

Science Teachers' Perceptions about Online Teaching at Secondary Level in District Chakwal

Sajjad Ahmad

MPhil Education, Allama Iqbal Open University Islamabad
Email: sajjadmphil16@gmail.com

Rahmat Ullah Bhatti

Assistant Professor, Department of ECE & ETED,
Allama Iqbal Open University Islamabad
Email: rehmat.ullah@aiou.edu.pk

Tahir Mehmood

Assistant professor,
Federal college of education Islamabad
Email: aajiz0313@gmail.com

Abstract

Pandemics have always posed a threat to the human race. Globally, the educational system was interrupted as a result of the COVID-19 pandemic, which led to a serious health crisis and forced people to stay indoors. In order to maintain the educational system, online learning was made available to students majoring in the arts and sciences. Teachers of science subjects due to their practicability, they encountered some issues during online teaching. This study highlights the elements of adaptation of online teaching during the outbreak of COVID-19. Along with the severe health crisis posed by COVID-19 impacted the education sector in a disastrous way. To provide uninterrupted learning opportunities many institutions have started online mode of learning as an alternative to the face-to-face mode of learning. The purpose of the study was to explore Science Teachers' Perception about online Teaching at Secondary Level in District Chakwal. The study tool used to collect the data was questionnaire, which was developed by the researcher itself for this study. The data was collected from 140 schools, 68 of them were female teachers and 72 were male teachers. The outcomes of data show that some teachers found significant benefits of online teaching method. However some teachers feel more confident and contented in traditional way of teaching. As far as the perception of teachers regarding online science teaching is concerned, majority of the teachers has negative perception. Mostly, teachers agreed that teaching science online is more difficult. Based on the review of existing literature and the findings of the study, it is also concluded that the existing curriculum of science is not suitable for online teaching mode as current curriculum requires a lot of practical work and this is not possible in online mode of teaching. Moreover, use of technology and understanding of technology is also a big challenge for both students as well

as teachers. However, this study illustrated online teaching also has some positive impacts on learning like, effective communication, quick solution to the issues and problems of students, availability of the teachers during off class timing. Better behavior and discipline of students is observed in online teaching.

Keywords: COVID-19, Distance learners, Adaptation, Alternative, Face to Face learning

INTRODUCTION

A decade ago, it was common to hear that “online learning is the future!” Indeed, it became the future and is now very much the present. Online learning is the newest and most popular form of distance education today. Within the past decade it has had a major impact on secondary education and the trend is only increasing.

Online learning is education that takes place over the Internet. It is often referred to as “e-Learning” among other terms. However, online learning is just one type of “distance learning” - the umbrella term for any learning that takes place across distance and not in a traditional classroom. By far the most popular approach of distance learning today is online learning.

Concept of online learning

E-Learning is the process of sharing knowledge through various channels such as e-books, CDs, webinars and more. It has revolutionized the conventional method of chalk and board style of learning imparted to the students. Unlike this, **e-Learning education** makes giving and receiving simpler, prolific, and productive. Tutors apply the method of teaching purely through the latest technology. We define E-Learning as Courses which are specifically delivered through the internet everywhere other than the traditional classroom where the teacher is teaching. Thus, teaching and learning both become simpler, easier, and more effective.

LITERATURE REVIEW

The process of online teaching started nearly two decades ago, yet a lot of people do not know what it is, how it works, and even related terminologies. Some people like faculty members may now have an overall idea of what's associated with online schooling, yet they don't have a clue how to begin, or they feel some anxiety about taking care of the issues they may experience (Bordoloi, 2018). Furthermore, there are currently numerous who have taught on the web however feel that they have scarcely started to expose what's underneath as far as figuring out how best to adjust their teaching to the new climate. Maybe this scope of sentiments exists partially because online teaching is not quite the same as what most educators have experienced previously (Burnsed, 2010).

Online Teaching

Online teaching is conduction of a course partially or totally through the web either on the internet or via mobile applications that permit one to control

the online course components (Ko, 2017). In online teaching system teacher and students are not sitting in the same place like traditional classroom. The main reason to carry out online education is the absence of qualified center substance instructors at the homegrown level, especially in the branches of knowledge of math and science (Picciano & Seaman, 2009). To see how teachers educate in an online setting, it is vital for know how they experience this specific circumstance (Marton, 2013).

Barriers in Online Teaching

Following are the barriers in online teaching.

Pedagogy and Technology

Obtaining satisfactory technical and pedagogical skills are two components essential to a fruitful change to the online classroom. The instructive community largely agrees that the accomplishment of online courses and educational plans relies generally upon the utilization of students' centered academic practices (Duffy, 2004). Hence, the part of the online educator is to create, design and work with rich communications among students to keep them spurred. In well planned online courses, students are often approached to take on extra duties, some of which used to be the privilege of educators. This is the motivation behind why the shift has regularly been portrayed as a shift from being "the sage on the stage to the guide on the side (Simon, 2012). Notwithstanding the academic test of changing in accordance with internet learning conditions, and paying little heed to the specialized help they may get from their establishments, educators should be capable in the technology of distance schooling to have the option to choose the devices that will permit them to do their educational objectives. This prerequisite may address a critical test for educators who entered in the profession when technological mastery was not needed (Bolliger, 2014).

Student Readiness

While the obtaining of sufficient instructing and specialized abilities are fundamental. Web based learning is frequently as new to understudies for what it's worth to educators. Understudies need to make changes in accordance with their reading propensities with the end goal for them to be effective online students. Personnel have revealed the absence of understudy discipline as a primary obstruction to web based learning. As instructors surrender a portion of their command over educational events, understudies should acknowledge a portion of the obligations generally expected by educators. Numerous understudies are not ready for this test, which may mostly represent high weakening levels on the web (Henke, 2000). As in a study it was noted, often, they have been instructed through long period training of abilities and drill where an accentuation was set on retention and testing of information. After numerous long periods of working with this transmission model of instructing, understudies, become alright with the cycle. They comprehend what is generally anticipated of them as latent

students, and they created abilities for viably dominating the substance. Intellectual therapists allude to this interaction as the computerization of procedural information. In this way internet learning difficulties not the customary perspective on being an educator, yet in addition being an understudy (Means B. &, 1997).

Time Commitment and Compensation Teaching

Online teaching presents numerous expected advantages. Faculty motivations like proficient and self-improvement, contacting more different understudy populaces, more adaptable learning as well as teaching opportunities, and expanded pay (Seaman, 2009). In any case, online teaching is a tedious undertaking, particularly given that most of online courses remain prevalently text-based (Walter Gudea, 2008). Almost 64 % of staff studied by Sloan-C in 2009 revealed that showing on the web requests more exertion than teaching in physical environment. The outcomes for online course improvement are considerably seriously striking: more than 85 % of the faculty with online course advancement experience detailed that building on the web courses required more exertion than building face to face courses. In numerous occasions, the pay got was viewed as deficient in the light of the exertion required (Garrison, 2003).

Further, in 2020 Li and Lalani (Li, 2020) relate a few understudies without dependable web access or potentially innovation battle to take an interest in computerized learning; this hole is seen across nations and between levels of pay inside nations. For some who approach with the right innovation, there is proof that learning on the web can be more viable yet it adequacy differs among age gatherings. The general agreement on kids, particularly more youthful ones, is that an organized climate is required, in light of the fact that children are all the more quickly drawn off-track. (Loeb, 2020) is of the view that web based instructing and learning are by and large not as compelling as face to face classes, but rather they are unquestionably better compared to no classes. In this manner virtual learning are permitting leaners to get to exercises and practices and communicate with educators in manners that would have been inconceivable if a scourge had shut schools even a decade or two prior.

Online training will in general be more moderate, it is more financially savvy than customary instruction (Advice, n.d.). In any case, various contentions are related with internet educating and learning. Availability, moderateness, adaptability, learning teaching method, deep rooted learning, and strategy are a portion of the issues identified with online guidelines (Dhawan, 2020).

Perceptions of Online Teaching

Perhaps the most persevering difficulties that staff need to defeat prior to consenting to teach online is the still wide-spread insight, both inside and outside scholarly circles, that web based learning is a less commendable type of schooling (Legg, 2009). The bias for physical guidance over distance schooling has its foundations in the beginning of the field: Correspondence

study, which was intended to give instructive freedoms to the individuals who were not among the tip top and who couldn't bear the cost of full time home at an instructive establishment, was peered down on as second rate training. This negative insight has stayed connected to the field of distance learning: Distance learning has consistently been known for its takeoff from the conditions where teaching and learning normally happen. Somewhat, distance schooling is an academic peculiarity, regularly requiring further avocation, like the augmentation of teaching freedoms or the support of online teaching (McIsaac, 2004). The bias for physical guidance over distance schooling has its foundations in the beginning of the field: Correspondence study, which was intended to give instructive freedoms to the individuals who were not among the tip top and who couldn't bear the cost of full time home at an instructive establishment, was peered down on as second rate training. This negative insight has stayed connected to the field of distance learning: Distance learning has consistently been known for its takeoff from the conditions where teaching and learning normally happen. Somewhat, distance schooling is an academic peculiarity, regularly requiring further avocation, like the augmentation of teaching freedoms or the support of online teaching (Larreamendy-Joerns, 2006). The current writing on personnel arrangement to educate online mostly distinguishes useful boundaries to a fruitful change to the virtual class room. Nonetheless, almost no consideration has been paid to the inside changes that educators need to encounter prior to changing their showing practice, and little consideration has been paid to the effect of such changes on teachers' expert character (Legg, Constructivist strategies in online distance education in nursing, 2009). The current writing on staff readiness to educate online primarily recognizes down to earth boundaries to a fruitful progress to the virtual classroom. This examination centers around the transaction between teachers' convictions and their teaching practice, yet additionally considers the impact of the socio-social settings in which educators are implanted. By considering not just inside and outside factors affecting the progress on the web, yet in addition the manners by which these elements interconnect, this orderly methodology offers a more far reaching image of the effect of online educating on the teaching profession and educators' personality (Means B. T., 2009).

Technologies of Online Teaching

The primary authentic model of online teaching technologies is Garrison and Anderson's model (Garrison, 2003).

Garrison and Anderson Model

Garrison and Anderson contend that the arrangement of technologies in ages considers a superior comprehension of their effect on the field as long as the organizing strategies interfaces the technologies to the educational practices they were intended to serve. They further contend that rigorously modeled groupings may prompt the incorrect supposition that new

technologies methodically supplant the latest, while they frequently supplement them. Hence, Garrison and Anderson's four generation model interfaces ages of innovation to significant takes-up in educational psychology (Van Niekerk, 2015).

First Generation

First generation of distance learning innovations was impacted by behaviorist standards as per which learning is the result of involvement. Students should be helped with getting and changing legitimate associations (Greeno, 1996). Since this model doesn't think about friendly associations among students as fundamental for learning, early types of distance learning were for the most part self-guided and firmly took after free investigations a good ways off (Arbaugh, 2007). Correspondence programs commonly utilized post mail to convey exercises bundles to understudies who might peruse the material, set up a bunch of answers to questions, compose a paper, or perhaps go to a delegated test. Later on, the expansion of voice and email correspondence worked with trades among understudies and instructor. At the point when the Internet became standard, numerous correspondence courses were essentially ported to the web with no guarantees, with the PC supplanting the mailman. This isn't unexpected, given that new advances are regularly used to recreate old methods of getting things done (Cleveland-Innes, 2007). Today, the Course Management System (CMS) is the essential apparatus used to convey online instructive substance. Albeit most CMS's offer a huge scope of correspondence highlights, they actually are utilized prevalently to disseminate content (Carmean, 2008).

Second Generation

The second era of distance learning innovations endeavored to use intellectual clarifications for learning instruments, in which the mind functions as a data handling machine. Students are not vacant vessels holding on to be loaded up with data, however have pre-established calculated understandings of numerous marvels and ideas. Uncover these originations and use them as a springboard for additional learning (Hickey, 2001). The principle motivation behind instructing, as per the psychological practice is to orchestrate content so that students can acclimatize and put together it without any problem. As far as innovation, these were the early long stretches of Computer Assisted Language Learning, boring projects, Computer-Based Training (CBT), self-guided instructional exercises and costly tele courses (Siddiquei N. &, 2018).

Third Generation

The third era of distance learning innovation exploited instruments like email, conversation gatherings, and talk rooms to foster learning conditions grounded in constructivist learning hypothesis (Akyol, 2009). As indicated by the constructivist hypothesis, learning is an in a general sense social wonder and students should be furnished with rich freedoms to interface socially to determine perplexing and not well organized certifiable issues.

Both coordinated and no concurrent conversation apparatuses are utilized to work with exchange among students and with the instructor. Constructivism started the change in educators' job from the focal point of the stage to the outskirts. (Bransford, 2000).

Fourth Generation

The fourth era incorporates the highlights of the three past ages by permitting understudies to get to online substance through learning objects, lead singular reflections utilizing instruments like websites, and cooperate to develop information through the social exchange of importance by utilizing interpersonal organizations. (Sammons, 2003).

E-learning in Pakistan

During 1990s, the top private schools began utilizing ICT arrangements as they could afford computer labs. These schools had an additional benefit of customer base that esteemed the critical skill. While PC labs were set up in schools and PCs were made available even in classrooms, there were not enough instructors who had the ability and experience to appropriately incorporate innovation inside school rooms. Subsequently, the utilization of technology could not go past composing reports, making installations and perusing web using basic programming applications (Chester, 2007). Another challenge looked by these early endeavors to send innovation in the schools was lack of content especially in nearby dialects (Siddiquei & Khalid (2017) . The One Laptop for every Child (OLPC) program in 2000s, got famous in Latin America, Africa, and a few countries of South and South East Asia skipped Pakistan. The circumstance started to change in second half of the 2000s. With introduction of PDAs, minimal expense PCs and web access suppliers, a more extensive segment of school going populace began profiting with innovation

(Siddiquei N. L., 2011). Furthermore, content creating networks, for example, Khan Academy and Saba Foundation began novel trends in e-learning by limiting required substance. The pattern fortified with initiatives such as Jung TV, Toffee TV, Tele Taleem and Knowledge Platform, which invested in neighborhood content turn of events. The NUSTITE, Reading Room Projects and EDeQUAL, are getting

conspicuous in confined models of mixed discovering that may work within Pakistani settings (HEC, 2011). In 2004, unique ventures with colleges and industry are started by the MoIT (Ministry of Information Technology and Telecommunications) for the advancement of e-learning amongst the adolescent (HEC, 2008). The Ministry is basically expects to disperse preparing instrument for English language and math learning at secondary school. At first, such preparing projects will be comprised of a number of contests on the improvement of website pages and substance which is of utmost importance for youthful personalities and have a significant expansion to the information on their friends. Online teaching is still under progress and a lot is needed to be done to make it successful in Pakistan.

Impact of Online Teaching

Online teaching decidedly affects the existences of educators just as understudies. The expanding utilization of innovation in the field of learning has improved the nature of schooling. The two educators and understudies have idealistic perspectives about online classes. It is clear that web based learning has more huge advantages like it fills the hole of education rate by coming to the provincial regions (Ritimoni, 2018). Still, to adequately execute, certain things must be observed. This incorporates fortifying foundation offices, improvement in Internet availability, advancement of provincial regions, getting changes the mentality of understudies and instructors, and so on One of the serious issues looked by understudies from a rustic region is educators need to notice the change in their jobs, for example from only being a transmitter of information to the architect of the instructive interaction (Kulal, 2020).

COVID- 19 and Online Teaching

Corona virus – 19(corona infection) is an infective syndrome that has affected surprisingly on worldwide economy. The pandemic has affected human existence as well as affected on education. The instructive area was overwhelmed when the terrible stirred up the area wrecked .The obstruction of the instructive area during Corona virus – 19cannot be under assessed around the world. The development of the Corona virus – 19 pandemic has seen instructive interruption for an enormous scope, UNESCO (2020). The Corona virus pandemic flare-up constrained all colleges, polytechnics, universities, optional schools and the fundamental schools to stay shut briefly similar to the case in Ghana. The divulgence of Corona virus-19 saw an expanding fame of Data innovation (Sahoo, 2020). The greater part of the instructive organizations has resort to internet educating and learning. The quick shift from the up close and personal or the typical study hall cooperation to the online connection between the educator and student arose with a great deal of difficulties. Both the instructor and the student needed to conform to the better approaches for communicating during educating and learning, with the educator canvassing for new techniques for educating and students acclimating to the better approaches for learning (Verma, 2020). The transformation of online teaching practice: Tracing successful online teaching in higher education. These difficulties included figuring out how to collaborating with students on the web, how to evaluate students on the web, suitable innovative gadget to utilize, admittance to web availability, assets for information and how the educator will gave inputs to students and the other way around (Ch, 2020).

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the case in Ghana. The divulgence of COVID – 19 saw an expanding ubiquity of Information innovation. A large portion of the instructive organizations has resorted to web-based educating and learning. The quick shift from the up close and personal or the typical study hall collaboration to the online cooperation between the educator and student arose with a ton of difficulties. Both the educator and the student needed to conform to the better approaches for interfacing during instructing and learning, with the instructor canvassing for new strategies for instructing and students acclimating to the better approaches for learning (Baran, 2011). These difficulties included figuring out how to communicating with students on the web, how to evaluate students on the web, proper mechanical gadget to utilize, admittance to web availability, assets for information and how the instructor will give criticisms to students and the other way around.

Research problem

Keeping in view the current situation of COVID-19, this article is an effort to explore 'Science Teachers' Perception of Online Teaching at Secondary Level in District Chakwal'.

Research Questions

1. What is the perception of male science teachers for online teaching at secondary level?
2. What is the perception of female science teachers for online teaching at secondary level?
3. How male teachers' perceptions differ from female teachers' perceptions when it comes to online teaching at secondary level.

METHODOLOGY

We have conducted a survey from teachers of Rural and Urban areas at both Government and Private sector for secondary level with a questionnaire in order to analyze their perception concerning online teaching. The questionnaire assisted us to classify their idea. For this study we have only considered teachers teaching in secondary level and in future we are planning to repeat same process in other education levels.

Population and sample

The intended population of this research study is teachers who are teaching at the secondary level in private and public schools within District Chakwal. Convenient sampling is be used to draw a sample from the population. The sample consists of 100 teachers who are teaching in private and public schools. The sampling ratio is 50:50 i.e. half of the sample are male participants and other half are female participants.

Sample of the study

Sr. No	Type of School	Locality	No of Teachers
1	Male	Rural	68
2	Female Rural	Rural	74

Sources of Data Collection

The schools were visited by the researcher for data collection. The data was collected from the teachers of various secondary schools of both Government and Private Sector from rural and urban areas of Chakwal, Punjab Pakistan.

Tool of Research

To collect data questionnaire tool is used. The researcher developed questionnaire herself. The instrument is adapted from two research studies which are published by:

1. (Afzal, M. T., Safdar, A., & Ambreen, M, 2015)
2. (Sahoo, 2020)

To get the opinion from male and female teachers about their perception regarding online teaching, 5-point Likert scale was developed. The respondents were requested to choose one option from the five options as desired. Every statement is followed by three choices:

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

Data Collection

Researcher personally visited all the schools and got permission from the authorities to conduct the surveys from the teachers of secondary level. All the teachers were briefed about the questionnaire and motives behind it. Proper time was allocated to everyone to fill out the questionnaire and then their response was collected personally.

Data Analysis

To analyze the collected data mean, standard deviation and t-test was used by employing SPSS software.

Data Analysis

Table No. 1

S. No.	STATEMENTS	Frequency/ Percentage	Strongly Disagree	Disagree	Un-decided	Agree	Strongly Agree	Total
1	Online teaching enables teachers to teach science subjects more effectively.	Freq.	39	26	21	30	26	142
		%age	27.5	18.3	14.8	21.1	18.3	100
2	Online science teaching can be used to improve students' science learning.	Freq.	40	39	24	22	17	142
		%age	28.2	27.5	16.9	15.5	12.0	100
3		Freq.	40	39	24	22	37	142

	Online teaching science subject is easier than face to face teaching.	%age	28.2	27.5	16.9	15.5	12.0	100
4	Online-teaching made possible to use different teaching styles effectively.	Freq.	27	30	31	38	16	142
		%age	19.0	21.1	21.8	26.8	11.3	100
5	Online mode of teaching promotes self-learning for science students.	Freq.	20	44	24	32	22	142
		%age	14.1	31.0	16.9	22.5	15.5	100
6	I feel I can speed up my teaching skill through Online mode of teaching.	Freq.	21	27	27	30	37	142
		%age	14.8	19.0	19.0	21.1	26.1	100
7	Curriculum objectives can be achieved fully through online teaching.	Freq.	37	33	25	23	24	142
		%age	26.1	23.2	17.6	16.2	16.9	100
8	Use of online-teaching appears to improve the learning outcomes of science subjects.	Freq.	19	44	36	27	16	142
		%age	13.4	31.0	25.4	19.0	11.3	100
9	Integrating online-teaching with my teaching style is easier for me.	Freq.	16	27	39	23	17	142
		%age	18.3	26.1	27.5	16.2	12.0	100
10	The practical of science can be performed better through online teaching?	Freq.	33	31	29	27	22	142
		%age	23.2	21.2	20.4	19.0	15.5	100
11	Students can perform the group activities better during online classes of science subjects.	Freq.	34	32	32	17	16	142
		%age	31.0	22.5	23.2	12.0	11.3	100
12	Lab assessment is a challenge in online teaching process.	Freq.	38	20	21	26	37	142
		%age	26.8	14.1	14.8	18.3	26.1	100
13	Assessment of the learning needs of science students is a challenge in online mode of teaching.	Freq.	20	27	30	36	29	142
		%age	14.1	19.0	21.1	25.4	20.4	100
14	Online science teaching is not as efficient as face to face teaching.	Freq.	23	24	39	30	26	142
		%age	16.2	16.9	27.5	21.1	18.3	100

CONTINUE-----

S. No.	STATEMENTS	Frequency/ Percentage	Strongly Disagree	Disagree	Un-decided	Agree	Strongly Agree	Total
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15	The Laboratory work is a challenge in online teaching.	Freq.	29	30	31	25	27	142
		%age	20.4	21.1	21.8	17.6	19.0	100
16	I believe that teaching science subjects online enhances students' performance	Freq.	41	29	26	29	17	142
		%age	28.9	20.4	18.3	20.4	12.0	100
17	Online teaching science subjects is challenging when it comes to experimental style of teaching.	Freq.	22	26	30	37	27	142
		%age	15.5	18.3	21.1	26.1	19.0	100
18	Online teaching enhances students' interest in science subjects.	Freq.	19	22	42	24	35	142
		%age	13.4	15.5	29.6	16.9	24.6	100
19	I can easily teach the scientific calculations to my students through online teaching.	Freq.	32	29	35	25	21	142
		%age	22.5	20.4	24.6	17.6	14.8	100
20	Online teaching of science subjects can better cater the individual differences.	Freq.	26	31	30	34	21	142
		%age	18.3	21.8	21.1	23.9	14.8	100
21	I feel stressed while teaching online.	Freq.	12	36	39	30	21	142
		%age	8.5	25.4	27.5	23.9	14.8	100
22	I feel more freedom when teaching science online as compared to physical teaching.	Freq.	45	20	36	28	13	142
		%age	31.7	14.1	25.4	19.7	9.2	100
23	All my students have necessary resources and technologies to attend online classes.	Freq.	30	18	26	35	33	142
		%age	21.1	12.7	18.3	24.6	23.2	100
24	Online teaching helps me with time management and self-discipline.	Freq.	25	21	43	36	17	142
		%age	17.6	14.8	30.3	25.4	12.0	100
25	Online teaching increases student-teacher communication.	Freq.	33	29	31	35	14	142
		%age	23.2	20.4	21.8	24.6	9.9	100
26	Online teaching permits what is suitable for my own teaching style.	Freq.	30	34	39	22	17	142
		%age	21.1	23.9	27.5	15.5	12.0	100

27	As a teacher I prefer online teaching than physical teaching.	Freq.	57	22	21	27	15	142
		%age	40.1	15.5	14.8	19.0	10.6	100
28	Online science teaching helps to minimize the waste of resources.	Freq.	30	30	28	30	24	142
		%age	21.1	21.1	19.7	21.1	16.3	100
29	I am aware of the knowledge on privacy and security concerns of using the internet.	Freq.	25	24	37	28	28	142
		%age	17.6	16.9	26.1	19.7	19.7	100
30	The use of technology is a challenge for you when teaching online.	Freq.	41	21	44	32	14	142
		%age	21.8	14.8	31.0	22.5	9.9	100

CONTINUE-----

S. No.	STATEMENTS	Frequency/ Percentage	Strongly Disagree	Disagree	Un-decided	Agree	Strongly Agree	Total
31	I find government initiatives are helpful in supporting teaching online.	Freq.	34	39	35	20	14	142
		%age	23.9	27.5	24.6	14.1	9.9	100
32	It is difficult for me to answer students' scientific queries while teaching online.	Freq.	41	23	32	34	12	142
		%age	28.9	16.2	22.5	23.9	8.5	100
33	Online Science teaching is difficult as compare to other subjects.	Freq.	35	25	23	28	31	142
		%age	24.6	17.6	16.2	19.7	21.8	100

It is evident from the table no. 1, that

In q1, 39.4% of the teachers agree to the fact that Online Teaching enables teacher to teach science subject more effectively.

In q2, 27.5% of the teachers agree to the fact that online science teaching can be used to improve students' science learning.

In q3, 32.4% of the teachers agree to the fact that Online Teaching science subject is easier than face to face teaching.

In q4, 38.1% of the teachers agree to the fact that Online Teaching made possible to use different teaching styles effectively.

In q5, 38% of the teachers agree to the fact that online mode of teaching promotes self-learning for science students.

In q6, 47.2% of the teachers agree to the fact that I feel I can speed up my teaching skill through online mode of teaching.

In q7, 33.1% of the teachers agree to the fact that Curriculum objectives can be achieved fully through online teaching.

In q8, 30.3% of the teachers agree to the fact that Use of online-teaching appears to improve the learning outcomes of science subjects.

In q9, 28.2% of the teachers agree to the fact that integrating online-teaching with my teaching style is easier for me

In q10, 34.5% of the teachers agree to the fact that the practicals of science can be performed better through online teaching.

In q11, 23.3% of the teachers agree to the fact that Students can perform the group activities better during online classes of science subjects.

In q12, 44.4% of the teachers agree to the fact that Lab assessment is a challenge in online teaching process.

In q13, 45.8% of the teachers agree to the fact that Assessment of the learning needs of science students is a challenge in online mode of teaching.

In q14, 39.4% of the teachers agree to the fact that online science teaching is not as efficient as face to face teaching.

In q15, 36.6% of the teachers agree to the fact that The Laboratory work is a challenge in online teaching.

In q16, 32.4% of the teachers agree to the fact that I believe that teaching science subjects online enhances students' performance.

In q17, 45.1% of the teachers agree to the fact that Online teaching science subjects is challenging when it comes to experimental style of teaching.

In q18, 41.5% of the teachers agree to the fact that Online Teaching enhances students' interest in science subjects.

In q19, 32.4% of the teachers agree to the fact that I can easily teach the scientific calculations to my students through online teaching.

In q20, 38.7% of the teachers agree to the fact that Online Teaching Online teaching of science subjects can better cater the individual differences.

In q21, 38.7% of the teachers agree to the fact that I feel stressed while teaching online.

In q22, 28.9% of the teachers agree to the fact that I feel more freedom when teaching science online as compared to physical teaching.

In q23, 47.8% of the teachers agree to the fact that all my students have necessary resources and technologies to attend online classes.

In q24, 37.4% of the teachers agree to the fact that Online Teaching Online teaching helps me with time management and self-discipline.

In q25, 34.5% of the teachers agree to the fact that Online Teaching increases student-teachers communication.

In q26, 27.5% of the teachers agree to the fact that Online Teaching Online teaching permits what is suitable for my own teaching style.

In q27, 29.6% of the teachers agree to the fact that as a teacher I prefer online teaching than physical teaching.

In q28, 38% of the teachers agree to the fact that online science teaching helps to minimize the waste of resources.

In q29, 39.4% of the teachers agree to the fact that I am aware of the knowledge on privacy and security concerns of using the internet.

In q30, 32.4% of the teachers agree to the fact that the use of technology is a challenge for you when teaching online.

In q31, 24% of the teachers agree to the fact that I find government initiatives are helpful in supporting teaching online.

In q32, 32.4% of the teachers agree to the fact that it is difficult for me to answer students' scientific queries while teaching online.

In q33, 41.5% of the teachers agree to the fact that Online Science teaching is difficult as compare to other subjects.

TABLE NO. 2

S. N o.	STATEMENTS	Gender	N	Mean	Standard Deviation
1	Online teaching enables teachers to teach science subjects more effectively	Male	68	3.54	1.440
		Female	74	2.20	1.227
2	Online science teaching can be used to improve students' science learning.	Male	68	2.6912	1.4378
		Female	74	2.4324	1.2829
3	Online teaching science subject is easier than face to face teaching.	Male	68	2.7206	1.5145
		Female	74	2.8919	1.2667
4	Online-teaching made possible to use different teaching styles effectively.	Male	68	2.7353	1.3451
		Female	74	3.0541	1.2484
5	Online mode of teaching promotes self-learning for science students.	Male	68	3.2206	1.44393
		Female	74	2.6892	1.1338
6	I feel I can speed up my teaching skill through Online mode of teaching.	Male	68	3.6176	1.4458
		Female	74	2.9054	1.2945
7	Curriculum objectives can be achieved fully through online teaching.	Male	68	2.8529	1.4687
		Female	74	2.6486	1.4087
8	Use of online-teaching appears to improve the learning outcomes of science subjects.	Male	68	2.8088	1.20022
		Female	74	2.8649	1.2311
9	Integrating online-teaching with my teaching style is easier for me.	Male	68	2.6471	1.2785
		Female	74	2.8919	1.24491
10	The practical of science can be performed better through online teaching?	Male	68	2.7941	1.4305
		Female	74	2.8378	1.3651

11	Students can perform the group activities better during online classes of science subjects.	Male	68	2.6471	1.3904
		Female	74	2.3649	1.2882
12	Lab assessment is a challenge in online teaching process.	Male	68	2.4118	1.4584
		Female	74	3.5946	1.4422
13	Assessment of the learning needs of science students is a challenge in online mode of teaching.	Male	68	3.2794	1.3365
		Female	74	3.1081	1.3504
14	Online science teaching is not as efficient as face to face teaching.	Male	68	2.9706	1.2925
		Female	74	3.1892	1.3616
15	The Laboratory work is a challenge in online teaching.	Male	68	2.5588	1.2857
		Female	74	3.2838	1.4288
16	I believe that teaching science subjects online enhances students' performance	Male	68	2.6618	1.3227
17	Online teaching science subjects is challenging when it comes to experimental style of teaching.	Male	68	2.8382	1.3779
		Female	74	3.4324	1.2614
18	Online teaching enhances students' interest in science subjects.	Male	68	3.6029	1.4261

CONTINUE-----

S. No.	STATEMENTS	Gender	N	Mean	Standard Deviation
19	I can easily teach the scientific calculations to my students through online teaching.	Male	68	3.1029	1.3173
		Female	74	2.5541	1.3562
20	Online teaching of science subjects can better cater the individual differences.	Male	68	2.7941	1.3555
		Female	74	3.0946	1.3155
21	I feel stressed while teaching online.	Male	68	2.8529	1.1751
		Female	74	3.3514	1.1637
22	I feel more freedom when teaching science online as compared to physical teaching.	Male	68	2.4412	1.2973
		Female	74	2.7568	1.39285
23	All my students have necessary resources and technologies to attend online classes.	Male	68	2.5441	1.3542
		Female	74	2.8108	1.4774
24	Online teaching helps me with time management and self-discipline.	Male	68	2.9853	1.3658
		Female	74	3.000	1.17041
25	Online teaching increases student-teachers communication.	Male	68	2.7647	1.2473
		Female	74	2.7838	1.3875

26	Online teaching permits what is suitable for my own teaching style.	Male	68	2.5735	1.3856
		Female	74	2.8784	1.1815
27	As a teacher I prefer online teaching than physical teaching.	Male	68	2.4265	1.4692
		Female	74	2.4595	1.4692
28	Online science teaching helps to minimize the waste of resources.	Male	68	2.8824	1.5051
		Female	74	2.9439	1.3021
29	I am aware of the knowledge on privacy and security concerns of using the internet.	Male	68	2.6471	1.1940
		Female	74	3.4595	1.4063
30	The use of technology is a challenge for you when teaching online.	Male	68	2.6912	1.1494
		Female	74	2.9730	1.3746
31	I find government initiatives are helpful in supporting teaching online.	Male	68	2.6382	1.2169
		Female	74	2.8108	1.2786
32	It is difficult for me to answer students' scientific queries while teaching online.	Male	68	2.7059	1.2585
		Female	74	2.6351	1.4197
33	Online Science teaching is difficult as compare to other subjects.	Male	68	2.9412	1.4129
		Female	74	2.9865	1.5832

Table No. 2 shows that:

Mean for the q1, is higher for male participants as compared to female participants. Thus, most of the male candidates' percept that Online Teaching enables teacher to teach science subjects more effectively.

Mean of q2, responses from male participants is higher i.e. 2.6912 as compared to female participants. This means male participants believe strongly that online science teaching can be used to improve students' science learning.

Mean for q3, female participants is 2.8919 which higher than male participants. Thus, more female candidates think that Online teaching science subject is easier than face to face teaching for female teachers as compared to male.

Mean of q4, of female responses is higher. Accordingly female teacher thinks that Online-teaching made possible to use different teaching styles effectively.

Mean of q5, from the responses of male is higher. So, male participants agree more that online mode of teaching promotes self-learning for science students.

Q6, more male participants believe that they can speed up their teaching skill through online mode of teaching. While less female participants feel so.

Mean of q7, for male participants higher than female participants. Thus, more male candidates think that Curriculum objectives can be achieved fully through online teaching.

Q8, more female participants believe that Use of online-teaching appears to improve the learning outcomes of science subjects. While less male participants feel so.

Mean of q9, for female participants is higher than male participants. Thus, more female candidates think that integrating online-teaching with their teaching style is easier for them.

Mean of q10, for female participant is higher than male participants. Thus, more female candidates think that the practical of science can be performed better through online teaching.

Mean of q11, from the responses of male is higher. So, male participants agree more that students can perform the group activities better during online classes of science subjects.

Mean of q12, indicates that more female participants believe that Lab assessment is a challenge for them in online teaching process.

Mean of q 13, indicates that mean from the male responses is higher about the perception regarding the testimonial that assessment of the learning needs of science students is a challenge in online mode of teaching.

Mean of q14, indicates that mean from the responses of female is higher, which states generally female teachers thinks that online science teaching is not as efficient as face to face teaching

Mean of q 15, indicates that mean from the responses of female is higher. This shows that the Laboratory work is a challenge for female teachers in online teaching.

Mean of q16, indicates that mean from male and female responses are almost equal which directs that male and female teachers are in the same way regarding the fact that teaching science subjects online enhances students' performance.

Mean of q17, indicates that more female participants believe that Online teaching science subjects is challenging for them when it comes to experimental style of teaching.

Mean of q18, indicates that mean from male responses is higher for the point that online teaching enhances students' interest in science subjects.

Mean of q19, indicates that mean from male responses is higher which directs that male teachers can easily teach the scientific calculations to students through online teaching.

Mean of q20, indicates that mean from the responses of female is higher. So, female participants agree more that Online teaching of science subjects can better cater the individual differences.

Mean of q 21, indicates that mean from female is higher. Thus, female teachers believes that they feel stressed while teaching online.

Mean of q22, indicates that mean of female responses is higher which states female teachers feel more freedom when teaching science online as compared to physical teaching.

Mean of q23, indicates that mean from male responses is higher. They believe that all their students have necessary resources and technologies to attend online classes.

Mean of q24, shows that mean for female participants higher than male participants. Thus, more female candidates think that online teaching helps them with time management and self-discipline.

Mean of q25, indicates more female rely on that Online teaching increases student teachers communication as compared to male respondents.

Mean of q26, indicates that mean from female responses is higher for the element that Online teaching permits them what is suitable for their own teaching style.

Mean of q27, indicates that mean from the responses of female is higher. So, female participants agree more that as a teacher they prefer online teaching than physical teaching.

Mean of q28, indicates that mean from the responses of female is high. Thus more female agrees that online science teaching helps them to minimize the waste of resources.

Mean of q29, indicates that mean from female comebacks is higher for the point that they are aware of the knowledge on privacy and security concerns of using the internet.

Mean of q30, indicates that mean from the responses of female is higher. So, female participants agree more that the use of technology is a challenge for them when teaching online.

Mean of q31, indicates that mean from female responses is higher. Thus more female thinks that government initiatives are helpful in supporting teaching online.

Mean of q32, indicates higher mean from male students show that it is difficult for them to answer students' scientific queries while teaching online.

Mean of q33, Indicates that mean of responses from female participants is higher. This means female participants believe strongly that online science teaching is difficult for them as compare to other subjects.

DISCUSSION:

Most of the teachers among participants have experienced online teaching and found online teaching more difficult. Therefore, majority teachers have negative perception regarding online teaching. Table 1, q1, only 39.4% of the teachers agree to the fact that online teaching enables teacher to teach science subject more effectively. While Table 2, q1, ,gender-based comparison indicates that mean is higher for male participants as compared to female participants. Thus most of the male candidates' percept that online teaching enables teacher to teach science subject more effectively.

In Table 1, q2, just 39.4% of the teachers agree to the fact that online science teaching can be used to improve students' science learning. While Table 2,

q2, gender comparison for this indicates that mean of responses from male participants is higher i.e., 2.6912 as compared to female participants. This means male participants believe strongly that online science teaching can be used to improve students' science learning.

Table 1, q3, indicates that only 32.4% of the teachers agree to the fact that Online Teaching science subject is easier than face to face teaching. However, gender-based comparison in Table 1, q3, shows that mean for female participants is 2.8919 which higher than male participants. Thus, more female candidates think that Online teaching science subject is easier than face to face teaching for female teachers as compared to male.

Table 1, q4, indicates that 38.1% of the teachers agree to the fact that Online Teaching made possible to use different teaching styles effectively. While gender based comparison in table Table2, q4, indicates that mean from the female responses is higher. Accordingly female teacher thinks that online teaching made possible to use different teaching styles effectively.

Further, Table 1, q5, indicates that 38% of the teachers agree to the fact that online mode of teaching promotes self-learning for science students. On contrary, gender based comparison in Table 2, q5, indicates that mean from the responses of male is higher. So, male participants agree more that online mode of teaching promotes self-learning for science students.

Moreover, Table 1, q6, indicates that 47.2% of the teachers agree to the fact that I feel I can speed up my teaching skill through online mode of teaching. While gender based comparison in Table 2, q6, indicates that more male participants believe that they can speed up their teaching skill through online mode of teaching. While less female participants feel so.

Table 1, q7, indicates that 33.1% of the teachers agree to the fact that Curriculum objectives can be achieved fully through online teaching. While gender based comparison in Table 2, q7, shows that mean for male participants higher than female participants. Thus, more male candidates think that Curriculum objectives can be achieved fully through online teaching.

Next, Table 1, q8, indicates that 30.3% of the teachers agree to the fact that Use of online teaching improves the learning outcomes of science subjects. While gender based comparison in Table 2, q8, indicates that more female participants believe that

Use of online-teaching appears to improve the learning outcomes of science subjects.

While less male participants feel so. Table 1, q9, indicates that 28.2% of the teachers agree to the fact that integrating online-teaching with my teaching style is easier for me While gender-based comparison in Table 2, q9 shows that mean for female participants is higher than male participants. Thus, more female candidates think that integrating online teaching with their teaching style is easier for them.

Table 1, q10, indicates that 34.5% of the teachers agree to the fact that the practical of science can be performed better through online teaching. While gender-based comparison in Table 2, q10, shows that mean for female participant is higher than male participants. Thus, more female candidates think that the practical of science can be performed better through online teaching.

Table 1, q11, indicates that 23.3% of the teachers agree to the fact that Students can perform the group activities better during online classes of science subjects. While gender-based comparison in Table 2, q11, indicates that mean from the responses of male is higher. So, male participants agree more that Students can perform the group activities better during online classes of science subjects.

Table 1, q12, indicates that 44.4% of the teachers agree to the fact that Lab assessment is a challenge in online teaching process. While gender-based comparison in Table 1, q12, indicates that more female participants believe that Lab assessment is a challenge for them in online teaching process.

Table 1, q13 indicates that 45.8% of the teachers agree to the fact that Assessment of the learning needs of science students is a challenge in online mode of teaching. While gender-based comparison in Table 2, q13, indicates that mean from the male responses is higher about the perception regarding the testimonial that assessment of the learning needs of science students is a challenge in online mode of teaching.

Table 1, q14, indicates that 39.4% of the teachers agree to the fact that online science teaching is not as efficient as face-to-face teaching. While gender-based comparison in Table 2, q14, indicates that mean from the responses of female is higher, which states female teachers thinks that online science teaching is not as efficient as face-to face teaching.

Table 1, q15, indicates that 36.6% of the teachers agree to the fact that The Laboratory work is a challenge in online teaching. While gender-based comparison in Table 2, q15, indicates that mean from the responses of female is higher. This shows that the Laboratory work is a challenge for female teachers in online teaching.

Table 1, q16, indicates that 32.4% of the teachers agree to the fact that I believe that teaching science subjects online enhances students' performance. While gender based comparison in Table 2, q16 indicates that mean from male and female responses are almost equal which directs that male and female teachers are in the same way regarding the fact that teaching science subjects online enhances students' performance.

Table 1, q17, indicates that 45.1% of the teachers agree to the fact that Online Teaching science subjects is challenging when it comes to experimental style of teaching. While gender-based comparison in Table 2, q17, indicates that more female participants believe that Online teaching science subjects is challenging for them when it comes to experimental style of teaching.

Table 1, q18 indicates that 41.5% of the teachers agree to the fact that Online Teaching enhances students' interest in science subjects. While gender-based comparison in Table 2, q18, indicates that mean from male responses is higher for the point that online teaching enhances students' interest in science subjects.

Table 1, q19, indicates that 32.4% of the teachers agree to the fact that I can easily teach the scientific calculations to my students through online teaching. While gender based comparison in Table 2, q19, indicates that mean from male responses is higher which directs that male teachers can easily teach the scientific calculations to students through online teaching.

Table 1, q20 indicates that 38.7% of the teachers agree to the fact that Online Teaching Online teaching of science subjects can better cater the individual differences. While gender-based comparison in Table 2, q20, indicates that mean from the responses of female is higher. So, female participants agree more that Online teaching of science subjects can better cater the individual differences.

Table 1, q21, indicates that 38.7% of the teachers agree to the fact that I feel stressed while teaching online. While gender-based comparison in Table 2, q21, indicates that mean from female is higher. Thus, female teachers believe that they feel stressed while teaching online.

Table 1, q22 indicates that 28.9% of the teachers agree to the fact that I feel more freedom when teaching science online as compared to physical teaching. While gender-based comparison in Table 2, q22, indicates that mean from female responses is higher which states female teachers feel more freedom when teaching science online as compared to physical teaching.

Table 1, q23, indicates that 47.8% of the teachers agree to the fact that all my students have necessary resources and technologies to attend online classes. While gender based comparison in Table 2, q23, indicates that mean from male responses is higher. They believe that all their students have necessary resources and technologies to attend online classes.

Table 1, q24, indicates that 37.4% of the teachers agree to the fact that Online Teaching Online teaching helps me with time management and self-discipline. While gender based comparison in Table 2, q24, shows that mean for female participants higher than male participants. Thus, more female candidates think that online teaching helps them with time management and self-discipline.

Table 1, q25, indicates that 34.5% of the teachers agree to the fact that Online Teaching increases student-teachers communication. While gender-based comparison in Table 2, q25, indicates more female rely on that Online teaching increases student teachers communication as compared to male respondents.

Table 1, q26, indicates that 27.5% of the teachers agree to the fact that Online Teaching Online teaching permits what is suitable for my own teaching style. While gender based comparison in Table 2, q26, indicates that mean

from female responses is higher for the element that Online teaching permits them what is suitable for their own teaching style.

Table 1, q27, indicates that 29.6% of the teachers agree to the fact that As a teacher I prefer online teaching than physical teaching. While gender-based comparison in Table 2, q27, indicates that mean from the responses of female is higher. So, female participants agree more that as a teacher they prefer online teaching than physical teaching.

Table 1, q28, indicates that 38% of the teachers agree to the fact that online science teaching helps to minimize the waste of resources. While gender-based comparison in Table 2, q28, indicates that mean from the responses of female is high. Thus more female agrees that online science teaching helps them to minimize the waste of resources.

Table 1, q29, indicates that 39.4% of the teachers agree to the fact that I am aware of the knowledge on privacy and security concerns of using the internet. While gender based comparison in Table 2, q29, indicates that mean from female comebacks is higher for the point that they are aware of the knowledge on privacy and security concerns of using the internet.

Table 1, q30, indicates that 32.4% of the teachers agree to the fact that the use of technology is a challenge for you when teaching online. While gender-based comparison in Table 2, q30, indicates that mean from the responses of female is higher. So, female participants agree more that the use of technology is a challenge for them when teaching online.

Table 1, q31, indicates that 24% of the teachers agree to the fact that I find government initiatives are helpful in supporting teaching online. While gender-based comparison in Table 2, q31, indicates that mean from female responses is higher. Thus more female thinks that government initiatives are helpful in supporting teaching online.

Table 1, q32, indicates that 32.4% of the teachers agree to the fact that **it is** difficult for me to answer students' scientific queries while teaching online. While gender-based comparison in Table 2, q32, indicates higher mean from male. This directs that it is difficult for them to answer students' scientific queries while teaching online.

Table 1, q33, indicates that 41.5% of the teachers agree to the fact that Online Science teaching is difficult as compare to other subjects. While gender-based comparison in Table 2, q33, indicates that mean of responses from female participants is higher. This means female participants believe strongly that online science teaching is difficult for them as compare to other subjects.

CONCLUSIONS

Following are the conclusions which were drawn according to the findings as mentioned above.

As far as the perception of teachers regarding online science teaching is concerned, majority of the teachers has negative perception. Mostly,

teachers agreed that teaching science online is more difficult. There are many reasons for this, for example limited resources, time constraints and lack of awareness for technology usage etc.

Based on the review of existing literature and the findings of the study, it is also concluded that the existing curriculum of science is not suitable for online teaching mode as current curriculum requires a lot of practical work and this is not possible in online mode of teaching. Moreover, use of technology and understanding of technology is also a big challenge for both students as well as teachers.

However, this study illustrated online teaching also has some positive impacts on learning like, effective communication, quick solution to the issues and problems of students, availability of the teachers during off class timing.

Better behavior and discipline of students is observed in online teaching.

RECOMMENDATIONS

As the study indicated that all kind of science course contents were converted to online mode, knowing that course required practical work like groups activities, hands on activities and laboratory work. Thus, based on the findings following are some recommendations:

- Technical training of teachers for teaching science online so that the issue of technology management can be resolved.
- Ensuring free computer courses for science students in schools so that they can use technology effectively.
- Alternative to laboratory works such as virtual laboratories to ensure practical learning of students.
- Redesigning science curriculum keeping in mind the content suitability for online mode of teaching.
- Ensuring the provision of digital resources to students as well as teachers.
- Ensuring free of cost access to technology by students as well as teachers.

LIMITATIONS

No doubt study found important perceptions of teachers for online science teaching at secondary level in District Chakwal. Yet this study has a few limitations which may impact the generalizability of the study findings. First, in this research all schools of

District Chakwal could not be covered due to time constraint and limited resources. Second, majority of the participants were from the public sector schools because the administration of private school was not willing to cooperate. Third, the focus of the study was urban areas only.

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