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RESEARCH

Learning of the millennial generation in medical schools

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Abstract

Currently, most undergraduate students are individuals born between 1982 and 2000, the so-called millennials, a generation that expects the integration of technology in education. Thus, this cross-sectional and descriptive-exploratory study proposes to understand the relationship of medical students with web-based technologies, which can improve learning, to implement them more efficiently in the academic environment. The results show that undergraduate medical students use these technologies, but with little diversity in services, being the most common Google Docs, Facebook, YouTube and Dropbox. We emphasize the need to expose students to technologies in medical education to overcome technological challenges faced by future physicians.
Keywords: Education, medical, undergraduate. Social media. Information technology. Internet.

Resumo

Aprendizagem da geração *millenial* na graduação médica

A maioria dos atuais graduandos nasceu entre 1982 e 2000. Trata-se dos chamados "*millennials*", e essa geração espera que a educação integre a tecnologia. Com isso, este estudo, transversal e descritivo-exploratório, propõe-se a conhecer a relação de estudantes de medicina do ciclo básico com as tecnologias interativas da web – as quais podem melhorar o ensino –, visando fornecer informações para implementá-las com mais eficiência no meio acadêmico. Os resultados evidenciam que os alunos utilizam ferramentas da internet, mas com pouca diversidade, sendo as plataformas mais usadas o Google Docs, Facebook, YouTube e Dropbox. O artigo conclui que é necessário promover o contato com a tecnologia na educação médica a fim de preparar os alunos para enfrentar futuros desafios profissionais.
Palavras-chave: Educação de graduação em medicina. Mídias sociais. Tecnologia da informação. Internet.

Resumen

Aprendizaje de la generación *millennial* en la graduación médica

La mayoría de los estudiantes de grado actuales nacieron entre 1982 y 2000. Son los llamados "*millenials*", generación que espera que la educación integre la tecnología. Este estudio descriptivo transversal y exploratorio se propone comprender la relación de los estudiantes de medicina del ciclo básico con las tecnologías interactivas de la web –que pueden mejorar la docencia–, con el objetivo de brindar información para implementarlas de manera más eficiente en el entorno académico. Los resultados muestran que los estudiantes utilizan herramientas de Internet, pero con poca diversidad, siendo las plataformas más utilizadas Google Docs, Facebook, YouTube y Dropbox. El artículo concluye que es necesario promover el contacto con la tecnología en la educación médica con el fin de preparar a los estudiantes para enfrentar los desafíos profesionales futuros.
Palabras clave: Educación de pregrado en medicina. Medios de comunicación sociales. Tecnología de la información. Internet.

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Currently, most undergraduate students, including medical students, were born between 1982 and 2000, therefore belonging to the generation of the so-called "millennials." This term was first used by Strauss and Howe [1] in 1992 in the book *Generations: The History of America's Future, 1584 to 2069*. Since then, the literature on how these individuals behave, interact and like to learn has been growing, and faculty from previous generations have been struggling to understand and interact with millennials [2].

One notes that in medical education, millennial students need more feedback, more interaction with classmates and more relationships involving feelings [3]. In general, young people of this generation are more assertive, show narcissistic traits and have high expectations [4]. Given their unique personality characteristics, they have different preferences, motivations and expectations regarding education and assessment methods compared to previous generations [5].

Millennials want to take part in unique educational experiences, adapted to their needs, in a process named "napsterism" [4] after one of the first online music sharing services, which allowed users to create personalized playlists. These students prefer practical learning [6] to reading long texts [4] and expect professors to assess their skills in a real environment [2].

The integration of technology in medical education is expected by students of generation Y – another name for millennials – since one in five of these youths was already familiar with computers by the age of 5, while the rest were used to such technology before they were 18 [7]. For them, technological literacy means relevance and ability to relate to people of the same generation [8], and many millennials are eager to use social media for educational purposes [9]. Thus, social networking sites are clearly integrated into the daily life of this group, resulting in a finer line between work and personal life than that observed in previous generations.

Advanced technologies facilitate learning by meeting needs and offering students study opportunities, besides allowing students and teachers to share valuable information and access resources regardless of where they are [10]. In medical education, virtual patient simulators, for example, allow to practice risk-free diagnosis and observe pathologies that would not be readily available in real patients [11]. Personalized augmented reality systems can also favor autonomous learning, reducing the need for laboratory materials and costs with instructors [12]. Such resources, which incorporate or add information to reality, are more attractive than textbooks [11,12].

Interactive technologies in teaching are based on recent computational advances. Any software or website that triggers new networking activity can be considered interactive. For example, when a user sends a message on social media, interaction is triggered with the entire network. This also happens with URL sharing websites, blogs, wikis, movie sharing platforms, etc. The functionality and capabilities of these tools often enable all interactions to happen simultaneously online and complement each other [13].

This type of technology has created new opportunities for the construction of knowledge and new teaching and learning strategies [14], expanding study time. The use of technology in the classroom feeds many discussions. In this new model, digital media conveys the actual information, while the professor prompts debates and stimulates critical thinking in clinical cases and simulations. Educational institutions take an interest in these innovations partly because web-based interactive technologies (WITs) are easily created, engage students' attention and make study hours more flexible, allowing them to set their own learning pace [15].

WITs are not only used in active methodologies in medical teaching. In traditional methods also many professors encourage students to create content, produce and manipulate video images (posting them later on services like YouTube), use tags to create taxonomies that streamline information search in blogs, or participate in the collective development of virtual encyclopedias such as Wikipedia [16]. In medical education there are resources such as *Homem Virtual* [Virtual Man], animation software developed at the University of São Paulo to assist teaching embryology or anatomy content in the basic cycle [17].

Although WITs can improve medical education, whose traditional methods are obsolete [18], there are few studies supporting its use in this context or even identifying how these technologies are actually used by medical students. To fill part of this gap, this article seeks to understand the relationship of students with technology, aiming to provide input for a more efficient use of WITs in the academic environment.

Method

This is a cross-sectional and descriptive-exploratory study. The data were collected at the

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Medical School of São José do Rio Preto (Famerp), in the state of São Paulo, which offers courses in nursing, medicine and psychology. The convenience sample consisted of 113 medical students, both male and female, all over 18 years of age. The data collection instrument was administered in the classroom, on the occasion of the final exams of the first two years, when almost all students were present.

The researcher introduced the study to the participants, explaining the subject and goals and informing them about non-mandatory participation, anonymity and other ethical aspects. After the informed consent form was read and signed, the data collection instrument was used. To avoid contamination of the sample, a strategy was adopted to prevent students from talking about topics related to the instrument while filling it out, that is, they remained in the room used for their individual assessment.

The data collection instrument was a structured questionnaire that asked students to choose between alternatives related to how often they used a number of WITs. The first part comprised overall sociodemographic data; the second contained specific questions, based on the conversation prism, and a dynamic map of the main social networking sites [19]. The most significant WITs and objects of research were: digital tools of the actual institution, collaborative journalism, questions and answers, collaboration, blogs, digital curation, learning networks, discussion forums, social media, business networking, videos, documents and content, wikis, photos and cloud storage.

Data exploratory analysis included mean, median and standard deviation, as well as variation for numerical variables and number and proportion for categorical variables. Ordinal variables on a Likert scale were represented as mean ± standard deviation, and ordinal variables between two unrelated groups were compared using the Mann-Whitney test. We compared categorical variables between two unrelated groups using the Pearson's chi-square test or Fisher's exact test, when appropriate. Statistical analysis was performed using IBM-SPSS Statistics software version 24. All tests were two-tailed and $p<0.05$ values were considered significant.

Results

A total of 113 students were included in the study, 52 (46%) in the first year of medical school, 39 (34.5%) men and 74 (65.5%) women. Forty-six (40.7%) students were 20 years old or younger, and 57 (50.4%) were between 21 and 24 years old. One hundred (88.5%) participants were from the state of São Paulo, 11 (9.7%) from other Brazilian states and 2 (1.8%) did not provide this information. Ninety-one (80.5%) came from metropolitan areas and 13 (11.5%) from rural areas.

Regarding the use of printed or digital material, most students reported using physical books (85%), notes (75.2%) and the internet (77%) to study, while, in general, e-books (62.8 %) and articles (55.8%) were not used for this purpose. According to Table 1, a considerable number of participants strongly agree or agree that the internet improves learning (93.8%), enables greater interaction between students and faculty (72.6%) and should be used in the classroom under professors' supervision (66.4%). All agree that the internet expands possibilities to explore content, but there is no consensus on whether it increases motivation to study (49.6% believe so, 46% disagree).

Table 1. Opinion on the role of the internet in education (São José do Rio Preto, São Paulo, Brazil, 2017)

	Strongly agree n (%)	Agree n (%)	No opinion n (%)	Disagree n (%)	Strongly disagree n (%)
Improves learning	50 (44.2)	56 (49.6)	2 (1.8)	5 (4.4)	0 (0.0)
Motivates to study	15 (13.3)	41 (36.3)	5 (4.4)	45 (39.8)	7 (6.2)
Enables greater interaction between students and faculty	25 (22.1)	57 (50.4)	8 (7.1)	22 (19.5)	1 (0.9)
Expands possibilities to explore content	66 (58.4)	47 (41.6)	0 (0.0)	0 (0.0)	0 (0.0)
Should be used in the classroom, supervised by faculty	20 (17.7)	55 (48.7)	12 (10.6)	26 (23.0)	0 (0.0)

According to Table 2, 59.3% of students use the internet at home to study, and 36.3% do not use a wireless network. Most use social media sites (93.8%), Facebook groups (84.1%) and email (80.5%) to study – the last two created specifically for interaction among students in the class. Most (65.5%) also report being abreast of the class's formal and informal topics of conversation.

Table 2. Use of internet and other tools to study (São José do Rio Preto, São Paulo, Brazil, 2017)

Variable	n (%)
Places used for internet study*	
Famerp library	97 (85.8)
Home	67 (59.3)
Other Famerp facilities	16 (14.2)
Other places	2 (1.8)
Use of Famerp Wi-Fi per week	
Does not use a wireless network	41 (36.3)
Once a week	12 (10.6)
3 or 4 days a week	28 (24.8)
Every day	29 (25.7)
No answer	3 (2.6)
Use of social media sites to study*	
Yes	106 (93.8)
No	7 (6.2)
Purchase of educational software	
Never	66 (58.4)
Rarely	19 (16.8)
Sometimes	7 (6.2)
Often	1 (0.9)
No answer	20 (17.7)
Tools used by the class*	
Facebook group	95 (84.1)
Classroom email	91 (80.5)
No answer	18 (15.9)
Control of class's formal and informal topics of conversation	
Yes	74 (65.5)
No	21 (18.6)
No answer	18 (15.9)

**This variable allowed more than one answer*

Table 3 shows how often students use WITs. Of the 14 categories analyzed, students seem to have significant contact (over 40% of "often" and "always" answers in all subcategories) with two of them: "Famerp tools" and "social media." In the categories "collaboration," "videos" and "cloud storage," only Google Docs (45.1%), YouTube (81.4%) and Dropbox (84.1%) showed significant values. The other subcategories were below 40%.

Table 3. Use of web-based interactive technologies (São José do Rio Preto, São Paulo, Brazil, 2017)

	Never n (%)	Rarely n (%)	Sometimes n (%)	Often n (%)	Always n (%)	Unknown n (%)	No answer n (%)
Famerp tools							
Famerp Management System, for attendance, grades, etc.	1 (0.9)	5 (4.4)	15 (13.3)	30 (26.5)	61 (54.0)	0 (0.0)	1 (0.9)
Sophia (library platform)	17 (15.0)	5 (4.4)	19 (16.8)	33 (29.2)	38 (33.6)	0 (0.0)	1 (0.9)
Collaborative journalism							
Digg	103 (91.2)	2 (1.8)	1 (0.9)	0 (0.0)	0 (0.0)	5 (4.4)	2 (1.8)
Reddit	104 (92.0)	1 (0.9)	0 (0.0)	0 (0.0)	1 (0.9)	5 (4.4)	2 (1.8)
Questions and answers							
Yahoo	52 (46.0)	20 (17.7)	25 (22.1)	9 (8.0)	5 (4.4)	1 (0.9)	1 (0.9)
Answers	103 (91.2)	3 (2.7)	2 (1.8)	1 (0.9)	0 (0.0)	3 (2.7)	1 (0.9)
All Experts	105 (92.9)	2 (1.8)	2 (1.8)	0 (0.0)	0 (0.0)	3 (2.7)	1 (0.9)
Collaboration							
Google Docs	24 (21.2)	15 (13.3)	23 (20.4)	27 (23.9)	24 (21.2)	0 (0.0)	0 (0.0)
Microsoft Office	59 (52.2)	5 (4.4)	12 (10.6)	15 (13.3)	21 (18.6)	1 (0.9)	0 (0.0)
Zoho	105 (92.9)	3 (2.7)	1 (0.9)	1 (0.9)	1 (0.9)	2 (1.8)	0 (0.0)
Mindjet	106 (93.8)	3 (2.7)	0 (0.0)	1 (0.9)	0 (0.0)	3 (2.7)	0 (0.0)

continues...

Table 3. Continuation

	Never n (%)	Rarely n (%)	Sometimes n (%)	Often n (%)	Always n (%)	Unknown n (%)	No answer n (%)
Blogs							
Blogger	80 (70.8)	15 (13.3)	7 (6.2)	2 (1.8)	5 (4.4)	4 (3.5)	0 (0.0)
Tumblr	77 (68.1)	11 (9.7)	11 (9.7)	8 (7.1)	3 (2.7)	3 (2.7)	0 (0.0)
WordPress	88 (77.9)	10 (8.8)	5 (4.4)	4 (3.5)	2 (1.8)	4 (3.5)	0 (0.0)
Digital curation							
Pinterest	97 (85.8)	7 (6.2)	2 (1.8)	0 (0.0)	2 (1.8)	4 (3.5)	1 (0.9)
Paper.li	108 (95.6)	1 (0.9)	0 (0.0)	0 (0.0)	0 (0.0)	3 (2.7)	1 (0.9)
Flipboard	101 (89.4)	4 (3.5)	5 (4.4)	0 (0.0)	0 (0.0)	3 (2.7)	0 (0.0)
Discussion forums							
Google Groups	39 (34.5)	16 (14.2)	23 (20.4)	16 (14.2)	17 (15.0)	1 (0.9)	1 (0.9)
Social media sites							
Facebook	0 (0.0)	1 (0.9)	6 (5.3)	17 (15.0)	89 (78.8)	0 (0.0)	0 (0.0)
Professional networking sites							
Plaxo	109 (96.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (2.7)	1 (0.9)
LinkedIn	100 (88.5)	7 (6.2)	1 (0.9)	0 (0.0)	1 (0.9)	3 (2.7)	1 (0.9)
Videos							
YouTube	0 (0.0)	4 (3.5)	17 (15.0)	26 (23.0)	66 (58.4)	0 (0.0)	0 (0.0)
Vimeo	77 (68.1)	8 (7.1)	9 (8.0)	9 (8.0)	8 (7.1)	2 (1.8)	0 (0.0)
TED	86 (76.1)	8 (7.1)	6 (5.3)	6 (5.3)	5 (4.4)	2 (1.8)	0 (0.0)
Vevo	57 (50.4)	12 (10.6)	10 (8.8)	10 (8.8)	24 (21.2)	0 (0.0)	0 (0.0)
Documents/content							
ThinkFree	82 (72.6)	5 (4.4)	7 (6.2)	9 (8.0)	8 (7.1)	2 (1.8)	0 (0.0)
Scribd	82 (72.6)	7 (6.2)	10 (8.8)	3 (2.7)	1 (0.9)	3 (2.7)	7 (6.2)
SlideShare	76 (67.3)	9 (8.0)	12 (10.6)	5 (4.4)	3 (2.7)	2 (1.8)	6 (5.3)
Prezi	65 (57.5)	16 (14.2)	20 (17.7)	3 (2.7)	2 (1.8)	1 (0.9)	6 (5.3)
Wikis							
Wikispace	98 (86.7)	5 (4.4)	0 (0.0)	0 (0.0)	0 (0.0)	4 (3.5)	6 (5.3)
TWiki	99 (87.6)	4 (3.5)	0 (0.0)	0 (0.0)	0 (0.0)	4 (3.5)	6 (5.3)
Wikia	95 (84.1)	5 (4.4)	1 (0.9)	2 (1.8)	0 (0.0)	4 (3.5)	6 (5.3)
Images							
Flickr	87 (77.0)	8 (7.1)	6 (5.3)	3 (2.7)	1 (0.9)	2 (1.8)	6 (5.3)
Photobucket	95 (84.1)	4 (3.5)	3 (2.7)	1 (0.9)	1 (0.9)	3 (2.7)	6 (5.3)
Picasa	70 (61.9)	9 (8.0)	15 (13.3)	8 (7.1)	3 (2.7)	1 (0.9)	7 (6.2)
Facebook Camera	78 (69.0)	7 (6.2)	7 (6.2)	4 (3.5)	10 (8.8)	1 (0.9)	6 (5.3)
Instagram	48 (42.5)	9 (8.0)	18 (15.9)	12 (10.6)	17 (15.0)	2 (1.8)	7 (6.2)
Cloud storage							
Dropbox	2 (1.8)	1 (0.9)	9 (8.0)	16 (14.2)	79 (69.9)	0 (0.0)	6 (5.3)
One Drive	69 (61.1)	7 (6.2)	11 (9.7)	6 (5.3)	13 (11.5)	1 (0.9)	6 (5.3)
Google Drive	72 (63.7)	5 (4.4)	8 (7.1)	8 (7.1)	11 (9.7)	3 (2.7)	6 (5.3)
Apple iCloud	75 (66.4)	2 (1.8)	8 (7.1)	4 (3.5)	16 (14.2)	2 (1.8)	6 (5.3)
Amazon Cloud	101 (89.4)	1 (0.9)	2 (1.8)	0 (0.0)	0 (0.0)	3 (2.7)	6 (5.3)

Analyzing how often students used printed or digital tools compared to other data, we noticed that second-year students (p=0.049) use e-books more often and seem to be more abreast of the class's formal and informal conversation topics on the internet (p=0.002). The answer "yes" for the variable "the internet should be used in the classroom under professors' supervision" was more significant among women (p=0.030) and second-year students (p=0.031). Internet use at home to study was also significantly higher among second-year students (p=0.006), as was frequent use of Famerp Wi-Fi (p=0.023), which also prevailed among students from the state of São Paulo (p=0.015). All other comparisons were not significant.

Discussion

Most interviewees were aged 29 and under (92.9%), therefore belonging to the millennial generation, which will soon be the predominant workforce and accounts today for almost all resident physicians. The predominance of women (65.5%) correlates with data from the Federal Council of Medicine [20].

Although the use of e-books has been spreading among university students, there is clear evidence of preference for physical books as a learning resource [21-25], based on the perception that it is easier to concentrate when reading print [21]. Digital books were enthusiastically adopted by academic libraries for providing more efficient use of resources, saving shelf space and being compatible with the habits of the millennial generation. But despite these advantages, which also include portability, availability and functionality for research, e-books do not stir entirely positive feelings. There are frustrations regarding the complexity of purchasing them, copyright restrictions of publishers and poor compatibility with reading devices [26]. Moreover, many students are unaware that the libraries they frequent have e-books [22].

The fact that e-books are more commonly used by second-year students may be a question of adaptation. Diniz and Almeida [27] found that, especially in the first semester, interpersonal relationships are more important than managing responsibilities, which only increase in the second semester. Social inclusion at the beginning of the course allows students to build a shared sense of their experiences, both positive and negative, helping them develop strategies to adapt to the school [28], including becoming familiar with available learning resources, such as e-books.

Despite the consensus regarding the role of the internet in education [29-31] (with the exception of motivation to study) and the fast development of WITs in the last 15 years, the use of such technologies in medical education is not significant. In general, professors lack motivation and resources to use internet-based media more effectively [32]. These factors might explain the lack of consensus in this study regarding WITs and motivation to study.

The fact that second-year students tend to agree that the internet should be used in the classroom under faculty supervision confirms their dependence on professors, inherited from the traditional teaching methods of secondary school and university prep courses. The perception that the successful use of learning groups on Facebook depends on previous social connections and academic leadership, whether through committed students or mentoring professors [33], may also be at the root of this need for guidance by faculty.

The average rates of internet use to study at home, as well as the predominance of this variable among second-year students, may be related to the initial adaptation process, in the sense of being properly "settled" in the city where the university is located and being able to hire internet services or share expenses. Likewise, greater use of Famerp Wi-Fi and greater control of the class's formal and informal conversation topics on the internet also seems to result from this adaptation.

As for the school's online tools – the Famerp Management System, for controlling attendance and grades, and the library platform, Sophia –, we must emphasize that these services are essential for students to manage their academic performance and use the library, which justifies the high access rates. The results are in line with the literature, which highlights the importance of informing students, especially in the first weeks after admission, about what the university offers (documentation services, enrollment procedures, use of the university cafeteria, location of departments and services, regulations, etc.) [28].

The services under the "collaboration" category allow various people to work on a given task simultaneously, and include basic text editors, spreadsheets and presentation tools. They are widely used by students as they allow them to create and modify files without the need to install software. In this study, of the services

listed, Google Docs was the most commonly used, corroborating the results of Ríos [34], which highlights to what extent the platform favors practices that develop students' skills by stimulating both independent and group work. The author also stressed as benefits of the service the possibility of synchronous and asynchronous communication – overcoming spatiotemporal barriers – and interaction for joint decision-making. These traits enhance communication between faculty and students and facilitate assessment and feedback [34].

Cloud storage services allow users to save work online and, if desired, share files and all kind of data. Students use them to share presentations, seminars and notes, among other teaching materials. Of the services listed, Dropbox was the most commonly used, corroborating the study by Meske and collaborators [35] carried out with more than 3,000 participants, which also showed a very high demand for this platform in German higher education. The intense use of Dropbox by university students is also reported by Ashtari and Eydgahi [36], although the service, in this study, came second to Google Drive. The use of cloud storage services is lower among medical students from low-income countries [37].

Physicians are currently required to master technologies and know how to use them to search for updated scientific evidence to support decision-making [38,39]. Information and communication technologies can help build knowledge and provide student-centered learning, and research recommends its integration into teaching [40-45]. Such technologies even include Facebook [46], whose frequent use observed in this study (93.8% of the sample) is in line with recent studies [10].

This social networking site is especially well accepted as a learning and teaching environment by undergraduate medical students, who use open or closed Facebook groups to prepare for exams, share material online, discuss clinical cases, organize face-to-face sessions and exchange information on internships [46,47]. Also reported is the successful implementation of a group to help undergraduates cope with stressful situations in their first year of college [48]. However, despite the good acceptance of Facebook by most medical students, there is no conclusive evidence about its impact as a personal learning and teaching environment at higher levels of clinical competence and patient outcomes [46].

Medical education is undoubtedly undergoing a transformation process, seeking to ensure that training models, at undergraduate, graduate and continuing education levels, produce doctors who can thrive in challenging environments. However, many medical students of the millennial generation have not yet fully explored the benefits of WITs for learning. As shown in this study, in several categories surveyed (9 of 14), their contact with such services is still incipient, even in the case of platforms whose potential as learning tools has been widely explored, such as blogs [44,49] and Twitter [50,51] (the latter was not included in this research).

In this sense, one study reported that undergraduates may oppose the formal involvement of faculty in the informal context of Facebook [33], and according to another, when asked whether they would accept to participate in formal courses offered by professors via this social media, only 30% answered affirmatively [52]. In turn, YouTube, currently used by students in the sample, is often described in the literature as a tool of little educational value (contrary to the preferences of the millennial generation) due to the unsupervised nature of the content added daily to the platform [45].

Studies have shown that students use few WIT resources [53], mentioning lack of time and knowledge as obstacles to exploring these technologies [36,37]. Most would like to have some kind of training to use them [37], which shows the importance of WIT education being included across the medical curriculum and not only in the first years of the course, as happens in the researched institution. Finally, it is common for students to neglect WIT classes during the first and second years of undergraduate education due to the large workload of other subjects, ignoring the importance of mastering technology for lifelong professional development. This fact has been informally observed by all authors of this article as professors, students and former students of the medical undergraduate course of the researched institution.

Final considerations

The results show that the basic cycle medical students who answered the questionnaire use WITs, but with little variety. The most commonly used technologies, in addition to the school's internal resources, were Google Docs, Facebook, YouTube and Dropbox. This lack of variety is to some extent paradoxical, as a more intense use of WITs was expected among students of the millennial generation.

Developing learning strategies supported by WITs requires training both faculty and students. Therefore, policies must be designed to enhance students' mastery of technology, given that such skills will be increasingly required. The results of this study can be partly attributed to the traditional teaching model adopted by the course and by the actual faculty, but universities should also provide adequate connectivity and equipment.

The limitations of this study include the possibility of response bias in the survey, as some participants may not remember or incorrectly report how often they use each service. Moreover, internet services are subject to constant fluctuation, falling into disuse or gaining popularity quickly. But even if the preference for a particular platform changes, the type of service sought by students remains approximately the same, given the importance of these activities developed on the internet.

Understanding the use of WITs is essential to help students face dilemmas associated with healthcare in the 21st century. Learning about these technologies during medical education is extremely important for future doctors. A final observation is the need to repeat this study after the current Covid-19 pandemic, which affected educational systems worldwide, including medical education, by requiring a sudden transition to the so-called "emergency remote learning."

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Participation of the authors

Paula Tamoto and João Marcelo Rondina conceived and designed the project, collected the data and, with Renan dos Santos Gati, who further contributed in writing the manuscript, analyzed and interpreted the information. Júlio César André, Sérgio Luís Aparecido Brienze and Alba Regina de Abreu Lima wrote the manuscript and critically revised relevant content. All the authors have read and approved the version to be published.

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