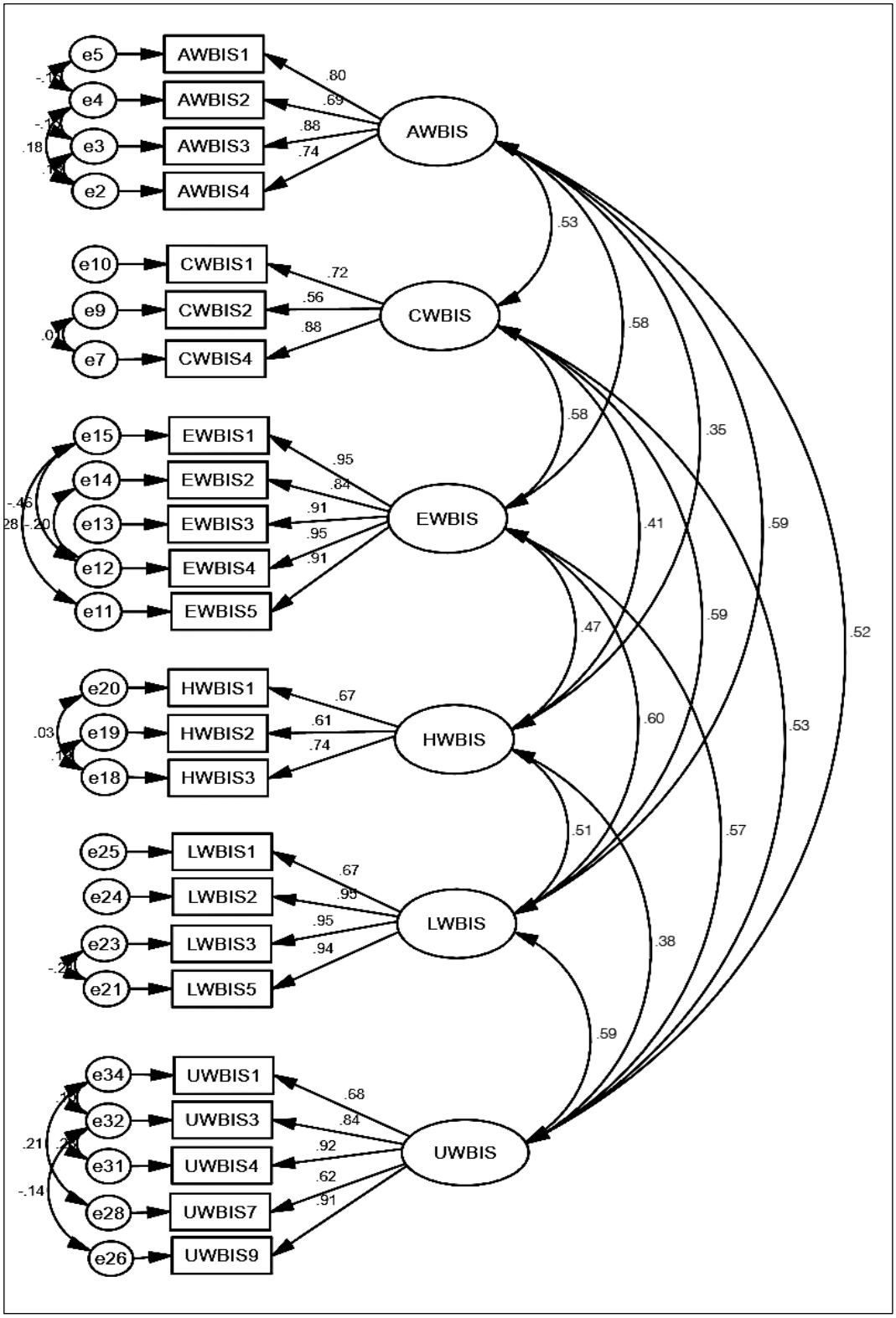

Figure 4.3: Graphical Representation of Measurement Model

Model fit indices; x^2 = 585.866, df = 222, CFI = 0.970, GFI = 0.913, IFI = 0.970, TLI = 0.963, NFI = 0.953, RMR = 0.033, RMSEA = 0.058

Table 4.19: Model fit Indices of the Measurement Model

Category	Model Fit Index	Index Value	Threshold	Comment
1. Absolute Fit	RMSEA	0.058	< 0.08	Satisfied
	GFI	0.913	> 0.90	Satisfied
	RMR	0.033	< 0.05	Satisfied
2. Incremental Fit	AGFI	0.910	> 0.90	Satisfied
	CFI	0.971	> 0.90	Satisfied
	NFI	0.953	> 0.90	Satisfied
	TLI	0.963	> 0.90	Satisfied
3. Parsimonious Fit	CMIN/df	2.639	< 3.0	Satisfied

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	78	585.866	222	.000	2.639
Saturated model	300	.000	0		
Independence model	24	12536.106	276	.000	45.421

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.033	.913	.882	.675
Saturated model	.000	1.000		
Independence model	.872	.096	.018	.088

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.953	.942	.970	.963	.970
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.058	.053	.064	.009
Independence model	.304	.299	.308	.000

The estimated measurement model is illustrated in Figure 4.3. once the overall model fit is considered, x^2 = 585.866, df = 222 and CMIN/DF recorded 2.639 making the measurement model satisfied and acceptable. As shown in table 4.19, the Root Mean Square Error of Approximation (RMSEA), which assess the hypothesized model fit with a population covariance matrix is 0.058 for the estimated model and 0.09 > PCLOSE reject the null hypothesis "RMSEA > 0.08". The Root Mean Square Residual (RMR) value for this study (RMR = 0.033) is less than the critical value of 0.05 while GFI (Goodness of Fit Index) and adjusted GFI (AGFI) that represent the overall amount of the covariation among the observed variables that can be accounted for by the model is 0.913 and 0.910 respectively. They are greater than 0.9 providing evidence of well-fitting of the measurement model. The comparative Fit Index (CFI) value for the model is greater than 0.9 (CFI = 0.971), indicating a good overall fit of the measurement model. The Norm Fix Index (NFI) value of the study was 0.953 which is greater than 0.9, and it indicates a good incremental fit. Moreover, TLI = 0.963, IFI = 0.970 are greater than the cut-off of 0.9. Accordingly, all the model fit indices meet the requirement for a good-fitting measurement model.

4.4.4: Validity of the measurement model

Table 4.20: Standardized loading, AVE, and CR values.

	AWBIS	CWBIS	EWBIS	HWBIS	LWBIS	UWBIS
AWBIS4	0.759					
AWBIS3	0.892					
AWBIS2	0.685					
AWBIS1	0.789					
CWBIS4		0.886				
CWBIS2		0.561				
CWBIS1		0.721				
EWBIS5			0.915			
EWBIS4			0.943			
EWBIS3			0.905			
EWBIS2			0.833			

	AWBIS	CWBIS	EWBIS	HWBIS	LWBIS	UWBIS
EWBIS1			0.945			
HWBIS4				0.516		
HWBIS3				0.709		
HWBIS1				0.654		
HWBIS5				0.549		
LWBIS5					0.939	
LWBIS3					0.949	
LWBIS2					0.949	
LWBIS1					0.679	
UWBIS9						0.905
UWBIS7						0.617
UWBIS4						0.922
UWBIS3						0.839
UWBIS1						
AVE	**0.616**	**0.540**	**0.826**	**0.378**	**0.786**	**0.643**
CR	**0.864**	**0.773**	**0.978**	**0.956**	**0.935**	**0.898**

The convergent validity is verified mainly by computing the Average Variance Extracted (AVE), standardized loading, and the Composite Reliability (CR) for all variables. AVE reported for the AWBIS, CWBIS, EWBIS, LWBIS, UWBIS are above 0.5 while the HWBIS reported AVE value at 0.378. CR value for all the variables is above the cut-off of 0.7. Although the AVE value for the variable HWBIS is less than 0.5, it is not a serious issue since the CR value for the same variable is greater than 0.7 (CR value for HWBIS is 0.956). Thus, all the factor loadings are significant. The results of all the indicators that are presented in table 4.20 provide evidence for a satisfactory level of convergent validity for the measurement model.

Table 4.21: Comparison of Square Root AVE Values and Correlations.

	AWBIS	CWBIS	EWBIS	HWBIS	LWBIS	UWBIS
AWBIS	**0.78**					
CWBIS	0.520	**0.734**				
EWBIS	0.535	0.527	**0.912**			
HWBIS	0.570	0.578	0.585	**0.674**		
LWBIS	0.375	0.353	0.410	0.470	**0.888**	
UWBIS	0.585	0.586	0.585	0.603	0.508	**0.803**

In the table 4.21, the diagonal values indicate the square root values of AVE for relevant variables while the values below the diagonal show correlation. As the table shows, all the inter variable correlations are less than the relevant AVE square root values, supporting the discriminant validity of the measurement model of this study.

4.5: Assessment of the Structural Model

Standard model fit indices were used to assess the Goodness-of-fit (GFI) of the structural model, viz. the discrepancy ratio (x^2/df: df = degree of freedom), the adjusted goodness-of-fit (AGFI), the comparative fit index (CFI), the normative fit index (NFI), and the root mean square error of approximation (RMSEA). As given on Table 4.22, x^2 = 624.040, df = 230, CMIN/df = 2.713, TLI = 0.960, CFI = 0.968, IFI = 0.968, RMR = 0.034, RMSEA = 0.060. For a good model fit, the discrepancy ratio should be smaller than 3; the AGFI should be higher than 0.8. Meanwhile, the RMSEA should be below or equal 0.08 for a good fit and below 0.05 for an excellent fit. The result show that the model is good fit for testing the direct-effect hypotheses established in this study.

Table 4.22: The Fitness indices of the Structural Model

Category	Model Fit Index	Index Value	Threshold	Comment
1. Absolute Fit	RMSEA	0.060	< 0.08	Satisfied
	GFI	0.908	> 0.90	Satisfied
	RMR	0.034	< 0.05	Satisfied
2. Incremental Fit	AGFI	0.881	> 0.80	Satisfied
	CFI	0.968	> 0.90	Satisfied
	NFI	0.950	> 0.90	Satisfied
	TLI	0.961	> 0.90	Satisfied
3. Parsimonious Fit	CMIN/df	2.713	< 3.0	Satisfied

All the model fit indices of the structural model are in satisfied level like the measurement model. The graphical output along with the results of the structural equation model if represented in Figure 4.4 while Table 4.23 reports the standardized structural path estimates of the main model and the factor loading for each item on the latent factor SEs, CRs, and *p*-value of the SEM model. All the path estimates are significant (1 percent level of significant) and are in the expected direction. Accordingly, the five hypotheses of the study

can be tested through path coefficients (β), critical ratio and related *p*-values. The results show that learnability of web-based information system (LWBIS) has the strongest effect on the usability of web-based information system. Furthermore, LWBIS has a direct and positive relationship with usability of web-based information system (β = 0.75; CR = 20.25; $P < 0.001$), which support hypothesis five. Meanwhile, efficiency of the web-based information system (EWBIS) and controllability of web-based information system have direct positive moderate relationships with usability of web-based information system having β = 0.41; CR = 13.43; $p < 0.001$, and β = 0.37; CR = 10.48; $p < 0.001$ respectively, which support hypotheses three and two. Also, Helpfulness of web-based information system (HWBIS) and attractiveness of web-based information system (AWBIS) have direct positive poor relationship with usability of web-based information system having β = 0.11; CR = 3.45; $p < 0.001$, and β = 0.10; CR = 3.39; $p < 0.001$ respectively, which support hypotheses four and one.

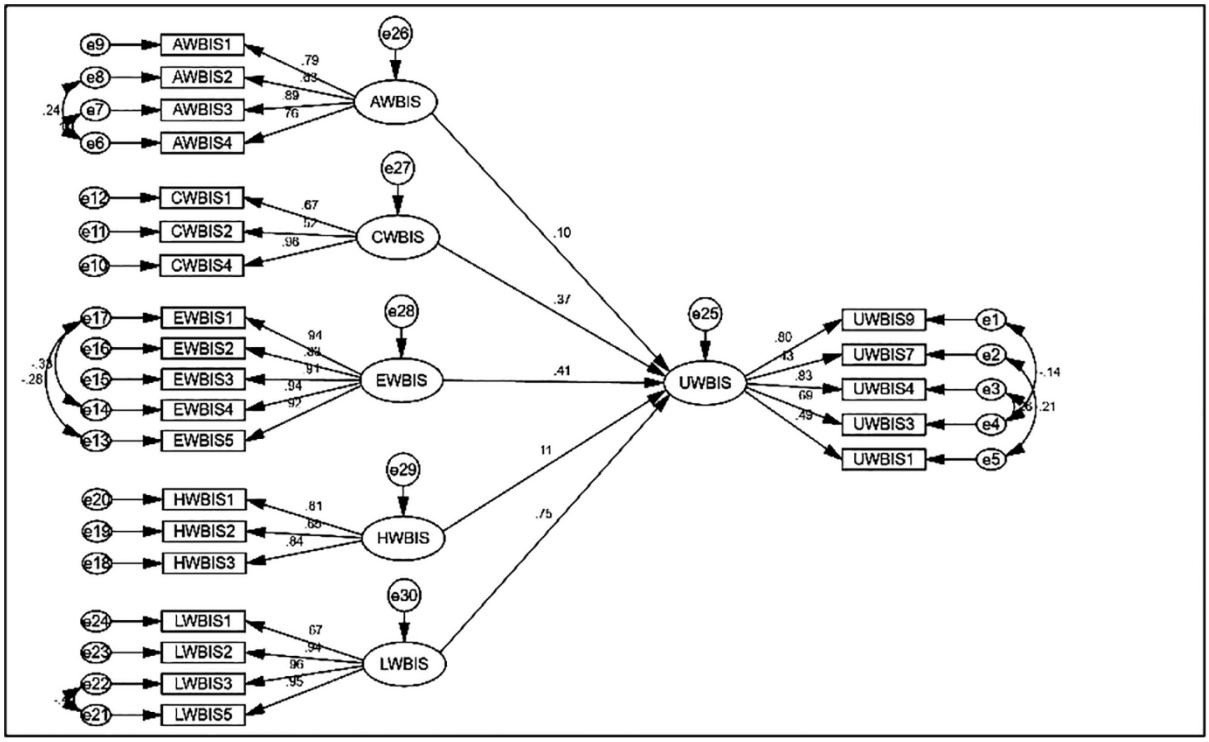

Figure 4.4: Graphical output of SEM.

Model fit indices; x^2 = 624.040, df = 230, CMIN/df = 2.713, TLI = 0.961, CFI = 0.968, IFI = 0.968, RMR = 0.034, RMSEA = 0.060.

Table 4.23: Path Coefficient Estimated through Structural Equation Modeling (SEM)

			Estimate	S.E.	C.R.	P
UWBIS	<---	AWBIS	0.099	0.021	03.393	0.001
UWBIS	<---	CWBIS	0.367	0.021	10.479	0.001
UWBIS	<---	EWBIS	0.411	0.018	13.426	0.001
UWBIS	<---	HWBIS	0.106	0.021	03.455	0.001
UWBIS	<---	LWBIS	0.750	0.021	20.251	0.001
UWBIS9	<---	UWBIS	0.800	0.065	18.001	0.001
UWBIS7	<---	UWBIS	0.427	0.068	09.294	0.001
UWBIS4	<---	UWBIS	0.826	0.057	20.140	0.001
UWBIS3	<---	UWBIS	0.694	0.076	14.970	0.001
UWBIS1	<---	UWBIS	0.490	0.070	10.802	0.001
AWBIS4	<---	AWBIS	0.763	0.074	11.936	0.001
AWBIS3	<---	AWBIS	0.810	0.067	18.271	0.001
AWBIS2	<---	AWBIS	0.626	0.060	13.091	0.001
AWBIS1	<---	AWBIS	0.787	0.084	12.936	0.001
CWBIS4	<---	CWBIS	0.960	0.021	40.072	0.001
CWBIS2	<---	CWBIS	0.518	0.048	10.652	0.001
CWBIS1	<---	CWBIS	0.675	0.053	13.366	0.001
EWBIS5	<---	EWBIS	0.916	0.039	33.934	0.001
EWBIS4	<---	EWBIS	0.939	0.028	36.142	0.001
EWBIS3	<---	EWBIS	0.908	0.029	33.134	0.001
EWBIS2	<---	EWBIS	0.834	0.033	26.922	0.001
EWBIS1	<---	EWBIS	0.945	0.030	33.005	0.001
HWBIS3	<---	HWBIS	0.841	0.057	20.140	0.001
HWBIS2	<---	HWBIS	0.654	0.073	10.304	0.001
HWBIS1	<---	HWBIS	0.608	0.071	10.044	0.001
LWBIS5	<---	LWBIS	0.951	0.019	39.072	0.001
LWBIS3	<---	LWBIS	0.965	0.025	41.072	0.001
LWBIS2	<---	LWBIS	0.941	0.024	39.816	0.001
LWBIS1	<---	LWBIS	0.665	0.037	18.266	0.001

As presented in the Table 4.23: path coefficients of structural model can be interpreted as follows;

- ***When Attractiveness of web-based information system (AWBIS) increase by one unit of standard deviation, the usability of web-based information system (UWBIS) increases by 0.099 of standard deviation.***

- ***When Controllability of web-based information system (CWBIS) increase by one unit of standard deviation, the usability of web-based information system (UWBIS) increases by 0.367 of standard deviation.***

- ***When Efficiency of web-based information system (EWBIS) increase by one unit of standard deviation, the usability of web-based information system (UWBIS) increases by 0.411 of standard deviation.***

- ***When Helpfulness of web-based information system (HWBIS) increase by one unit of standard deviation, the usability of web-based information system (UWBIS) increases by 0.106 of standard deviation.***

- ***When Learnability of web-based information system (LWBIS) increase by one unit of standard deviation, the usability of web-based information system (UWBIS) increases by 0.750 of standard deviation.***

Chapter 05

5. Discussion

The attractiveness of the web-based information system was evaluated using six indicators. The highest agreement rate was for "The colors on the NVQ system web pages are pleasing to my eye" which received a 31% agreement. This means that the default colour scheme used in the system should be pleasing to users. The rest of the indicators tended to have lower agreement percentages, so there may be weak areas for system advocate improvement. As an example, when individuals were asked if "The typography and font choices of the system make the content can understand" only 26% approved, which means not every user may find the typefaces and typographic choices very appealing or as legible as they potentially could be. In comparison, only 26% of the web pages with images and graphics were deemed to be relevant and would enhance the attractiveness suggesting that image materials might not effectively increase appeal on the system. In addition, only 20% of the evaluators agreed with the statement "Compared to other systems I have used this system has a modern and up-to-date visual appearance", This means that its visuals designer is unlikely to do well when compared with other systems out there.

In conclusion, there is space for improvement in terms of typography, font selections, picture and graphic usage, and overall visual modernism, even though the web-based information system's colour scheme seems to be adequate. The system's appeal can be increased by taking care of these issues, which will improve the user experience.

The controllability of the web-based NVQ system, evaluated through six indicators. Each indicator reflects users' experiences and satisfaction levels, measured by the number of responses and the percentage of agreement. The first indicator, "I can navigate through the menus and options of the web-based information system by simply hovering the mouse" assesses users' ability to navigate menus easily, with a 27% agreement rate suggesting that a quarter of users find the menu navigation satisfactory. The second indicator, "The system gives users feedback and confirmation, keeping them in control of their actions" measures the system's feedback mechanism, where a 21% agreement indicates that feedback is somewhat effective but could be improved. The third indicator, "Users have a clear understanding of how to cancel actions if needed", a critical indicator, evaluates users' understanding of how to cancel actions if needed, with only 18% agreement highlighting a

significant area for improvement. Users struggle with canceling actions, which affects their overall control and confidence in using the system. The fourth indicator, “The system responds to user inputs in less than 30 seconds, which is satisfactory and predictable” with a 31% agreement, shows that users are relatively satisfied with the system’s response time, as it responds to inputs in less than 30 seconds. The fifth indicator, “Interfaces of the web pages in the system are designed to help users recover from errors without any difficulty” assesses the usability of the interface, where a 18% agreement suggests that while some users find the interface user-friendly, there is room for enhancement. Lastly, “Overall, I find the web-based system to provide a high level of controllability to training centres” measures the overall ease of use without difficulty, with a 20% agreement indicating that a significant portion of users finds the system manageable but not without challenges. The low agreement rate for “Users have a clear understanding of how to cancel actions if needed” underscores the need for improvements in the system’s controllability. Enhancing this aspect could involve providing clearer instructions or designing more intuitive cancellation processes. Addressing this issue is crucial for boosting user autonomy and confidence, ultimately leading to a more seamless and satisfactory user experience.

The efficiency of the web-based information system encompasses aspects such as responsiveness, speed, and the system's ability to fulfill its intended functions in an optimized manner.

The analysis of the web-based NVQ system’s user interface efficiency reveals several key insights. The first indicator, “Web-based information system's main user interface allows me to access the necessary NVQ-related information within 5 seconds” which assesses the ability to access necessary information within 5 seconds, shows that only 33% of the agreement, indicating a need for improvement in information retrieval speed. Similarly, the second indicator, “The system's navigation is simple, enabling me to find web link separately for the login credentials for xxxxxxxIN and xxxxxxxRG.” which evaluates the simplicity of navigation for finding login credentials, has a 36% agreement, suggesting that while navigation is straightforward, it may not be efficient enough for quick access. The third indicator, “The system loads reports within a reasonable time frame of 5 seconds, avoiding significant delays.” focusing on the system’s report loading times, has a 31% agreement, indicating that while some users find the loading times reasonable, there is still room for enhancement. The fourth indicator, “I can track my centre progress through dashboard, allowing me to view enrollments compared to completions for NVQ

assessments" which looks at tracking center progress through the dashboard, has a consistent 32% agreement, highlighting a steady but moderate satisfaction level with this feature. The compatibility of the system across different devices, as assessed by the fifth indicator, "The system is compatible with different devices" has a 33% agreement, showing that while device compatibility is recognized, it could be further optimized. Lastly, "Overall, I find the web-based information system to be efficient in supporting student batch registration", which evaluates the overall efficiency in supporting student batch registration, has a 34% agreement, indicating general satisfaction but also potential for further improvement. Overall, these indicators suggest that while the web-based NVQ system has several strengths, there are specific areas, particularly in speed and efficiency, that require attention to enhance user satisfaction.

A helpful system is one that facilitates users in understanding, navigating, and successfully completing tasks associated with it, ultimately contributing to a positive and effective user experience. This could include features such as clear instructions, user-friendly interfaces, and accessible support resources.When evaluating the usability of a web-based NVQ system, it's essential to consider helpfulness on various indicators. Each indicator reflects different aspects of the system's functionality and user experience, with the number of responses and percentage of agreement providing insight into areas of strength and those needing improvement.

The first indicator, "Web-based information system offers relevant resources such as documents and videos to assist with understanding the web-based system functionalities" which assesses the availability of relevant resources such as documents and videos to assist users in understanding the system's functionalities, received a 24% agreement. This relatively low percentage suggests that users find the provided resources inadequate or not sufficiently helpful. Improving the quality, clarity, and accessibility of these resources could enhance user satisfaction.

The second indicator, "The system user guides and tutorials explain how to navigate and use its features." with a 20% agreement, evaluates the effectiveness of system user guides and tutorials in explaining how to navigate and use the system's features. The low agreement percentage indicates that users may struggle with the current guides and tutorials, highlighting a need for more comprehensive and user-friendly instructional materials.

The third indicator, “Within the Trainee/Certificate Search module (https://nvq.gov.lk), provides thorough and constructive feedback on assessments completed by students pursuing National Vocational Qualifications (NVQ)” which focuses on the system’s ability to provide thorough and constructive feedback on assessments, received a 24% agreement. The feedback mechanism is crucial for users pursuing National Vocational Qualifications (NVQ), and the low agreement suggests that the feedback provided may not be meeting users’ expectations. Enhancing the feedback process to be more detailed and supportive could improve user experience.

The fourth indicator, “The system offers additional support, such as online forums or discussions, to enhance my understanding of new modules in the system”, evaluating the system’s support features, such as online forums or discussions, this indicator received a 17% agreement. The low percentage indicates that users do not find these support features particularly helpful. Enhancing these features to foster better interaction and support could significantly improve user satisfaction.

The fifth indicator, “I find the system's Email notifications and SMS reminders helpful in keeping me on track with related tasks and deadlines” assesses the helpfulness of the system’s email notifications and SMS reminders in keeping users on track with related tasks and deadlines. With only a 14% agreement, it is clear that users find these reminders insufficient. Improving the frequency, timing, and relevance of these notifications could help users stay more effectively on track.

Lastly, “Overall, I find the web-based information system to be helpful in supporting under student registration, assessment request and evaluating the students’ results”, the highest agreement percentage, 33%, was for this indicator, which evaluates the overall helpfulness of the system in supporting student registration, assessment requests, and evaluating results. While this is the highest among the indicators, there is still room for improvement to ensure the system meets users’ needs more effectively.

In summary, while some aspects of the web-based NVQ system are perceived positively, there are several areas where improvements are needed. Focusing on enhancing the quality of resources, user guides, feedback mechanisms, support features, and notifications can lead to a more user-friendly and effective system.

When evaluating the learnability of a web-based information system, several indicators provide insight into user experiences and areas needing improvement.

The first indicator**, "**Web-based information system's user interfaces are easy to understand and navigate**"** focuses on the ease of understanding and navigating the user interfaces. With agreeing (27%), it suggests that while some users find the system manageable, there is significant room for improvement in making interfaces more intuitive or providing clearer instructions.

The second indicator**,** "The system offers step-by-step guidance for using its features through user manuals" examines the effectiveness of user manuals in guiding users through the system's features. With a higher agreement rate of 32%, it indicates that manuals are somewhat effective but could benefit from enhancements to improve clarity and accessibility.

The third indicator, "I can learn how to use the system to complete renewal of centre registration" assesses the usefulness of interactive tutorials or modules for tasks like renewal registration. This indicator has a 34% agreement, suggesting these tools are beneficial but may be underutilized or need refinement to be more effective.

The fourth indicator, "The system provides interactive tutorials or onboarding that aid in learning when new modules added to the system" looks at the support provided when new features are introduced. With only a 15% agreement, this highlights a significant need for better support and resources to help users adapt to new features.

The fifith indicator, "I feel confident in exploring new features or options within the system" measures users' confidence in exploring new features or options within the system. A 33% agreement suggests that while there is some ease in exploration, enhancing navigational aspects could further improve user experience.

Lastly, **"**Overall, I find the web-based system to be easy to learn and use in a positive user experience**"** evaluates the overall positive user experience regarding learnability and use of the system. With a 32% agreement, it points to the need for better strategies to enhance overall satisfaction with learning how to use the system effectively.

In summary, while certain aspects like using manuals and exploring new options show moderate levels of user agreement on learnability, other areas, particularly related to support during feature updates, indicate significant potential for enhancement to improve overall learnability and user experience.

Chapter 06

6. Recommendations

6.1. Overall Recommendations

Based on a user survey evaluating the web-based information system across various dimensions, including attractiveness, controllability, efficiency, helpfulness, and learnability, the feedback provided valuable insights into areas of both strength and needed improvement. The survey revealed moderate satisfaction in some areas, such as layout organization and interface navigation, but also highlighted significant challenges in modernity, speed, support features, and ease of use. To address these concerns, the following key recommendations are proposed:

1. Improve Visual Appeal and Modernity:
   - Revise color schemes and typography to enhance attractiveness.
   - Modernize the design to match user expectations of contemporary web systems.

2. Enhance User Control and Navigation:
   - Implement more intuitive navigation and control mechanisms.
   - Provide clearer instructions on canceling actions and using system features.

3. Optimize System Speed and Responsiveness:
   - Improve information retrieval times and report loading speeds.
   - Ensure smooth and efficient performance across different devices.

4. Strengthen Help and Support Features:
   - Provide more comprehensive resources, such as user guides and video tutorials.
   - Improve feedback mechanisms and enhance support options like forums and notifications.

5. Focus on Learnability and User Onboarding:
   - Create more user-friendly tutorials and onboarding materials for new features.
   - Ensure that interactive tutorials are easy to understand and widely accessible.

6. Regular User Feedback Collection:

- Continuously gather user feedback to identify areas for improvement and maintain high satisfaction levels.

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Appendices

Survey on identifying the factors that influenced the usability of TVEC's web-based information system

Thank you for participating in this survey. We are conducting a study to identify the factors that influence the usability of TVEC's web-based information system. Your feedback will help us to understand the strengths and weaknesses of the system and make improvements accordingly. This survey may take approximately 20 minutes to complete. Your responses will remain confidential and anonymous.

(Please ask the online system operator at your institute to reply to this survey.)

Let's get started.

Section 1: Demographic Information

1. Gender:
   - Male ☐
   - Female ☐

2. Age: ☐ Years

3. Designation: ……...

   3.1 Status of the designation: Full Time ☐ Part Time ☐

   3.2 Category of the designation: Permanent ☐ Temporary ☐ Visiting ☐

4.1 Highest education qualification: Degree and above ☐ G.C.E. A/L ☐ G.C.E. O/L ☐ Below O/L ☐

4.2 Highest qualification in related to the Information Technology (IT)

Certificate ☐

Diploma ☐

Degree ☐

Other ……..

4.3 Highest qualification for English language

G.C.E. O/L ☐

Certificate ☐

Diploma ☐

Degree ☐

Other …….

5. District in which the institution is located .....

Section 2: Web-based Information System Usage

6. Do you use the Web-based information system daily?

- Yes ☐
- No ☐

If yes,

6.1 How many times a day? ☐

If no,

6.2 How many days a week? ☐

6.3 How many days a month? ☐

7. How long have you been using the web-based information system? ……

Years

8. Does your organization conduct any ICT-related training courses?

- Yes ☐
- No ☐

Section 3: Factors to be focused

On a scale of 1 to 5, rate the importance of the following factors in influencing the usability of web-based information Q system. (1 = Strongly Agree, 2= Agree, 3= Neutral, 4= Disagree, 5 = Strongly Disagree)

7. Attractive of the web-based information system

(*An attractive system uses colors, fonts, layout, and images in a way that makes it pleasing to the eyes and enjoyable for users.****)***

No	Description	1	2	3	4	5
7.1	The colors on the NVQ system web pages are pleasing to my eye.					
7.2	The typography and font choices of the system make the content can understand.					
7.3	The layout and organization of information on the system dashboard are clear and able to understand.					
7.4	The images and graphics used in web pages are relevant and contribute to its attractiveness.					
7.5	Compared to other systems I have used this system has a modern and up-to-date visual appearance.					
7.6	Overall, I find the web-based system to be visually appealing and attractive.					

8. Controllability of the web-based information system

(A system with good controllability gives users a sense of control and ease in managing their interactions within the system.)

No	Description	1	2	3	4	5
8.1	I can navigate through the menus and options of the web-based information system by simply hovering the mouse.					
8.2	The system gives users feedback and confirmation, keeping them in control of their actions.					
8.3	Users have a clear understanding of how to cancel actions if needed.					

No	Description	1	2	3	4	5
8.4	The system responds to user inputs in less than 30 seconds, which is satisfactory and predictable.					
8.5	Interfaces of the web pages in the system are designed to help users recover from errors without any difficulty.					
8.6	Overall, I find the web-based system to provide a high level of controllability to training centres.					

9. Efficiency of the web-based information system

(*System encompasses aspects such as responsiveness, speed, and the system's ability to fulfill its intended functions in an optimized manner.****)***

No	Description	1	2	3	4	5
9.1	Web-based information system's main user interface allows me to access the necessary NVQ-related information within 5 seconds.					
9.2	The system's navigation is simple, enabling me to find web link separately for the login credentials for xxxxxxxIN and xxxxxxxRG.					
9.3	The system loads reports within a reasonable time frame of 5 seconds, avoiding significant delays.					
9.4	I can track my centre progress through dashboard, allowing me to view enrollments compared to completions for NVQ assessments.					
9.5	The system is compatible with different devices (e.g., desktop, mobile, tablet).					
9.6	Overall, I find the web-based information system to be efficient in supporting student batch registration.					

10. Helpfulness of the web-based information system

(A helpful system is one that facilitates users in understanding, navigating, and successfully completing tasks associated with it, ultimately contributing to a positive and effective user experience. This could include features such as clear instructions, user-friendly interfaces, and accessible support resources.)

No	Description	1	2	3	4	5
10.1	Web-based information system offers relevant resources such as documents and videos to assist with understanding the web-based system functionalities.					
10.2	The system user guides and tutorials explain how to navigate and use its features.					
10.3	Within the Trainee/Certificate Search module (https://nvq.gov.lk), provides thorough and constructive feedback on assessments completed by students pursuing National Vocational Qualifications (NVQ)					
10.4	The system offers additional support, such as online forums or discussions, to enhance my understanding of new modules in the system.					
10.5	I find the system's Email notifications and SMS reminders helpful in keeping me on track with related tasks and deadlines.					
10.6	Overall, I find the web-based information system to be helpful in supporting under student registration, assessment request and evaluating the students' results.					

11. Learnability of the web-based information system

(*Refers to the ease with which users, particularly new or registered training centres, can understand, navigate, and use a web-based system.****)***

No	Description	1	2	3	4	5
11.1	Web-based information system's user interfaces are easy to understand and navigate.					
11.2	The system offers step-by-step guidance for using its features through user manuals.					
11.3	I can learn how to use the system to complete renewal of centre registration.					
11.4	The system provides interactive tutorials or onboarding that aid in learning when new modules added to the system.					
11.5	I feel confident in exploring new features or options within the system.					
11.6	Overall, I find the web-based system to be easy to learn and use in a positive user experience.					

12. Usability of the web-based information system

(Relates to the degree to which the system is efficient and user-friendly in providing those logged in web-based National Vocational Qualification (NVQ) system with a favorable user experience.)

No	Description	1	2	3	4	5
12.1	I am very interested in using the TVEC's web-based information system frequently, as it allows me to generate progress reports by saving me a lot of time and effort.					
12.2	I found the process for login to the web-based system to be unnecessarily complex, such as Web address for the PxxxxxIN account and web address for the PxxxxxxRG are totally separate link to login to the same TVEC's web-based information system.					
12.3	I appreciate the fact that the system is available 24/7, so I can work on my PxxxxxIN account at my own convenience.					
12.4	I think that using the TVEC's web-based information system is convenient for me, because I could access the system from anywhere with an internet connection.					
12.5	This system is much easier to learn than other systems I've used. It's more user-friendly.					
12.6	It was difficult to find the functionality I needed. Such as updating pre-assessment result, it took me much longer to complete tasks than it should have.					
12.7	I felt very confident using the system. For Example; I can easily access student batch entry details reports, assessment scheduled reports.					
12.8	I regularly need the technical support from TVEC to navigate through the web-based system.					
12.9	I found the various functions in this system well integrated, such as the ability to export data to an Excel file.					
12.10	I found that the navigation is the same on every page, and the same design elements are used throughout the site. This makes the system easy to learn and use.					

13. What are the specific aspects of the TVEC's web-based information system that you find most usable and user-friendly?

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14. What are the specific aspects of the TVEC's web-based information system that you find least usable and need improvement?

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15. Do you have any additional comments or suggestions for improving the usability of the TVEC's web-based information system?

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Thank you for taking the time to complete this survey!

Your feedback is highly valuable in understanding the factors that influence the usability of web-based* information *system.