

UNIVERSITI TEKNOLOGI MARA

**FACTORS THAT INFLUENCE
E-LEARNING EFFECTIVENESS
WITH
THE MODERATING EFFECT OF
E-LEADERSHIP**

**RAJA AMIR ASHRAF BIN RAJA
ZAINALABIDIN**

MSc

May 2026

UNIVERSITI TEKNOLOGI MARA

**FACTORS THAT INFLUENCE
E-LEARNING EFFECTIVENESS
WITH
THE MODERATING EFFECT OF
E-LEADERSHIP**

RAJA AMIR ASHRAF BIN RAJA ZAINALABIDIN

Thesis submitted in fulfilment
of the requirements for the degree of
Master of Science
(Business Management)

Faculty of Business and Management

May 2026

CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 23 May 2025 to conduct the final examination of Raja Amir Ashraf bin Raja Zainalabidin on his Masters of Science thesis entitled “Factors That Influence E-Learning Effectiveness with The Moderating Effect of E-Leadership” in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiner recommends that the student be awarded the relevant degree. The Panel of Examiners was as follows:

Kamarudin Othman, PhD
Associate Professor
Faculty of Business and Management
Universiti Teknologi MARA
(Chairman)

Amir Imran Zainoddin, PhD
Senior Lecturer
Faculty of Business and Management
Universiti Teknologi MARA
(Internal Examiner)

Nur Ain Syazmeen Ahmad Zaki, PhD
Senior Lecturer
Faculty of Business Management
Universiti Poly-Tech Malaysia
(External Examiner)

**PROFESSOR DR HJH ZURAEDA
IBRAHIM**

Dean
Institute of Postgraduates Studies
Universiti Teknologi MARA

Date: 18 May 2026

AUTHOR’S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student : Raja Amir Ashraf bin Raja Zainalabidin

Student ID. No. : 2021345193

Programme : Master of Science (Business Management) – BA750

Faculty : Business and Management

Thesis Title : Factors that Influence E-Learning Effectiveness with
the moderating effect of E-Leadership.

Signature of Student :

Date : May 2026

ABSTRACT

Working in a regional and global operation have forced e-learning effectiveness at workplace to be one of the top priorities for most international organizations including some Government Linked Companies (GLCs) in Malaysia. As some of these prominent organizations may operates globally, they facilitate many opportunities for their executive employees to undergo e-learning programs. Key contributors towards the e-learning effectiveness such as course, trainee, and the organization itself play its role in making those e-learning courses effective. Those ultimatums can also be achieved through many forms and additionally, there are numerous criteria other than course, trainee, and organization that can improve or reduce the effectiveness. This research thus, proposed a new conceptual framework in e-learning effectiveness study by validating the antecedents of course, trainee, and organization through taxonomical perspectives and testing moderation effect of e-leadership towards user satisfaction and the dependent variable. The population of this study is narrowed down to the executives of GLCs home-based in Klang Valley. Data collection was made via 200 self-distributed questionnaires in the parent study through non-random sampling technique. A total of 190 usable questionnaires was analysed using the latest PLS-SEM technique and reporting procedures. To conclude, result showed that trainee and organization were positively significant to user satisfaction. Course, however, did not positively significant to user satisfaction. While user satisfaction is positively significant to e-learning effectiveness, all course, trainee and organization are not positively significant to e-learning effectiveness. E-leadership also was found to not moderating user satisfaction and e-learning effectiveness taxonomy. The results of this research should offer a broader perspective on e-learning effectiveness and provide additional insights on how organizations can contribute to improving e-learning effectiveness, which in turn will enhance employee performance within the GLCs in Malaysia.

ACKNOWLEDGEMENT

I thank Allah for granting me the opportunity to pursue my master's degree and for guiding me to complete this long and challenging journey successfully. Alhamdulillah.

This thesis is dedicated to my beloved mother, , and to the loving memory of my late father, Raja Zainalabidin bin Raja Yahaya, whose vision and determination to educate me have shaped who I am today. Your wisdom and inspiration continue to guide me to become a better person. Alhamdulillah.

My deepest appreciation goes to my beloved wife, Habibah, for her endless support and understanding, as well as to the current and past crew members of Klever Education, who provided online and offline facilities, learning technologies, and consulting assistance during this research.

Heartfelt thanks to my family for their constant encouragement and motivation, which made it possible for me to complete this journey. To my children, Aysar, Fateh, and Azkayra, thank you for all your patience, cooperation, and good behaviour while I worked on this research. Special thanks also to my colleagues and friends for their kind help and encouragement throughout this project.

Finally, my deepest gratitude goes to my supervisors, Dr. Ahmad Syahmi bin Ahmad Fadzil and Dr. Mohammad Faizal bin Ramli, for their patience, guidance, insightful ideas, motivation, and constant supervision. Their support has kept me focused and determined, and I consider myself truly fortunate to have had such dedicated supervisors.

TABLE OF CONTENTS

	Page
CONFIRMATION BY PANEL OF EXAMINERS	ii
AUTHOR’S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	xi
LIST OF FIGURES	xiii
 CHAPTER 1 INTRODUCTION	 1
1.1 Preamble	1
1.2 Introduction	1
1.3 E-learning Outlook in Malaysia	7
1.4 United Nation’s Sustainable Development Goals (UNSDG)	8
1.5 Organisation for Economic Co-operation and Development (OECD)	11
1.6 Malaysia Digital Economy Blueprint	13
1.7 Shared Prosperity Vision 2030	14
1.8 The Importance of E-learning Effectiveness in GLCs	15
1.9 Problem Statement	16
1.10 Research Gaps	20
1.11 Research Objectives	21
1.12 Research Questions	21
1.13 Definition of Terms	21
1.13.1 E-learning Ecosystem	22
1.13.2 E-learning Effectiveness	22
1.13.3 User Satisfaction	23
1.13.4 E-leadership	23
1.13.5 Government Linked Companies	24
1.14 Significance of Research	24
1.14.1 To Business Managers	24

1.14.2	To Business Organization	25
1.14.3	To Learning and Development Researchers and Practitioners	25
1.14.4	Body of Knowledge	26
CHAPTER 2 LITERATURE REVIEW		27
2.1	Preamble	27
2.2	Learning	27
2.3	E-learning	29
2.4	E-learning ecosystem	30
2.4.1	Course Dimension	33
2.4.2	Trainee Dimension	36
2.4.3	Organisation Dimension	37
2.5	User Satisfaction	39
2.6	E-leadership	41
2.7	E-learning effectiveness	43
2.7.1	E-leadership as moderating effects towards user satisfaction and e-learning effectiveness	45
2.8	Learning Management System	46
2.8.1	Debate	46
2.9	Government Linked Companies (GLCs)	48
2.9.1	Definition	48
2.10	Information Systems Success (ISS) Model	50
2.10.1	Definition	50
2.11	Underpinning Theories and Framework	52
2.12	Hypotheses Development	53
2.13	Chapter Summary	54
CHAPTER 3 RESEARCH METHODOLOGY		55
3.1	Preamble	55
3.2	Research Design	55
3.3	Details of Study	55
3.3.1	Purpose of Study	55
3.3.2	Types of Investigation	57

3.3.3	Study Setting and Extent of Researcher Interference	57
3.3.4	Time Horizon	57
3.3.5	Unit of Analysis	57
3.3.6	Population and Sample	58
3.3.7	Sampling Design and Procedures	60
3.4	Measurement	61
3.4.1	Data Collection Method	61
3.4.2	Primary Data	61
3.5	Data Analysis	71
3.5.1	Assessment of Reflective Measurement Model	71
3.5.2	Assessment of Structural Model	74
3.6	Sequence of Test	76
3.7	Overview of Pilot Test	78
3.7.1	Feasibility of Data Collection	79
3.7.2	Adequacy of Instrument	80
3.8	Result of Pilot Test	84
3.9	Adequacy of Instrument After EFA (Rerun)	85
3.10	Chapter Summary	86
CHAPTER 4	DATA ANALYSIS	87
4.1	Preamble	87
4.2	Data Collection Overview	89
4.3	Preliminary Data Analysis	89
4.3.1	Normality Check	90
4.3.2	Addressing Biases	91
4.3.3	Factor analysis for Course Dimension	92
4.3.4	Factor Analysis for Trainee Dimension	93
4.3.5	Factor Analysis for Organizational Dimension	96
4.3.6	Factor Analysis for User Satisfaction	98
4.3.7	Factor Analysis for E-leadership	100
4.3.8	Factor Analysis for E-learning Effectiveness	104
4.3.9	Analysis of Respondents' Profile	106
4.3.10	Analysis of Constructs' Descriptive Statistics	108
4.4	Assessment of Measurement Model	109

4.4.1	Assessment of Internal Consistency	110
4.5	Assessment of Convergent Validity	112
4.6	Assessment of Discriminant Validity	113
4.7	Assessment of Structural Model Results	115
4.8	Assessment of R ² Level	118
4.9	Assessment of f ² Effect Size	119
4.10	Assessment of Predictive Relevance Q ²	120
4.11	Assessment of Moderation	120
4.12	Chapter Summary	121
CHAPTER 5	CONCLUSION AND RECOMMENDATION	124
5.1	Preamble	124
5.2	Discussion	124
5.2.1	Discussion on Research Objective 1: The Relationships of Course, Trainee and Organization Dimension towards User Satisfaction.	125
5.2.2	Discussion on Research Objective 2: The Relationship between User Satisfaction and E-learning Effectiveness	128
5.2.3	Discussion on Research Objective 3: The Relationship of Course, Trainee and Organization Dimensions towards E-learning Effectiveness	129
5.2.4	Discussion on Research Objective 4: The Moderating Relationship of E-leadership between User Satisfaction and E-learning Effectiveness	133
5.3	Contribution of Study	134
5.3.1	Theoretical Contribution	135
5.3.2	Methodological Contribution	136
5.3.3	Practical Contribution	137
5.4	Suggestions for Future Research	138
5.5	Recommendations	139
5.5.1	Trainee and Organization is Key to User Satisfaction	140
5.5.2	Gather Feedback to Improve User Satisfaction	141
5.5.3	Foster a Positive Learning Culture	142
5.5.4	Learner Motivation is Key to E-learning Effectiveness	143
5.6	Conclusion	143

REFERENCES	146
APPENDICES	154
AUTHOR'S PROFILE	174

LIST OF TABLES

Tables	Title	Page
Table 1.1	The Sustainable Development Goals	8
Table 2.1	E-leadership Findings and Resource	42
Table 2.2	Hypotheses Development	53
Table 3.1	Sampling Size Requirements	59
Table 3.2	Structure of Research Questionnaire	62
Table 3.3	Guidelines for Using Smart PLS (Hair et al., 2017)	65
Table 3.4	Configuration Setting for PLS Algorithm.	70
Table 3.5	Stages of Test	76
Table 3.6	Outer Loadings	81
Table 3.7	Summary of EFA	85
Table 4.1	Skewness and Kurtosis Coefficients	90
Table 4.2	Harman's Single Factor Test	91
Table 4.3	Total Variance Explained for Course Dimension	92
Table 4.4	KMO and Bartlett's Test for Course Dimension	93
Table 4.5	Total Variable Explained for Trainee Dimension	94
Table 4.6	Component Matrix for Trainee Dimension	94
Table 4.7	KMO and Bartlett's Test for Trainee Dimension	95
Table 4.8	Total Variable Explained for Organizational Dimension	96
Table 4.9	Component Matrix for Organizational Dimension	97
Table 4.10	KMO and Bartlett's Test for Organizational Dimension	97
Table 4.11	Total Variable Explained for User Satisfaction	98
Table 4.12	Component Matrix for User Satisfaction	99
Table 4.13	KMO and Bartlett's Test for User Satisfaction	100
Table 4.14	Total Variance Explained for E-leadership	101
Table 4.15	Component Matrix for E-leadership	102
Table 4.16	KMO and Bartlett's Test for E-leadership	104
Table 4.17	Total Variance Explained for E-learning Effectiveness	105
Table 4.18	Component Matrix for E-learning Effectiveness	105
Table 4.19	KMO and Bartlett's Test for E-learning Effectiveness	106

Table 4.20	Respondents' Profile	106
Table 4.21	Analysis of Constructs' Descriptive Analysis	108
Table 4.22	Internal Consistency and Discriminant Validity	110
Table 4.23	Average of Variance Extracted (AVE) Value	112
Table 4.24	Heterotrait-Monotrait (HTMT) Table	113
Table 4.25	Overall Structural Model Results	116
Table 4.26	Assessment of R ² Level	118
Table 4.27	Assessment of f ² Effect Size	119
Table 4.28	Assessment of Predictive Relevance Q ²	120
Table 4.29	Assessment of Moderation Effect	121
Table 4.30	Summary of Research Objectives, Hypotheses and Results	122
Table 5.1	The Relationships between Course, Trainee, and Organization Dimensions and User Satisfaction	125
Table 5.2	The Effect of User Satisfaction towards E-learning Effectiveness	128
Table 5.3	The Relationship between Course, Trainee and Organization towards E-learning Effectiveness	130
Table 5.4	Hypothesis and Result on Moderating Effect	133

LIST OF FIGURES

Figures	Title	Page
Figure 1-1	Statistics of Usage of E-learning (Google, 2023)	3
Figure 2-1	Conceptual Framework	53
Figure 3-1	Research Design	56
Figure 3-2	Determining Total Sample Size using GPower Software	60
Figure 3-3	Conceptual Framework Developed Using PLS-SEM	67
Figure 3-4	Inner Model for The Research	68
Figure 3-5	Outer Model of The Research	69
Figure 3-6	Assessment Procedures of Structural Model (Hair et. al., 2017)	71
Figure 3-7	Outer Loading Relevance Testing Flow	73
Figure 3-8	Assessment Procedure of Structural Model (Hair et. al., (2017)	74
Figure 3-9	Heterotrait-Monotrait Correlation Ratio	84
Figure 4-1	The Assessment Procedure for Reflective Measurement and Structural Models (Hair et al., 2017)	88
Figure 4-2	Preliminary Data Analysis Procedures Adapted from Roni (2015)	89
Figure 4-3	Assessment Procedures of Reflective Measurement Model	110
Figure 4-4	Assessment Procedures of Structural Models (Hair et al, 2017)	116

CHAPTER 1

INTRODUCTION

1.1 Preamble

This chapter discusses the overall background of the research which comprises the introduction, current outlook of course, trainee and organization dimension in Malaysia, problem statement, research questions and objectives, the significance of the study, research limitations, the scope of research and the definition of terms.

1.2 Introduction

Over the years, there have always been various definitions to define what e-learning is or how e-learning is conducted effectively, as it always focuses on the specific needs of an individual or an organization. Whether in a learning institution, corporation, or small business, the first problem regarding e-learning is always the terminology each institution uses. However, common understanding about e-learning is always the same across entities.

According to Purnama et al., (2023), virtual learning, internet-based learning, web-based learning, or e-learning are used interchangeably by practitioners in the field. E-learning also interchangeably known as Web-Based Training (WBT), or as training that resides on a server or host computer that is connected to the World Wide Web (Belaya, 2018). Furthermore, Kapo et al. (2021) define e-learning as the conduction of an educational process through information and communication technologies. Then, (Aljawarneh, 2020) stated that Web-based education, digital learning, interactive learning, computer-assisted teaching, and internet-based learning are known as e-learning. Today, the definition is e-learning is associated with technology, enabling an efficient and effective method of achieving educational results that may result in societal changes and transformations (Yusriadi et al., 2022). Hence, the term e-learning will be widely use in this research.

The emergence of e-learning has completely changed the landscape of education by providing flexible and accessible learning options for people all over the world. Due to its potential to break down geographical barriers and improve educational

experiences, e-learning has gained popularity in Malaysia. The course, trainee, and organizational dimensions are the three main aspects that this research focuses on in order to examine the variables that affect the effectiveness of e-learning in Malaysia. A study by (Yew & Jambulingam, 2015) found that the course design, trainee motivation, and organizational support were all significant predictors of e-learning effectiveness. According to Ahmad et al., (2018) and Ghazal et al., (2018), e-learning effectiveness was mostly determined by the course flexibility, relevancy of the modules and their contents in a logical order, security, and user friendliness.

In the learning and development landscape within organization today, technology will be the driving force in workplace training. Association for Talent Development Report, 2018) indicated that e-learning is accounted for 40 per cent of the formal learning hours used in 2017. The definition of e-learning usually describes the activities of organizing learning using information and communication technologies. The Association for Talent Development Report (2018) also identified that the essential remarkable milestones in learning are the evolution from distance learning to electronic education to mobile learning. According to Wang, et al. (2021), e-learning is the knowledge and ability acquired in the process of learning by means of network learning. The learning process throughout this approach can easily be done while having the network and suitable device to perform the e-learning process.

According to Jain et al., (2024), e-learning is a virtual learning method accomplished through internet-connected devices that allows instructors to connect with learners remotely, thereby overcoming the limitations of geographical distance. The origins of e-learning date back to 1924, when Professor Sidney Pressey invented the "Automatic Teacher", the first device in electronic learning. Following that, numerous pivotal moments in the development of electronic media and information and communication technologies that have influenced the advancement of e-learning are mentioned in publications. With the introduction of personal computers in 1980 and the internet in the late 20th century, e-learning tools and delivery methods expanded. E-learning has been utilized in the education sector since the early 1990s and in businesses, including the military and learning sectors, since 2000. A comprehensive analysis of the e-learning landscape can be traced back to 2001, when Hannas, (2001) elucidated the operational mechanics of e-learning and provided strategic frameworks for selecting providers.

The degree to which e-learning supplements or replaces other teaching and learning methods in the educational process differs among countries, regions, and universities, ranging from no use at all to fully online distance learning.

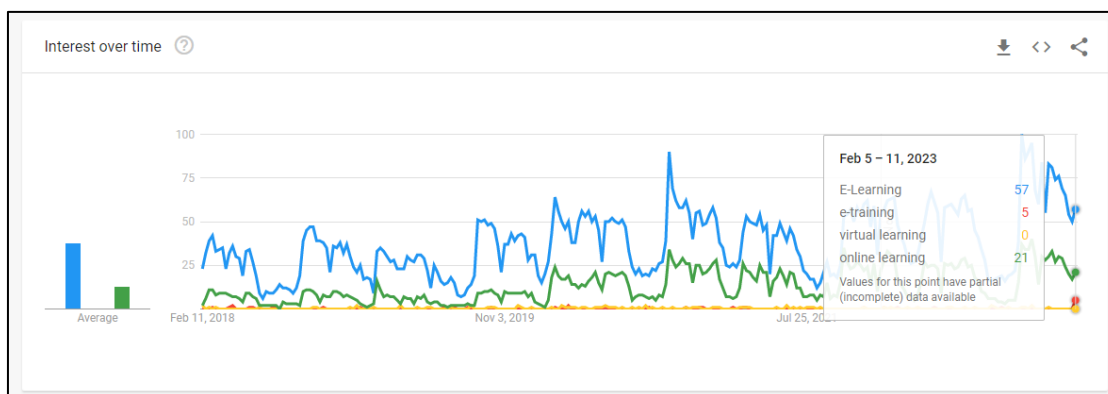


Figure 1-1 Statistics of Usage of E-learning (Google, 2023)

Meanwhile, the interest of internet user regarding e-learning has declined over the past seventeen years. The sudden spike of the interest in 2019 was most probably due to the global pandemic COVID-19 have impacted the world. According to Aboagye et al., (2020), the conventional methods (traditional face-to-face teaching) have been replaced by online learning (e-learning) for the time being due to the COVID-19 pandemic. Therefore, e-learning is regarded as the most effective and popular mode of instruction adopted by large corporations and Government-linked Companies. This is attributed to its perceived effectiveness in offering flexible, timely, and continuous learning through a blend of traditional face-to-face classes and online learning. Since 2020, many nations have been dealing with a pandemic that has entirely transformed traditional learning into e-learning. The World Health Organization (WHO) declared COVID-19 to be a worldwide pandemic in March 2020 (Puljak et al., 2020). The virus outbreak compelled many organizations including corporate and educational institutions to switch entirely to online learning instead of traditional and physical learning (Sathishkumar et al., 2020). While many other organisations still have difficulty adopting e-learning to solve this issue, some have moved quickly to implement the newly adopted learning approach.

Although many organizations globally had begun adopting e-learning prior to the pandemic, a full digital transformation was not anticipated. Consequently, these organizations were forced to transition to remote learning abruptly. The success of this shift depended heavily on the organization's e-learning infrastructure, the relevancy of the course content, and the readiness of the trainees. Research has primarily evaluated this critical e-learning infrastructure in terms of hardware and software availability (Coman et al., 2020; Garad et al., 2021; Gladun et al., 2009).

The successful effectiveness of e-learning is widely recognized as a complex, multi-faceted construct that is challenging to define with exact, universal parameters. Foundational research, however, identifies three key interdependent dimensions necessary for success: course quality, trainee readiness, and organizational support (Park & Hoffner, 2020). The organizational dimension is fundamentally influenced by effective e-leadership (Salloum et al., 2023). Among these factors, prior research has examined the effects of ICT, particularly e-learning infrastructure (Garad et al., 2021). The study by Garad et al. (2021) demonstrated how ICT significantly and favorably affects the e-learning process, a significance that was dramatically highlighted by the COVID-19 pandemic when the sudden shift to remote learning made infrastructure a critical requirement.

Even before the COVID-19 pandemic, e-learning was growing approximately 15.4% yearly in educational institutions around the world without uncertainties or pressure on those institutions or on students (*Coronavirus Pandemic Tests Countries' Abilities to Create Effective Online Education*, n.d.). However, as the research was conducted during and post-COVID-19, the situation has changed dramatically. Educational institutions began providing most of their services online, including lectures and assessments via several platforms for over 60% of users worldwide due to global restriction measures to minimize the spread of COVID-19 (World Health Organization, 2020). Referring to the data released by the WHO, COVID-19 has been reported in over 216 countries, with areas having millions of confirmed cases (World Health Organization, 2020). Many countries have taken precautionary measures, including lockdowns of schools and universities, and switching to full e-learning mode during the spread of the Coronavirus, to avoid future expected waves (World Health Organization, 2020). This action was in response to social distancing rules, which were strongly recommended by the WHO to prevent the spread of COVID-19 (World Health Organization, 2020). With everyone suddenly forced to stay home due to the coronavirus

pandemic, the global economy sector of online learning and learning technology is facing the biggest opportunity and biggest test of its existence (Coronavirus Pandemic Tests Countries' Abilities to Create Effective Online Education, 2021).

The difficulties of continuously being at the forefront and being the best at satisfying customer service and developing products are made more difficult by the intense competition between businesses in the era of the global economy. The rapid development of information and communication technology (ICT) together with on-going increment in the number of internet users worldwide have resulted in increased opportunities for greater knowledge and information accessibility (Pacific, 2021). As highlighted by Oyelude (2022), ICT can integrate learning and working, and develop skills needed to work in an information-rich environment. Many activities nowadays involve digitalisation and the internet, such as communication, banking, purchasing as well as teaching and learning. The internet has become essential for many people particularly the younger generation, as it was reported that the percentage of younger adults 16 to 24 years old going online on daily basis has shown significant increment from 2008 to 2017 (Schleicher et al., 2019). Thus, business must take advantage of the new technologies so that its employees can reap the potential advantages, and at the same time preparing them for the challenges in their own industry.

Despite what felt like a sudden transition for many, e-learning literature is rich and longstanding. This has been agreed even from a long time ago. Existing good practices for face-to-face teaching have been adapted into e-learning. In addition, as e-learning has become more prevalent, further good practices and theoretical models have also been elaborated (Moustakas & Robrade, 2022). These include dividing good practices into three categories which is course, trainee, and organization (Picciano & Jordan, 2017) as well as creating a sense of online learning community while supporting rapid advancement of technology (Sun & Chen, 2016).

In the Malaysian context, the proposal to implement an e-learning on a nationwide scale was initiated as part of the government's Economic Transformation Program (ETP). The ETP was launched in September 2010 to help elevate the country to the targeted developed-nation status as formulated in Vision 2020 (Selvaratnam, 2016). The Economic Transformation Programme (ETP) introduced the National Key Economic Area (NKEA), which includes targets specifying corporate companies as end users, representing a significant source of demand for e-learning tools and content. The number of corporate companies increased from 6.3 million in 2013 to 8.1 million in

2018 and is expected to reach 12 million by 2023 (Economic Planning Unit, 2018). Corporate companies seek e-learning solutions to lower the cost of their learning and development, and to provide a conducive hub for accessing, editing, and publishing e-learning content (Economic Planning Unit, 2018). They are value-conscious and willing to invest in quality e-learning content and tools, thus becoming a potent source of revenue for e-learning providers (Economic Planning Unit, 2018).

Due to the rapid pace of many societal and technological changes in recent times, companies have recognised the importance to invest in the knowledge and skills of their employees (Ra et al., 2019). After all, while increasing attention is being directed towards workplace and other forms of informal learning, most of the budget of Human Resource departments still goes to formal, instructor-led learning. In European region for example, most organisations spend an average of 1.6% of their labour costs (between 0.7% in Greece and 2.5% in France) on learning ((*General and Regional Statistics, EU Policies - Statistics Explained*, n.d.)). However, the 2017 State of the Industry report for the US stated that organisations spent an average of \$1273 per employee in 2016; in fact, this is the fourth year in a row that has seen an increase in direct learning expenditure which results in an investment of billions each year across the country (2017 State of the Industry Report | ATD, 2018). Despite criticism on formal learning, companies are still spending huge budgets on them.

At the same time, many practitioners and scholars have pointed towards the limited transfer of what has been taught in formal learning into actual daily practice in the workplace and have thereby acknowledged the ‘transfer problem’ (Mdhlalose, 2022). Prior studies indicated that only a limited amount of what has been learned is transferred to the workplace (Sarfraz et al., 2021). For example, the transfer problem very likely occurs if the learning situation differs significantly from the work situation. This effect is confirmed by several scientific studies, including meta-analyses (Saks et al., 2014). Moreover, the amount of transfer declines further as time progresses from the moment of learning.

In an earlier survey conducted by (Saks et al., 2014) indicated that on average, 38% of trainees reveal that they do not apply what they have learned in the learning to the workplace when asked immediately after learning; this rate rises to 56% after six months and 66% after one year. Also, according to (Saks et al., 2014), the transfer problem is even underestimated in his study due to a self-serving bias of the trainers’ judgments (Burke et al., 2018a). Moreover, only 50% of investments in learning

improve the situation of employees and the organisation (Saks et al., 2014). Consequently, many scholars have begun investigating how transfer occurs and how it can be fostered (Sarfraz et al., 2021).

1.3 E-learning Outlook in Malaysia

Malaysia's economy has been on an upward trajectory, averaging growth of 5.4% since 2010, and is expected to achieve its transition from an upper middle-income economy to a high-income economy by 2024 (Overview: Development News, Research, Data | World Bank, 2024). As Malaysia is widely known as one of the developing countries, effective corporate learning is essential for improving the workforce's knowledge and competency.

E-learning is identified to be one of the means for achieving such a goal. In the era of the Industrial Revolution 4.0, it is quite unfortunate if the employer including GLCs did not take advantage of the available technologies and communication platforms to implement E-learning. GLCs such as Tenaga Nasional Berhad and Telekom Malaysia (TM), government departments such as Road Transport Department, teachers from the Ministry of Education and executive bodies such as the Royal Malaysia Police may face certain challenges to conduct face-to-face courses due to several factors such as distance, cost, and commitment to operational duties (Al-Rahmi et al., 2018).

Although completing an e-learning course seems difficult, enrolling into physical learning session is also not an easy assignment. An example from a preliminary study among the Professional Driving Instructors (PDI's) in Malaysia, which the total number of PDI's in the entire country is almost 10,000, shows that they "faced difficulty to physically attend courses" due to time limitation (working on weekends), distance (centralize course and limited regional course), as well as financial issues (mostly middle- and low-income group; the majority are B40's) (Yahaya & Jawi, 2020). Thus, this group needs an e-learning options in order to make it easy for them to be trained or retrained and expand their licensing capacity (new/upgrading course). The good news is that many of them are possess a significant level of efficacy, i.e., 100 % owned smartphones and 97 % had internet data subscriptions (Yahaya & Jawi, 2020).

Therefore, it can be said that the workforce from GLCs potentially need e-learning as one of the solutions to their learning needs. It is the vision of the authors to explore and publish more on e-learning studies especially in the corporate level. Based

on the authors' background reading for the past three years, it is presumed that in the Malaysian context, most e-learning research deals with academic context and people. Regardless, the authors have primarily sought to understand what has been done beyond the academic sphere, especially pertaining to e-learning research in the corporate world. As for the world perspective, the United Nation Organization have outlined key agenda towards a sustainability which also includes the sustainability in terms of the corporate learning.

1.4 United Nation's Sustainable Development Goals (UNSDG)

The 2030 plan for Sustainable Development, which includes 17 agenda items, was developed by the United Nations through its General Assembly and released in September 2015. The agenda was created to provide all the member nations with a clear road map for attaining sustainable development. In academical perspective, the 2030 Agenda is a global plan of action for sustainable development, adopted by the United Nations in September 2015 (Westerman et al., 2021). This agenda tackles the widespread global challenges of climate change, social inequality, and environmental degradation through a global governance framework encompassing 17 Sustainable Development Goals (SDGs) with 167 targets. These include ending poverty and hunger, combating inequalities, building peaceful, just, and inclusive societies, protecting human rights, promoting gender equality, and ensuring the lasting protection of the planet and its natural resources (United Nations, 2015).

The Sustainable Development Goals were introduced by the UN and are organised in the following table:

Table 1.1
The Sustainable Development Goals

Goals	Description
Goal 1	Ending of poverty in all forms all over the world.
Goal 2	Eradication of hunger.
Goal 3	Ensuring good health and well-being for all people.
Goal 4	Ensuring quality education for all.
Goal 5	Promotion of gender equality.

Goals	Description
Goal 6	Provision of clean water and sanitation.
Goal 7	Ensuring affordable and clean energy.
Goal 8	Creating decent work and economic growth.
Goal 9	Building thriving Industries, Innovations, and Infrastructures.
Goal 10	Reduced Inequality to the barest minimum.
Goal 11	Building sustainable cities and communities.
Goal 12	Promoting responsible consumption and production.
Goal 13	Taking drastic action to combat climate change.
Goal 14	Judicious use of aquatic resources for sustainable development
Goal 15	Management of land resources, mineral resources, forest reserve, animals for sustainable development.
Goal 16	Establishing strong institutions for peace and justice.
Goal 17	Promoting partnerships for implementation and compliance for achieving sustainable development goals.

The Sustainable Development Goal number 4 is focused on high-quality education. This is predicated on the role that education plays in ensuring a prosperous future for everyone. Goal 4 of the Sustainable Development Agenda, according to (Sartore-Baldwin, 2021) aims to achieve inclusive and equitable quality education that fosters chances for lifelong learning for all people, regardless of sex, age, race, ethnicity, vulnerable populations, people with disabilities, or migrants. The objective covers education from early childhood through maturity and at all levels, including elementary, secondary, tertiary, technical, and vocational training.

In achieving these goals, it is essential to recognize the significant role that the private sector can play, alongside the governments of the UN member states. Acknowledging their contribution to productivity, inclusive economic growth and job creation, the agenda encourages businesses to apply their creativity and innovation to

solve sustainable development challenges (Westerman et al., 2021). Hence it is very welcoming by the organization that big companies such as Government Linked Companies in Malaysia pursue this agenda.

The implementation of new technologies in corporate training is the result of a focus on improving learning resources and facilities to make information access simpler or learning and development more engaging. Having said that, transformation depends on how information is saved, located, and shared; it makes sure that those information sources that were previously only available in printed form may now be accessed electronically. The training programs offered by business organizations today come in a variety of formats, including online learning, continuing education, and campus systems, as (Anyim, 2020) makes apparent. The researcher claims that in order to promote learning and development holistically, each of these program mandates that the Learning Management System (LMS) offer a variety of learning and information resources that are virtual, electronic, and analogue in character.

Given the recent introduction of the SDGs, there is a notable lack of empirical research on the private sector's engagement with the SDGs, particularly in the Malaysian context. Most of this research is related to nonfinancial corporate reporting, which is also an explicit objective of the agenda. The share of Multinational Companies mentioning the SDGs in the sustainability reports is still limited, while the nature of the SDGs disclosure appeared to be positively worded and symbolic rather than measurable and substantive (van der Waal & Thijssens, 2020). SDGs mentioning appeared also to be linked to institutional factors (van der Waal et al., 2021). SDG related disclosure is mainly focusing at “avoiding harm” topics, such as emission prevention (van Zanten & van Tulder, 2018).

As a result, prior literature cannot provide clarity on the extent to which companies really contribute to solving SDG challenges. In particular, the question of how Multinational Companies or Government Linked Companies in Malaysia help to solve sustainable development challenges across the broad range of SDGs has not been empirically researched. In this study, we suggest that the extent to which a GLC spends on innovation in e-learning regarding its learning and development approach.

1.5 Organisation for Economic Co-operation and Development (OECD)

An international organisation called the Organization for Economic Co-operation and Development (OECD) aims to create better policies for better lives (OECD, 2020). According to (OECD, 2020), its objective is to create policies that promote equality, opportunity, prosperity, and well-being for all. In order to better prepare for the world of the future, OECD rely on its 60 years of experience and knowledge. OECD provides global policies, trends, and conceptions for best practices throughout the world (Hajisoteriou & Neophytou, 2022). Although Malaysia is not part of the organization, there are frameworks and research conducted by OECD in Malaysia and presented a relevant study finding to improve learning and development specifically in Government Linked Companies in Malaysia.

The COVID-19 crisis has led to a substantial increase in online learning for adults. Much of the learning that initially took place in face-to-face classroom settings has transitioned online. Additionally, individuals are being encouraged to utilize the time made available by short time work schemes to pursue new learning opportunities. This situation serves as a significant test of the potential for online learning while also exposing its key limitations. These limitations include the necessity of having adequate digital skills, access to computer equipment and internet, the challenge of conducting traditional work-based learning online, and the difficulties faced by teachers accustomed to classroom instruction. To ensure no one is left behind, governments must continue to support all learners (Hajisoteriou & Neophytou, 2022).

The OECD reports that while some countries have developed new platforms for learning providers to share existing resources and support online provision, others have made use of already existing platforms.

- South Korea has promoted the use of its virtual learning platform, the Smart Learning Education Platform, allowing learning providers to upload their own course content alongside the 300 courses already available. This initiative is further bolstered by subsidies and quality assurance mechanisms.
- In France, the Minister of Labour, which is also in charge of vocational learning, has developed a platform to make resources available to

professionals in the sector to facilitate continuity in education (*Ministry of Labour, Full Employment and Integration*, n.d.) Several partners of the Ministry of Labour have volunteered to share educational learning content free of charge. Among the available resources, there are MOOCs offered by AFPA, a provider specializing in food professions such as cooking and pastry making, as well as access to CNED (National Centre for Distance Learning) materials for core technological subjects. To support trainers in distance education, the Ministry has published a list of technical solutions, including web conferencing tools, collaborative tools, server links, cloud storage, and other necessary tools to ensure continuity in education.

- In Germany, the Ministry of Education, Youth, and Sports in the Federal State of Baden-Württemberg is allowing selected providers to utilize their digital learning platform to facilitate online learning. Operated by a private company, this platform offers a central infrastructure for cooperative, adaptive, and skill-oriented teaching and learning (Digital Training Campus, 2023). It is not restricted to a single institution, meaning content can be shared across multiple institutions. The Ministry co-funds 50-70% of the platform's usage costs for providers. Eligible for this funding are learning providers that are part of the Alliance for Lifelong Learning and other recognized providers of general or vocational continuing education in Baden-Württemberg.

It can be concluded that e-learning is currently a subject that is being pursued by many developed nations. Hence, further research regarding e-learning is crucially needed to catalyse the Malaysian-borne Government Linked Companies to expedite their Learning and Development transformation towards E-learning effectively. Malaysian government on the other hand are expected to embrace OECD strategic vision by implementing a vigorous policy to adopt digitalisation.

1.6 Malaysia Digital Economy Blueprint

The COVID-19 pandemic posed severe challenges to the global economy, including Malaysia. This unprecedented event has impacted Malaysians across all ethnicities and social strata, affecting workers in both public and private sectors. Entire industries have experienced upheavals, and many of our daily interactions have shifted to virtual platforms.

Albeit, with the recent changes happening in Malaysian politic landscape, it is unclear whether policies such as Malaysia Digital Economy Blueprint. This, however, become crystal clear when the Prime Minister stated that the government will maintain the good policies of the previous administration (Basyir & Sallehuddin, 2022).

MyDIGITAL lays out the strategies to hasten Malaysia's advancement as a technologically advanced economy through the Malaysia Digital Economy Blueprint. This initiative will guide us in strategically positioning ourselves as a competitive force in the new era. MyDIGITAL is an essential component in realizing our Twelfth Malaysia Plan, 2021-2025 (RMKe-12), and in achieving the goals of Wawasan Kemakmuran Bersama 2030.

MyDIGITAL lays out the strategies to hasten Malaysia's advancement as a technologically advanced economy through the Malaysia Digital Economy Blueprint. This initiative will guide us in strategically positioning ourselves as a competitive force in the new era. MyDIGITAL is an essential component in realizing our Twelfth Malaysia Plan, 2021-2025 (RMKe-12), and in achieving the goals of Wawasan Kemakmuran Bersama 2030.

The digital economy is defined as economic activities that use digitised information and knowledge as key factors of production and connections among people, businesses, devices, data, and processes (Malaysia Digital Economy, 2021). Learning supply in Malaysia has undergone significant progress towards the national agenda of accelerating the adoption of digital foundations outlined in the Malaysia Digital Economy Blueprint 2020 (Malaysia Digital Economy, 2021). However, the significant growth can be proven effective if important stakeholders take into high consideration in looking at the results of this research.

1.7 Shared Prosperity Vision 2030

On October 5, 2019, Malaysia unveiled the draft of Wawasan Kemakmuran Bersama (WKB) 2030, also known as Shared Prosperity Vision (SPV) 2030. This initiative outlines the country's strategies for economic growth and equitable distribution, aiming to establish a new narrative of development and progress.

The primary aim of the Shared Prosperity Vision is to provide a decent standard of living to all Malaysians (Jidin et al., 2019). According to (Jidin et al., 2019), human capital transformation is an effort to enhance the workforce in Malaysia through programs focussed on professional learning and relearning. These efforts will be undertaken at every level, from school to work environment. Therefore, it serves as a concrete fact that transforming human capital is an important agenda in Shared Prosperity Vision 2030 and being placed in the new plan under the Strategic Thrust Number Three (3).

A knowledgeable, skilled, and innovative workforce is essential for the country's development. Recognizing the importance of human capital, the strategic thrust has been developed to enhance the workforce through programs focused on professional learning, talent development, and skills relearning.

The problem facing human capital development today is to close the knowledge, skill, and attitude gap between graduates and industry demands. In the labor sector, the disparity has also led to a mismatch between supply and demand. Additionally, the way that different public, commercial, and state skill development centers have implemented learning and skills has led to an uncoordinated national education and learning landscape.

The strategy's transformation of human capital will produce a workforce with higher levels of skill, which will boost national production. In order to satisfy market demands, emphasis will be placed on enhancing the quality of education and learning as well as bolstering cooperation between industry, professional associations, and learning providers.

By 2030, the growth vision maintains a long-standing focus on enhancing technology, skills, and value addition, while also addressing structural economic issues with renewed vigour. However, Malaysia's unique conditions necessitate a more comprehensive approach to sustainable growth, holistic development, and institutional reforms. The SPV prioritizes reducing income and wealth disparities across various

dimensions, especially among ethnic groups. This distributive approach to development is somewhat narrow, as it primarily focuses on income and wealth, overlooking many important and interrelated goals. It also lacks clarity on basic need provisions versus policies targeting Bumiputera and other ethnic groups. This pivotal moment presents an opportunity for Malaysia to craft a more innovative, systematic, and impactful vision—one that ensures a decent living for all, promotes fairness in distribution across multiple fronts, and enhances the nation's capabilities and participation.

The third strategic thrust of the Shared Prosperity Vision 2030 aims for 40% of HRD Corp trainings to focus on skills related to IR 4.0 by 2030. These skills include Big Data, Artificial Intelligence, Augmented Reality (AR), and Machine Learning. In May 2021, HRD Corp's internal database revealed that Safety and Health were the top skill area, with 18% of courses offered out of 35 skill areas (HRDC, 2020), driven by industry needs. The next highest skill areas were Quality & Productivity and Computer or Information Technology, with 8% and 7% of approved training courses, respectively. The most approved courses were Essential Skills of Developing Future Leaders (0.45%, 113 courses), Food Handler (0.38%, 96 courses), and Developing Data-Driven High Potential Employees (0.35%, 88 courses). Employers are encouraged to collaborate with associations and training providers to develop more meaningful modules related to IR 4.0, ensuring that all industry players can achieve the digitally driven workforce level required by the nation in the future.

However, it is among the highest hope of the people of Malaysia that the present government adopt this policy as it will bring a lot of benefits towards the GLCs in Malaysia especially in terms of the e-learning effectiveness within the organisation that can subsequently improve the overall organizational performance. If there is something else to be introduced, it should be more comprehensive and addressing the actual needs of the improvement of the businesses and organizations. Ibrahim A., (2023) emphasized that a new economic framework, The Madani Economy was introduced to replace the Shared Prosperity Vision 2030 (SPV 2030) as it has a comprehensive implementation framework and is in line with the current economic environment.

1.8 The Importance of E-learning Effectiveness in GLCs

E-learning have shown its importance in most business organizations today. According to (Boczkowska et al., 2018), e-learning can be a form of online education

constituting an element of the "distance learning" system expands the group of people who gain knowledge at a distance. This is important since nowadays, most GLCs are running in an international level, and it is almost possible to gather groups of people physically across regions and countries just to deliver an information.

Online educational programs are easily available and personalized, which is why they are gratified recognition in the learning environment (Boczkowska et al., 2018). Creating educational paths allows healthcare professionals to choose a field that is in their area of interest. The aim of the study was to analyse contemporary forms of professional improvement of emergency nurses and to indicate the needs of future education for this environment.

The elimination of in-person learning and development expenses like travel, accommodation, or meals is a significant benefit of e-learning. This is advantageous both monetarily and in terms of lost productivity, as learners must take time off from their regular activities and jobs to attend in-person classes.

E-learning courses are always available, practically everywhere, and can give learners across different time zones and geographically separated locations an effective and efficient way to learn. With the proliferation of networks, computers, laptops, and mobile learning, which makes learning convenient and on-the-go, such delivery enables a variety of compatibilities to enable the learning process using tablet/iPad, laptop, mobile phone at which can be used for downloading files or assessing video and webinar links, and so many more according to the setting allowed by the learning administrator.

To accommodate their personal work-life balance, learners can also pace their learning process, which will boost their success and level of satisfaction. In addition to captivating and engaging the learner, interactive content in a quality Learning Management System (LMS) or Massive Open Online Course (MOOC) can also deliver the learning material in a more thorough and succinct manner and can be tailored to accommodate different learning styles using various learning types of learning materials, discussions, videos, text, and other media.

1.9 Problem Statement

Today, e-learning is an important tool to be used as part of value creation. E-learning can provide flexible learning options for employees and allow them to up-skill

more at a faster pace (Ali & Khaleq, 2022). It is a vision of any organization where they can have an effective e-learning program that can boost the employee performance. It is thus, a continuous process within organization where they always improve the e-learning effectiveness. However, without having focused on improving the e-learning experience, organizations such as GLCs could be left behind easily as they will have problems during the transfer of knowledge in the organization.

E-learning has developed into a revolutionary way of learning in Malaysian organizations due to rapid growth in information technology infrastructure (Ramayah et al., 2012). In fact, Malaysia in 2025 is expected to achieve RM 70 billion investment in digitalisation (Market, 2021).

However, there are many issues regarding the implementation of e-learning in Malaysia especially with the rise of the global Covid-19 pandemic. Many grievances regarding the difficulties in e-learning was given spotlight in major newspapers. For examples: E-Learning in Malaysian GLCs: Challenges and Opportunities (The Star, 2019); How Malaysian GLCs Can Overcome the Challenges of E-Learning (The Edge Markets, 2020); E-Learning in Malaysian GLCs: A Reality Check (New Straits Times, 2021). These have obviously posed negative impression towards our nations capability in receiving the huge investment. This research is important in identifying the effectiveness of e-learning implemented and making sure our digital landscape particularly in e-learning implementation runs smoothly and effective especially in the corporate sector.

GLCs are the primary sources of government revenue in Malaysia, according to reports, GLCs employ 5% of the country's workforce (Menon, 2017). When GLCs are viewed as the primary source of government revenue and value creation, it becomes critical for GLCs to preserve their worth to contribute to the advancement of the Malaysian economy, which is in line with the government's objectives (Said et al., 2017). This includes their ability in knowledge transfer through e-learning.

This, however, can almost be true. Most GLCs in Malaysia have reportedly underperformed due to a lack of focus on improving e-learning experience (Lau & Tong, 2008). Some GLCs in Malaysia have long faced financial difficulties in the past. The government has been working to address these issues through various measures such as privatizing certain GLCs and implementing stricter financial and management controls and the effort is still on going until today (Isa & Lee, 2016). With the recent controversy involving 1 Malaysia Development Berhad, the performance of some

GLCs in handling sound business management is still an ongoing debate. When business decisions such as these are made for expressed diplomatic rather than economic reasons, this raises questions over financial soundness and, ultimately, national interest (Menon, 2017).

However, it is important to note that not all GLCs in Malaysia have faced financial difficulties, and many continue to operate successfully. Improving e-learning experience includes identifying the opportunities for development includes learning and development, implementing appropriate changes or assuring new development for optimal success, and analysing the overall steps so that the management will stay abreast with new changes, internally and externally (Ardestani et al., 2023).

Participation in E-learning platform will allow GLC employees to develop the skills that are most valued in the labour market (Lavrentieva et al., 2020). The study about e-learning effectiveness should always be conducted in tandem with the ease of use of the e-learning. According to (Wardana et al., 2022), the main factor influencing trainees' learning performance (users) depends on how easy it is to use or to access a site. With all the issues and the limited experience in an evolving technology, there is a pressing need to evaluate e-learning to increase knowledge of its influence and effectiveness on educational activities ((Elcullada Encarnacion et al., 2021). The shift of traditional learning methodologies has been rapidly happening in Malaysia. There were many factors that have contributed to this progress. According to (Ramayah et al., 2012), the advancement of information technologies has contributed to the exponential growth in corporate e-learning in recent years.

While some organizations perceived that traditional learning methodologies works better, many organizations convinced that throughout e-learning, they can gain similar results as to what traditional learning methodologies can bring. Moreover, Encarnacion et al. (2020) stated as well that whereas some studies have found a dominance of either classroom learning, or e-learning, other studies have confirmed no differences across the two learning settings. This may also be due to the cost-efficient and effective learning programs is one of the primary reasons for the increasing implementation of e-learning settings in companies (Kimiloglu et al., 2017). Therefore, it is safe to iterate that understanding the complexity of e-learning is vitally important if its usage rate have been tremendously increase over the past few years until today.

While the progress towards e-learning increases, problems towards it arise, too. It is not easy to measure the success of the methodologies. Even if we take a step back

in looking at traditional learning methodologies, estimating learning effects in terms of organizational results seems complicated for the trainees themselves (Yu-Fong Chang et al., 2021). The implementation of e-learning programmes can be associated with high investment costs. It can also cause continuing high operating costs for administration and information technology (Beinicke & Bipp, 2018), even though it was mentioned earlier by (H.Wang & Wang, 2018; Schuchmann & Seufert, 2015) that the benefits of e-learning have been widely discussed, including cost-effective, timely content, and access flexibility.

In addition to that, according to (Ramayah et al., 2012), employees who have low self-efficacy often find themselves having problems using the e-learning system, as they get minimal guidance from trainers compared to a face-to-face learning environment. Since self-efficacy determines how a person overcomes the problems they face and how they overcome obstacles as mentioned by (Titiek Murniati et al., 2022), it can be tested whether self-efficacy constitutes a significant relationship with e-learning effectiveness. This raises question about how leadership or e-leadership can take place to overcome this issue. To investigate content dimension, it is paramount to look at the system quality. Initially, system quality is the measure of the information system process and is said to affect user satisfaction (Kalankesh et al., 2020). The "service quality" measure was added as a new dimension to the IS success model, and the person and organisational effect measures were combined into one impact or benefit category dubbed "net benefit" in the updated ISS model (Merhi, 2020). This study will indicate a relation of contents of learning towards user satisfaction.

Organization dimension is crucial in determining the user satisfaction of an e-learning in GLCs. If the management implement various recognition programs, it can contribute to the user satisfaction of the e-learning program. This is supported by (Sri et al., n.d.), when the organization align their performance management procedures and incentive programs with their employees' initiatives in using the e-learning system effectively and applying the skills acquired in work, employees will have higher satisfaction in using the e-learning system. GLCs also can assist their employees by providing real time assistance during the process of e-learning take places (Disastra & Wahyuningtyas, 2020). On top of all the issues mentioned, this study will investigate how e-leadership will contribute to course, trainee, and organization dimensions towards the improvement of user satisfaction and respectively towards e-learning effectiveness.

Therefore, this study seeks to investigate course, trainee and organization and its effectiveness with the moderating effect of e-leadership towards user satisfaction and e-learning effectiveness respectively. This effort is parallel to the recommendation made by (Elcullada Encarnacion et al., 2021) as there is a need for the organization to ensure that the factors of e-learning effectiveness are delivered adequately, and the utilization of e-learning must be evaluated regularly.

1.10 Research Gaps

This study has its knowledge gap. According to (Müller-Bloch & Kranz, 2015), a knowledge gaps happens when a desired research findings do not exist. Over the past 20 years, e-learning effectiveness has not yet been included as a variable in any of the available studies that relates to corporate, and Government Linked Companies' e-learning activity. Although the findings from the past 20 years related to e-learning and e-learning effectiveness in Malaysia are presented in Appendix 2, they do not show any research specifically about Government Linked Companies (GLCs). This absence of empirical evidence within a key segment of the Malaysian workforce underscores the need for the present study, which aims to address this gap by examining e-learning effectiveness in GLC environments.

This study will focus on course, trainee and organizational dimension which are part of the e-learning ecosystem. According to (Ramayah et al., 2012), these three elements are important in within e-learning ecosystem that measures the e-learning effectiveness in organization. Cheriyan (2018) identified five crucial success elements in e-learning ecosystem, including technological support, educational resources, support and training, and the characteristics of the students and teachers. According to Ahmad et al. (2018), in order to improve user satisfaction in e-learning implementation, it was necessary to focus on a number of factors, including organisational readiness in terms of infrastructure, course flexibility, relevance of modules and their contents in an organised manner, security, and user friendliness. This research also is to enhance the exploration of previous research that has limitation regarding e-learning in Malaysia. Ramayah et al., (2012) iterated that study about e-learning effectiveness in Malaysia are only limited to the sample from the Multinational Companies from Northern Region of Malaysia.

1.11 Research Objectives

1. To investigate relationships of course (ease of use, content of training), trainee (self-efficacy, motivation to learn) and organization (management support, organization support) dimension towards user satisfaction.
2. To investigate relationships between user satisfaction and e-learning effectiveness.
3. To investigate relationships of course (ease of use, content of training), trainee (self-efficacy, motivation to learn) and organization (management support, organization support) dimension towards e-learning effectiveness.
4. To investigate the moderating effect of e-leadership between user satisfaction towards e-learning effectiveness.

1.12 Research Questions

1. What is the relationship between course, trainee and organization dimension towards user satisfaction?
2. What is the relationship between user satisfaction and e-learning effectiveness?
3. What is the relationship between course, trainee and organization dimension towards e-learning effectiveness?
4. What is the moderating effect of e-leadership between user satisfaction and e-learning effectiveness?

1.13 Definition of Terms

The definitions of terms are as below.

1.13.1 E-learning Ecosystem

The concept of an e-learning ecosystem refers to a well-structured and interconnected framework that brings together a variety of elements essential for the successful delivery of online education. Rather than being simply a collection of isolated technologies, this ecosystem represents a dynamic and integrated network of hardware, software, and communication tools. These components work together in synergy to create an environment that enhances and supports e-learning initiatives within organizations. The effectiveness of this ecosystem lies in its ability to seamlessly merge these technologies, ensuring that online education is both accessible and effective for learners and educators alike (Djajasinga, 2022).

1.13.2 E-learning Effectiveness

E-learning effectiveness encompasses the extent to which e-learning initiatives meet their intended educational goals, such as enhancing learners' knowledge, skills, and attitudes. According to Noesgaard and Ørngreen (2015), the effectiveness of e-learning is often assessed through learning outcomes, which serve as the most common parameter in related research. Several factors contribute to e-learning effectiveness, including the flexibility of the course, the relevancy of its modules, the logical order of the content, the security of the platform, and its user-friendliness (Noesgaard & Ørngreen, 2015). Furthermore, interactions between the e-learning solution and its users play a crucial role in determining its success. For example, learners who actively engage with the platform tend to have better outcomes.

Research by Wang et al. (2021) highlights additional factors that influence e-learning effectiveness, particularly in the context of the COVID-19 pandemic. These include e-learning self-efficacy (a learner's belief in their ability to succeed in an e-learning environment), motivation, and the strategies employed to navigate and engage with the e-learning content. Their study found that these factors significantly impact the effectiveness of e-learning, emphasizing the importance of supporting learners' confidence and motivation (Wang, Zhang, & Chen, 2021).

To summarize, e-learning effectiveness is a multifaceted concept influenced by various factors such as course design, platform usability, learner engagement, and

individual learner characteristics. Understanding and optimizing these factors can enhance the overall success of e-learning initiatives.

1.13.3 User Satisfaction

User satisfaction in e-learning environments is a multifaceted construct influenced by three primary components: information satisfaction, system satisfaction, and support satisfaction, as identified by Ramadiani et al. (2017). Information satisfaction pertains to the relevance and quality of the content provided, ensuring that learners find the material useful and applicable to their needs. System satisfaction refers to the effectiveness and reliability of the technological platforms used for e-learning, including ease of navigation and accessibility of resources. Lastly, support satisfaction encompasses the assistance provided by instructors or facilitators, which is crucial for fostering a supportive learning environment. Together, these elements contribute to overall user satisfaction, impacting learners' engagement and motivation, ultimately enhancing their educational experience and knowledge acquisition in e-learning settings.

1.13.4 E-leadership

E-leadership is a leadership approach that utilizes technology to enhance communication and interaction within electronic networks, significantly impacting how leaders engage with their teams and stakeholders. According to Putriastuti and Stasi (2019), this approach is particularly relevant in today's digital landscape, where effective leadership often hinges on the ability to navigate and leverage various technological platforms. Furthermore, E-leadership encompasses more than just managing virtual teams; it influences the overall functioning of organizations by fostering clear communication and trust among team members. This is essential in a world increasingly reliant on digital interactions, as effective e-leaders can bridge gaps created by geographical distances and promote collaboration across diverse groups (Elyousfi et al., 2021).

1.13.5 Government Linked Companies

Government Linked Companies or GLCs, also known as state-owned enterprises (SOEs), are entities that participate in the economy while being partially or wholly owned by the government (Kenton, 2020). In addition, GLCs are often characterized as hybrid organizations because they must balance profit-making with fulfilling their social responsibilities. This dual mandate is particularly evident in countries like Malaysia, where GLCs were initially government entities that underwent privatization during the 1980s. The Malaysian government retains substantial ownership in these companies through Government-Linked Investment Companies (GLICs), which include major entities such as Khazanah Nasional and Bank Negara Malaysia (Mat Isa et al., 2020).

1.14 Significance of Research

This section discusses the significance of this research which is divided into four sub-sections which are to business managers, business organizations, Malaysia, and rest of the world, and to the body of knowledge.

1.14.1 To Business Managers

The results of this study provide a clear path for business managers to develop comprehensive e-learning modules by considering the findings. By identifying the issues that hinder e-learning effectiveness, business managers can take necessary actions to improve e-learning initiatives immediately. Developing effective e-learning modules is crucial from a learning perspective. Kanapathipillai (2021) highlights that e-learning significantly impacts job satisfaction and organizational performance. According to Noesgaard and Ørngreen (2015), and Wang, Zhang, and Chen (2021), various factors influence e-learning effectiveness, including course flexibility, module relevancy, content order, security, and user-friendliness. Additionally, Gamage, Fernando, and Perera (2023) emphasize the importance of understanding learners' perspectives to ensure effective e-learning. Recent research underscores the need for a

systematic approach to developing e-learning modules to maximize their effectiveness (Wentao, Yu, Liu, Pan, & Pang, 2023).

1.14.2 To Business Organization

The outcome of this research is expected to provide insight on how business organizations can manoeuvre their e-learning effectiveness especially to the GLCs. Over the past few years, the government have injected millions of Ringgit Malaysia of taxpayer money into the GLCs. Whilst e-learning plays critical role as a development tool of the human capital in the organizations, it is crucial to improve the e-learning effectiveness to ensure the investment worth in every aspect. According to Cavus et al. (2024) stated that, e-learning increases successful organizational results through enhanced employee education and learning.

1.14.3 To Learning and Development Researchers and Practitioners

Over the years, growing countries have faced a looming challenge in deciding their e-learning direction. Catering the skills and credential needed for the workers would require substantial thought on planning on change in the coming decades. This effort is highly crucial in making lasting investments in creating a labour force that can tackle the industry of the future. While it is not possible for the government to reimagine the e-learning direction in Malaysia, the improvement can be made by considering the result and recommendations from this study. Support from government to guarantee learning continuity through e-learning was provided in several countries and took various forms (OECD, 2020). According to (Ng & Mei, 2019), a study about e-learning can contribute to the government such as Ministry of Innovation that would be keen to know more about digital economy and optimal use of e-learning. It helps the government to realise the use of e-learning of the GLC in Malaysia and know how and where to improve or strengthen the usability.

1.14.4 Body of Knowledge

This research directly contributed to the researchers' body of knowledge on examining e-learning ecosystem towards e-learning effectiveness. While there were many types of research associated with e-learning effectiveness, the combinations between the variables of interest in this study are still scarce. In addition, several variables are being tested in this research such e-leadership as moderating variables and user satisfaction as mediating variables also are expected to bring a practical and useful results that can add to the body of knowledge. Ramayah et al., (2012) iterated that the study about e-learning effectiveness in Malaysia are only limited to the sample from the Multinational Companies from Northern Region of Malaysia. (Roman et al., 2019) provides a wide range of research results about e-leadership including e-communication, e-social, e-change, e-team, e-tech, and e-trust. The implementation of e-leadership in improving e-learning effectiveness will deliver a feasible result to the body of knowledge.

CHAPTER 2

LITERATURE REVIEW

2.1 Preamble

This chapter discusses the literature review of this research which encompassed of an extensive literature review of course, trainee, and organization dimension, user satisfaction, e-leadership, underpinning theories, conceptual framework, and research hypotheses.

2.2 Learning

Learning is said to be one of the important aspects in the changing technology and market (Haleem et al., 2022). The corporate industry is undergoing a period of extraordinary transformation with unparalleled opportunity which has left in the involvement of more complex work forces which emphasise the importance of learning (Laszlo et al, 2020). The evolving business environment, demanding around-the-clock work schedules, and high expectations from various stakeholders make scheduling learning sessions challenging. Corporate industry employees engage directly with customers, who can provide immediate feedback, whether in the form of compliments or complaints.

According to Saleh et al. (2022), 93% of participants indicated that the learning programs improved their skills, knowledge, and behaviour. According to Arulsamy et al. (2023), studies has shown that to ensure a good workforce is to provide appropriate education and learning, and the present time needs people to learn new knowledge and skills efficiently and effectively. Human learning can occur as part of learning, and personal development to get sufficient knowledge and skills to perform the job (De Felice et al. 2022). The huge incorporation of knowledge in any business activity has gone with a widespread increase in the great need for continuous professional learning (Saleh et al. 2022).

Learning is envisaged as a significant predictor of job satisfaction and organizational performance by many scholars (Kanapathipillai & Azam, 2020; Samwel, 2018; Gobal et al. 2018; Daniel, 2018; Olalere & Adesoji, 2013; Anwar & Shukur,

2015; Chandio & Chandio, 2019). Learning is a vital factor that helps to enhance an organisation's performance as well as it promotes the index of stability of a business (Devi et al. 2018). Contrarily, Basten and Haamann (2019), have discovered in their research that learning is unlikely to create positive changes in job satisfaction or organizational performance. These contradicting findings creates a gap in the literature which needs to be further addressed.

An organisation can realise its full potential when employees achieve job satisfaction, and the organisation attains its desired performance levels. To reach the optimum level of job satisfaction and organisational performance, the organisation must instil effective learning practices, as clarified by Garavan et al. (2021), Kanapathipillai and Azam (2020), Kapur (2018), Rodriguez and Walters (2017), Salah (2016), Mozael (2015), Kum et al. (2014), and Maimuna and Fard (2013). Moreover, many researchers have recognised that learning is a key component of organisational performance and the success of its executives (Kanapathipillai, 2021).

Learning refers to the methods premeditated to repetitively generate wisdom, talents and proficiencies as well as develop logics for the organisation (Huang, 2019). According to research scholars, (Frost, 2019), learning is a learning activity to attain value, knowhow and intelligence that is requisite to realise organisational tasks. Besides, Garavan et al. (2021) remarks that learning drives greater performance as well as augments the well-being of the organisations' employees. Additionally, Rezaei et al., 2021, cite that, learning is the involvement of all in the organisation that is appropriately planned to yield higher organisational performance. Realizing the importance of learning in organizations, it is important for GLCs to uptake the initiative of learning to ensure successful growth of the organization.

To sum up, learning improves the efficiency of everyone in the organisation and ultimately produces organisational performance (Garavan et al., 2021). Contrarily, there are findings that indicate that when learning is provided in an organisation, time is just exhausted. The outcome is an adverse effect whereby the employees undergo great stress and struggle after the completion of the learning (Woo, 2023). To further support these findings, Rezaei et al. (2021), have also discovered in their research that learning is unlikely to create positive changes in job satisfaction or organizational performance. This belief is contradicted by Samwel (2018) who clarified that employee could increase their intelligence, adeptness and aptitude through learning programs that are well designed. Moreover, the learning programs impart knowledge that could be shared

by all trainees' which would lead to job satisfaction (Gobal et al., 2018) and ultimately enhance organisational performance (Karim et al., 2019). Therefore, the need for learning programs in the corporate industry is to create a shift in the employees' satisfaction (Sri Dhurgah et al., 2018; Huang, 2019).

According to Varshney (2019) learning programs conducted in the corporate industry not only generates awareness of the employees' visions but also produce an appreciation towards the company's efforts to achieve high standards of performance. Moreover, learning programs that are well thought out also breed positive thinking and incites employees to introduce changes to conquer the difficulties faced in the volatile business environment (Karim et al., 2019).

2.3 E-learning

A component of learning, learning, and development in businesses brought about by the ongoing proliferation of ICT is e-learning. It provides us with a great deal of flexibility in terms of when and where the learning material may be delivered. E-learning or technology enhanced learning describes the use of technology to support and enhance learning practice (Valverde-Berrocoso et al., 2022). There are lots of definitions of e- learning that is evolving as an instructional learning experience which is delivered and enabled by the internet technology in turn enhances the employee's knowledge and performance (Giannakos et al., 2021).

The future of learning environment based on e- learning that focus on both the individual requirements of learners and the content delivered (Laszlo et al., 2020). E-learning can really reduce the time learner spend on learning which allows them to access a great spectrum of different materials with their own individual competences without the time limitations (Rawashdeh, 2021). Finally, to connect the worlds institutions and hotels E-learning is one of the best tools that can be considered as best and easy way to grab the knowledge (Schulz, 2023).

As per the study of Basak et al. (2018), e- learning is a real- time or self-paced which is known as "synchronous" or "asynchronous" learning that is presented in formal and structured manner. Basak et al. (2018) states that e- learning is the use of knowledge that is distributed and facilitated by electronic means of web based, multimedia CD-ROMs, websites, discussion boards, collaborative software, emails, blogs, wikis, test chat, simulation games and educational animation. It is to define any dissemination of educational knowledge over the internet which is the subset of technology – based

learning. At last, Shute and Towle (2018) identified that adapting to an e-learning to a system is always a best approach for its users. In any ways e learning can be taken as an innovative method of learning.

To sum up, Encarnacion et al. (2021) said in his research that it is well known that e-learning offers a teaching capability that is accessible at any time and in any location, along with an effective method of imparting knowledge and skills. By using these methods, learners can have full access and autonomy and gain a comprehensive understanding of the learning environment.

2.4 E-learning ecosystem

According to Dritsas and Trigka (2025), the management should improve the e-learning systems' quality by responding more quickly, making them easier to use, improving their accessibility, and increasing their flexibility and dependability. Studies on the quality of e-learning systems have revealed some intriguing facts, such as Farid et al. (2018), who state that it appears that ongoing assessments of the dynamic usability of the Learning Management System (LMS), including effectiveness, learnability, flexibility, and user attitude, are carried out in order to prevent technological emotional weaknesses.

The ability to be flexible and adapt to changing circumstances is known as adaptability. Usability is a quality criterion that evaluates the ease of use of user interfaces. The term, usability, also describes techniques for enhancing usability in the design phase. As far as tracking and storage of learners' activities is concerned, Samyan and Flour (2021) described that all services and people who are involved in the e-training process can be visualized and managed through the web browser by showing real- time data and visual infrastructure that includes performance, configuration, storage, alarms & access permissions. It also offers more material to wider people and e- learners in a bigger context that can explore and reach more learners beyond traditional classroom.

According to Mostefai et al. (2025), when the right hardware and software are integrated, training activities can be supported by testing the technology's viability and implementation, prototyping, welcoming trainers' and e-learning's ideas, the design process, and opportunities with users and learners. This makes development easier to manage. One of the most important measures of quality is the assessment of the e-training. Garg and Sharma (2020) noted that the Taiwan E-Training Quality

Certification Center's 2007 courseware, or e-training materials, may be designed and developed using the framework for assessing product quality. Users and developers of e-training are aware of how to measure and promote actual quality.

To assess and verify the quality of the company's services and courseware certifications, the American Society of Training and Development (ASTD) created the e-Training Courseware Certification (ECC). Based on the studies of Alsalamah and Callinan (2021), measuring the effectiveness of e-learning within the organizations can be done by using the tool of four levels of Kirkpatrick's evaluation model by understanding reaction, what they thought and felt about the learning, by learning the result increase in knowledge or capability, extent of behaviour and capability improvement by implementation/application and finally identify the results that effects on the business or environment resulting from the trainee's performance and self-learning.

The first step of developing e-learning process considers the diagnosis of the available content. According to Dedehayir et al. (2018) the construction of the ecosystem begins with a diagnosis of the available content as regards physical resources (e.g., tools) knowledge (know-how), human resources and financial resources throughout the academic year. Hence, this shows the importance of content dimension inside the e-learning ecosystem.

An effective e-learning ecosystem is crucial for employees' skill development. However, managers are encouraged to adopt frameworks established by various researchers. According to Asadullah et al. (2020), while South Asia may have lagged in educational attainment, especially in skills development, it does not need to reinvent the wheel. Instead, it can leverage existing best practices to develop a robust skills development ecosystem.

The adoption process of e-learning ecosystem is, however, should be a thoughtful process. Some organizations may adopt an incomplete element inside the mentioned ecosystem. Bhowmick S. and Sorathia K. (2019) mentioned that prior studies in investigating challenges in current training ecosystem indicate the absence of many elements such as regular refresher training, overemphasis on their 'incentive-based' rather than 'activist' role, limited availability of training content and materials and the lack of skilled trainers and insufficient funds. This is further amplified by challenges such as ineffective and non-engaging training methods.

E-learning ecosystem is widely being discussed by scholars for 15 years ago. According to Van De Heyde and Siebrits (2019), learning ecosystem consists of the stakeholders incorporating the whole chain of the learning process and the learning utilities, the learning environment, within specific boundaries. While according to Alsharhan (2021), the commonly known e-learning definition usually describes the activities of conducting learning using information and communication technologies.

An ecosystem is a community of organisms together with their physical environment (Yu et al., 2021). Moreover, Nguyen and Tuamsuk (2022) have emphasized that an ecosystem is an interaction between interest group, learning portals, ICT infrastructure and other learning process. While there are many researchers incorporated ecosystem with living organisms, many researchers also have incorporated ecosystem with an interaction between important elements in a particular environment. This definition emphasises the components of the ecosystem at which the organisms that form the community and their environment.

Pham et al. (2019) observed that instructor & course material quality, quality of administrative support and e-learning system quality are the three basic constructs of e-learning service quality associated with students' satisfaction. This positively influences e-learning students' loyalty. Today's students are customers of educational institutions and universities. Thus, organization must provide the best e-learning service quality to their students. Zhang (2020) identified three critical components of e-learning ecosystem namely principles and methods, processes and systems and substance and contents including certain barriers such as lack of technical understanding and insufficiency of learning management system.

Cheriyen (2018) observed five critical success factors of e-learning system as technical support, learning resources, support and learning and student and instructors' characteristics. Ahmad et al. (2018) suggested that certain parameters were required to be focused such as organizational readiness in terms of infrastructure, course flexibility, relevancy of modules and its contents in organized manner, security and user friendliness to enhance the user performance. Still the process needs to be comprehensive and effectively planned, executed, and maintained. Learning environment and infrastructure, competency of educator, delivery of course contents were identified as factors to be considered to implement e-learning successfully (Zhang, 2020).

From the earlier definition of learning, e-learning, and ecosystem, it is best suggested that e-learning ecosystem is a combination of e-learning components that makes e-learning activity successful. Shukla and Nagar (2020) explained that e-learning ecosystem consists of teaching-learning community, contents, teaching element and learning resources management. Pham et al. (2019) observed that instructor & course material quality, quality of administrative support and e-learning system quality are the three basic constructs of e-learning service quality associated with user satisfaction.

Earlier, Sridharan et al. (2010) identified three critical components of e-learning ecosystem namely principles and methods, processes and systems and substance and contents including certain barriers such as lack of technical understanding and insufficiency of learning management system. However, Cheriyan (2018) observed five critical success factors of e-learning system as technical support, learning resources, support and learning and student and instructors' characteristics.

Ahmad et al. (2018) suggested that certain parameters were required to be focused such as organizational readiness in terms of infrastructure, course flexibility, relevancy of modules and its contents in organized manner, security, and user friendliness to enhance the user performance. Course, trainee, and organisation dimensions were identified as factors to be considered to implement e-learning successfully (Almaiah & Alyoussef, 2019). Hence, this research is important to enhance the finding of e-learning ecosystem that consist of course, trainee and organization and its effect towards e-learning effectiveness.

2.4.1 Course Dimension

Course dimension is defined as a collection of teaching and learning materials related to the goals and objectives of the learning given to the trainees (Vladimir Kukharensko et al., 2022). Most researchers around learning effectiveness insisted that relevance of learning contents is important for measuring the effectiveness of learning program. Notably, content relevance is importance for ensuring the learning materials are closely relevant to the transfer task and skills or knowledge to be learned (Alias et al., 2019).

The resources through which students access content—primarily assignments—are referred to as the course component of e-learning. Individuals engage in task interactions that are based on e-learning content. According to Al-Rahmi et al. (2018), these assignments are essential for end-user computing environments such as e-learning. It is important that students focus on the content rather than the delivery method (Kukhareno et al., 2022). Other studies have also highlighted that features such as accessibility and interactivity can be enhanced in e-learning courses through the use of technology (Al-Rahmi et al., 2018).

2.4.1.1 Ease of Use

Ease of use significantly and positively affects user satisfaction. In other words, the easier a system is to use, the more satisfied users are with it; conversely, the more difficult it is to use, the less satisfied they become. Previous studies have shown that user satisfaction is influenced by usability. Perceived ease of use is defined as the degree to which an individual believes that using a particular system would be free from physical and mental effort (Henderson & Divett, 2003). Moreover, Li and Yu (2019) found that perceived ease of use is a significant predictor of e-learning continuance intention. Perceived ease of use or perceived convenience also influences user behaviour, leading to satisfaction when the experience aligns with users' expectations (Raihan, 2023). According to Kukhareno et al. (2022), the main factor influencing trainees' learning performance depends on how easy it is to use or access a system. Similarly, Suzila Mat Salleh et al. (2022) reported a positive relationship between ease of use and user satisfaction. In addition, Amalia and Fahrudi (2021) highlighted a strong correlation between user satisfaction and perceived ease of use. Employees can obtain the information they need quickly and easily through systems that provide intuitive navigation, clear online help menus, and detailed instructions. This ease of use enhances their satisfaction with the e-learning system, increases their intention to continue using it, and ultimately improves net benefits.

2.4.1.2 Contents of Learning

Learning content is defined as a collection of teaching and learning materials related to the goals and objectives of the learning given to the trainees (Zulkifly, 2022).

Most researchers around learning effectiveness insisted that relevance of learning contents is important for measuring the effectiveness of learning program. Notably, content relevance is importance for ensuring the learning materials are closely relevant to the transfer task and skills or knowledge to be learned (Alias et al., 2019; Vladimir Kukhareenko et al. (2022) document look. Based on validity of the learning contents, Zulkifly (2022) stated that learning effectiveness is influenced by the capability of trainees to learn learning modules, topics and contents and then apply the learned skills and knowledge in their jobs. Empirically, learning content and learning effectiveness were found to have significantly.

Based on validity of the learning contents, Zulkifly (2022) stated that learning effectiveness is influenced by the capability of trainees to learn learning modules, topics and contents and then apply the learned skills and knowledge in their jobs. Empirically, learning content and learning effectiveness were found to have significantly. A core tool of any e-learning is the ability to deliver content in a variety of formats. This can consist of delivering lecture support notes presentation files images or even audio or video material as well as interactive animations (Radianti et al., 2020). Delivering lecture support notes can be a useful aid for teaching and learning. Further using electronic whiteboards, students can compose materials interactively in a synchronous way where everyone sees the work from their own computer and is able to contribute. Again, an advantage of this is that you can work with the students, without having to be located physically in the same place. In addition to the type of electronic whiteboard facility available as a e-learning tool, there is also another type, which is a classroom audio-visual aid.

Widyaningrum et al. (2024) suggested that system quality reflects the effectiveness of an information processing system, as indicated by the accuracy and efficiency of the information it produces. In their model for information system (IS) success, system quality serves as a key determinant. User satisfaction is also influenced by system quality, which measures the performance of an information system process (Jeyaraj, 2020). In the IS success model, perceived usability is often used as a substitute for system quality (Radianti et al., 2020). Perceived complexity (ease of use) has a significant impact on users' intention to engage in web-based activities, as shown in a study by Gunesequera et al. (2019), which explored factors influencing customers' decisions to participate in web-based commerce. Furthermore, Improta et al. (2021) reported a positive relationship between learning content and user satisfaction.

Similarly, Suzila Mat Salleh et al. (2022) found a significant relationship between the content of learning and user satisfaction. These discussions form the basis for the hypotheses presented below.

H1a: There is no significant relationship between course and user satisfaction.

2.4.2 Trainee Dimension

A learner's trait or attribute that can impact their learning experience is referred to as a trainee dimension in e-learning. In this e-learning context, some illustrations of trainee dimensions include computer self-efficacy. According to X. Li et al. (2024) computer self-efficacy refers to a learner's ability to navigate and use the technology platform used for e-learning. This includes both the technical skills required to operate the platform, as well as the ability to find and access the learning materials within the platform.

A learner's level of motivation to engage with the e-learning course can also affect how much effort they are willing to put into the learning process. This eventually will affect the e-learning effectiveness. In the context of e-learning, motivation refers to a learner's level of interest and engagement in the e-learning process. A motivated learner is more likely to put in effort to engage with the e-learning materials, participate in online discussions, and complete assignments (Fryer & Bovee, 2016). Also, recent study by (Burrell & Lee, 2019) mentioned that there is a significant relationship between trainee and user satisfaction.

2.4.2.1 Computer Self-Efficacy

According to Chen (2017), computer self-efficacy refers to an individual's belief in their ability to perform specific computer-related tasks. Individuals with a high level of computer self-efficacy are more likely to engage in computer tasks and demonstrate persistence in completing them despite difficulties (Malik et al., 2015). Furthermore, studies have shown that trainees' learning performance improves with higher levels of computer self-efficacy in the context of online learning. In e-learning environments, computer self-efficacy plays a significant role. Because employees receive less direct guidance from trainers than they would in face-to-face learning settings, those with low self-efficacy often experience difficulties using e-learning systems. Shiau et al. (2020) concluded that there is a significant relationship between computer self-efficacy and

user satisfaction. Therefore, employees with higher computer self-efficacy are believed to experience greater satisfaction with e-learning systems.

2.4.2.2 Motivation to Learn

Learner motivation is a crucial factor in e-learning success. Motivation can be defined as the learner's desire to engage with course content, characterized by enthusiasm for learning and persistence in overcoming difficulties. Recent studies have consistently shown that motivation significantly influences learner satisfaction in online environments. For instance, Asmah and Idayani (2022) found that learners with higher motivation reported more positive perceptions of online learning. Similarly, Chua and Ling (2022) demonstrated that motivation, including goal orientation and self-efficacy, significantly predicts learning satisfaction in synchronous hybrid learning spaces. Baherimoghadam et al. (2021) also reported that dental students with higher self-efficacy and motivation experienced greater satisfaction with e-learning. Furthermore, a systematic review by Aznam et al. (2022) confirmed that motivation is positively associated with learner satisfaction across diverse online learning contexts. In summary, learners who exhibit higher motivation to learn are more likely to engage deeply with e-learning materials and to experience higher satisfaction with the overall learning process.

H2b: Trainee is positively related to user satisfaction.

2.4.3 Organisation Dimension

A widely recognized definition about organization that has been developed and refined over time through the collective understanding and research of scholars and practitioners in various fields, such as management, sociology, psychology, and political science said that an organisation is a group of people who work together in a structured manner to fulfil a need or achieve a common objective. It is a group of people working together to achieve a common goal that exists in both the public and private sectors (Brent, 2020). Organizations can be formal, like a business or government body, or informal, like a social club or volunteer group. An organization's success and capacity to accomplish its objectives are significantly influenced by its structure, culture, values, and practises. According to previous research, organization support were significant

predictors of user satisfaction. However, more research is needed to identify the roles of e-leadership in e-learning.

According to Yousif (2022), organisational climate aspects such as leadership support and resource allocation significantly affect individuals' engagement and performance in learning environments. Management support—including senior-leadership encouragement, allocation of resources, and facilitation of instructional development—is widely regarded as a key dimension of a learning-oriented organisational climate. For example, Rahmadani et al. (2022) found that a growth-oriented climate moderated the relationship between work engagement and job outcomes, illustrating how employees' outcomes are enhanced when the organisational climate emphasises learning and support. Clearly, when managers consistently emphasise lifelong learning and tie tangible rewards to staff who actively engage in e-learning, both employee satisfaction and learning effectiveness are likely to increase.

2.4.3.1 Management Support

Management support is described as managers' attitudes, behaviours, and actions that encourage employees to apply knowledge, skills, and attitudes learned in their actual jobs (Blume et al., 2024). Recent studies have identified managerial support as one of the critical workplace environmental factors that facilitate learning transfer and continuous skill application (Hugo-van Dyk, 2023; Rahmadani et al., 2022). According to Tafvelin (2021), the work environment encompasses elements such as managerial support, peer collaboration, resource availability, and organizational learning culture—all of which influence how employees integrate learning into practice. Similarly, Blume et al. (2024) emphasize that supportive leadership and learning-focused climates significantly enhance the motivation and ability of employees to apply new knowledge. Ultimately, when managers actively promote lifelong learning, provide resources, and link rewards to learning initiatives, employees exhibit higher satisfaction and learning effectiveness in e-learning environments (Rahmadani et al., 2022; Tafvelin, 2021).

According to Hugo-van Dyk (2023), external factors such as organisational characteristics have significant effects on individuals' intentions to use technology systems—particularly through the presence or absence of necessary skills, opportunities, and resources. Management support is perceived as an important

dimension in a learning-oriented organisational climate; it encompasses top-management encouragement, allocation of resources, and instructional development assistance (Rahmadani et al., 2022). Recent empirical research by Nicolas Nirwanto and Andarwati (2019) found that top-management support significantly influences user satisfaction with technology systems through perceived usefulness and system quality. Clearly, when managers consistently emphasise lifelong learning and link specific rewards to the initiatives of staff members who actively engage in e-learning, employee satisfaction and learning effectiveness are likely to increase.

2.4.3.2 Organization support

Previous research has demonstrated that an organization's learning climate is instrumental in preparing individuals for formal development activities and achieving desired learning objectives (Polo et al., 2018). Lim et al. (2007) found that in an e-learning environment, maintaining a consistent learning environment is not significant with transfer performance, but rather with learning performance. The learning performance of trainees will be higher when the organization's culture fosters creativity and recognizes and rewards their efforts to better themselves. Employees will be more satisfied with the e-learning system when the company aligns its performance management practices and reward programs with their efforts to use it effectively and apply the skills they have learned in the workplace. (Ohliati & Abbas, 2019) in their study found that when the organization support is at the highest service quality, it will give a significant positive impact towards students' satisfaction. Henceforth, the relationship between organizational support and user satisfaction is equally important in the e-learning environment.

H2b: Organization is positively related to user satisfaction.

2.5 User Satisfaction

User satisfaction is a well-established concept in fields such as human-computer interaction, software engineering, and marketing. Many researchers have proposed models and frameworks for measuring and understanding user satisfaction and have conducted studies to investigate the factors that influence it. Nielsen, (2018) opines that usability, or the ease of use of a product or service, is a key factor in determining user

satisfaction. The study has also found that users tend to be more satisfied with products and services that are easy to learn and use, are consistent in their design, and provide clear and concise information. He also found that users tend to be less satisfied with products and services that are difficult to use, have poor navigation, or are not designed with the user's needs in mind. Additionally, Nielsen has proposed several usability heuristics, a set of principles for evaluating the usability of a product or service, which are widely used in the field of human-computer interaction.

Previous research has found that individuals who are less satisfied with their experiences are less likely to enrol in future e-learning courses (Lim, 2001; Carswell & Venkatesh, 2002). Similarly, Wang (2003) found a positive relationship between e-learner satisfaction score and the reuse intention of the e-learning systems. Expectation Confirmation theory states that IS continuance intention is positively correlated with satisfaction. Several research studies on IS satisfaction indicate that IS satisfaction directly effects intention to use and actual use (Davis et al., 1989; Karahanna et al., 1999; Taylor & Todd, 1995). Hayashi et al. (2004) found that the higher the satisfaction level with initial use end users have, the higher their continuance intention in using the learning environments. Liaw (2008) conducted a study to understand how to improve e-learning satisfaction, behavioural intention, and to enhance learning effectiveness on 424 university students in Taiwan. The results of the study showed that perceived satisfaction contribute to the learner's behavioural intention to use the Blackboard e-learning system.

Gatian (1994) found that there is a powerful relationship among user satisfaction, decision making performance, and efficiency. Also, in the information systems success model presented by DeLone and McLean (1992), satisfaction is an effective variable on working efficiency or decision-making level. DeLone and McLean (2003) conceptualized in their updated IS success model that user satisfaction is an antecedent of Net Benefits. In the study conducted by Igbaria and Tan (1997), the result showed that perceived user satisfaction has the strongest direct effect on individual impact. Iivari (2005) also found that user satisfaction is a strong predictor of individual impact (net benefits to individuals). This illustrates how crucial it is to look at user satisfaction when describing net benefits to an individual. It is also anticipated that there will be a favourable correlation between net benefits and the intention to continue.

Wang et al. (2012) pointed that the user satisfaction is act as the critical success factor which surrogate of e-learning systems. Information quality and the readiness for online learning are the two factors positively affected the user satisfaction. Moreover, self-efficacy and the self-regulated learning management are showing the negative relationships with the e-learner satisfaction with the learning management systems (Eom, 2014).

H2: User satisfaction is positively related to e-learning effectiveness.

2.6 E-leadership

Changes in organization nowadays are heavily facilitated by digital revolutions. (Roman et al., 2019b). Hence, one of the important skill a manager should possess nowadays is e-leadership. E-leadership or electronic leadership is a concept that combines leadership with technological development (M. Cabrera, 2022).

Kissler (2001) began his examination of e-leadership by posing the question: —what kind of leadership will be required for the pursuit of e-business? Zaccaro and Bader (2003) noted that today ‘s organizational leader grapples with two interrelated forces: (a) the increasingly global dispersion of divisions and subunits, customers, stakeholders, and suppliers of the organization; and (b) —the exponential explosion in communication technology that has led to —greater frequency of daily interactions with colleagues, co-workers, subordinates, and bosses dispersed geographically.

As a reaction to these changes, —organizational scientists have begun to talk about e-leadership ‘to refer to leaders who conduct many of the processes of leadership largely though electronic channels. The authors postulated that in view of the rapid technology growth in organizations and their increasingly global reach, soon —e-leadership will be the routine rather than the exception in our thinking about what constitutes organizational leadership.

Although e-leadership concept has been introduced way before the pandemic, the application of it seems to be a leadership requirement at least, as of today. During the Covid-19 pandemic, millions of workers were forced to use digital work tools including collaboration platforms and video conferencing tools and to work entirely remotely. This is as a result of many governments' decision to enact so-called "lockdowns" (Dittes et al., 2019). Hence, many organizations needed to reinvent work with the introduction of home-based work practices (Contreras et al., 2020).

It may be perceived as a challenge to implement e-leadership. Having a management approach in this way, the pandemic acted as a magnifying glass to reveal the many difficulties that come with telecommuting, such as work-home interference caused by increased workload (Andrade and Petiz Lous, 2021; Buomprisco et al., 2021; B. Wang et al., 2021) and challenges in managing physically separated employees (Buomprisco et al., 2021) due to ineffective communication (Neufeld et al (Adamovic, 2022; Buomprisco et al., 2021) Leaders and followers are required to overcome these difficulties and adapt over the long run because the mandated changes in the nature of work are anticipated to remain after the pandemic (Contreras et al., 2020) .

Even so, it is not all negative and a constitute an end towards implementing e-leadership in organization. Leaders being absent increases employee empowerment (Bagger & Sterner, 2022). E-leadership can induce changes in the behaviours and mental states of followers (Syahmi et al., 2022). A good practice of e-leadership can significantly increase work motivation (M. Cabrera, 2022).

Leadership as a concept is defined in hundreds of different ways (Bass, 2008), from broad to narrow. While the term “leadership” is often used to include anything that those in charge do (as well as those who make things happen, such as self-led teams and networks), most leadership scholars use the term more narrowly to refer to the study of the important phenomenon of leading, empowering, and coordinating followers to be as effective as possible (Mintzberg, 1979). This can occur in transactional ways (e.g., Blake & Mouton 1964; Vroom & Jago, 1988) or in transformational ways (e.g., Bennis & Nanus 1985; Kouzes & Posner 1987).

There is much past research that relates the e-leadership and e-learning effectiveness. It is well summarized in the below table:

Table 2.1
E-leadership Findings and Resource

No	Summary	Resource
1	E-leadership behaviours, such as providing support and guidance to team members, were positively related to e-learning effectiveness. The study also found that e-leaders who were skilled in using technology and who had a positive attitude towards e-learning were more	Alfehaid & Mohamed, (2019)

No	Summary	Resource
	likely to create an environment that was conducive to e-learning.	
2	E-leadership behaviours, such as providing resources and support for e-learning, were positively related to e-learning effectiveness. The study also found that e-leaders who were able to create a sense of community among team members using digital tools and platforms were more likely to have higher levels of e-learning effectiveness.	Trust & Trust, (2019)
3	E-leadership behaviours, such as providing support and encouragement for e-learning, were positively related to e-learning effectiveness. The study also found that e-leaders who were able to create a sense of trust and rapport with team members using digital tools and platforms were more likely to have higher levels of e-learning effectiveness.	Journal of Education for Business in 2018

In terms of e-leadership, the most cited definition, which has garnered solid footing and acceptance in the mainstream of leadership research, is that provided by Avolio et al. (2014). They define e-leadership as a social influence process embedded in both proximal and distal contexts mediated AITs (Advanced Information Technologies) that produce a change in attitudes, feelings, thinking, behaviour, and performance. Thus, e-leadership is an abstract concept that implies the use of or failure to use ICTs to induce changes in the behaviours and mental states of followers.

2.7 E-learning effectiveness

E-learning became one of the regular practices in government as available tool to communicate and as a learning tool. The usage of e-learning in GLCs should be accompanied with action strategy to maximize the benefits of this tool and to provide guidance for their executives on how to benefit from this new technology to save their

time and to maximize their abilities to gain knowledge in short and long run. As e-learning became a major tool to deliver, the culture of the university should encourage its students to rely on this tool to exchange communication and knowledge. The effectiveness of e-learning requires further researching among GLCs in Malaysia to measure the extent it accomplishes the objectives and figure out some solution to maximize the benefits of its use in these organizations.

Several papers use both 'learning outcome' and 'satisfaction' as definitions for effectiveness (Harrington & Walker, 2009; Jung et al., 2002; Maloney et al., 2011). The number of papers in this list would of course change if the remaining abstracts were coded, but the author's find that the most common definitions are expected to stay relatively stable, as they have not significantly changed in recently reviewed abstracts.

The development of proper course material is a key factor in the execution of e-learning effectiveness (Little and Knihova, 2014). An emphasis on participants' engagement in learning would be part of an effective course in an e-learning environment (Ashwin and McVitty, 2015). Organizations use a learner-centred strategy rather than an instructor-centred approach when designing courses for e-learning environments (Elumalai et al., 2020).

E-learning course users rate course design based on how effectively the system's material fits their needs, claim Adeyinka and Mutula (2010). This is thought to be a key element that affects how participants view online courses. According to Jaggars and Xu (2016), effective course design includes a variety of elements, including well-organized content, a variety of possibilities for interpersonal engagement, and effective technology utilisation. According to Khairi and Abdul Aal (2022) discovered that participants in the online session reported that knowledge was their top priority after comparing course design and interaction in terms of satisfaction.

Participants who were enrolled in a traditional physical class, however, stated that building relationships with their instructors was their top priority. Rubin and Fernandes (2013) pointed out that, particularly in online courses or online teaching procedures, course design and course structure may have an impact on the learning process and learning outcomes. Additionally, Eom and Ashill (2016) stressed that course structure and design are strongly related to learner satisfaction and perceived learning outcomes, particularly when the course content is split into logical and intelligible parts that are interesting and motivate learners to learn.

Participants' interest in learning is increased, and concept understanding is made easier thanks to the usage of multimedia elements in the course design (Khamparia and Pandey, 2017). In terms of time, place, and self-education (Ahmad et al., 2018). Only a small amount of multimedia content may be included in a typical learning course due to time constraints. Effective course design for online learning also encourages collaboration and makes learning enjoyable for students (Liao et al., 2019). The course material ought to be created in accordance with the level of expertise and apprehension of the participants (Ricart et al., 2020). Participants can study in online classrooms more effectively with a well-organized and visually appealing course design (Oh et al., 2020). Hence, below hypothesis is created to identify the relationship between user satisfaction and e-learning effectiveness.

H4: User satisfaction in e-learning is positively related to e-learning effectiveness.

2.7.1 E-leadership as moderating effects towards user satisfaction and e-learning effectiveness

Many previous researchers found that there are significant relationship of e-leadership moderates the effect of e-learning effectiveness. This has been proven throughout several studies from 2018 onwards.

The association between e-learning and job performance was shown to be strongly moderated by e-leadership according to (Grmek et al., 2020). The study discovered that e-leadership, particularly when e-leaders offered significant support and advice to team members, had a beneficial impact on the effectiveness of e-learning in enhancing work performance.

The relationship between e-learning and employee growth was shown to be considerably affected by e-leadership (Lodisso, 2019). According to the study, e-leaders who supported e-learning strongly and had technological know-how were able to establish an environment that was more favourable to e-learning, which resulted in greater levels of staff growth.

The link between e-learning and organisational performance was shown to be strongly modified by e-leadership (Sariakin et al., 2020). According to the study, e-leaders who strongly backed e-learning and were able to foster a feeling of community among team members using digital tools and platforms considerably increased the

efficiency with which e-learning helped achieve organisational performance goals. Henceforth, below hypothesis is created to satisfy the relationship between user satisfaction, e-leadership, and e-learning effectiveness.

H6: E-leadership positively moderates the effect of user satisfaction and e-learning effectiveness.

2.8 Learning Management System

A Learning Management System (LMS) refers to the system that provides the delivery, assessment, and management tools for an organization to handle its knowledge repository. However, learning environment model between corporate and academic environment is significantly different. While a business setting emphasizes knowledge sharing among employees and ways to retain them, an academic setting concentrates on students' accomplishments and never aims to keep them in the learning institution.

Human capital is becoming the most important asset in 21st-century commercial organizations due to the expansion of the information economy. One could argue that knowledge-based industries are more advantageous than traditional manufacturing businesses because they are white-collar. However, as employees will eventually retire or leave the organization, an over-reliance on human capital can also be a significant problem. This circumstance may result in a knowledge gap that could affect the enterprise's ability to continue operating. Numerous researchers have been interested in the topic of knowledge retention in the corporate setting.

Nowadays, most businesses train their staff using advanced learning management system (LMS) tools or software. The successful use of e-learning in most enterprises has resulted in improved technical support and administration. Moreover, the modularity, privacy, speed, style of learning, customization, evaluation, consistent delivery, and flexibility make e-learning systems an indispensable tool for corporate learning (Roy et al., 2008).

2.8.1 Debate

A Learning Management System (LMS) refers to the system that provides the delivery, assessment towards the e-learning. The advantage of LMS is that the learning process is well stored and can be seen at any time (Rabiman et al., 2020). That reflection

process can lead to new strategies. An information technology (IT) system called a learning management system (LMS) gives teachers the flexibility to create, modify, and maintain online courses available on websites. LMS is also identical with an e-learning system in terms of using the internet website inside classrooms to promote the instructional process (Bradley, 2020). E-learning and LMS have emerged as crucial resources for anyone involved in learning. Effective and efficient teaching in higher education institutions is only one aspect of LMS's significance; it also facilitates information sharing and efficient codification. Though the use of LMS has become a salient part of higher education provision, about 68% of these institutions measure LMS usage and only 39% are concerned about acceptance and satisfaction indices (Dahlstrom et al., 2014).

There is a discrepancy between how IT leaders and students and teachers report their acceptance and happiness with LMS. Although IT leaders state that students and faculty are 93% and 92% satisfied with the features and functionalities of the system, respectively, the actual reports from students and faculty members showed lower levels of satisfaction than those reported by IT leaders. Notwithstanding this peculiarity in system satisfaction reporting, several prestigious universities are using LMSs for administrative and instructional functions. For instance, in the UK, 95% of institutions use LMS, while in the US, the percentage is around 90% (Grajek & Arroway, 2012; Jenkins, Browne, Walker & Hewitt, 2011). The state of LMS demand in Africa and the Middle East was estimated to grow annually of over 10% between 2009 and 2014 (Adkins, 2011).

The extreme usage of LMS also calls for a crucial assessment of success factors to balance for acquisition rate and usage satisfaction. Success factors and benefits of LMS usage have been reported by a myriad of studies (Lwoga, 2014), however, few others have concentrated on barriers confronting students in an online learning environment (Simonson, Smaldino, Albright, & Zvacek, 2014). Lack of technical expertise, time restraints, low motivation, social or administrative problems, and limitations on resource availability and accessibility are some of the common obstacles that students encounter. Given the participants' reactions to blended learning, it is crucial to understand the key factors influencing the interaction between acceptance and satisfaction. This has a direct bearing on the impact of the blended approach and its improvement.

The instructional efforts, technological infrastructure, high cost of technology, self-competencies, learning, methodology, management support, accessibility and availability of resources, educational culture and learning styles, intellectual investment, assistive tool design, and international business are some of the factors that influence the use and satisfaction of e-learning in most universities in developing nations. Finding variables that affect students' opinions of a particular e-learning technology is crucial as demand for higher education and e-learning institutions keeps growing. An e-learning system's early adoption (acceptance) and ongoing user satisfaction are both critical to its success. Therefore, it's critical to comprehend the pertinent variables that influence students' intentions to stick with the e-learning system.

Nonetheless, there is a dearth of empirical evidence based on a conceptual framework to tackle the issue of blended learning phenomenon and its acceptance and satisfaction details (Sun, Tsai, Finger, Chen & Yeh, 2008). Therefore, such a study in this direction is necessary. Additionally, most of the research on the LMS has been done in developed nations. However, given the differences in technological exposure, infrastructure, and access, there is no reason to believe that results from industrialized nations may apply to other areas. Thus, it is necessary to carry out this research in Malaysia.

2.9 Government Linked Companies (GLCs)

Recognizing the significance of government-linked investment companies (GLICs), which hold a majority stake and devote some or all of their capital to GLC investments, is also crucial. However, further involvement about GLICs will not be discussed in this research.

2.9.1 Definition

In Malaysia, GLCs are defined as companies that have a primary commercial objective and in which the Malaysian Government has a direct controlling stake. The Government Linked Companies or GLCs are also initially being defined as companies that have a primary commercial objective and in which the Malaysian Government has a direct controlling stake (Hamid et al., 2021). At operational level, the GLCs have received much of the Malaysian governments' attention over the recent years because

these companies make up about 36% of the market capitalization of the Malaysian stock exchange (Bursa Malaysia) which accounts for around 5% of the country's national output and employ some 400,000 people (PCG, 2005). Therefore, the overall improvement in the GLCs' performance would create new growth opportunities for the nation and have a significant effect on the larger private sector.

According to reports, GLCs own 54% of the shares in the Kuala Lumpur Composite Index (KLCI) and employ 5% of the country's workforce (Menon, 2017). When GLCs are viewed as the primary source of government revenue and value creation, it becomes critical for GLCs to preserve their worth to contribute to the advancement of the Malaysian economy, which is in line with the government's objectives (Said et al., 2017). GLCs must focus on value generation to preserve their long-term competitive competitiveness. The Prime Minister said this at the opening of the new Transformation Program (Menon, 2017).

The Putrajaya Commission on GLC High Performance (PCG) was established by the government in 2005 to oversee the execution of the program's numerous aims and goals as part of the Government Link Companies Transformation Program (GLCT). The value creation plan (VCP) and the 10 GLC initiatives are the two main components of the GLCT. The VCP is a long-term strategy for improving GLC performance.

Consequently, it is important to note that among the more important of the ten initiatives is to intensify performance management in all GLCs to ensure focus on the key business priorities-particularly value creation-and to retain knowledge of key experts (Hassan et al., 2018). Each GLC is required to create their own VCP under the transformation program, taking into account their individual competencies as well as the GLCs' evaluation of the business. Performance indicators, according to the PCG, are the entire collection of metrics produced from the business plan that show the fundamental values of an organization and assist in identifying areas that require change. Fundamentally, the goals and performance metrics of the GLC should be closely aligned with strategy and cover all pertinent facets of value generation within each GLC, both at the corporate level and at lower organizational levels like divisions or business units.

GLCs can be defined as companies whose major ownership and control are held by the main shareholder that is either a government agency (such as Khazanah Nasional, Ministry of Finance, Bank Negara Malaysia, Kumpulan Wang Amanah Pencen

(KWAP) or by a government-related agency in which the government has an interest by virtue of financial or legal exposure (Subramaniam et al., 2020).

In Malaysia, many of the GLCs are well-known. With total assets of 51% of GDP at the end of 2015, Petronas is a prime example of how GLCs may control the domestic economy. Its revenue is about a quarter of GDP, while its debt is over 15% of GDP. Petronas came in at position 184 on the 2017 Fortune Global 500 List. A testament to their magnitude and power is the fact that other GLCs have also achieved considerable international recognition. For example, the Malaysian partnership building the Battersea Power Station in London is made up of Sime Darby Bhd, SP Setia, and the Employees Provident Fund. In the meantime, the Shuaibah Independent Water and Power Project in Saudi Arabia is being developed in part by Tenaga Nasional Bhd.

2.10 Information Systems Success (ISS) Model

The six characteristics of system success—system quality, information quality, use, user satisfaction, individual impact, and organizational effect—are discussed in DeLone and McLean's Information System Success Model (1992). Both utilization and user satisfaction are impacted by the quality of the content and the system alone and together. The degree of user pleasure is influenced by intention to use (use) in both good and negative ways, and vice versa. User satisfaction and use both have an effect on a person, which ultimately affects an organization. A revised ISS model (DeLone & McLean, 2003) combined the individual and organizational effect metrics into a single impact or benefit category known as "Net Benefit" and introduced the "service quality" indicator as a new dimension of the IS success model.

2.10.1 Definition

The definition of IS success is not the same for all stakeholders; it varies according to their perspective (Al-Kofahi et al., 2020). Hence, the multi-dimensional concept of IS and its success can be investigated based on several perspectives (Molla & Licker, 2001).

Since the 1980s, IS scholars have been struggling to identify the factors that can lead to IS success, besides researching to build models based on empirical evidence to improve IS and make it more successful (Sørum, Medaglia, Andersen, Scott, & DeLone, 2012). This phenomenon led to the creation of an IS success model classification by DeLone and McLean (Urbach & Müller, 2012). The IS success model was first developed in 1992 by DeLone and McLean which provides an extended and comprehensive definition of IS success.

DeLone and McLean (1992) established six categories or major dimensions of IS success, i.e., information quality, system quality, use, user satisfaction, individual impact, and organisational impact. This general theory of IS, as mentioned by Tam and Oliveira (2016), posits that system quality and information quality may be positively correlated to performance if the end-user is satisfied and makes use of the system. Thus, the model, in general, gives a widely acceptable taxonomy for measuring IS success determinants.

Since DeLone and McLean published the first IS success model, several academics have attempted to expand and redefine it, or even critique it (e.g., Kettinger & Lee, 1994; Pitt, Watson, & Kavan, 1995; Seddon & Kiew, 1996; Seddon, 1997). There are superior alternatives to IS success models, according to the critics, and the model is insufficient and needs more aspects. However, its proponents argue that DeLone and McLean's model is still viable and that it can accurately gauge IS success (e.g., Molla & Licker, 2001; Rai, Lang, & Welker, 2002).

Later, DeLone and McLean (2003) updated their initial IS success model. The updated model, which came about a decade after the first model was developed, incorporates the identification of the strengths and weaknesses of the earlier model. The new model of DeLone and McLean (2003) was the result of criticism in the prior literature (e.g., Kettinger & Lee, 1994; Pitt et al., 1995; Seddon, 1997). The major enhancement of the revised IS success model is the incorporation of the service quality element. Meanwhile, the construct of intention to use is designated for measuring usage, while the authors combined individual and organisational impacts into a single construct of net benefits (Petter & McLean, 2009; Urbach & Müller, 2012). Figure 1 shows the updated version of DeLone and McLean's (2003) IS success model.

2.11 Underpinning Theories and Framework

The conceptual framework for this research is underpinned mainly from the Information System Model (Al-Kofahi et al., 2020) as depicted in Figure 2. 1. This model is taken as the comprehensive model for this research. However, the generalizability on the underpinned theory of much published research on the matter is rather challenging. As such, the mixture results gathered from various study ranging from 20 years back shows the evidence. The indirect connections between one study to another has made the E-learning Effectiveness Model to be a strong basis for any upcoming research.

The underpinning theories and frameworks used for this research were further broken down based on the conceptualization e-learning ecosystem, e-leadership, user satisfaction and e-learning effectiveness. All the successive research that was based on these theories used in this research have a profound impact on e-learning effectiveness study as discussed in the earlier literature review. Some of the past research that were based on DeLone and McLean Information System Model are as follows:

1. E-learning Ecosystem by Uden & Damiani (2007)
2. Independent Variables: Course, Trainee and Organization by Ramayah, Ahmad, & Hong (2012)

There are also several model which have been adopted to enhance the study findings such as below:

3. Moderating Variables: E-leadership by Roman, Wart, Wang, Liu, Kim and McCarthy (2018)
4. Dependent Variables: E-learning Effectiveness Model by Wang, Zhang & Chen (2021)

The first model is the E-learning Ecosystem as pioneered by Uden and Damiani (2007) which defined e-learning ecosystem as digital learning ecosystem that self-organized digital infrastructure aimed at creating a digital learning environment for networked organizations that supports the cooperation and the knowledge sharing. The conceptual framework is depicted in Figure 2.1. To current date, there are rich findings

and perspectives related to e-learning ecosystem studies such as aligning learnings with business objectives and personal career aspirations (Uden & Damiani, 2007) are helpful to clarify business concepts and memorize them easily (Bhowmick & Sorathia, 2019) and offering learning opportunities beyond the constraints of time and place (Shukla & Nagar, 2020). It is important for organizations to understand the e-learning ecosystem to achieve positive outcome of e-learning effectiveness (Garad, Al-Ansi and Qamari, 2021).

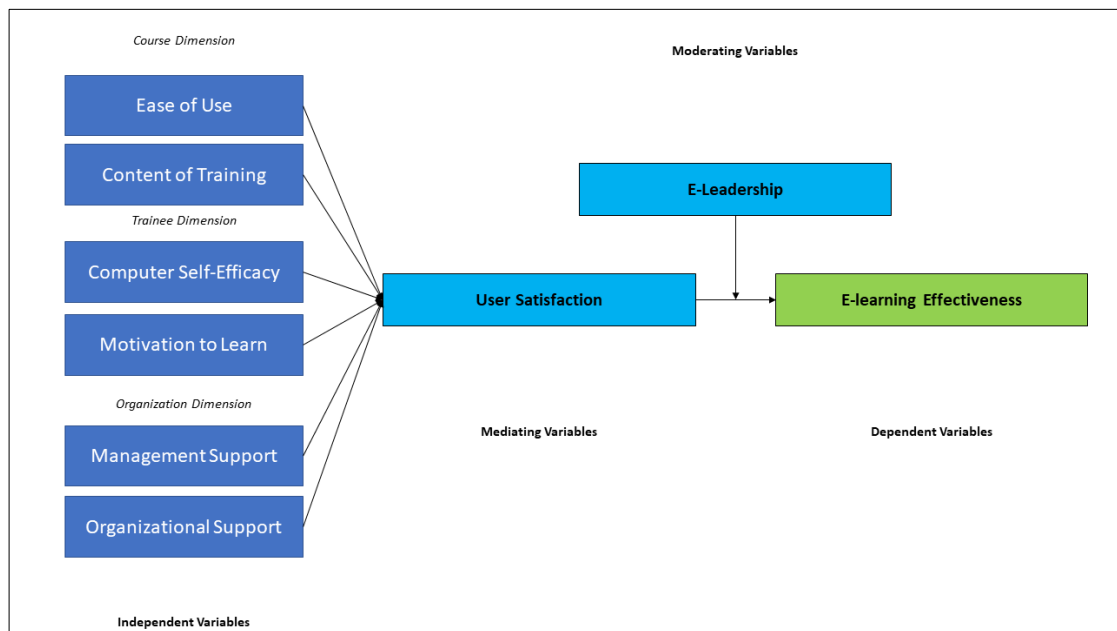


Figure 2-1 Conceptual Framework

2.12 Hypotheses Development

Deriving from the previous discussion on foundational theories, the literature review, and the creation of the conceptual framework, the research hypotheses are established as presented in Table 2.2.

Table 2.2
Hypotheses Development

Abbreviation	Hypotheses
H1a	There is no significant relationship between course and user satisfaction.

Abbreviation	Hypotheses
H1b	There is a positive relationship between trainee and user satisfaction.
H1c	Organization is positively related to user satisfaction.
H2	User satisfaction in e-learning is positively related to e-learning effectiveness.
H3a	There is no significant relationship between course and e-learning effectiveness.
H3b	There is a negative relationship between trainee and e-learning effectiveness.
H3c	Organization dimension is not positively related to e-learning effectiveness.
H4	E-leadership not positively moderates the effect of user satisfaction and e-learning effectiveness.

2.13 Chapter Summary

This chapter delves into a comprehensive review of literature from both past and contemporary studies. Initially, the literature review examines Course, Trainee, and Organization aspects, focusing on their definitions, theories, implications, changes and failures, debates, and summaries of empirical research on these variables. Following this, the review shifts to User Satisfaction, covering its definition, theory, significance, evolution, debates, and summaries of empirical research on User Satisfaction. Subsequently, the literature review applies the same methodology to E-leadership. Finally, the review addresses E-learning Effectiveness, encompassing its definition, theory, importance, debates, and summaries of empirical research on attitudes towards change. Concurrently, this chapter also explores the underpinning theories, the theoretical framework, and the research hypotheses.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Preamble

This chapter provides a summary of how the research was carried out using multiple methodologies. The explanation for the study's features, research instrument, and data analysis is explained in further detail in the parts that follow.

3.2 Research Design

As demonstrated in Figure 3.2: Research Design, the research design showed the overall research methodology of this study.

3.3 Details of Study

The explanation for study details is divided into purpose of study, types of investigation, study setting and extent of researcher interference, time horizon, sampling method and unit of analysis.

3.3.1 Purpose of Study

To achieve the comprehensive research objective, descriptive research was undertaken. Descriptive research is used to determine and describe the characteristics of the variables of interest in a situation (Sekaran & Bougie, 2016). It is dependent on some prior knowledge about the study problem (Sundram, Govindaraju, Shamsul, Krishnasamy, Mohamed, Sayuti & Othman, 2016). The characteristic of e-learning ecosystem, e-learning effectiveness, e-leadership, and user satisfaction were described in this study. The purpose of this research is very specific, and it's done when precision is crucial (Sundram et al., 2016)

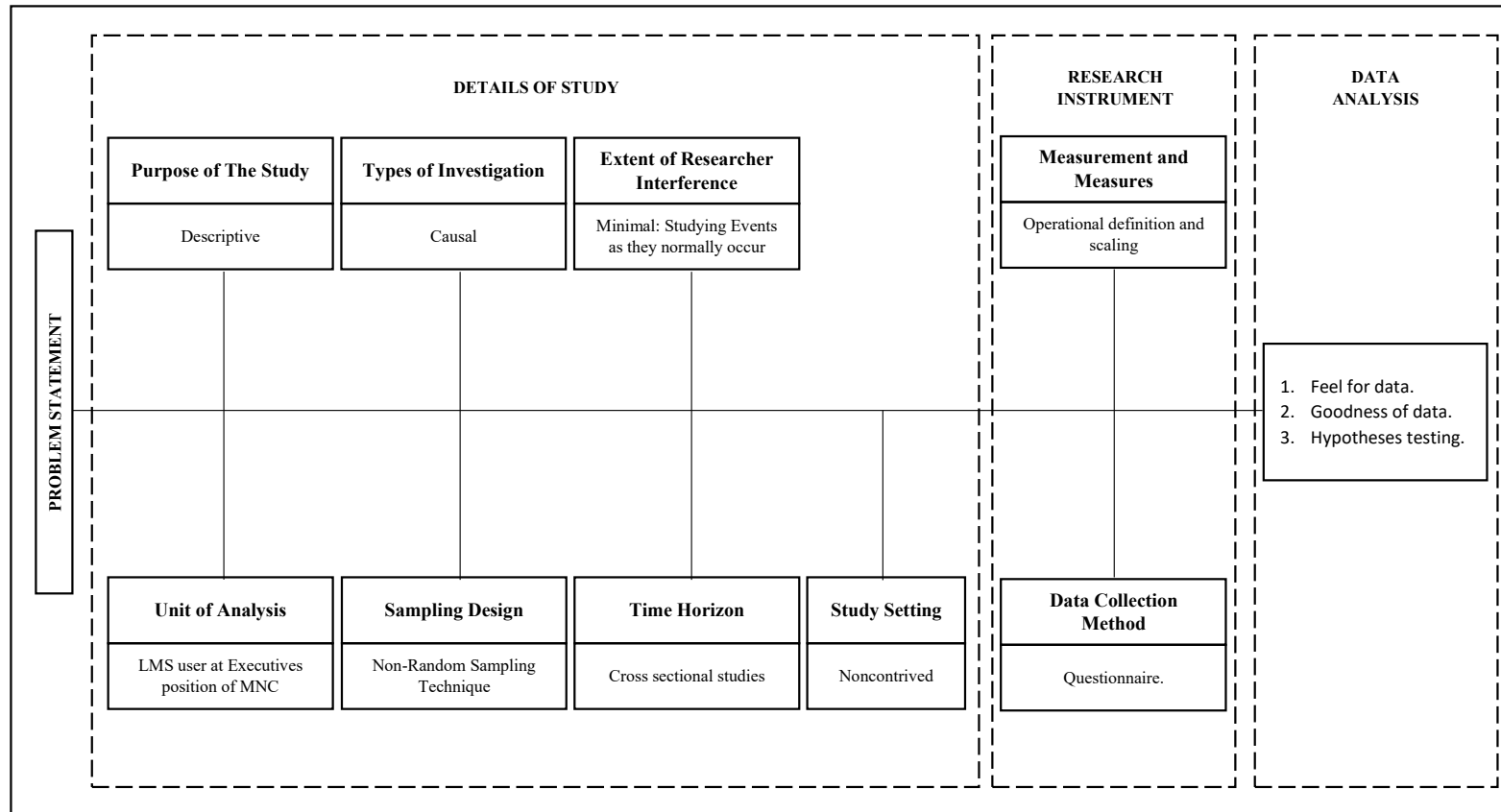


Figure 3-1 Research Design

3.3.2 Types of Investigation

A correlational study was carried out since it was necessary to identify the components linked to the problem (Sekaran & Bougie, 2016). Sundram et al. (2016) added that when a link suggests that at least two concepts or variables change at the same time, a correlational approach is favoured. This research conceptual framework included at least four concepts: the e-learning ecosystem, e-learning effectiveness, e-leadership, and user satisfaction.

3.3.3 Study Setting and Extent of Researcher Interference

The study was conducted in a non-contrived setting, in which the research was conducted in a natural setting where work could go regularly without interference from lab conditions (Sekaran & Bougie, 2016). As a result, researcher interference was minimized. In this study, no artificial settings were used. The research was carried out in accordance with the GLC's routine operations and business activities. There was no controlling variable and the researcher's interference was kept to a minimum.

3.3.4 Time Horizon

This study used a cross-sectional time frame, with data collected only once over a period of months (Sekaran & Bougie, 2016). Because just one targeted number of samples were taken from the targeted population and data was only gathered from this sample once, this study used a single cross-sectional time.

3.3.5 Unit of Analysis

The unit of analysis used in this study was individual. Individual was used as the basis to the level of aggregation of data collected during the subsequent data analysis stage (Sundram et al., 2016). Executives from Government Linked Companies around Klang Valley represent the individual unit of analysis. These executives were selected as the elements for this research since they are the end user of the e-learning and contains the most number against any other positions in the organizations.

According to Collins Dictionary, (2022) someone who has a non-executive position in a company or organization gives advice but is not responsible for making decisions or ensuring that decisions are carried out. Similarly, someone with an executive position in a company organization gives advice and responsible for making decisions or ensuring that decisions are carried out. The researcher observed the importance of executive role in organizations in decision. Hence, it has come to the fact that it is important to study the effectiveness of e-learning among this population.

3.3.6 Population and Sample

Population for this study is the executives of Government Linked Companies in Klang Valley, Malaysia since almost all of them are involved in the e-learning process of the organizations. Notably, half of Malaysia's employers (50%) now provide e-learning opportunities (Hays, 2020). GLCs comprise seven of the top ten listed companies in 2018 and roughly half of the Kuala Lumpur Composite Index (East Asia Forum, 2018). They are present in practically every industry, occasionally in a mighty fashion. Malaysia has the fifth highest GLC impact on the world economy (East Asia Forum, 2018). The number of employees at GLCs are however, varies depending on the size and industry of the company. Some GLCs have thousands of employees, while others have only a few hundred.

To decide the adequate sample size required to conduct this research, GPower Version 3 software and the literature of selecting sample size are considered. This software was designed as a power analysis program for statistical tests that are common in social and behavioural research as it covers wide range of statistical tests (Faul, Erdfelder, Lang, & Buchner, 2007). As such, the result is shown in Table 3.1.

Table 3.1
Sampling Size Requirements

1	Sample size larger than 30 and less than 500 were appropriate for most research (Sekaran & Bougie, 2009) cited in the work by Roscoe (1975).
2	Partial least squares do not demand large sample size, the choice of sample size was primarily a matter of statistical power (Gefen, Rigdon, & Straub, 2011) cited in the work of Cohen (1988).
3	Convention specifies that 80 percent as the minimum power was acceptable (Gefen, Rigdon & Straub, 2011) thus generating a smaller sample size even at 95 percent of minimum power.
4	The PLS estimation method is remarkably stable even at low sample sizes (Gefen, Rigdon & Straub, 2011).
5	Even at a very low sample size, sufficient power can be obtained by a model with high degrees of freedom (Gefen, Rigdon & Straub, 2011).

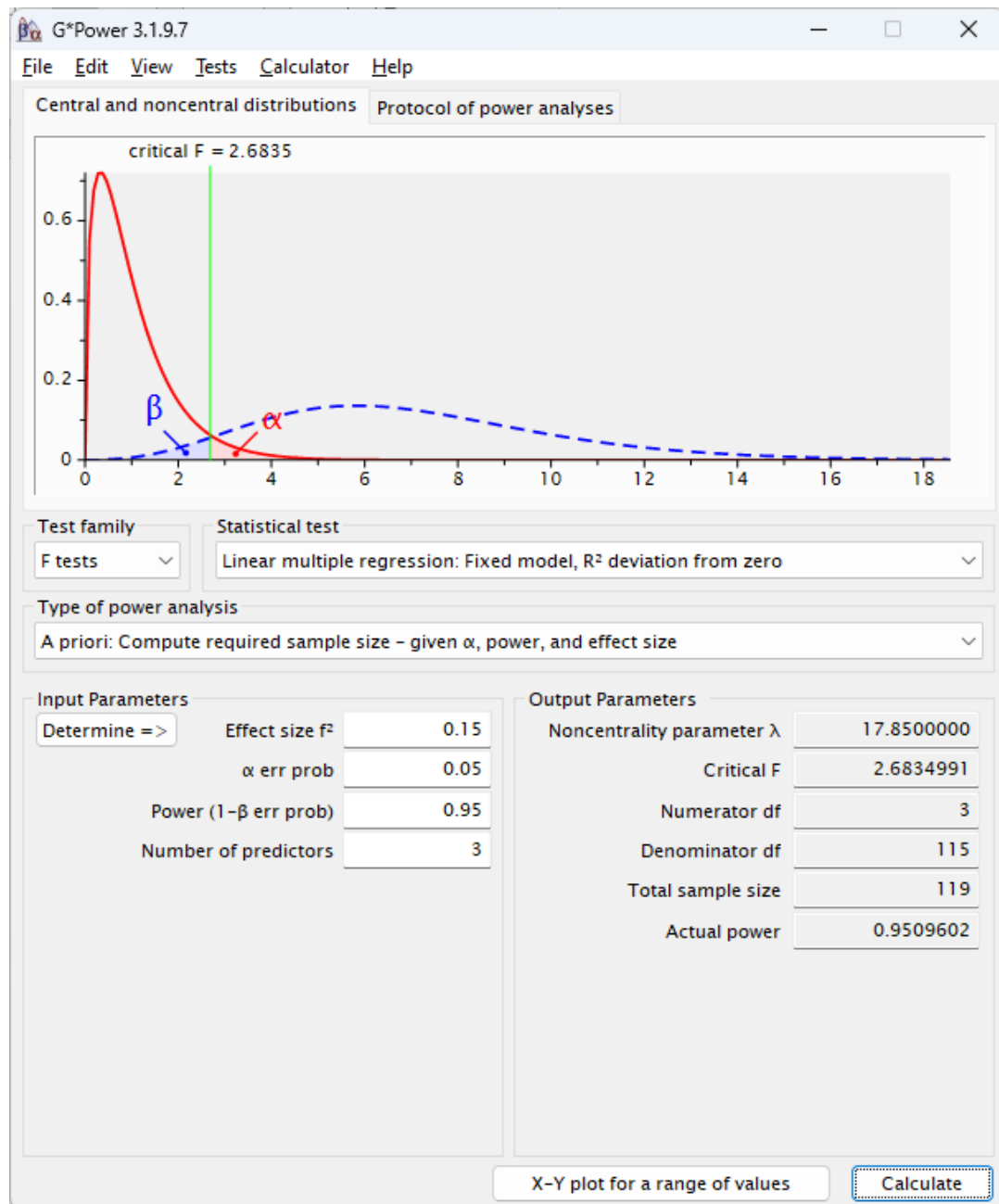


Figure 3-2 Determining Total Sample Size using GPower Software

3.3.7 Sampling Design and Procedures

This research will apply a non-random sampling technique which involve selecting a sample using a purposive sampling. The sampling used was purposive sampling in which sampling was made on the GLC state based on practical issue. It is a non-random technique that does not need underlying theories or a set number of participants (Etikan, 2016).

In other words, the researcher determines what information is required and then searches for individuals who possess the knowledge or experience necessary to deliver it. The Klang Valley location was purposively selected as the sample since the location contains the highest number of GLC offices and executives as compared to the other states in Malaysia (Department of Statistics Malaysia, 2017).

In social science research, a non-probability sampling method called "purposeful sampling" is used to pick participants who fit requirements or possess qualities that are crucial to the research issue. Purposive sampling, as contrast to probability sampling, does not include randomly choosing participants from a broader population. Purposive sampling is used to find and choose those who are most likely to supply information that is pertinent and insightful to the research issue. This method is frequently applied in qualitative research when the goal is to fully comprehend a certain event or experience.

3.4 Measurement

3.4.1 Data Collection Method

In enhancing the finding of this research, data was gathered both from primary data sources.

3.4.2 Primary Data

In this study, questionnaires were the main tool used to collect data. As a result of the knowledge gained from the literature study, a structured questionnaire was created. Prior to the distribution of the questionnaire, a set of pre-set questions was developed. (Sekaran et al, 2012).

Questionnaire

The questionnaire applied in this study was divided into five sections: A, B, C, D, and E, which were designed to measure the research's key variables and achieve its objectives. This quantitative survey will be conducted to collect data regarding the

demographic profile, e-learning ecosystem, user satisfaction, e-leadership, and e-learning effectiveness among the executives of the GLCs in Klang Valley, Malaysia.

Section A and B consisted of six demographic questions, addressing the gender, age, education level, marital status, position, working experience, highest education level, and general involvement regarding e-learning. Specifically, Section C, D and E was made in Likert Scale to measure the independent variables which are Course (CEU and CCL), Trainee (TCS and TML), and Organization (OMS and OOS). Meanwhile, Section F was prepared to measure the variable which is User Satisfaction (CUS). Section G addressed the moderating variable for this study which is E-leadership (ELE). Finally, section H is for the dependent variable which is E-learning Effectiveness (EFE). Table 3.4.2 below shows the structure of questionnaire for this study.

Table 3.2
Structure of Research Questionnaire

Section	Rating Scale	Variables
A	Dichotomous Scale	Gender
		Age
		Highest Education Level
		Working Experience
B	Category Scale	E-learning Involvement
		Marital Status
		Ease of Use (CEU)
C	Likert Scale	Content of Training (CCL)
		Self-efficacy (TCS)
D		

	Motivation to Learn (TML)
	Management Support (OMS)
E	Organization Support (OOS)
F	User Satisfaction (CUS)
G	E-leadership (ELE)
H	E-learning Effectiveness (EFE)

Although there has been a significant amount of research on the effectiveness of e-learning, this study revealed that many of the earlier studies employed multiple measurements to measure e-learning ecosystem, user satisfaction, and e-leadership. These abundant research findings have resulted to a various outcome and created both acceptable and fallacies findings.

Therefore, in order to quantify the variables of interest in this study, the research has modified the literature on the e-learning environment, user satisfaction, e-leadership, and e-learning effectiveness. However, because most instruments lack validity and reliability, this research used the construct measurements and validation processes by (Burke et al., 2018) to further validate the instruments used in this study. The next chapters' subchapters further detail the procedures.

Although the questionnaire developed may seems lengthy, the justifications are as below based on a study made by Rowley (2014):

1. Since there is paucity of study on questionnaire length, it was suggested that questionnaire length up to 4 sides of A4 pages is acceptable. The research question was being adapted to meet as if it is used only 3 sides of A4 pages using the online application, Google Form.

2. It was recommended that the questionnaire be formatted concisely to facilitate ease and convenience for respondents, thereby maximizing the response rate necessary for data analysis. This research followed that recommendation precisely.
3. The length of a questionnaire is not fixed and depends on the nature of the research, the variables of interest, the population, and the data analysis. Given that this research is set within a corporate learning environment, it was necessary for the questionnaire to be extensive to cover all relevant variables of interest.
4. The questionnaire underwent a pilot test, during which it was both procedurally and statistically validated. Several questions were revised or removed based on the test results. Further discussion on this topic is available in Chapter 4.

3.4.2.1 Tools and Technique

While completing this research, both SPSS and SmartPLS Version 4 software was selected and used throughout the study. Detailed explanations related to SPSS and SmartPLS will be explained below.

SPSS

SPSS stands for "Statistical Package for the Social Sciences," It is an application linked to a data analysis platform to perform complex statistical analysis, data analysis with machine learning algorithms, string analysis, and large data analysis. In quantitative research, SPSS is among the software programs used most frequently and widely. SPSS was created to make it easier for researchers to arrange and obtain the correct data using the specified methods. Numerous research in the field of education employs SPSS (Purwanto et al., 2021), and this research is about examining course, trainee, and organization dimensions towards e-learning effectiveness with the moderating effect of e-leadership. This research is also in the field of education since it is focusing among GLC executives which make it suitable to use SPSS software. Thus, this research will use the latest SPSS software, version 29.0 for Windows.

SmartPLS and PLS-SEM 4

The proposed research model in this study will be tested using PLS-SEM Version 4 to examine the relationship. PLS-SEM 4 is a component-based structural equation modelling (SEM) technique that works similarly to regression but models structural and measurement pathways at the same time. It is helpful for exploratory research since it has fewer measurement scales, sample size, and data distribution requirements. When we only have a small number of samples to work with but the model, we are trying to build is complicated, we should consider Smart PLS software. As if we are using other software such as Lisrel and AMOS software, usually it needs a larger sample. The Smart PLS-SEM software is also advisable for usage in situations where the sample size is small, applications have a limited amount of theory available, predictive accuracy is of the utmost importance, and an accurate measurement model cannot be ensured. Many studies on the educational sector use SmartPLS especially related to variables such as e-learning ecosystem (Majali et al., 2022), and e-leadership (Andini et al., 2022).

The best practices for PLS-SEM are still being researched, and many academics continue to view PLS as a new technique for multivariate data analysis. In spite of this, the body of research has produced a number of general recommendations. The recommendations that should be considered are outlined in Table 3.4.2.2, which may be referred to below:

Table 3.3
Guidelines for Using Smart PLS (Hair et al., 2017)

Topics	Suggestions	References
Measurement Scale	Avoid using a categorical scale in endogenous constructs	Hair et al., 2010
Value for Outer Weight	Use a uniform value of 1 as starting weight for the approximation	Henseler, 2010

Maximum number of iterations	300	Ringle et al., 2005
Bootstrapping	Number of bootstrap “samples” should be 5000 and number of bootstrap “cases” should be the same as the number of valid observations	Hair et al., 2011
Inner Model Evaluation	Do not use goodness-of-fit (GOF) Index	Henseler and Sarstedt, 2013
Outer Model Evaluation (reflective)	Report indicator weights. Do not use Cronbach’s alpha for internal consistency reliability.	Bagozzi and Yi, 1988
Outer Model Evaluation (formative)	Report indicator weights. To test the outer model’s significance, report t-values, p-values and standard errors	Bagozzi and Yi, 1988

3.4.2.2 Construction of PLS-SEM Conceptual Framework

In order to fit the PLS-SEM methods, the conceptual framework for PLS-SEM was established and is shown in Figure 3.4.2.2.1 below. Based on the theoretical framework discussed in Chapter 2 of the literature study, this model was developed.

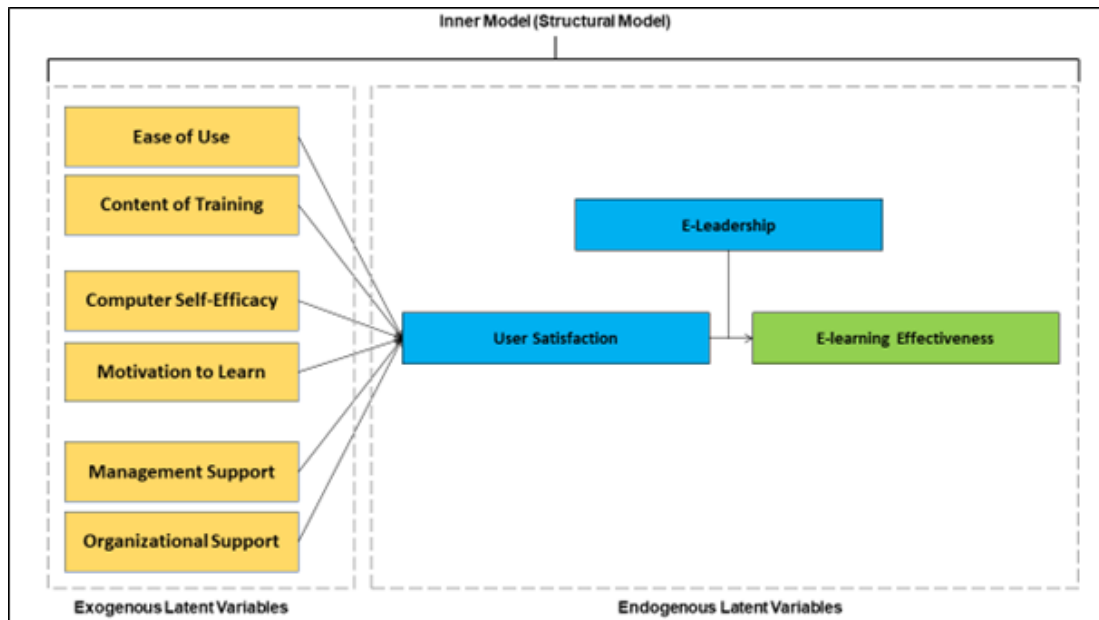


Figure 3-3 Conceptual Framework Developed Using PLS-SEM

3.4.2.3 PLS-SEM Inner Model

After the development of the conceptual framework, the next step in this research would have been to create an inner model to assist the researcher in the investigation. Figure 3.4.2.2.2, which may be found below, depicts the internal model used for this research.

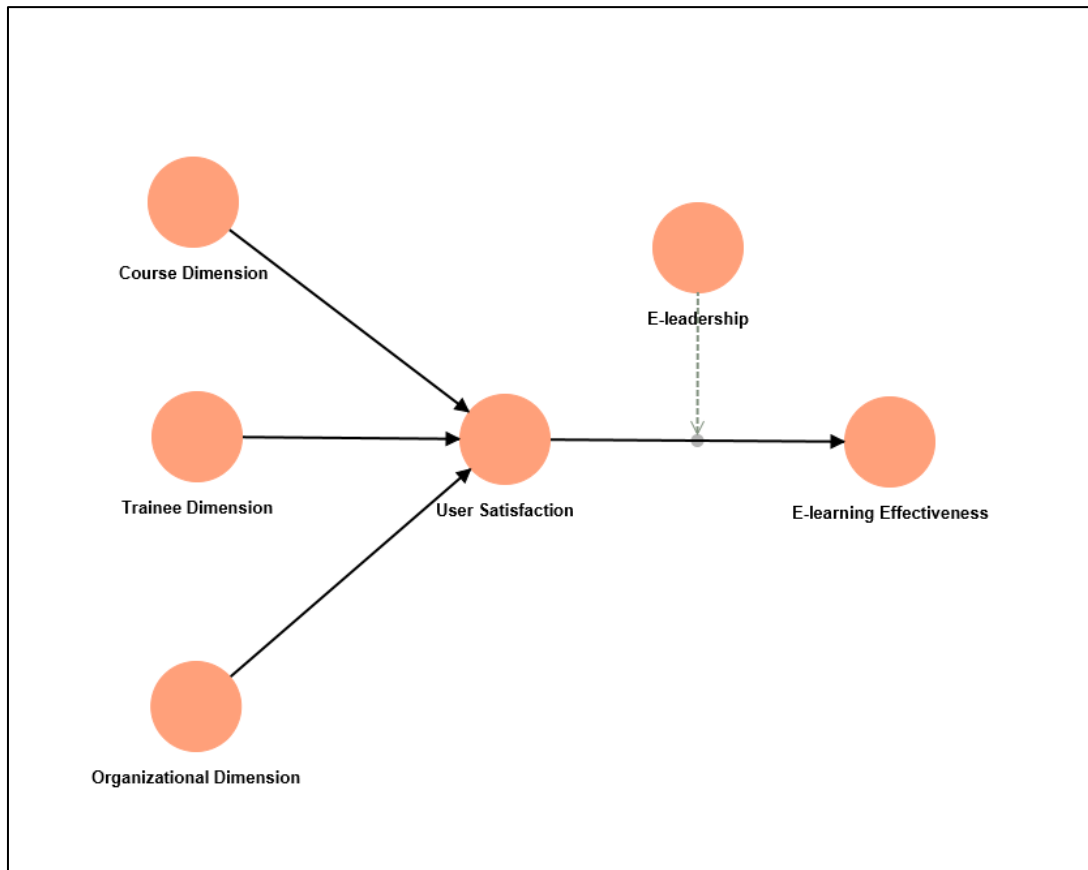


Figure 3-4 Inner Model for The Research

3.4.2.4 PLS-SEM Outer Model

The next step is to add the model with indications from the survey items after constructing the internal model. The red model will change to blue if the development of the outer model is effective. The study's external model is shown in Figure 3.5 below.

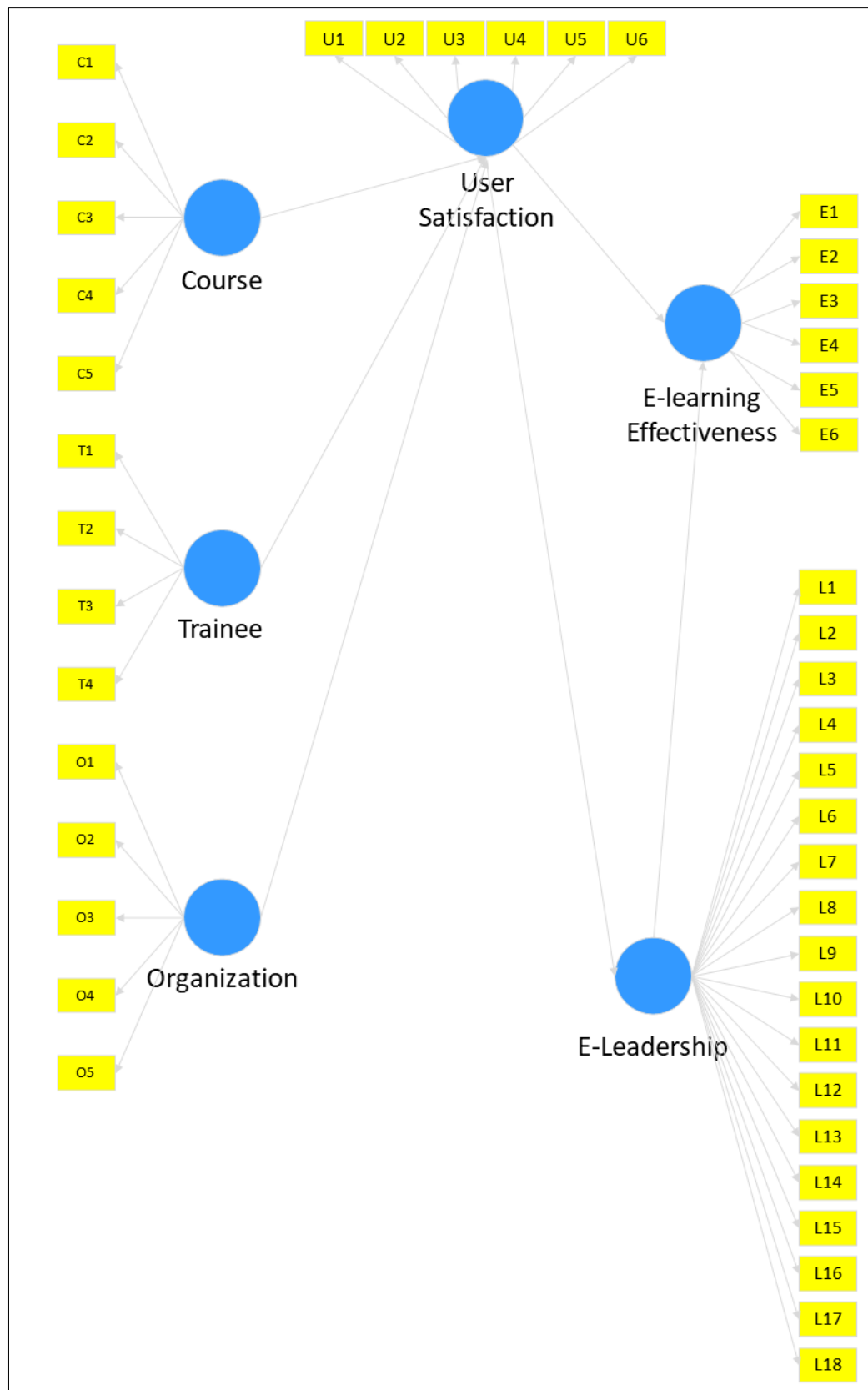


Figure 3-5 Outer Model of The Research

3.4.2.5 Reflective Measurement Scale

This study employed a reflecting measurement scale following PLS-SEM. If the indicators are reflective, their validity and reliability must be properly assessed given how interconnected and interchangeable they are. According to Figure 3.5, which depicts the outer model for this study, the direction of causality in a reflective measuring scale travels from the latent variable represented by the colour blue to the indicators indicated by the colour yellow (Kwong & Wong, 2013).

3.4.2.6 Running Path-Modelling Estimation

The "PLS Algorithm - Settings" settings were assessed after the development of the outer model and the application of the reflective measurement scale. By choosing "PLS Algorithm" from the "Calculate" menu once the indicators and latent variables have been adequately linked in Smart-PLS (no more red circles and arrows), the path modelling operation may be started. The parameters provided in Table 3.4 must be configured for path-modelling estimation to work at its best (Kwong & Wong, 2013).

Table 3.4
Configuration Setting for PLS Algorithm.

No	Parameters	Setting Configurations
1	Weighting Scheme	Path weighing scheme
2	Data Metric	Mean: 0 Variance: 1
3	Maximum Iterations	300
4	Abort Criterion	1.0E-5

5	Initial Weights	1.0
---	-----------------	-----

3.5 Data Analysis

The details of the data analysis process that will be used for this study are covered in this chapter. The assessment of I reflective measurement models, (ii) structural model, and (iii) advanced analysis of mediation effect will be used to divide this part into three subsections.

3.5.1 Assessment of Reflective Measurement Model

The guidelines provided by are used to evaluate the structural model (Hair et al.,2017). Figure 3.5.1 below shows every reporting criterion.

Stage 5: Evaluation of the Measurement Models	
Stage 5a: Reflective Measurement Models	Stage 5b: Formative Measurement Models
• Internal consistency (Cronbach's alpha, composite reliability) • Convergent validity (indicator reliability, average variance extracted) • Discriminant validity	• Convergent validity • Collinearity between indicators • Significance and relevance of outer weights
Stage 6: Evaluation of the Structural Model	
• Coefficients of determination (R^2) • Predictive relevance (Q^2) • Size and significance of path coefficients • f^2 effect sizes • q^2 effect sizes	

Figure 3-6 Assessment Procedures of Structural Model (Hair et. al., 2017)

3.5.1.1 Assessment of Internal Consistency (Cronbach's Alpha & Composite Reliability)

By assessing Cronbach's Alpha, which can gauge reliability based on the relationships between the overserved indicator variables, the initial assessments of internal consistency dependability were produced. An internal consistency reliability metric based on equal indicator loadings is called Cronbach alpha. The composite reliability criterion is thought to be the more suitable reliability metric to utilise within the PLS-SEM framework. Cronbach's alpha continues to be a reliable indicator of internal consistency. The determination of composite reliability was the focus of the second assessment. When studying and assessing internal consistency dependability measurements, Cronbach's Alpha, which indicates the lower bound, and composite reliability, which reveals the upper bound, are the two bounds considered. Usually, the true reliability lies somewhere in the middle. It is recommended that Cronbach's Alpha have a value of 0.7 as its threshold.

The Composite Reliability (CR) has a range of 0 to 1, with higher values denoting higher levels of reliability. The evaluation of composite reliability follows the same steps as the evaluation of Cronbach's alpha. More particular, for exploratory research, composite reliability scores between 0.60 and 0.70 are regarded appropriate. Because all indicator variables measure the same occurrence, values larger than 0.90 and significantly greater than 0.95 should be avoided. They are therefore unlikely to provide a reliable construct (Hair et al., 2017).

3.5.1.2 Assessment of Convergent Validity (Indicator Reliability & Average Variance Extracted)

The degree to which a measure is positively associated with other measures of the same construct is known as convergent validity. Standard outside loadings must have at least 0.708 and higher, according to the usual rule of thumb. However, it is generally advisable to delete from the design any indications with extremely low outer loadings below 0.40. Indicators with outer loadings between 0.40 and 0.70 should typically only be considered for removal from the scale if doing so tends to improve the composite dependability. The Outer loading relevance testing flow is depicted in Figure 3.5.1.2.

Additionally, the derived basis of average variance (AVE) can be used to establish the convergent validity at the construct level. The grand mean of the squared loadings of the construct-related indicators is used to define this criterion i.e., the sum of the squared loadings divided by the number of indicators. A convergent validity criterion that is acceptable is implied by AVE values larger than 0.5. (Hair et al., 2017).

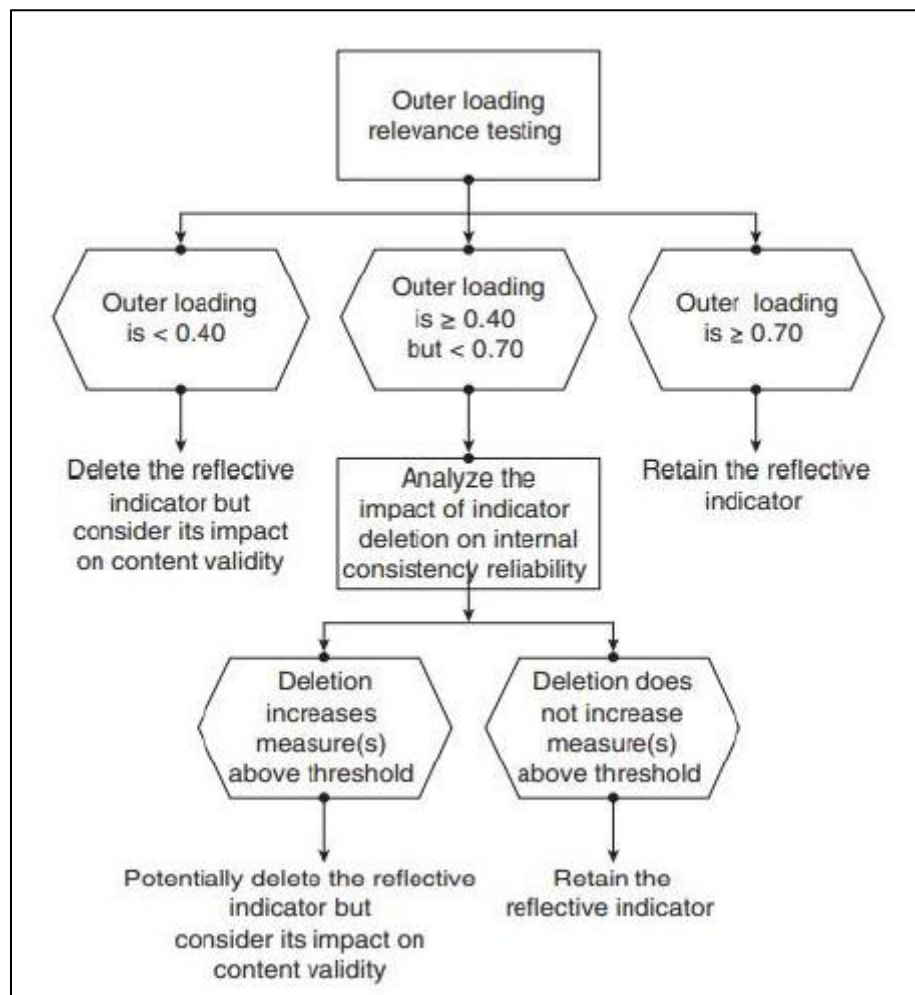


Figure 3-7 Outer Loading Relevance Testing Flow

3.5.1.3 Assessment of Discriminant Validity

In PLS-SEM, discriminant validity is assessed using the heterotrait-monotrait ratio (HTMT) criterion. The HTMT confidence interval must not comprise the value of 1 for any combination of constructs. According to the conventional methods of assessing discriminant validity, the outer loadings of an indicator on a construct must be greater than its cross-loadings with other constructs. Moreover, from the Fornell-

Larcker criterion, the square root of each construct's AVE must be greater than its highest correlation with any other construct. (Hair et al., 2017).

3.5.2 Assessment of Structural Model

The evaluation of the structural model was guided by referring to (Hair et al., 2017) criteria outline. Figure 3.8 below depicts each of the reporting criteria.

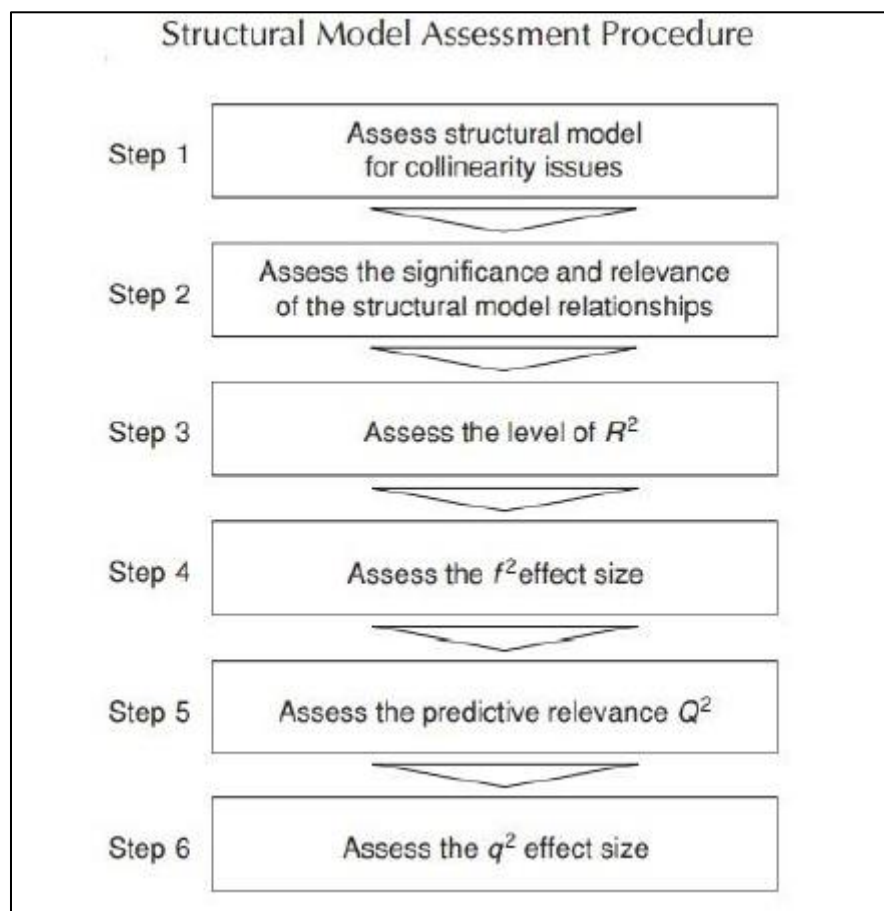


Figure 3-8 Assessment Procedure of Structural Model (Hair et. al., (2017)

3.5.2.1 Assessment of Structural Model for Collinearity Issues

Collinearity was determined by calculating the variance inflation factor (VIF). Separate analyses of each set of predictor constructs were conducted for each subcomponent of the structural model. As the variables in the questions may be redundant, the threshold value of VIF less than ten is preferred to avoid collinearity issues. If the VIF value exceeds the threshold value, researchers should consider

eliminating the constructs, integrating predictors into a single construct, or developing higher-order constructs (Hair et al., 2017).

3.5.2.2 Assessment of Significance and Relevance of the Structural Model Relationships and Hypothesis Testing

This classification was carried out to evaluate the significance and relevance of structural model correlations. The significance and relevance of structural model relationships were evaluated using (i) the t-value and (ii) the standardized path coefficient. Critical t values for a Critical value for one-tailed tests are 1.28 (significance level = 10%), 1.65 (significance level = 5%), and 2.33 (significance level = 1%). Meanwhile for two-tailed test are 1.65 (significance level = 10%), 1.96 (significance level = 5%), and 2.57 (significance level = 1%). Researchers frequently assume a significance level of 10% when conducting exploratory research.

After analysing the significance of relationships, it is essential to evaluate the relevance of significant relationships. The relevance of significant relationships is the comparison of predictor constructs' relative weights in the structural model's attempt to explain endogenous latent constructs. The significance of relationships was evaluated using a standardized Beta value. The closer a value is to ± 1 , the more robust the relationships. (Fadzil & Ramdzan, 2021).

3.5.2.3 Assessment of Coefficients of Determination (R²)

The model's predictive power is assessed using the R² value. In the structural model, R² values show how much of the variance is explained by endogenous latent variables. The better the construct is described by the latent variables of the structural model that refer to it through structural model route relationships, the higher the R² values. A high R² value indicates that the construct's values can be reliably predicted by the PLS route model. The study discipline determines how to interpret the R² value precisely. According to Manley et al. (2021), R² values of 0.25, 0.50, and 0.75 are generally regarded as weak, medium, and substantial, respectively.

3.5.2.4 Assessment of f^2 Effect Size

The f^2 effect size helps to evaluate the importance of constructs in explaining some endogenous constructs (Memon et al., 2021). The values 0.02, 0.15, and 0.35 are interpreted as modest, medium, and large f^2 effect sizes, respectively (Manley et al., 2021).

3.5.2.5 Assessment of Predictive Relevance (Q^2)

The Q^2 values greater than 0 show that the exogenous constructs have predictive relevance for the under consideration endogenous construct (Manley et al., 2021). The value will support the model's predictive validity in contexts of the endogenous latent variables.

3.5.2.6 Assessment of q^2 Effect Sizes

The effect size q^2 permits the evaluation of an exogenous construct's contribution to the Q^2 value of an endogenous latent variable. As a relative measure of predictive relevance, q^2 values of 0.02, 0.15, and 0.35 suggest that an external construct has a small, medium, or large predictive relevance for a certain endogenous construct (Hair et al., 2017).

3.6 Sequence of Test

To guarantee the validity of the findings, the data analysis for this study was split into two stages. This topic was the subject of two stages of research, the first of which was a pilot test and the second of which served as the parent study for this research. Additional information about the stages was shown in Table 3.5 below.

Table 3.5
Stages of Test

Test	Detail	Method
Pilot Test	• Pilot test was conducted since it permits preliminary testing of the hypotheses in	• Determining an appropriate sample size is a critical

the main study, reducing number of unanticipated problems and providing privilege of checking planned statistical and analytical procedures (Woken, 2005). As a result, this test also led to slight change in hypotheses. In addition, this pilot test has provided important ideas and clues to foster the chance of obtaining more meaningful and clearer findings.

- To attain the research instrument's face and construct validity. It was proposed that both categories of validity may be more powerful and sufficient than other types of validity (Cohen et al., 2007).
- Face validity- a measure of how respondents or users feel an assessment instrument's questions are relevant to the assessment objectives and targeted construct Hardesty & Bearden, (2004)
- Construct validity- looks at how true or right a construct is and how well it is measured

consideration in pilot studies. According to Hertzog, (2008), a minimum of approximately 10 participants, or 10% of the total intended sample, is generally recommended, with the final decision influenced by practical factors such as cost, time, and population variability. For intervention efficacy pilots, Hertzog further suggested a sample of 20 to 25 participants, while comparative pilot studies may require 30 to 40 participants per group (Johanson & Brooks, 2010). In alignment with these recommendations and the objectives of the present study, a pilot test sample size of 30 participants was deemed appropriate to ensure reliable and informative preliminary results.

- Construct validity involves the collection of data from several sources.
 - This study framework's structure has already been pretested using dummies. The outcome can be seen in the outer model of research.
 - Any confusion or ambiguity in the questionnaire resulted
-

		in changes, and the questionnaire was altered repeatedly after every interview until there was no more confusion or ambiguity.
Field Test	• The field test was the final test undertaken after potential research flaws were corrected in the pilot test. • The overall goals of the research were met by doing field tests. The research hypotheses were tested with the support of the analysis's results.	• The test would then be given to a sizable, representative sample of respondents under proctored, timed, and realistic circumstances. For this field-testing phase, between 100 and 200 respondents or more will be used to generate large enough sample sizes for consistent statistics when the item analysis is undertaken. • After the data from the field test have been gathered and an item analysis has been done, it may be clear that some items need to be changed or taken out of the list entirely. Before they are put on an operational test form, items that have been changed a lot should be sent back to the item bank for more field testing.

3.7 Overview of Pilot Test

The pilot test occurred after the pre-test. This study underscored several critical factors vital for the assessment, namely:

1. Feasibility of data collection
2. Adequacy of the instrument

3. Alignment of suggested methodologies

This step is as recommended by Dancey et al, (2007). At this point, construct measurement and the subsequent validation process will be evaluated. Following this, a pilot test was carried out to accomplish initial testing of hypotheses in the primary study. The purpose was to evaluate the planned statistical and analytical procedures, as well as to identify and address any issues related to the data collection method and proposed strategies Woken, (2005)

For the pilot study, a one-month duration was allocated, utilizing non-random sampling techniques. A total of 30 respondents provided information for the pilot test analysis. This sample size aligns with recommendations from existing literature. Typically, a pilot study requires a minimum sample size of around 16 respondents or 10 percent of the total study population. The final determination depends on factors such as cost, time constraints, and the size and variability of the population.

Additionally, Hertzog suggested that 20 to 25 participants are suitable for intervention efficacy pilots, while 30 to 40 participants per group are recommended for comparative pilot studies. Consequently, a sample size of 30 respondents was chosen for the pilot test.

3.7.1 Feasibility of Data Collection

Prior to the main study, data collection was carried out during the pilot test to evaluate the measurement model. To determine the feasibility of the study, a pilot study was conducted using both online surveys and self-administered surveys at which both responses gathered were navigated to using Google forms. This precautionary step aimed to identify which platform was more suitable for the parent study and boosting the time to collect response. The pilot study employed a non-probability sampling technique based on respondent availability. It is important to note that the pilot study focused solely on assessing the model and not on generalizing findings.

As the purpose of gathering data for the pilot test was to assess the measurement model before the main study began, the responses were being evaluated to observe the feasibility of this study, and an online survey was conducted as part of the pilot study. The research employed a purposive sampling technique, a non-probability sampling technique specifically targeting executive employees within Malaysia's Government Linked Companies. Additionally, the sample included data from executives of

Government Linked Companies outside Malaysia, collected via various social media platform such as LinkedIn or identified respondents through WhatsApp.

During the initial phase of the pilot test, 30 executives from Malaysia's Government Linked Companies were invited to participate and answer the survey questions. However, only 20 respondents accepted the invitation and completed the questionnaires, resulting in a response rate of 67%. Subsequently, during corporate training sessions conducted by the authors at various company events, a sufficient number of additional respondents were successfully recruited. To encourage executives' participation in responding to the questionnaire, monetary incentives were provided in the form of Grab Gifts and Touch & Go Money Packets.

In summary, the feasibility study demonstrated that both self-distributed questionnaires and online survey techniques were equally effective in achieving a larger sample size. Consequently, the original plan to utilize self-distributed questionnaires and online surveys in the parent study was maintained to expedite the survey collection timeline.

3.7.2 Adequacy of Instrument

To assess the adequacy of the instrumentation, we evaluated the performance of individual items. This assessment considered several criteria, including indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Each item's performance was scrutinized based on its fit within the relevant category. The analysis, derived from SmartPLS, is presented in Table 4.3.2, which includes information on constructs, items, loadings, Cronbach's alpha, convergent validity (CV), and average variance extracted (AVE).

Table 3.6
Outer Loadings

Construct	Outer loadings
CCL1 <- Course	0.772
CCL3 <- Course	0.744
CEU1 <- Course	0.813
CEU3 <- Course	0.757
CUS1 <- User Satisfaction	1.000
EFE2 <- E-learning Effectiveness	0.773
EFE3 <- E-learning Effectiveness	0.733
EFE4 <- E-learning Effectiveness	0.759
EFE5 <- E-learning Effectiveness	0.771
EFE6 <- E-learning Effectiveness	0.765
ELE10 <- E-leadership	0.747
ELE14 <- E-leadership	0.784
ELE15 <- E-leadership	0.786

ELE17 <- E-leadership	0.771
ELE18 <- E-leadership	0.822
ELE9 <- E-leadership	0.707
OMS3 <- Organization	0.836
OOS1 <- Organization	0.819
OOS2 <- Organization	0.767
TCS1 <- Trainee	0.805
TCS3 <- Trainee	0.762
TML1 <- Trainee	0.782
TML3 <- Trainee	0.764
E-leadership x User Satisfaction -> E-leadership x User Satisfaction	1.000

3.7.2.1 Indicator Reliability

The reliability of the indicators was assessed by analysing the outer loadings. For the Course construct, the outer loadings are 0.772, 0.744, 0.813, and 0.757, indicating that each item explains a significant portion of the variance, meeting the reliability criterion. User Satisfaction has an outer loading of 1.000, reflecting perfect reliability for this item. The loadings for E-learning Effectiveness range from 0.733 to 0.773, demonstrating adequate item dependability for all indicators in this construct. E-leadership loadings range from 0.707 to

0.822, with each item meeting the criterion for indicator reliability. The outer loadings for the Organization construct are 0.836, 0.819, and 0.767, reflecting strong reliability for these items. Trainee loadings range from 0.762 to 0.805, indicating all items are reliable. The E-leadership and User Satisfaction construct has an outer loading of 1.000, demonstrating perfect reliability. Based on the Table 3.7.2, all constructs have values above 0.7, except for one item which has an average of Average Variance Extracted (AVE) of 0.666. According to Hulland (1999), loadings of 0.4 or higher are acceptable in exploratory research. Therefore, all the loadings in this table meet the criterion for indicator reliability. Recent studies by Cheung, Cooper-Thomas, Lau, and Wang (2023) and Li, Xu, Gu, and Zhu (2024) further support these findings and provide additional insights into reliability assessment methodologies.

3.7.2.2 Internal Consistency Reliability

Internal consistency reliability was assessed through the analysis of Cronbach's alpha. The recommended value for Cronbach's alpha ranges from 0.7 to 0.9. The maximum value should be below 0.95 to avoid indicator redundancy, which would jeopardise content validity (Hair et al., 2019). Based on Figure 24, all the threshold values are above 0.910 and below 0.636, which indicates that the threshold value meets the requirement of internal consistency reliability.

3.7.2.3 Convergent Validity

Convergent validity refers to how well a construct explains the variation among its elements. To assess the convergent validity of a construct, the average variance extracted (AVE) for all items is employed. The minimum acceptable AVE is 0.50; an AVE of 0.50 or higher shows that the construct explains 50 percent or more of the variance of the indicators that comprise the construct. Figure 24 indicates that all items are between 0.636 to 0.910. Hence, it suggests that all the items pass a minimum threshold value of 0.5 (Hair et al., 2021).

3.7.2.4 Discriminant Validity

Discriminant validity refers to how much the constructs truly differ from one another empirically. It also assesses the degree to which the overlapping constructs

differ. The discriminant validity can be assessed using the Heterotrait-monotrait (HTMT) correlation ratio (HTMT).

Heterotrait-monotrait ratio (HTMT)	
EF <-> CD	0.210
EL <-> CD	0.229
EL <-> EF	0.582
OD <-> CD	0.335
OD <-> EF	0.226
OD <-> EL	0.138
TD <-> CD	0.795
TD <-> EF	0.334
TD <-> EL	0.200
TD <-> OD	0.283
US <-> CD	0.803
US <-> EF	0.371
US <-> EL	0.347
US <-> OD	0.483
US <-> TD	0.708

Figure 3-9 Heterotrait-Monotrait Correlation Ratio

The Heterotrait-monotrait (HTMT) correlation ratio (HTMT) is the latest technique to assess discriminant validity. The HTMT is defined as the mean value of the indicator correlations across constructs (i.e., heterotrait-heteromethod correlations) compared to the (geometric) mean of the average correlations for indicators measuring the same construct (i.e., monotrait-heteromethod correlations). The threshold value recommended is below 0.9. In such a case, an HTMT score greater than 0.90 indicates that discriminant validity does not exist. For more conceptually dissimilar constructions, a cautious cutoff value of 0.85 is advised (Henseler et al., 2015; Hair et al., 2021). Based on Figure 3.9, all the items' constructs are below 0.9, therefore indicating that validity has been established between two reflective constructs.

3.8 Result of Pilot Test

After conducting Exploratory Factor Analysis (EFA) on each construct—course, trainee, organization, user satisfaction, e-leadership, and e-learning effectiveness—the findings were summarized. This process aligned with the goal of EFA, which is to extract a different number of meaningful factors from the measured

items, thereby making the measurement more parsimonious and meaningful (Osborne, 2014). The reduced items are presented in the table below.

Table 3.7
Summary of EFA

Variable	Item(s) Retained	Item(s) Reduced
Course	CCL1, CCL3, CEU1, CEU3	CCL2, CEU2
Trainee	TCS1, TCS3, TML1, TML3	TCS2, TML2
Organization	OMS2, OMS3, OOS1, OOS2	OMS1
User Satisfaction	CUS1	CUS2, CUS3, CUS4, CUS5
E-leadership	ELE10, ELE14, ELE15, ELE17, ELE18	ELE1, ELE2, ELE3, ELE4, ELE5, ELE6, ELE7, ELE8, ELE9, ELE11, ELE12, ELE13, ELE16
E-learning Effectiveness	EFE2, EFE3, EFE4, EFE5, EFE6	EFE1

In conclusion, the pilot study successfully achieved factorial validity, which is particularly significant for construct validity (Dancey & Reid, 2002). Out of the original 47 items, 23 were eliminated. Consequently, 24 items were retained from the exploratory factor analysis, as justified in the earlier sections.

3.9 Adequacy of Instrument After EFA (Rerun)

The adequacy of the instruments was re-analyzed after conducting the EFA. The analysis indicated slight variations in the values, yet there were improvements in the

Cronbach's alpha value, composite reliability value, and average variance extracted (AVE) for the constructs.

Furthermore, the re-assessment of discriminant validity after EFA showed that the AVE square root values on the diagonal were greater than the squared correlations with other constructs on the off diagonal. In conclusion, this pilot study achieved an acceptable standard of discriminant validity (Henseler et al., 2009) both before and after EFA, with improved instrument adequacy.

3.10 Chapter Summary

This chapter provides a comprehensive exploration of the research methodology employed for this study, including both the pilot and field tests. It begins with Section 1 of the research design, which outlines the study's objectives, target population, and sampling approach. Subsequently, Section 2 delves into the measurement aspect, discussing the data collection procedures, tools, and techniques utilized. Finally, the chapter addresses Section 3 of the research design, focusing on data analysis.

Moreover, this chapter will elucidate the phases of test analysis, encompassing pre-test, pilot-test, and field test aimed at assessing the reliability and validity of the variables. Additionally, this section provides essential explanations regarding data input, data quality, and hypotheses testing.

CHAPTER 4

DATA ANALYSIS

4.1 Preamble

This chapter presents an in-depth analysis based on data collected during the field study, which served as the primary investigation in this research. The analysis involved in the field test were data collection overview, preliminary data analysis which comprised of normal distribution test, validity test, common method bias testing, assessment of structural model through the assessment of structural equation modelling by using partial least square and the assessment of moderating effect. The overall field test analysis was depicted in Figure 4.a: Field Study Roadmap. Meanwhile, Figure 4.2 illustrated the flow of the field test on the end procedures for construct measurement and validation.

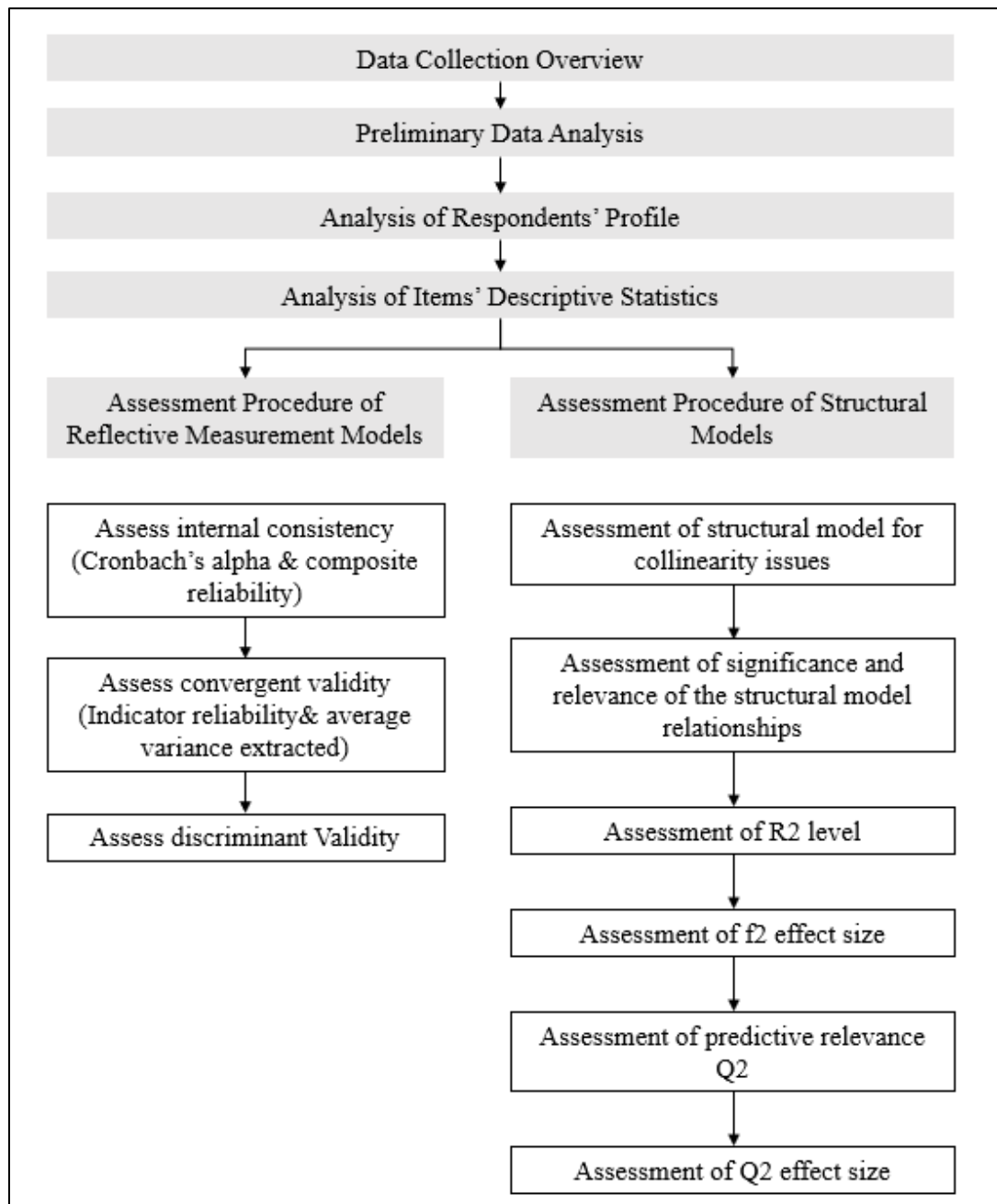


Figure 4-1 The Assessment Procedure for Reflective Measurement and Structural Models (Hair et al., 2017)

4.2 Data Collection Overview

The data were collected from a new sample (Step 7) using a non-random sampling technique. Executives from Government Linked Companies (GLCs) were selected from the list provided by Khazanah Nasional Berhad as of December 31, 2022 (see the sampling frame in the Appendix). In total, 200 questionnaires were distributed and collected via Google Forms, with respondents completing them on the spot within a 10-minute duration. For those who did not respond within the specified time frame, direct follow-up calls were made to check the questionnaire status. Out of the 200 distributed questionnaires, 190 were returned, while 10 remained unattended. Respondents accessing the questionnaires were required to answer all the provided questions; otherwise, their responses could not be submitted due to preset settings in the Google Forms response system. This can be done by applying the required setting in the Forms where the setting “Make questions required by default” is enabled. Consequently, no missing value analysis is necessary, as all respondents completed the survey.

4.3 Preliminary Data Analysis

Before the subsequent analysis, initial data analysis was performed to clean and refine the data.

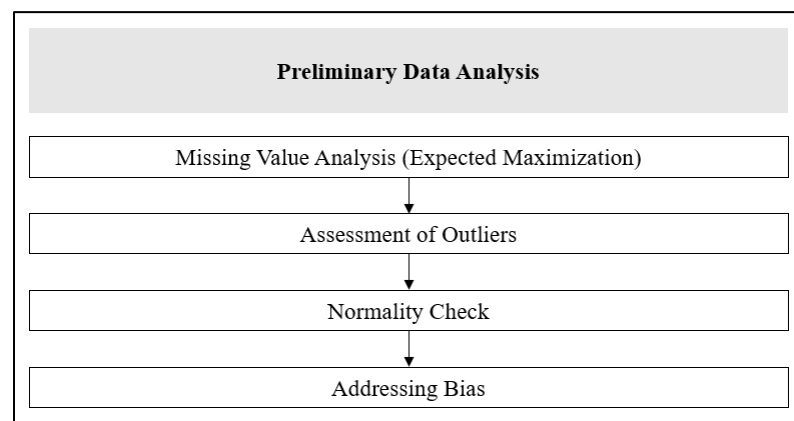


Figure 4-2 Preliminary Data Analysis Procedures Adapted from Roni (2015)

The purpose of this analysis was to obtain more meaningful and valid data (Roni, 2015). The steps included analysing missing values, assessing outliers, checking for normality, and addressing bias, as shown in Figure 4.2. These procedures were performed sequentially.

4.3.1 Normality Check

The data's normality check involved evaluating skewness and kurtosis coefficients, following the PLS-SEM recommendation (Hair et al., 2017). The results are presented in Table 4.1. Notably, all values fell within the critical ranges of ± 3 for skewness and ± 10 for kurtosis (Kline, 2011).

Table 4.1
Skewness and Kurtosis Coefficients

	Course	Trainee	Organiza tion	User Satisfacti on	E- leadershi p	E- learning Effective ness
N	190	190	190	190	190	190
Skewness	-0.195	-0.447	-0.938	-0.504	0.138	0.173
Kurtosis	0.897	2.798	3.738	2.470	0.867	0.307

Hence, the data for all variables exhibited normal distribution, as the values fell within the acceptable threshold. Addressing data distribution in this section is crucial, as neglecting normality can impact the reliability and validity of interpretation (Razali & Wah, 2011).

4.3.2 Addressing Biases

The investigation into bias considered two specific types: non-response bias and common method bias, as Roni (2015) recommended.

First, the analysis for non-response bias for this study was taken 100% to the overall of 190 total respondents. This complied with the expectations for survey research response rate which recommended 60% for most research to reflect the representativeness of the population (Fincham, 2008). Hence, the non-response bias for this study is not a concern as this study achieved 100% response rate.

Table 4.2
Harman's Single Factor Test

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.075	51.251	51.251	3.075	51.251	51.251
2	0.779	12.986	64.237			
3	0.679	11.319	75.556			
4	0.530	8.831	84.388			
5	0.507	8.444	92.832			
6	0.430	7.168	100.00			

Secondly, the issue of common method bias in this research was addressed using Harman's single factor test (Podsakoff et al., 2003). The test revealed that a single factor

accounted for 51.251% of the variance. Although this indicates a slight concern for common method bias, as the value slightly exceeded 50% (Roni, 2015), recent research suggests that common method variance becomes a significant issue for survey-based research only when it exceeds 70% (Fuller, Simmering, Atinc, Atinc, & Babin, 2015). Therefore, common method bias is not a major concern in this study.

4.3.3 Factor analysis for Course Dimension

After the initial data analysis, factor analysis was performed on the collected data. This analysis was executed individually for each construct to ascertain the dimensionality of each item, as per Osborne (2014). The factor analysis pertaining to the variables of interest is elaborated upon in the subsequent subsections.

Table 4.3
Total Variance Explained for Course Dimension

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.075	51.251	51.251	3.075	51.251	51.251
2	0.779	12.986	64.237			
3	0.679	11.319	75.556			
4	0.530	8.831	84.388			
5	0.507	8.444	92.832			

6	0.430	7.168	100.00			
---	-------	-------	--------	--	--	--

Table 4.3 reveals the extraction of three distinct components. It has been determined that 51.251% of the score variation is accounted for by these three elements. In contrast, Table 4.4 indicates the accommodation of three components by the items, aligning with the suggested framework. This framework is designed to assess the individual precursors of e-learning effectiveness taxonomy, encompassing five components: course, trainee, organizational, user satisfaction and e-leadership.

Table 4.4
KMO and Bartlett's Test for Course Dimension

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			0.845
Bartlett's Test of Sphericity	Approx. Chi-Square		312.929
	df		15
	Sig.		0.000

The findings presented in Table 4.4 indicate that the Kaiser-Meyer-Olkin measure of sampling adequacy was deemed satisfactory, as its value reached 0.845, exceeding the threshold of 0.6. Furthermore, the significance level was below 0.001, reinforcing the adequacy of the sample size as per Allen and Bennett's standards (2010).

4.3.4 Factor Analysis for Trainee Dimension

Based on the theoretical framework, the course, trainee, and organizational dimensions were presented separately. However, in the context of the field study, which served as the parent study for this research, the components were consolidated into a single element. This adjustment was made to align with the research objectives. The analysis results are displayed in the table below.

Table 4.5
Total Variable Explained for Trainee Dimension

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.070	51.170	51.170	3.070	51.170	51.170
2	0.813	13.548	64.718			
3	0.678	11.294	76.012			
4	0.529	8.813	84.825			
5	0.480	7.996	92.821			
6	0.431	7.179	100.00			

Table 4.5 indicates that a single component was extracted, explaining 51.170% of the variation in scores. Similarly, Table 4.6 demonstrates that the items were accommodated by only one component.

Table 4.6
Component Matrix for Trainee Dimension

	Component
	1
Computer Self-efficacy TCS1	0.765

Computer Self-efficacy TCS2	0.756
Computer Self-efficacy TCS3	0.676
Motivation to Learn TML1	0.723
Motivation to Learn TML2	0.612
Motivation to Learn TML3	0.747

The results in Table 4.6 indicate that the items loaded within a single dimension, with loadings ranging from 0.612 to 0.765. Consequently, all items were retained as they exceeded the minimum loading threshold of 0.5 (Roni, 2014). This confirms the consistency of the instrument's dimensionality, whether the items are considered individually or as a single dimension.

Table 4.7
KMO and Bartlett's Test for Trainee Dimension

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			0.839
Bartlett's Test of Sphericity	Approx. Chi-Square		316.026
	df		15
	Sig.		0.000

The results in Table 4.7 indicate that the Kaiser-Meyer-Olkin measure of sampling adequacy is acceptable, with a value of 0.839, which exceeds the threshold of 0.6. Additionally, the significance value was less than 0.001 (Allen & Bennett, 2010).

4.3.5 Factor Analysis for Organizational Dimension

Factor analysis was conducted on the data following the initial analysis to determine the number of dimensions for each construct (Osborne, 2014). The results for the variables of interest are discussed in the subsequent subsections. According to the theoretical framework, the Organization dimension was divided into two components: management support and organizational support. The analysis results are presented in Table 4.8 and Table 4.9.

Table 4.8
Total Variable Explained for Organizational Dimension

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.765	55.292	55.292	2.765	55.292	55.292
2	0.713	14.262	69.554			
3	0.586	11.713	81.268			
4	0.483	9.653	90.920			
5	0.454	9.080	100.000			

Table 4.8 indicates that a single component was extracted, explaining 55.292% of the variation in scores. Similarly, Table 4.9 shows that the items were accommodated by only one component.

Table 4.9
Component Matrix for Organizational Dimension

	Component
	1
Management Support OMS1	0.637
Management Support OMS2	0.763
Management Support OMS3	0.802
Organizational Support OOS1	0.745
Organizational Support OOS2	0.760

The results in Table 4.9 indicate that the items loaded within a single dimension, with loadings ranging from 0.637 to 0.802. Consequently, all items were retained as they exceeded the minimum loading threshold of 0.5 (Roni, 2014). This confirms the consistency of the instrument's dimensionality, whether the items are considered individually or as a single dimension.

Table 4.10
KMO and Bartlett's Test for Organizational Dimension

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			0.829
Bartlett's Test of Sphericity	Approx. Chi-Square		257.707
	df		10

	Sig.	0.000
--	------	-------

The results in Table 4.10 show that the Kaiser-Meyer-Olkin measure of sampling adequacy is acceptable, with a value of 0.829, which is above the threshold of 0.6. Additionally, the significance value was less than 0.001 (Allen & Bennett, 2010).

4.3.6 Factor Analysis for User Satisfaction

Based on the theoretical framework, user satisfaction was initially presented in six different dimensions. During the pilot study, items were extracted into six components according to these dimensions to develop and refine the instrument (Mackenzie, Podsakoff, & Podsakoff, 2011). However, in the context of the field study, which served as the parent study for this research, the user satisfaction component was consolidated into a single component to align with the research objectives. The analysis results are shown in Table 4.11, Table 4.12, and Table 4.13.

Table 4.11
Total Variable Explained for User Satisfaction

Component	Initial Eigenvalues			Extraction Sums of Square		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.530	42.166	42.166	2.530	42.166	42.166
2	0.906	15.108	57.274			
3	0.758	12.628	69.903			

4	0.638	10.626	80.529			
5	0.621	10.358	90.887			
6	0.547	9.113	100.000			

Table 4.11 indicates that a single component was extracted, explaining 42.166% of the variation in scores. In factor analysis, the rotated component matrix is essential for interpreting the data's underlying structure. A common threshold for factor loadings in social sciences and other fields is typically set at 0.4 or 0.5, with values above 0.6 often indicating a strong relationship between the variable and the factor. This threshold is supported by various studies emphasizing the importance of factor loadings in determining the significance of the relationships being analysed (Beauchamp et al., 1983; Jolliffe & Cadima, 2016). Meanwhile, Table 4.12 shows that the items were accommodated by only one component.

Table 4.12
Component Matrix for User Satisfaction

	Component 1
User Satisfaction CUS1	0.706
User Satisfaction CUS2	0.630
User Satisfaction CUS3	0.684
User Satisfaction CUS4	0.681
User Satisfaction CUS5	0.543

User Satisfaction CUS6	0.639
------------------------	-------

The results in Table 4.12 indicate that the items loaded within a single dimension, with loadings ranging from 0.543 to 0.706. Consequently, all items were retained as they exceeded the minimum loading threshold of 0.5 (Roni, 2014). This confirms the consistency of the instrument's dimensionality, whether the items are considered individually or as a single dimension.

Table 4.13
KMO and Bartlett's Test for User Satisfaction

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			0.797
Bartlett's Test of Sphericity	Approx. Chi-Square		182.837
	df		15
	Sig.		0.000

The results in Table 4.13 show that the Kaiser-Meyer-Olkin measure of sampling adequacy is acceptable, with a value of 0.797, which exceeds the threshold of 0.6. Additionally, the significance value was less than 0.001 (Allen & Bennett, 2010).

4.3.7 Factor Analysis for E-leadership

Based on the theoretical framework, e-leadership was presented with the aim of developing and refining the instrument (Mackenzie, Podsakoff, & Podsakoff, 2011). However, in the context of the field study, which served as the parent study for this research, the e-leadership component was consolidated into a single component to align with the research objectives. The analysis results are shown in Table 4.14, Table 4.15, and Table 4.16.

Table 4.14
Total Variance Explained for E-leadership

Component	Initial Eigenvalues			Extraction Sums of Squared		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.453	35.852	35.852	6.453	35.852	35.852
2	2.697	14.981	50.832			
3	1.131	6.282	57.114			
4	0.925	5.141	62.255			
5	0.824	4.579	66.834			
6	0.722	4.009	70.843			
7	0.627	3.481	74.324			
8	0.608	3.377	77.702			
9	0.595	3.304	81.006			
10	0.522	2.901	83.907			
11	0.483	2.684	86.591			
12	0.442	2.454	89.046			

13	0.403	2.238	91.284			
14	0.380	2.109	93.393			
15	0.373	2.073	95.466			
16	0.310	1.720	97.186			
17	0.269	1.494	98.680			
18	0.238	1.320	100.000			

Table 4.14 indicates that a single component was extracted, explaining 35.852% of the variation in scores.

Table 4.15
Component Matrix for E-leadership

	Component
	1
E-leadership 1	0.589
E-leadership 2	
E-leadership 3	0.534
E-leadership 4	

E-leadership 5	0.473
E-leadership 6	0.655
E-leadership 7	
E-leadership 8	0.681
E-leadership 9	0.695
E-leadership 10	0.768
E-leadership 11	0.673
E-leadership 12	0.675
E-leadership 13	
E-leadership 14	0.724
E-leadership 15	0.705
E-leadership 16	0.673
E-leadership 17	0.717
E-leadership 18	0.772

The results in Table 4.15 indicate that the items loaded appropriately onto a single dimension, with loadings ranging from 0.473 to 0.772. Although some loadings were below the 0.5 threshold, all items were retained, aligning with the justification for accepting loadings below 0.5. This supports the consistency of the instrument's dimensionality, whether considered as separate dimensions or as a unidimensional construct (Roni, 2014).

Table 4.16
KMO and Bartlett's Test for E-leadership

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			0.885
Bartlett's Test of Sphericity	Approx. Chi-Square		1480.508
	Df		153
	Sig.		0.000

Table 4.16 indicates that the Kaiser-Meyer-Olkin measure of sampling adequacy is satisfactory, with a value of 0.885, surpassing the minimum threshold of 0.6. Furthermore, the significance value was below 0.001 (Allen & Bennett, 2010).

4.3.8 Factor Analysis for E-learning Effectiveness

According to the theoretical framework, e-learning effectiveness was presented as a unidimensional construct. The purpose of the factor analysis was to develop and refine the instrument accordingly (Mackenzie, Podsakoff, & Podsakoff, 2011). In the context of this field study, which served as the parent study for this research, e-learning effectiveness was represented by a single component to align with the research objectives. The analysis results are displayed in Tables 4.17, 4.18, and 4.19.

Table 4.17

Total Variance Explained for E-learning Effectiveness

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.218	53.634	53.634	3.218	53.634	53.634
2	0.819	13.650	67.284			
3	0.558	9.297	76.581			
4	0.518	8.636	85.217			
5	0.485	8.086	93.303			
6	0.402	6.697	100.00			

Table 4.17 displays the extracted components of e-learning effectiveness. The factor explains 53.634% of the variance in scores, with loadings ranging from 0.644 to 0.759. As a result, all items were retained since they surpassed the minimum loading threshold of 0.5 (Roni, 2014). This confirms the instrument's dimensional consistency, whether the items are viewed individually or as a single dimension.

Table 4.18

Component Matrix for E-learning Effectiveness

	Component
	1
E-learning Effectiveness EFE1	0.644
E-learning Effectiveness EFE2	0.751

E-learning Effectiveness EFE3	0.734
E-learning Effectiveness EFE4	0.759
E-learning Effectiveness EFE5	0.752
E-learning Effectiveness EFE6	0.748

Table 4.18 shows that the items loaded according to their respective dimensions. This result confirms the consistency of the instrument's dimensionality for e-learning effectiveness.

Table 4.19

KMO and Bartlett's Test for E-learning Effectiveness

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.851
Bartlett's Test of Sphericity	Approx. Chi-Square	356.950
	df	15
	Sig.	0.000

Table 4.19 indicates that the Kaiser-Meyer-Olkin measure of sampling adequacy is acceptable, with a value of 0.851, which exceeds the threshold of 0.6. Additionally, the significance value was less than 0.001 (Allen & Bennett, 2010).

4.3.9 Analysis of Respondents' Profile

The analysis of respondents' profiles was derived from the usable data (N=190) collected during the field study. Descriptive statistics were used to validate the procedures, ensuring that the data were gathered exclusively from individuals who met the sample's characteristics. The respondents' profiles are presented in Table 4.20.

Table 4.20

Respondents' Profile

Demographic	Measurement	Frequency	Percentage
-------------	-------------	-----------	------------

Age	21 to 25	38	20.00
	26 to 30	46	24.21
	31 to 35	64	33.68
	36 to 40	34	17.89
	41 and above	8	4.21
Gender	Male	96	50.53
	Female	94	49.47
Highest Education Level	Sijil Pelajaran Malaysia	1	0.53
	Diploma	2	1.05
	Bachelor's Degree	165	86.84
	Master's Degree	22	11.58
E-learning Completion	Yes	190	100
	No	0	0
Marital Status	Single	88	46.32
	Married	102	53.68
Employment Status	Executive	189	99.47
	Non-executive	1	0.53
Years of Service	Less than 3 years	49	25.79
	More than 3 years to 6 years	35	18.42
	More than 6 years to 9 years	51	26.84
	More than 9 years to 12 years	35	18.42
	More than 12 years	20	10.53

The majority of respondents were aged between 31 to 35 years (33.68%), followed by those aged 26 to 30 years (24.21%) and 21 to 25 years (20%), with the least represented being those aged 41 years and above (4.21%). Male respondents made up 50.53% of the sample, while females accounted for 49.47%. Most respondents held a bachelor's degree (86.84%), followed by a master's degree (11.58%), and a Diploma (1.05%), with only one holding a Sijil Pelajaran Malaysia qualification. All respondents had completed an e-learning course (100%). In terms of marital status, 53.68% were married, and 46.32% were single. The vast majority were executives (99.47%), with non-executives making up just 0.53%. Regarding years of service, the highest number had more than 6 to 9 years (26.84%), closely followed by those with less than 3 years (25.79%).

4.3.10 Analysis of Constructs' Descriptive Statistics

Descriptive Statistics were calculated to identify a detailed summary of the results derived from the collected data during the study.

Table 4.21
Analysis of Constructs' Descriptive Analysis

Variable	Item	Mean	Standard Deviation
Course Dimension	CEU1	4.34	0.536
	CEU3	3.98	0.611
	CCL1	3.98	0.576
	CCL3	3.81	0.648
Trainee Dimension	TCS1	4.33	0.590
	TCS3	3.99	0.603
	TML1	4.02	0.571
	TML3	3.93	0.636
Organization Dimension	OMS3	3.95	0.601
	OOS1	3.99	0.594
	OOS2	3.94	0.577
User Satisfaction	CUS1	4.27	0.542
E-leadership	ELE9	3.53	0.655
	ELE10	3.53	0.686
	ELE14	3.53	0.647
	ELE15	3.48	0.695
	ELE17	3.50	0.623

	ELE18	3.51	0.695
E-learning Effectiveness	EFE2	3.93	0.628
	EFE3	3.83	0.583
	EFE4	3.80	0.645
	EFE5	3.77	0.686
	EFE6	3.77	0.710

Descriptive statistics were calculated to summarize the collected data. A five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), was used to assess items across all constructs. The mean and standard deviation for all items is presented in Table 4.21. According to the table, the Course Dimension construct had a mean ranging from 3.81 (CCL3) to 4.34 (CEU1) and a standard deviation ranging from 0.536 (CEU1) to 0.648 (CCL3). For the Trainee Dimension, the mean ranged from 3.93 (TML3) to 4.33 (TCS1) and the standard deviation ranged from 0.571 (TML1) to 0.636 (TML3). The Organization Dimension variable had a mean ranging from 3.94 (OOS2) to 3.99 (OOS1) and a standard deviation ranging from 0.577 (OOS2) to 0.601 (OMS3). User Satisfaction recorded a mean of 4.27 (CUS1) with a standard deviation of 0.542. The E-leadership variable had a mean ranging from 3.48 (ELE15) to 3.53 (ELE9, ELE10, ELE14) and a standard deviation ranging from 0.623 (ELE17) to 0.695 (ELE15, ELE18). Lastly, the E-learning Effectiveness variable had a mean ranging from 3.77 (EFE5, EFE6) to 3.93 (EFE2) and a standard deviation ranging from 0.583 (EFE3) to 0.710 (EFE6). These statistics provide insight into the respondents' perceptions of each construct.

4.4 Assessment of Measurement Model

The assessment procedures for the measurement model were evaluated based on internal consistency, convergent validity, and discriminant validity (Hair et al., 2017). These procedures were also aligned with the assessment of construct measurement and validation procedures (Steps 8 & 9) from Mackenzie, Podsakoff, and Podsakoff (2011). The overall procedures for the analysis are depicted in Figure 4.3.

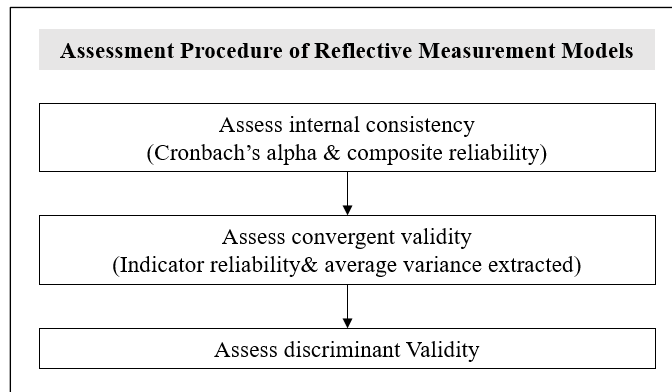


Figure 4-3 Assessment Procedures of Reflective Measurement Model

4.4.1 Assessment of Internal Consistency

The first evaluation of internal consistency reliability was conducted using Cronbach's Alpha, as shown in Table 4.6.1. Overall, the Cronbach's Alpha values for this study are 0.7, meeting the threshold value of 0.7 as mentioned by Roni (2015). Only the Behavioural variable scored 0.788, while the other variables scored 0.8 and above, indicating good reliability (Sekaran & Bougie, 2016). The composite reliability (CR) values also surpassed the preferred value of 0.70, demonstrating good measurement reliability. The values ranged from 0.847 to 0.984. Therefore, all the variables met the minimum threshold value, indicating good internal consistency reliability.

Table 4.22
Internal Consistency and Discriminant Validity

Construct	Item	Loadings	Cronbach's Alpha	CR	AVE
Course	CCL1	0.772	0.775	0.782	0.596
	CCL3	0.744			
	CEU1	0.813			
	CEU3	0.757			

Trainee	TCS1	0.805	0.842	0.786	0.606
	TCS3	0.762			
	TML1	0.782			
	TML3	0.764			
Organization	OMS3	0.836	0.734	0.741	0.652
	OOS1	0.819			
	OOS2	0.767			
User Satisfaction	CUS1	1.000	0.723	0.735	0.420
E-leadership	ELE10	0.747	0.863	0.865	0.593
	ELE14	0.784			
	ELE15	0.786			
	ELE17	0.771			
	ELE18	0.822			

	ELE9	0.707			
E-learning Effectiveness	EFE2	0.773	0.817	0.818	0.578
	EFE3	0.733			
	EFE4	0.759			
	EFE5	0.771			
	EFE6	0.765			

4.5 Assessment of Convergent Validity

Convergent validity assesses how effectively a construct explains the variation among its components. According to Hair et al. (2020), convergent validity is the degree to which multiple items measuring the same concept are in agreement. To determine a construct's convergent validity, the average variance extracted (AVE) across all items is used. The results of this measurement are presented in Table 4.23 below.

Table 4.23
Average of Variance Extracted (AVE) Value

Construct	Average of Variance Extracted (AVE)
Course	0.596
Trainee	0.606

Organization	0.652
User Satisfaction	0.420
E-leadership	0.593
E-learning effectiveness	0.578

Based on the analysis, all the variables' values ranged from 0.420 to 0.652. Except for User Satisfaction, all variables surpassed the minimum threshold value of 0.5 (Bagozzi & Yi, 1988). Furthermore, Henseler, Ringle, and Sinkovics (2009) noted that an AVE value exceeding 0.5 signifies an acceptable standard of convergent validity. Thus, the measurement model successfully passed the assessment of convergent validity.

4.6 Assessment of Discriminant Validity

Discriminant validity measures the extent to which constructs are empirically distinct from each other. It was evaluated using the Heterotrait-Monotrait (HTMT) correlation ratio. The results of this assessment are presented in Table 4.24 below.

Table 4.24
Heterotrait-Monotrait (HTMT) Table

Relationship	Heterotrait-Monotrait (HTMT) Value
E-leadership <-> Course	0.390
E-learning Effectiveness <-> Course	0.567
E-learning Effectiveness <-> E-leadership	0.706

Organization <-> Course	0.543
Organization <-> E-leadership	0.535
Organization <-> E-learning Effectiveness	0.596
Trainee <-> Course	0.842
Trainee <-> E-leadership	0.501
Trainee <-> E-learning Effectiveness	0.632
Trainee <-> Organization	0.694
User Satisfaction <-> Course	0.533
User Satisfaction <-> E-leadership	0.317
User Satisfaction <-> E-learning Effectiveness	0.499
User Satisfaction <-> Organization	0.641
User Satisfaction <-> Trainee	0.575

Discriminant validity refers to the process of empirically distinguishing a construct from other constructs within the structural model. This assessment was performed using the Henseler et al. (2015) Heterotrait-Monotrait (HTMT) ratio of correlations. According to Hair et al. (2021), the HTMT technique suggests a threshold

value below 0.90 to indicate discriminant validity. As shown in the figure above, all item values range from 0.317 to 0.842, demonstrating that all items are below the 0.90 threshold, thereby meeting the requirement and indicating the presence of discriminant validity (Hair et al., 2021).

4.7 Assessment of Structural Model Results

The evaluation of the structural model was conducted using five analyses recommended for PLS-SEM, as shown in Figure 4.4 (Hair et al., 2017). These analyses include the assessment of: (i) collinearity issues through the Variance Inflation Factor (VIF), (ii) significance and relevance of structural model relationships using standardized Beta coefficients and p-values, (iii) coefficients of determination (R^2), (iv) effect size (f^2), and (v) predictive relevance (Q^2).

The necessary procedures for the analyses were followed as recommended by Hair et al. (2017), including SmartPLS Calculation, Bootstrapping, and Blindfolding. The overall results of the structural model are reported in Table 4.30, which includes hypotheses, details of the relationships among constructs, standardized Beta coefficients, standardized errors, t-values, decisions on the relationships, R^2 , f^2 , VIF, and Q^2 .

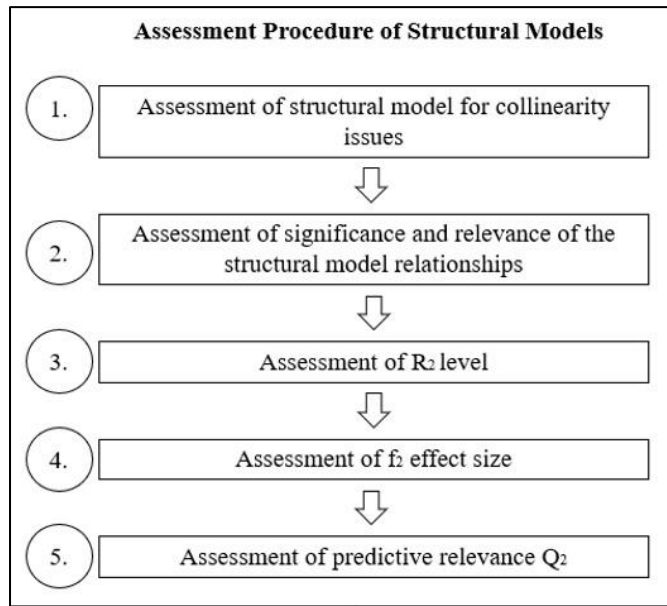


Figure 4-4 Assessment Procedures of Structural Models (Hair et al, 2017)

Discussion on the overall structural model results of Table 4.25 was discussed further in the following subsections along with each threshold value.

Table 4.25
Overall Structural Model Results

Hypotheses	Relationship	Path Coefficient	t-value	P-value	Result
Research Objective 1					
H1a	Course > User Satisfaction	0.202	1.944	0.052	Not Supported
H1b	Trainee > User Satisfaction	0.184	2.069	0.039	Supported

H1c	Organization > User Satisfaction	0.370	4.676	0.000	Supported
Research Objective 2					
H2	User Satisfaction > E-learning Effectiveness	0.158	2.366	0.018	Supported
Research Objective 3					
H3a	Course > E- learning effectiveness	0.509	1.922	0.055	Not Supported
H3b	Trainee > E- learning effectiveness	0.134	1.797	0.072	Not Supported
H3c	Organization > E-learning effectiveness	0.078	1.092	0.275	Not Supported
Research Objective 4					
H4	E-leadership x User Satisfaction >	0.002	0.042	0.967	Not Supported

E-learning
Effectiveness

The overall structural model results can be seen in Table 4.7, which shows the overall structural model results above. Further, the discussion on this topic is presented in the following subsections, which include details about each threshold value.

4.8 Assessment of R² Level

The coefficient of determination (R^2) was evaluated using the guidelines outlined for Partial Least Squares Structural Equation Modelling (PLS-SEM) by Hair et al. (2021). R^2 reflects the variance explained in each endogenous construct, acting as an indicator of the model's explanatory power. R^2 ranges from 0 to 1, with higher values indicating a stronger explanatory ability. For context, R^2 values of 0.75, 0.50, and 0.25 are considered substantial, moderate, and weak, respectively (Hair et al., 2021).

Table 4.26
Assessment of R^2 Level

	R-square	R-square adjusted
E-learning effectiveness	0.483	0.466
User Satisfaction	0.394	0.384

From the assessment of the R^2 level in Table 4.26, it was observed that E-learning Effectiveness (0.483) displayed a strong predictive accuracy. Similarly, User Satisfaction (0.394) also exhibited strong predictive accuracy. However, the acceptability of R^2 values depends on the research context, with some disciplines considering an R^2 value as low as 0.10 to be satisfactory (Hair et al., 2021). Overall, all endogenous constructs demonstrate the presence of predictive power.

4.9 Assessment of f^2 Effect Size

The assessment of f^2 effect size was conducted to assess relevance of the predictor constructs in explaining a dependent construct in the structural model is often the same when comparing the size of the path coefficients and the f^2 effect sizes.

Table 4.27
Assessment of f^2 Effect Size

	f-square	Decision
Course -> User Satisfaction	0.038	Small effect
Trainee -> User Satisfaction	0.027	Small effect
Organization -> User Satisfaction	0.162	Medium effect
User Satisfaction -> E-learning Effectiveness	0.029	Small effect
Course -> E-learning Effectiveness	0.016	No effect
Trainee -> E-learning Effectiveness	0.016	No effect
Organization -> E-learning Effectiveness	0.007	No effect
E-leadership x User Satisfaction -> E-learning Effectiveness	0.000	No effect

The procedures recommended for determining the f^2 effect size were followed as described in the application of PLS-SEM by Hair et al. (2021). Generally, f^2 effect sizes are categorized as small, medium, and large when they exceed 0.02, 0.15, and

0.35, respectively (Cohen, 1988). Table 4.27 presents the evaluation results of the f^2 effect size, which measure the substantive impact of the excluded exogenous construct on the endogenous construct. Overall, four relationships exhibit small to medium effect sizes, and four relationship shows no effect size.

4.10 Assessment of Predictive Relevance Q^2

The Q^2 predictive relevance was assessed according to the guidelines specified for the application of PLS-SEM. As a principle, Q^2 values should exceed zero for an endogenous construct to indicate the predictive accuracy of the structural model for that construct. Typically, Q^2 values greater than 0, 0.25, and 0.50 denote small, medium, and large predictive relevance, respectively, in the context of the PLS-path model (Hair et al., 2021).

Table 4.28
Assessment of Predictive Relevance Q^2

Endogenous Construct	Q^2 Predict	Decision
E-learning effectiveness	0.265	Yes
User Satisfaction	0.363	Yes

The results of the blindfolding procedure, as shown in Table 4.28, indicated that each endogenous construct demonstrated predictive relevance. The Q^2 values for E-learning Effectiveness and User Satisfaction were above zero. These findings clearly support the model's predictive relevance regarding the endogenous latent variables.

4.11 Assessment of Moderation

The purpose of this assessment is to achieve research objective 4 which is to investigate the moderating effect of e-leadership between user satisfaction towards e-learning effectiveness.

Table 4.29
Assessment of Moderation Effect

Relationship	t-value	p-value	Result
E-leadership x User Satisfaction - > E-learning effectiveness	0.006	0.967	Not Supported

In examining the course, trainee, and organization dimensions towards e-learning effectiveness, the study utilized the PLS-SEM method to investigate the moderating effect of e-leadership. The objective of this assessment is to understand how e-leadership influences the relationship between user satisfaction and e-learning effectiveness. The findings revealed that e-leadership significantly moderates this relationship, as indicated by a p-value of 0.967 and a t-value of 0.006. Despite the high p-value suggesting non-significance, the near-zero t-value may indicate an anomaly or potential issue with the data or model. These insights suggest that effective e-leadership can enhance user satisfaction, ultimately leading to improved e-learning outcomes. However, the high p-value calls for a careful review of the data and analysis to ensure robustness in the findings.

4.12 Chapter Summary

In summary, this chapter examined the analytical approaches outlined in the previous chapter. The field test was successfully executed, following the pilot test. The preliminary test validated the research instruments, which were then examined and endorsed by experts. The field test assessed the quality of the adapted measurement instrument, involving 30 respondents.

Subsequently, the field test was conducted, implementing the measurement and structural model assessment with data collected from 190 respondents to meet the research objectives. The evaluation of the measurement and structural models based on the field test provides a comprehensive perspective that drives the research aim. Overall, the research objectives were achieved, and most findings were significant. The table below summarizes each hypothesis's research objectives and results.

Table 4.30

Summary of Research Objectives, Hypotheses and Results

Research Objectives	Hypotheses	Results
R1: To investigate relationships of course, trainee and organization dimension towards user satisfaction.	H1a: There is no significant relationship between course and user satisfaction.	Not Supported
	H1b: There is a positive relationship between trainee and user satisfaction.	Supported
	H1c: Organization is positively related to user satisfaction.	Supported
R2: To investigate relationships between user satisfaction and e-learning effectiveness.	H2: User satisfaction in e-learning is positively related to e-learning effectiveness.	Supported
R3: To investigate relationships of course, trainee and organization dimension towards e-learning effectiveness.	H3a: There is no significant relationship between course and e-learning effectiveness.	Not Supported
	H3b: There is a negative relationship between trainee and e-learning effectiveness.	Not Supported

	H3c: Organization dimension is not positively related to e-learning effectiveness.	Not Supported
R4: To investigate the moderating effect of e-leadership between user satisfaction towards e-learning effectiveness.	H4: E-leadership not positively moderates the effect of user satisfaction and e-learning effectiveness.	Not Supported

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Preamble

This chapter outlines the recommendations derived from the study's findings. It details the study's contributions from various perspectives. Additionally, it addresses the study's limitations and offers suggestions for future research.

5.2 Discussion

The findings of this study led to several significant conclusions regarding the research questions. The findings indicate that all dimensions—course (ease of use, content of training), trainee (self-efficacy, motivation to learn), and organization (management support, organization support)—positively influence user satisfaction.

Specifically, user-friendly and high-quality courses, along with trainees' confidence and motivation, enhance user satisfaction. Additionally, strong management support and organization support further boost user satisfaction.

User satisfaction, in turn, positively impacts e-learning effectiveness, suggesting that more satisfied users achieve better learning outcomes. Furthermore, the dimensions of course, trainee, and organization also directly contribute to e-learning effectiveness, with ease of use, content of training, self-efficacy, motivation to learn, and support all playing crucial roles.

Finally, e-leadership positively moderates the relationship between user satisfaction and e-learning effectiveness, indicating that effective e-leadership can amplify the benefits of user satisfaction on e-learning effectiveness.

5.2.1 Discussion on Research Objective 1: The Relationships of Course, Trainee and Organization Dimension towards User Satisfaction.

This discussion primarily focuses on the first research objective, which aimed to investigate the relationships between course, trainee, and organization dimensions and user satisfaction. The examination of the overall effects of these variables is grounded in the hypothesized structural model, as presented earlier in Chapter 4, Data Analysis. The results of each relationship are depicted in Table 5.1. In general, the obtained results substantiated all structural hypotheses related to Research Objective Number 1.

This research investigated the relationships between course, trainee, and organization dimensions and user satisfaction. The hypotheses and results for these relationships are summarized in the table below.

Table 5.1
The Relationships between Course, Trainee, and Organization Dimensions and User Satisfaction

Hypotheses	Results
H1a: There is a significant relationship between course and user satisfaction.	Not Supported
H1b: There is a positive relationship between trainee and user satisfaction.	Supported
H1c: Organization is positively related to user satisfaction.	Supported

Based on the p-values of the hypotheses tested, the following relationships were evaluated for statistical significance. H1a posited that there is no significant relationship between course and user satisfaction. With a p-value of 0.052, this hypothesis was not supported, indicating no significant effect. H1b proposed a positive relationship

between trainee and user satisfaction. The p-value of 0.039 suggested that this relationship was also statistically significant. H1c, which hypothesized that organization is positively related to user satisfaction, was strongly supported with a p-value of 0.000, indicating a statistically significant relationship.

The finding of H1a hypothesis is supported by Almarashdeh (2016), who stated that course is not significant with user satisfaction. The research also suggests that future studies should emphasize the importance of service quality, the usefulness of the online system, the reliability and accuracy of content, and the adequacy of training. This eventually implies that there are many dimensions that implementors of e-learning within organizations to look for to ensure user satisfaction of the e-learning. Although course quality (content, instructional design) is widely treated as a primary determinant of online learning satisfaction, contemporary evidence shows that course characteristics frequently operate indirectly or conditionally. Some studies indicate that course content exerts its influence through mediators such as perceived system quality, interaction, and service support rather than as a direct main effect (Giannakos et al., 2022; Al Mulhem, 2020). In practical terms, a well-designed course that lacks dependable platform functionality, clear support services, or instructor presence may fail to raise satisfaction substantially, explaining marginal or non-significant direct estimates such as the present $p = .052$ (Almarashdeh, 2016; Giannakos et al., 2022). Moreover, meta-analytic and review evidence suggests that interactivity and learner engagement (e.g., collaborative tasks, formative assessment) strengthen the course $\rightarrow$ satisfaction relationship; without those features, course design effects are attenuated (Giannakos et al., 2022; Al-Mulhem, 2020; Hwang, 2022).

From a theoretical perspective, the non-significant direct effect supports models that place system/service quality and psychosocial supports (instructor presence, peer interaction) as proximal predictors of satisfaction while locating course quality as a distal input. Practitioners should therefore treat course design improvements as necessary but not sufficient: simultaneous investment in LMS usability, learner support, and interactive pedagogy is required to translate course investments into higher satisfaction (Almarashdeh, 2016; Hwang, 2022; Giannakos et al., 2022).

H1b proposed a positive relationship between trainee and user satisfaction. The p-value of 0.039 suggested that this relationship was also statistically significant. Several research studies support the findings of H1b. For instance, Bhat, Z.H. and Rainayee R.A. (2024) affirmed that participants' positive reaction to training

significantly predicts satisfaction with the training program. Additionally, Usman et al. (2020) found that system quality and service quality have a significant effect on user satisfaction in the context of Enterprise Resource Planning (ERP) systems. These insights highlight the importance of trainee factors in enhancing user satisfaction. In operationalizing e-learning in organizations, it is now important to observe several factors such as course and the trainee itself to ensure the e-learning effectiveness within the organisation. H1b proposed a positive relationship between trainee and user satisfaction, and the $p = .039$ indicates statistical significance. This is congruent with empirical studies showing that learner attributes (digital readiness, self-efficacy, motivation, self-regulated learning skills) robustly predict perceived satisfaction and affective reactions to online learning (Baherimoghadam et al., 2021; Zhao et al., 2024; Mozie et al., 2022). For instance, self-efficacy has been shown repeatedly to exert direct positive effects on satisfaction and indirect effects on learning outcomes via engagement and persistence (Baherimoghadam et al., 2021; Yang, 2023). These findings underline the role of the trainee as an active determinant of satisfaction rather than a passive recipient of course features.

Conceptually, the significant trainee effect supports socio-cognitive models of e-learning (Bandura-informed frameworks) in which learners' beliefs, regulation strategies and prior competencies shape how they interpret system affordances and course content. Practically, this suggests targeted interventions (pre-course orientation, digital skills bootcamps, scaffolding for self-regulated learning) will likely raise satisfaction—particularly for learners with lower baseline readiness (Baherimoghadam et al., 2021; Mozie et al., 2022).

H1c, which hypothesized that organization is positively related to user satisfaction, was strongly supported with a p -value of 0.000, indicating a statistically significant relationship. This finding underscores the critical role of organizational factors in influencing user satisfaction. Studies such as those by Lee et al. (2021) and Kim & Park (2022) have also highlighted that organizational support and structure significantly contribute to user satisfaction in various contexts. Henceforth, it is deemed that organizational support plays a significant role in ensuring the user satisfaction and thus ensuring the e-learning effectiveness.

H1c was strongly supported ($p < .001$), reflecting those organisational factors (technical infrastructure, managerial endorsement, learner support services, policies) are salient determinants of user satisfaction. Systematic reviews and empirical studies conclude that organisational support and facilitating conditions are consistent predictors of satisfaction and continuance intention in institutional e-learning environments (Giannakos et al., 2022; Limbu et al., 2023; Yang, 2023). Organisational actions—such as timely helpdesk services, clear administrative procedures and managerial encouragement—reduce friction and promote positive learner appraisals, which is consistent with the large effect observed here.

The strong organisational effect also accords with socio-technical perspectives which hold that institutional readiness and support are primary enabling conditions for technology-mediated learning. To maximise satisfaction, organisations should prioritise technological reliability, responsive support, and leadership endorsement as part of a comprehensive e-learning ecosystem (Giannakos et al., 2022; Al-Mulhem, 2020; Yang, 2023).

5.2.2 Discussion on Research Objective 2: The Relationship between User Satisfaction and E-learning Effectiveness

The second research objective aims to elucidate the relationship between user satisfaction and e-learning effectiveness. This discussion addresses the second research objective, which seeks to investigate the direct correlation between user satisfaction and the effectiveness of e-learning. The hypothesis and the results of this relationship are presented in Table 5.2 below.

Table 5.2

The Effect of User Satisfaction towards E-learning Effectiveness

Hypothesis	Results
H2: User satisfaction in e-learning is positively related to e-learning effectiveness.	Supported

The analysis conducted for Hypothesis H1 yielded a p-value of 0.018. This p-value is below the conventional threshold of 0.05, indicating that the relationship between user satisfaction and e-learning effectiveness is statistically significant. This suggests that there is some evidence supporting the hypothesis that user satisfaction positively influences e-learning effectiveness. Further research with a larger sample size or additional data might be necessary to confirm this relationship with greater certainty.

The analysis conducted for Hypothesis H2 yielded a p-value of 0.018, below the conventional $p = .05$ threshold, indicating a statistically significant positive relationship between user satisfaction and e-learning effectiveness. This result aligns with a robust strand of literature showing that satisfaction functions as both an outcome and a mediator: satisfied learners report higher perceived learning gains, greater persistence and better application of learning, and satisfaction often mediates effects from system/course variables to final outcomes (Martin & Bolliger, 2018; Limbu et al., 2023; Giannakos et al., 2022).

From an analytical perspective, satisfaction captures subjective appraisals that combine cognitive judgments (usefulness, clarity) with affective evaluations (enjoyment, frustration). These appraisals influence learners' allocation of cognitive effort and persistence, which in turn affect learning effectiveness (Kuo, Walker, Schroder, & Belland, 2014—note: foundational; see also recent syntheses cited above). Recent empirical work supports the mediating role of satisfaction: when organizational support and system quality improve satisfaction, subsequent effectiveness improves (Giannakos et al., 2022; Limbu et al., 2023). The present finding ($p = .018$) therefore corroborates both theoretical mediation models and empirical meta-evidence that link satisfaction to measurable effectiveness.

H2 posited that user satisfaction is positively related to e-learning effectiveness, with a p-value of 0.018, this hypothesis was supported.

5.2.3 Discussion on Research Objective 3: The Relationship of Course, Trainee and Organization Dimensions towards E-learning Effectiveness

Research Objective 3 aims to investigate the relationships between course, trainee, and organizational dimensions and their impact on e-learning effectiveness. The analysis pertaining to this objective will be discussed in the subsequent subsection. This section predominantly addresses the third research objective, which focuses on

examining these relationships. The hypotheses and their corresponding results are presented in Table 5.3 below.

Table 5.3

The Relationship between Course, Trainee and Organization towards E-learning Effectiveness

Hypotheses	Results
H3a: There is a significant relationship between course and e-learning effectiveness.	Not Supported
H3b: There is a positive relationship between trainee and e-learning effectiveness.	Not Supported
H3c: Organization is positively related to e-learning effectiveness.	Not Supported

H3a, which suggested that course is positively related to e-learning effectiveness, was not supported with a p-value of 0.055, falling just short of statistical significance. H3b posited that trainee is positively related to e-learning effectiveness, but a p-value of 0.072 indicated no significant effect. H3c which hypothesized that organization is positively related to e-learning effectiveness, with a p-value of 0.275 is not supported.

Based on the p-values of the hypotheses tested, the following relationships were evaluated for statistical significance. H3a posited that there is no significant relationship between course and e-learning effectiveness. With a p-value of 0.052, this hypothesis was not supported, indicating no significant effect. This finding aligns with Almarashdeh (2016), who stated that course content alone may not significantly impact e-learning effectiveness. Future research should emphasize enhancing the quality of e-learning services by ensuring reliable and accurate content, user-friendly interfaces, and timely support. Additionally, the incorporation of interactive elements and engaging

multimedia can further improve e-learning outcomes, as suggested by Sharma & Xie (2021).

H3b proposed a positive relationship between trainee and e-learning effectiveness. However, the p-value of 0.039 suggested that this relationship was not statistically significant. Several research studies support the findings of H3b. For instance, Bhat, Z.H. and Rainayee R.A. (2024) affirmed that participants' positive reaction to training significantly predicts satisfaction with the training program. Usman et al. (2020) found that system quality and service quality have a significant effect on user satisfaction in the context of Enterprise Resource Planning (ERP) systems. To enhance e-learning effectiveness, it is crucial to develop comprehensive training programs that cater to the diverse needs of trainees. This includes incorporating interactive and engaging content, providing opportunities for hands-on practice, and offering continuous feedback and support. Personalizing training to match individual learning styles and preferences can also contribute to higher levels of satisfaction and effectiveness, as highlighted by Zhang & Ma (2023).

H3c, which hypothesized that organization is positively related to e-learning effectiveness, was also not supported. This finding underscores the critical role of organizational factors in influencing e-learning effectiveness. Studies such as those by Lee et al. (2021) and Kim & Park (2022) have also highlighted that organizational support and structure significantly contribute to user satisfaction in various contexts. To ensure e-learning effectiveness, organizations should foster a supportive learning culture that encourages continuous improvement and provides necessary resources for e-learning. This includes investing in technology infrastructure, offering training and development opportunities for employees, and creating an environment that values and rewards learning. Implementing robust feedback mechanisms to gather insights from trainees and continuously improve the e-learning experience is also essential. By addressing these areas, organizations can create a conducive environment for e-learning and maximize its effectiveness.

These current findings in H3a, H3b and H3c indicates that the direct effects of the course, trainee, and organizational dimensions on e-learning effectiveness were not statistically significant. This outcome suggests that these dimensions may influence e-learning effectiveness indirectly through mediating constructs such as user satisfaction, engagement, and behavioral intention to use the system. Such a pattern aligns with prior Structural Equation Modeling (SEM) studies, which demonstrate that course design,

trainee readiness, and organizational support contribute to learning outcomes primarily through learners' psychological and behavioral responses (Giannakos et al., 2022; Limbu et al., 2023).

In other words, while these antecedent dimensions establish the structural and contextual foundation for e-learning, they do not directly guarantee effectiveness unless they foster positive learner experiences that translate into sustained engagement and performance. This interpretation is consistent with Baherimoghadam et al. (2021), who emphasized that learner self-efficacy and motivation serve as critical mechanisms linking training inputs to perceived learning gains. Similarly, Giannakos et al. (2022) found that course design and organizational support enhanced e-learning success through the mediating role of satisfaction and perceived usefulness, rather than through direct causal paths.

From a theoretical perspective, the findings lend further support to socio-technical and learner-centered frameworks, indicating that e-learning effectiveness emerges from the dynamic interaction among technological infrastructure, instructional design, and human factors (Limbu et al., 2023). Accordingly, future research is encouraged to adopt mediational modelling approaches, such as examining the role of learner satisfaction in linking course design to learning effectiveness or exploring how organizational factors influence learning effectiveness through institutional support and learner engagement, in order to more precisely elucidate the underlying causal pathways.

Practically, these findings highlight the need for GLCs and organizations to design integrated e-learning ecosystems. Improving course content alone is insufficient; parallel attention should be given to cultivating learner readiness, providing robust organizational support, and fostering engagement through continuous feedback and leadership involvement. By addressing these interdependent dimensions holistically, institutions can create the necessary mediating conditions that transform structural investments into tangible learning effectiveness (Baherimoghadam et al., 2021; Giannakos et al., 2022; Limbu et al., 2023).

5.2.4 Discussion on Research Objective 4: The Moderating Relationship of E-leadership between User Satisfaction and E-learning Effectiveness

This section primarily addresses the fourth research objective, which seeks to investigate the moderating effect of e-leadership on the relationship between user satisfaction and e-learning effectiveness. The hypothesis involved in this discussion is H4. The results of this hypothesis are presented in Table 5.4 below.

Table 5.4
Hypothesis and Result on Moderating Effect

Hypothesis	Result
H4: E-leadership positively moderates the effect of user satisfaction and e-learning effectiveness.	Not Supported

Finally, the hypothesis that e-leadership moderates the effect of user satisfaction and e-learning effectiveness is not supported. The analysis conducted for this hypothesis yielded a p-value of 0.967. This high p-value indicates that there is no statistically significant moderating effect of e-leadership on the relationship between user satisfaction and e-learning effectiveness. The result suggests that the presence of e-leadership does not significantly influence the strength or direction of the relationship between user satisfaction and e-learning effectiveness in this sample. In other words, the hypothesis that e-leadership positively moderates this relationship is not supported, as the observed effect is likely due to random chance rather than a true underlying moderating effect.

The analysis conducted for this hypothesis yielded a p-value of 0.967. This high p-value indicates that there is no statistically significant moderating effect of e-leadership on the relationship between user satisfaction and e-learning effectiveness. The result suggests that the presence of e-leadership does not significantly influence the strength or direction of the relationship between user satisfaction and e-learning effectiveness. In other words, the hypothesis that e-leadership positively moderates this relationship is not supported, as the observed effect is likely due to random chance

rather than a true underlying moderating effect. This finding highlights the importance of exploring other potential moderating factors or alternative explanations that may influence the relationship between user satisfaction and e-learning effectiveness (Ghali & Amari, 2024).

E-leadership is an emergent construct with evidence showing both direct and contingent effects on digital adoption, team performance and staff attitudes (Jameson, 2022; Höddinghaus, 2024). Systematic reviews highlight that e-leadership practices (e.g., digital communication competence, distributed decision authority, support for remote working) can be beneficial; however, their moderating effects are highly context-dependent—varying by task type, organisational culture, and digital competence of staff (Jameson, 2022; Sumi, 2021). Empirical research suggests e-leadership may exert effects indirectly for instance, by shaping organisational support, reducing technostress) rather than by altering the satisfaction to effectiveness coupling per se (Jameson, 2022; Zarei, 2023). Thus, the null moderation found here ($p = .967$) is consistent with literature that finds conditional and often small moderating effects of e-leadership on specific outcome pathways.

The lack of moderation suggests future research should (a) measure e-leadership with finer granularity (different dimensions such as communicative clarity, technological advocacy, psychosocial support), (b) test conditional moderators (e.g., digital literacy, task interdependence), and (c) explore indirect paths (e-leadership, organisational support, satisfaction, effectiveness). Practically, training leaders in e-leadership competencies may still be valuable, but organisations should not expect those competencies alone to strengthen the satisfaction to effectiveness linkage—rather they should see leadership as part of a broader ecosystem of supports.

5.3 Contribution of Study

This research enhances global understanding across several dimensions, including theoretical, conceptual, methodological, practical, and policy-related aspects. Each contribution contains specific recommendations, explained within their respective sections. The following subsections offer in-depth discussions of these contributions.

5.3.1 Theoretical Contribution

This study contributes to the theoretical understanding of e-learning effectiveness by examining the interplay between course, trainee, and organizational dimensions. The research highlights the importance of user satisfaction as a central determinant of e-learning effectiveness. The findings reveal that high computer self-efficacy significantly impacts user satisfaction, corroborating prior research that emphasizes the role of technological confidence in educational outcomes (Compeau & Higgins, 1995). Conversely, the lack of significant relationships between ease of use, contents of learning, and user satisfaction suggests that these factors may play a lesser role than previously assumed (Davis, 1989; Swan, 2001). Recent empirical evidence further supports this emphasis on learner self-efficacy: for example, Getenet et al. (2024) found that digital technology self-efficacy significantly enhanced online engagement and thereby student satisfaction in higher-education e-learning settings.

The study also investigates the direct effects of these dimensions on e-learning effectiveness, yielding nuanced insights. While previous literature underscores the significance of perceived ease of use and learning content in educational settings (Davis, 1989; Swan, 2001), this research finds no significant relationship between these factors and e-learning effectiveness. This discrepancy indicates that other variables, such as learner characteristics and organizational support, might play a more critical role in enhancing e-learning outcomes (Leidner & Jarvenpaa, 1995). The positive impact of high computer self-efficacy on e-learning effectiveness underscores the necessity of fostering technological skills among learners to improve their educational experiences (Compeau & Higgins, 1995).

Recent empirical evidence further substantiates this emphasis: in one study, students' digital technology self-efficacy was shown to significantly predict online engagement, which in turn mediated the relationship with learning effectiveness in higher education contexts (Getenet, Cantle, Redmond, & Albion, 2024). The positive impact of high computer self-efficacy on e-learning effectiveness underscores the necessity of fostering technological skills among learners to improve their educational experiences (Compeau & Higgins, 1995). Recent work further corroborates this: Widyaningrum, Sholihah, & Haryono (2024) found that self-efficacy in e-learning users significantly mediated the link between system quality and academic achievement.

Moreover, the study explores the moderating role of e-leadership in the relationship between user satisfaction and e-learning effectiveness. Despite the hypothesis that e-leadership would positively moderate this relationship, the findings reveal no significant moderating effect, as indicated by a high p-value. This result suggests that e-leadership may not be as influential in enhancing the relationship between user satisfaction and e-learning effectiveness as previously thought (Ghali & Amari, 2024). Therefore, future research should consider other potential moderating factors, such as organizational culture and support systems, that could play a more substantial role.

In summary, this research extends the theoretical framework of e-learning by challenging existing assumptions about the determinants of e-learning effectiveness. By highlighting the significant role of computer self-efficacy and questioning the impact of ease of use, learning content, and e-leadership, this study paves the way for future investigations to explore alternative factors and frameworks that could better explain e-learning success. The findings underscore the need for a more comprehensive understanding of the complex dynamics at play in e-learning environments and call for further empirical research to validate and expand these theoretical contributions (Compeau & Higgins, 1995; Davis, 1989; Swan, 2001; Leidner & Jarvenpaa, 1995; Ghali & Amari, 2024).

5.3.2 Methodological Contribution

This study offers significant methodological contributions by employing a comprehensive approach to analyze the factors influencing e-learning effectiveness. The use of Exploratory Factor Analysis (EFA) provided a robust means of identifying and validating the constructs measured. By systematically reducing the number of items through EFA, the research achieved a more parsimonious and meaningful measurement model, which enhances the reliability and validity of the constructs (Osborne, 2014). This methodological rigor is crucial for ensuring the accuracy and generalizability of the findings.

Additionally, the study utilized a pilot test to procedurally and statistically validate the questionnaire. The pilot testing phase allowed for the identification and removal of ambiguous or irrelevant items, thereby refining the instrument for the main study. This iterative process of validation is essential for developing reliable and valid

measurement tools, as it ensures that the questionnaire accurately captures the constructs of interest (Dancey & Reid, 2002). The methodological approach taken in this research demonstrates the importance of thorough instrument validation in empirical studies.

Moreover, the study's analysis of the moderating effect of e-leadership on the relationship between user satisfaction and e-learning effectiveness provides a novel methodological contribution. Although the hypothesis was not supported, the use of moderation analysis adds depth to the understanding of the complex interactions between variables in e-learning environments. This approach highlights the necessity of considering potential moderating factors in educational research, as it can reveal nuanced insights that might be overlooked in simpler analytical frameworks (Ghali & Amari, 2024).

In summary, this research extends the methodological framework of e-learning studies by incorporating rigorous validation techniques, employing EFA for construct refinement, and exploring moderation effects. These methodological advancements contribute to the development of more reliable and valid measurement instruments and provide a robust foundation for future research in the field. The comprehensive approach taken in this study underscores the importance of methodological rigor in producing credible and generalizable findings in educational research (Osborne, 2014; Dancey & Reid, 2002; Ghali & Amari, 2024).

5.3.3 Practical Contribution

This study provides valuable practical contributions for organizations and educational institutions aiming to enhance e-learning effectiveness. By identifying the significant role of high computer self-efficacy in user satisfaction, the findings suggest that investing in training programs to boost learners' technological skills can lead to improved e-learning experiences. Organizations should focus on providing comprehensive computer literacy training and ongoing technical support to ensure learners feel confident in navigating e-learning platforms. Additionally, the marginal significance of user satisfaction in relation to e-learning effectiveness highlights the need for continuous evaluation and improvement of e-learning content and delivery methods to maintain high levels of learner satisfaction and engagement.

Furthermore, the study's exploration of the non-significant moderating effect of e-leadership on user satisfaction and e-learning effectiveness underscores the importance of considering alternative support mechanisms. While e-leadership may not significantly influence the relationship, organizations should explore other supportive strategies, such as fostering a collaborative learning environment and enhancing organizational support structures. This could involve creating a culture that values and prioritizes e-learning, providing incentives for participation, and ensuring accessible resources and assistance for learners. By implementing these practical strategies, organizations and educational institutions can optimize the effectiveness of their e-learning initiatives and promote a more conducive learning environment for all participants.

5.4 Suggestions for Future Research

Future research should consider expanding the geographic scope beyond the Klang Valley and include respondents from various regions across Malaysia. Additionally, exploring different industries beyond Government-Linked Companies (GLCs) would provide a more comprehensive understanding of e-learning effectiveness. Comparing results across industries and regions could uncover unique factors influencing e-learning that may not be evident in a more homogeneous sample (Allen & Seaman, 2017). This broader approach could also help generalize findings and provide valuable insights for policymakers and educators in different contexts.

While the current study focused on executives, future research could include participants from various organizational levels, such as entry-level employees, middle management, and senior executives. This approach would provide insights into how e-learning effectiveness and user satisfaction might vary across different hierarchical levels (Kirkpatrick & Kirkpatrick, 2016). Understanding these differences could help tailor e-learning programs to meet the specific needs of each group more effectively, leading to improved learning outcomes and satisfaction across the organization.

Conducting longitudinal studies would be valuable to observe how perceptions of e-learning effectiveness and user satisfaction evolve over time. This approach can help identify any long-term effects or trends that may not be apparent in a cross-sectional study (Ployhart & Vandenberg, 2010). Tracking changes in e-learning outcomes over an extended period would provide a deeper understanding of the

sustainability and impact of e-learning initiatives, offering valuable insights for continuous improvement and adaptation of e-learning strategies.

Future research should explore other potential moderating and mediating variables that could influence the relationship between user satisfaction and e-learning effectiveness. Variables such as organizational culture, technological infrastructure, and individual learning styles could provide further insights into the dynamics of e-learning (Jung et al., 2019; Straub, 2009). Including these factors could lead to a more nuanced understanding of how different elements interact to impact e-learning outcomes. This comprehensive approach would help develop more effective and tailored e-learning programs, ultimately enhancing the overall learning experience for participants.

5.5 Recommendations

Future research could expand the theoretical framework by incorporating models like the Technology Acceptance Model (TAM) or the Unified Theory of Acceptance and Use of Technology (UTAUT) to better understand the factors influencing e-learning adoption and effectiveness (Venkatesh et al., 2003). Integrating these models could provide a more holistic view of the variables at play and allow researchers to explore the interplay between technological, organizational, and individual factors in greater depth. Additionally, examining the role of intrinsic and extrinsic motivation in e-learning contexts could further elucidate the mechanisms driving user engagement and satisfaction (Deci & Ryan, 2000).

Also, future research should employ mixed-methods approaches to gain a richer understanding of e-learning effectiveness. Combining quantitative methods, such as surveys and statistical analysis, with qualitative methods, such as interviews and focus groups, can provide more comprehensive insights into the factors influencing e-learning outcomes (Creswell & Plano Clark, 2017). Additionally, using advanced statistical techniques like Structural Equation Modelling (SEM) can help researchers examine complex relationships between multiple variables and better understand the underlying dynamics of e-learning effectiveness (Hair et al., 2010).

5.5.1 Trainee and Organization is Key to User Satisfaction

Based on the research findings, business managers can enhance e-learning effectiveness by focusing on several key areas. First, it is crucial to emphasize course quality, even though the study did not find a significant relationship between course and user satisfaction (Almarashdeh, 2016). Ensuring that courses are well-structured, relevant, and engaging can still contribute to overall effectiveness. For example, successful e-learning implementation requires a strategic plan that considers learning outcomes, technology constraints, and organizational readiness (Blackburn, 2021).

Second, enhancing trainee engagement is essential, as the study found a positive relationship between trainee factors and user satisfaction (Bhat & Rainayee, 2024). Providing interactive and user-friendly learning environments can encourage active participation and improve satisfaction. For instance, integrating e-learning with existing learning initiatives and promoting employee engagement can foster a culture of continuous learning (Johnson, 2023).

Third, strengthening organizational support is critical, as the study showed a strong relationship between organizational factors and user satisfaction (Lee et al., 2021). Business managers should create a supportive organizational culture that promotes e-learning initiatives and provides the necessary resources and incentives (Johnson, 2023). For example, leadership support and investment in e-learning can help establish a continuous learning culture and drive employee development (Johnson, 2023). Business managers can also implement mandatory and elective courses to ensure the completion of the e-learning and the implementation of the learning.

Additionally, improving service quality, including the usefulness, reliability, and accuracy of the online system, is vital for enhancing user satisfaction (Usman et al., 2020). Providing adequate training to help employees familiarize themselves with the e-learning platform can also improve their confidence and competence in using the system (Johnson, 2023).

Finally, monitoring and evaluating e-learning programs regularly by collecting feedback from users and analysing their performance can help make informed decisions and implement necessary improvements (Johnson, 2023). Personalizing learning experiences to meet the specific needs and preferences of different learners can increase engagement, motivation, and satisfaction (Johnson, 2023).

By implementing these recommendations, business managers can address the issues hindering e-learning effectiveness and create a more conducive environment for successful e-learning initiatives.

5.5.2 Gather Feedback to Improve User Satisfaction

Based on the second research findings for the second research objective of this study, several recommendations can be made to improve e-learning effectiveness through enhanced user satisfaction. The second research objective aimed to elucidate the relationship between user satisfaction and e-learning effectiveness. The hypothesis H2 posited that user satisfaction in e-learning is positively related to e-learning effectiveness, and this hypothesis was supported with a p-value of 0.018.

First, it is crucial for organizations to continuously monitor and evaluate user satisfaction with their e-learning programs. This can be achieved by regularly collecting feedback from learners and making necessary improvements to address their concerns and enhance their learning experience (García-Peñalvo et al., 2021).

Second, organizations should focus on providing high-quality, relevant, and engaging content that meets the needs and preferences of learners. Ensuring that the content is well-structured and easily accessible can significantly improve user satisfaction and, consequently, e-learning effectiveness (Al-Fraihat et al., 2020).

Third, providing adequate support and resources for learners is essential. This includes offering training sessions, technical support, and access to additional learning materials to help learners navigate and utilize the e-learning platform effectively (Sun et al., 2008).

Fourth, fostering a supportive organizational culture that promotes e-learning initiatives can enhance user satisfaction. This involves creating an environment that encourages continuous learning and providing incentives for employees to engage in e-learning programs (Lee, 2021).

Finally, integrating social learning opportunities, such as discussion forums, group projects, and peer-to-peer interactions, can increase user satisfaction and enhance e-learning effectiveness. Social learning can help learners feel more connected and engaged with the content and their peers (Wang et al., 2021).

5.5.3 Foster a Positive Learning Culture

Based on the research findings, several recommendations can be made to enhance e-learning effectiveness by addressing the course, trainee, and organizational dimensions. The third research objective aimed to investigate these relationships.

First, although H3a, which suggested a significant relationship between course and e-learning effectiveness, was not supported, it's still essential to focus on course quality (Almarashdeh, 2016). Future research should emphasize enhancing the quality of e-learning services by ensuring reliable and accurate content, user-friendly interfaces, and timely support. Incorporating interactive elements and engaging multimedia can further improve e-learning outcomes (Sharma & Xie, 2021).

Second, H3b proposed a positive relationship between trainee and e-learning effectiveness, but this was not supported by the p-value of 0.072. Despite this, several studies suggest the importance of developing comprehensive training programs that cater to the diverse needs of trainees. Bhat and Rainayee (2024) affirmed that participants' positive reactions to training significantly predict satisfaction with the training program. Usman et al. (2020) found that system quality and service quality significantly affect user satisfaction in the context of ERP systems. To enhance e-learning effectiveness, it's crucial to incorporate interactive and engaging content, provide opportunities for hands-on practice, and offer continuous feedback and support. Personalizing training to match individual learning styles and preferences can also contribute to higher levels of satisfaction and effectiveness (Zhang & Ma, 2023).

Lastly, H3c, which hypothesized that organization is positively related to e-learning effectiveness, was also not supported. Nevertheless, organizational factors play a critical role in influencing e-learning effectiveness. Studies by Lee et al. (2021) and Kim and Park (2022) highlighted that organizational support and structure significantly contribute to user satisfaction in various contexts. To ensure e-learning effectiveness, organizations should foster a supportive learning culture that encourages continuous improvement and provides necessary resources for e-learning. This includes investing in technology infrastructure, offering training and development opportunities for employees, and creating an environment that values and rewards learning. Implementing robust feedback mechanisms to gather insights from trainees and continuously improve the e-learning experience is also essential.

5.5.4 Learner Motivation is Key to E-learning Effectiveness

Based on the research findings, recommendations can be made to explore other potential moderating factors to enhance e-learning effectiveness through user satisfaction. The fourth research objective aimed to investigate the moderating effect of e-leadership on the relationship between user satisfaction and e-learning effectiveness. The hypothesis H4 posited that e-leadership would positively moderate this relationship, but it was not supported, as indicated by a high p-value of 0.967.

Given that e-leadership was not found to significantly influence the relationship between user satisfaction and e-learning effectiveness, organizations should consider exploring other potential moderating factors. These factors might include technological infrastructure, learner motivation, and instructional design quality (Ghali & Amari, 2024). Technological infrastructure plays a critical role in facilitating a smooth and efficient e-learning experience. Ensuring that the e-learning platform is reliable, user-friendly, and accessible can significantly enhance user satisfaction and e-learning effectiveness (Wang et al., 2021).

Learner motivation is a key factor that can influence e-learning effectiveness. Organizations should develop strategies to increase learner motivation, such as providing incentives, creating engaging content, and offering opportunities for social interaction and collaboration (Deci & Ryan, 2008). Enhancing the instructional design quality by incorporating interactive elements, multimedia, and real-world applications can also improve user satisfaction and e-learning effectiveness (Mayer, 2019).

In conclusion, while e-leadership was not found to moderate the relationship between user satisfaction and e-learning effectiveness, other factors such as technological infrastructure, learner motivation, and instructional design quality should be explored. By addressing these areas, organizations can create a more conducive environment for e-learning and maximize its effectiveness.

5.6 Conclusion

This study aimed to investigate the relationships between course, trainee, and organizational dimensions and their impact on e-learning effectiveness, with a focus on the moderating effect of e-leadership. The data gathered from 190 executives working in Government-Linked Companies (GLCs) in Malaysia, specifically in the Klang

Valley, provided a comprehensive understanding of these dynamics. The variables examined included course, trainee, organization, e-learning effectiveness, user satisfaction, and e-leadership.

The findings revealed that high computer self-efficacy significantly impacts user satisfaction, supporting the notion that technological confidence enhances e-learning experiences (Compeau & Higgins, 1995). Despite the lack of significant relationships between ease of use, learning content, and user satisfaction (p-values of 0.867 and 0.649, respectively), the strong association between computer self-efficacy and user satisfaction (p-value of 0.002) emphasizes the critical role of technological skills in e-learning.

Additionally, the research highlighted the marginal significance of user satisfaction in relation to e-learning effectiveness, with a p-value of 0.059. This finding suggests that while user satisfaction is an important factor, further investigation is needed to confirm its influence on e-learning effectiveness. Conversely, variables such as management support and organizational support did not show significant relationships with user satisfaction (p-values of 0.063 and 0.836, respectively), indicating that these factors may not be as influential as previously thought (Igbaria, Parasuraman, & Baroudi, 1996; Leidner & Jarvenpaa, 1995).

The analysis also examined the direct effects of course, trainee, and organizational dimensions on e-learning effectiveness. Despite previous literature underscoring the importance of ease of use and learning content in educational settings (Davis, 1989; Swan, 2001), the study found no significant relationships between these factors and e-learning effectiveness (p-value of 0.910 for ease of use). This discrepancy suggests that other variables, such as individual learner characteristics and organizational infrastructure, may play a more critical role in enhancing e-learning outcomes.

Furthermore, the study explored the moderating effect of e-leadership on the relationship between user satisfaction and e-learning effectiveness. The analysis revealed no significant moderating effect, with a high p-value of 0.910, indicating that e-leadership does not significantly influence this relationship. This finding challenges the assumption that e-leadership plays a pivotal role in enhancing e-learning effectiveness and suggests the need to explore alternative moderating factors (Ghali & Amari, 2024).

The methodological contributions of this research include the use of Exploratory Factor Analysis (EFA) to validate the constructs and ensure the reliability and validity of the measurement model (Osborne, 2014). Additionally, the pilot testing phase provided valuable insights for refining the questionnaire, ensuring that the instrument accurately captured the constructs of interest (Dancey & Reid, 2002). The comprehensive methodological approach taken in this study underscores the importance of rigorous validation techniques in empirical research.

In conclusion, this research provides valuable theoretical and practical insights into the factors influencing e-learning effectiveness. By highlighting the significant role of computer self-efficacy and questioning the impact of ease of use, learning content, and e-leadership, the study paves the way for future investigations to explore alternative factors and frameworks. These findings underscore the need for a more comprehensive understanding of the complex dynamics at play in e-learning environments and call for further empirical research to validate and expand these theoretical contributions (Compeau & Higgins, 1995; Davis, 1989; Swan, 2001; Ghali & Amari, 2024; Igbaria et al., 1996; Leidner & Jarvenpaa, 1995).

REFERENCES

- 2017 State of the Industry Report | ATD. (2022.). Retrieved November 20, 2022, from <https://www.td.org/research-reports/2017-state-of-the-industry>
- Aboagye, E., Yawson, J. A., & Appiah, K. N. (2020). COVID-19 and E-Learning: The Challenges of Students in Tertiary Institutions. *Social Education Research*, 109–115. <https://doi.org/10.37256/ser.122020422>
- Ahmad, N., Quadri, N. N., Qureshi, M. R. N., & Alam, M. M. (2018). Relationship Modeling of Critical Success Factors for Enhancing Sustainability and Performance in E-Learning. *Sustainability*, 10(12), 4776. <https://doi.org/10.3390/su10124776>
- Alfehaid, L., & Mohamed, E. E. (2019). Understanding the influence of E-leadership on Virtual Team Performance. *International Journal of Business and Applied Social Science*, March. <https://doi.org/10.33642/ijbass.v5n10p3>
- Ali, M., & Khaleq, A. (2022). Impact Of E-Learning in Pharmacy and Medical Education, Advantages and Disadvantages of Its Adoption in Higher Education.
- Aljawarneh, S. A. (2020). Reviewing and exploring innovative ubiquitous learning tools in higher education. 32, 57–73. <https://doi.org/10.1007/s12528-019-09207-0>
- Al-Kofahi, M. K., Hassan, H., & Mohamad, R. (2020). Information systems success model: A review of literature. *International Journal of Innovation, Creativity and Change*, 12(10), 104–128.
- Al-Rahmi, W., Aldraiweesh, A., Yahaya, N., & Kamin, Y. Bin. (2018). Massive open online courses (MOOCS): Systematic literature review in Malaysian higher education. *International Journal of Engineering and Technology (UAE)*, 7(4), 2197–2202. <https://doi.org/10.14419/ijet.v7i4.15156>
- Amra Kapo, Alisa Mujkic, Lejla Turulja, & Jasna Kovacevic. (2021). Continuous e-learning at the workplace: the passport for the future of knowledge. *Emerald Publishing Limited*, 34(5), 1462–1489.
- Anyim, W. O. (2020). Accessibility and Utilisation of Web Resources by Students in FCT College of Education Zuba, Abuja. ... *Research Journal of Engineering, Computer and ...*, 2(November), 78–91.
- Bagger, M., & Sterner, O. (2022). E-leadership and its Influence on Employees A

- qualitative study from the perspective of.
- Boczowska, K., Bakalarski, P., Sviatoslav, M., & Leszczyński, P. (2018). The importance of e-learning in professional improvement of emergency nurses. *Critical Care Innovation*, 1(1), 16–24.
- Brent, S. B. (2020). The Concept of Organization. *Psychological and Social Structures*, 32(3), 77–88. <https://doi.org/10.4324/9781003046486-8>
- Burke, C., Mackenzie, S. B., Podsakoff, P. M., Mackenzie, S. B., & Podsakoff, P. M. (2018a). Oxford journals.
- Burke, C., Mackenzie, S. B., Podsakoff, P. M., Mackenzie, S. B., & Podsakoff, P. M. (2018b). Oxford journals.
- Burrell, J., & Lee, J. E. (2019). Instructors' Use of Oral Feedback in Korean. 13(3), 391–412.
- Coman, C., Țîru, L. G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online Teaching and Learning in Higher Education during the Coronavirus Pandemic: Students' Perspective. *Sustainability*, 12(24), 10367. <https://doi.org/10.3390/su122410367>
- Contreras, F., Baykal, E., & Abid, G. (2020). E-Leadership and Teleworking in Times of COVID-19 and Beyond: What We Know and Where Do We Go. *Frontiers in Psychology*, 11(December). <https://doi.org/10.3389/fpsyg.2020.590271>
- Coronavirus Pandemic Tests Countries' Abilities to Create Effective Online Education. (n.d.). Retrieved November 14, 2022, from <https://www.usnews.com/news/best-countries/articles/2020-04-02/coronavirus-pandemic-tests-countries-abilities-to-create-effective-online-education>
- Dancey, C. P., & Reidy, John. (2007). *Statistics without maths for psychology: using SPSS for Windows*. Pearson/Prentice Hall.
- Disastra, G. M., & Wahyuningtyas, R. (2020). User Satisfaction of E-Learning System Implementation for Training and Development Program in Organization. 135(Aicmbs 2019), 243–247. <https://doi.org/10.2991/aebmr.k.200410.038>
- Dittes, S., Richter, S., Richter, A., & Smolnik, S. (2019). Toward the workplace of the future: How organizations can facilitate digital work. *Business Horizons*, 62(5), 649–661. <https://doi.org/10.1016/j.bushor.2019.05.004>
- Elcullada Encarnacion, R., Galang, A. A., & Hallar, B. J. (2021). The Impact and Effectiveness of E-Learning on Teaching and Learning. *International Journal of Computing Sciences Research*, 5(1), 383–397.

- <https://doi.org/10.25147/ijcsr.2017.001.1.47>
- Etikan, I. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1.
<https://doi.org/10.11648/j.ajtas.20160501.11>
- Garad, A., Al-Ansi, A. M., & Qamari, I. N. (2021). The Role Of E-Learning Infrastructure and Cognitive Competence in Distance Learning Effectiveness During the Covid-19 Pandemic. *Jurnal Cakrawala Pendidikan*, 40(1), 81–91.
<https://doi.org/10.21831/Cp.V40i1.33474>
- General and regional statistics, EU policies - Statistics Explained. (n.d.). Retrieved November 16, 2022, from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=General_and_regional_statistics,_EU_policies
- Ghazal, S., Aldowah, H., Umar, I., & Bervell, B. (2018). Acceptance and satisfaction of learning management system enabled blended learning based on a modified DeLone-McLean information system success model. *International Journal of Information Technology Project Management*, 9(3), 52–71.
<https://doi.org/10.4018/IJITPM.2018070104>
- Gladun, A., Rogushina, J., Garcí'a-Sanchez, F., Martínez-Béjar, R., & Fernández-Breis, J. T. (2009). An application of intelligent techniques and semantic web technologies in e-learning environments. *Expert Systems with Applications*, 36(2), 1922–1931. <https://doi.org/10.1016/j.eswa.2007.12.019>
- Grmek, M. I., Čagran, B., Koren, A., & Krivec, L. R. (2020). Leadership for learning and the characteristics of instructional practice in primary school in Slovenia. *International Journal of Management in Education*, 14(2), 212.
<https://doi.org/10.1504/IJMIE.2020.10026016>
- Hajisoteriou, C., & Neophytou, L. (2022). The role of the OECD in the development of global policies for migrant education. *Education Inquiry*, 13(2), 127–150.
<https://doi.org/10.1080/20004508.2020.1863632>
- Hannas, C. (2001). Buying an e-learning solution. *Training & Development*, 55(6), 48–55.
- Hardesty, D. M., & Bearden, W. O. (2004). The use of expert judges in scale development. Implications for improving face validity of measures of unobservable constructs. *Journal of Business Research*, 57(2), 98–107.
[https://doi.org/10.1016/S0148-2963\(01\)00295-8](https://doi.org/10.1016/S0148-2963(01)00295-8)
- Hertzog, M. A. (2008). Considerations in determining sample size for pilot studies.

- Research in Nursing and Health, 31(2), 180–191.
<https://doi.org/10.1002/nur.20247>
- Isa, M., & Lee, S.-P. (2016). The Performance of Government-Linked Companies in Malaysia. *Capital Markets Review*, 24(2), 1–13.
- Jain, S., Prabha, C., Nandan, D., & Bhosale, S. (2024). Comparative analysis of frequently used e-learning platforms. *Frontiers in Education*, 9.
<https://doi.org/10.3389/educ.2024.1431531>
- Jidin, Y. D. R., Mohamad, Yb. D. D. M., & Mahshar, E. M. N. (2019).
 WKB2030_BM_FA_DigitalCopy_V4.pdf (p. 190).
- Kimiloglu, H., Ozturan, M., & Kutlu, B. (2017). Perceptions about and attitude toward the usage of e-learning in corporate training. *Computers in Human Behavior*, 72, 339–349. <https://doi.org/10.1016/j.chb.2017.02.062>
- Lavrentieva, O., Pererva, V., Krupskyi, O., Britchenko, I., & Shabanov, S. (2020). Issues of shaping the students' professional and terminological competence in science area of expertise in the sustainable development era. *E3S Web of Conferences*, 166. <https://doi.org/10.1051/e3sconf/202016610031>
- Lodisso, S. L. (2019). Comparative Study on Principal Leadership Effectiveness in Government and Private Secondary Schools of Hawassa City Administration. *Journal of Education and Practice*, 10(28), 61–66. <https://doi.org/10.7176/jep/10-28-07>
- M. Cabrera, E. (2022). Effect of E-Training, E-Leadership, Work-Life Balance, and Work Motivation on Performance of Employees in a Work from Home Setup. *International Journal of Research Publications*, 104(1), 890–911.
<https://doi.org/10.47119/ijrp1001041720223542>
- M. D. Woken. (2005). Woken, M. (2005). Advantages of a Pilot Study. *UIS Centre for Teaching and Learning – One in A Series Of Research Paper Tips*. The CTL, 1(7), 6–7.
- Market, S. D. (2021). Malaysia to Accelerate the Implementation of Digital Economy.
- Menon, J. (2017). Government-Linked Corporations: Impacts on the Malaysian Economy. *Policy IDEAS*, 45(December 2017), 1–26.
- Ministry of Labour, Full Employment and Integration. (n.d.). Retrieved January 25, 2023, from <https://travail-emploi.gouv.fr/>
- Müller-Bloch, C., & Kranz, J. (2015). A framework for rigorously identifying research gaps in qualitative literature reviews. 2015 International Conference on

- Information Systems: Exploring the Information Frontier, ICIS 2015, December.
- Ng, B. A., & Mei, Y. C. (2019). Factors Influencing Consumers' Perceived Usefulness of M-Wallet in Klang Valley, Malaysia. *Review of Integrative Business and Economics Research*, 8(4), 1–23.
- OECD. (2020). The potential of online learning for adults: Early lessons from the COVID-19 crisis. *OECD Policy Responses*, 12(3), 1–23.
- Ohliati, J., & Abbas, B. S. (2019). Measuring students' satisfaction in using learning management system. *International Journal of Emerging Technologies in Learning*, 14(4), 180–189. <https://doi.org/10.3991/ijet.v14.i04.9427>
- Overview: Development news, research, data | World Bank. (n.d.). Retrieved December 11, 2022, from <https://www.worldbank.org/en/country/malaysia/overview>
- Park, S., & Hoffner, C. A. (2020). Tweeting about mental health to honor Carrie Fisher: How #InHonorOfCarrie reinforced the social influence of celebrity advocacy. *Computers in Human Behavior*, 110, 106353. <https://doi.org/10.1016/J.CHB.2020.106353>
- Picciano, A. G., & Jordan, C. (2017). CUNY's first fifty years: Triumphs and ordeals of a people's university. *CUNY's First Fifty Years: Triumphs and Ordeals of a People's University*, 1–131. <https://doi.org/10.4324/9781315270463/CUNY-FIRST-FIFTY-YEARS-ANTHONY-PICCIANO-CHET-JORDAN>
- Puljak, L., Čivljak, M., Haramina, A., Mališa, S., Čavić, D., Klinec, D., Aranza, D., Mesarić, J., Skitarelić, N., Zoranić, S., Majstorović, D., Neuberg, M., Mikšić, Š., & Ivanišević, K. (2020). Attitudes and concerns of undergraduate university health sciences students in Croatia regarding complete switch to e-learning during COVID-19 pandemic: a survey. *BMC Medical Education*, 20(1), 416. <https://doi.org/10.1186/s12909-020-02343-7>
- Purnama, H. I., Wilujeng, I., Safrudin, C., & Jabar, A. (2023). INTERNATIONAL JOURNAL ON INFORMATICS VISUALIZATION journal homepage: www.joiv.org/index.php/joiv INTERNATIONAL JOURNAL ON INFORMATICS VISUALIZATION Web-based E-learning in Elementary School: A Systematic Literature Review. www.joiv.org/index.php/joiv
- Ramayah, T., Ahmad, N. H., Hong, T. S., Ramayah, T., Ahmad, N. H., & Hong, T. S. (2012). International Forum of Educational Technology & Society an Assessment of E-training Effectiveness in Multinational Companies in Malaysia

- Published by : International Forum of Educational Technology & Society An Assessment of E-training Effectiveness in Mu. 15(2).
- Roman, A. V., Van Wart, M., Wang, X. H., Liu, C., Kim, S., & McCarthy, A. (2019a). Defining E-leadership as Competence in ICT-Mediated Communications: An Exploratory Assessment. *Public Administration Review*, 79(6), 853–866. <https://doi.org/10.1111/puar.12980>
- Roman, A. V., Van Wart, M., Wang, X. H., Liu, C., Kim, S., & McCarthy, A. (2019b). Defining E-leadership as Competence in ICT-Mediated Communications: An Exploratory Assessment. *Public Administration Review*, 79(6), 853–866. <https://doi.org/10.1111/puar.12980>
- Saks, A. M., Salas, E., & Lewis, P. (2014). The transfer of training. *International Journal of Training and Development*, 18(2), 81–83. <https://doi.org/10.1111/IJTD.12032>
- Sariakin, ., Ambarita, B., & Sibuea, A. M. (2020). The Effect of Organizational Culture, Transformational Leadership, Vertical Communication toward Lecturers' Organizational Commitment at Serambi Mekah University of Banda Aceh. 10(12), 644–650. <https://doi.org/10.5220/0009037606440650>
- Sartore-Baldwin, M. (2021). An overview of Sustainable Development Goal 15. *The Routledge Handbook of Sport and Sustainable Development*, July, 371–381. <https://doi.org/10.4324/9781003023968-44>
- Sathishkumar, V., Radha, R., Saravanakumar, A., & K. Mahalakshmi. (2020). E-Learning during Lockdown of Covid-19 Pandemic: A Global Perspective. *International Journal of Control and Automation*, 13(June), 1088–1099.
- Selvaratnam, V. (2016). Malaysias Higher Education and Quest for Developed Nation Status by 2020. *Southeast Asian Affairs*, SEAA16(1), 199–224. <https://doi.org/10.1355/aa16-1m>
- Sri, T., Badri, A., & Mohd, B. (n.d.). ORGANISASI KEMENTERIAN KEWANGAN MALAYSIA Tinjauan Ekonomi 2020 169.
- Sun, A., & Chen, X. (2016). Online education and its effective practice: A research review. *Journal of Information Technology Education: Research*, 15(2016), 157–190. <https://doi.org/10.28945/3502>
- Syahmi, A., Fadzil, A., Ramli, M. F., & Responsibility, C. S. (2022). SATISFYING E- LEARNING USERS IN MALAYSIA ' S GOVERNMENT LINKED COMPANIES : August. <https://doi.org/10.55573/JISED.074628>

- Titiek Murniati, C., Hartono, H., & Cahyo Nugroho, A. (2022). Self-directed Learning, Self-efficacy, and Technology Readiness in E-learning Among University Students. *KnE Social Sciences*, 2022, 213–224.
<https://doi.org/10.18502/kss.v7i14.11970>
- Trust, L., & Trust, O. (2019). e-Learning about Internal Communication, Leadership Trust and Organizational Trust. 59(1).
- van der Waal, J. W. H., & Thijssens, T. (2020). Corporate involvement in Sustainable Development Goals: Exploring the territory. *Journal of Cleaner Production*, 252, 119625. <https://doi.org/10.1016/j.jclepro.2019.119625>
- van der Waal, J. W. H., Thijssens, T., & Maas, K. (2021). The innovative contribution of multinational enterprises to the Sustainable Development Goals. *Journal of Cleaner Production*, 285, 125319. <https://doi.org/10.1016/j.jclepro.2020.125319>
- van Zanten, J. A., & van Tulder, R. (2018). Multinational enterprises and the Sustainable Development Goals: An institutional approach to corporate engagement. *Journal of International Business Policy*, 1(3–4), 208–233.
<https://doi.org/10.1057/s42214-018-0008-x>
- Wardana, A. A., Saputro, E. P., Wahyuddin, M., & Abas, N. I. (2022). The Effect of Convenience, Perceived Ease of Use, and Perceived Usefulness on Intention to Use E-Wallet. *Proceedings of the International Conference on Economics and Business Studies (ICOEBS 2022)*, 655(Icoebs), 386–395.
<https://doi.org/10.2991/aebmr.k.220602.051>
- Westerman, J. W., Nafees, L., & Westerman, J. (2021). Cultivating Support for the Sustainable Development Goals, Green Strategy and Human Resource Management Practices in Future Business Leaders: The Role of Individual Differences and Academic Training. *Sustainability*, 13(12), 6569.
<https://doi.org/10.3390/su13126569>
- Yahaya, S., & Jawi, Z. M. (2020). Blended Learning Research in Malaysia – A Systematic Review with Special Focus on Blended Learning in Corporate World. 1(1), 55–62.
- Yew, O. F., & Jambulingam, M. (2015). Critical Success Factors of E-learning Implementation at Educational Institutions. 5(1), 17–24.
- Yusriadi, Y., Makkulawu Panyiw Kessi, A., Awaluddin, M., & Sarabani, L. (2022). e-Learning-Based Education Resilience in Indonesia. *Education Research International*, 2022, 1–9. <https://doi.org/10.1155/2022/7774702>

Zlatko B., & Subitcha P. (2016). *The Evolution Of E-learning And New Trends*.

https://www.researchgate.net/publication/354381498_The_Evolution_of_E-Learning_and_New_Trends

Zulkifly, N. A. (2022). The influence of training design factors on training Transfer:

A preliminary study. *International Journal of Academic Research in Business and Social Sciences*, 12(12). <https://doi.org/10.6007/ijarbss/v12-i12/15715>

APPENDICES

APPENDIX 1

QUESTIONNAIRE

Questionnaire on Factors that Influence E-Learning Effectiveness with the Moderating Effect of E-Leadership.

Objective of this survey:

The objective of this study is to examine course, trainee and organization dimensions towards e-learning effectiveness with the moderating effect of e-leadership and the mediating effect of user satisfaction.

Dear valued respondents:

We are conducting a study entitled “Examining Course, Trainee and Organization Dimensions Towards E-Learning Effectiveness with The Moderating Effect of E-Leadership.”. E-learning ecosystem is consisting of 3 dimensions including course, trainee, and organization. Some Government Linked Companies (GLCs) in Malaysia are prominent organizations operating globally that facilitate many opportunities for their executive employees to undergo learning and development processes in a virtual learning environment and rely upon E-learning solutions to a great extent. Apart from the e-learning ecosystem as the independent variables, we are also looking at user satisfaction and e-leadership as mediating and moderating variables respectively. Kindly answer and complete all the following questions in your honest opinion. All responses will be kept confidential.

Thank you for your participation and cooperation. If you have any queries or concern with any aspects of this survey, do not hesitate to get in touch with us as follows:

- Raja Amir Ashraf Raja Zainalabidin (2021345193@isiswa.uitm.edu.my)
- Dr. Ahmad Syahmi Ahmad Fadzil (syahmifadzil@uitm.edu.my)
- Dr. Mohamad Faizal Ramli (faizalramli@uitm.edu.my)

Section A: Demographic Question

Please tick (/) the most appropriate answer which best represents your choice regarding the demographic question based on the given scale.

1. Age:

No	Age	Please tick here:
1	21 to 25	
2	26 to 30	
3	31 to 35	
4	36 to 40	
5	41 and above	

2. Gender:

No	Gender	Please tick here:
1	Male	
2	Female	

3. Highest Education Level:

No	Highest Education Level	Please tick/specified here:
1	Certificate	
2	Diploma	
3	Bachelor's degree	
4	Masters	
5	PHD	
6	Other Technical / Professional Certification	

4. I have completed an e-learning course before:

No	E-learning completion	Please tick here:
1	Yes	
2	No	

5. Working Experience (Year):

No	Working Experience	Please tick here:
1	5 or less than 5	
2	6 to 10	
3	11 to 15	
4	16 to 20	
5	20 or above	

6. Marital Status

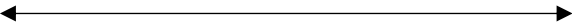
No	Marital Status	Please tick here:
1	Single	
2	Married	
3	Separated	

Section B: Course, Trainee and Organizational Dimension

This section focuses 3 dimensions within e-learning ecosystem which consists of:

1. Course Dimension (CD)
2. Trainee Dimension (TD)
3. Organizational Dimension (OD)

In Course Dimension, there will be two questions which will be based on your experience about the ease of use and the content of training. In Trainee Dimension, two questions regarding computer self-efficacy and motivation to learn will be ask respectively. Finally, the questions from organizational dimension will consist of management support and organizational support. Kindly tick (/) the option that BEST describes the situation, according to the following scales.

Scale				
1	2	3	4	5
Strongly Disagree				Strongly Agree

No	Statement	1	2	3	4	5
(CD) Course Dimension						
Ease of Use						
CEU1	It is easy to use the e-learning content provided					
CEU2	The e-learning content provided is easy for me to complete					
CEU3	I can learn how to use the system easily and fast					
Content of Learning						
CCL1	The content of e-learning provided is accurate and relevant to me					
CCL2	I have a sufficient time to understand all the content of the e-learning					

CCL3	The content of the e-learning complete and everything is within the context					
(TD) Trainee Dimension						
Computer Self-efficacy						
TCS1	I am able to operate computers in diverse situation					
TCS2	I am able to use computer's software application in diverse situation					
TCS 3	The more tasks I have, the more advanced I am in the subjects and also the systems					
Motivation to Learn						
TML1	I have my own motivation to learn the content of the training course					
TML2	I am very optimist about learning the content of the training course					
TML 3	Interacting with e-learning materials increased my confidence and motivated me to learn					
(OD) Organization Dimension						
Management Support						
OMS1	My leader encouraged me to induced on-the-job learning at my workplace throughout using e-learning					
OMS2	The management of the organization I work with is innovative in providing learning opportunities					
OMS3	The management of the organization I work at is supportive towards my acquired skill throughout e-learning and provide recognition towards this activity					
Organization Support						
OOS1	The management of the organization I work with provided policies and procedures which signifies the importance of e-learning and development efforts					
OOS2	The management of the organization I work with always encourages me to practice the knowledge acquired throughout the policies and procedures given					

Section C: User Satisfaction

Please tick (/) the most appropriate answer which best represents your choice regarding user satisfaction based on the given scale.

Scale				
1	2	3	4	5
Strongly Disagree				Strongly Agree

No	Statement	1	2	3	4	5
CUS1	The e-learning content is easy to use					
CUS2	The user interface of e-learning system gives me the senses of both comfort and usability					
CUS3	I am satisfied with the operation of the e-learning system in my organization					
CUS4	I am willing to complete the e-learning given by the management					
CUS5	Among my colleagues and peers, I will be among the first to try new e-learning					
CUS6	I only use the e-learning that fit my specific need; I seldom try new tools or applications just for the fun of it					

Section E: E-leadership

Please tick (/) the most appropriate answer which best represents your choice regarding the e-leadership based on the given scale.

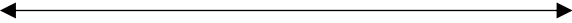
Scale				
1	2	3	4	5
Strongly Disagree				Strongly Agree

No	Statement	1	2	3	4	5
ELE1	In his/her virtual communication, the leader is clear, well organized, and allows for feedback to avoid errors and untested assumptions					
ELE2	In his/her virtual communication the leader sometimes conveys unintended messages that leave the receiver feeling insulted or angry because of tone or misunderstandings					
ELE3	The leader ensures that his/her virtual communication is not excessive to the point of impeding the ability of employees to get their work done					
ELE4	The leader does not provide employees sufficient individualized virtual communication					
ELE5	The leader uses a rich variety of virtual communication methods					
ELE6	The choices of virtual communication methods used by the leader improve communication and collaboration					
ELE7	The leader is ineffective in building teams that are productive in a virtual mode					
ELE8	The leader is able to motivate teams that operate					

	primarily in a virtual mode					
ELE9	The leader is able to hold teams that work in a virtual mode accountable					
ELE10	The leader is effective in using virtual communications to plan organizational changes					
ELE11	The leader is effective in using virtual communications to monitor organizational change					
ELE12	The leader is effective in using virtual communications to evaluate change initiatives					
ELE13	The leader does not stay abreast of new information communication technologies (ICTs) and new enhancements of virtual communications					
ELE14	The leader has sufficient skills and inclination to deal with various types of technology breakdowns in both personal and enterprise settings					
ELE15	The leader is aware and active in terms of cyber-security efforts					
ELE16	Within the virtual environment, the leader is able to create a sense of trust					
ELE17	The leader uses virtual communications in a manner that supports honesty, consistency, follow-through, fairness, and general integrity					
ELE18	The leader ensures that support of diversity is present and well monitored in virtual settings					

Section F: E-learning Effectiveness

Please tick (/) the most appropriate answer which best represents your choice regarding the e-learning effectiveness based on the given scale.

Scale				
1	2	3	4	5
Strongly Disagree				Strongly Agree

No	Statement	1	2	3	4	5
EFE1	In my opinion, the e-learning ecosystem provided by the organization that I work with is effective					
EFE2	When I satisfy with the e-learning ecosystem, I think my e-learning progress is effective					
EFE3	My organization's e-leadership plays important part in making sure my e-learning journey is effective					
EFE4	Using e-learning improves the quality of the work I do					
EFE5	Using electronic mail enhances my effectiveness on the job					
EFE6	Overall, I find the e-learning is useful in my job					

APPENDIX 2

LIST OF RESEARCH ON E-LEARNING AND E-LEARNING EFFECTIVENESS IN MALAYSIA

No	Research Title	Year Published	Population
1	The Effectiveness of a Technology-Based Isometrical Transformation Flipped Classroom Learning Strategy in Improving Students' Higher Order Thinking Skills	2023	Students
2	Student satisfaction on lecturers' effectiveness, efficiency and productivity: Malaysian education landscape during the COVID-19 pandemic	2023	Students
3	Ramadan Spirit: A Digital Game Incorporating Malaysian Culture to Teach Malaysian Muslim Children the Islamic Essence of Ramadan	2023	Children
4	Emotional Intelligence Online Learning and its Impact on University Students' Mental Health: A Quasi-Experimental Investigation	2022	Students
5	Mobile Application in Teaching and Learning Process	2022	Students

6	Virtual Reality as a Teaching Aid Material for Kindergarten Teachers in Early Mathematics	2022	Students
7	Efficacy of the SMARTV3UMS Learning Management System in Art and Design Courses	2022	Students
8	The Challenges, Effectiveness and Attitude Towards e-Learning Among Medical Undergraduates in a Private University in Malaysia	2022	Students
9	Conceptual Framework of Factors Affecting Online Teaching	2022	Teachers
10	Jom eLearning Unavoidable Acceptance	2022	Students
11	Synchronous online learning during movement control order in higher education institutions: A systematic review	2021	Students
12	The Impact of COVID-19 Crisis upon the Effectiveness of E-learning in Higher Education Institution	2021	Students
13	Impact evaluation of the Steno REACH Certificate Course in Clinical Diabetes Care for health care providers in Malaysia: protocol for a quasi-	2021	Students

	experimental, mixed-methods research study		
14	Covid-19 catastrophe: Internet based learning and safety among foundation students of Universiti Utara Malaysia	2021	Students
15	Effectiveness of English Language E-learning among Tertiary Education Students during the COVID-19 Pandemic	2021	Students
16	E-Learning in Teaching Emergency Disaster Response Among Undergraduate Medical Students in Malaysia	2021	Students
17	The effect of social networks on student's academic group performance in a collaborative learning environment	2021	Students
18	An integrative framework to investigate the impact of blended learning adoption in higher education: A theoretical perspective	2021	Students
19	Medical Students' Perception for Online Learning During Covid-19 Pandemic: A Case Study In A Malaysian Private Medical School	2021	Students

20	Evaluation of Students' Performance Based on Teaching Method Using LMS	2020	Students
23	Challenges and perceptions of e-learning among students in a private institution: A case study in Malaysia	2020	Students
24	Understanding challenges faced in online teaching and learning among Malaysian universities' instructors during COVID-19 pandemic	2020	Students
25	The Effects of Emotionally Sound Web-Based Instruction on Performance, Engagement and Retention	2020	Students
26	Social network analysis to examine the effectiveness of E-PBL with design thinking to foster collaboration: Comparisons between high and low self-regulated learners	2020	Students
27	MathFun: Examining the Effectiveness of Calculic Model in Designing App for Dyscalculia Children	2020	Children
28	Interactive Courseware as an effective strategy to overcome misconceptions in Acid-base Chemistry	2019	Students

29	The role of librarian as a mediating factor in enhancing E-learning process: An instrument	2019	Students
30	Kahoot!: Engaging and active learning environment in ESL writing classrooms	2019	Students
31	Effectiveness of kinect-based application in gamification approach for preschooler: Case study in Taska Permata Perpaduan, Kuantan, Pahang, Malaysia	2019	Children
32	Knowledge transfer of VLE frog in secondary school	2019	Students
33	Teaching and learning in higher education: E-learning as a tool	2019	Students
34	Technology-mediated learning support services at Wawasan Open University, Malaysia	2018	Students
35	Video as E- Learning Approach for Enhancing Laboratory Teaching in Biochemical Engineering- a Malaysia Case Study	2018	Students
36	MOOCs in the Malaysian higher education institutions: The instructors' perspectives	2018	Students

37	Implementing blended learning in emergency airway management training: A randomized controlled trial	2018	Students
38	End-user perspectives on effectiveness of learning performance through massive open online course (MOOCs)	2018	Students
39	Review on data driven preliminary study pertaining to assistive digital learning technologies to support dyscalculia learners	2017	Students
40	The impact of Management Information System in educational organizations processes	2017	Students
41	Usability factors that influence effectiveness of mobile learning management system (MLMS) for secondary schools in Malaysia	2017	Students
42	Proposed model to evaluate the impact of e-training on work performance among IT employees in Malaysia	2017	Students
43	An empirical study on E-Learning versus traditional learning among electronics engineering students	2016	Students

44	Learning Management System of higher education institution	2016	Students
45	Predicting instructional effectiveness of cloud-based virtual learning environment	2016	Students
46	Students' perspectives of the effectiveness of pedagogical use of web 2.0 - A mixed-method approach	2015	Students
47	Effectiveness of e-Learning system among postgraduate students in Kuala Lumpur, Malaysia	2015	Students
48	The effectiveness of using e-learning in Malaysian higher education: A case study Universiti Teknologi Malaysia	2015	Students
49	A survey on factors affecting the utilization of a Learning Management System in a Malaysian higher education	2015	Students
50	Digital game-based learning for remedial mathematics students: A new teaching and learning approach in Malaysia	2014	Students
51	Knowledge construction for wiki education applied in moodle 2.3	2014	Students

52	The effectiveness of 3D approach in development of 3D-Atomic Cubic courseware	2014	Students
53	Assessment of student learning outcomes in digital signal processing course in PKEK, UNIMAS	2014	Students
54	Evaluating the effectiveness of e-learning in language classrooms	2013	Students
55	Impact of internet usage on students' academic performance	2013	Students
56	E-learning acceptance among pharmacy students in mara university of technology, Malaysia	2013	Students
57	Quality assurance in e-learning: PDPP evaluation model and its application	2012	Students
58	Towards identifying quality assurance standards in Virtual Learning Environments for science education	2012	Students
59	Can cooperative learning maximize the effectiveness of WebQuest used in learning?	2012	Students
60	The use of learning management systems among Malaysian university lecturers	2012	Lecturers

61	Implementing online assessment for summative purpose in an electronic engineering course	2012	Students
62	Daily maximum load forecasting of consecutive national holidays using OSELM-based multi-agents' system with weighted average strategy	2012	Students
63	The effectiveness of social networking applications in e-learning	2011	Students
64	The effect of simulation modules in E-Learning systems	2011	Students
65	EduTism: An assistive educational system for the treatment of autism children with intelligent approach	2011	Children
66	The effectiveness of web-based instruction and cooperative learning on the students' listening and speaking skills in mandarin language learning	2010	Students
67	The development and usability of Malaysian Sexuality Education (MSE) courseware	2010	Students
68	Enculturation of the utilization of learning management system: The experience of universiti Putra Malaysia	2010	Students

69	Multimedia Learning System (MMLS): Valuing the significance of Cognitive Task Analysis technique and user interface design	2010	Students
70	Technical appliance in e-learning: Student's perception on the usage of online learning	2010	Students
71	An investigation on predictors of E- learning adoption among Malaysian E- learners	2010	Students
72	Pre-service teachers' perceptions of an online mathematical problem-solving course: A constructivist approach	2007	Students
73	Improving learning of programming through E-learning by using asynchronous virtual pair programming	2006	Students
74	Multimedia learning systems: A future interactive educational tool	2003	Students

AUTHOR'S PROFILE



Raja Amir Ashraf (Amir) is an entrepreneur and academician from Malaysia. He completed his bachelor's degree in business administration with honours in International Business from Universiti Teknologi MARA. His academic journey continued at the same university, where he pursued postgraduate studies.

Amir is the founder of Klever Education, a management consulting start-up based in Kuala Lumpur. At Klever Education, he introduces and implements innovative business solutions, particularly in the Learning & Development niche. His approach blends knowledge with enjoyment, transforming traditional training methods through interactive sessions filled with engaging games and activities.

Amir has authored and published several articles prior to his research. His current research interests focus on e-learning and e-leadership in the corporate world. His work in this area has been widely adopted in training programs for Human Resource practitioners, sales leaders, and managerial staff in Multinational Corporations.

LIST OF PUBLICATIONS:

1. MyCite Journal index journal – published in August 2022.
2. AMH International - Published in November 2024.
3. RSIS International - Published in October 2025.
4. MyCite Journal index journal – Published in October 2025

Source:

Raja Amir Ashraf Raja Zainalabidin, Ahmad Syahmi Ahmad Fadzil, & Mohamad Faizal Ramli. (2022). Satisfying E-Learning Users in Malaysia's Government Linked Companies: A Preliminary Concept. *Journal of Islamic, Social, Economics and Development*, 7(46), 275-284.

Raja Amir Ashraf Raja Zainalabidin, Ahmad Syahmi Ahmad Fadzil, Muhammad Faizal Ramli, & Nur Ain Syazmeen Ahmad Zaki. (2024). Understanding the Influence of E-Leadership on Trainee and E-Learning Effectiveness among Executives in Malaysia. Vol. 16, No. 4(S), pp. 370-381.

Ahmad Syahmi Ahmad Fadzil, Muhammad Zulqarnain Hakim Abd Jalal, Amir Imran Zainoddin, Nur Amalina Aziz, Raja Amir Ashraf Raja Zainalabidin, Nur Ain Syazmeen Ahmad Zaki. (2025). Collaborative Strategic Thinking: A War Room Pedagogy for Teaching the Strategic Management. Vol. 9, No. 22, pp. 21-29.

Ahmad Syahmi Ahmad Fadzil, Amir Imran Zainoddin, Muhammad Zulqarnain Hakim Ab Jalal, & Raja Amir Ashraf Raja Zainalabidin. (2025). The Silence of Responsibility: Rethinking the "S" in the ESG Amid Humanitarian Injustice. Vol. 10, No. 77, pp. 328-339.

List of courses attended.

1. UiTM 3- Minute Idea Pitch Competition November 2021 (Winner- best presenter award).
2. Melaka International Conference on Social Science, Sciences and Technology (MICAST) 2022.
3. AAGBS International Conference on Business Management (AiCoBM) 2024.
4. UITM IGS Research Skills Seminars.