

CAN FACEBOOK® BE USED TO ADMINISTER A DISTANCE-LEARNING MODULE OF EVIDENCE-BASED MEDICINE? AN OBSERVATIONAL STUDY

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ABSTRACT

Introduction: There is a small volume of published literature describing the use of social networking sites, such as Facebook®, in medical education. However where this literature is available, only poor outcome measures such as learner satisfaction have been measured.

Objectives: The primary aim of this study was to create and measure the use of a novel distance-learning module on the practice of evidence-based medicine (EBM). This programme was to be delivered using an established and free web-based social-networking site, Facebook®.

Methods: A prospective observational study was performed. 31 post-graduate residents enrolled to participate in a module that was delivered by Facebook® over five simultaneous weeks. A standardised tool, the Columbia EBM Instrument, was used to measure outcome measures such as "comfort-level", "self-reported practice", and "knowledge" before and after the module.

INTRODUCTION

Small levels of research have shown that students are trying to engage in peer learning through the use of social-networking sites such as Facebook® [1]. Facebook® continues to be the largest of such social-networking sites globally. For educators, the exciting potential is that networks of individuals can become networks of learners[2], however, the challenge is how to integrate such social software into curricula. Though there is published research on the use of social-media in medical education these adequately measures the effectiveness of material delivered through Facebook®, with the available literature only measuring poor outcome measures such as learner satisfaction. [1]–[7].

The topic of the use of social-media in medical education was described in a systematic review by the authors of this paper [8] in 2013 which concluded that "social-networking sites have been employed without problems of professionalism, and received positive feedback from learners. This systematic review revealed a number of papers assessing different low-levels within the Kirkpatrick hierarchy (e.g. participation and satisfaction) [8], [9]. However, within these studies no solid evidence demonstrating that social-networking is equally or more effective than other media available for educational purpose". Since this systematic review there have been further papers describing the use of social-media in medical education [10], [11]. There appears to be very little published education research demonstrating

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Results: 12 residents (40%) engaged with the Facebook® activities. The residents' knowledge of EBM did increase, though a quasi-experimental analysis revealed that this increase of knowledge could not be attributed to the Facebook® group. were aged 3 years and younger. Scalds were by far the commonest type of burn occurring in 93% of the patients. Partial thickness burns accounted for 91.7% of cases. The average length of hospital stay was 20.9 days and the mortality rate 16.7%. Total Body Surface Area (TBSA) burned greater than 25% and full thickness burns were associated with mortality.

Conclusion: Residents did not engage with the Facebook® groups despite the feasibility of doing so being high. The results of this study should guide educators to use Facebook® with caution as students may not engage with the activities.

Keywords: Medical Education; Social Media; Social Networking; Evidence-Based Medicine

that Facebook does not work in medical education. This could reflect publication bias on behalf of both authors and publishers.

The use of Facebook® has raised some controversies regarding professionalism by health professionals using this site. There is a large volume of literature discussing the issue of professionalism in relation to social-media use by health care professionals. Common problems described include breaches in patient confidentiality, profanity, discriminatory language and depiction of intoxication or sexually suggestive material [12]–[14]. However, these problems were found in students' personal rather than professional use of social-networking sites. There is a small amount of evidence that engaging students with social-networking sites actually leads students to nurture an on-going understanding of medical professionalism and may also lead them to positively change privacy-settings and postings [3], [15]–[18]

Lack of access to health and medical education resources for students and doctors in the resource-poor setting is a serious global health problem. [19]

To see if Facebook® could be used effectively in medical education we administered and facilitated an outcome-based, distance-learning module of EBM for post-graduate residents using this social-networking site.

METHODS

Research aims:

Our primary aim was to create a novel distance-learning programme, on the practice of EBM to be delivered using an established and free web-based social-network (Facebook®) as a Virtual Learning Environment (VLE). Secondary aims were to assess pre-existing practice, experience and knowledge of EBM between residents from different continents.

Setting:

The module was simultaneously implemented at the Yorkshire School of Paediatrics (YSP) in the UK and the University of Rwanda (UR) respectively. EBM is included in the curriculum for post-graduate residents at both these institutions.

Population:

48 residents were invited to partake in the module as part of their post-graduate training programmes, 23 from the YSP and 25 from the UR of Rwanda.

Module:

The module was delivered over a five-week period in 2011 and each week a new concept of EBM was introduced to the residents through interactive tasks. 48 residents were invited to partake in the EBM module as part of their respective post-graduate training programmes, 23 from the YSP and 25 from the UR. 31 (65%) enrolled, 17 (74%) and 14 (56%) respectively. Completing the post-module assessment was deemed as completion of the module. 14 (82%) and five (36%), respectively, of those enrolled completed the module (drop out rate 39%). UK drop out was 3 of 17 (18%) and Rwanda was 9 of 14 (64%).

The Residents were divided into two "secret" groups, on Facebook®, each containing a mix of Rwandan and UK residents. Secret Facebook® groups were used to ensure privacy and maintain the academic nature of the activity. Membership to these groups was restricted to students enrolled on the module. Three faculty members joined the groups in order to give active facilitation. In order to successfully complete the module the only compulsory activities were the pre and post-module assessments which were word documents delivered by e-mail. The Facebook® tasks were not mandatory.

Data collection:

A standardised tool, the Columbia Instrument, was used to measure "comfort-level", "self-reported practice" and "knowledge" of EBM [20]. This was combined with an additional module related questionnaire made up of demographics, binary questions (e.g. do you own a computer?) and Likert style Learner Satisfaction questions. They were delivered and collected via email to all residents before and after the module. Finally we appraised the Facebook® groups for the number of

contributions made by residents. Participant identifying features were removed from the assessments prior to appraisal. Non-identifying tags, i.e. the last three digits of cell-phone number, were used to allow anonymous pre and post module comparisons.

Outcome measures:

Best evidence medical education (BEME) recommends assessing outcome measures using the Kirkpatrick hierarchy and we therefore assessed several outcome measures [9], [20], [21]

i. Learner engagement by assessing participation (i.e. Facebook® posting) and learner satisfaction using true/false and Likert style questions, e.g. "it was easy to discuss cases on Facebook®".

ii. Student perceptions of "comfort" of practicing EBM using six Likert style questions, e.g. "comfort in one's ability to generate a clinical question".

iii. Change in behaviour by measuring "self-reported practice" using seven Likert style questions, e.g. "how often one searches articles to answer a clinical question"

iv. Acquisition of knowledge using a pre and post-module EBM knowledge assessment. This section, testing knowledge of EBM, forms the bulk of the Columbia Instrument and is formed by ten standardised open questions that are based around two paediatric clinical scenarios. A knowledge score, out of 50, is then derived via a marking-key provided by the authors of the Columbia Instrument. Two different versions are available to test identical concepts allowing pre and post module assessment without the user being able to rely on superficial similarity.

Analysis:

The Likert items were combined to create two scores: i. a "comfort level score" and ii. a "self-reported practice score". The scores of the 17 UK residents and the 14 Rwandan residents who enrolled were compared using Mann-Whitney non-parametric testing. Knowledge scores between Rwandan and UK residents who enrolled were compared using a Mann-Whitney test. Paired t-tests were used to assess pre and post-module comfort level, self-reported practice and EBM knowledge for the residents who completed the module. Though not originally planned a quasi-experimental analysis was used to compare if the knowledge score had significantly improved in those who reported engaging with the Facebook® group or not. Statistical analyses were performed using SPSS. Descriptive statistics with ranges, standard deviation were used due to small sample sizes. When comparative tests were employed and found to be significant these are described using p-value.

Ethical approval:

This project was performed as an evaluation of a post-graduate educational package and the proforma was approved by the University of Leeds MSc Child Health research committee.

A statement describing the questionnaire was given to the residents and enrolment in the module was deemed as implied consent. Subjects were given the choice to withdraw at any point from the study but continue the module.

RESULTS

Demographics

	At enrolment		All
	UK	Rwandan	
Median Age	27	35	31 (range 24-46)
Gender	13 (76%) female, 4 (24%) male	1 (7%) female, 13 (93%) male	17 (55%) female, 14 (45%) male,
Total	17	14	31

Table 1: Demographics of participants.

Feasibility: Facebook®, email, and computer access

Of the 31 residents who enrolled in the module, 11 (65%) UK, and six (43%) Rwandan residents had no previous training in EBM. All 31 residents owned a computer. 29 (94%) already had a Facebook® account. Of the 31 residents who enrolled, 27 (87%) reported checking their email frequently or very frequently. 13 (42%) reported checking their Facebook® account frequently or very frequently. 22 (71%) and 20 (65%) residents had good access to the Internet at work and at home respectively.

Learner engagement and satisfaction (Kirkpatrick level: Participation [9])

29 enrolled residents (94%) were successfully added to the two secret Facebook® groups. Each week residents were asked to post a response to an exercise presented by the faculty. 17 residents (59%) made no posts whatsoever during the module. Of those 12 residents who did contribute, they responded to an average of 2.7 (SD=1.3) of the five exercises, with only two residents responding to all five set exercises. Two subjects chose not to use Facebook® and received an exercise via e-mail but did not respond. One major limitation to the use of Facebook® was that the site is blocked by many UK hospitals. Ten (71%) of the UK residents who completed the module reported that their place of employment blocked Facebook®. There was no evidence of engagement between residents of different nationalities. No inappropriate posts were identified. There were no posts that could have breached patient confidentiality.

Student perceptions of "comfort" of practicing EBM (Kirkpatrick level: Reaction [9])

The Columbia tool combines Likert style questions to give a comfort-score out of 30 and a "self-reported practice" score out of 35. At enrolment the median comfort scores were 17.0 (10-29, SD=4.4) and 16.0 (11-25, SD=3.4) for

the UK and Rwandan residents respectively (p=0.95). In the 19 residents who completed the module, there was an increase, (2.6 out of 30) in the mean comfort score from 17.4 (SD=4.6), to 20.0 (SD=3.3, p=0.018). At enrolment the median self-reported practice scores were 15.0 (10-23, SD=4.1) and 20.0 (11-26, SD=4.4) for the UK and Rwandan residents respectively (p=0.03). In the 19 residents who completed the module, there was no change in the "self-reported practice" score from 16.9 (SD=4.2) to 18.7 (SD=3.8, p=0.153).

Acquisition of EBM knowledge (Kirkpatrick level: Learning [9])

The Columbia tool gives a knowledge score out of 50. At enrolment the median scores were 21 (14-39, SD=6.0) and 13.5, (5-19, SD=3.8) for the UK and Rwandan residents respectively (p<0.001). For the 19 residents who completed the module the mean score increased from 20.7 (SD=6.24) to 27.1 (SD=8.8, p=0.001). Subgroup analysis revealed that the mean knowledge increase for UK residents of 8.5 (22.4 pre and 30.9 post module) was significantly better than the knowledge increase for Rwanda residents of 0.6 (15.8 pre and 16.4 post-module), (p=0.028).

Residents reported if they "responded to posts on Facebook®". 11 (58%) reported yes and eight (42%) reported no. We compared the mean-difference between these groups (Table 2).

	Mean comfort score increase (SD)	Mean self-reported practice score increase (SD)	Mean EBM knowledge increase (SD)
Used Facebook® (n=11)	3.5 (4.5)	2.4 (5.3)	6.8 (7.0)
Didn't use Facebook® (n=8)	1.3 (3.6)	1.1 (6.6)	5.9 (7.9)
t-test p-values between groups	0.59	0.80	0.89

Table 2: comparison of means for Facebook® use

DISCUSSION

We used Facebook® as a Virtual-Learning Environment to deliver a module on EBM. The level of engagement is similar to that described in other successful applications of Facebook® [3]. The level of engagement was disappointing as our results reveal that using Facebook® could be highly feasible as; more than half of our residents had no experience of EBM, which is a rapidly developing and relevant subject, all residents owned a computer and the majority had good access to the Internet and finally the vast majority were already registered with Facebook® and many checked it regularly, though not as regularly as their email. One barrier to implementation was that access to Facebook® is blocked by many hospitals in the UK. This could suggest that only particular learners would be motivated to learn through this medium.

In the past there have been concerns regarding Facebook® use and professionalism. One encouraging finding was that no posts were felt to be inappropriate or breached patient confidentiality.

We measured multiple levels of effect, as described by the Kirkpatrick hierarchy. It is interesting to note that despite

the low levels of engagement by residents, there was a significant increase in the knowledge of EBM over the course of the module. However, our results suggest that this knowledge increase cannot be attributed to the activities found on Facebook® as there was no significant difference in the mean knowledge increase between those who did and those who did not report engaging with the Facebook® activities. We are therefore unable to prove that a significant improvement in knowledge of EBM can be established using a web-based social-network resource. Though, it is important to note that this was a finding from an unplanned quasi-experimental analysis and not from a randomised-controlled assessment. We have several theories as to how the knowledge score increased: The pre-module assessment may have acted as a needs-assessment highlighting areas where the residents lacked knowledge and so may have led to self-directed learning. Residents may have assumed the post-module assessment was a summative assessment and were therefore more thorough in completing it. Finally there may be more superficial similarity between the two assessments than we anticipated.

We aimed to assess if there was a difference in knowledge, perceived comfort and perceived practice between residents from the UK and Rwanda. On enrolling, there was no significant difference in the perceived comfort of practicing EBM between the Rwandan and UK residents but the Rwandan residents did report that their perceived practice of EBM was significantly more than the UK residents. This result is likely to reflect different attitudes toward the use of EBM between the nationalities. Secondly, the Columbia Assessment was developed in the USA and therefore standardisation is more likely to reflect the attitudes and beliefs of the UK residents. This increase in perceived practice in Rwandan residents was not reflected in their knowledge of the subject. UK residents achieved significantly higher knowledge scores on enrolment.

There are several limitations to this project: The median age and gender of residents between the UK and Rwandan group differed. Digital natives (aka "the Millennials") are individuals born after 1980 and represent a cohort who is consistently skilled at using information technology [22]. The age difference between Rwandan and UK residents (Table 1) could therefore reflect the differences in those completing the module. Selection bias could have been introduced by administering the Columbia tool electronically. We did not survey those residents who did not enrol as it would have fallen outside of the ethical limitations of only measuring the educational intervention. These subjects could have been those who did not own computers, had poor computer skills or had poor Internet access. Using Likert style questions could have introduced acquiescence bias, whereby respondents have a tendency to agree with the questions or indicate a positive connotation. Like all previous studies in this area we did not employ a control group. Due to sample sizes the results have been presented using standard deviation rather than confidence intervals. Finally this study was performed in 2011. Though this does not

affect the quality of the study undertaken it needs to be noted that technology in this era moves quickly. Important considerations include the widespread use of Facebook on smart-phones which were not as widely available in 2011. Despite this limitation the conclusions do not significantly change; Facebook should be used with caution as students may not engage with the activities because they want to keep their work and private life independent.

CONCLUSION

In conclusion, we used Facebook® to administer a module of EBM and found a measurable increase in student knowledge, though the increase may not be attributable to the module. Engagement was not as high as expected, despite evidence that the feasibility of using Facebook® was high. Though there are a small number of articles describing learner satisfaction, there currently does not appear to be good quality evidence, in the literature, that Facebook® can be used effectively in medical education. We hope that the results of this study will guide educators to use Facebook® with caution, as students may not engage with the activities, but also with the confidence that issues of professionalism are unlikely. We also hope to encourage educational researchers to perform a controlled trial of its use to adequately measure its effectiveness.

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Conflict of interest:

No authors report any conflicts of interest.

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