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An Exploration of Key Success Factors for Enterprises Implementing Online Education Training Based on the Unified Theory of Acceptance and Use of Technology

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Abstract

The key factor in achieving a competitive advantage for businesses lies in the talents that cannot be easily replicated. In the face of economic changes and the post-pandemic era, leveraging technology to accelerate learning scenarios and enhance employee competitiveness becomes paramount in corporate management. Due to technological advancements, online learning, characterized by its freedom from temporal and spatial constraints, has emerged as one of the forms for corporate education and training. Past empirical studies on the effectiveness of online education have yielded mixed results. Therefore, this study seeks to explore the reasons behind these discrepancies, serving as a reference for formulating educational training programs and providing assistance to relevant industries in evaluating the implementation of online education and training. The researcher employs the Integrated Technology Acceptance and Use Model as the foundation. In the first phase, relevant literature is collected, leading to the identification of four dimensions and 14 indicators. In the second phase, a Likert five-point scale is employed to extract the top three indicators for each of the four dimensions. Finally, a survey using the Fuzzy Analytic Hierarchy Process questionnaire is conducted to obtain the relative weights for the four dimensions and twelve indicators, with the dimensions ranked in the following order: hedonic motivation, habit, price value, and personal innovativeness. The study concludes with five propositions, aiming to provide crucial reference points for companies implementing online education and training, ultimately speeding up adoption and enhancing the intention to use online education.

JEL classification numbers: C83, I25, M53, O15.
Keywords: Unified Theory of Acceptance and Use of Technology (UTAUT), employee training, online learning, Key Success Factor (KSF).

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1. Introduction

Education and training constitute a broad learning process aimed at enhancing individuals' knowledge, skills, abilities, and competencies. It typically encompasses formal education, such as school and university education, as well as informal education, including professional training and skills development programs. The purpose of education and training is to assist individuals in acquiring the necessary skills and knowledge to meet the demands of modern society and the workplace. It can cover a wide range of subjects, including academic disciplines, vocational training, soft skills, language learning, and more. Education and training play a crucial role both at the individual and societal levels. On an individual level, it provides opportunities for continuous learning and self-improvement, enabling individuals to better cope with the rapidly changing workplace and society. It also helps individuals access more job opportunities, enhancing employability and opening up different stages in their careers. On a societal level, education and training contribute to raising the overall quality of the workforce, fostering economic growth. Well-educated individuals are more adaptable to new technologies and contribute to increased productivity. Moreover, education and training contribute to reducing social inequality by providing equal opportunities across various social strata. This helps build a more equal and harmonious society. Importantly, education and training drive innovation and technological progress, enhancing a country's international competitiveness. Well-educated labor forces are more inclined to innovate and develop new solutions, contributing to the overall advancement of a nation (Carbery & Garavan, 2007; Maurer et al., 2008; Mesmer-Magnus & Viswesvaran, 2010).

Online education holds significance in various aspects of corporate training. For instance, it allows employees to access training resources anytime, anywhere, providing flexible learning opportunities. Online education is often more cost-effective than in-person training, as it reduces travel and accommodation expenses and allows the reuse of training materials after initial development. It enables companies to offer personalized training based on individual employee needs and learning pace. Online education platforms typically offer real-time assessment and feedback opportunities, allowing employees to immediately gauge their progress. This facilitates timely adjustments to training plans to ensure learning objectives are met. Online education platforms provide a variety of testing and assessment tools to ensure employees truly grasp the content. This helps enhance training effectiveness and ensures its success. Furthermore, online education systems can generate detailed reports, tracking employees' learning progress and performance. This aids companies in evaluating the effectiveness of training and return on investment. The ability to monitor and analyze employee learning outcomes contributes to informed decision-making in shaping future training initiatives. Overall, online education proves instrumental in optimizing the efficiency and outcomes of corporate training programs (Cheng, 2013; Geray, 2007; Kantek, 2014; Lera et al., 2020; Ren, 2020; Sit et al., 2005; Talbert, 2009).

However, online education and training are not without their challenges. Online training may lack face-to-face interaction, posing a challenge for some learners, especially those in courses that require hands-on skill practice. Additionally, it requires some employees to adapt to using technological tools for participation, which can be a barrier, particularly for those unfamiliar or uncomfortable with technology. Moreover, online learning demands that employees possess self-directed learning skills, including time management and self-discipline. Some individuals may require additional support and guidance. Lastly, the absence of face-to-face supervision is a notable limitation. In online learning, the lack of real-time supervision can lead to a lack of motivation among students, affecting learning outcomes (Darab & Montazer, 2011; Kourkouta et al., 2018; Pozdnyakova & Pozdnyakov, 2017; Ren, 2020).

Based on the aforementioned background, it is evident that while online education and training have positive impacts on both businesses and employees, overcoming the challenges of online education is crucial and worthy of research focus. This constitutes the primary research motivation of this study. Therefore, this research aims to use the Unified Theory of Acceptance and Use of Technology (UTAUT) as a foundation to explore potential extensions or additional dimensions. The key research questions of this study include:

(a) Explore the content and models of online education and training through literature and relevant theories.
(b) Analyze the challenges that online education and training may encounter based on literature and relevant theories.
(c) Propose coping strategies in response to the challenges identified in online education and training.
(d) Provide recommendations to the academic and business communities based on the research findings.

2. Literature Review

2.1 Current Status of Online Education Training for Corporate Employees

In recent years, with the continuous evolution of technology and learning concepts, the proportion of enterprises adopting online education training for their employees has gradually increased (Miller, 2012; Noe, 2017). The development of online education training for corporate employees has gone through the following major stages (American Society for Training and Development, 2000; The New Media Consortium, 2010):

- Early E-Learning: The fundamental roots of online education training for corporate employees can be traced back to the early 1990s when the internet and computer technology began to proliferate. The earliest forms of e-learning were primarily educational courses based on CD-ROMs and early network platforms, covering foundational education and training materials.
- Rise of Distance Education: With the widespread use of the internet, distance

education began to rapidly develop. Universities and businesses started using distance education technologies such as video conferencing and online course platforms to provide more interactive educational experiences. The main focus during this stage was on providing higher education and professional training.

- Emergence of Learning Management Systems (LMS): The advent of Learning Management Systems enabled companies to more effectively manage and track training programs. LMS allowed companies to create, deploy, and monitor online training courses while providing learner feedback and assessment.
- Proliferation of Mobile Learning: The ubiquity of smartphones and tablets accelerated the development of mobile learning. Learners could access training resources anytime, anywhere, increasing the flexibility of learning. Companies began developing applications and content suitable for mobile devices.
- Remote Live Broadcasting and Virtual Reality (VR): Technologies such as remote live broadcasting and virtual reality started being applied to corporate training. These technologies offered more interactive and immersive learning experiences, making training more vivid and realistic.
- Big Data and Analytics: Companies began using big data and analytics to understand employees' learning needs and performance. This helped tailor training programs better to enhance learning effectiveness.
- Artificial Intelligence and Machine Learning: Artificial intelligence and machine learning technologies were applied to personalized learning and intelligent education. These technologies automatically adjust course content based on the learner's needs.
- Globalization and Internationalization: Companies are increasingly focusing on providing consistent training for a globalized workforce. Multilingual and multicultural training content has become more prevalent.

In summary, online education training for corporate employees has undergone significant development, evolving from early e-learning to modern intelligent learning and virtual reality technology. With the continuous progress of technology, corporate education training will continue to evolve to better meet the needs of employees and enhance learning effectiveness, playing an increasingly important role.

The push from COVID-19 has made online learning a more prevalent mode for workplace training (Hidayati et al., 2021; Ou et al., 2019). COVID-19 has made remote work the new normal, leading more people to adopt online learning to cultivate new skills. In Taiwan, companies are exhibiting a similar trend, with many investing more training resources in online learning (Ally & Prieto-Blázquez, 2014). Moreover, compared to the pre-pandemic era, there has been a significant increase in the number of employees who have experienced online learning, indicating the growing popularity of online learning in the industry.

2.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT was proposed by Venkatesh and his colleagues (Venkatesh et al., 2003). It integrates eight major models, including the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), the Technology Acceptance Model (TAM), the Extended Technology Acceptance Model, the Motivational Model (MM), the Model of PC Utilization (MPCU), the Diffusion of Innovation Theory, and the Social Cognitive Theory (SCT). The model delineates four core dimensions influencing behavioral intention: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. Each dimension is crucial in explaining users' adoption of information systems (Al-Adwan et al., 2018; Chao, 2019; Gupta, 2022; Nikolopoulou et al., 2021; Twum et al., 2022).

In addition to the original four core dimensions, various studies have proposed additional extended dimensions. After reviewing the literature, this study identified four extended dimensions: Hedonic Motivation, Personal Innovativeness, Price Value, and Habit, with substantial discussion and support (Al-Azawei & Alowayr, 2020; Chao, 2019; Hu et al., 2020; Khan et al., 2022; Kim & Kang, 2023; Limayem et al., 2007; Marikyan & Papagiannidis, 2023; Nikolopoulou et al., 2021; Pinto et al., 2022; Twum et al., 2022; Venkatesh et al., 2012). Therefore, this study will delve into these four extended dimensions to understand the potential advantages and challenges faced by enterprises when implementing online education training.

3. Materials and Methods

3.1 Analytic Hierarchy Process (AHP)

The Analytic Hierarchy Process (AHP) is a decision-making method developed by Professor Thomas L. Saaty (1980) at the University of Pittsburgh. It is primarily employed for decision problems characterized by multiple criteria under conditions of uncertainty. AHP systematically and hierarchically decomposes complex problems, determining the relative importance of elements through pairwise comparisons, and organizing them in a chosen order. It provides decision-makers with comprehensive information, thereby reducing the risk of decision errors. Addressing a limitation of AHP, namely its inability to overcome decision fuzziness, Laarhoven and Pedrycz (1983) further introduced the Fuzzy Analytic Hierarchy Process (FAHP).

This study adopts a mixed-methods approach, combining qualitative and quantitative research methods. Initially, four dimensions and 14 indicators were developed based on a review of existing literature (as shown in Table 1). Subsequently, surveys were conducted with human resource managers in enterprises, utilizing a Likert five-point scale for scoring. Higher scores indicate a higher level of agreement by the enterprise with the various facets of online education and training. After collecting and analyzing the survey responses, the three indicators with the highest scores under each of the four dimensions were identified. Finally, employing analytical techniques from expert panel decision-making, the study utilized FAHP to calculate weights and construct a weight matrix

for the key success factors in the implementation of online education and training within enterprises.

Table 1: The Extended Dimensions Summary of Unified Theory of Acceptance and Use of Technology

Dimensions	Definition	No.	Indicators
Hedonic Motivation, HM	The fun or pleasure derived from using a technology	HM1	The process of using an online education and training platform is interesting.
		HM2	The process of using an online education and training platform is enjoyable.
		HM3	The process of using an online education and training platform is entertaining.
Personal Innovativeness, PI	The willingness of an individual to try out any new information technology	PI1	I am among the first to know how to use an online education and training platform for learning.
		PI2	I aspire to be the first person to use an online education and training platform for learning.
		PI3	When I learn about the existence of an online education and training platform, I make an effort to try it out.
		PI4	Even if I am unaware of others having prior experience, I prefer to be one of the first to use an online education and training platform for learning.
Price Value, PV	A consumer's trade-off between the perceived benefits of the applications and the monetary cost of using them	PV1	The cost of using an online education and training platform for learning is acceptable.
		PV2	Using an online education and training platform for learning provides value for money.
		PV3	At the current price, using an online education and training platform for learning offers good economic value.
Habit, HB	The extent to which people tend to perform behaviors automatically	HB1	When desiring to learn online, prioritizing the use of an online education and training platform has become a habit for me.
		HB2	When desiring to learn online, I am inclined to use an online education and training platform.
		HB3	When desiring to learn online, I will certainly use an online education and training platform.
		HB4	Utilizing an online education and training platform for learning has become a natural thing for me.

3.1 Participants

The primary participants in the FAHP questionnaire of this study were university professors holding a Ph.D. in business management and human resources department heads engaged in corporate training. All participants had over 10 years of work experience. The study distributed 10 questionnaires to both the academic and industrial sectors, totaling 20 questionnaires. Ultimately, 18 completed questionnaires were collected.

4. Result and Discussion

4.1 Weight analysis of dimensions and indicators

Firstly, a consistency check was conducted on the selected four dimensions and 12 indicators. The results revealed that the Consistency Index (C.I.) and Consistency Ratio (C.R.) for all items were below 0.1, meeting the consistency requirements as proposed by Saaty (1980). Subsequently, an analysis of the weights of the dimensions was performed. The results indicated that the relative weight of hedonic motivation was the highest, followed by habit, price value, and personal innovativeness, in that order. Among the four dimensions, the highest-scoring indicators were respectively: "The process of using online education training platforms is enjoyable" (HM1), "When I want to learn online, using online education training platforms has become a habit for me" (HB1), "At the current price, using online education training platforms for learning provides good economic value" (PV3), and "When I know there is an online education training platform, I will try it first" (PI3).

4.2 The overall weight analysis of the indicators

Following the comprehensive weight analysis of the dimensions and indicators, the top five dimensions with the highest weights are as follows: "The process of using online education training platforms is enjoyable," "When I want to learn online, using online education training platforms has become a habit for me," "When I know there is an online education training platform, I will try it first," "At the current price, using online education training platforms for learning provides good economic value," and "The price of using online education training platforms for learning is acceptable" (as shown in Table 2). Since hedonic motivation and habit have the highest weights in the dimensions, the overall weights of the indicators under these dimensions are also relatively high.

Table 2: The integration weights of evaluation dimensions and evaluation indicators

Evaluation Dimensions	Weight (A)	Evaluation indicator	Weight (B)	Integration weight (C) = (A)∗(B)
Hedonic motivation	0.283 (1)	HM1	0.403 (1)	0.114 (1)
		HM2	0.316 (7)	0.089 (4)
		HM3	0.281 (11)	0.080 (7)
Personal innovativeness	0.218 (4)	PI1	0.291 (9)	0.063 (12)
		PI3	0.394 (3)	0.086 (6)
		PI4	0.315 (8)	0.069 (10)
Price value	0.230 (3)	PV1	0.341 (5)	0.078 (8)
		PV2	0.282 (10)	0.065 (11)
		PV3	0.377 (4)	0.087 (5)
Habit	0.269 (2)	HB1	0.399 (2)	0.107 (2)
		HB2	0.335 (6)	0.090 (3)
		HB4	0.266 (12)	0.072 (9)

Note: the parentheses after the weight number mean the ranking.

5. Conclusions and Recommendations

5.1 Conclusions

Based on the analysis above, this study summarizes the research results of enterprise adoption of online education training according to the weighted factors and proposes the following propositions:

Proposition 1: In the construction of key success factors for enterprises to adopt online education training, the hedonic motivation dimension is relatively more critical than other dimensions such as personal innovativeness, price value, and habit. Among them, hedonic motivation and habit dimensions rank as the top two. This is consistent with the findings of Hu et al. (2020) and Khan et al. (2022). Therefore, this study suggests that when designing online education training programs or platforms, companies should prioritize the user experience and convenience for employees, creating a sense of enjoyment and habit formation to enhance the effectiveness of online education training.

Proposition 2: Within the hedonic motivation dimension, the indicators "The process of using online education training platforms is enjoyable" obtained the highest weight. This result indicates that the key to helping employees continue using online education training platforms lies in the enjoyment of instructional content and operation. Combining training materials with digital game-based learning is likely to improve employee training or learning effectiveness (Wang et al., 2022).

Proposition 3: In the personal innovativeness dimension, "When I know there is an online education training platform, I will try it first" obtained the highest weight. While this indicator ranks only sixth in overall weight, this situation may be related to employees' motivation to participate in training (Chung et al., 2022; Mahmood et

al., 2023). To enhance the weight of this indicators, efforts should start by increasing learning motivation. When employees have a high motivation for the training content, it can trigger autonomous use of online education training platforms.

Proposition 4: In the price value dimension, "At the current price, using online education training platforms for learning provides good economic value" obtained the highest weight. Despite this, the indicators ranks relatively low in overall weight, indicating that price is not the primary consideration for employees when using online education training. To increase the weight of this indicators, enhancing the content of instructional materials to make employees feel they are getting value for money can be effective.

Proposition 5: In the habit dimension, "When I want to learn online, using online education training platforms has become a habit for me" obtained the highest weight. Therefore, it is recommended that companies, when designing online education training programs or platforms, emphasize the habit formation of employees. Enriching the system or platform's content can make employees willing to use it and find it easy to use, thereby increasing their willingness to use.

5.2 Recommendations

This study aimed to understand the key success factors in the implementation of online education training in enterprises. Therefore, a combination of qualitative and quantitative research methods was employed for data collection, leading to the derivation of a weight matrix. The following recommendations are provided for future research:

(a) The study utilized a survey questionnaire and expert group interviews to successfully establish a hierarchical framework for the implementation of online employee training in enterprises. However, this result has not yet received extensive empirical support. Therefore, it is suggested that future research continues with this hierarchical framework, designing quantitative surveys for empirical studies targeting enterprises with a demand for online education training.

(b) The study focused on supervisors from the human resources departments of enterprises. However, in different types of enterprises, it is possible that other units are responsible for arranging employee training. Therefore, it is recommended that future research includes all possible research subjects to address potential gaps in the study.

(c) The study synthesized four extended dimensions obtained from past literature. Discrepancies in the weightings of these dimensions were observed in the research results, indicating that literature on online learning or education may yield different results in different industries. Therefore, it is advised that future research take into account the nature of the industry, conducting distinct extensions for different industries within the realm of online learning or education.

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