

EFFECTIVENESS OF ONLINE PRACTICAL EXERCISES AMONG THIRD YEAR DENTAL UNDERGRADUATE STUDENTS -A QUESTIONNAIRE BASED SURVEY.

Running title: Knowledge and awareness of online practical classes.

ABSTRACT:

INTRODUCTION: When teachers and students synthesize knowledge from multiple subjects and experiences, objectively weigh dramatically different viewpoints, and integrate various inquiries, education may become transformative. Online applications have been marketed as effective and well-accepted methods for improving student learning in health professional education, including physiotherapy. This study aimed to evaluate the efficacy of online technology for physiotherapy teaching and learning, as well as user expectations. Educators may create such opportunities by encouraging students to develop their capacities for study, creativity, critical synthesis, creative expression, self-awareness, and intentionality in critical learning spaces. **MATERIALS AND METHODS:** Survey was distributed to third-year undergraduate students. It suggests that most of the students are aware of online practical classes and also they have knowledge about online classes. **RESULTS AND DISCUSSION:** It is concluded that types of classes students prefer, 69% prefer online classes, 31% prefer offline classes, gaining of knowledge in online classes 91% can gain knowledge, 9% are not able to gain knowledge, Preference in online classes 49% preferred theories, 49% prefer practical classes, 2% prefer none Association between gender and preferences of online practical classes was done using chi-square test $p=2$, $p>0.05$ which is found to be statistically not significant. **CONCLUSION:** It is concluded that most of the students are aware, and students also have knowledge about online practical exercises and classes, the results and this study was compared with other studies.

Keywords: Awareness, comfortable, knowledge, online practical, innovative method.

INTRODUCTION :

Online tutoring is tutoring in an online, or networked, environment in which teachers and students or learners interact from various physical locations, it's literature also states that participants can be separated by the means of time. It also involves many methods to teach for the learner. The learners also should have an equal interest in online listening. Experiencing significant changes that challenge traditional approaches of teaching or learning in college or school classrooms. These changes reflect the increasing diversity of the student body, including students of different racial and ethnic backgrounds, as well as age diversity, educational pathways, and academic readiness, to name but a few. Other improvements include new pedagogies that discuss active and problem-based learning, including courses conducted entirely online, and, perhaps most notably, educational technology (1).

Online courses are a strong and increasing part of undergraduate education, but many biology instructors are doubtful of online instruction's effectiveness. For both the teacher and the student, online and integrated classes provide greater versatility and convenience in scheduling and venue. Convenience and accessibility are, however, only beneficial if courses promote student learning effectively. (2) In democratizing education, online learning is lauded as an integral power. It is a means to open up schooling to communities with reduced access due to geography, status, or physical impairment (3)(4). The new generation is the first one to take for granted the presence of the Internet. The EU Kids Online Study estimates that kids aged 9-16 go online for an average of 88 minutes a day. Nevertheless, this generation's very optimistic labels such as mask the possible derogatory site for this rise in internet usage (5,6). We can still benefit from our observations even though we don't have the answers to these questions. For example, students would be well-advised not to take all of their classes online, but this may not be feasible for all of our students, especially those who live farther away or who have commitments that make earning a degree while attending classes on a campus impossible. Technological developments have contributed to the extension of teaching from conventional approaches to online instruction, such as online laboratories, which draw medical schools' interest because they tend to better fulfill institutional needs, also leading to the reduction or loss of in-person

laboratories. These new developments in microbiology education affect the understanding of students of their academic experience, based on how they study (7,8).

Online technologies include social networks, web-based services, and message forums, and can be described as any service or networking platform accessible on or using the internet. In higher education, online tools have been an indispensable feature of students' and academics' lives, affecting learning strategies(9). Students in the health professions tend to use the internet regularly, participating in a variety of networking events centered mostly on social media sites. Because of the rapid evolution of web-based information systems, especially social media, many health professions students now use the internet as their primary source of information (10,11). The results show that when students take a larger proportion of their course load online, their success decreases. When it comes to tackling this pattern in higher education, colleges must pay careful attention to ways to boost the success of online students. In the aftermath of the COVID-19 pandemic, it's particularly important to consider the needs of online learners, the online classes also save time in our day-to-day life. Higher education is seeing an increase in online education, including creative and sensitive online course formats as well as studies on student opportunities to engage with online course material. (12). Similarly, we don't know why students who take all of their classes online are less likely to be retained, particularly because much of the research cited above suggests that students learn just as much in online courses as they do in face-to-face courses, including in political science, and that online instruction can provide students with valuable interaction opportunities there are also many other instant opportunities in online classes. Students who perform coursework remotely would find online classes enticing thanks to the widespread use of smartphones and web apps, furthering the idea of studying anywhere and anywhere. In 2014, the growth rate of online enrollment at community colleges was 4.7 percent, which was greater than the growth rate of the student population. The majority of higher education institutions see online learning as an important aspect of their long-term development strategy. In reality, online classes are becoming more popular as a means to extend learning opportunities and attract a broader audience (13,14)

This study aims to create awareness of online class exercises among third-year undergraduate dental students. There is lagging in the population of the people. This study shows the

importance and some disadvantages of online classes. Our team has extensive knowledge and research experience that has translated into high quality publications (15), (16–29), (30–34)

MATERIALS AND METHODS:

A descriptive cross-sectional study was conducted among the third-year Saveetha dental college randomly. To analyze their awareness and knowledge in on, one practical exercise. Approval was given from the Institutional review board. The survey was conducted among 100 people. A random sampling method was done. Self-administered questionnaires of 15 closed-ended questions were prepared and distributed among the participants online through “Google forms”. The self-administered questionnaire was prepared and explained well and distributed. The data were collected, compiled, arranged systematically, and analyzed in terms of frequencies using SPSS software and the Pearson chi-square test which was done in association with gender and the awareness and knowledge in online practical exercises among third-year undergraduate students. The confidence interval was found to be 95% and statistically significant of $p < 0.05$. The results are then represented as pie charts and bar graphs.

RESULTS AND DISCUSSION:

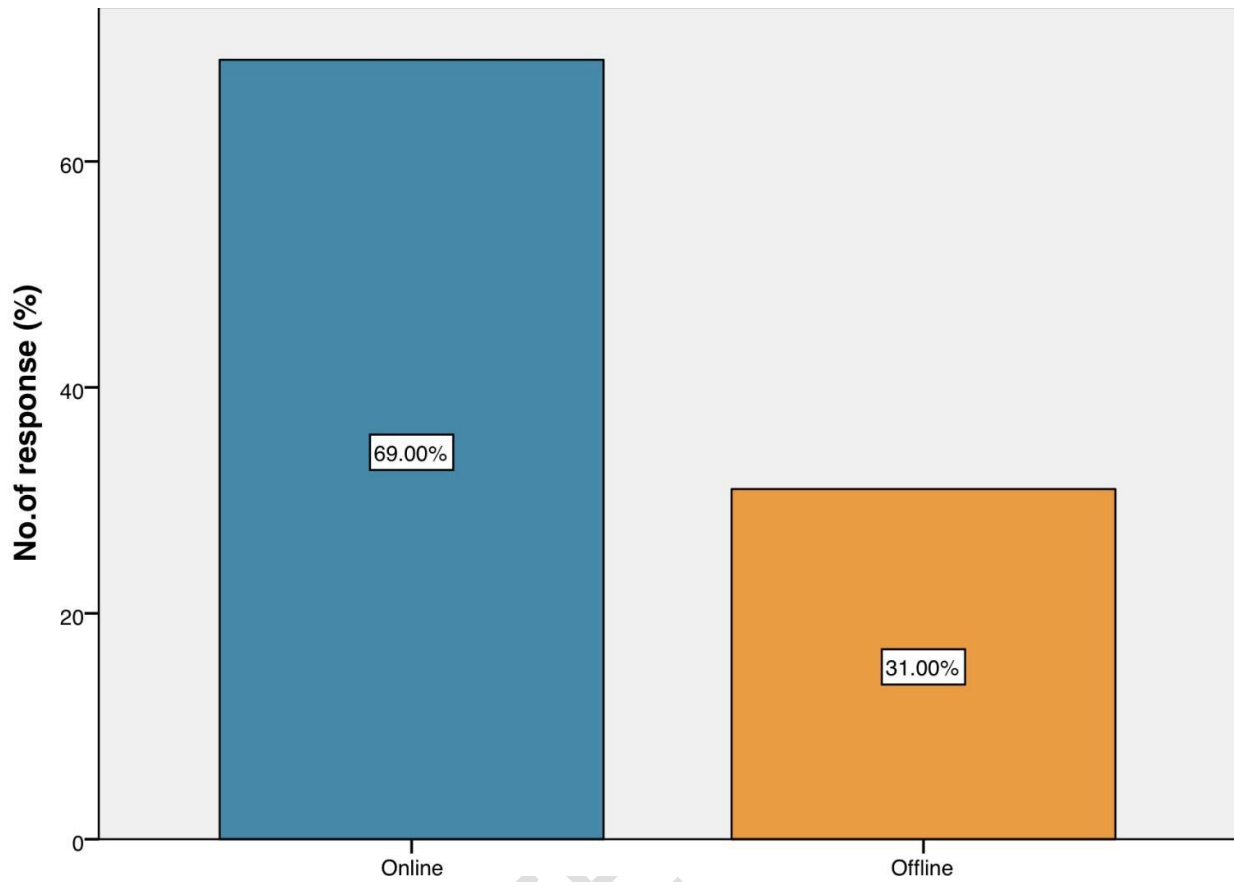


Figure 1: The bar graph represents the frequency distribution in awareness of classes they prefer, 69% (blue) choose online classes and 31% (orange) choose offline classes.

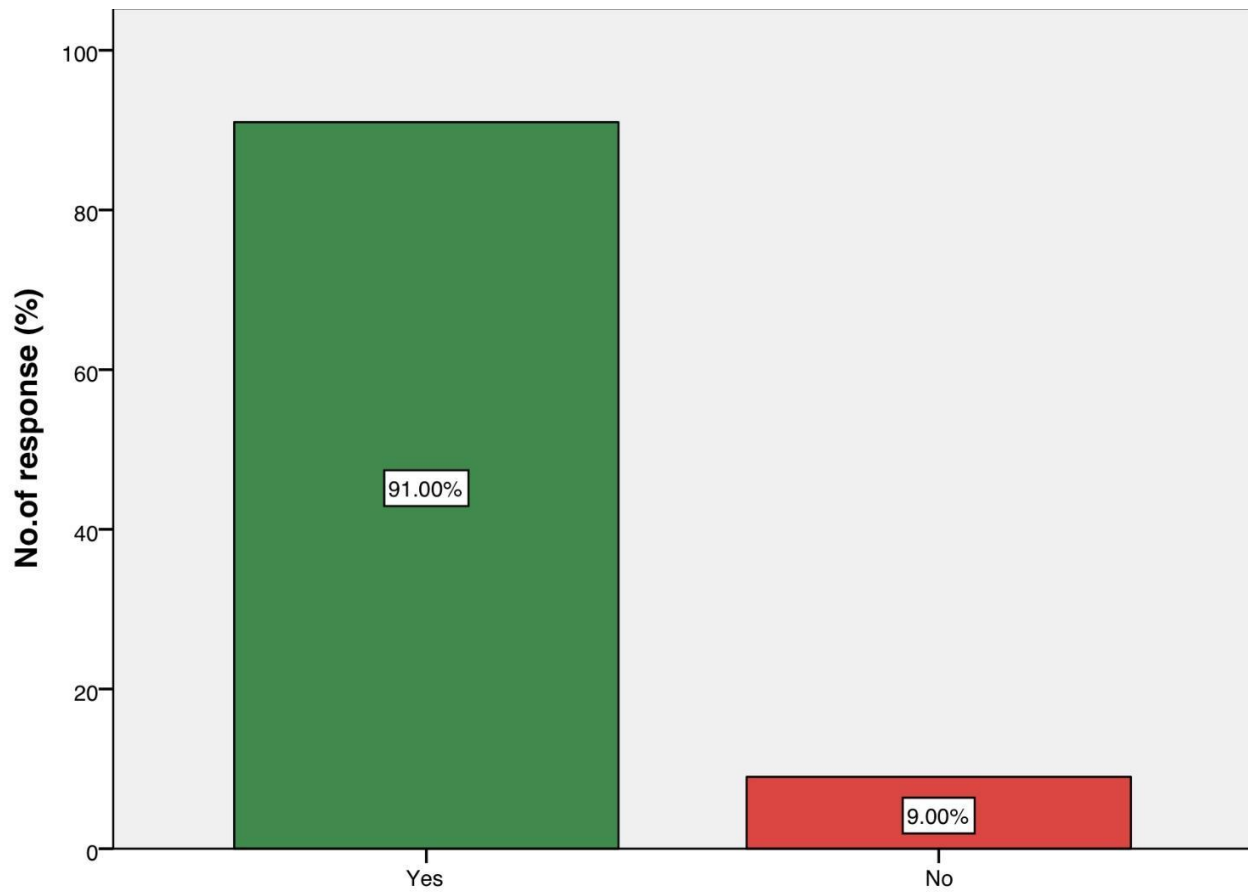


Figure 2: The bar graph represents the frequency distribution awareness to gain knowledge in online classes, 91% (green) can gain, 9% (red) are not able to gain knowledge.

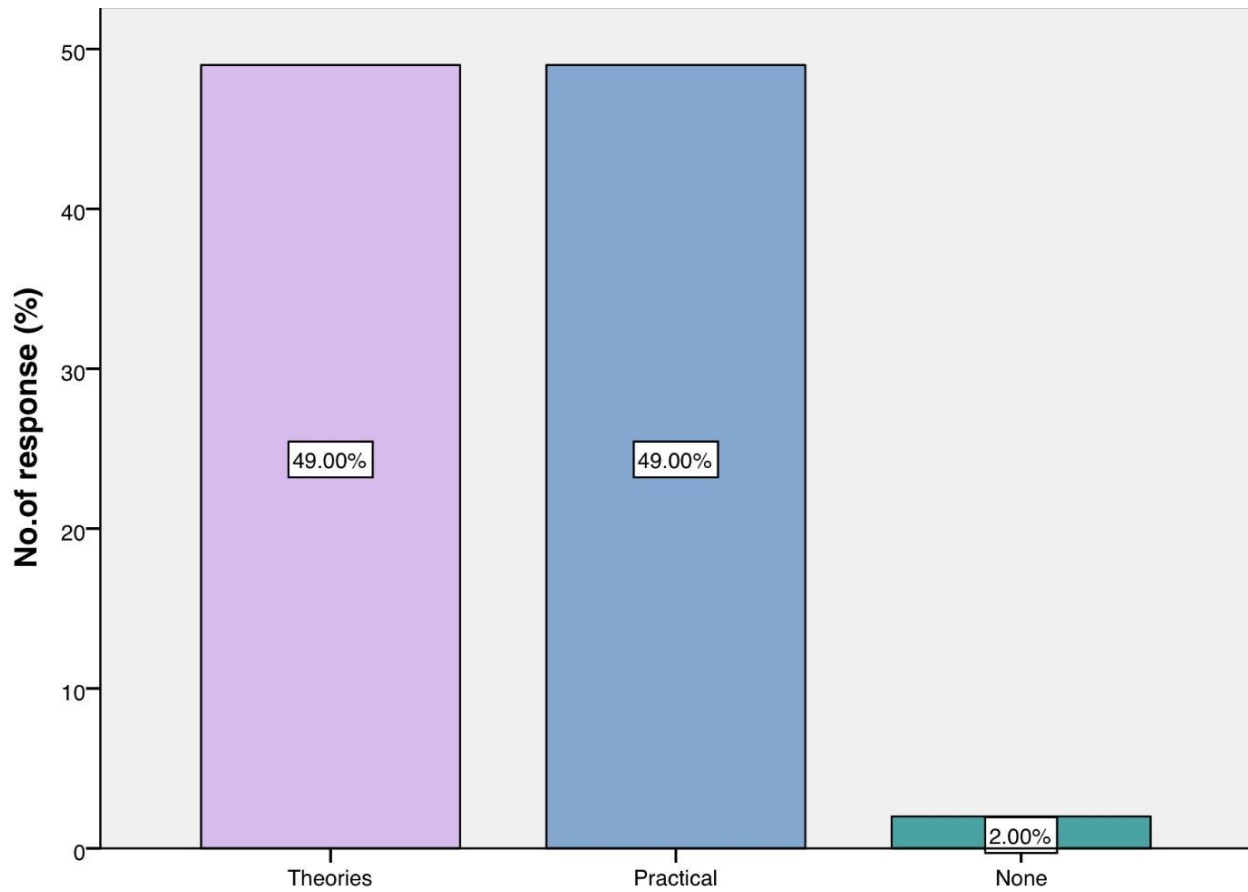


Figure 3: The bar graph represents the frequency distribution most preferable in practical classes, 49% (purple) prefer theories, 49% (blue) prefer practicals, 2% (green) do not prefer both.

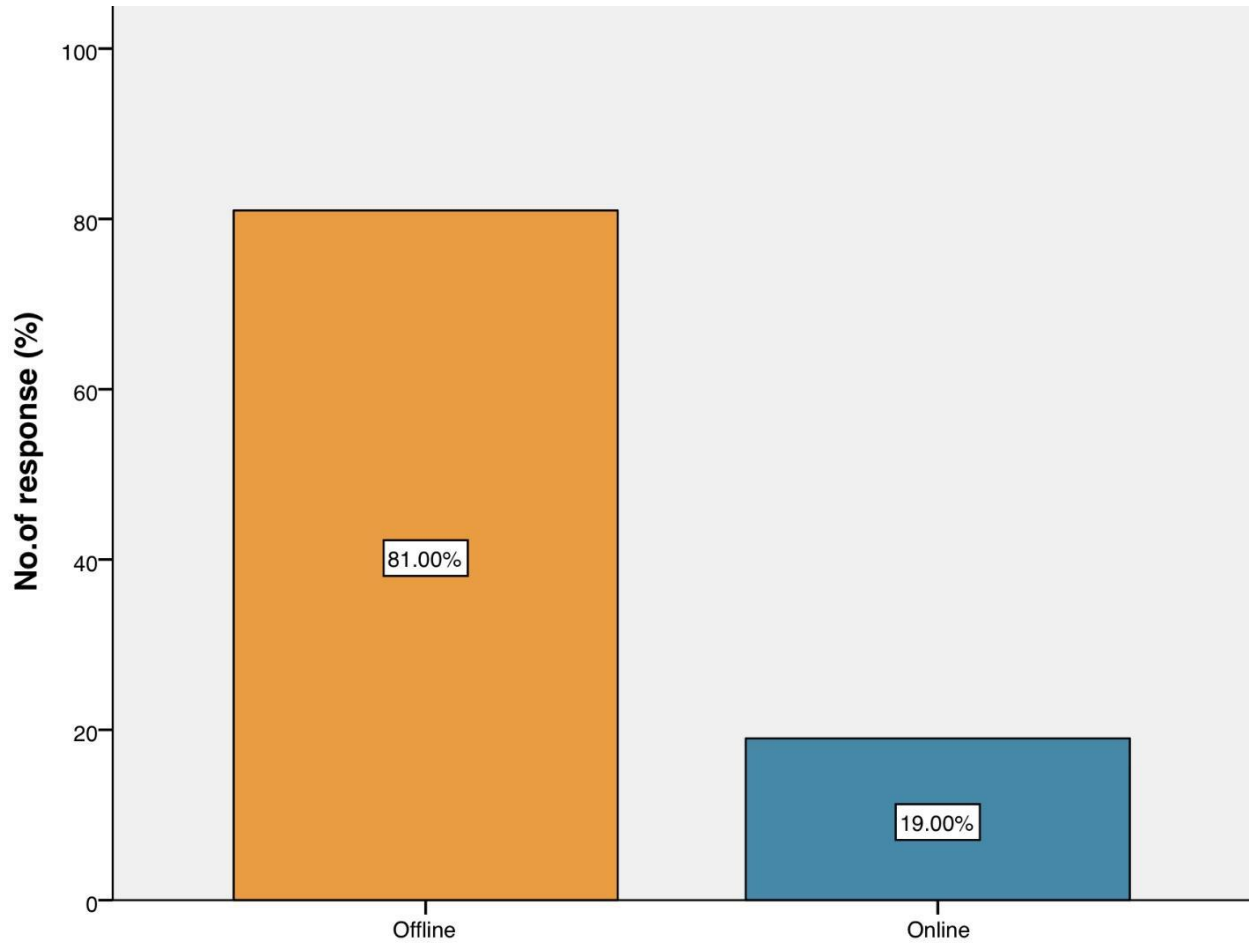


Figure 4: The bar graph represents the frequency distribution work overloaded classes, 81% (orange) prefer offline, 19% (blue) prefer online.

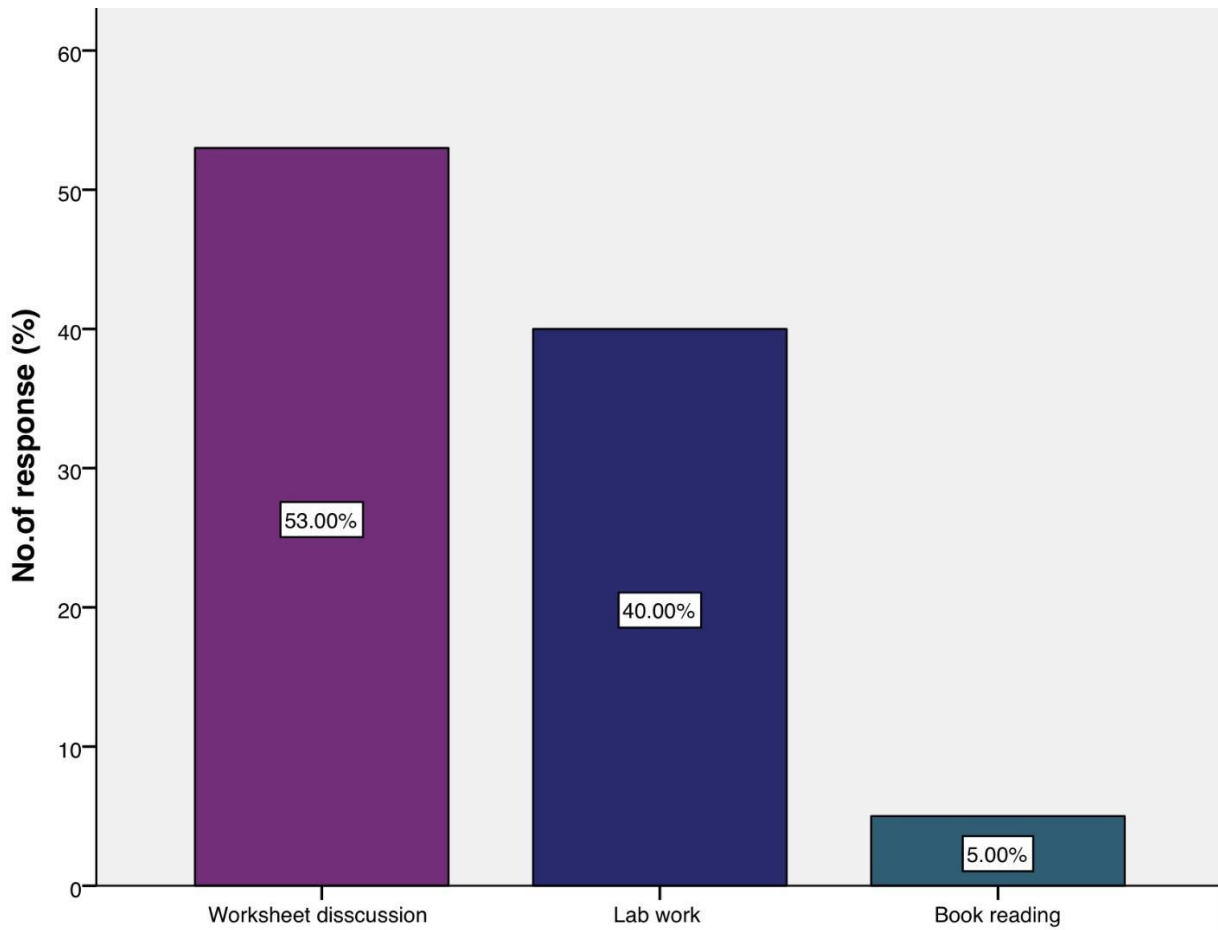


Figure 5: The bar graph represents the frequency distribution, students preference, 53% (violet) prefer worksheet discussion, 40% (dark blue) prefer lab work, 5% (dark green) prefer book reading.

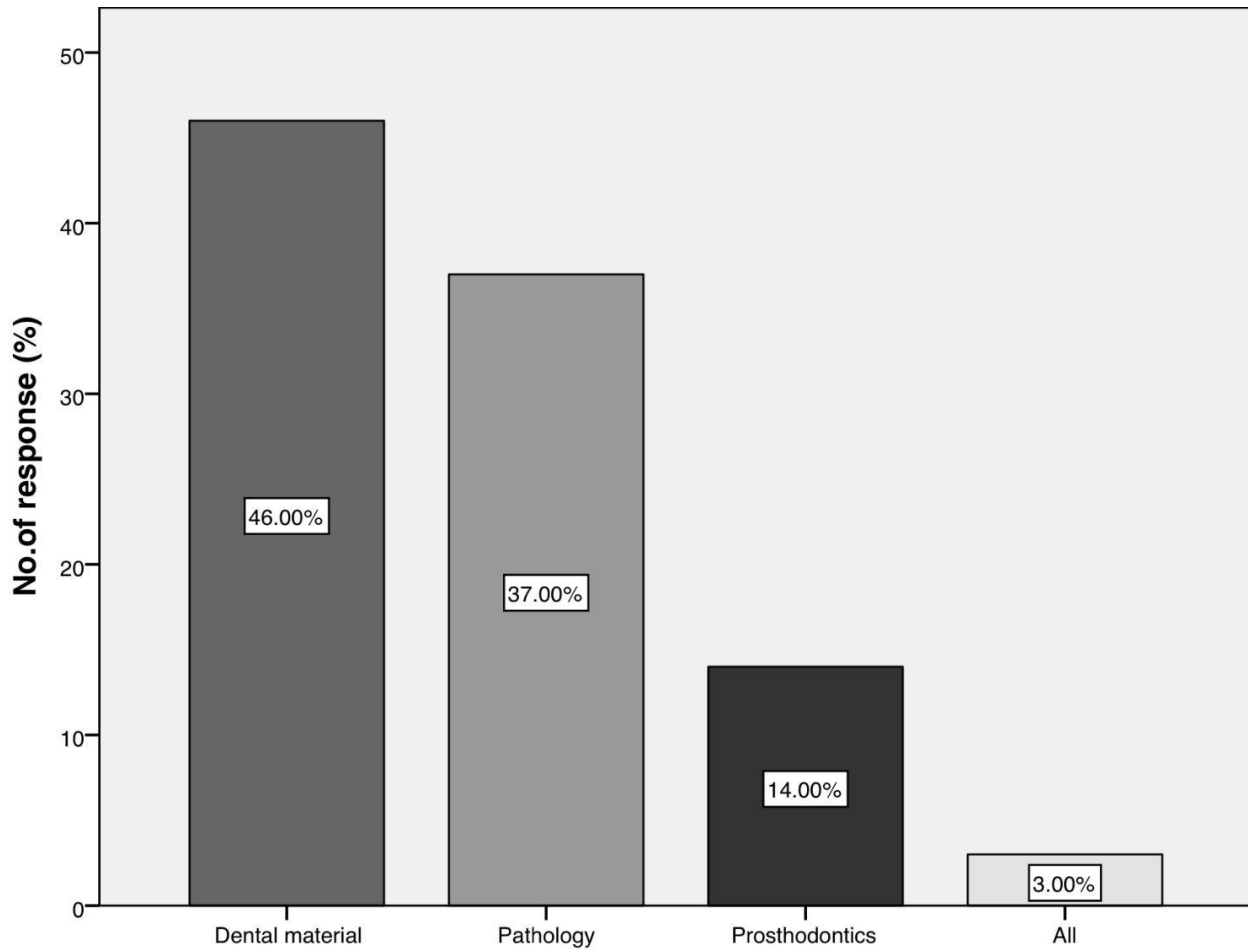


Figure 6: The bar graph represents the frequency distribution awareness in the hardest subject to learn in online classes, 46% (dark grey) chose dental materials, 37% (grey) chose pathology, 14% (black) chose prosthodontics, 3% (lightest grey) chose all.

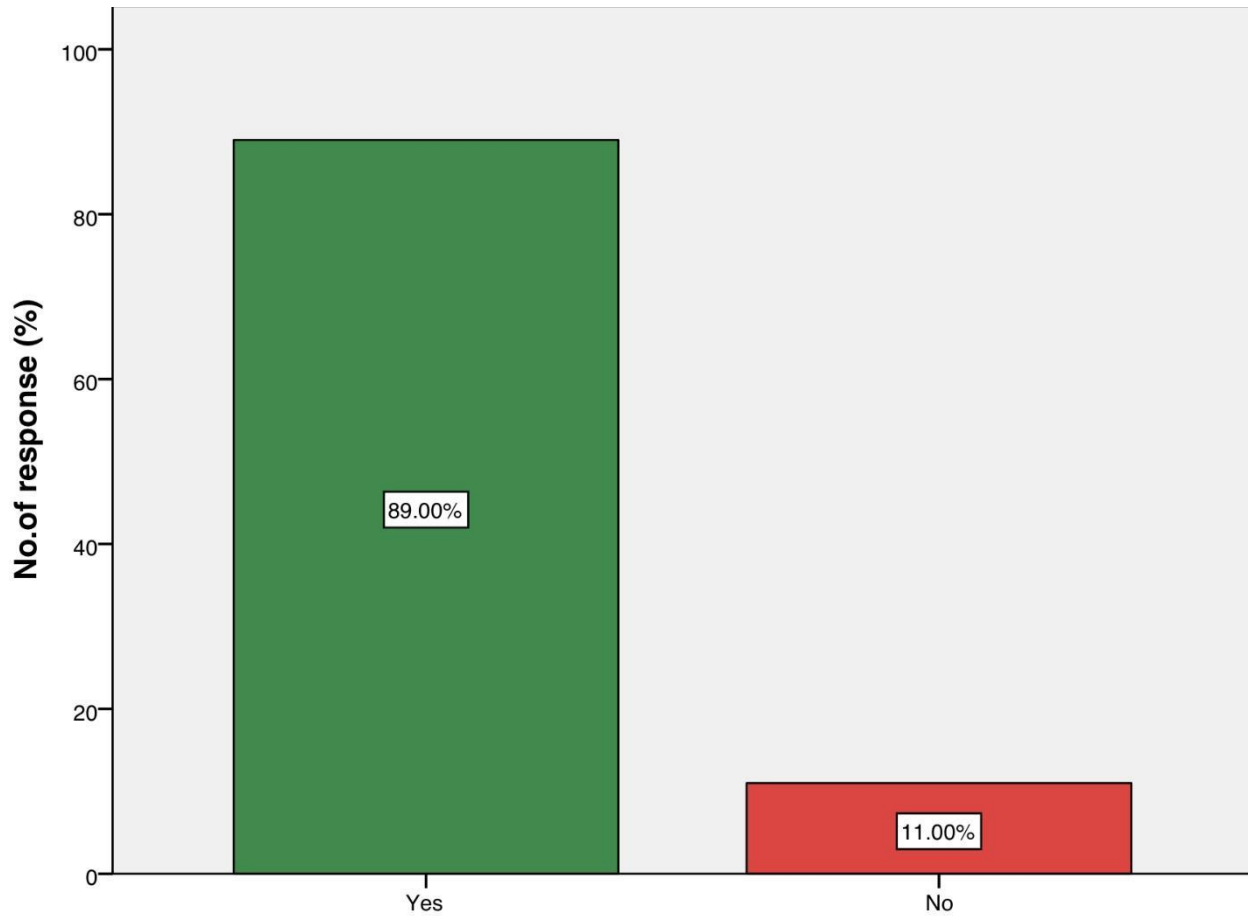


Figure 7: The bar graph represents the frequency distribution of whether subjects like prosthodontics are comfortable to attend online or not, 89% (green) prefer are comfortable, 11% (red) are not comfortable.

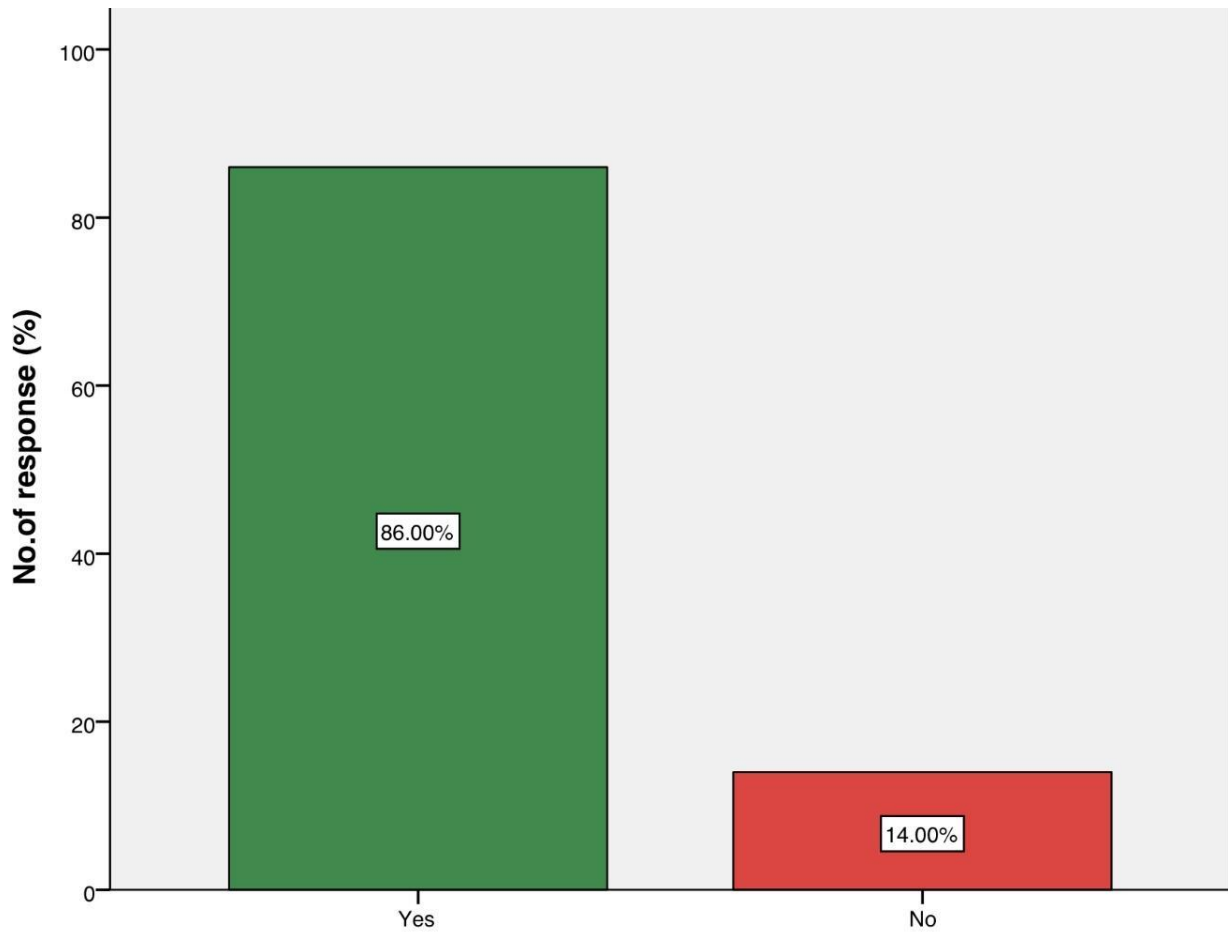


Figure 8: The bar graph represents the frequency distribution of comfortableness in attending online classes, 86% (green) responded yes, 14% (red) responded no.

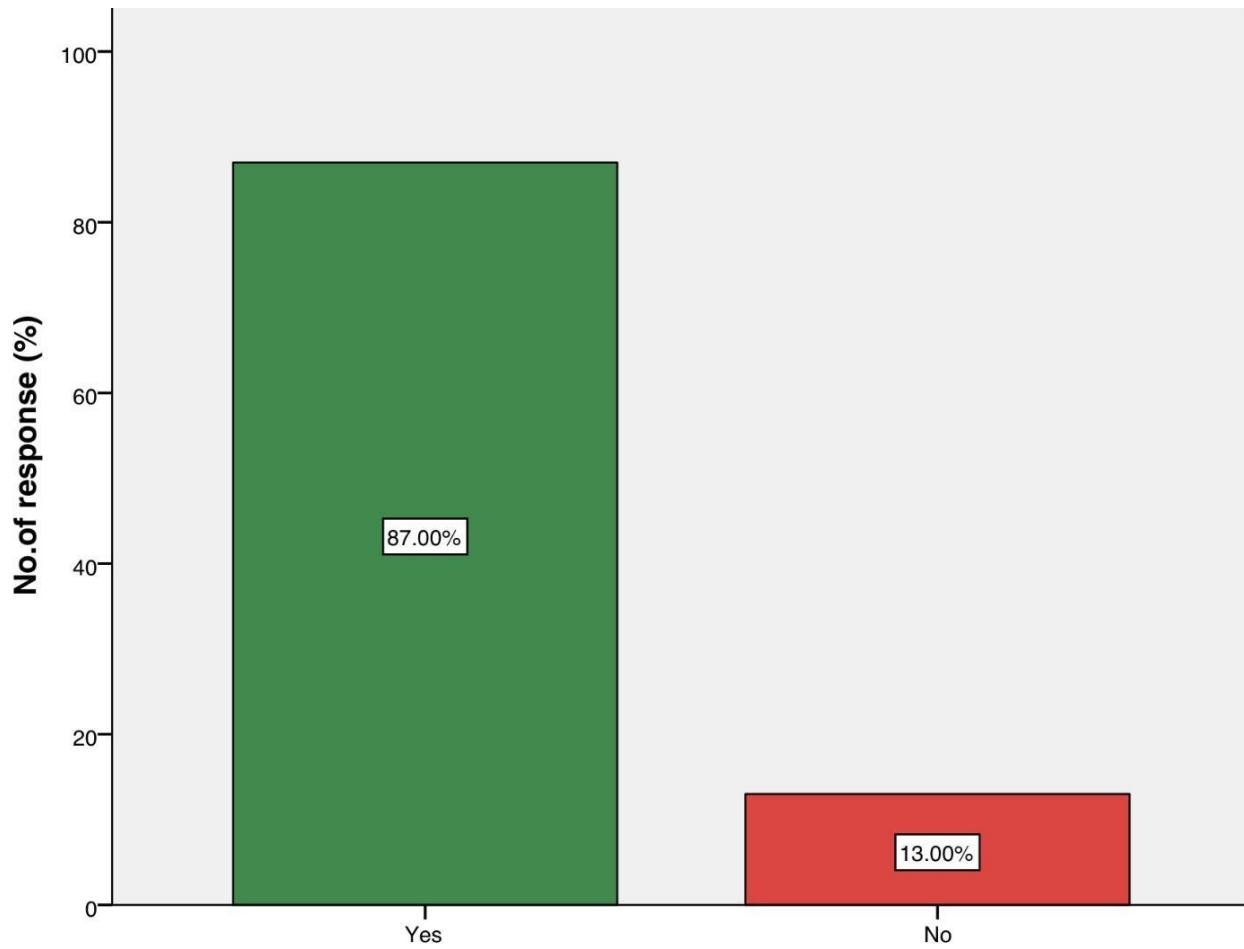


Figure 9: The bar graph represents the frequency distribution of scoring good marks in online classes, 87%(green) responded yes, 13%(red)responded no.

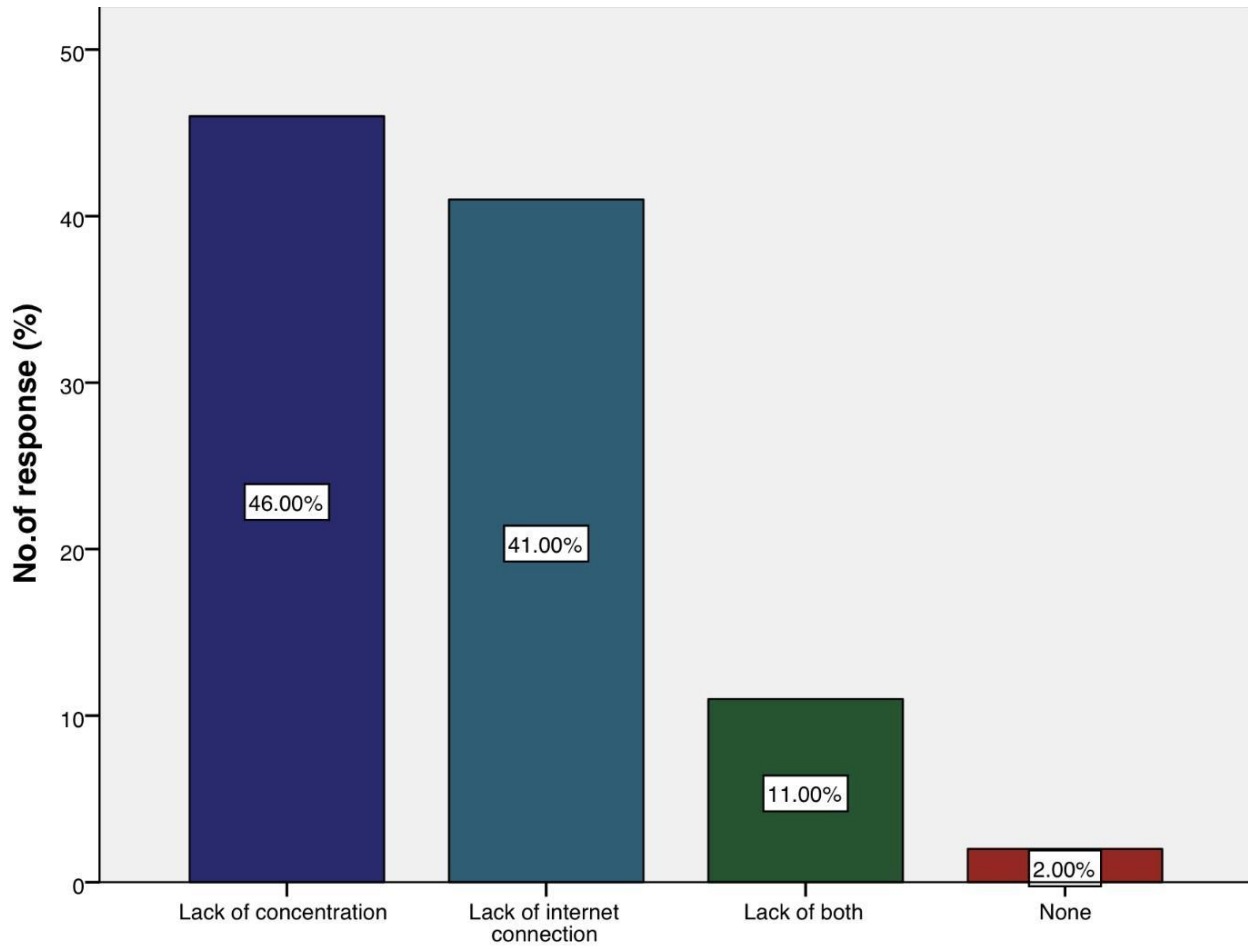


Figure 10: The bar graph represents the frequency distribution disadvantages facing during online classes, 46% (dark blue) responded as lack of concentration, 41% (blue) responded lack of internet, 11% (green) responded as lack of both, 2% (red) responded as none.

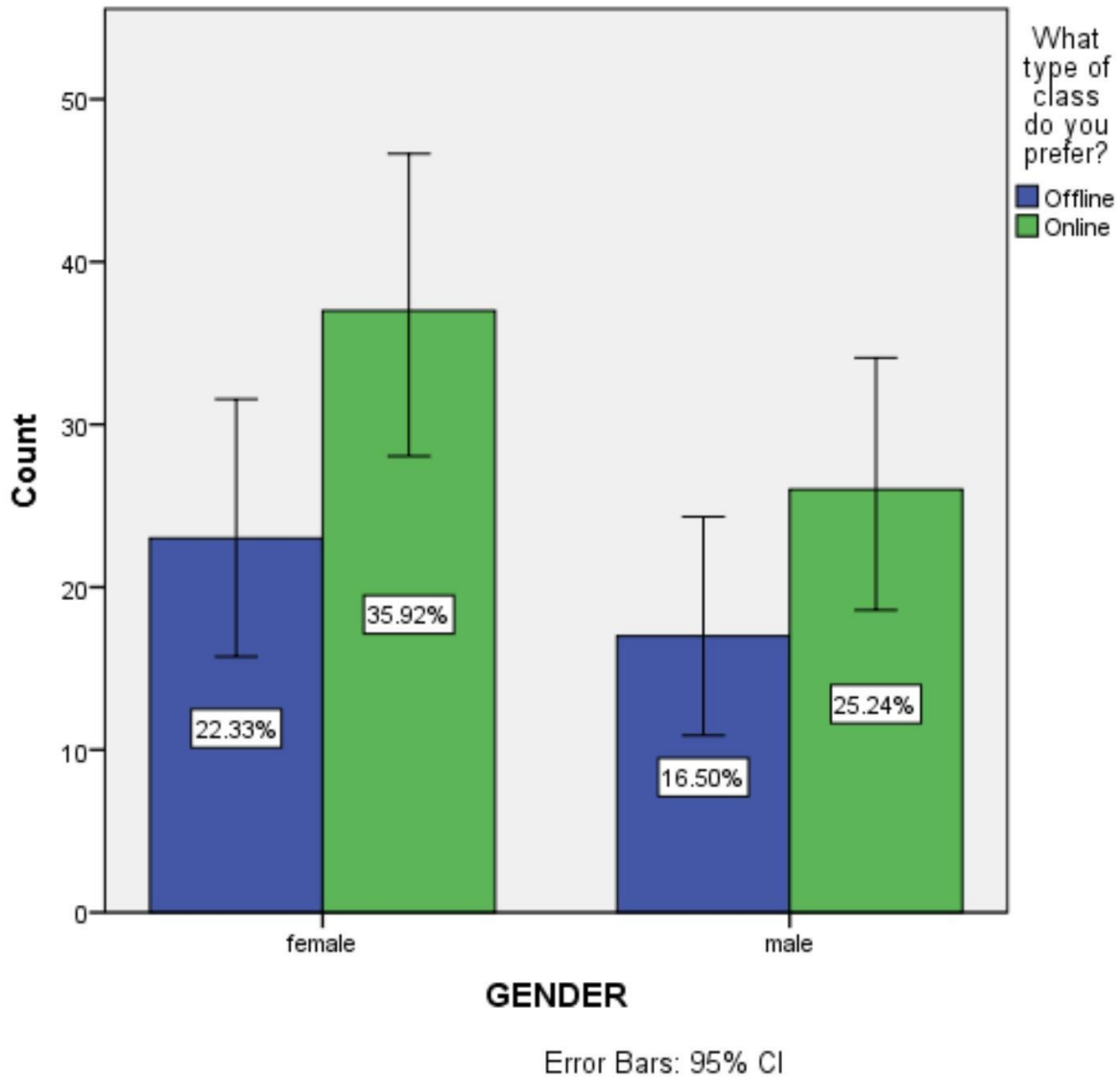


Figure 11: This graph represents the association between gender and the awareness of students of online classes, The x-axis represents the gender, and the y-axis represents the number of participants, Where blue represents that students prefer online classes, and the green represents that students prefer online classes. Association between gender and awareness and knowledge of online practical classes was done using chi-square test $p=0.71, p>0.05$ which is found to be statistically not significant. In females majority of them are aware and knowledgeable of online practical classes than the male.

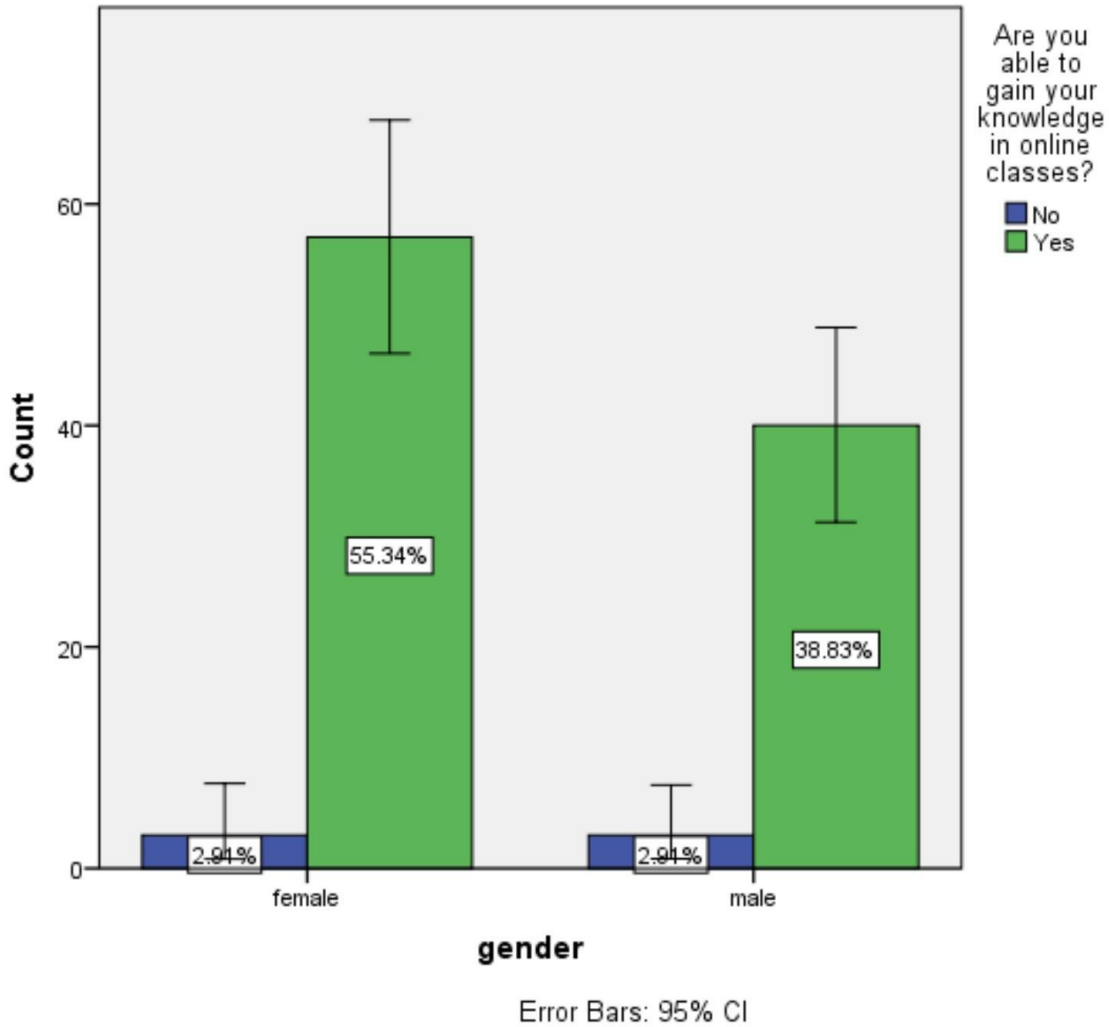


Figure 12: This graph represents the association between gender and the knowledge about online practical classes, The x-axis represents the gender and the y-axis represents the number of participants, Where blue represents that students are not able to gain knowledge in classes, and the green represents that students can gain knowledge. Association between gender and awareness and knowledge of online practical classes was done using chi-square test $p=0.62$, $p>0.05$ which is found to be statistically not significant. In females majority of them can gain knowledge online practical classes than the male.

Responses were collected and the data was analyzed. The majority of the third-year population know online practical exercises most of them were aware of the practical exercises while some of them were not aware of the preventional strategy.

It is concluded that types of classes students prefer, 69% prefer online classes, 31% prefer offline classes. (Figure 1) gaining of knowledge in online classes 91% can gain knowledge, 9% are not able to gain knowledge (Figure 2). Preference in online classes 49% preferred theories, 49% prefer practical classes, 2% prefer none (Figure 3). 81% responded that work is overloaded in offline classes, 19% responded that work is overloaded in online classes. (Figure 4) In Preferences 53% responded as worksheet discussion, 40% responded as lab works, 5% responded as book reading (Figure 5). Which subject is hard to attend during online classes, 46% responded as dental materials, 37% responded as pathology, 14% responded as prosthodontics, 3% responded as all (Figure 6). The subjects like prosthodontics are comfortable for 89% of students, 11% are not comfortable (Figure 7). Comfortableness of attending clinic classes online, 86% responded as yes, 14% responded as no (Figure 8). 87% responded that they are good at scoring in online classes, 13% are not comfortable (Figure 9). Disadvantages faced during online classes 46% responded as lack of concentration, 41% responded as lack of internet connection, 11% responded as lack of both, 2% responded as none (figure 10).

Long online courses can cause eye problems and social media distraction. A person's social isolation is caused by a lack of outdoor recreation, community projects, and communication skills. Our students have indicated that while online classes lasted more than an hour, 79 percent of them lost interest due to internet access problems comparatively there is much chance of lacking interest and information. (35). According to 80 percent of our pupils, sedentary life with less physical play and project work was a significant downside to online courses because of less physical activity the students were becoming very lazy and also lack interest in whatever stuffs they do. (5,36) When attending lengthy online classes, 75% of students complained of eye-related problems such as eye pressure, epiphora, and headache. Other important stumbling blocks include student engagement and social well-being (37). These may be solved by using simulation-based training apps, creating a swift and secure internet network, pre-training teachers on how to use this technology, time flexibility, and shorter class periods, when students

get used to online they are not able to attend online classes. (38) Visual whiteboards, videos on clinical exams, 3D photographs, surgical videos if appropriate, weekly one-on-one student-teacher therapy sessions, and daily reviews from students can all assist in overcoming obstacles and the popularity of online courses. (36) The findings of community college multi-section comparisons do not reliably address the question of whether online biology courses can be successful (12). It's worth noting that none of the research looked at the nature of either the face-to-face or online classes, such as whether they used evidence-based best practices including constructive learning methods or exercises to facilitate student-student and student-instructor engagement (39). Many of the studies involved undergraduate biology classes that were conducted entirely online, with 80 percent to 100 percent of the material accessed through the Internet. Studies that had a positive effect on learning outcomes had effects that were in line with or better than conventional, on-campus comparative classes (39,40)

For both the teacher and the pupil, online and combined classes offer more flexibility and versatility in terms of scheduling and venue. Convenience and usability, on the other hand, are only useful if courses help students learn more efficiently (41). Several meta-analyses have looked at this, with the majority of them concluding that well-designed online courses do help students learn. (42) Students did "modestly better, on average than those learning the same content by conventional, face-to-face teaching" in 43 of 50 surveys of online classes, according to the US Department of Education, but the findings "do not show that online learning is superior as a tool (43). The observed learning benefits were the result of a mixture of factors in the care environments (which were likely to require more learning time and materials, as well as more opportunities for collaboration)" (emphasis in original). The majority of distance education is now delivered over the Internet, and millions of students benefit from it each year. In 2014, for example, over 5.8 million students enrolled in online classrooms, with more than half of them taking both online and on-campus courses. (36).

Limitation of the study is done only among the third year students, other years were not involved, number of articles are cited in a limited way, vast information about other years subjects is not included. Future studies can be done to overcome these limitations.

CONCLUSION:

It is concluded that most of the third-year undergraduate students are aware of online practical exercises and they also have knowledge about online classes.

REFERENCES

1. Hamann K, Glazier RA, Wilson BM, Pollock PH. Online teaching, student success, and retention in political science courses. *Eur Polit Sci* [Internet]. 2020 Jul 30; Available from: <http://link.springer.com/10.1057/s41304-020-00282-x>
2. Biel R, Brame CJ. Traditional Versus Online Biology Courses: Connecting Course Design and Student Learning in an Online Setting. *J Microbiol Biol Educ*. 2016 Dec;17(3):417–22.
3. Adarkwah MA. “I’m not against online teaching, but what about us?”: ICT in Ghana post Covid-19. *Educ Inf Technol (Dordr)*. 2020 Sep 16;1–21.
4. Seidman I. *Interviewing as Qualitative Research: A Guide for Researchers in Education and the Social Sciences*. 1998. 143 p.
5. Schilder JD, Brusselaers MBJ, Bogaerts S. The Effectiveness of an Intervention to Promote Awareness and Reduce Online Risk Behavior in Early Adolescence. *J Youth Adolesc*. 2016 Feb;45(2):286–300.
6. Preethikaa S, Brundha MP. Awareness of diabetes mellitus among general population. *Research Journal of Pharmacy and Technology*. 2018;11(5):1825–9.

7. Brockman RM, Taylor JM, Segars LW, Selke V, Taylor TAH. Student perceptions of online and in-person microbiology laboratory experiences in undergraduate medical education. *Med Educ Online*. 2020 Dec;25(1):1710324.
8. Hannah R, Ramani P, Brundha MP, Sherlin HJ, Ranjith G, Ramasubramanian A, et al. Liquid Paraffin as a Rehydrant for Air Dried Buccal Smear. *Research Journal of Pharmacy and Technology*. 2019;12(3):1197–200.
9. Swan K. Building Learning Communities in Online Courses: the importance of interaction [Internet]. Vol. 2, Education, Communication & Information. 2002. p. 23–49. Available from: <http://dx.doi.org/10.1080/1463631022000005016>
10. Timothy CN, Samyuktha PS, Brundha MP. Dental pulp Stem Cells in Regenerative Medicine--A Literature Review. *Research Journal of Pharmacy and Technology*. 2019;12(8):4052–6.
11. Prashaanthi N, Brundha MP. A Comparative Study between Popplet Notes and Conventional Notes for Learning Pathology. *Research Journal of Pharmacy and Technology*. 2018;11(1):175–8.
12. Randy Garrison D. *E-Learning in the 21st Century: A Community of Inquiry Framework for Research and Practice*. Taylor & Francis; 2016. 202 p.
13. Richardson JC, Swan K. EXAMINING SOCIAL PRESENCE IN ONLINE COURSES IN RELATION TO STUDENTS' PERCEIVED LEARNING AND SATISFACTION [Internet]. Vol. 7, Online Learning. 2019. Available from: <http://dx.doi.org/10.24059/olj.v7i1.1864>
14. Nyachae JN. The Effect of Social Presence on Students' Perceived Learning and Satisfaction in Online Courses [Internet]. Available from: <http://dx.doi.org/10.33915/etd.4761>
15. Anita R, Paramasivam A, Priyadharsini JV, Chitra S. The m6A readers YTHDF1 and YTHDF3 aberrations associated with metastasis and predict poor prognosis in breast cancer patients. *Am J Cancer Res*. 2020 Aug 1;10(8):2546–54.

16. Jayaseelan VP, Paramasivam A. Emerging role of NET inhibitors in cardiovascular diseases. *Hypertens Res.* 2020 Dec;43(12):1459–61.
17. Sivakumar S, Smiline Girija AS, Vijayashree Priyadharsini J. Evaluation of the inhibitory effect of caffeic acid and gallic acid on tetR and tetM efflux pumps mediating tetracycline resistance in *Streptococcus* sp., using computational approach. *Journal of King Saud University - Science.* 2020 Jan 1;32(1):904–9.
18. Smiline Girija AS. Delineating the Immuno-Dominant Antigenic Vaccine Peptides Against gacS-Sensor Kinase in *Acinetobacter baumannii*: An in silico Investigational Approach. *Front Microbiol.* 2020 Sep 8;11:2078.
19. Iswarya Jaisankar A, Smiline Girija AS, Gunasekaran S, Vijayashree Priyadharsini J. Molecular characterisation of csgA gene among ESBL strains of *A. baumannii* and targeting with essential oil compounds from *Azadirachta indica*. *Journal of King Saud University - Science.* 2020 Dec 1;32(8):3380–7.
20. Girija ASS. Fox3+ CD25+ CD4+ T-regulatory cells may transform the nCoV's final destiny to CNS! *J Med Virol* [Internet]. 2020 Sep 3; Available from: <http://dx.doi.org/10.1002/jmv.26482>
21. Jayaseelan VP, Ramesh A, Arumugam P. Breast cancer and DDT: putative interactions, associated gene alterations, and molecular pathways. *Environ Sci Pollut Res Int.* 2021 Jun;28(21):27162–73.
22. Arumugam P, George R, Jayaseelan VP. Aberrations of m6A regulators are associated with tumorigenesis and metastasis in head and neck squamous cell carcinoma. *Arch Oral Biol.* 2021 Feb;122:105030.
23. Kumar SP, Girija ASS, Priyadharsini JV. Targeting NM23-H1-mediated inhibition of tumour metastasis in viral hepatitis with bioactive compounds from *Ganoderma lucidum*: A computational study. *pharmaceutical-sciences* [Internet]. 2020;82(2). Available from: <https://www.ijpsonline.com/articles/targeting-nm23h1-mediated-inhibition-of-tumour-metastasis-in-viral-hepatitis-with-bioactive-compounds-from-ganoderma-lucidum-a-comp>

24. Girija SA, Priyadharsini JV, Paramasivam A. Prevalence of carbapenem-hydrolyzing OXA-type β -lactamases among *Acinetobacter baumannii* in patients with severe urinary tract infection. *Acta Microbiol Immunol Hung*. 2019 Dec 9;67(1):49–55.
25. Priyadharsini JV, Paramasivam A. RNA editors: key regulators of viral response in cancer patients. *Epigenomics*. 2021 Feb;13(3):165–7.
26. Mathivadani V, Smiline AS, Priyadharsini JV. Targeting Epstein-Barr virus nuclear antigen 1 (EBNA-1) with *Murraya koengii* bio-compounds: An in-silico approach. *Acta Virol*. 2020;64(1):93–9.
27. Girija As S, Priyadharsini J V, A P. Prevalence of Acb and non-Acb complex in elderly population with urinary tract infection (UTI). *Acta Clin Belg*. 2021 Apr;76(2):106–12.
28. Anchana SR, Girija SAS, Gunasekaran S, Priyadharsini VJ. Detection of *csgA* gene in carbapenem-resistant *Acinetobacter baumannii* strains and targeting with *Ocimum sanctum* biocompounds. *Iran J Basic Med Sci*. 2021 May;24(5):690–8.
29. Girija ASS, Shoba G, Priyadharsini JV. Accessing the T-Cell and B-Cell Immuno-Dominant Peptides from *A.baumannii* Biofilm Associated Protein (bap) as Vaccine Candidates: A Computational Approach. *Int J Pept Res Ther*. 2021 Mar 1;27(1):37–45.
30. Arvind P TR, Jain RK. Skeletally anchored forsus fatigue resistant device for correction of Class II malocclusions-A systematic review and meta-analysis. *Orthod Craniofac Res*. 2021 Feb;24(1):52–61.
31. Venugopal A, Vaid N, Bowman SJ. Outstanding, yet redundant? After all, you may be another Choluteca Bridge! *Semin Orthod*. 2021 Mar 1;27(1):53–6.
32. Ramadurai N, Gurunathan D, Samuel AV, Subramanian E, Rodrigues SJL. Effectiveness of 2% Articaine as an anesthetic agent in children: randomized controlled trial. *Clin Oral Investig*. 2019 Sep;23(9):3543–50.

33. Varghese SS, Ramesh A, Veeraiyan DN. Blended Module-Based Teaching in Biostatistics and Research Methodology: A Retrospective Study with Postgraduate Dental Students. *J Dent Educ.* 2019 Apr;83(4):445–50.
34. Mathew MG, Samuel SR, Soni AJ, Roopa KB. Evaluation of adhesion of *Streptococcus mutans*, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: randomized controlled trial [Internet]. Vol. 24, *Clinical Oral Investigations.* 2020. p. 3275–80. Available from: <http://dx.doi.org/10.1007/s00784-020-03204-9>
35. Harris CM, Mazoué JG, Hamdan H, Casiple AR. Designing an Online Introductory Statistics Course [Internet]. *Best Practices for Teaching Statistics and Research Methods in the Behavioral Sciences.* 2007. p. 93–108. Available from: <http://dx.doi.org/10.4324/9780203936603-10>
36. Fletcher T, Mandigo J, Kosnik C. Elementary classroom teachers and physical education: change in teacher-related factors during pre-service teacher education [Internet]. Vol. 18, *Physical Education & Sport Pedagogy.* 2013. p. 169–83. Available from: <http://dx.doi.org/10.1080/17408989.2011.649723>
37. Vangrieken K, Meredith C, Packer T, Kyndt E. Teacher communities as a context for professional development: A systematic review [Internet]. Vol. 61, *Teaching and Teacher Education.* 2017. p. 47–59. Available from: <http://dx.doi.org/10.1016/j.tate.2016.10.001>
38. Vangrieken K, Dochy F, Raes E, Kyndt E. Teacher collaboration: A systematic review [Internet]. Vol. 15, *Educational Research Review.* 2015. p. 17–40. Available from: <http://dx.doi.org/10.1016/j.edurev.2015.04.002>
39. Bogomolov V. *The Moment of Truth: A Novel and Two Stories.* 1982. 552 p.
40. Ahn H, Hyeri AHN. NIE for Improving English Medium Instruction in Art Theory Course: A Case of Korean Higher Education [Internet]. Vol. 71, *Society for Art Education of Korea.* 2019. p. 143–60. Available from: <http://dx.doi.org/10.25297/aer.2019.71.143>
41. Kim J-I, Seo Y-M, Lee Y-J. Application of Unplugged Learning Method for Intellectual

Disability Students' Informatics Education [Internet]. Vol. 17, Journal of the Korea Society of Computer and Information. 2012. p. 189–96. Available from:
<http://dx.doi.org/10.9708/jksci/2012.17.9.189>

42. Grieve R, Indian M, Witteveen K, Anne Tolan G, Marrington J. Face-to-face or Facebook: Can social connectedness be derived online? [Internet]. Vol. 29, Computers in Human Behavior. 2013. p. 604–9. Available from: <http://dx.doi.org/10.1016/j.chb.2012.11.017>
43. Poston DL, Jr. Low Fertility Regimes and Demographic and Societal Change. Springer; 2017. 242 p.

UNDER PEER REVIEW