

Impact of Remote Work during Pandemic COVID-19 in University Education

Abdullah Al Rubaish¹, Fahad Al Harbi², Nuhad A. Alomair^{3*}, Vijaya Ravinayagam⁴,
Muneerah B. Almahasheer⁵, Wael Assaf⁶, Palanivel Rubavathi Marimuthu⁷

¹College of Medicine, Imam Abdulrahman Bin Faisal University, P. O. Box. 1982, Dammam 31441, Saudi Arabia.

²College of Dentistry, Imam Abdulrahman Bin Faisal University, P. O. Box. 1982, Dammam 31441, Saudi Arabia.

³Department of Chemistry, College of Science, Imam Abdulrahman Bin Faisal University, P. O. Box. 1982, Dammam 31441, Saudi Arabia.

⁴Deanship of Scientific Research, Imam Abdulrahman Bin Faisal University, P. O. Box. 1982, Dammam 31441, Saudi Arabia.

⁵Deanship of eLearning & Distance Learning, Imam Abdulrahman Bin Faisal University, P. O. Box. 1982, Dammam 31441, Saudi Arabia.

⁶Deanship of eLearning & Distance Learning, Imam Abdulrahman Bin Faisal University, P. O. Box. 1982, Dammam 31441, Saudi Arabia.

⁷Deanship of Quality and Academic Accreditation, Imam Abdulrahman Bin Faisal University, P. O. Box. 1982, Dammam 31441, Saudi Arabia.

*Corresponding author

e-mail: nalomair@iau.edu.sa (Dr. Nuhad A. Alomair); Tel: +966 3332400

Abstract

Background: COVID-19 pandemic and second wave precautions has dramatically affected the health, education, and economy of human society. The present medical emergency has suddenly affected onsite routine working environments of University including administration, academic and research. A survey conducted to study the impact of remote working of faculty members in Imam Abdulrahman Bin Faisal University (IAU).

Methods - The study evaluates six major feel parameters using QuestionPro survey, assessed the reliability and constructed variables associated with remote work efficiency. A total of 484 faculty and staff members of IAU has responded to the survey. Out of them, 287 completed surveys were received with the response rate observed as 59.3%. Faculty perception are considered with regard to demographic differences. The reliability value of Cronbach's α coefficient indicated high degree and reliable (0.83). Percentage of respondents was analysed on working variables. Structural equation modeling (SEM) was used to estimate the variables associated with the model.

Results - The respondents of survey have expressed job satisfaction remote working in administration and academic section. working space availability and feel scale. There was neutral scenario observed related to the distance working space availability (computer/laptop/lab access/internet speed/distractions), and feel scale (stress) indicating psychological reorientation. The research activity at IAU was confirmed with research output using Clarivate Analytics (WOS) and Scopus, online scientific tools like iThenticate, Turnitin, and Converis.

Conclusion - The results indicate a positive impact with remote work at IAU, managing continuous university activities at the same time protecting university employees and student's infection spread.

Keywords: *COVID-19; Education; Research; Administration; Remote working; Public health.*

Introduction

Coronavirus causes respiratory tract infection, results in organ failure and mortality. The ability to infect and transmit illnesses has affected the economy worldwide [1]. A steady rise in registered COVID-19 cases of more than 15 million of cases with total deaths higher than 8 lakhs has led to economic crisis and impacted heavily the formal education, industries and health care systems [2]. Country wise, USA have registered highest total cases with total deaths, followed by Spain. The cases and deaths are continuously rising across the globe (213 countries) making this infectious spread deadliest for mankind in modern times. Pharmaceutical companies are searching for an efficient methodology to develop drugs and vaccines. The medical emergency has significantly affected the education sectors, where increased number of students in class, colleges, universities, research and administration pose the risk of virus spread. Academic activities like conferences, workshops and trainings have already been either cancelled or postponed [3]. At present no specific medicine or vaccine is available. It takes lot of resources to cure the patients. To control the spread of disease, social distancing, quarantine and hygiene are recommended by WHO. Government has instructed to stay home, work from home and be safe. In the present Corona virus pandemic scenario, health care communities and education sectors are turning towards digital eLearning [4]. Communications using latest technology has been reported to be an effective strategy during pandemic lockdown situation [5]. The digital technologies are reported to control the transmission of COVID-19 [6]. In the present COVID-19 pandemic, a virtual and internet communications have become an important tool for education sector and narrow teaching practice gap [7,8].

In case of academic programs, several Universities around the world are adopting various measures for virtual education to transfer academic knowledge to students through internet-based communications. Imparting traditional education involves transfer of knowledge, skill and scientific advancement information's through communication between teacher and students. In USA, many colleges have switched from traditional to virtual classes. In Saudi Arabia, several technological readiness measurements in Universities have been implemented by Kingdom's Vision 2030. Statistics related to internet users in KSA shows a steady increase in internet users from 21.6 million in 2015 to 32.23 million in 2020. IAU has taken several strides to keep in line the advancement of information and communication technologies. The University uses high-speed internet and different types of communication tools to coordinate administration without interruptions. As per Ministry of Education (MOE), the pandemic effect is assessed by the higher officials of IAU to proceed administration, academic programs and research activities through alternative remote work route. Saudi Arabia higher education system has already been shifting towards virtual system including administration and education. The present study will analyse the effect of remote

work in the mainstream activities of university (administration, academic, research) that eventually protects employees and student health.

Methodology

Questionnaire

The survey was conducted from IAU faculty members, which includes administration, academics and researchers. The completed survey response rate was of 59.3%. The study received IAU, Institutional Review Board approval with Institutional review board (IRB) Number IRB-2020-10-143.

Analytical methods

The transformation from traditional onsite working environment to online virtual medium was historically unimagined but the scenario has been inevitably changed. In order to tackle the current educational management challenges, a web-based management is required using internet based advanced learning tool. A comprehensive knowledge about the University administration, academic, research and culture coexistence are required. Kinzl et al [9] has reported that job satisfaction is a core variable that needs to be considered in working environment and remains a key indicator of work quality. An employee with job satisfaction improves the productivity and creativity. The commitment to work during distant working is critically for evaluation and it motivates employees to course of action towards specific set of targets [10]. Feeling scale of employees experiencing positive effect, optimistic, stress reliver, anxiety symptoms, depression and motivational factors shown to influence the active participation of people [11]. Therefore, evaluation of feeling scale is required to access the employee participating interest in distant working. Similarly, the support of University, working space in home, effectivity of such mode of distant working in teaching, administration and research needs to be evaluated.

The QuestionPro survey questionnaire has 66 items related to the positive influence of remote working during pandemic situation. The link to survey was sent through IAU email. Questions were prepared to predict the effect of remote working related to job satisfaction working in administration, teaching and research-based institutes/departments at IAU. The questionnaire varies depending on the job profession. In particular, the survey was based on 6 major parameters, like Job satisfaction, Commitment to workplace, Feeling scale, Distance working support, Distance working, Distance working space, Distance working related to teaching, Distance working related to administration. Each item had 5-16 question points. The statement of agreements was stated in the order: Strongly agree, Agree, Neutral, Disagree, and Strongly disagree.

Results

Demographic data

Table 1 shows the demographic data obtained from faculties of IAU. The ethnicity includes both Saudis and Non-Saudis. Among respondents, 43.9% of them were observed between 35-44 years and 47.4% hold a PhD-equivalent degree. Most of the respondents (73.9%) were faculty members and only 3.1% of them were researchers. About 55.7% of the respondents were residing in Dammam.

Table 1. Demographic data

Category	Frequency (N)	Percentage (%)
Age		
18 – 24	10	3.5
24 – 34	66	23.0
35 – 44	126	43.9
45 – 54	63	22.0
Above 55	22	7.7
Role		
Administrative	66	23.0
Faculty Member	212	73.9
Researcher	9	3.1
Education level		
High school	8	2.8
Bachelor	81	28.2
Master	62	21.6
Ph.D.	136	47.4
Residence		
Dammam	160	55.7
Khobar	80	27.9
Others	47	16.4
Total	287	100

Reliability and validity of the instrument

While analysing the results, the overall alpha coefficient value is found as 0.832 (Table 2), which indicated that the variables measuring the perception of faculty members towards distance working could be graded as ‘Good’ [12]. Hence, it is inferred that the questionnaire used in this study is a reliable one. Also, the Cronbach’s alpha value for individual variables were described in Table 2.

Table 2 Reliability statistics of Sub-scales of Distance working Questionnaire

Factor	Dimensions	No. of Items	Cronbach's α
1	Job satisfaction	4	0.628
2	Commitment to workplace	6	0.847
3	Feeling scale	7	0.615
4	Distance Working University support	7	0.883
5	Distance working	16	0.701
6	Distance working Space	9	0.748
7	Distance Working related to teaching	13	0.863
8	Distance Working related to Administration	5	0.702
	Overall	66	0.832

Responses towards distance working variables

Table 3 shows the responses on the of faculty members towards distance working variables. More than 50% of respondents reported 'Strongly Agree' on variables such as job satisfaction, commitment to workplace, and distance working. Only a very few respondents reported "Strongly Agree" towards variables such as feeling scale, university support for distance working, and distance working space. It was also observed that 5.9% of respondents reported 'Strongly Disagree' towards distance working space. No faculty members reported 'Strongly Disagree' with job satisfaction, commitment to workplace, feeling scale, distance working, university support for distance working, distance working related to teaching, and distance working related to administration. About 82.6% of respondents reported "Neutral" towards the variable feeling scale.

Table 3 Percentage of respondents toward distance working variables.

Variables	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean±SD
Job satisfaction	-	1(0)	14(4.9)	123(42.9)	149(51.9)	4.46±0.607
Commitment to workplace	-	4(1.4)	13(4.5)	80(27.9)	190(66.2)	4.59±0.646
Feeling scale	-	22(7.7)	237(82.6)	26(9.1)	2(0.7)	3.03±0.442
Distance Working University support	-	2(0.7)	15(5.2)	114(39.7)	156(54.4)	4.48±0.630
Distance working	-	2(0.7)	100(34.8)	179(62.4)	6(2.1)	3.66±0.531
Distance working Space	17(5.9)	87(30.3)	140(48.8)	40(13.9)	3(1.0)	2.97±0.809
Distance Working related to teaching	-	2(0.7)	49(17.1)	138(48.1)	98(34.1)	4.16±0.719
Distance Working related	-	5(1.7)	82(28.6)	155(54)	45(15.7)	3.84±0.698

to Administration

Note: Strongly Disagree (SD), Disagree (D), Neutral(N), Agree (A), Strongly Agree (SA)

Level of perception of IAU faculty members towards distance working

The level of perception of faculty members with respect to all distance working variables except feeling scale and distance working space was found to be high (mean score more than 0.503). However, the level of perception of faculty members with respect to feeling scale and distance working space is found to be medium (mean score=3.03) and (mean score=2.97), respectively (Table 3).

Structural Equation Modelling for Distance working variables

SEM model is used to analyse how different structures are related in educational research [13]. Based on the results, SEM analysis resulted in a model depicted in Figure 1, and the following characteristics i.e. $n=287$, $df=20$, Chi square=90.280, $p=0.000$ (<0.05) were reported. The results showed that the value of 90.280 is significant (Chi square goodness of fit). Therefore, it is concluded that the proposed model used in this study adequately fits the sample data representing IAU faculty members. While reviewing the relationship between each item and the proposed eight dimensions, the path coefficient between each item and the proposed eight dimensions is positive and significant (p -value <0.05). The results showed that there is a positive significant relationship between each item and the proposed eight dimensions ranging from 0.503 to 1.020, which is given in (Table 4). In this study, Normed Fit Index (NFI), Relative Fit Indices (RFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) values of 0.753, 0.655, 0.797, 0.709, and 0.792 respectively are highly consistent, suggesting the proposed model represented an adequate fit to the data in Base line comparison. Root Mean Square Error of Approximation (RMSEA) for the proposed model is equal to 0.011 (p -value <0.05), which indicates the model is a good fit. This finding is supported by a study by Bryne [14], which stated that the value of Normed Fit Index (NFI), Relative Fit Indices (RFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) ranges from 0 to 1, with values closer to 1 being indicative of good fit. In conclusion, SEM analysis showed that the items observed under the proposed eight dimensions are acceptable to measure the experience of distance working by IAU faculty members during COVID-19 outbreak.

Table 4 Regression Weights for Distance working at IAU Faculty

Variables	Path	Construct	Estimate	Standard Error	Critical Ratio	p value
Distance Working related to Administration (Q8)	<---		1.000			
Distance Working related to teaching (Q7)	<---	Distance working	1.020	0.126	8.114	0.001
Distance working Space (Q6)	<---		0.473	0.121	3.090	0.001
Distance working (Q5)	<---		0.534	0.084	6.368	0.001
Distance Working University support	<---		0.714	0.102	7.010	0.001

(Q4)					
Feeling scale (Q3)	<---	0.503	0.065	2.765	0.006
Commitment to workplace (Q2)	<---	0.654	0.102	6.398	0.001
Job satisfaction (Q1)	<---	0.521	0.094	5.559	0.001

IAU researchers use various online tools (ithenticate, Turnitin) to assist their research originality to maintain the quality of research. The Clarivate analytics tools were used to update researchers research knowledge. WOS and Scopus indexed publications quartile ranks are checked by researchers through Clarivate analytics and Scopus. Utilizing such Clarivate analytics tools helps researchers to upgrade high quality research and publish in this platform. IAU is providing online platform to research funding applications submission using Converis. In addition, Converis also supports researchers to submit their IRB applications. During Pandemic period, research activities were observed. Table 5 shows the database to access such IAU online research facility.

Table 5 IAU Research database to online scientific tools

Year	2017	2018	2019	2020 (until July 19)
IAU WOS Indexed publications	580	918	1245	645
IAU Scopus indexed Publications	582	959	1261	886
Ithenticate (new accounts created)	295	90	387	75
No. of documents submitted for ithenticate	7217	10720	11914	9729
Turnitin (new accounts created)	318	178	366	75
No. of documents submitted to Turnitin	2278	3652	5144	7040
Number of Proposals Received for DSR Funding	244	167	173	256
Number of Proposals Approved for DSR Funding	125	49	85	112
IRB application Received through Converis	218	268	334	173
No of IRB Approved Projects through Converis	181	244	329	171

Source: Research database collected from the Web of science, Scopus, Converis, ithenticate and Turnitin

Discussion

The survey involves IAU populations participation with age group between 18-24 (3.5%), 24-34 (23 %), 35-44 (43.9%), 45-54 (22 %) and above 55 (7.7%) (Table 1). The participants include workforce of IAU pertaining to administrative (23%), faculties (73.9%), and researchers (3.1%). The education of personnel's ranges from high school (2.8%), bachelor (28.2%), master (21.6%) and Ph.D. (47.4%). The residence of participants includes region of Dammam (55.7%), Khobar (27.9%) and Others (16.4%). The population age structure that

actively participated in survey was between 35-44 years. Administrative and faculty members were found to be actively participated in the survey (96.9%). The least participation of researchers (3.1%) shows the negative perception of distant working.

The survey reliability of benchmark was analysed by Chronbach's alpha (Table 2). The reliability value of Cronbach's α coefficient ranges between 0.00-1.00. The α value above 0.60 indicates a consistency in data collection protocols. The standardized alpha coefficient for 66 items showed value of 0.83, which indicates the questionnaire consistency of high degree and reliable. The survey reliability of sub-scales of distant working questionnaire was analysed by Chronbach's alpha. The Cronbach's α coefficient for job satisfaction in pandemic situation showed a value of 0.628 indicating neutral stance and also feeling scale was rated as 0.615. However, the α coefficient value ranges between 0.70-0.88 for six variables indicating good rating (Table 2).

With COVID-19 infection spread across Saudi Arabia, online distance working served as major driver in maintaining activities at IAU. In order to know the effectiveness of communication technology, survey conducted. The respondents were asked about how the communication technology were effectively used in their day to day administrative, academic, research activities. Table 3 shows the percentage of respondents toward distance working variables. It has been observed that 94.8% of respondents have expressed job satisfaction agreeing and strongly agreeing to online or distance education formats. A higher proportion of faculties (66.2%) have shown a strong commitment, while 27.9% agreed to commitment to online working mode of action. Respondents of only 1.4% disagreed, while 4.5% express neutral stance with the virtual format to job commitment. Most importantly, the respondents remain neutral (82.6%) to the feel scale questions during distance working involving cheerfulness, depression, optimistic, stress, better life balance, no psychological benefits, and less motivation. Lower proportions (9.1%) agreed, while 7.7% disagreed. Very less percentage (0.7%) strongly agreed to such feel scale. This shows the psychological agitation and uncertainty that remains among the faculties during the pandemic state. In case of IAU working assistance support to distance education such as IAU decision, circulations, access to online IAU tools, supervisor and colleague support, a high proportion (94.1%) has expressed satisfaction with agree (39.7%) to strongly agreeing (54.4%) to online working support. With respect to distance working, a major proportion have agreed (62.4%), while 34.8% remains neutral. This trend clearly shows that IAU has effectively complied with implementation of advanced web-based working environment. In case of distance working space like availability of equipment's (computer/laptop/lab access/internet speed/distractions) at home, a major difference is seen. A major response remains neutral (48.8%), which indicates some difficulties or obstruction are faced by the faculties that affects the effectiveness of available working space. Distance teaching using online platform has been found to be positively impacted. A highest proportion of about 82.2% agreed to distance learning at IAU. This indicate that University has effectively cope with pandemic situation with advanced web-based working approach. The high proportion shows effective internet-based teaching and class management, controlling the course syllabus time, maintain teacher-student interaction through online resources. The online academic course delivery is proposed to be effective in combination with technology integrated learning experience in combination with traditional learning techniques in classrooms. Based on the emergency situation, IAU

has efficiently complied with implementation of advanced web-based working approach. The University foray the education via internet-based studies for class management, controlling the syllabus timeline, continued student interaction through video offline and online, taking advantageous of vast learning online resources. IAU aligned with rapid phase change in educational mode keeping intact with educational demand using latest online video chat technology.

The University started to follow unified successful approaches of blending online learning environment and provides graduate and master students a high-quality web-based learning experiences with latest state of art technology. For instance, graduate and master students are actively involved and teaching through online platform “Blackboard. The software includes various active learning options like online teaching courses, uploading teaching materials, project works, assignments, conducting online examination, posting examination results and so on. The online platform engages students in authentic environment simulating traditional classroom teaching experience. In order to sustain the active learning, faculties are provided effective software training sessions, webinars, online teaching practices, honing the student engagement and interactive sessions. The effectiveness concerning blackboard based virtual classes received a response of 57% in combined category of strongly agree and agree. Respondents of about 38% remain neutral. It shows the positive trend of online classes.

IAU maintain the active learning experience by training the faculty members of online tools (44% strongly agree; 35% agreeing) and keeping the students engaged in the learning phase. Mutual participation of students-faculty is encouraged to actively built knowledge and make learning more effective and enjoyable experience. Faculty shown that maintenance of student’s attendance is easy using IAU E-service/Blackboard. Teaching through the Blackboard software was found to be effective among faculties. The respondents of 36% strongly agree, while 40% agree and 16% remains neutral to such online tool. The faculties positively responded with 71% in strongly agree and agree category to the ease of conducting examination. Students were actively seen to be participating in online blackboard teaching with 54% (strongly agree-agree). However, 18% reported to disagree and 6% strongly disagree. The respondents shown that ease of using Zoom online software tool with 61% strongly agreeing and 30% agreeing to virtual classes. Law et al [15] has reported that such learning motivations, student’s interactivity are mainly attributed to the blended learning atmosphere and critical collaboration of faculties by keeping track on learning goals.

Faculties in administration working through online reported an effective working ability with 54% agreeing and 15.7% strongly agreeing. Respondents of 28.6% remains neutral, while 1.7% disagree with distance working. The positive response towards distance working of administrative activities shows the effectivity of IAU that has initiated several measures for awareness and prevention during COVID-19 through different departments such as Deanship of ICT, Directorate of Security, Safety and Occupational health, arranged interactive training session for administrative offices with motto of work from home and be safe. Provided Cisco Jabber for mobile service and maintain E-service portal. Deanship of Scientific Research maintains the research project evaluation, funding activities through online Converis portal. Administration routine works are effectively maintained through Microsoft team and e-morasalat, etc.

IAU have different participants of different ages and demographic differences. Based on the emergency situation, management of distance working requires effective technological implementation related to administration, teaching and research activities. Faculty's perceptions are required to tune the impact of distant working. In consideration of the physiological and psychological differences of participants, perception of IAU faculty members was evaluated towards online working system to understand the common interpretations at IAU. The survey shows high level of perception in major variables related to the job satisfaction, commitment, distance working university support, distance working, distance working related to teaching and administration. The feeling scale remains medium, while distance working space remains very low. Overall, the distance working environment at IAU in present pandemic situation remains positive. The observed medium scale in feeling and low scale of working space is expected due to sudden environmental changes that affected routine working environments of faculties. The contagious nature of virus and work from home scenario is expected to disrupt the psychological behaviours and attitudes.

SEM model is used to analyse how different structures are related in educational research [13]. Based on the collected output, the SEM analysis resulted in a model depicted in Figure 1, and the following characteristics i.e. $n=287$, $df=20$ Chi square=90.280, $p=0.000$ (<0.05) were reported found significant (Chi square goodness of fit). Therefore, it is concluded that the proposed model used in this study adequately fits the sample data representing IAU faculty members. While reviewing the relationship between each item and the proposed eight dimensions, the path coefficient between each item and the proposed eight dimensions is positive and significant (p -value <0.05). The results showed that there is a positive significant relationship between each item and the proposed eight dimensions ranging from 0.503 to 1.020, which is given in Table 4. In this study, Normed Fit Index (NFI), Relative Fit Indices (RFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) values of 0.753, 0.655, 0.797, 0.709, and 0.792 respectively are highly consistent, suggesting the proposed model represented an adequate fit to the data Baseline Comparison Root Mean Square Error of Approximation (RMSEA) for the proposed model is equal to 0.011 (p -value <0.05) in Root Mean Square Error of Approximation, which indicates the model is a good fit. This finding is supported by a study by Bryne (2009), which stated that the value of Normed Fit Index (NFI), Relative Fit Indices (RFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) ranges from 0 to 1, with values closer to 1 being indicative of good fit. In conclusion, SEM analysis showed that the items observed under the proposed eight dimensions are acceptable to measure the experience of distance working by IAU faculty members during COVID-19 outbreak.

The impact of COVID-19 has been felt substantially on research activities. The survey report indicates that preventive measures of lockdown and limited accessibility to labs have increased the stress of scientist and caused interruption in long term research work. However, the study finds that such disruptions raised the prospect of international collaboration, limited excessive traveling and reduced carbon footprint [16]. In this survey, a statistically non-significant response was observed from researchers. Unlike the active responses among administrative and academic faculties, a less participation was observed among researchers. The collection of scientific data requires a coordinated research activity among different departments of interdisciplinary field of research. Though a long-term research activity is

disrupted worldwide, the database related to IAU Web of Science (WOS) using Clarivate analytics and Scopus Scopus. Interestingly, the database regarding to IAU publication indicate a significant publication output for the seven-month period of year 2020. This indicates the active progress of research activities. For instance, the number of WOS publications for the current year as of July 2020 was 645, which matches approximately with six months of previous year 2019. The database of Scopus indexed publications was found to be high of 886, which clearly reflects the excellent research productivity during pandemic state at IAU. The current research activities linked to COVID-19 and research knowledge updatements in different fields of research, the University library E-resources are enriched with a wide range of e-journals (70,000) and e-books (70,000). In order to keep update about the research, University has included the patent and entrepreneurship resources (European patent and Hague express database), clinical resource information, and hospital corner, access medicine. IAU formed strategic partnership with Clarivate Analytics, Elsevier, Scopus, and Derwent innovations. In partnership with them, arranged several online webinars to train faculties and researchers and update research knowledge. IAU has access to research analytics tools like SciVal and InCites to evaluate the KBIs of research institute, researchers, provide national and international research database. IAU provide online database of Web of Science, Scopus, Reaxys, and KnoVel. Further, to promote the research standard, online scientific tools (ithenticate/Turnitin) are given access to researchers to detect the similarity index. In order to determine the researcher's activity in the year 2020 (until July 15th, 2020), the database of faculty users accessing online research tools (plagiarism software, Converis and IRB approval) was analysed and compared with 2019, 2018 and 2017 (Table 5). The plagiarism software tools were accessed by faculty. Therefore, the new account created for new users and documents submitted for similarity index (ithenticate) reflects the active ongoing research activities by IAU faculties. Turnitin report matches with the new account users of ithenticate and reflects even higher documents submitted compared to previous three years. The database reveals that number of proposals received for DSR 2020 Funding through Coveris was highest among four years. The number of approved projects were second highest compared to 2018 and 2019. In the span of six months, IRB application received and approved database through Converis indicates active ongoing research activities during pandemic situation.

In order to find the potential funding agencies, the University has access to "Research Professional" that can be effectively utilized to find national and international funding sources. IAU has conference representative unit that analyse and evaluate the quality of conference that are attended by the faculties through online. The internal funding is comprehensively evaluated and funded through Converis system. The progress report of the funded projects is received through Converis and evaluated periodically. The biomedical research projects, IRB (SCRELC) approval is processed through online Converis system. IAU has advanced Digital facilities. Though lab-based research work is temporarily interrupted, a shift based working protocol and social distancing among researchers, fellow technicians, trainees and students is proposed to improve the research activities.

Conclusion

Key scenario is to identify the challenges and difficulties to manage the effective function of the University during COVID-19. Based on the remote working facilities, the challenges faced by digital facilities of IAU was analysed to study the effective working, teaching, learning and research environment. The consistency of high degree and reliable survey data was confirmed using Cronbach's α . Structural equation modeling (SEM) was used to estimate the variables associated with the model. The survey indicates a positive effect of remote working with major responses to job satisfaction in administration and academics. The supporting evidence from research output of IAU (2020) in Clarivate Analytics (WOS) and Scopus indicated a significant research publication output. In addition, through remote working researchers have used Converis tool for internal project submission, IRB approval and checked similarity index softwares (iThenticate/Turnitin). The current pandemic state has respondents prefer neutral scenario with respect to working space availability and feel scale. This trend indicates the psychological agitation and uncertainty that remains among the faculties during the pandemic state. Remote working mode tends to safeguard university employees and student's health. Overall, a positive response in university activities, reflects an effective usage of online based working approach of IAU aligned with Saudi 2030 Vision.

Acknowledgement

Dr. Nuhad Alomair like to acknowledges the funding obtained for survey study from Deanship of Scientific Research (DSR), Imam Abdulrahman Bin Faisal University with grant number Covid19-2020-074-DSR.

References

1. Chakraborty I, Maity P. COVID-19 outbreak: Migration, effects on society, global environment and prevention. *Sci Total Environ* 2020; 728:138882.
2. Nicola M, Alsafi Z, Sohrabi C, Kerwan A, Al-Jabir A, Losifidis C, Agha M, Agha R. The Socio-Economic Implications of the Coronavirus and COVID-19 Pandemic: A Review." *Int J Surg*, 2020; 78: 185-193.
3. Stambough JB, Curtin BM, Gililand JM, Guild, GN, Kain, MS, Karas V, Keeney JA, Plancher KD, Moskal JT, The Past, Present, and Future of Orthopedic Education: Lessons Learned from the COVID-19 Pandemic, *J Arthroplasty*, 2020; 35: S60-S64.

4. Kapoor A, Guhu S, Das MK, Goswami KC, Yadav R. Digital healthcare: The only solution for better healthcare during COVID-19 pandemic. *Indian Heart J*, 2020; 72: 61-64.
5. Jowsey T, Foster G, Cooper-Ioelu P, Jacobs S. Blended learning via distance in pre-registration nursing education: A scoping review. *Nurse Educ Pract* 2020; 44: 102775.
6. Kummitha RKR. Smart technologies for fighting pandemics: The techno- and human-driven approaches in controlling the virus transmission. *Gov Inf Q*, 2020; 37: 101481.
7. Kriz A, Nailor C, Jansen K, Potocnjak-Oxman C. Teaching-practice as a critical bridge for narrowing the research-practice gap. *Ind. Mark. Manag*, 2020; 92: 254-266.
8. Junior AJM, Pauna HF. Distance learning and telemedicine in the area of Otorhinolaryngology: lessons in times of pandemic. *Braz J Otorhinolaryngol*, 2020; 86: 271-272.
9. Kinzl JF, Knotzer H, Traweger C, Lederer W, Heidegger T, Benzer A. Influence of working conditions on job satisfaction in anaesthetists. *Br. J. Anaesth*, 2005; 94: 211-215.
10. Meyer JP, Herscovitch L. Commitment in the workplace: toward a general model. *Hum. Resour. Manag. Rev*, 2001; 11: 299-326.
11. Rebar AL, Stanton R, Wells R, Steel Z, Rosenbaum S. Feeling states of people experiencing depression, anxiety, or comorbid depression and anxiety symptoms during a multi-day charity cycling ride: An ecological momentary assessment study, *Psychol Sport Exerc*, 2020; 47: 101489.
12. Darren G, Paul M. *SPSS for Windows step by step: A simple guide and reference. 11.0 update (4th ed.)*, Boston: Allyn and Bacon; 2003.
13. Jansson A, Sundblad GB, Lundvall S, Norberg J. Assessing Students' Perceived Learning and Contentment in Physical Education: A Scale Development Study and Structural Equation Modeling Analysis. *Meas Phys Educ Exerc Sci* 2019; 23: 280-290.
14. Bryne BM. *Structural equation modeling with AMOS: Basic concepts, applications and programming. (2nd Ed.)*. Mahwah, NJ: Lawrence Erlbaum; 2009.
15. Law KMY, Geng S, Li T. Student enrollment, motivation and learning performance in a blended learning environment: The mediating effects of social, teaching, and cognitive presence." *Comput Educ*, 2019; 136: 1-12.



May-2021, Vol. 54, No. 2

16. Korbel JO, Stegle O. Effects of the COVID-19 pandemic on life scientists. *Genome Biol*, 2020; 21: 113.