

ORIGINAL PAPER
ΕΡΕΥΝΗΤΙΚΗ ΕΡΓΑΣΙΑ

Challenges in distance technical education for trainers and trainees in secondary and post-secondary settings during COVID-19

OBJECTIVE To investigate technical distance education and the stress of its implementation in trainers and trainees, at secondary and post-secondary levels of education in Greece due to COVID-19. **METHOD** The survey was conducted using an anonymous questionnaire for e-learning, with closed-ended questions, using the Likert scale. The survey results were processed with the help of the statistical processing software Microsoft Excel Statistical Package for Social Sciences (IBM SPSS Statistics for Windows, IBM Corp, Armonk, NY), version 29.0.0.0. **RESULTS** 84% of respondents agreed positively that some stress is created with distance lab training, while 37% recognized it as a lot and 47% reported it as a little. Finally, when asked if there is a feeling that problems arose during distance learning, an overwhelming 98% believed that there have been problems without them being named yet. **CONCLUSIONS** In the survey, the majority of respondents answered that the pandemic negatively affected the educational process in technical education and how problems arose during distance learning. Trainers and trainees agreed that distance lab training creates some levels of stress and for this purpose, training teachers in digital techniques is deemed necessary.

Coronaviruses were discovered in the 1960s and are a large family of enveloped RNA-viruses (Coronaviridae that usually cause respiratory infections).¹ Some types of coronaviruses can infect humans, while others affect only mammals and birds. All coronaviruses are able to cause intestinal, hepatic and neurological diseases.² There are seven strains of human coronaviruses, with four of them being predominant and usually causing symptoms of the common cold in immunocompetent individuals.³ The three new viruses causing epidemics are SARS-CoV, MERS-CoV,

and the recently added SARS-CoV-2 (COVID-19). The three aforementioned newer coronavirus strains are zoonotic and have been associated with fatal diseases in humans. SARS-CoV is the causative agent of the 2002 Severe Acute Respiratory Syndrome (SARS) outbreak in China, while MERS-CoV was responsible for the Middle East Respiratory Syndrome (MERS) outbreak.⁴ The coronavirus pandemic (COVID-19) was first identified in China in December 2019.⁵ It is an RNA virus, which has a typical crown-like appearance due to the presence of spiked glycoproteins in its envelope.¹

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2026, 43(3):371–376

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Προκλήσεις απομακρυσμένης τεχνικής εκπαίδευσης κατά την COVID-19 για εκπαιδευτές και εκπαιδευόμενους στη δευτεροβάθμια και μεταδευτεροβάθμια εκπαίδευση

Περίληψη στο τέλος του άρθρου

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Coronaviruses often cause epidemics and pose a significant global threat to human health. According to the results of a clinical analysis of the virus, it is transmitted from person to person.⁶ On March 11, the Director-General of the World Health Organization (WHO) declared COVID-19 a pandemic, following the rapid spread of the virus and its severity at a global level as well. As a measure to limit transmission, social distancing measures were announced⁷ and a curfew was imposed.⁸ Distance learning has been adopted since the first wave of the pandemic.⁹ Videoconferencing constitutes the main tool used in online distance learning. This method requires participants to use technology and access the Internet.¹⁰

The implementation of distance learning initially caused great confusion among both students and trainers.¹¹ Because of the urgent need for its use, teachers were asked to conduct the lesson as if they were in the classroom and at the same time to reassure and encourage their students about this unprecedented condition, thus increasing anxiety levels.¹² Schools reopened in person in the 2021–2022 school year.¹³ The social insecurity and uncertainty caused by the COVID-19 pandemic in teachers strengthened their motivation to teach and guide students.¹⁴ The new educational conditions, simultaneously, are considered the main cause of the development of anxiety, anger, and depression.¹⁵

MATERIAL AND METHOD

Study design

The present research attempted to study whether COVID-19 affected the educational process and communication in technical distance education for trainers and trainees in Greece, as well as the levels of stress caused by the COVID-19 pandemic. To achieve the objective of the study, an anonymous questionnaire was distributed, which included demographic characteristics and information regarding the impact of COVID-19 on education as well as the stress caused by distance learning. The survey was conducted among trainers and trainees, randomly throughout the territory, at secondary and post-secondary levels of education from October 2023 to December 2023 and the collection of questionnaires was carried out using the self-completion method.

In the first section of questions, personal and demographic data were recorded (tab. 1). The second section of questions explored the influence of COVID-19 on education (tab. 2), and the extent to which the educational process and learner behavior were affected during the period of confinement due to COVID-19. The third section explored distance learning and the stress it caused during the pandemic (tab. 3). Questions were created to detect the problems in distance learning and the stress it created.

Table 1. Personal and demographic data.

Sex
Age
Educational level
Area of residence
Trainer/trainee
Method of participation

Table 2. Impact of COVID-19 on education.

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- Do you think that the COVID-19 pandemic has affected the educational process in technical education?
 - In your opinion, has the COVID-19 pandemic affected the communication of trainers/trainees with the school unit?
 - Do you think that the COVID-19 pandemic has affected the communication between the trainers and the trainees?
 - Was the trainers' behavior affected during the COVID-19 pandemic?
-

Table 3. Distance learning and stress.

Is distance learning considered to have caused you stress?
Was the internship during COVID-19 stressful?
Do you think there were any problems during distance learning?
What problems arose during distance learning?
In your opinion, what are the major problems of distance learning?

Statistical analysis

Quantitative statistical analysis was applied as a sampling method using a structured questionnaire in the form of a survey tool, consisting of closed-ended questions, based on the Likert scale. Scientific and research articles from Greek and international literature were used to develop the questionnaire. The introduction clearly stated the purpose of the research, voluntary participation, maintaining the anonymity of responses, and the exclusive use of data for research purposes.

The use of the Web for collecting the questionnaires is motioned as a weakness of the research. The lack of contact with the participants can also be considered a disadvantage. However, saving time in distributing and collecting the questionnaires and ensuring the anonymity of the participants are among the advantages of the method. The results were processed using the Statistical Package for Social Sciences (SPSS) software, version 29.0.0.0 (IBM SPSS Statistics for Windows, IBM Corp, Armonk, NY). The significance level was set at $p < 0.05$.

RESULTS

Responses from 164 questionnaires were taken into account and utilized. In total, the 164 questionnaires are analyzed as follows: 127 trainers, 30 trainees, and seven participants who were simultaneously trainers and trainees in different subjects during this specific period of time.

The first section included individual data that are considered as determining factors of formation: (a) 57 men (34.8% of the sample) and 107 women (65.2% of the sample) participated, (b) 6.7% were aged 15–25, 22.6% aged 26–40, 65.2% aged 41–60, and 5.5% over 60, (c) the level of education of the participants was 8.9% high school graduates, 6.7% Institute of Vocational Training (IVT) graduates, 40.2% Higher Education Institution (HEI)/Technological Educational Institute (TEI), 40.7% postgraduate and 4.5% doctoral education, (d) 32.3% of the respondents were residents of Attica, and 67.7% lived in other cities in Greece (fig. 1), (e) area of residence with more or less than 1,500 inhabitants, one participant chose less than 1,500, which concerns the authors about the objectivity of the sample, as it is possible that in areas with fewer inhabitants there were problems with distance learning which were not highlighted in this survey, (f) 52.4% participated in distance learning, 42.1% in distance learning and teleworking and 2.4% only in teleworking.

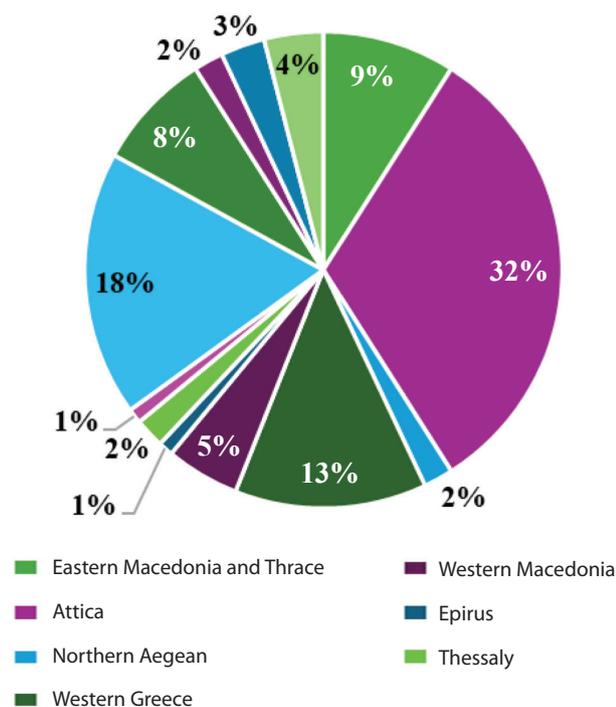


Figure 1. Residential areas.

The second section consists of questions regarding whether the COVID-19 pandemic affected the educational process in technical education, 90.9% answered a lot, while 9.1% a little (fig. 2). In response to the question of whether the communication between trainees and trainers with the school unit was affected, 82.3% answered a lot, 17.1% a little, and 0.6% not at all. As to whether the COVID-19 pandemic affected the communication between the trainer and trainees, 81% answered a lot and 15% a little. Regarding whether the trainees' behavior was affected by the pandemic, 86.6% answered a lot, 12.2% a little, and 1.2% not at all.

The third section consists of questions regarding whether distance learning caused stress; 47% answered a little, 37% a lot, and 16% not at all (fig. 3).

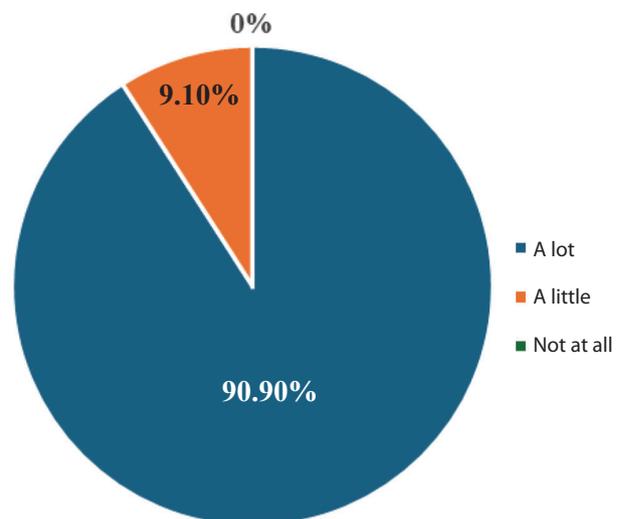


Figure 2. Educational process in technical education.

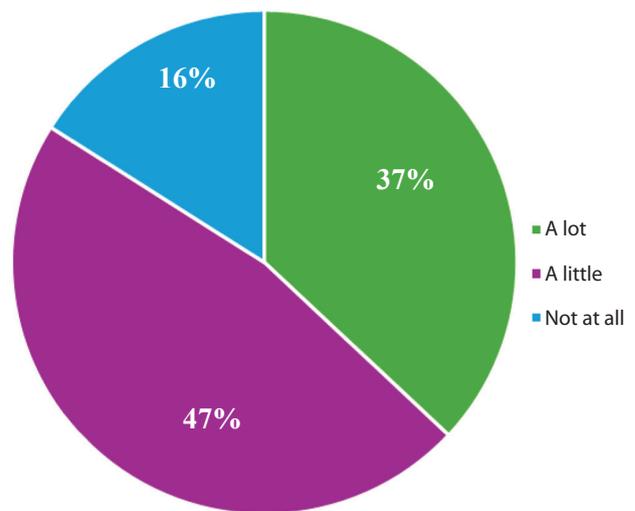


Figure 3. Anxiety/stress about distance laboratory teaching.

The next section consists of one question concerning internships during COVID-19 and whether they were stressful, with the majority of responses stating that they were stressful; 54% answered a lot, 31% a little, and 15% not at all (fig. 4).

DISCUSSION

This research attempted to record the impact of COVID-19 at the level of technical secondary and post-secondary education. Specifically, it attempted to investigate the levels of anxiety caused, the problems that may have occurred, and the difficulties that stood out during distance learning due to COVID-19.

The questions on the axis concerned demographic characteristics, from which it emerges that the sample, compared to the characteristics of the total population of the country, has deviations and therefore under-representation is recorded in terms of gender, age, and level of education. Subsequently, followed questions were structured in two axes.

Axis B examined the impact of COVID-19 on education, revealing that the COVID-19 pandemic greatly affected the educational process, communication, and behavior of trainees and trainers in technical education. The first question of axis B investigated whether the pandemic affected the educational process in technical education. The results of this question clearly demonstrated the impact, with 91% of respondents answering *a lot*, while 9% answered *a little*. As far as the question of whether the communication of trainees or trainers with the school was affected

during distance learning is concerned, only one participant answered *not at all*, 28 participants answered *a little*, and 135 answered *a lot*. This result confirmed that distance learning had a negative impact on communication with the school unit. Regarding the question examining student behavior and whether it was affected during COVID-19, 87% of respondents claimed that trainee's behavior changed a lot, in contrast to 12% who believed that it changed a little, and 1% who believed it did not change at all. Based on this question, the safe conclusion is drawn, within the framework of this research, that trainees were affected and altered their attitude during distance learning.

The third axis studied stress in distance learning and the results showed that distance laboratory teaching caused little stress, but practical training during COVID-19 was very stressful. The first question of the axis dealt with whether laboratory teaching caused stress. A total of 84% agreed that distance laboratory teaching creates stress. Continuing with the next question, the internship is investigated and whether it was stressful during the pandemic; 15% of respondents supported *not at all*, 31% *a little*, and 54% *a lot*.

Other research such as the Committee on Employment and Social Affairs of the European Parliament¹⁶ confirms that technical education trainees were affected more than trainees of other forms of education during the quarantine period. Another survey conducted among the Basques in Spain in January 2021 showed 50.6% rates of stress, 49.5% of anxiety, and 32.2% of depression among secondary education teachers. Approximately 49.5% of trainers suffered from anxiety, of which 7.6% reported serious symptoms and 8.1% extremely serious symptoms.¹² When asked whether there is a feeling that problems have arisen during distance learning, an overwhelming 76% answer *a lot*, 22% *a little*, and only 2% *not at all*. The conclusion is drawn that everyone believes that there have been problems without them being named yet.¹⁷ Based on the research carried out in "Attitudes and perceptions of vocational high schools teachers on distance learning", the use of distance learning can create positive student behavior towards learning, 32.5% answered neither agree/nor disagree, and 39.7% agree.¹⁸ Also, according to the research of the Center for Studies and Documentation,¹⁹ the implementation of distance learning had an impact on the psychology of teachers and students, 61.4% negative, 7.0% positive, and no impact 31.6%. Finally, the majority of dental students reported more negative (69.1%) than positive features (51.8%) to e-learning during the pandemic, confirming most convincingly that the health issues caused turbulence in education, as well leading to student discontent.²⁰

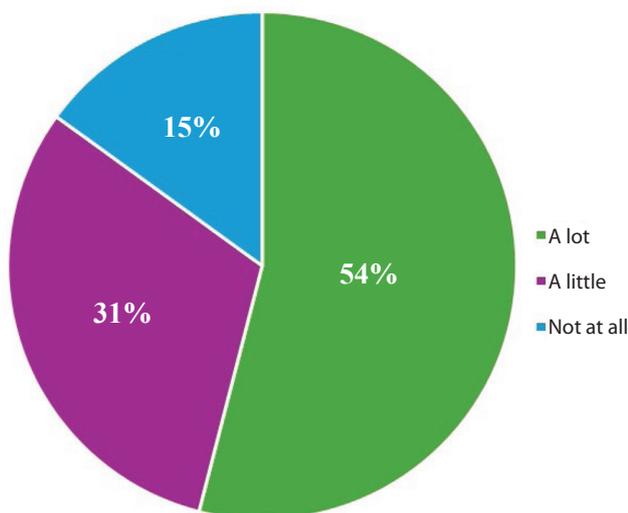


Figure 4. Internship anxiety/stress.

In conclusion, the above research studied the impact of COVID-19 on education, focusing on the stress it caused and its overall influence. All respondents answered that the pandemic affected technical education and communication between trainees and trainers and trainees with the school unit, as well as changing the trainees' behavior towards the trainer and the school unit. We would like to note that distance learning has gained supporters and detractors. Most experienced some levels of stress; the entire

academic community was upset and was forced to develop digital communication and interaction skills. Certainly, the classroom is the natural environment for students and teachers, therefore the educational community must be able to adapt rapidly when extraordinary circumstances require it. Furthermore, training teachers to cultivate crisis management skills and knowledge plays a decisive role in achieving this goal.

ΠΕΡΙΛΗΨΗ

Προκλήσεις απομακρυσμένης τεχνικής εκπαίδευσης κατά την COVID-19 για εκπαιδευτές και εκπαιδευόμενους στη δευτεροβάθμια και μεταδευτεροβάθμια εκπαίδευση

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ΣΚΟΠΟΣ Διερεύνηση της τεχνικής εξ αποστάσεως εκπαίδευσης και του stress υλοποίησής της σε εκπαιδευτές και εκπαιδευόμενους, λόγω COVID-19, σε δευτεροβάθμιο και μεταδευτεροβάθμιο επίπεδο εκπαίδευσης στην Ελλάδα. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Η έρευνα διεξήχθη με τη χρήση ανώνυμου ερωτηματολογίου για την τηλεεκπαίδευση, με ερωτήσεις κλειστού τύπου συμπλήρωσης, με τη χρήση της κλίμακας Likert. Τα αποτελέσματα της έρευνας επεξεργάστηκαν μέσω του λογισμικού Microsoft Excel Statistical Package for Social Sciences (IBM SPSS Statistics for Windows, IBM Corp, Armonk, NY), έκδοση 29.0.0.0. **ΑΠΟΤΕΛΕΣΜΑΤΑ** Οι συμμετέχοντες, σε σύνολο 84%, συμφώνησαν θετικά ότι δημιουργείται άγχος με την εξ αποστάσεως εργαστηριακή εκπαίδευση, ενώ το 37% το αναγνώρισε ως πολύ και το 47% ως λίγο. Τέλος, στην ερώτηση αν υπάρχει η αίσθηση ότι προέκυψαν προβλήματα κατά την τηλεεκπαίδευση, ένα συντριπτικό 98% θεώρησε ότι υπήρξαν προβλήματα χωρίς αυτά να κατονομάζονται ακόμη. **ΣΥΜΠΕΡΑΣΜΑΤΑ** Στην έρευνα, η πλειοψηφία των ερωτηθέντων απάντησαν ότι η πανδημία επηρέασε αρνητικά την εκπαιδευτική διαδικασία στην τεχνική εκπαίδευση και πως προέκυψαν προβλήματα κατά την τηλεεκπαίδευση. Εκπαιδευτές και εκπαιδευόμενοι συμφώνησαν ότι η εξ αποστάσεως εργαστηριακή εκπαίδευση δημιουργεί άγχος και γι' αυτόν τον σκοπό κρίνεται αναγκαία η επιμόρφωση των εκπαιδευτικών στις ψηφιακές τεχνικές.

Λέξεις ευρητηρίου: Άγχος, COVID-19, Πανδημία, Τεχνική εξ αποστάσεως εκπαίδευση

References

- ZOUMPOURLIS V, GOULIELMAKI M, RIZOS E, BALIOU S, SPANDIDOS DA. The Covid-19 pandemic as scientific and social challenge in the 21st century. *Mol Med Rep* 2020, 22:3035–3048
- PORTA M. *A dictionary of epidemiology*. Oxford University Press, New York, 2008
- ZOPPI L. How does SARS-CoV-2 compare to SARS-CoV? News Medical.net, 2020. Available at: <https://www.news-medical.net/health/How-does-SARS-CoV-2-Compare-to-SARS-CoV.aspx>
- CUI J, LI F, SHI Z. Origin and evolution of pathogenic coronaviruses. *Nat Rev Microbiol* 2019, 17:181–192
- JIAOWY, WANG LN, LIU J, FANG SF, JIAO FY, PETTOELLO-MANTOVANI M ET AL. Behavioral and emotional disorders in children during the COVID-19 epidemic. *J Pediatr* 2020, 221:264–266e1
- CACHÓN-ZAGALAZ J, SÁNCHEZ-ZAFRA M, SANABRIAS-MORENO D, GONZÁLEZ-VALERO G, LARA-SÁNCHEZ AJ, ZAGALAZ-SÁNCHEZ ML. Systematic review of the literature about the effects of the COVID-19 pandemic on the lives of school children. *Front Psychol* 2020, 11:569348
- WORLD HEALTH ORGANIZATION. Pandemic influenza risk management: A WHO guide to inform and harmonize national and

- international pandemic preparedness and response. WHO, Geneva, 2017. Available at: <https://www.who.int/publications/item/WHO-WHE-IHM-GIP-2017.1>
8. INTERNATIONAL LABOUR ORGANIZATION; UNESCO. ILO-UNESCO Joint survey on technical and vocational education and training (TVET) and skills development during the time of COVID-19. ILO, Geneva, 2020. Available at: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/-emp_ent/documents/genericdocument/wcms_742817.pdf
 9. PAPAIOANNOU A. The state of the national pandemic preparedness plan. The case of the General Hospital of Argolis, National Hospital of Argos. Thesis, University of Peloponnese, 2020
 10. PISUTOVA K, ROGERS RC, MERCER J. Engaging students at a distance: Advantages and pitfalls of video-conference use in teaching. 16th International Conference on Emerging e-Learning Technologies and Applications (ICETA), IEEE, Stary Smokovec, 2018
 11. BESSER A, FLETT GL, ZEIGLER-HILL V. Adaptability to a sudden transition to online learning during the COVID-19 pandemic: Understanding the challenges for students. *Scholarsh Teach Learn Psychol* 2022, 8:85–105
 12. OZAMIZ-ETXEBARRIA N, SANTXO NB, MONDRAGON NI, SANTAMARIA MD. The psychological state of teachers during the COVID-19 crisis: The challenge of returning to face-to-face teaching. *Front Psychol* 2021, 11:620718
 13. BASILAIA G, DGEBUADZE M, KANTARIA M, CHOKHONELIDZE G. Replacing the classic learning form at universities as an immediate response to the COVID-19 virus infection in Georgia. *Int J Res Appl Sci Eng Technol* 2020, 8:101–108
 14. KOURTIS G, MAVROEIDIS H, IOAKEIMIDOU B. School distance secondary education in Greece in the context of the Covid-19 pandemic. Investigation of the difficulties of teachers and the use of ICT in the educational process. *Open Education: The Journal for Open and Distance Education and Educational Technology* 2023
 15. WONG KM, MOORHOUSE BL. The impact of social uncertainty, protests, and COVID-19 on Hong Kong teachers. *J Loss Trauma* 2020, 25:649–655
 16. KONLE-SEIDL R, PICARELLA F. Youth in Europe: Effects of COVID-19 on their economic and social situation. Publication for the committee on Employment and Social Affairs, Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, 2021. Available at: [https://www.europarl.europa.eu/RegData/etudes/STUD/2021/662942/IPOL_STU\(2021\)662942_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2021/662942/IPOL_STU(2021)662942_EN.pdf)
 17. PAIDOUSI C. Vocational Education and Training (VET) during COVID-19 pandemic: Challenges and practices. Athens, 2022
 18. KORRES D, ALIVIZOS S. Attitudes and perceptions of EPAL teachers on distance learning as implemented with the “We learn at home” approach. Proceedings of the 1st International Online Conference, 2020
 19. ANDRINOPOULOS G, GEORGIADIS T, GEORGARIOU M, TZANETAKOS N, PANOPOULOU F, KARLAITIS T ET AL. Aspects of distance learning during the pandemic: Educational inequalities and consequences for labor rights, KEMETE (Center for Research and Documentation of the Hellenic Labor Market Organization). Athens, 2021
 20. ANASTASIADOU P, CHERISTANIDIS S, KAVVADAS D, ANDREADIS D, TSIRONIS C, POULOPOULOS A ET AL. Covid-19 pandemic and e-learning: The case of the School of Dentistry, Aristotle University of Thessaloniki. *Aristotle Biomedical Journal (AUMJ)* 2023, 5:1–13
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