Original Article

Opinion of Healthcare Organization Employees on the Usefulness, Ease of Use, and Effectiveness of Electronic-Learning for Continuous Professional Development

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Abstract

Background and Aim: To be effective, electronic learning requires user acceptance based on perceptions of its usefulness, ease, and effectiveness. The study aimed to assess opinions of healthcare and other professionals on electronic learning for continuous professional development.

Methods: A descriptive, cross-sectional study was conducted with 210 Riyadh General Directorate of Health Affairs employees in electronic- learning programmes. Data collection was via a self-administered electronic questionnaire covering background, effectiveness, usefulness, and ease of use variables. Opinions were evaluated with average scores and subgroup comparisons with one-way ANOVA and t-tests.

Results: Respondents viewed electronic learning favorably for usefulness (mean score (standard deviation) = 29 (8.5) out of 40 points), but expressed concerns about interaction and hands-on training suitability. They also had a positive opinion on ease of use (mean score (standard deviation) = 15.9 (4.2) out of 20 points), yet noted concerns about location availability for training. Similarly, they rated effectiveness favorably (mean score (standard deviation) = 14.6 (5.6) out of 16 points). Males had more positive view of usefulness and ease of use compared to females (usefulness: males 30 (8.3) versus females 27 (8.6), p-value = 0.010; ease of use: males 16. 7 (3.8) versus females 13. 9 (4.6), p-value = 0.000). Those aged 45-49 showed a more positive opinion on effectiveness compared to those under 45 years (15.8 (5.1) versus 13.8 (5.9), p-value = 0.014).

Conclusions: Opinions regarding usefulness, ease of use, and effectiveness of electronic learning were favorable , making it an option for implementing continuous professional development training, albeit with careful planning to overcome its shortcomings.

Keywords: Electronic-learning, usefulness, ease of use, effectiveness, Saudi Arabia

Introduction

Continuous professional development (CPD) in healthcare is essential to empower practitioners to gain and apply the skills necessary for providing effective care. This involves practitioners regularly refreshing their skills to align with evolving healthcare needs, emerging care delivery models, and changing public expectations[1,2].

Modern educational technologies, such as electronic learning, provide resources that could aid practicing healthcare professionals in their ongoing CPD[3]. Electronic learning (e-learning) refers to training conducted via digital means, encompassing any instructional delivery to trainees through e-learning systems utilizing modern Information and Communication Technologies[4,5]. It is referred to by different names such as web-based learning, online education, computer-assisted instruction, and virtual training[4,6]. The use of e-learning for CPD has significantly increased lately. For instance, e-learning activities accounted for 43% of physician CPD learning in 2017, and for 45% by 2019 in the United States of America[6]. During the era of COVID-19, there was a rapid surge in demand for e-learning in the form of virtual and distance training in response to lockdown measures[5,6].

Saudi Arabia embraced e-learning in the early 1990s and expanded its use in the subsequent decades with the advancement of computer technology[7]. During the COVID-19 pandemic in Saudi Arabia, there was a rise in the adoption of e-learning, with various online learning management systems utilized to help achieve educational goals[8].

The General Directorate of Health Affairs (GDHA) in the Riyadh Region is responsible for overseeing, monitoring, and evaluating the delivery of health services in the region. Its workforce comprises both healthcare professionals, as well as non-health professional staff. The responsibilities of healthcare professionals include supervising healthcare provision across different levels of care at health facilities and developing and delivering training programs for healthcare providers. Therefore, it is crucial for them to stay updated on rapidly produced medical knowledge and advancements in healthcare to effectively fulfill their roles. The Training and Institutional Development Department (TIDD) at the GDHA is responsible for the CPD of its employees. In response to the COVID-19 pandemic and beyond, TIDD introduced e-learning in addition to the traditional class-based training activities.

Well-designed e-learning medical education programs not only yield knowledge comparable to traditional classroom instruction but also result in significant self-reported changes in professional practice[9]. Moreover, E-learning reduces training time, lowers delivery costs, boosts accessibility, and provides study flexibility[4,10,11]. However, to realize its potential as an effective mode of training delivery, e-learning must be embraced and utilized by its intended users, which depends on their opinions regarding its usefulness, ease of use, and effectiveness[12].

Perceived usefulness refers to the subjective probability of a prospective user that utilizing a specific application system will

enhance their job performance within an organizational setting. Perceived ease of use pertains to the prospective user's expectation of the target system being effortless to use[13]. According to Kirkpatrick (1996), training effectiveness is the extent to which training objectives are achieved and beneficial for the organization and trainees[14].

Numerous studies conducted in Saudi Arabia exploring the attitudes and satisfaction of various healthcare professionals, as well as medical students, regarding e-learning, consistently report favorable attitudes towards it[8,15,16]. However, these studies were conducted among health professionals delivering care at health facilities, with no studies conducted among healthcare professionals or individuals from other professions tasked with supervising and monitoring healthcare delivery, as well as delivering training to practicing healthcare providers.

Transitioning to e-learning for the delivery of CPD activities, the TIDD must assess the opinions of GDHA employees regarding e-learning, which will provide valuable insights into employee experiences, and potential challenges, thereby guiding decisions regarding the potential expansion of e-learning initiatives. This study aimed to evaluate the opinions of healthcare and other professionals at GDHA in the Riyadh Region regarding the usefulness, ease of use, and effectiveness of e-learning for CPD training.

Methods

Design and setting

This study was an institution-based, descriptive, cross-sectional study conducted in the GDHA in the Riyadh Region, which comprises seven directorates and employs around 2000 individuals. The TIDD organizes two types of e-learning CPD activities: 1) Live synchronous online CPD training activities delivered virtually at a specific pre-scheduled time, using widely used electronic platforms such as Zoom or Microsoft Teams. 2) Non-synchronous e-learning or Internet enduring materials offered via three government-accredited electronic training platforms. In this latter type, participants can choose when to attend the training, as there is no fixed time or location requirement for participation[6].

Participants

The study population consisted of employees who have taken part in the e-learning CPD training programs organized by the TIDD. The employees are categorized into two groups: 1) healthcare professionals, including physicians, dentists, pharmacists, nurses, and other allied healthcare professionals; 2) non-healthcare professionals such as human resources management, information technology, law, engineering, and clerical roles. The sample size of 217 participants was calculated using the online calculator of the open Epi Program (version 3.01-2013), assuming a total study population of 1000, a 95% confidence level, a 5% confidence limit, and a 50% frequency of outcome. The participants were selected using the stratified sampling technique to cover the seven general directorates in the RHD, where the study participants were selected using the systematic random sampling technique.

Procedure and ethical considerations

The study protocol was approved by the

Institutional Review Board of King Fahad Medical City (IRB Log Number: 24-L26E), and Princess Nourah Bint Abdulrahman University (RB Log Number: 24-0571). Informed consent was obtained from the study participants.

Measures

The data were collected using a self-administered, structured, pre-coded questionnaire designed with the Google Forms application. The questionnaire was adapted from validated instruments used in previous studies to evaluate the effectiveness, ease of use, and usefulness of e-learning, information technology, and training in generall7-20. The questionnaire consisted of four sections: Section 1 covered background information, Section 2 included variables assessing the effectiveness of received e-learning CPD training (seven items). Responses for the first two items were rated on a 4-point Likert scale (great, somewhat, small, no), while the remaining five variables used a 3-point Likert scale (yes to a great extent, yes to some extent, no). Section 3 encompassed variables related to the usefulness of e-learning (ten items) and the ease of use of e-learning (five items), measured on a five-point Likert scale (very strongly agree, strongly agree, neutral, disagree, very strongly disagree). The questionnaire was pilot-tested with a sample of 30 respondents, yielding Cronbach's Alpha values of 0.971, 0.941, and 0.865, and for items measuring the effectiveness, usefulness, and ease of use of e-learning, respectively.

Statistical analysis

The data was exported from the Excel sheet into the Statistical Package for the Social Sciences (SPSS) version 21 file. The analysis involved descriptive statistics, calculating proportions for categorical variables and averages [mean (standard deviation)] for continuous variables. The opinions about the effectiveness, usefulness, and ease of use of e-learning for CPD training were computed by obtaining the average scores of the items measuring them and the overall average. Comparisons between subgroups were conducted using one-way analysis of variance and t-tests for means of independent samples. A p-value less than 0.05 at a 95% confidence interval was considered significant.

Results:

Two hundred and ten individuals from the target population completed the questionnaire, resulting in a response rate of 96.8%. The background information of the study participants is shown in Table l.The majority of the respondents were male (70%), with over half of them (58.6%) under 45 years of age. Approximately two-thirds (68.6%) were health professionals, while the remaining third (31.4%) were from non-health professions. Additionally, 65.2% of respondents reported their participation in the training needs assessment within the past year.

Table 1: The background information of the respondents to the training impact questionnaire (n = 210)

Characteristics	n (number)	o/o Percentage
Sex		
Male	147	70
Female	63	30
Age		
< 45 years	123	58.6
45-49 years	82	39
>50 years	5	2.4
Type of profession		
Health professionals	144	68.6
Non-health professionals	66	31.4
Participated in training needs assessment		
Yes	137	65.2
No	73	34.8

Usefulness of e-learning

Table 2 presents the respondents' opinion on the usefulness of e-learning, yielding an overall score of 29 (8.5) out of 40 points. Specifically, favorable opinions were expressed towards the aspects of (e-learning requires no movement), (e-learning improve access to education), (e-learning saves time), and (e-learning is flexible and comfortable) with scores of 3.4(8), 3.4(9), 3.4(9), and 3.2(9) respectively. However, less favorable opinions were observed regarding items (e-learning enhances interaction with trainer), (e-learning enhances relations with trainer), and (e-learning enhances relations between trainees), which garnered scores of 2.6(1.1), *2.5(1.2),* and 2.4(1.2) respectively. The lowest rating was associated with the opinion that (e-learning is effective for subjects requiring hands-on learning experiences) receiving a score of 2.3(1.3).

Table 2: The opinion of the respondents regarding the usefulness and ease of using e-learning (n = 210)

Characteristics	Meau (SD)	Total score
The Usefulness of E-learning Training		
Requires no movement	3.4 (.8)	4
Improves access to education	3.4(.9)	4
Saves time	3.4(.9)	4
Is flexible and comfortable	3.2 (.9)	4
Is effective in providing knowledge	3.1(1)	4
Is effective in enhancing comprehension	2.7(1.1)	4
Enhances interaction with the trainer	2.6(1.1)	4
Enhances relations with the trainer	2.5(1.2)	4
Enhances relations between trainees	2.4(1.2)	4
Is effective for hands-on learning	2.3 (1.3)	4
The overall usefulness of e-learning	29(8.5)	40
Ease of use		
I have adequate technical skills to engage in E-learning	3.2 (.9)	4
I have an adequate internet connection to attend E-learning	3.3(1)	4
I have the necessary equipment to attend E-learning	3.3 (.9)	4
I have a suitable private location to attend E-learning	2.8 (1.2)	4
E-learning is easy to use for me	3.2(1)	4
Overall score of easiness	15.9(4.2)	20

Ease of use of e-learning

Table 2 also shows respondents' opinions on the ease of use of e-learning, with an overall average score of 15.9(4.2) out of 20 points. Specifically, favorable views were expressed regarding (having the necessary equipment), (having adequate internet connection), and (having sufficient personal technical skills for online learning), scoring 3.3(.9), 3.3(1), and 3.2(.9) respectively. Conversely, a less positive opinion was noted regarding the availability of a suitable private location for e-learning, achieving a score of 2.3(1.2).

Effectiveness of e-learning

Table 3 presents respondents' opinions on the effectiveness of e-learning they received in the previous year, yielding an overall effectiveness score of 14.6(5.6) out of 16 points. Notably, all items achieved nearly similar scores.

Table 3: The opinion of the respondents regarding the effectiveness of online training (N=201).

	Mean (SD)	Total score
Gained new knowledge	2.2(.83)	3
Enhanced existing knowledge	2.2(.85)	3
Improved performance	1.4(.61)	2
Complete tasks more quickly	1.3 (.66)	2
Motivation to perform	1.4(.65)	2
Perform demanding tasks	1.3 (.63)	2
Overall benefit	1.4(.65)	2
Overall score of effectiveness	14.6(5.6)	16

Factors associated with usefulness, ease of use, and effectiveness of e-learning

Table 4 displays the factors influencing opinions on the usefulness, ease of use, and effectiveness of e-learning.

Table 4: The factors associated with usefulness, ease of use, and effectiveness of online training (n = 210)

	Characteristics	n	Mean (SD)	P-value
Usefulness	SexMale			
	ale	147	30(8.3)	0.01
	Female	63	27(8.6)	
	Age			
	<45 years	123	29.1 (8.2)	0.333
	45 - 49 years	82	29.1 (9)	
	>50 years	5	23.4 (7.8)	
	Type of profession			
	Health professionals	144	28.76 (7.2)	0.49
	Non-health professionals	66	29.6(10)	
Ease of use	Sex			
	Male	147	16.7(3.8)	0
	Female	63	13.9(4.6)	
	Age			
	<45 years	123	15.8(4)	0.292
	45 - 49 years	82	16 (4.6)	
	>50 years	5	13 (4.6)	
	Type of profession			
	Health professionals	144	15.6 (4.1)	0.235
	Non-health professionals	66	16.4(4.5)	
Effectiveness	SexMale			
	ale	147	14.7(5.8)	0.596
	Female	63	14.3(5.1)	
	Age			
	<45 years	123	13.8(5.9)	.014*
	45 - 49 years	82	15.8(5.08)	
	>50 years	5	13.3(3.2)	
	Type of profession			
	Health professionals	144	15(5.1)	0.12
	Non-health professionals	66	13.7(6.5)	

SD: Standard Deviation, * < 45 years versus 45 - 49 years

Males held a more favorable opinion regarding the usefulness of e-learning compared to females (males: 30(8.3) versus females: 27(8.6) - p-value = 0.010). On the other hand, age group and type of profession were not found to be associated with opinions regarding usefulness. Likewise, males expressed a more positive opinion regarding the ease of use of e-learning compared to females (males: 16.7(3.8) versus females: 13.9(4.6) - p-value = 0.000). However, similar to opinions on usefulness, neither age group nor the type of profession was associated with perceptions of ease.

Individuals in the age group 45 - 49 years expressed a more favorable opinion about the effectiveness of e-learning compared to those under 45 years of age (45-49 years: 15.8(5.1) versus <45 years: 13.8(5.9) - p-value = 0.014). However, neither sex nor type of profession were associated with opinions regarding effectiveness.

Discussion

This research was conducted to examine the viewpoints of healthcare workers on the implementation of e-learning for continuous professional development (CPD) training.This study revealed that employees at GDHA, including health professionals and other professionals, generally held favorable opinions regarding the usefulness, ease of use, and effectiveness of online e-learning activities for CPD. This finding aligns with similar reports from studies conducted in Saudi Arabia and other countries, indicating that various healthcare workers find e-learning to be a useful and feasible learning meth- $_{O}$d3,8,n,i5,i6$_{t}$2i_^{r}p|$_{ie}$ l$_{earner's}$ opinion holds significance as they are central to the learning process, and their opinion influences learning efficiency, motivation, and knowledge application[21]. The continuous evaluation of learners' opinions becomes particularly relevant amidst the rapid evolution of technology and information resources and emerging learning technologies[11,15].

In recent decades, e-learning has proven its capacity to deliver consistent education, shorten instruction times, boost learning effectiveness and efficiency, and enhance learner motivation and satisfaction[6,11,22]. These benefits were particularly notable for CPD, especially for individuals like healthcare workers who have various competing interests demanding their time[6,8]. For instance, flexibility in terms of time and space was acknowledged by our respondents as a strength of e-learning. Convenience, encompassing easy access, reduced travel, and scheduling flexibility, was identified as the main advantage of e-learning in most studies evaluating this learning method[6]. This makes it more suitable than the class-based model as it can better accommodate the constraints of learners' work, serving as an appropriate learning approach for CPD, especially for those with limited time[11,21,23,24]. The respondents also perceived e-learning as efficient in enabling more trainees to attend specific training, a benefit seen in both CPD for healthcare professionals and undergraduate studies. This increase in attendance numbers is an advantage of e-learning that is not attainable with class-based training[6,11,25].

The opinion of the respondents was also

favorable regarding the ease of use of e-learning, particularly concerning the availability of internet connection and equipment. This is facilitated by the well-maintained and continuously expanding technological infrastructure needed for e-learning in Saudi Arabia[12]. All employees at GDHA in Riyadh are provided with their own computers equipped with reliable, continuous internet connections. This can significantly influence an individual's willingness to engage in and complete e-learning activities[21]. The respondents also perceived that they possess a sufficient level of personal information technology (IT) skills, enabling them to participate in e-learning without encountering technological barriers. This perception is consistent with reports from Saudi Arabia and other countries, where technology has not hindered e-learning[3,12]. Having IT skills is crucial for participating in web-based learning programs[6,12,21], as the absence of such skills often leads health professionals to perceive e-learning as challenging and contributes to fostering a negative attitude towards e-learning[4,17,21].

As crucial as assessing perceptions of usefulness and ease of use is, evaluating the outcomes and benefits of online CPD is essential, including determining the extent to which trainees' performance is enhanced[12]. The respondents perceived e-learning as effective in equipping them with knowledge and skills, thereby enhancing their performance. Likewise, other studies in Saudi Arabia have also reported that online CPD effectively enhances the clinical performance of various healthcare professionals[8,26].

Literature from other countries also suggests that virtual CPD activities are considered comparable in quality to face-to-face learning[u]and have the potential to improve physicians' knowledge, clinical care, and health outcomes for patients[6,27]

While the respondents generally held a positive opinion, their attitude was less favorable towards specific aspects of e-learning, that should be considered when planning the expansion of e-learning CPD activities..

The respondents showed concerns about the effectiveness of e-learning for subjects that require hands-on experiences, a concern shared by respondents in other studies, especially undergraduate medical students who believe that face-to-face training is essential to provide practical experience to students[25,28]. However, within the context of CPD, professionals may need to enhance or update their existing skills, and the e-learning approach may suffice for achieving this. This is particularly noteworthy given that technological advancements enable learners to utilize interactive features and multimedia tools on the internet, allowing them to simulate skills in authentic work settings[6]. Nevertheless, this necessitates careful planning by the TIDD for CPD training activities, deciding which ones can be delivered more effectively online, which ones are better suited for onsite delivery, or a combination of both. Similarly, the opinion of our respondents was less favorable regarding the impact of e-learning on interaction with trainers and other trainees. Interestingly the literature reported conflicting views regarding this aspect of e-learning. Several studies have

cited the absence of interactions, active involvement, and prompt feedback as significant disadvantages of e-learning for CPD[6,11,21,29]. On the other hand, other studies have reported that e-learning is interactive, enables active participation and immediate feedback, and enhances communication with learners from diverse locations[6]. Moreover, according to trainers' perspectives, technology promotes participation from learners who may have been hesitant in traditional learning. E-learning offers equal discussion opportunities, unlike traditional settings where ensuring equal participation is challenging due to the 'safer' environment[22]. It appears that it is not the mode of delivery of training (face-to-face or virtual) that affects interaction; rather, it is the mode of teaching adopted by the trainer, whether didactic or interactive, considering that computer-based programs offer the potential for interactivity[27]. To boost e-learning interaction, recommended strategies include emphasizing "two-way interaction" in course design, integrating interactive question and answer sessions, setting up online discussion areas, and forming web-based learning communities[21,30].

The predominant concern expressed by respondents in this study regarding the usability of e-learning was the availability of an appropriate, private space at their workplace to engage in e-learning activities without interruptions. A conducive learning environment is crucial as it can impact an individual's motivation to engage in and complete distance learning courses[21]. A specific office space could be designated for individuals who wish to attend e-learning, where they can participate in training without distractions.

Multiple studies have indicated that the adoption of online learning is significantly influenced by the characteristics of learners[4]. In the current study, males held a more favorable opinion regarding the usefulness and ease of e-learning compared to females. There is a discrepancy in the study results concerning the perception and use of e-learning by males and females.

Some studies report that females use online CPD more than males[27], while others agree with our findings that females are less inclined to use e-learning compared to males[11]. This is attributed to better computer literacy among males compared to females[11,31] in addition to females having personal commitments that compete with their pursuit of e-learning for CPD[6]. This study also found that older employees perceive e-learning as more effective in providing and enhancing knowledge and improving performance compared to their younger counterparts.

This finding contrasts with reports from other studies that indicate a better perception and use of e-learning among younger healthcare professionals[8,27]. The reason could be that older healthcare professionals, who may have experience with traditional forms of continuing education such as in-person conferences and seminars, may perceive e-learning as adequate for their CPD needs[8]. No difference was observed in the opinions of health and non-health professionals regarding the usefulness, ease of use, or effectiveness of e-learning. This suggests that the

benefits and limitations of e-learning are universally perceived, regardless of professional background. It also implies that e-learning programs are designed and implemented effectively to meet the needs and preferences of both groups, resulting in consistent perceptions among them.

A limitation of this study is that the findings may have limited generalizability beyond GDHA in the Riyadh Region. However, the context and characteristics are similar to other healthcare organizations and institutions within Saudi Arabia.

Conclusion

The respondents in this study expressed a favorable view of e-learning for CPD, highlighting its usefulness, ease of use, and effectiveness. They found it convenient and efficient and appreciated the availability of necessary IT skills, internet access, and equipment. Moreover, they acknowledged its effectiveness in knowledge acquisition and performance improvement. However, they showed concerns about the level of interaction, suitability for hands-on training, and availability of distraction-free locations. Therefore, e-learning stands out as a viable option for implementing CPD training; however, this choice requires careful planning and considerations to effectively address and overcome any shortcomings or limitations associated with this mode of learning.

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