iGeneration's social media usage in retrieving information related to healthcare education: a web-based survey among Italian and Romanian undergraduate medical students

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Abstract
The aim of our study was to assess medical undergraduate student's preferences associated with the value of information/learning methods via social media. An electronic questionnaire was developed and applied to undergraduate medical students from two university centers: Foggia (Italy) and Cluj-Napoca (Romania). 1196 answers were collected, 326 from the Italian university, and 870 from the Romanian university. Students use smartphones to access Facebook, from home, in average 1-3 hours daily. Along with school bibliography and Internet, social media is an active part of the academic life of students. Social media is used to search for information about a specific medical topic or to manage daily student activities. Romanians frequently share information with other colleagues or search for topics related to courses taught at school. The medical students use social media for academic purposes similarly in Italy and Romania.

INTRODUCTION

Social media (SM) defines the online platforms that enable the user to create and publish information. These platforms have user generated content, a high degree of interaction between creator and viewer, and can easily be integrated with other sites [1].

Currently, five generations could be seen as making up our society, each having an active role: the Silent Generation (born 1945 and before), the Baby Boomers (born 1946 to 1964), the Generation X (born 1965 to early the 1980s), the Generation Y or Millennials (no precise start and end dates; the most commonly used timeframe is early 1980s to the mid-1990s or early 2000s) and the Generation Z (starting late-1990s or mid 2000s) [2, 3]. Students enrolled in universities starting early 2010s fall into Generation Z, also known as iGeneration, iGen or Post-Millennials. They have been raised in this world with Internet, smartphones, and social media, so, this generation has no ability to understand a world without these features [4]. Social media is a medium to connect to the world more than any other channel or communication option for the

iGen [5]. The technology savviness of this generation was documented in previous research, showing that social media can be used as an information sharing or collaborative learning tool, and to educate students on a global scale in a virtual form (e.g. teaching through multiplayer virtual world games, podcasts, etc.) [6, 7]. Medical education goes beyond the boundaries of the classroom [8], and social media has been used as an open-learning resource for medical students [9] as well as a tool for active engagement of undergraduate students [9, 10].

Third-year students of the University of Tennessee Health Science Center College of Pharmacy communicate with classmates about course content and connect with professors via social media [11]. In United States, Wiki-based learning proved to enhance nursing education [12]. Specifically, Wikipedia was found to be an appropriate educational tool, judging by learning outcomes [13]. Furthermore, in Canada, the same platform, has shown short-term knowledge acquisition in medical students [14]. Canadian nursing students perceive social media as an educational tool, but their

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faculty members use it much less for this purpose [15].

Similar research questions were addressed to first-year nursing students of one university in a large major city in Australia, and the same outcome was depicted: Facebook (specifically) was found to be a useful avenue for peer-to-peer learning and support [16]. Other researchers within the same geography, showed that medical students positively support the use of social media (specifically Twitter) in medical education as it enables student-staff engagement [17], but more in principle than in practice as they still prefer to print out, highlight, and annotate the lecture material [18].

In 2016, undergraduate medical students in Saudi Arabia, mostly using YouTube, found social media to be beneficial (efficient and effective) for academic purposes, but considered that their tutors did not use SM effectively [19]. In 2017, Al-Jumaili *et al.* showed that Facebook is accessible and easy to use tool for academic communication among Iraqi pharmacy students [20].

A study on Israel nursing students demonstrated the positive and key role of social media in class and the clinical placement. Furthermore, students expected faculty members and nurse educators to use social media to provide support and guidance during the learning process [21]. In 2017, a research conducted at Ludwig-Maximilians-University Munich, Germany, found Facebook groups to be an essential part of the learning environment of their medical students [22].

Social networking sites, in particular Facebook, are popular among United Kingdom (UK) pharmacy students [23]. Twitter, in UK, proved to be a feasible tool for both Plymouth University's nursing students [24] and Southampton University's medical students [25], creating an online support network during learning by enhancing communication methods with teachers and increasing morale among students. Additionally, Facebook pages have demonstrated to be useful tools to support medical students in preparation for high-stakes timed anatomy assessments in the UK [26]. The response of the undergraduate students about the use of social media in medical education is positive, but the efficacy of the teaching strategies via social media lack scientific evidence regarding the outcome of the teaching intervention and thus the benefit from social media as a learning tool [10; 27-29].

The use of social media across Europe was reviewed by different organizations *(Table 1)*. A research among Romanian population of 2014 highlighted the preferred time to use social media as evening time and the preferred place as home [30]. Starting in high school or college, Romanian students are aware that the use of social media has advantages and disadvantages [31].

This study aimed to assess the value of social media usage among Italian and Romanian undergraduate medical students in order to identify the most common resources used in education.

MATERIALS AND METHODS
Participants and procedures

During December 2016-January 2017 in Italy and February-May 2017 in Romania, we conducted a cross-sectional web-based study among undergraduate medical students. We invited all students at the University of Foggia, Italy (n = 1808) [36] and at the Iuliu Haţieganu University of Medicine and Pharmacy, Romania (n = 4218) [37] to participate. The universities included in the analysis are both public universities and have similar educational programs (six years program for medicine and dentistry, five years for pharmacy, four years for midwives and nursing, and three years program for physiotherapy and other medical/healthcare related sciences) with qualifications recognized in the European Countries, as well as similar ranks according to Scimago Institutions Rankings (with the Italian university on the 1173 position and the Romanian university of the 1218 position). The investigated universities have similar paths, and just a cultural difference may emerge.

We built the questionnaire through 6 steps: a literature review, construct definition, writing the survey items, pretesting on prospective respondents, and reconciliation of the definitions found through the literature with the suggestions made by the target audience and final revision by a pool of experts [38]. We examined students' perceptions and attitudes toward social media as an educational tool using 12 items as closed questions (single choice (5), multiple choice (4), Likert-scale (2)), and one open question. The Likert-scale had five points with one being strongly disagree, and five strongly agree.

Table 1
Summary of knowledge about social media usage in Italy and Romania in 2017

Item [ref]	Italy	Romania
SM penetration [32]		
%	52	49
Active users (millions)	31	9.4
Mobile social use penetration [32]		
%	27	41
Active users (millions)	28	8
The most active social media platforms	YouTube, Facebook, Instagram, Twitter, Google+, LinkedIn, Pinterest, and Tumblr (2016) [33]	Facebook, Wikipedia, YouTube, Google+, Twitter, Hi5, and LinkedIn (2014) [30]
The average time spent on SM	2 hours [33]	30 minutes and 3 hours [34, 35] (students)
Why students use SM?		Communication, learning and exchanging information, exchanging photo, video, friend search, and texting [35]

We created the questionnaire in both Italian and Romanian, following instructions available in the Google Forms web site. An e-mail containing an explanatory letter and a link to a self-administered standardized questionnaire was sent to all students. Recipients who agreed to respond were directly linked to the questionnaire by clicking the following URLs: https://goo.gl/forms/LjnBHu2CnxXAuagn1 (Italian) and https://goo.gl/forms/mINZDy8x7nQROLHz1 (Romanian). A reminder e-mail was sent one and two weeks after the initial e-mail. Anonym responses were automatically redirected in an Excel spreadsheet.

The study protocol was approved by the Iuliu Haţieganu University of Medicine and Pharmacy's Ethics Committee (no. 185/10/05/2016).

Statistical analysis

To ease up comparison, all the undergraduate programs of 3 or 4 years (180-240 European Credits Transfer System also known as ECTS) were grouped under the name of college: nursing, midwifery, radiology and medical imaging technicians, laboratory, balneo-physio-kinesiotherapy and rehabilitation, dental technology, speech-language therapy, nutrition and dietetics. Similar answers of the open questions were pooled before analysis. Descriptive statistics were used to characterize responses to the survey. Qualitative data are summarized as percentage and associated 95% confidence interval (values provided in squared brackets) calculated with an exact method [39]. Quantitative data are expressed as mean and standard deviation whenever data proved to follow the normal distribution (tested with Shapiro-Wilk test), otherwise median and the range (min-max) were reported. The Mann-Whitney Test was used to compare quantitative data that proved not to follow the normal distribution among two groups (Italian and Romanian students). The Chi-square test, with or without continuity correction according to the expected frequencies, was used to test the association in the contingency tables. Statistical analysis was performed with Statistica program (v. 8, StatSoft, Tulsa, USA) at a significance level of 5% and a p-value lower than 0.05 was considered statistically significant.

RESULTS

Participant's profile

Overall, 325 (17.98% [16.25-19.85]) students responded from the Italian University, and 870 (20.63% [19.42-21.89]) students responded from the investigated Romanian University.

The majority of respondents were females *(Table 2)*, with younger participants in Romania compared to Italy (p < 0.0001). Sixteen participants from the Romanian University did not fill the age, corresponding to 1.84% [1.03-2.99] missing data.

General use of social media

Most of the respondents both Italian (92.92%, 95% CI [89.54-95.38]) and Romanian (98.62%, 95% CI [97.59-99.31]) used Facebook with significantly higher frequency among Romanian respondents *(Table 3)*.

They use social media mostly from home, 96.32% Italian responders (95% CI [93.85-98.15]), and 98.39% Romanian responders (95% CI [97.36-99.08]). The average time spent on social media is 1-3 hours for both groups, Italian (57.36%, 95% CI [52.00-63.1]) and Romanian (55.98%, 95% CI [52.64-59.31]) responders *(Table 3)*. No significant differences were observed between Italian and Romanian undergraduate students regarding the use of Snapchat (p = 0.5475), LinkedIn (p = 0.2208), SlideShare (p = 0.2687), or WhatsApp (0.9747). A small but significant number of Romanian students use ResearchGate or Academia (Romania:Italy = 3.45%:0.92%, p = 0.0178), Pinterest (Romania:Italy = 1.61%:0%, p = 0.0214) or Tumblr (Romania:Italy = 1.38%:0%, p = 0.0333).

The most used gadgets to access social media platforms are the smartphones regardless the geographical setting of the respondents (Italians:Romanians = 95%:94%), and a significantly higher percentage of Romanian respondents (87%) access social media using laptops (Italy 30%, p < 0.0001). Tablets are less frequently used (Italy:Romania = 25%:23%, p = 0.4313) while the desktop are on the fadeaway (Italy:Romania = 15%:19%, p = 0.1293).

Academic use of social media

Over 90% of the responders both Italian (95.69%) and Romanian (93.10%) use social media platforms for academic purposes, with no significant differences between groups (χ^2 = 2.41, p = 0.1209).

The respondents also use other information sources in their learning process (293/325 of Italians and 833/870 of Romanians) with a significantly higher percentage among Romanian students compared to Italian students (χ^2 = 13.61, p = 0.0002). Besides social media, the other most used sources of information are school bibliography (Italians:Romanians = 78%:74%, p = 0.2147) and the general Internet *(Table 4)*. Majority of the responders both Italian (78.15%, 95%CI [73.23-82.46]) and Romanian (88.97%, 95%CI [91.26-94.71]) said that they would like that teachers to use social media platforms to communicate with them. Facebook (including the features messenger and groups) was pointed as the most useful platform of communication by both Italian students (49%) and Romanian students (56%), with a significantly higher percentage among Romanian respondents (p = 0.0223).

Frequently, both Italian and Romanian students search through social media while preparing for an exam (Italians 26.77% [22.15-31.99] and Romanians 27.36% [24.37-30.46]) or to find administrative information about the university (Italians: Romanians = 34.46%:41.61%). Neither Italians (30.46% [25.54-35.69]) nor Romanians (23.91% [21.15-26.90]) search healthcare professionals through social media. Italians, also, never share their own experience as students (36.00% [30.77-41.54]) or their own opinion on a given medical subject (37.23% [32.00-42.77]), meanwhile Romanians rarely post their experiences (24.94% [22.07-27.93]) or express their opinion (29.66% [26.67-32.76]).

Sometimes, Italian students search for information

Table 2
Main characteristics of the participants

	Italian (n = 325)	Romanian (n = 870)	Stat. (p-value)
Gender, no. (%) [a]			11.42 (0.0007)
Female	188 (57.85)	593 (68.16)	
Male	136 (41.85)	273 (31.38)	
Age, median (Q1-Q3) [b]	22 (20–25)	20 (20–21)	12.43 (< 0.0001)
Study program, no. (%) [a]			229 (< 0.0001)
Medicine	92 (28.31)	416 (47.82)	
Dentistry	0 (0.00)	227 (26.09)	
College	226 (69.54)	223 (25.63)	
No Erasmus, no. (%) [a]	289 (88.92)	849 (97.59)	39.09 (< 0.0001)

% = percentage; a: Chi-square test; b: Mann-Whitney Test.

Table 3
Summary of social media usage, location, time, and devices

	Italian (n = 325) no. (%)	Romanian (n = 870) no. (%)	χ^2 (p-value)
Social media, no. (%)			
Facebook	302 (92.92)	858 (98.62)	27.02 (< 0.0001)
YouTube	64 (19.69)	309 (35.52)	27.60 (< 0.0001)
Instagram	187 (57.54)	557 (64.02)	4.23 (0.0396)
Wikipedia	235 (72.31)	776 (89.2)	51.80 (< 0.0001)
Google +	174 (53.54)	574 (65.98)	15.64 (0.0001)
Scribd	2 (0.62)	225 (25.86)	98.01 (< 0.0001)
Bloggs	1 (0.31)	77 (8.85)	28.30 (< 0.0001)
Twitter	8 (2.46)	119 (13.68)	31.34 (< 0.0001)
Location			
home	314 (96.62)	856 (98.39)	3.64 (0.0564)
public places	105 (32.31)	681 (78.28)	222 (< 0.0001)
school/university	83 (25.54)	612 (70.34)	195 (< 0.0001)
Hours spent per day			14.83 (0.0006)
≤ 1 hour	63 (19.38)	98 (11.26)	
1-3 hours	187 (57.54)	487 (55.98)	
3-6 hours	59 (18.15)	210 (24.14)	

Table 4
Summary of other learning sources and teacher-student communications platform desired by students

	Italian (n = 325) no. (%)	Romanian (n = 870) no. (%)	χ^2 (p-value)
Other Learning Sources			
The Internet but not SM	242 (74.46)	569 (65.4)	8.90 (0.0028)
Books[a]	9 (2.77)	81 (9.31)	14.54 (0.0001)
Course notes	12 (3.69)	9 (1.03)	9.68 (0.0019)
Teachers-students communication platform:			
Email[b]	15 (4.60)	104 (11.95)	14.21 (0.0002)
YouTube	25 (7.67)	35 (4.02)	6.68 (0.0097)
WhatsApp (groups)	22 (6.75)	20 (2.30)	13.94 (0.0002)
Wikipedia	2 (0.62)	32 (3.68)	8.03 (0.0046)
Cloud storage[c]	14 (4.29)	14 (1.61)	7.53 (0.0061)

a: atlases, manuals, books from the library, e-books; b: Gmail, Hotmail, Yahoo, Groups; c: Dropbox, Google drive.

regarding a course taught in school (29.85% [24.92-35.08]) and share information on social media with other colleagues (27.69% [23.08-32.92]). Romanians perform these searches a little more frequently (27.82% [24.83-30.92]) and share with other colleagues more frequently information (40.11% [36.78-43.45]). A specific medical subject (not mandatory to be school related) is a frequent subject to search for the Italian students (29.85% [24.92-35.076]), while Romanians perform this search only occasionally (29.66% [26.67-32.76]). Italian students rarely search for healthcare providers' information (23.38% [19.08-28.31]), but Romanian students sometimes look up more (26.90% [24.02-29.99]).

The differences between the Italians and Romanians remain unchanged if the comparisons were conducted for gender or specialization subgroups as compared to the country batches.

DISCUSSION

The primary objective, namely to explore the use of social media within two medical schools, one in Romania and one in Italy, was successfully achieved. The results indicate that the use of social media for educational purposes is spread in a similar way within the researched groups.

A slightly higher rate of female responders from both countries (57.67% for the Italian university and 68.16% for the Romanian university). This can be explained by the fact that in both countries more women than men graduate the baccalaureate exam [40], so they have better chances of being accepted by universities. The median age of the Italian students was slightly higher than the median age of the Romanian students *(Table 2)* and both fits within the demographics of the two geographies. Most participants in the Italian sample were college students while most participants in the Romanian sample were general medicine students *(Table 2)* reflecting the distribution of undergraduate students at the universities included in the study.

The investigated samples of undergraduate medical students are part of Generation Z [2] with social media as an integrative part of their lives. Facebook was listed as the most utilized social media among both investigated groups not only in this research but in previously reported ones [18, 22]. The students spend from 1 to 3 hours daily on these platforms. Smartphones, convenient gadgets (easy to carry and use), are the preferred method to access social media by the two groups assessed, but not the only one, the students also using their laptops, tablets or desktops *(Table 3)*. Neither the Italian nor the Romanian students have a one-and-only preferred location to interact through social media *(Table 3)*, this generation has integrated technology in their every-day activity and staying connected, no matter if they are at home, at school/work or in a public place, is essence [5].

Having social media integrated into every-day-routine is not a surprise that over 90% of both groups have integrated these platforms for academic purposes *(Table 3)*. Wikis [12], YouTube [19], Facebook [20] proved to be feasible tools for searching about a specific medical subject or performing administrative educative tasks, like planning of the exams, lectures, practical activities, scientific manifestations or extracurricular activities. The administrative feature has been successful previously tested among Israel [21] and UK [24, 25] students. Similar to US students [11], Romanian students also search for topics related to courses taught at school.

As Wikipedia [13, 14], YouTube [19], and Facebook [26] have proven to be useful tools that can enhance the learning outcomes, students from both university centers use, these three, but not exclusively, while preparing for an exam *(Table 3)*. Romanians, like their US [11] or Australian [16] counterparts, frequently share information with other colleagues, through social platforms.

Despite the usage of social media throughout the educational process, technology is not the single point of trough. Students also use other information sources, like the school bibliography, in print version that can be highlighted and annotated [18] or Internet, in general *(Table 4)*.

US [11], Canadian [15], Australian [16, 17], Israel [21] or UK [24, 25] students found social media a useful avenue for communication and support during the learning process. Likewise, the Italian and Romanian students encourage teachers to use especially Facebook to communicate with them. There has been revealed a gap between the academia members and students not only among Italian and Romanian students but also across other geographies like Canada [15] or Saudi Arabia [19].

Limitations

The present study has several limitations that provide opportunities for future research. Firstly, the response rate was reasonable; however, the possibility of bias resulting from non-response cannot be ignored. Cultural or geographical customs may affect to the country generalization of the results reported in this paper. Furthermore, the non-probabilistic sampling used in the design also induce some limitations. A multi-center study to analyze the differences in usage of social media by undergraduate medical students across Europe could bring more insights and more generalizable results.

Additionally, regarding the same audience, it will be interesting to assess whether or not, and how, the information received on social media influences their exam results. Secondly, this study only examined one-way communication, student's interaction. The social media phenomena are tools that support healthcare education. Youngsters are social media savvies, but research aiming teacher's social media behaviors are scarce [15]. Further studies are recommended to evaluate the usage of social media also from the perspective of teachers, and the student-teacher social media interactions. Thirdly, the opinions were captured at one point in time and were self-reported, and several potential sources of bias such as attribution and exaggeration can be listed. Fourthly, the research conducted did not capture complex values and behaviors indicatives of professionalism. Having an identifiable presence on social media can have the same impact on a future healthcare professional's social reputation as being active in any other public venue. In fact, having access to a global audience can magnify this reputation. The most effective use of social media often involves communicating information that is both personal and professional. However, students must retain the same standards boundaries of the professional relationship when dealing with virtual interactions that they would apply in face-to-face interactions [15]. The question thus remains open as to what measure(s) should be used to identify potentially inappropriate attitudes towards professionalism and how guidelines or trainings would increase the responsibly of social media behavior [41, 42].

Recommendations

It is important to acknowledge that, even though healthcare practitioners are known to be late adopters of technology, the next generation of undergraduate

students will have grown up in a society where social media technology is inescapable. Enforcing existing recommendations to include social media in the educational process [43], based on the results, social media might be used as one of the tools to fill the communication gap between the two universities and students. We appreciate that the students will well receive the use of this innovative practice in current teaching and it will facilitate interactive learning and their engagement with lectures and lecturers. Health care educators should educate the students on how to utilize social media as support in their daily lives and studies (e.g., learn how to differentiate between real and fake information, how to look for high-quality information).

CONCLUSIONS

The results confirm that the undergraduate medical students are readily using social media platforms as educational support. This creates an avenue to research further the most effective methods to engage these stu-

dents on their own terms whilst still providing sound and reliable pedagogical structure.

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