

Social Media for Teaching Infection Prevention and Control in Dentistry: Survey of Students Perception and Comparative Study of Academic Performance

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ABSTRACT

Introduction: Promoting student engagement for safe practice in dentistry has been a challenge. Social media, so strongly present in the lives of young people, can become a support for better engagement, motivation and learning.

Aim: To evaluate dental student perception (adherence and applicability) about the inclusion of social media (Facebook-F, WhatsApp-W, and Instagram-I) as learning tools for teaching infection prevention and control. The performance (scores) of the students was compared to the results obtained by students who did not have access to social media for educational purposes.

Materials and Methods: This research sample was formed by the students enrolled in the discipline of Biosafety and Ergonomics 2, at Federal University of Pernambuco-Brazil, between 2014 and 2017 (n=371). They answered a questionnaire survey in which the adherence, applicability and use of social media were evaluated as educational platforms. The academic

performance (scores) of the interviewees on the discipline was compared to the results obtained by students who did not have access to social media for educational purposes in previous semesters (2011 to 2014).

Results: The adherence of the use of social media apps was 98.3% (F), 100% (W), and 90% (I). Students considered that social media were advantageous teaching platforms (F-99%, W-100% e I-94%) because of: easy access to obtain didactic material (F); obtaining information quickly (W); images making the student assimilate the studied subject more effectively (I). There was no difference when comparing the students' scores before and after inclusion of the social media in the subject (p=0.141; Student's t-test).

Conclusion: The majority of students adhered to social media and considered them to be advantageous infection prevention and control study platforms. This inclusion did not have negative impact on students' academic performance.

Keywords: Dental education, Infection control, Learning, Social media

INTRODUCTION

Social media is a global platform and plays a key role in young people' relationships with others, in how they deal with the world, and in how they can receive new information. This new method of social interaction has been increasingly inserted in people's daily lives, especially in generations X and Z. A recent survey with 4,500 young people from 10 different countries, including Brazil, showed that 52% of respondents usually check social networks as soon as they wake up [1]. Another important fact is that young Brazilians between the ages of 18 and 25 remain connected to social media, through their cell phones, for about six hours a day [2]. For current college students framed in the Millenium/Y and Z generation, social media may become important interaction tools inside and outside the classroom [3].

Social media has been playing an important role in students' daily lives; it's well known that the number of students using these mobile apps for information and content is growing. From this perspective, teachers have also been using these resources as tools when sharing their teaching strategies [4]. Therefore, technology can help or hinder learning. This will depend on the context and purpose involved in the inclusion of social media in higher education [5].

In a recent study, the majority of the medical students were using social media for entertainment, news updates and socialisation and much less for learning purposes [6]. However, some investigations have analysed the insertion of social media in a learning context in Dentistry [3,7-11]. Promoting learner engagement, feedback, and

collaboration and professional development represent the most commonly reported learning opportunities related to social media incorporation on medical education [12]. Since 2014, Facebook, WhatsApp and Instagram, which represent some of the most popular virtual platforms among young Brazilians, began to be used as complementary tools to the active methodologies for teaching biosafety in Dentistry, at Federal University of Pernambuco-Brazil [3]. Teaching students how to develop a culture of safety in dental practice has been challenging, since identifying risks through a risk assessment is new to Dentistry. That being said, this is necessary part of practising dentistry because not developing a safe work culture may lead to irreversible consequences for patients and oral healthcare workers.

Therefore, using the strategies for the implementation of a "The Safest Dental Visit" [13], it is necessary to awaken and encourage continuous learning. In this sense, the inclusion of popular virtual communication platforms among students will suggest how they can make their learning easier and closer to young people's reality. Initial results were positive [3]. Therefore, increasing knowledge about the role of social media in students' learning, as well as its repercussions on teaching, are required for curricular change. In addition, the number of studies on this subject is still limited, which reinforces the need for more investigation in this field. The objective of this study was to evaluate the opinion of students from a Brazilian Dental School about the inclusion of social media (Facebook, WhatsApp, and Instagram) as learning tools related to learning of infection control in dentistry, and to verify the impact of the insertion of these tools in the academic performance.

MATERIALS AND METHODS

Research Design and Ethical Considerations

This cross-sectional study was carried out in the discipline of Biosafety and Ergonomics 2 from a Brazilian Dental School, in which 3 social media apps were used for the development of each of their teaching-learning activities-Facebook, WhatsApp and Instagram. The investigation was composed of a survey about student perceptions and a comparative approach to analyse academic performance. This study was approved by the research ethics committee of the Center for Health Sciences of the Federal University of Pernambuco – Brazil (Clearance number - CAAE 50949615.7.0000.5208). This research has been conducted in full accordance with the World Medical Association Declaration of Helsinki. Each participant was told about the research stages, by signing the Term of Free and Informed Consent.

Survey

For the analysis of the student perception about the inclusion of these tools in the pedagogical activities of the discipline, the study population was represented a convenient sample composed by students regularly enrolled in the discipline (n=371), day and night shifts, of second semester class 2014 (2014.2) to the first semester class 2017 (2017.1). The student's withdrawal during the course and absence from classes were exclusion criteria used. The sample selection was determined by the number of students who responded to the research instrument (questionnaire survey). This questionnaire was based on the application of an electronic form used in a previous study [3] through the Google forms virtual platform, which was e-mailed to the students who were enrolled in the discipline. Since all students were already users of social media apps, no training has been required.

The questions were formulated with the purpose of evaluating the user opinions regarding adherence and applicability of these platforms to the variables in the development of the pedagogical activities experienced by the students in the discipline. The survey was available with a one-month deadline. In that period, the students' answers were recorded, later they were consolidated and then analysed.

Comparative Academic Analysis

In order to evaluate the impact of the insertion of social media on academic performance, a comparison was made using the semester average data obtained by students who used social media in biosafety learning, with the student scores when they had not joined the insertion of these virtual platforms in the educational context. These samples were represented by classes from the second semester of 2011 until the first half of 2014. The scores were obtained through the access to the university's Information and Academic Management System (Sig@).

Educational Insertion of Social Media

In all the studied period, from 2011 to 2017, the classes were coordinated by the same teacher, who is specialised in active learning methodologies. The classes were conducted using the team-based learning and problem-based learning methodologies, with duration of two hours per week. All students had access to the same didactic materials. The difference was that students who used social media accessed the content virtually. These apps were already used by students for non-purpose of study. Social media were used in complementary. Monitoring methods were not performed.

Facebook was used as a platform to support students, who were included in a restricted group, managed by the teacher. In this virtual environment, didactic materials were made available and messages and information about the discipline were posted. Whatsapp app was used in the discipline by groups of students guided by the teacher and by monitors, in which a closer relationship was established

outside the classroom. This platform was available for the resolution of doubts, discussion of problem situations of an educational nature and publication of information about the discipline. All students were included into those groups which had been moderated by professor and monitors. An Instagram profile (@dontologia_biossegura) was created to allow students a visual experience to the study of infection control. Images, videos and texts related to the subject of infection control and risk management in the dental environment were published on this Instagram account.

Student's access to social media (Facebook, Whatsapp, Instagram) occurred according to their availability. Professor and lecturers interacted virtually with the students in the university working time.

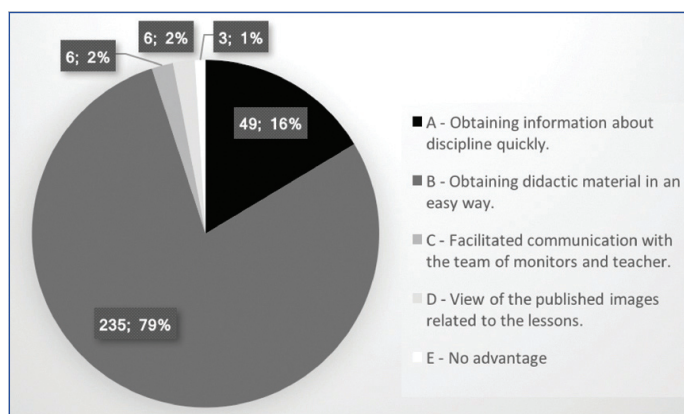
STATISTICAL ANALYSIS

Data was organised in spreadsheets and underwent descriptive and inferential statistical treatment for a significance level of p=0.05 (5%). Statistical calculations were performed using SPSS software (Statistical Package for the Social Sciences) in version 23.0.

RESULTS

A total of 298 students answered the online electronic surveys. The response rate corresponded to 80.32% of the total of 371 students enrolled in the discipline of Biosafety and Ergonomics 2. Adherence to the use of social media as virtual learning platforms for infection control in Dentistry have been 98.3% (n=294) for Facebook, 100% (n=298), for WhatsApp, and 90% (n=269) for Instagram. Pearson's chi-square test indicated a statistically significant percentage of adherence compared to non-adherence (p<0.01).

The majority of participants considered Facebook an advantageous tool in the subject studied (n=295, 99%) with the greatest practical utility being easy access to didactic material published in the virtual page of the discipline. This result was statistically significant (p<0.001, Pearson's chi-square test, [Table/Fig-1]. The analysis by semester also revealed the same pattern of responses [Table/Fig-2].



[Table/Fig-1]: Advantages of using Facebook as an educational resource, considering the total group of interviewed students.

Semester	Responses										p-value
	A		B		C		D		E		
	n	%	n	%	n	%	n	%	n	%	
2014.2	15	28,3	31	58,5	5	9,4	2	3,8	-	-	p ^(A) < 0.001*
2015.2	7	10,6	56	84,8	-	-	-	-	3	4,5	p ^(A) < 0.001*
2016.1	13	17,1	60	78,9	1	1,3	2	2,6	-	-	p ^(A) < 0.001*
2016.2	7	13,0	45	83,3	-	-	2	3,7	-	-	p ^(A) < 0.001*
2017.1	7	14,0	43	86,0	-	-	-	-	-	-	p ^(A) < 0.001*

[Table/Fig-2]: Advantages of using Facebook as an educational resource, considering the answers per semester.

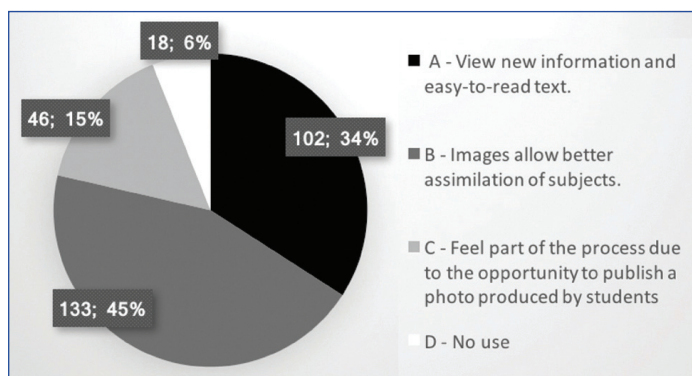
(* Significant difference for 5%

(A) Using Pearson's Chi-square test to compare two proportions in a population

The use of WhatsApp as a teaching aid was also reported to be useful for all interviewees and again most frequently reported practical use was obtaining information about the discipline quickly

(clarification of doubts, receiving messages) (n=181, 64.3%). Other positives uses were: of ease of communication with teachers and monitors on administrative and clinical questions (n=114, 38.1%); visualization of the posted images related to the classes (n=3, 1%); and access to didactic material (n=1, 0.3%). This result was statistically significant (p<0.001) after application of the Pearson's chi-square test. No statistically significant difference was observed when using the Likelihood Ratio test in comparisons between semesters (p=0.837).

The use of Instagram as a didactic resource was considered an efficient social media by 94% (n=280) of the participants. The main use of the Instagram was the possibility of having images to make the student assimilate the subject more effectively, a result that was statistically significant (p<0.001, Pearson's chi-square test) [Table/Fig-3]. The pattern of responses on the use of Instagram was shown to be variable when comparing the responses distributed per semester [Table/Fig-4].



[Table/Fig-3]: Instagram's usefulness for study of infection control in Dentistry, considering the total group of interviewed students.

Semester	Responses								p-value
	A		B		C		D		
	n	%	n	%	n	%	n	%	
									p ^(A) <0.001*
2014.2	19	35,8	14	26,4	16	30,2	4	7,5	p ^(B) =0.023*
2015.2	16	24,2	31	47,0	12	18,2	7	10,6	p ^(B) <0.001*
2016.1	26	34,2	36	47,4	8	10,5	6	7,9	p ^(B) <0.001*
2016.2	27	50,0	25	46,3	2	3,7	-	-	p ^(B) <0.001*
2017.1	14	28,0	27	54,0	8	16,0	1	2,0	p ^(B) <0.001*

[Table/Fig-4]: Instagram's usefulness for study of infection control in Dentistry, considering answers per semester.

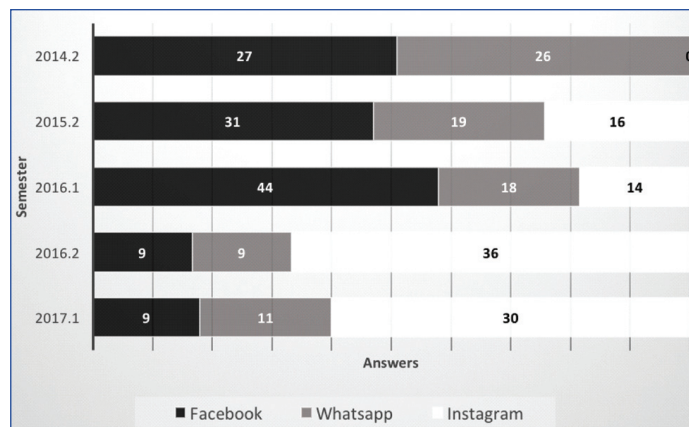
(*) Significant difference for 5% (A) Through the likelihood ratio test in the comparison between semesters. (B) Using Pearson's Chi-square test to compare two proportions in a population

The social media considered by students as the most useful pedagogical tool was Facebook (n=120, 40.1%), followed by Instagram (n=96, 32.1%) and WhatsApp (n=83, 27.8%), with statistically significant differences after application of the Pearson chi-square test (p=0.029). When comparing the results between semesters, significant differences were observed (Pearson's chi-square test, p<0.001) [Table/Fig-5]. None of students informed any disadvantages about use of social media on educational approach.

The comparison of the test scores obtained by students enrolled in the course before (mean=7.71, standard deviation=0.88, n=408) and after (average =7.61, standard deviation =1.02, n=371) inclusion of the social networks did not indicate a statistically significant difference between the matter (p=0.141; Student's t-test).

DISCUSSION

Adopting technology that students are accustomed to using in their lives improves the quality of teaching and learning experiences [14]. Social media apps have become essential means of communication in recent years and this digital penetration was observed in the



[Table/Fig-5]: Social media most useful for learning infection control in Dentistry, considering the answers per semester.

response rate of this research (80.32%). These results were comparable or even superior to the results of other investigations: 47.4% [11]; 50% [4]; 70% [15]; 82.83% [3]; 84.6% [16]; 90% [17]. It is the opinion of the authors that expressive results of the response rate were due to the respondents were from generations (Y and Z) in which technology is invogue, being proficient in an increasingly digital world [18,19]. For them, network platforms (Facebook, Blogging, YouTube, Twitter, Instagram) are a normal way of communicating with the world on a daily basis [20]. In this sense, the introduction of social media in the teaching of infection control in Dentistry arises from the need to insert virtual tools that are easy to apply in an active learning approach, in order to make classes more dynamic and attractive for this generation actively involved in technology in their daily lives [3].

Positive role of Facebook for learning biosafety was almost unanimous, since 99% of the respondents said that it was an efficient social network in the pedagogical aspect. Results superior to those from Alshiekhly U et al., [11] which verified that two-thirds of the students interviewed in their research, agreed that Facebook proved to be useful in helping the teaching-learning process. In addition, the ease of obtaining didactic material [Table/Fig-1] was identified as its greatest functionality, an opinion that was shared by all students during the semesters studied [Table/Fig-2]. Facebook had a positive relationship in communication and collaboration among students, as it allows easy access to educational materials making classes more interesting [3,21,22].

On the other hand, the increased time spent on Facebook can be a distraction regarding the time assigned for school work [23]. However, as it was used a restricted Facebook group, only these students had access to the virtual learning environment, making the studying as the main focus, and with fewest distractions possible.

The use of social media from instant messaging applications (WhatsApp) as a teaching aid also proved to be useful for all respondents. This tool features the functions of sharing written or audio messages, photos and videos, and has been predominantly used from mobile phones with internet access (Smartphones).

Smartphone apps used as teaching tools in the medical and dental area have shown remarkable growth in student participation. The use of WhatsApp in teaching basic health care has shown several benefits for trainee nurses. The app has been used to: integrate theory and clinical practice; increase the resources for the preparation of tests and to provide a platform for clarifying doubts about graduation [24]. Obtaining information about the discipline quickly (clarifying doubts, errands) was the most cited utility in relation to the use of WhatsApp 64.3%). However, teachers may be reluctant to adopt such tools when communicating with students [25].

New technological tools are being developed every day, and the pace of change will be determined by educators and their

willingness to explore new solutions based on technology [26]. From this perspective, Instagram has been used by young people as social media for sharing photos and videos. The use of this app as a didactic resource was considered an efficient social media by 94% of respondents. The main use for Instagram was that images allowed better assimilation of the subject by students [Table/Fig-5]. This result was divergent from a previous study [3], which identified the possibility of visualizing new information with easy-to-read texts. Both justifications are coherent, and because this social network has a very large visual appeal they justify the data in [Table/Fig-4], which reveals this preference for learning from images in 3 of the 5 semesters studied.

Despite being popular among students, Instagram has shown little insertion in academic life. In students' points-of-view, according to a previous study [22], only 22.6% of the interviewed students attributed an important role for their learning in higher education to Instagram. The reasons for using Instagram are its popularity and student interest, as well as the convenience of using camera phones, a highly social aspect of the application [27]. According to Ebrahimpour A et al., many students do not see the use of social media under an educational perspective because universities and educational institutes do not take the applicability of social media in the educational context seriously [28].

When analysing the social network of choice in the educational context of the interviewed students, there was a preference migration from Facebook to Instagram in the last two academic semesters [Table/Fig-3]. Again, it is the opinion of the authors that the increase in interest for Instagram was due to the incorporation of new functions to this platform: ease of exchanging messages between users; creating groups; disclosure of daily images that automatically delete after 24 hours (stories); real-time video transmission with the possibility of interaction between users (live). As the discipline utilized all of these resources, including conducting virtual classes synchronously, students became engaged and excited about this new and connecting way of sharing and building knowledge.

Universities are geared to compare student performance. No difference was observed in the results/scores before and after the inclusion of social media in the studied discipline. The fact that the discipline has always been taught in active methodologies can explain this result. The insignificant difference before and after using these social media applications for educational purposes can be justified by the fact that they are only technological resources to facilitate communication and access to teaching materials. They are not able to allow the construction of knowledge. Contents have always been worked using active learning methodologies, in which the student is constantly encouraged to research, read, write, ask, discuss or stay busy in problem-solving and developing projects. Such methodology can encourage the development of student's autonomy, increasing curiosity in the subjects, as well as stimulating decision making. This also reinforces the understanding that social media is only a tool, not a methodology. When properly used in a meaningful pedagogical context, they can be useful for an active learning process. Despite this similarity in the scores, it was possible to notice improvement in the development of knowledge for the students who experienced social media in teaching of Dentistry. These students have become more participative and interested in content related to infection control in Dentistry.

While dental schools are not aware of how students use new internet apps and Internet tools, the gap between students and teachers will grow larger. This may impact on how learning is consolidated [25]. It is important to emphasize the role of universities in relation to the use of social media in higher education, since, in general, institutional platforms are perceived as unattractive and do not envision the inclusion of social media in virtual learning environment. As commercial social media sites develop more user-friendly apps,

students are rapidly adopting these mobile devices rather than using their educational communication platforms [25]. Thus, creation of institutional policies that incorporate the advantages of social networks are necessary, giving direction to their inclusion in school life. To this end, educational institutions should provide technical support that is capable of offering proper training to interested users and keeping their devices running. From there, teachers need time to learn how to incorporate social media and other forms of distance education into the existing curricula [29].

Therefore, it is fair to say that online tools can offer great support in pedagogical activities, both on information sharing and providing space for grouping. Social media can be used to advantage to advance the teaching-learning process for healthcare topics, in easier and more dynamic ways for informative contents [30]. The easy access to information shared interactively among students of the more connected generation ever, cannot be ignored.

LIMITATION

This research provided an overview of the student perceptions about popular social media apps that were used in a pedagogical perspective. In this way, a comparison between them and specific dental learning apps need to be performed. Further longitudinal studies are needed to see if social media enables better maintenance of learning. In addition, it is necessary to analyse the opinion of the teachers about inserting these applications in pedagogical activities.

CONCLUSION

Dental students considered social media (Facebook, WhatsApp, and Instagram) as advantageous tools in the process of learning infection prevention and control concepts depending on the media used. There was no negative impact of the inclusion of the media on the scores obtained by the students in the subject. This indicates that social networks can take active roles and became partners in teaching both didactic and clinical dentistry.

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REFERENCES

- [1] AMDOCS. Amdocs survey: teenagers have a digital lifestyle that service providers should adjust to. 2016. At: <https://www.amdocs.com/media-room/amdocs-survey-teenagers-have-digital-lifestyle-service-providers-should-adjust>. Accessed: November 05, 2017.
- [2] Pechi D. Como usar as redes sociais a favor da aprendizagem. *Nova Escola*. 2011;6(246):1-4.
- [3] Souza FB, Lopes MGQ, Lima Filho RM. Redes sociais na aprendizagem em odontologia: opinião dos estudantes de uma universidade brasileira. *Rev Cuba Estomatol*. 2017;54(2):1-11.
- [4] Arnett M, Loewen A, Romito L. Use of social media by dental educators. *J Dent Educ*. 2013;77(11):1402-12.
- [5] Smith E. "A real double-edged sword:" Undergraduate perceptions of social media in their learning. *Comput Educ*. 2016;103(1):44-58.
- [6] AlFaris E, Irfan F, Ponnampuruma G, Jamal A, Van der Vleuten C, Al Maflehi H, et al. The pattern of social media use and its association with academic performance among medical students. *Med Teach*. 2018;40:1-6.
- [7] Beebe R, Gurenlian R, Rogo J. Educational technology for millennial dental hygiene students: A survey of US dental hygiene programs. *J Dent Educ*. 2014;78(1):838-49.
- [8] Knösel M, Jung K, Bleckmann A. YouTube, dentistry, and dental education. *J Dent Educ*. 2011;75(12):1558-68.
- [9] Gardner K. An online community of inquiry for reflective practice in an operative dentistry course. *J Dent Educ*. 2012;76(5):641-50.
- [10] Bholra S, Hellyer P. The risks and benefits of social media in dental foundation training. *Br Dent J*. 2016;221(10):609-13.
- [11] Alshiekhly U, Arrar R, Barnkgkei I, Dashash M. Facebook as a learning environment for teaching medical emergencies in dental practice. *Educ Health*. 2015;28(1):176-80.
- [12] Cheston CC, Flickinger TE, Chisolm MS. Social media use in medical education: a systematic review. *Acad Med*. 2013;88:893-901.
- [13] Miller CH. OSAP. Team huddle: Who is managing your safety culture? *Infect Control Pract*. 2014;13(1):1-4.

- [14] Vyber D, Williams B, Marais A. Using social media as a managerial platform for an educational development project: Cofimvaba. *Int J InfEduc Technol.* 2015;5(12):910-13.
- [15] Halboub E, Othathi F, Mutawwam F, Madkhali S, Somaili D, Alahmar N. Effect of Social Networking on Academic Achievement of Dental Student, Jazan University, Saudi Arabia. *East Mediterr Health J.* 2016;22(11):865-69.
- [16] Arif M, Kanwal S. Adoption of social media technologies and their impact on students' academic performance: the only way for future survival of distance education students in Pakistan. *PJIM&L.* 2016;18(1):25-36.
- [17] Kenny P, Jonhson G. Social media use, attitudes, behaviours and perceptions of online professionalism amongst dental students. *Br Dent J.* 2016;221(10):651-55.
- [18] Werth EP, Werth L. Effective training for Millennial students. *Adult Learn.* 2011;22(3):12-19.
- [19] Beebe C, Gurenlian J, Rogo E. Educational technology for Millennial dental hygiene students: A survey of US dental hygiene programs. *J Dent Hyg.* 2014;78(6):838-50.
- [20] Battersby L. Education strategies that best engage Generation Y students. *Can J Dent Hyg.* 2017;51(3):118-25.
- [21] Pessoni A, Akerman M. O uso das mídias sociais para fins de ensino e aprendizagem: estado da arte das pesquisas do tipo survey. *ECCOM.* 2014;5(10):29-42.
- [22] Smith EE. Social media in undergraduate learning: categories and characteristics. *Int J Educ Tech in Higher Educ.* 2017;14(12):1-24.
- [23] Estus EL. Using facebook within a geriatric pharmacotherapy course. *Am J Pharm Educ.* 2010;74 (8):01-05.
- [24] Raiman L, Antbring R, Mahmood A. WhatsApp messenger as a tool to supplement medical education for medical students on clinical attachment. *BMC Med Educ.* 2017;17(7):2-9.
- [25] Kathoon B, Hill KB, Walmsley D. Instant messaging in dental education. *J Dent Educ.* 2015;79(12):1471-78.
- [26] Hillenburg L, Cederberg RA, Gray SA, Hurst CL, Johnson GK, Potter BJ. E-learning and the future of dental education: opinions of administrators and information technology specialists. *Eur J Dent Educ.* 2006;10(1):169-77.
- [27] Bell MA. Picture this! using instagram with students. *Internet Sch.* 2013;20(4):23-25.
- [28] Ebrahimipour A, Rajabali F, Yazdavar F, Azarbad R, Nodeh MR, Siamian H, et al. Social Network Sites as Educational Factors. *Acta Inform Med.* 2016;24(2):134-38.
- [29] McAndrew, Johnston A. The role of social media in dental education. *J Dent Educ.* 2012;76(11):1-9.
- [30] Mccann L, Schneiderman E, Hinton R. E-Teaching and learning preferences of dental and dental hygiene students. *J Dent Educ.* 2010;74(1):65-78.

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