



# **E-learning Challenges Faced by the Primary School English Teachers of Taif City in Saudi Arabia**

**Sara Allahbi <sup>a\*</sup>**

<sup>a</sup> *Department of Foreign Languages, College of Arts, Taif University, Saudi Arabia.*

## **Author's contribution**

*The sole author designed, analysed, interpreted and prepared the manuscript.*

## **Article Information**

DOI: 10.9734/AJESS/2023/v47i11015

## **Open Peer Review History:**

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/102422>

**Original Research Article**

**Received: 05/05/2023**  
**Accepted: 06/07/2023**  
**Published: 17/07/2023**

## **ABSTRACT**

**Aims:** The ultimate aim of this research project is to find out the adverse effect of COVID 19 on the learning environment in the Kingdom of Saudi Arabia (KSA). Furthermore, considering the impact of the corona virus on the education sector across the globe, especially at the primary level, this research addresses whether primary school English as foreign language (EFL) teachers faced challenges in dealing with online/virtual classes. To achieve the objectives and answer the research questions of the present study, the researcher elicited teachers' perceptions regarding the challenges they face in the process of learning via virtual mode- the only alternative e-learning strategy available at the time of social distancing during Covid-19. The research method was quantitative, as data was collected from teachers' questionnaires (adapted). The study relied on the primary school context of Taif region, Saudi Arabia. The study took around 7 months from conception to completion towards the last phase of the master's level. The sample comprised 154 EFL Primary School teachers aged 25 to 35 years (104 females and 50 males) in Taif, Saudi

<sup>\*\*</sup>MA (TESOL);

<sup>\*</sup>Corresponding author: Email: sara.allahbi@gmail.com;

*Asian J. Educ. Soc. Stud., vol. 47, no. 1, pp. 43-62, 2023*

Arabia. The adapted tool (a questionnaire) included different components such as attitude towards e-learning, readiness, challenges, infrastructure etc.

It was found that e-learning tools were more effective for more female teachers. Hence, the year of experience did not significantly affect e-learning materials with reference to two groups of teachers. The study also revealed that the age of male and female teachers does not contribute to the use of e-learning materials. Moreover, digital material exploitation is more easily done by the younger generation than the traditional teachers. The research findings are beneficial in redefining e-learning/virtual learning and redesigning compatible curricula, especially teaching strategies that would incorporate blended learning. In addition, teacher development activities will be initiated, keeping the teachers' needs in view. Extension research at the doctoral level may be conducted to further support the findings by undertaking research with a larger sample. A tool should also be developed and employed to study online learning and associated factors, especially in the Taif region.

**Keywords:** COVID-19; E-learning strategies; teacher perception; curriculum; blended learning; teacher development.

## 1. INTRODUCTION

The entire paradigm of education has passed through drastic changes in recent times. Furthermore, technology has become extremely crucial these days. Teachers' preparedness is also essential in the process of the goal of attainment. Technology and learning have become two sides of the same coin in the existing society. In other words, the present digital society utilises technology in every sphere and corner of all the sectors: industry, business, and education. Psycholinguists believe that technology integration in education creates or increases motivation among all the primary, secondary or tertiary education students [1]. The perceived impact of COVID-19 has resulted in the forced incorporation of technology in global classrooms. As a result, not only in institutions in the urban world but also in remote and rural regions, technology knocked on everyone's door because its use was inevitable. Many sophisticated universities, colleges, institutes, and schools have been using technology or e-learning for a very long time. However, in recent times, pedagogues and educationists have agreed to employ virtual learning mode as an alternative to face-to-face learning/teaching [2].

### 1.1 Statement of Problem

Moving on from the general to the specific, teaching in Saudi Arabia shares the same problems seen elsewhere; however, there are some differences between cities and schools as we shall see. Taif, a region in western Saudi Arabia, though not as developed as Jeddah, Riyadh, or Dammam as yet, tries to utilise similar educational technology in the schools to

especially deal with the primary students through virtual learning. All top Saudi government universities use the 'Blackboard' software for teaching and testing. Some of them were using blended learning techniques even before the attack of the COVID-19 deadly virus. Hence, schools were unprepared for such challenges as the current pandemic effect [3].

Though the administration has provided infrastructure for the smooth functioning of classes through e-learning/virtual mode, many challenges remain. Therefore, the categorical allegation on administration or management may not be justified, but all the stakeholders may be found accountable for not making optimum use of the electronic resources for many reasons. One of the main reasons could be the under-preparation of the teachers and lack of teacher motivation to equip them with sophisticated technology, utilisation, and expected learning outcomes. In that case, intensive professional development of teachers is needed at frequent intervals to be updated. The present study is an attempt to resolve such issues. [4].

### 1.2 Objectives

**Following are the specific objectives for the present study:**

- 1- to study the importance of e-learning in the primary schools of the Taif region,
- 2- to ascertain challenges faced by teachers at the primary level in the Taif region,
- 3- to find out factors contributing to the challenges of e-learning,
- 4- to design professional development sessions for teachers.

### 1.3 Research Questions

Based on the objectives of the study, the following research questions were formulated:

- 1- How is e-learning important in today's educational context?
- 2- What are the perceived challenges of e-learning?
- 3- Which variable contributes the most to the challenges of learning?
- 4- Why is professional development crucial for teachers?
- 5- How can e-teacher training contribute to effective e-learning?

## 2. LITERATURE REVIEW

The present paper is about the importance of e-learning in the present scenario. Though e-learning has a tremendous effect on learning outcomes, its utilisation is not without challenges. Challenges may occur due to many reasons. One of the factors could be teachers' under-preparedness; therefore, systematic professional development needs to be imparted to the target teachers/instructors working in the primary schools in the Taif region.

### 2.1 Related Studies

In this connection with the definition of e-learning, Khan [5] stated that "e-learning can be thought of as nothing more or less than electronic utilisation, e-delivery and accomplishment of learning goals via electronic media". (P.126). Thus, certain technical terms are treated synonymously. However, the hairline difference is always possible. As believed and mentioned earlier, virtual learning has been used as an alternative to physical /traditional education, especially after the Covid-19 pandemic; it is high time to study the challenges primary school teachers face in the Taif region and why.

There is no scarcity of related studies/literature, especially during Covid-19 and even when thousands of journals have dedicated their volumes and issues to Covid-19 related research. Online/virtual learning has many advantages. However, its effect on motivation and engagement is obvious. Chandra and Lloyd [6] contend that in an e-learning setting, learners are found more motivated and engaged in both learning and the assessment processes. In the

past, studies were typically undertaken to assess the comparative effectiveness of the two modes: traditional and online/blended learning [7]. However, it was noticed that the research trends started shifting in the recent past, and so has the paradigm.

Khan [8] has been conducting studies related to the importance of e-learning, utilisation of e-resources, the effectiveness of e-learning, challenges in the e-learning mode and professional development of the teachers in general and English teachers in particular. Though most researchers have started praising e-learning for many known and unknown reasons, the sheer reality might be a little different as perceived, 'development of skills may not be attained if the system depends entirely on the distance mode [7]. Martinez et al. [9] focused on using mobile devices to improve Learning Outcomes and Teachers' Professional development.

Recently Allo [10] investigated whether online learning was effective amid Covid-19. The study explored that e-learning/virtual learning experiment has been quite supportive in teaching-learning.

On the other hand, Donnelly and McAvinia, [11] found that "many academics have had little training and minimal experience in the use of communications and information technology as an educational tool" (p 19). Furthermore, Taurus., David., and Alex [12] explored the problems that prevented the use of e-learning in Kenyan universities. The study listed some of the challenges that emerged while implementing virtual learning. Finally, Feeney [13] stated that E-learning has been the focus of research these days.

On the other hand, Kim [14] pointed out that technological problems hinder virtual learning applications. Hence, it is important to mention that many other studies show factors affecting the learning process, such as technology integration, teacher-student interaction, instructor effectiveness, and quality of learning. [15, 16]. Furthermore, Khan et al. [17] also summarised the effective use of technology; it is necessary to have a positive attitude about technology use. This cannot be easy without professional development. Jones [18] explored the advantages of eLearning, while Cidral et al. [19] explored the E-learning success determinants.

On the other hand, Gamble [20] explored EFL University Students' Acceptance of E-learning Using TAM. Moreover, Garrison [21] studies the relevance of E-Learning in the 21st Century. In addition, Hassanzadeh et al. [22] worked on the relevance of a model for measuring an e-learning system's success. Institutional and administrative choices are also significant in making the e-learning process a success. Berhanu [23] sheds light on E-learning promotion, which provides a potential ladder for development. According to Al-Harbi [24], a variety of factors impact E-learning acceptability. However, the most important aspect in influencing whether or not students will use E-learning is their attitude toward it. Al-Mubireek [25] researched E-learning in the English Classroom by comparing Two E-Learning Platforms Impacting Preparatory Year Students' Language. Similarly, Nedeva and Dimova [26] found Some Advantages of E-Learning in English Language Training.

Students' decision to use E-learning is also determined by different factors. Furthermore, students' access to e-learning impacts their attitudes and behaviour towards accepting such kind of learning. Moreover, primary school learners are unable to express their own perceptions while their teachers can observe well. In this context, Al-Dosari [27], Abbasi et al. [28] and Vitoria et al. [29] studied, in different contexts, the faculty members' and students' perceptions; they found and observed that students' responses were positive and showed that learning in an E-learning environment was superior to the conventional Classroom. Aggarwal et al. [30] discussed Continuing online learning and skills development in the COVID-19 crisis. Mansour and Al-Shorman [31] revealed that learners taught through a blended learning strategy are much better than those taught through the traditional method. Also, Dwiyo and Radjah [32] elicited the Effectiveness, Efficiency and Instruction Appeal of the Blended Learning Model. Bali and Liu [33] evaluated students' perceptions toward online learning and face-to-face learning courses. Salmon [34] stated that "training on the technological features of the E-learning system is only the first step to success, and the real challenge is training for changes to pedagogy" (p.6). Likely, Blinco et al. [35] viewed that some requirements are essential to form the success of teaching/studying through e-learning that both teachers and students should own sufficient knowledge and skills in using online tools.

Similarly, Zake [36] stated that in developing countries like Africa, lack of infrastructure and poverty hinder the implication of eLearning because ICT is relatively more expensive in developed countries. As a result, the majority of Kenyan public institutions have chosen blended learning as the first step toward E-learning's full implementation.

Rhema and Miliszewska [37] listed some challenges that impact the attitudes of both students and teachers, including weak infrastructures, high costs from the implication of eLearning, low experience in eLearning, and poor management systems. Some of these challenges are whether linguistics or culture.

The reviewed literature can be summarised as the increased perceptions of such learning, especially from faculty members, say Roca et al [38]. However, still many issues need to be overcome while applying eLearning in higher education. In addition, challenges must be dealt with strategically while implementing E-learning in universities. Sekakubo. et al. [39] pointed out that initiatives to implement e-learning failed completely or partially in developing countries for several reasons. Al-Ghaith al. [40] pointed out that in Saudi Arabia, the availability of speedy internet connection boosts the adoption and implication of e-learning. As a result, Lastly, Sahu [41] investigated the closure of institutions due to Corona virus overspread in 2019 (COVID-19). The study pointed out the fundamental psychological dimensions that negatively affected not only teachers but also learners because of the Covid-19 pandemic.

## 2.2 Concluding Remarks

Having seen certain essentially related studies, especially in the context of Saudi Arabia, it is felt that research related to the challenges of online teaching should especially be carried out in the Taif region. It will explore many other factors that affect online/virtual learning and its effectiveness. A need for curriculum design, textbook/material selection and teacher development seems imperative.

## 2.3 Research Gap and Justification of the Study

Despite many available studies, there seems to be a shortage of literature related to the e-learning practices at the primary education level in general in KSA and Taif in particular. In the past, virtual learning at this level was not in practice except in rare situations. However,



COVID-19 forced the pedagogues to implement e-learning/virtual learning at every level of education. Thus, the training need of primary school teachers in the Taif region needs to be explored. The present study is going to bridge the gap in the existing literature.

### **3. METHODS AND DESIGN OF THE STUDY**

This study briefly describes the participants and data collection tools employed in the present project. In short, the design part usually describes the research design used and its characteristics, especially if the research is experimental in nature. This study is quantitative in nature as the analysis initially depends on the data elicited from the questionnaires filled by the teachers. Therefore, a questionnaire for the teachers was adapted (see Appendix-A) to collect data related to different components related to e-learning, such as attitude, preparedness, facilities, challenges and necessary feedback. This study also deals with some technical requirements such as validity and reliability, permissions, consent and ethical consideration. Therefore, necessary measures were taken.

#### **3.1 Study Context**

Since the Covid-19 pandemic forced global institutions to switch to online/virtual learning to abide by the physical/social distancing norms, pedagogues, researchers, and policymakers started thinking about studying the roles, importance, and challenges of e-learning (online/virtual). Saudi Arabia is no exception. Therefore, many studies were undertaken in the kingdom. However, there was a need for such a study in the Taif region to explore factors associated with it. Therefore, the researcher undertook the present research.

#### **3.2 Data Collection Tools and Techniques**

To collect quantitative data, a questionnaire was adapted [42]. The five-point scale was utilised. (Appendix-A).

#### **3.3 Participants of the Study**

This study involved n=154 EFL Primary School teachers (104 females and 50 males) at Taif, Saudi Arabia, as the study sample. Convenient sampling was employed in this study because of the limited time; the google questionnaire was sent to the supervisors at all the Taif secondary

schools and requested them to share the questionnaire with the EFL teachers there. The convenient sample is used when the researcher collects the data from the available participants and is willing to take the role in the study [43]. The researcher also sent a voice recording to the teachers demonstrating the purpose and aims of the questionnaire and assuring them that their information would stay confidential and only be used in this research. The researcher also promised them that if they wanted to get a copy of the research, she would share it with them as soon as the study was completed. The online questionnaire was sent to all the teachers, and interested and willing teachers responded. The data was collected between 8-3-2022 and 24-3-2022.

#### **3.4 Validity of the Tool**

Since the present work adapted a questionnaire used in the Saudi context, it was not required to test validity again. However, a few experts were consulted to give their opinions on the appropriateness of the tool.

#### **3.5 The Procedure of Data Collection**

First, the researcher consulted Taif Education Administration to know the whole number of primary school teachers to choose a convenient number of participants. However, they did not tell the researcher the number because I did not carry the approval letter of the Taif University. However, later the researcher sent to 100 male and the same number of female teachers of primary schools in Taif. The questionnaire was sent via apps like 'WhatsApp' and 'telegram'. In addition, The researcher also contacted some relatives and friends who work in the primary school to share the questionnaire with male and female teachers. My classmates, some teachers and my supervisor also shared the questionnaire through various media to get the tool filled by the maximum possible number of participants.

#### **3.6 Concluding Remarks**

In summary, this study has provided information about the methodology section that sheds light on the study's participants and the tool employed with a brief description. In addition, the procedure of data collection is dealt with in detail. Finally, the main tool, an adapted questionnaire" was also briefly mentioned and appended towards the end. From here, the researcher can write about the analysis of data and later interpretation of results.

The following study describes the data elicited from the quantitative research methods, which was entered into SPSS to be analysed quantitatively and concluded in relation to some sub-factors such as gender, experience, qualification, etc.

#### 4. ANALYSIS OF DATA AND INTERPRETATION OF RESULTS

The current study includes the findings of the study, and the data analysis is shown for each research question and later statistical analysis of demographic data and comparisons between the two groups. Since the questionnaire has been described briefly, there is no need to explain it again.

##### 4.1 Objectives

Although the main objectives of the study are already presented above, in order to have a clear idea, these are written once again.

- 1- to study the importance of e-learning in the primary schools of the Taif region,
- 2- to ascertain challenges faced by teachers at the primary level in the Taif region,
- 3- to find out factors contributing to the challenges of e-learning,
- 4- to design professional development sessions for teachers.

##### 4.2 Research Questions

The analysis will be initially categorised based on the research questions for the current study. Then, each question is answered in light of the findings that emerged from the statistical analysis for demographic aspects and their association with e-learning.

- 1- How is e-learning important in today's educational context?
- 2- What are the perceived challenges of e-learning?
- 3- Which variable contributes the most to the challenges of learning?
- 4- Why is professional development crucial for teachers and effective teaching?

#### 4.3 Research Questions Based on Findings

Research question.1- How is e-learning important in today's educational context?

Item 3 of the questionnaire has been graphically presented as under to analyse the gathered data.

3-E-learning can enable learners to study, irrespective of where they are located in the world

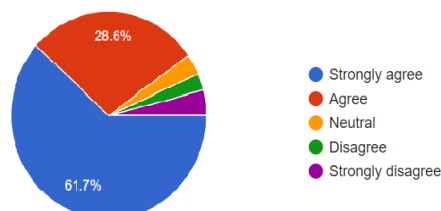


Fig. 1. Item 3 adapted from Bahanshal & Khan [42]

The data relating to item 3 shows that 61.7% of participants strongly agree, while 28.6% agree. The agreement is very strong, which proves that e-learning is very important.

Following item -8 of the questionnaire has been analysed to see the effect of e-learning mode on students' learning.

8-Studying through e-learning mode can increase students' learning effectively, as they will have easy access to learning materials (e.g. reading documents and recorded videos)

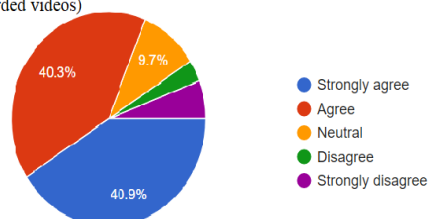


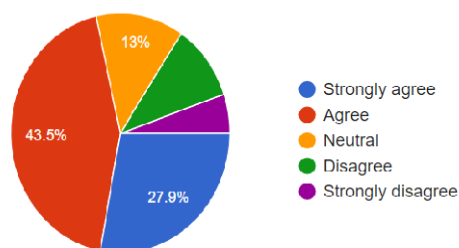
Fig. 2. Item 8 adapted from Bahanshal & Khan [42]

Based on the calculation of the percentage of item no.8, it can be concluded that nearly 50% of participants supported that e-learning is highly important for many reasons.

Research question. 2- What are the perceived challenges of e-learning?

Item 10 of the questionnaire studied the respondents' perception on the user friendliness of the e-learning platform.

10- I believe elearning platforms are user friendly



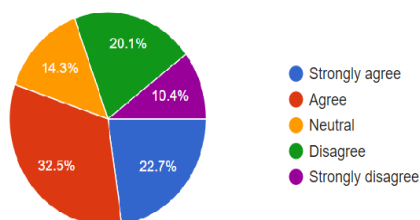
**Fig. 3. Item 10 adapted from Bahanshal & Khan [42]**

Item 10 confirms that there are no challenges in using e-learning. However, items 1 to 13 of category A also reveal the usefulness of e-learning. However, some items deal with difficulties or challenges which could not be exactly ascertained. Hence, some teachers showed an average amount of interest in e-learning as their attitude towards e-learning could not be very positive.

Research question.3- Which variable contributes the most to the challenges of learning?

Item.16 of the questionnaire has been analysed to study the limitations of e-learning for practical based subjects.

16- I don't believe e-learning is suitable for courses that need practical demonstrations



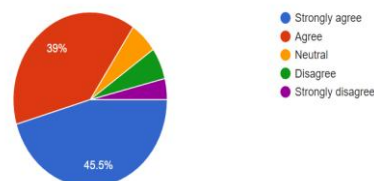
**Fig. 4. Item 16 adapted from Bahanshal & Khan [42]**

E-learning users have perceived that e-learning is not easily feasible for subjects with practical or demonstrations. In practical sessions, teacher interventions are imperative.

Research question.4- Why is professional development crucial for teachers?

.I am ready to utilize e-learning -18

154



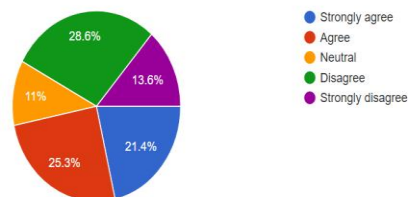
**Fig. 5. Item 18 adapted from Bahanshal & Khan [42] which shows teachers' professional readiness**

Professional development is always crucial. For example, if a teacher has no proper attitude, this can be changed by compatible professional development. Similarly, if a teacher finds anything challenging, he can overcome it with the help of teacher development. However, the graph shows that most teachers are ready and do not need any training.

Research question.5- How can e-teacher training contribute to effective e-learning?

.I don't need any training in e-learning -20

154



**Fig. 6. Item 20 adapted from Bahanshal & Khan [42]**

Teacher training (pre-service or in-service) is always a matter of great significance. Ineffective teachers can be changed into effective teachers by good teacher training. Moreover, the graph indicates that most teachers claim that they do not need training.

Comparison of the two groups: Based on the tabular presentation of data as analysed in Statistical Package for the Social Sciences (SPSS) version 28 (Appendix-B) and quantitative techniques of research, the following analyses have been attempted for demographic aspects and connections with e-learning:

**Table 1. Result of Test of Significance Difference between the scores of the perception scale on e-learning between female and male teachers**

Variable	Female			Male			t'- value
	N1	M1	SD1	N2	M2	SD2	
Use of e-learning	104	90.67	14.039	51	85.29	19.386	1.969

Table 1 shows that there is a significant difference between the mean scores of the female and male teachers. The 't' value obtained (1.969) was found to be greater than the table value at a 0.05 level of significance. The mean score of the female teachers is more than the male teachers, which indicates that female teachers find e-learning tools to be more effective.

#### 4.4 ANOVA Basis of Experience

ANOVA is used to compare two groups on different variables. Factor wise analysis follows:

**Table 2. One way ANOVA table of use of e-learning resources with regards to years of experience**

Source	Sum of squares	Df	Mean square	F	Significance
Between Groups	51.614	2	25.807	.097	.907
Within Groups	40005.736	151	264.939		
Total	40057.351	153			

Table 2 shows the value  $F(2,151) = .097$ ,  $p < .001$ , which indicates that male and female teachers do not differ significantly in the use of e-learning materials with respect to their years of experience.

#### 4.5 ANOVA Basis of Age

**Table 3. One way ANOVA table of use of e-learning resources with regards to the age**

Source	Sum of squares	Df	Mean square	F	Significance
Between Groups	399.038	2	199.519	.760	.470
Within Groups	39658.313	151	262.638		
Total	40057.351	153			

Table 3 shows the value  $F(2,151) = .760$ , at  $p < .001$ , which indicates that male and female teachers do not differ significantly in the use of e-learning materials with respect to their age.

#### 4.6 ANOVA Basis of Qualification

**Table 4. One way ANOVA table of the use of e-learning resources with regards to the qualification**

Source	Sum of squares	Df	Mean square	F	Significance
Between Groups	71.551	2	35.775	.135	.874
Within Groups	39985.800	151	264.807		
Total	40057.351	153			

Table 4 shows the value  $F(2,151) = .135$ , at  $p < .001$ , which indicates that male and female teachers do not differ significantly in the use of e-learning materials with respect to their qualifications.

#### 4.7 ANOVA Basis of Years of Usage

**Table 5. One way ANOVA table of use of e-learning resources with regards to the years of usage**

Source	Sum of squares	Df	Mean square	F	Significance
Between Groups	478.149	2	239.075	.912	.404
Within Groups	39579.202	151	262.114		
Total	40057.351	153			



Table 5 shows the value  $F(2,151) = .912$ , at  $p < .001$ , which indicates that male and female teachers do not differ significantly in the use of e-learning materials with respect to their years of usage.

## 5. FINDINGS, DISCUSSION, AND CONCLUSIONS

### 5.1 Findings

It was found that e-learning tools were more effective for female teachers. Hence the year of experience did not exert any significant effect on e-learning materials with reference to two groups of teachers. The study also revealed that the age of male and female teachers does not contribute to the use of e-learning materials. Moreover, digital material exploitation is more easily done by the younger generation than the traditional teachers. The research findings are beneficial in redefining e-learning/virtual learning and redesigning compatible curricula, especially teaching strategies that would incorporate blended learning. In addition, teacher development activities will be initiated, keeping the teachers' needs in view.

### 5.2 Discussion

The analysis shows that there is a significant difference between the mean scores of the female and male teachers. It was interesting to find that e-learning tools were more effective for female teachers. Hence, it cannot categorically be concluded that there were some specific reasons. One of the possibilities could be female teachers' interest and active participation in technology integration training. Teachers (females) at primary level in Saudi have been noticed as more enthusiastic than their counterparts [43].

Table 2 indicates the year of experience did not significantly affect e-learning materials with reference to two groups of teachers.

It was also found in Table 3 that the age of male and female teachers does not contribute to the use of e-learning materials. It verifies that the expertise can be developed through dedication and training rather than age or maturity. Moreover, digital material exploitation is more easily done by the younger generation than the traditional teachers.

It is rather interesting to note that Table 4 indicates that male and female teachers do not significantly differ in the use of e-learning materials regarding their qualifications (certificates).

In addition, it was also found that male and female teachers do not differ significantly in the use of e-learning materials with respect to their years of usage. Moreover, these findings seem quite strange because generally, the more technology is accessed, the better it is used. However, this study's data analysis does not confirm any such hypothesis.

In general, this study's findings are in line with Alghamdi's study [44] also conducted on the teachers of the TAIF city as well. Shaiba et al [45] also found similar results, however the level of education was different. In addition, Al Shamari's [46] study on challenges and barriers to e-learning experienced by trainers and training coordinators in the MoH in Saudi Arabia is also related to the current study's findings, however indirectly.

### 5.3 Conclusions

Based on the data analysis and interpretation of the results, it can be concluded that there are many challenges that the primary teachers of the Taif region encounter with special reference to online teaching, especially in the Covid-19 phase. Some main factors are teachers' attitudes toward e-learning/ blended/ virtual learning, and Students' technology-related orientations can also be one of the factors. In addition, students might not get enough support from their parents. Furthermore, the administration's passive attitude and supply of infrastructure might also contribute to the challenges both teachers and learners face. Finally, improper training in technology or no teacher training may also lead to such challenges.

It was found that e-learning is extremely important, especially in the phase like the Covid-19 when the schools had no other options than to either close schools, suspend teaching or conduct online/virtual classes. As mentioned, there have been many challenges of different types that initially were not easy to be controlled or dealt with. It is difficult to elicit which variable or factor has been the most crucial but almost all the variables, especially teacher development's effect. It is believed that despite all available resources, including digital media, teaching

cannot yield better results unless teachers are well equipped [47, 48-51].

## 6. LIMITATIONS OF THE STUDY

Every research answers a few questions; hence, it cannot be assured that the study is foolproof and it does not have limitations. One of the limitations of this study could be the sample size and selection. In addition, learners being too young, cannot be administered any tools to elicit desired data. The validity of the tool may be another limitation.

## 7. RECOMMENDATIONS

It is thus recommended that teachers must have a proper attitude toward e-learning. They should be well equipped with e-learning techniques. Management should facilitate the teachers with the necessary infrastructure.

## CONSENT AND ETHICAL CONSIDERATIONS

Required consents and permissions were sought following standard guidelines. The respondents were also convinced about the purpose of the research and confidentiality.

The researcher took data collection approval as per the ethical principles and guidelines.

## COMPETING INTERESTS

The author has declared that no competing interests exist.

## REFERENCES

1. Xu Z, Yuan H, Liu Q. Student performance prediction based on blended learning. *IEEE Trans. Educ.* 2021;64:66–73. DOI: 10.1109/TE.2020.3008751
2. Khan IA. Electronic learning management system: Relevance, challenges, and preparedness. *Journal of Emerging Technologies and Innovative Research.* 2020;7(5):471-480.
3. Thaheem, S.K., Zainol Abidin, M.J., Mirza, Q., & Pathan, H. (2021). Online teaching benefits and challenges during pandemic COVID-19: a comparative study of Pakistan and Indonesia. *Asian Education and Development Studies.* DOI: 10.1108/AEDS-08-2020-0189
4. Sims, S, Fletcher-Wood H. Identifying the characteristics of effective teacher professional development: a critical review. *School Effectiveness and School Improvement.* 2021;32(1):47-63. DOI:10.1080/09243453.2020.1772841 Available:https://doi.org/10.1080/09243453.2020.1772841
5. Khan IA. Effectiveness of e-learning for the teaching of English: a study of comparative strategies. *Advances in Language and Literary Studies.* 2016;7(3):125-135.
6. Chandra V, Lloyd M. The methodological nettle: ICT and student achievement. *British Journal of Educational Technology.* 2008;39(6):1087-1098.
7. Khan IA. Utilisation of different technologies and media in learning writing skill in English: a case study. *European Journal of Education Studies;* 2017.
8. McCutcheon, K., Lohan, M., Traynor, M., & Martin, D. A systematic review evaluating the impact of online or blended learning vs. face-to-face learning of clinical skills in undergraduate nurse education. *Journal of advanced nursing,* 2015; 71(2), 255–270. https://doi.org/10.1111/jan.12509
9. Martinez IG, Sanchiz DC, Batanero JMF, Rosa ALDL. Using mobile devices for improving learning outcomes and teachers'professionalization. *Sustainability.* 2019;11:6917. DOI:10.3390/su11246917.
10. Allo MDG. Is the online learning good in the midst of the Covid-19 Pandemic? The case of EFL learners. *Jurnal Sinestesia.* 2020;10(1):1-10.
11. Donnelly R, McAvinia C. Academic development perspectives of blended learning. In Anastasiades, P.S. (Ed.), *Blended Learning Environments for Adults: Evaluations and Frameworks,* Hershey, PA: IGI Global. 2012;1-18.
12. Taurus JT, David Gichoya, Alex Muumbo. Challenges of implementing e-learning in Kenya: A case of Kenyan Public University. *International Review of Research in Open and Distributed Learning.* 2015;16(1):120 -141.
13. Feeney D. Rates of adoption in a university course management system. Unpublished Dissertation, West Virginia University, Morgantown, WV; 2001.
14. Kim M. Factors influencing the acceptance of E-learning courses for mainstream faculty in higher institutions. *International*

- Journal of Instructional Technology and Distance Learning. 2008;5(2):29-44.
15. Baylor AL, Ritchie D. What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms? *Computers & Education*. 2002;39:395-414.
  16. Selim HM. Critical success factors for E-learning acceptance: Confirmatory factor models. *Computers & Education*. 2007; 49(2):396-413.
  17. Khan S, Hasan M, Clement C. Barriers to the introduction of ICT into education in developing countries: The example of Bangladesh. *International Journal of Instruction*. 2012;5(2):61-80.
  18. Jones KL. *The Advantages of eLearning*; 2018. Retrieved from elearningbrothers.com: <https://elearningbrothers.com/blog/the-advantages-ofelearning/>
  19. Cidral WA, Oliveira T, Felice MD, Aparicio M. E-learning success determinants: Brazilian empirical study. *Computers & Education*. 2018;122:273-290.
  20. Gamble C. Exploring EFL University Students 'Acceptance of E-learning Using TAM. Kwansei; 2018.
  21. Garrison DR. *E-learning in the 21st century: A framework for research and practice* (2<sup>nd</sup> ed.). Taylor & Francis, New York; 2011.
  22. Hassanzadeh A, Kanaani F, Elahi S. A model for measuring e-learning systems success in universities. *Expert Systems with Applications*. 2012;39(12):10956-10966.
  23. Berhanu B. A model for an e portfolio-based reflective feedback: a case study of elearning in Developing Countries, unpublished PhD thesis. University of Hamburg, Hamburg; 2010.
  24. Al-Harbi KA. E-learning in Saudi tertiary education: Potential and challenges. *Applied Computing and Informatics*. 2010;9:31-46. Available: <http://dx.doi.org/10.1016/j.aci.2010.03.002>
  25. Al-Mubireek S. E-learning in the English Classroom: Comparing two e-learning platforms impacting preparatory year students 'language learning. *Call-Ej*. 2019;20(2):19–37. Available:<http://callej.org/journal/20-2/Al-Mubireek2019.pdf>
  26. Nedeva V, Dimova E. Some advantages of e-learning in English language training. *Trakia Journal of Sciences*. 2010;8(8):21–28. Available:<http://www.uni-sz.bg>
  27. Al-Dosari H. Faculty members and students perceptions of E-learning in the English Department: A project evaluation. *Journal of Social Sciences*. 2011;7(3):391-407.
  28. Abbasi S, Ayoob T, Malik A, Memon SI. Perceptions of students regarding E-learning during Covid-19 at a private medical college. *Pakistan Journal of Medical Sciences*. 2020;36(COVID19-S4):S57–S61. Available:<https://doi.org/10.12669/pjms.36.COVID19-S4.2766>
  29. Vitoria L, Mislinawati M, Nurmasiyah N. Students'perceptions on the implementation of e-learning: Helpful or unhelpful? *J Physics*. 2018;1088.
  30. Aggarwal A, Comyn P, Fonseca PM. Discussion: Continuing online learning and skills development in times of the COVID-19 crisis March 27 - April 17; 2020. Available: [https://www.skillsforemployment.org/KSP/en/Discussions/EDMSP1\\_256625](https://www.skillsforemployment.org/KSP/en/Discussions/EDMSP1_256625)
  31. Al-Mansour NS, Al-Shorman RA. The effect of computer-assisted instruction of Saudi University students 'learning of English. *Journal of King Saud University – Languages and Translation*. 2011;24:51-56. Available:<http://dx.doi:10.1016/j.jksult.2009.10.001>
  32. Dwiyoogo WD, Radjah CL. Effectiveness, efficiency and instruction appeal of blended learning model. *International Journal of Online and Biomedical Engineering*. 2020;16(4):91–108. Available: <https://doi.org/10.3991/ijoe.v16i04.13389>
  33. Bali S, Liu MC. Students 'perceptions toward online learning and face-to-face learning courses. *J Physics*. 2018;1108:012094. DOI:10.1088/1742-6596/1108/1/01209
  34. Salmon, G. (2004). *E-moderating: The key to Teaching and Learning Online* (2nd Ed.) Oxford shire: Taylor & Francis Books Ltd.
  35. Blinco K, Mason J, McLean N, Wilson S. Trends and issues in e-learning infrastructure development: a white paper

- for alt-i-lab. Prepared on behalf of DEST (Australia) and JISC-CETIS (U.K.); 2004.
36. Zake J. Challenges to E-learning in Developing Communities of Africa; 2009. Available: <http://digitallearning>. (Accessed on August 28, 2013).
37. Rhema A, Miliszewska I. Towards e-learning in higher education in Libya. *Issues in Informing Science and Information Technology*. 2010;7:423-437.
38. Roca, J.C., Chiu, C.M. & Martínez, F.J. (2006) Understanding e-learning continuance intention: An extension of the Technology Acceptance Model. *International Journal of Human Computer Studies*, 64, 683– 696.
39. Sekakubo G, Suleman H, Marsden G. Issues of adoption: Have e-learning management systems fulfilled their potential in developing countries? In *Proceedings of the South African Institute of Computer Scientists and Information Technologists Conference on Knowledge, Innovation, and Leadership in a Diverse, Multidisciplinary Environment* (pp. 231–238). Cape Town, South Africa; 2011.
40. Al-Ghaith W, Sanzogni L, Sandhu K. Factors influencing the adoption and use of online services in Saudi Arabia. *The Electronic Journal on Information Systems in Developing Countries*. 2010;40(1):1-32.
41. Sahu P. Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact on Education and Mental Health of Students and Academic Staff. *Cureus*. 2020;2019(4):4–9. Available:<https://doi.org/10.7759/cureus.7541>
42. Bahanshal Dalal A, Khan Intakhab. Effect of COVID-19 on Education in Saudi Arabia and E-Learning Strategies (August 17, 2021). *Arab World English Journal (AWEJ) Special Issue on CALL Number 7*; 2021. Available:SSRN: <https://ssrn.com/abstract=3906323>
43. Alnahdi GH, Schwab S. The impact of gender differences in teachers' teaching practices and attitudes on students' math and science achievement in Saudi Arabia: Evidence from TIMSS 2019 data. *Frontiers in Psychology*. 2023;14:1066843. Available:<https://doi.org/10.3389/fpsyg.2023.1066843>
44. Alghamdi AA. Saudi Teachers' attitudes towards using online learning for young children during the Covid19 Pandemic. *International Journal of Learning, Teaching and Educational Research*. 2022;21(6): 178-193. Available: <https://doi.org/10.26803/ijlter.21.6.11>
45. Shaiba H, John M, Meshoul S. Female Saudi College students' e-learning experience amidst COVID-19 pandemic: An investigation and analysis. *Heliyon*. 2023;9(1):e12768. Available:<https://doi.org/10.1016/j.heliyon.2022.e12768>
46. Al Shamari D. Challenges and barriers to e-learning experienced by trainers and training coordinators in the Ministry of Health in Saudi Arabia during the COVID-19 crisis. *PLoS ONE*. 2022;17(10): e0274816. Available:<https://doi.org/10.1371/journal.pone.0274816>
47. Torremoro N, Colocado P. Professional development practices and teaching competencies of senior high school teachers: basis for an intervention program. *Journal of Academic Research*. 2022;6(1):58-67. Retrieved from: <https://jar.ssu.edu.ph/index.php/JAR/article/view/269>
48. Cleaver S, Dettrich R, States J, Keyworth R. Overview of teacher Professional development (in-service) Oakland, C.A: The Wing Institute; 2020. Available:<https://www.winginstitute.org/quality-teachers-in-service>
49. Clarke A. E-learning skills. New York: MacMillan; 2004.
50. Gakuin University Humanities Review, 22, 23-37. Garrison, D. R. E-Learning in the 21st Century: A Framework for Research and Practice. New York: Routledge; 2011.
51. Ruotsalainen H, Kyngäs H, Tammelin T, Kääriäinen M. Systematic review of physical activity and exercise interventions on body mass indices, subsequent physical activity and psychological symptoms in overweight and obese adolescents. *Journal of Advanced Nursing*. 2015;71(11):2461-77.

## APPENDICES

### Appendix-A

#### Questionnaire (for teachers) Adapted from Bahanshal & Khan

##### A: Personal information

1-Name (Optional): _____	1- الاسم: (اختياري): _____
2-Male / female _____	2- ذكر / انثى _____
3-Age: _____	3- العمر: _____
4-Standard of study: _____	4- مجال الدراسة: _____
5-Course/program: _____	5- المرحلة/ البرنامج: _____
6-Institutions: school/college _____	6- المؤسسات: المدرسة / الكلية _____
7-Do you have a personal computer (laptop or desktop)? Yes / No	7- هل لديك جهاز كمبيوتر شخصي (كمبيوتر محمول أو سطح مكتب)؟ نعم / لا
8-I have been using the computer for _____ years	8- أستخدم الكمبيوتر منذ _____ سنة

B: The section below has a set of statements about your attitudes, experience, and perceptions of e-learning. Kindly read the following statements and tick the choice which best describes your thinking. Your responses will only be used for research purposes and be kept confidential.

ب: الجزء أدناه يتضمن مجموعة من العبارات عن المواقف والخبرة والتصورات اتجاه التعلم الإلكتروني. أرجو منك قراءة العبارات التالية ومن ثم اختيار الإجابة المناسبة لك. سيتم استخدام ردودك فقط لأغراض البحث وستبقى سرية.

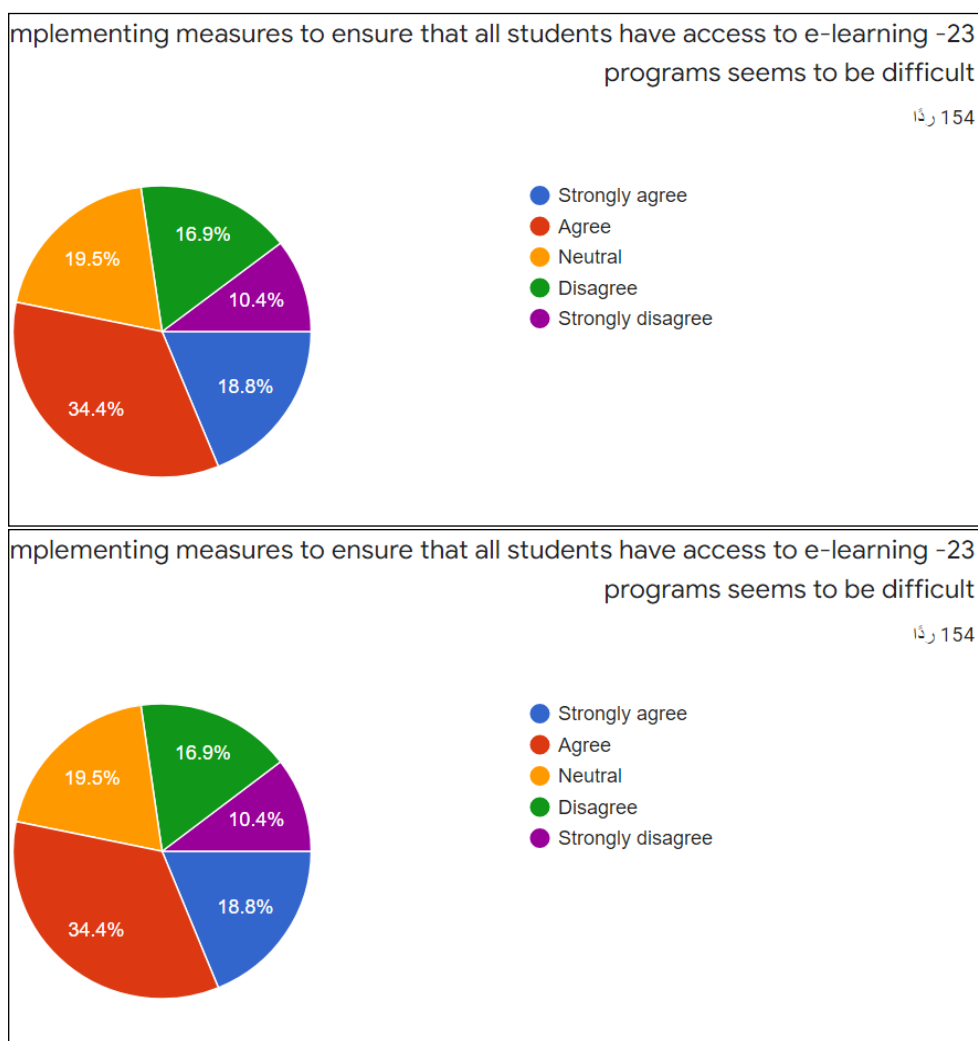
S.n.	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
<b>Category-I: Perceived usefulness of E-learning</b>						
1	E-learning is learning at one's own at your own pace through media. التعلم الإلكتروني هو التعلم بنفس السرعة التي تناسب الشخص من خلال وسائل الإعلام					
2	Studying through e-learning mode provides the flexibility to study at a time convenient to the learner. توفر الدراسة من خلال وضع التعلم الإلكتروني المرونة للدراسة في الوقت المناسب للمتعلم					
3	E-learning can enable learners to study, irrespective of where they are located in the world. يمكن للتعلم الإلكتروني تمكين الناس من الدراسة، بغض النظر عن مكان تواجدهم في العالم					
4	Tools are available to enable students to take tests and submit assignments electronically. الأدوات متاحة لتمكين المرء من الخضوع للاختبارات وتقديم الواجبات إلكترونياً.					
5	E-tools are available to enable interactive communication between instructors and students without meeting face-to-face. تتوفر الأدوات الإلكترونية لتمكين التواصل التفاعلي بين المعلم والطالب دون الاجتماع وجهاً لوجه					
6	E-learning can be interactive communication among students when participating in e-learning. يمكن أن يكون التعلم الإلكتروني اتصالاً تفاعلياً بين الطلاب عند المشاركة في التعلم الإلكتروني					



S.n.	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
7	Live lectures are available over the internet, as is done in the Classroom. تتوفر المحاضرات الحية عبر الإنترنت، كما هو الحال في الفصل الدراسي					
8	Studying through e-learning mode can increase students' learning effectively, as they will have easy access to learning materials (e.g., reading documents and recorded videos). يمكن للدراسة من خلال وضع التعلم الإلكتروني أن تزيد من التعلم بشكل فعال، حيث سيكون لدي وصول سهل إلى مواد التعلم (مثل قراءة المستندات ومقاطع الفيديو المسجلة)					
9	I don't foresee any usefulness of e-learning. لا أتوقع أي فائدة للتعلم الإلكتروني					
10	I believe e-learning platforms are user friendly. أعتقد أن منصات التعلم الإلكتروني سهلة الاستخدام					
11	Chatting is easily manageable. الدرشة يمكن التحكم فيها بسهولة					
12	Downloading a file is easy. تحميل ملف سهل					
13	Posting messages is difficult نشر الرسائل أمر صعب					
<b>Category-II: Attitude Toward Using E-Learning</b>						
14	I like the idea of e-learning تعجبنى فكرة التعلم الإلكتروني					
15	I think e-learning is an innovative concept and must be encouraged. أعتقد أن التعلم الإلكتروني مفهوم مبتكر ويجب تشجيعه					
16	I don't believe e-learning is suitable for courses that need practical demonstrations لا أعتقد أن التعلم الإلكتروني مناسب للمواد التي تحتاج إلى عروض عملية					
<b>Category-III: Readiness to use e-learning</b>						
17	My institution is fully [prepared to utilise technology and e-learning]. جامعتي مدرستي مستعدة تماماً للاستفادة من التكنولوجيا والتعلم الإلكتروني.					
18	I am ready to utilize e-learning. أنا على استعداد لاستخدام التعلم الإلكتروني.					
19	I prefer fully online learning to face-to-face. أفضل التعلم على الإنترنت بالكامل على التعلم وجهاً لوجه					
20	I don't need any training in e-learning. لا أحتاج إلى أي تدريب للتعلم الإلكتروني.					
<b>Category-IV: Practical experience</b>						
21	No support was provided to teachers to prepare the basic facilities they will need for teaching remotely لم يتم تقديم الدعم للمعلمين لإعداد المرافق الأساسية التي سيحتاجون إليها للتدريس عن بُعد					
22	There wasn't a clear process on how to facilitate and monitor students' learning from home.					

S.n.	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
23	<p>لم تكن هناك عملية واضحة حول كيفية تسهيل ومراقبة تعلم الطلاب من المنزل.</p> <p>Implementing measures to ensure that all students have access to e-learning programs seems to be difficult</p>					
24	<p>يبدو أن تنفيذ التدابير لضمان وصول جميع الطلاب إلى برامج التعلم الإلكتروني أمر صعب</p> <p>The online learning environment may not be appropriate for all students at all grade levels</p>					
	<p>قد لا تكون بيئة التعلم عبر الإنترنت مناسبة لجميع الطلاب في جميع مستويات الصفوف</p>					

### Appendix-B



**APPENDIX-C**

Coding  
 Female =1  
 Male= 2  
 25- 30 = 3  
 31-35= 4  
 36 and above= 5  
 Bachelors= 11  
 MA= 22  
 PhD= 33  
 11-15 years= 44  
 5-10 years= 55  
 16 years and above= 66  
 Yes= 1  
 No= 0  
 Exp of use-5 years=100  
 10 years= 99  
 15 years=88

**T test**

<b>Group Statistics</b>					
	VAR00001	N	Mean	Std. Deviation	Std. Error Mean
VAR00002	female	104	90.67	14.039	1.377
	male	51	85.29	19.386	2.715

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
VAR00002	Equal variances assumed	2.086	.151	1.969	153	.051	5.379	2.732	-0.019	10.777	
	Equal variances not assumed			1.767	76.567	.081	5.379	3.044	-0.682	11.440	

**ANOVA basis of experience**

**Descriptives**

<b>VAR00001</b>									
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	
					Lower Bound	Upper Bound			
44.00	45	89.11	16.058	2.394	84.29	93.94	24	120	
55.00	46	89.65	14.174	2.090	85.44	93.86	24	111	
66.00	63	88.29	17.789	2.241	83.81	92.77	24	120	
Total	154	88.94	16.181	1.304	86.36	91.51	24	120	

<b>Test of Homogeneity of Variances</b>			
VAR00001			
Levene Statistic	df1	df2	Sig.
.753	2	151	.473

<b>ANOVA</b>					
VAR00001					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	51.614	2	25.807	.097	.907
Within Groups	40005.736	151	264.939		
Total	40057.351	153			

**Post Hoc Tests**

<b>Multiple Comparisons</b>						
Dependent Variable: VAR00001						
Tukey HSD						
(I) experience	(J) experience	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
44.00	55.00	-.541	3.413	.986	-8.62	7.54
	66.00	.825	3.177	.963	-6.69	8.35
55.00	44.00	.541	3.413	.986	-7.54	8.62
	66.00	1.366	3.157	.902	-6.11	8.84
66.00	44.00	-.825	3.177	.963	-8.35	6.69
	55.00	-1.366	3.157	.902	-8.84	6.11

**Homogeneous Subsets**

VAR00001		
Tukey HSD		
experience	N	Subset for alpha = 0.05
		1
66.00	63	88.29
44.00	45	89.11
55.00	46	89.65
Sig.		.907

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 50.138.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

**ANOVA basis of age**

<b>Descriptives</b>								
VAR00002								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
25-30	19	86.3684	20.46192	4.69429	76.5061	96.2307	24.00	111.00
31-35	37	87.0541	18.38469	3.02243	80.9243	93.1838	24.00	120.00
36<	98	90.1429	14.34264	1.44883	87.2673	93.0184	24.00	120.00
Total	154	88.9351	16.18063	1.30387	86.3591	91.5110	24.00	120.00

<b>Test of Homogeneity of Variances</b>				
VAR00002				
Levene Statistic		df1	df2	Sig.
.674		2	151	.511

<b>ANOVA</b>					
VAR00002					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	399.038	2	199.519	.760	.470
Within Groups	39658.313	151	262.638		
Total	40057.351	153			

**Post Hoc Tests**

<b>Multiple Comparisons</b>						
Dependent Variable: VAR00002						
Tukey HSD						
(I) age	(J) age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
25-30	31-35	-.68563	4.57399	.988	-11.5125	10.1412
	36<	-3.77444	4.06239	.623	-13.3903	5.8415
31-35	25-30	.68563	4.57399	.988	-10.1412	11.5125
	36<	-3.08880	3.12703	.586	-10.4906	4.3130
36<	25-30	3.77444	4.06239	.623	-5.8415	13.3903
	31-35	3.08880	3.12703	.586	-4.3130	10.4906

**Homogeneous Subsets**

<b>VAR00002</b>		
Tukey HSD		
age	N	Subset for alpha = 0.05
		1
25-30	19	86.3684
31-35	37	87.0541
36<	98	90.1429
Sig.		.609

Means for groups inhomogeneous subsets are displayed.  
a. Uses Harmonic Mean Sample Size = 33.384.  
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

**ANOVA basis of standard/qualifications**

<b>Descriptive</b>								
VAR00002								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
bachelors	120	89.2333	16.31401	1.48926	86.2845	92.1822	24.00	120.00
MA	28	87.5000	17.23369	3.25686	80.8175	94.1825	24.00	111.00
PHD	6	89.6667	7.68548	3.13759	81.6012	97.7321	79.00	100.00
Total	154	88.9351	16.18063	1.30387	86.3591	91.5110	24.00	120.00



<b>Test of Homogeneity of Variances</b>			
VAR00002			
Levene Statistic	df1	df2	Sig.
.472	2	151	.624

<b>ANOVA</b>					
VAR00002					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	71.551	2	35.775	.135	.874
Within Groups	39985.800	151	264.807		
Total	40057.351	153			

**Post Hoc Tests**

<b>Multiple Comparisons</b>						
Dependent Variable: VAR00002						
Tukey HSD						
(I) standard	(J) standard	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
bachelors	MA	1.73333	3.41527	.868	-6.3508	9.8175
	PHD	-.43333	6.80743	.998	-16.5469	15.6802
MA	bachelors	-1.73333	3.41527	.868	-9.8175	6.3508
	PHD	-2.16667	7.32064	.953	-19.4950	15.1617
PHD	bachelors	.43333	6.80743	.998	-15.6802	16.5469
	MA	2.16667	7.32064	.953	-15.1617	19.4950

**Homogeneous Subsets**

<b>VAR00002</b>		
Tukey HSD		
standard	N	Subset for alpha = 0.05
		1
MA	28	87.5000
bachelors	120	89.2333
PHD	6	89.6667
Sig.		.933

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 14.237.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

**ANOVA basis of years of usage**

<b>Descriptives</b>								
VAR00002								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
15 years	90	89.7000	14.95645	1.57655	86.5674	92.8326	24.00	120.00
10 years	38	85.9211	22.26667	3.61213	78.6022	93.2399	24.00	120.00
5 years	26	90.6923	7.28159	1.42804	87.7512	93.6334	79.00	103.00
Total	154	88.9351	16.18063	1.30387	86.3591	91.5110	24.00	120.00

<b>Test of Homogeneity of Variances</b>			
<b>VAR00002</b>			
Levene Statistic	df1	df2	Sig.
5.002	2	151	.008

<b>ANOVA</b>					
<b>VAR00002</b>					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	478.149	2	239.075	.912	.404
Within Groups	39579.202	151	262.114		
Total	40057.351	153			

**Post Hoc Tests**

<b>Multiple Comparisons</b>						
<b>Dependent Variable: VAR00002</b>						
<b>Tukey HSD</b>						
(I) usage years	(J) usage years	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
15 years	10 years	3.77895	3.13211	.451	-3.6349	11.1928
	5 years	-.99231	3.60467	.959	-9.5248	7.5401
10 years	15 years	-3.77895	3.13211	.451	-11.1928	3.6349
	5 years	-4.77126	4.12056	.480	-14.5248	4.9823
5 years	15 years	.99231	3.60467	.959	-7.5401	9.5248
	10 years	4.77126	4.12056	.480	-4.9823	14.5248

**Homogeneous Subsets**

<b>VAR00002</b>		
<b>Tukey HSD</b>		
usage years	N	Subset for alpha = 0.05
		1
10 years	38	85.9211
15 years	90	89.7000
5 years	26	90.6923
Sig.		.392

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size= 39.532.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

© 2023 Allahbi; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:  
 The peer review history for this paper can be accessed here:  
<https://www.sdiarticle5.com/review-history/102422>