



Original article

Medical professionalism videos on YouTube: Content exploration and appraisal of user engagement

Tauseef Ahmad ^{a,b}, Kamran Sattar ^{a,c,*}, Ashfaq Akram ^a

^a Department of Medical Education, College of Medicine, King Saud University, Riyadh, Saudi Arabia

^b Department of Computer Science and Information Technology, NIMS University, Jaipur, Rajasthan, India

^c Department of Medical Education, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia



ARTICLE INFO

Article history:

Received 12 April 2020

Revised 3 May 2020

Accepted 1 June 2020

Available online 12 June 2020

Keywords:

Professionalism

YouTube

User engagement

Non-clinical & Clinical

Undergraduate

Medical students

ABSTRACT

Background: Social media has become the fastest growing platform for sharing and retrieving information and knowledge, and YouTube is one of the most popular and growing sources of health and educational information video-sharing website. But, videos on this open platform are not peer-assessed, therefore, the accessible data should be adequately assessed. Till date, no exploration and analysis for assessing the credibility and usefulness of Medical professionalism videos available on YouTube are conducted.

Objective: To analyze the video sources, contents and quality of YouTube videos about the topic of medical professionalism.

Methods: A systematic search was accomplished on YouTube videos during the period between March 1, 2020 and March 27, 2020. The phrases as significant words used throughout YouTube web search were 'Professionalism in Medical Education', 'Professionalism in medicine', 'Professionalism of medical students', 'Professionalism in healthcare', 'Teaching professionalism', 'Attributes of professionalism'. The basic information collected for each video included author's/publisher's name, total number of watchers, likes, dislikes and positive and undesirable remarks. The videos were categorized into educationally useful and useless established on the content, correctness of the knowledge and the advices. Different variables were measured and correlated for the data analysis.

YouTube website was searched the using keywords 'Professionalism in Medical Education', 'Professionalism in medicine', 'Professionalism of medical students', 'Professionalism in healthcare', 'Teaching professionalism', and 'Attributes of professionalism'.

Results: After 2 rounds of screening by the subject experts and critical analysis of all the 137 YouTube videos, only 41 (29.92%) were identified as pertinent to the subject matter, i.e., educational type. After on expert viewing these 41 videos established upon our pre-set inclusion/exclusion criteria, only 17 (41.46%) videos were found to be academically valuable in nature.

Conclusion: Medical professionalism multimedia videos uploaded by the healthcare specialists or organizations on YouTube provided reliable information for medical students, healthcare workers and other professional. We conclude that YouTube is a leading and free online source of videos meant for students or other healthcare workers yet the viewers need to be aware of the source prior to using it for training learning.

© 2020 The Author(s). Published by Elsevier B.V. on behalf of King Saud University. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Abbreviations: HMA, Hamza Muhammad Abdulghani; SRH, Syed Rashid Habib; DMH, Dost Muhammad Halepoto.

* Corresponding author at: Department of Medical Education, College of Medicine, King Saud University, Riyadh, Saudi Arabia.

E-mail address: kbaloch@ksu.edu.sa (K. Sattar).

Peer review under responsibility of King Saud University.



Production and hosting by Elsevier

1. Introduction

The modern era witnesses and advocates application and usefulness of internet and multimedia in the daily life of a learner in general and for the medical students in particular. Noticeably, internet-based learning tools have become an indispensable and fundamental part of the learners in medical education as they offer sustenance towards ever-evolving learning tasks (Shamji and Law, 2011; Ruiz et al., 2006). Learning through videos in medical education has gained its status exponentially in the past decade. This

learning has been endorsed by educational organizations and medical schools alike. Stanford University School of Medicine collaborates with the Khan Academy and been successfully utilizing short videos for teaching the curriculum through flipped classroom teaching modality (Prober and Khan, 2013). Moreover, nowadays, educationally useful videos have been found successful as an audio-visual support for learners' needs. Therefore, as a result, learners are now becoming proficient in fulfilling their learning needs through the videos. Another aspect making videos as a powerful learning and teaching tool is the provision of versatility in representing the learning material in a very simple and easy to understand fashion, which otherwise somehow is challenging through verbal approach in a face to face teaching session. Moreover, if the videos are prepared (e.g. by experts, with evidenced material) and presented (e.g. with a high quality audio-visual support) appropriately, tend to deliver medical students the suppleness to appraise teaching content according to their own capacity targeting their discrete educational needs for various subject topics. There has been an upsurge in the number of users to be inclining towards such learning opportunities. As an outcome of these videos there has been an increase in online learners and also the evidence-based practice. (Howick, 2011; Tilson et al., 2011).

Medical students frequently access various videos in search of their needed information related to different subject topics and these videos are prepared, organized and published on net by different internet video sharing websites (Mosa et al., 2012) Google, YouTube, and eMedicine are becoming medical students' learning resources (Akgun et al., 2014; Alsafi et al., 2013; Baudains et al., 2013). Among various video-sharing websites, YouTube is an American online video-sharing platform created in February 2005, allowing to bring about, watch, like/dislike, disseminate, remark in the form of comments on videos, and get in touch by subscribing to other users. Regardless of some boundaries, textbooks are still one of the key knowledge means, but still, the learners count on online resources e.g. YouTube, to augment their understanding of their learning issues (Cook and Smith, 2004).

Medical professionalism MP is ever-evolving, and recently it has shifted from total authority to accountability, from personal judgment to evidence-based medicine, from self-absorption to teamwork and mutual obligation. Attributes of the MP, e.g. altruism and humanism are also advocated as the "heart and soul of medicine." Although there has been an upsurge in the ways MP shall be inculcated within the medical curriculum to enhance students' understanding towards this essential element of a doctor-patient-society relationship, yet, many observers have concluded that we have a crisis of professionalism in the practice of medicine. There are many concerns about students' professionalism (Babelli et al., 2015), Unprofessional behavior is very common (Hofmann et al., 2013), and corrective actions are frequently resulting from unprofessional behavior (Papadakis et al., 2004). Therefore, bearing in mind its importance and current weak standing amongst the medical students, many organizations worldwide have started to promulgate the significance of its teaching, training and evaluation. Medical students have firm honors as well as accountabilities therefore, patients they serve to and the society they serve in anticipate from them to be true professionals. General Medical Council considers that it is imperative to review the guidance on professionalism (GMC). Moreover, a national competency framework is desired to be established and for that Committee of Deans of Medical Schools in the Kingdom of Saudi Arabia has started to work. The teachers and students believe that the existing formal curriculum is not adequately addressing professionalism. (Al-Eraky et al., 2013). Attributes of MP, as a full set of competency, are required for all medical students, across the globe. However, being an important topic, still in its infancy, at various medical schools and due to the lack of faculty to teach this essential element of profession-

alism, medical students in addition to traditional class lectures, feel compelled to look for alternative methods. In recent times, there is a frequent emergence of new methods of learning with new sets of information (Waterworth and Honey, 2017; Magsamen-Conrad et al., 2019).

In such a state, these YouTube videos become easily accessed alternative educational resources. This pertinent approach in the path of maintenance of students' skills has become a widely established educational approach (Ju and Ma, 2008). YouTube videos are available on a variety of topics and by various types of sources. This study assumed that there are potential variances concerning the quality of available videos, yet, to the date no substantial exploratory efforts are done to estimate the value. Therefore, the aim of this study was to evaluate the quality and accuracy of professionalism videos currently available on the YouTube. According to the authors' best knowledge, this is the very first study which has been carried out to look for the efficacy of YouTube videos on the topic of medical professionalism.

2. Methods

2.1. YouTube videos identification criteria and important of the qualification

We conduct the systematic search for YouTube videos for the period between March 1, 2020 and March 27, 2020. The phrases as significant words used throughout YouTube web search were 'Professionalism in Medical Education', 'Professionalism in medicine', 'Professionalism of medical students', 'Professionalism in healthcare'. 'Teaching professionalism', 'Attributes of professionalism'.

2.2. Data collection and quality assessment of YouTube videos

During the YouTube web search, just the initial five website pages of the outcomes recovered against each quest keyword were vetted for the relevant videos. Above five pages of YouTube search, the outcomes generally do not match/relate very well to the given query search keyword (s) (Murugiah et al., 2011). Subsequently, the absolute initial five YouTube pages were checked for the video recovery and information assortment for each recovered video, the methodological quality evaluation and information withdrawal were freely abridged in copy by two autonomous specialists (TA & KS) using a standard procedure. Three Professionalism subject experts (HMA, SRH & DMH) grouped the subject linked educational and non-educational videos and does the content examination for all the educationally beneficial videos. Standard information assortment structure was utilized to assure the precise exactness of the collected data by carefully following the pre-set consideration/rejection criteria. We collect and store the information of videos included, YouTube videos links, total length of the video-minute/second (we mainly focused on videos with length not more than 20 min, because from our initial review we were able to know that the lengthy videos do not attract viewers engagement), video title, total number of the views of the video, date of upload, total number of likes or dislikes of video, total number of positive and negative comments (if any) related to the video and name of the uploader & publisher of the video. For our data collection, we explored 'www.Youtube.com' using google chrome web browsers.

2.3. YouTube videos inclusion and exclusion criteria

All subject related YouTube videos included in the current study required to be fulfilling the pre-determined basic criteria prior to being labelled as educationally useful videos. Moreover, the video

content must be relevant and scientifically valid, conveying the right knowledge about the medical professionalism. The YouTube videos must be prepared (content, slides) as well as presented (if a presenter is there, even if talking in the background) in the English language.

Furthermore, when a similar video/content showed up in a few YouTube videos (published with a different name), only the latest one or the complete video was included in the current study. Videos duplication or same video with different name is the major factor most of the videos excluded in the current study. The major criteria for identifying the 'non-educational videos' excluded, 'not well demonstrated', 'poor audio/visualization', irrelevant and/or disinformation knowledge of the subject, scientifically unproven or not valid information, other than the English language, a piece of news or advertisement, movie documentary or clips.

3. Data analysis

We have summarized the collected data from the YouTube videos and using a standard form. This data was then entered into Microsoft Excel version 2016 and analyzed using SPSS version 23.0. Analysis of data and outcome variables was achieved through descriptive statistics (Mean, Standard deviation.). Determination of t-value and identification of significant differences were achieved through Statistical t-test (analysis of variance). A correlation was found between like vs. dislike, like vs. total views/day, like vs. like/day and like vs. dislike/day for all the 'Educational videos' under investigations using Pearson's correlation coefficient (r). The statistical significance level P-value < 0.05 was retained during the complete analysis. The videos' credibility was measured as varied scores $[(\text{Like}-\text{Dislike})/(\text{Like}, \text{Dislike})] * 100$ and videos' merits $[(\text{Positive comments}-\text{Negative comments})/\text{Total comments}] * 100$.

4. Results

After 2 proper rounds of screening by the subject experts and critical analysis of all the 137 retrieved YouTube videos, only 41 (29.92%) videos were identified as appropriate to the subject matter, i.e., educational type. Initially, 41 videos were found to have information about medical professionalism. After carefully appraising these 41 videos based upon our pre-set inclusion/exclusion criteria, only 17 (41.46%) videos were found to be educationally valuable and remaining 24 (58.53%) videos were either found poor in terms of audio, video quality or information about professionalism was very shallow (e.g. only the title matched the term 'professionalism'). Total mean duration of these educationally useful videos was 689.17 s (SD = 805.97) (Table 1). On the other hand, the duration of educationally useful videos ranged between 129 and 3531 s (Table 2). The mean (SD) viewership or views/day of all the videos in the current study was 8.97 (SD = 24.00) whereas, the range of viewership of the educationally useful videos was (0.35 to 101.02) (Table 2). A total mean (SD) of 'likes' for all of the 17 educationally useful in the current study videos was 87.17 (SD = 289.15), which showed that average number of users like the educationally useful 'medical professionalism videos' ($t = 1.24$, $p = 0.23$). The average number of 'likes' for videos by the viewers/day (when the users/viewers visit these YouTube videos), as mean of those videos was 0.52 (SD = 0.16), perhaps, because login information is required to 'like', 'dislike' or comment on any YouTube video so most of the user just view the videos and cannot mark on 'like, dislike' and also could not make any comments. The total mean of 'dislike' of educationally useful videos was 5.17 (SD = 14.76) which also showed that not much difference of opinions was present with the visitor ($t = 1.44$ and $p = 0.16$)

Table 1

Related information and mean scores of all the 17 videos included in the study.

Themes	Mean(SD)	T(P)*
Total second	689.17(805.97)	3.52(0.003)
Days	2260.41(1328.39)	7.01(0.000)
Total viewers	15886.35(41202.59)	1.59(0.13)
Like	87.17(289.15)	1.24(0.23)
Dislike	5.17(14.76)	1.44(0.16)
Positive comments	2.70(8.88)	1.25(0.22)
Negative comments	0.41(1.22)	1.38(0.18)
Viewer/day	8.97(24.00)	1.54(0.14)
Like/day	0.52(0.16)	1.28(0.21)
Like/Viewers	0.0031(0.002)	5.68(0.000)
Dislike/Viewers	0.0003(0.0004)	3.30(0.004)
Dislike/day	0.029(0.0085)	1.42(0.17)
Positive comments/Like	0.0292(0.053)	2.24(0.03)
Negative comments/Dislike	0.0295(0.071)	1.68(0.11)
Video Score**	72.86(34.91)	8.60(0.000)
Vedio Merite***	24.08(41.11)	2.41(0.028)

* Student t test.

** Vedio scores = $((\text{Like}-\text{Dislike})/(\text{Like} + \text{Dislike})) * 100$.

*** Videos merits = $((\text{Positive comments}-\text{Negative comments})/\text{Total comments}) * 100$.

Table 1. Concerning the positive comments of the each educationally useful video, the minimum number was 0 and the maximum was 37, therefore, the mean was 2.70 (SD = 8.88), and the total mean of negative comments was 0.41 (SD = 1.22) in the current study.

All 17 educationally useful videos related detailed information for the review purpose has been reported in the Table 2 and Table 3. It was soothing that all the 17 academically beneficial videos were produced and uploaded by the professionals, doctors, expert bodies and university teaching faculties. Also, the link for the concerned publishing groups, or authors were available, such as National Center for Complementary and Integrative Health (NCCIH), American Board of Internal Medicine (ABIM) Foundation, University of California, General Medical Council (GMC), Canadian Medical Association (CMA) and more.

The correlation between the total 17 educationally useful videos, the number of views and the number of viewers/day was positive and high and the result was statically significant ($r = 0.993$, $P = 0.000$). Likewise, a significant correlation was found between the total views and the Like/day ($r = 0.991$, $P = 0.000$), but no significant correlation was found with video scores ($r = 0.182$, $P = 0.48$) and video merit ($r = 0.343$, $P = 0.17$) (Table 4). The total likes of all the 17 videos and the number of views/day showed a statistically significant correlation ($r = 0.994$, $P = 0.000$). However, no correlation was found between the video scores ($r = 0.150$, $P = 0.56$) and video merits ($r = 0.371$, $P = 0.14$). Also, a significant correlation was found between the total dislikes and views/day, likes/day, but with the association and with the score of the video and the merits of the video were not significant (Table 4).

5. Discussion

To the best of our knowledge, this is the very first study carrying out an exploration of videos available on YouTube on the topic of Medical Professionalism (MP). A detailed content analysis of these videos was established, which help authors identify educationally beneficial videos on an ever-evolving, ever-growing and essential domain in medical education i.e. MP. Authors have established that viewers in a quite a noteworthy number watched YouTube videos designating this medium as an educational resource. This study found that an invaluable number of the videos accessible on YouTube associated with the MP were prepared and or uploaded by beings with unknown credentials in the field, whereas, a small

Table 2
Detailed information of all the 17 videos included in the study.

S. No	Author (publisher/uploader)	Length (min)	SEC	Viewer/day	Like/day	Like/viewer	Dislike/viewer	Dislike/day	Positive comment/like	Negative comment/dislike
1	NCCIH	4:47	287	1.4393382	0.0067402	0.00468284	0	0	0	0
2	OPENPediatrics	14:19	859	10.401903	0.0768668	0.00738968	0.00035189	0.003660322	0.0285714	0
3	wmumed	13:17	797	101.02378	0.6989559	0.00691873	0.000355984	0.035962877	0.0307054	0.080645161
4	NMCvideos	2:48	168	13.275	0.0375	0.00282486	0.000008	0.001136364	0	0
5	NEWMFGALL	5:20	320	6.9041509	0.0256604	0.00371666	0.000327941	0.002264151	0	0
6	usasknursing	6:51	411	2.1590703	0.0021129	0.00097861	0	0	0	0
7	PrimeNetworkInt	14:29	869	0.8202147	0.0022361	0.00272628	0.001090513	0.000894454	0.2	0
8	University of California Television (UCTV)	58:51	3531	1.3639838	0.0058453	0.00428548	0.000329652	0.00044964	0.0769231	0
9	University of California Television (UCTV)	9:21	561	2.1582378	0.0053945	0.00249948	0.00041658	0.000899078	0.0833333	0.25
10	University of California Television (UCTV)	21:16	1276	4.9136691	0.0008993	0.00018302	0	0	0	0
11	Canadian Medical Association	16:13	973	0.8568421	0.0010526	0.0012285	0.001228501	0.001052632	0	0
12	General Medical Council	3:40	220	0.764214	0.0005574	0.00072939	0	0	0	0
13	PracticalBioethics	4:34	274	0.3566896	0	0	0	0	0	0
14	ABIM Foundation	2:09	129	1.0828804	0.0022645	0.00209118	0.00083647	0.000905797	0	0
15	General Medical Council	3:03	183	0.6155378	0.001992	0.00323625	0	0	0	0
16	Faculty Center for Teaching and Learning	10:00	600	2.1753861	0.0064773	0.00297755	0.001374256	0.002989537	0.0769231	0.166666667
17	BoltonUniLibrary	4:18	258	2.1866295	0.0139276	0.00636943	0	0	0	0

Table 3
Access links and related comments of all the 17 videos included in the study.

S.no	Links	Total views	Like	Dislike	Positive comments	Negative comments	Video score	Video merit
1	https://www.youtube.com/watch?v=rYv3_H_5KYg	2349	11	0	0	0	100	0
2	https://www.youtube.com/watch?v=GYg2FeOtpSQ	14,209	105	5	3	0	90.909091	100
3	https://www.youtube.com/watch?v=S4wWCIQhZaA	174,165	1205	62	37	5	90.213102	76.190476
4	https://www.youtube.com/watch?v=TX01OVnK0-o	11,682	33	1	0	0	94.117647	0
5	https://www.youtube.com/watch?v=zegrMSEMFjo	9148	34	3	0	0	83.783784	0
6	https://www.youtube.com/watch?v=Pu8yI3PLYb0	7153	7	0	0	0	100	0
7	https://www.youtube.com/watch?v=TWWRWSIDfVE	1834	5	2	1	0	42.857143	100
8	https://www.youtube.com/watch?v=EpKG0VbZTGo	6067	26	2	2	0	85.714286	100
9	https://www.youtube.com/watch?v=5niE-DayNxw	9602	24	4	2	1	71.428571	33.333333
10	https://www.youtube.com/watch?v=EvbR_e_aNkc	21,856	4	0	0	0	100	0
11	https://www.youtube.com/watch?v=tleduTDVuL0	814	1	1	0	0	0	0
12	https://www.youtube.com/watch?v=d0DCdy-_LAQ	1371	1	0	0	0	100	0
13	https://www.youtube.com/watch?v=eXwe4errSMg	1349	0	0	0	0	0	0
14	https://www.youtube.com/watch?v=yhsDwz1ESI4	2391	5	2	0	0	42.857143	0
15	https://www.youtube.com/watch?v=HWIn5P_y7UI	927	3	0	0	0	100	0
16	https://www.youtube.com/watch?v=u0p7IhTY23s	4366	13	6	1	1	36.842105	0
17	https://www.youtube.com/watch?v=S703WyyqGn4	785	5	0	0	0	100	0

Table 4
Correlation between the likes/dislikes, comments, video score, and merit of 17 videos.

Correlation Coefficients							
	Viewer/day	Like/day	Dislike/day	Positive comments/Like	Negative comments/Dislike	Video score	Video merit
Total viewers	0.993(0.000)**	0.991(0.000)**	0.987(0.000)**	(-0.005(0.98)	0.196(0.45)	0.182(0.48)	0.343(0.17)
Like	0.994(0.000)**	0.995(0.000)**	0.996(0.000)**	0.11(0.96)	0.187(0.47)	0.150(0.56)	0.371(0.14)
Dislike	0.985(0.000)**	0.992(0.000)**	0.998(0.000)**	0.65(0.80)	0.261(0.31)	0.101(0.70)	0.374(0.13)
Positive comments	0.986(0.000)**	0.994(0.000)**	0.994(0.000)**	0.062(0.81)	0.226(0.38)	0.132(0.61)	0.407(0.10)
Negative comments	0.947(0.000)**	0.953(0.000)**	0.967(0.000)**	0.104(0.69)	0.437(0.08)	0.072(0.78)	0.304(0.23)

** Correlation is significant at 0.01.

number of videos from the qualified sources and or organizations. This could be due to the reason of equal opportunity (and provision to upload the videos) given to any individual or organization without any check and balance for the quality of the uploaded content. This lets the common viewers land in a territory of enormous knowledge that is not established and is not backed by educational and scientific evidence. YouTube videos contain misrepresentative health-related information due to the absence of evaluative analysis for any uploaded content within, prior uploading (Ibrahim, 2012; Hegarty et al., 2003). The search topic of this study i.e. pro-

fessionalism is ever-growing within the medical education context due to its dominant altruistic position which connects healthcare individuals with society. Our study found that a high number of likes and viewership was linked to the (educationally important) videos prepared and or uploaded by reliable resources (e.g. ABIM, University of California, Canadian Medical Association, OPENPediatrics, etc.). According to the Professional Standards Council (PSC), professionalism's principal notions is that society can rely professionals to exercise at or above a certain standard and apply their knowledge and skills to the benefit of the society. On the

one hand professionalism is the topic of utmost importance as it truly is the central domain in medical education, and on the other hand having frequently uploaded videos not really showing or presenting to the audience a true picture simply poses a danger and this double folds as concerns medical education and learners which are to be future physicians to take care of the needs of society.

Our study also established that the viewers after liking the videos also commented positively, this reflects that if the source is reliable, then videos tend to yield more likes and comments expressing their like due to the fact that such videos enhanced their learning. Similar findings were stated earlier in 2013 by Azer et al. We also noted that educationally useful videos that linked with doctor professional behavior at clinics, hospitals, universities or any other educational organizations are shown to impart knowledge and skills for the learners. A previously published study by Azer et al. (2013) reported similar findings. The statistical analysis of the data of the present study professionalism educational videos revealed average growth due to dry subject and no clinical content. Less percentage of the users like and a very small percentage of the users dislike the videos labeled as educationally worthwhile. But most of the YouTube videos comprised of good content and were useful, and showed a positive correlation with the total likes vs. total number of views/day, and total likes vs. likes/day.

Earlier studies (Braslow et al., 1997; Todd et al., 1998; Done and Parr, 2002; Batcheller et al., 2000) have established the benefits of video related learning. Furthermore, It has previously been stated that such videos are an competent mode of education (Azer et al., 2013).

Moreover, the students going to the educational sessions alongside viewing the videos (online or offline) and rehearsing the learning abilities on the patients have gotten one of the most significant learning techniques in the most majority of the medical schools (Krawczyk et al., 2012; Smith et al., 2012).

This study also showed that YouTube videos which were evaluated for the accuracy, scores on the basis of likes and dislikes, and it was almost more than 72%. In conclusion, the current findings suggested that current medical professionalism videos accessible on YouTube are potentially self-learning resources for the dynamic learners and help them in picking up information and skills, therefore the mainstream educationally useful videos were liked by the viewers more than they dislike. YouTube videos that are academically and professionally beneficial if employed appropriately strengthen students' learning, possibly due to audio/video clearness and the substance of the video (Cardine, 2008). Another study reported that students make use of their self-study time to acquire skills by viewing internet videos (Duvivier et al., 2012). Current study also recorded the comments related to educationally useful YouTube video, which were reviewed during the data collection process. It was found that most of the watchers were students, healthcare professionals. Additionally, this was also noticed that by their comments many of them ask questions related to the video content. This study also established that many were able to view but didn't like/dislike or marked any comments, this possibly could be due to the reason that login is obligatory for such accomplishments. The merit score of medical professionalism videos as based on positive and negative comments was less and just more than 24%. The negative comments mostly had pointed out the urge to improve the value of YouTube's search algorithm system for having an accurate process for aligning the related keywords, search items and a more specific lists of response (i.e., videos) (Taylor, 2014; Arnbjörnsson and Einar, 2014; Rabee et al., 2015). While the positive comments from the viewers as they valued the medical professionalism videos of YouTube as educationally knowledgeable, credible, along with good presentation (Rabee et al., 2015). As currently there has been an enormous increase

in utilizing and considering YouTube imperative for knowledge and learning our results will support current struggle which targets the tasks of debating, assessing and refining the medical professionalism videos available on YouTube platform (Murugiah et al., 2011). These tasks are achievable provided all the healthcare stakeholders work towards preparing high-quality multimedia content for the learners. (Murugiah et al., 2011). Carefully produced videos may play an essential role in students' training especially if quality standards related to the provided information are maintained. Our study offers the appraisal of existing YouTube videos related to MP with special consideration to the content and user commitment, resulting in the enhancement of students' knowledge with active and accurate learning. Authors believe the topic of 'medical professionalism' is of interest to a specific group (healthcare stakeholders) within the community; therefore the number of YouTube videos identified, explored, analyzed and reported in the current study was not very high.

6. Conclusions

Medical professionalism multimedia videos uploaded by healthcare specialists or organizations on YouTube provided reliable information for medical students, healthcare workers and other professionals. We conclude that YouTube is a leading and free online source of videos meant for students or other healthcare workers, yet the viewers need to be aware of the source prior to using it for training and learning.

Acknowledgments

The authors extend their appreciation to the Deanship of Scientific Research at King Saud University for funding this work through research group no. RG-1441-411.

Disclosure

The authors report no conflicts of interest in this work.

References

- Akgun, T., Karabay, C., Kocabay, G., Kalayci, A., Oduncu, V., Guler, A., et al., 2014. Learning electrocardiogram on YouTube: how useful is it?. *J. Electrocardiol.* 47, 11317.
- Al-Eraky, M.M., Chandratilake, M., Wajid, G., et al., 2013. Medical professionalism: Development and validation of the Arabian LAMPS. *Med. Teach.* 35 (Suppl 1), S56–S62.
- Alsafi, A., Kaya, G., Patel, H., Hamady, M.S., 2013. A comparison of the quality of the information available on the internet on interventional radiology, vascular surgery, and cardiology. *J. Postgrad. Med.* 59, 69–75.
- Arnbjörnsson, E., Einar, A., 2014. The use of social media in medical education: a literature review. *Creative. Educ* 05, 2057–2061.
- Azer, S.A., AlGrain, H.A., AlKhelaif, R.A., et al., 2013. Evaluation of the educational value of Youtube Videos about physical examination of the cardiovascular and respiratory systems. *J. Med. Internet. Res.* 15, e241.
- Babelli, S., Chandratilake, M., Roff, S., 2015. Recommended sanctions for lapses in professionalism by student and faculty respondents to Dundee Poly professionalism Inventory I: Academic Integrity in one medical school in Saudi Arabia. *Med. Teach.* 37, 162–167. <https://doi.org/10.3109/0142159X.2014.943712>.
- Batcheller, A.M., Brennan, R.T., Braslow, A., Urrutia, A., Kaye, W., 2000. Cardiopulmonary resuscitation performance of subjects over forty is better following half-hour video self-instruction compared to traditional four-hour classroom training. *Resuscitation* 43, 101–110.
- Baudains, C., Metters, E., Easton, G., Botton, P., 2013. What educational resources are medical students using for personal study during primary care attachments?. *Educ Prim Care.* 24 (5), 340–345.
- Braslow, A., Brennan, R.T., Newman, M.M., Bircher, N.G., Batcheller, A.M., Kaye, W., 1997. CPR training without an instructor: development and evaluation of a video self-instructional system for effective performance of cardiopulmonary resuscitation. *Resuscitation* 34, 207–220.
- Cardine, S., 2008. Is education ready for YouTube? *Converge.* <http://www.centerdigitaled.com/edtech/Is-Education-Ready-For-YouTube.html>.

- Cook, C.J., Smith, G.B., 2004. Do textbooks of clinical examination contain information regarding the assessment of critically ill patients?. *Resuscitation*. 60 (2), 129–136.
- Done, M.L., Parr, M., 2002. Teaching basic life support skills using self-directed learning, a self-instructional video, access to practice manikins and learning in pairs. *Resuscitation* 52, 287–291.
- Duvivier, R.J., van Geel, K., van Dalen, J., Scherpbier, A.J., van der Vleuten, C.P., 2012. Learning physical examination skills outside timetabled training sessions: what happens and why?. *Adv. Health Sci. Educ. Theory Pract.* 17 (3), 339–355. <https://doi.org/10.1007/s10459-011-9312-5>.
- Hegarty, M., Kriz, S., Cate, C., 2003. The roles of mental animations and external animations in understanding mechanical systems. *Cogn. Instruct.* 21, 209–249.
- Hofmann, B., Myhr, A.L., Holm, S., 2013. Scientific dishonesty – a nationwide survey of doctoral students in Norway. *BMC Med. Ethics*. 14, 3. <https://doi.org/10.1186/1472-6939-14-3>.
- Howick, J., 2011. *The Philosophy of Evidence-Based Medicine*. Wiley-Blackwell/BMJ Books, Chichester, West Sussex. ISBN 9781405196673.
- Ibrahim, M., 2012. Implications of designing instructional video using cognitive theory of multimedia learning. *Crit. Quest. Educ. J.* 3, 83–104.
- Ju, X., Ma, A., 2008. Microbiological testing and teaching reform and exploration. *Chin. J. Pathogen. Biol.* 7, 556–558.
- Krawczyk, A., Lau, E., Perez, S., Delisle, V., Amsel, R., Rosberger, Z., 2012. How to inform: comparing written and video education interventions to increase human papillomavirus knowledge and vaccination intentions in young adults. *J. Am. Coll. Health* 60 (4), 316–322. <https://doi.org/10.1080/07448481.2011.615355>.
- Magsamen-Conrad, K., Dillon, J.M., Billotte Verhoff, C., et al., 2019. Online health-information seeking among older populations: family influences and the role of the medical professional. *Health Commun.* 34, 859–871.
- Mosa, A.S., Yoo, I., Sheets, L., 2012. A systematic review of healthcare applications for smartphones. *BMC Med. Inf. Decis. Making* 12, 67.
- Murugiah, K., Vallakati, A., Rajput, K., Sood, A., Challa, N.R., 2011. YouTube as a source of information on cardiopulmonary resuscitation. *Resuscitation*. 82 (3), 332–334. <https://doi.org/10.1016/j.resuscitation.2010.11.015>.
- Papadakis, M.A., Hodgson, C.S., Teherani, A., Kohatsu, N.D., 2004. Unprofessional behavior in school is associated with subsequent disciplinary action by a state medical board. *Acad. Med.* 79, 244–249.
- Prober, C.G., Khan, S., 2013. Medical education reimagined: A call to action. *Acad. Med.* 88 (10), 1407–1410.
- Professional behaviour and fitness to practice. General Medical Council (GMC). 2020. Accessed. <https://www.gmc-uk.org/education/standards-guidance-and-curricula/guidance/professional-behaviour-and-fitness-to-practise>.
- Rabee, R., Najim, M., Sherwani, Y., et al., 2015. YouTube in medical education: a student's perspective. *Med. Educ. Online* 20, 29507.
- Ruiz, J.G., Mintzer, M.J., Leipzig, R.M., 2006. The impact of E-learning in medical education. *Acad. Med.* 81, 207–212.
- Shamji, A.I., Law, M., 2011. The role of technology in medical education: lessons from the University of Toronto. *Univ. Toronto Med. J.* 88, 150–153.
- Smith, W., Rafeek, R., Marchan, S., Paryag, A., 2012. The use of video-clips as a teaching aide. *Eur. J. Dent. Educ.* 16 (2), 91–96. <https://doi.org/10.1111/j.1600-0579.2011.00724.x>.
- Taylor, T., 2014. TF-6 the use of social media in emergency medical resident education. *Ann. Emerg. Med.* 64, S146.
- Tilson, J.K., Kaplan, S.L., Harris, J.L., et al., 2011. Sicily statement on classification and development of evidence-based practice learning assessment tools. *BMC Med. Educ.* 11, 78.
- Todd, K.H., Braslow, A., Brennan, R.T., et al., 1998. Randomized, controlled trial of video self-instruction versus traditional CPR training. *Ann. Emerg. Med.* 31, 364–369.
- Waterworth, S., Honey, M., 2017. On-line health seeking activity of older adults: an integrative review of the literature. *Geriatr. Nurs.* 39, 310–317.
- What is a profession? Professional Standards Council, © State of New South Wales (NSW Department of Justice) <http://www.psc.gov.au/what-is-a-profession/academic-view>. Accessed 17/1/2020.