

# Web 2.0 technologies for undergraduate and postgraduate medical education: an online survey

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**Objectives:** To identify the current familiarity and use of Web 2.0 technologies by medical students and qualified medical practitioners, and to identify the barriers to its use for medical education.

**Methods:** A semi-structured online questionnaire survey of 3000 medical students and 3000 qualified medical practitioners (consultants, general practitioners and doctors in training) on the British Medical Association's membership database.

**Results:** All groups had high familiarity, but low use, of podcasts. Ownership of digital media players was higher among medical students. There was high familiarity, but low use, of other Web 2.0 technologies except for high use of instant messaging and social networking by medical students. All groups stated that they were interested in using Web 2.0 technologies for education but there was lack of knowledge and skills in how to use these new technologies.

**Conclusions:** There is an overall high awareness of a range of new Web 2.0 technologies by both medical students and qualified medical practitioners and high interest in its use for medical education. However, the potential of Web 2.0 technologies for undergraduate and postgraduate medical education will only be achieved if there is increased training in how to use this new approach.

A wide range of Web 2.0 technologies have become very popular within the general population. For example, there are over 90 million blogs and the My Space social networking site has over 106 million users.<sup>1</sup> The main types of Web 2.0 technologies are described in box 1.

A major reason for this uptake has been that they require little or no technical expertise, allowing users to easily create their own content and also to actively share information, opinion and support across networks of users.<sup>2</sup> Most of this activity is social but the educational potential is increasingly being recognised.<sup>3</sup> For example, podcasts can deliver educational materials in addition to popular music and blogs can be used as reflective diaries and to develop online communities of practice.

The potential of Web 2.0 technologies for undergraduate and postgraduate medical education has been recognised but there has been little implementation.<sup>4</sup> Further development in this area will require an understanding of how this group currently uses Web 2.0 technologies and the barriers to effective use.

The objectives of this survey were to identify the current familiarity and use of Web 2.0 technologies by medical students and qualified medical practitioners, and to identify the barriers to its use for medical education.

## METHODS

From the 18 625 people listed on the British Medical Association's membership database as receiving the *Student BMJ* in July 2006, a computer generated random sample of 3000 medical students was taken. A computer generated random sample of 3000 doctors was taken from the 106 099 qualified doctors (consultants, general practitioners and doctors in training) listed on the database as receiving the *BMJ* in July 2006.

Participants were sent an email in February 2007 inviting them to complete an online semi-structured questionnaire that had been piloted and refined by a group who were not involved in this study. Examples of the technologies were given since we were concerned that participants may not be aware of the

general type of technology, only a particular product. Questions about the use of Web 2.0 technologies included any context, including social and educational. Free text responses were invited to identify the factors that may influence the uptake of these new technologies for education. These free text responses were analysed independently by the two researchers using a grounded theory approach to identify the main themes.<sup>5</sup> For each theme an illustrative quotation was noted. The two sets of themes were compared and discussed between the authors until consensus was reached. Descriptive quantitative data were analysed using SPSS.

## RESULTS

Of the 6000 questionnaires sent, 111 were email delivery failures. We received a response from 1239 (21%) of the 5889 functioning email addresses (637 medical students and 601 qualified doctors). There was no significant difference in the mean age of the respondents and non-respondents for medical students ( $p < 0.00$ ) or qualified doctors ( $p = 0.01$ ).

A total of 593 (48%) of the respondents identified themselves as medical students, 389 (31%) as consultants, 96 (8%) as general practitioners and 64 (5%) as doctors in training. Table 1 shows the sample characteristics.

Half of the consultants, general practitioners and doctors in training owned an MP3 or digital media player, but over three quarters of medical students were owners (table 2). Players capable of playing videos were similar across all groups.

Most respondents were familiar with the term podcast and approximately half of each group had used them, mainly for personal use (table 3). About 60% of respondents in all groups stated that podcasts were of no use in professional development but about 10% regarded them as being very or extremely useful (table 4).

Most consultants, general practitioners and doctors in training were familiar with the terms instant messaging and blogs, but less so for other types of Web 2.0 technologies (table 5). Medical students were more familiar with all of the terms, especially instant messaging, blogs and social networking.

### Box 1: Main types of Web 2.0 technologies

- **Podcasting:** A digital recording, or podcast, is produced and then played on a digital media player. The digital recording is commonly in the form of an audio MP3 (MPEG-1 Audio Layer 3) file but it may also include other formats, including video. The downloaded digital media files can be played on a range of devices. These include a personal computer (PC) or laptop which has a media player, such as iTunes or Windows Media Player, installed. They can also be played on a wide range of portable devices which support the file format, including iPods, MP3 players of many different brands, an increasing number of mobile phones, and Portable Digital Assistants (PDAs).
- **Instant messaging:** This allows real time (synchronous) communication between two individuals (one to one) or between several individuals (one to many). Examples of commonly used text based services include MSN messenger ([www.msn.com](http://www.msn.com)) and Yahoo! Messenger ([www.yahoo.com](http://www.yahoo.com)).
- **Blogs:** These are personal websites that allow rapid updating by the author. Examples include Blogger ([www.blogger.com](http://www.blogger.com)) and Typepad ([www.typepad.com](http://www.typepad.com)). Content can be easily created and shared by making the blog accessible to others.
- **Wikis:** These are similar to blogs but allow the text on the website to be edited by others, with the creation of a common document that can be shared between individuals. Examples include Wikipedia ([www.wikipedia.org](http://www.wikipedia.org)) and PB wiki ([www.pbwiki.com](http://www.pbwiki.com)).
- **Social bookmarking:** An individual's favourite websites, including blogs, can be "book marked" and stored on a website. Examples include del.icio.us (<http://del.icio.us/>) and digg ([www.digg.com](http://www.digg.com)). These bookmarks can be shared with others.
- **Media sharing:** Visual media can be uploaded and stored on a website, such as Flickr ([www.flickr.com](http://www.flickr.com)) for photographs and You Tube ([www.youtube.com](http://www.youtube.com)) for videos. These media can then be shared with others.
- **Social networking sites:** Several of the above approaches can be combined in these sites to make them extremely versatile. Examples include My Space ([www.myspace.com](http://www.myspace.com)) and Facebook ([www.facebook.com](http://www.facebook.com)).

All groups used Web 2.0 technologies for either personal or educational use and this was higher than their stated familiarity. Medical students had the highest use of instant messaging, media sharing and social networking.

Free text comments were made by 60 consultants, nine general practitioners, eight doctors in training, and 42 medical students. Four main themes were identified.

#### 1. Interested in use but need of further training

Fifty-seven respondents from all groups except doctors in training stated that they were interested in using Web 2.0 technologies for their professional education but most (54) additionally commented on the need for greater training in how to use the new technologies to enhance their professional education:

**Table 1** Age and sex distribution of sample

	Consultant n = 389	General practitioner n = 96	Doctors in training n = 64	Medical Student n = 593
Male	255 (66.0%)	38 (39.6%)	37 (57.8%)	237 (40.0%)
Female	134 (34.0%)	58 (60.4%)	27 (42.2%)	356 (60.0%)
Mean (SD) age (years)	48.3 (8.3)	42.3 (11.1)	37.8 (10.7)	24.4 (5.5)

"I would consider using some of these if I only knew how" – 46-year-old female consultant (ID 5240)

"Need to be taught how to use these technologies" – 41-year-old female general practitioner (ID3405)

"We should be shown how to use new media" – 22-year-old male medical student (ID 341)

Medical students were the main group (13) who specifically commented on the potential use of podcasts for their professional education:

"I find podcasts can be very useful as you can listen along when travelling. They are currently in short supply" – 23-year-old female medical student (ID 1736)

#### 2. Barriers due to learning and technology preferences

Nineteen respondents from all groups except doctors in training stated that a main barrier to using Web 2.0 technologies for professional education was their learning preferences and dislike for technology:

"Haven't got out of the habit of sitting on the sofa with a book or journal" – 47-year-old female consultant (ID 4250)

"I much prefer face to face discussion" – 56-year-old male general practitioner (ID 4623)

"Generally speaking I don't like too much technology in my education" – 24-year-old male medical student (ID 208)

#### 3. Quality of resources

Concern about the quality of the resources was stated by 15 respondents from consultants, medical students and doctors in training:

"I am not confident in the accuracy of the information given in some areas" – 41-year-old male consultant (ID 4560)

"Quality of information is always very important" – 32-year-old doctor in training (ID 1997)

"Publicise who writes/publishes the content more clearly" – 23-year-old female medical student (ID 933)

#### 4. Organisational issues

Seven consultants and general practitioners expressed concern about having time to use Web 2.0 technologies for professional education, and eight consultants noted difficulties with access to information and communication technology (ICT) at work.

"I have no idea how anyone can have the time if they are working hard" – 51-year-old male consultant (ID 4640)

"Lack of time is a huge factor" – 48-year-old male general practitioner (ID 3623)

**Table 2** Ownership of MP3/digital media players

	Consultant n = 389 (%)	General practitioner n = 96 (%)	Doctors in training n = 64 (%)	Medical student n = 593 (%)
Ownership of MP3/digital media player	190 (48.8)	45 (46.9)	35 (54.7)	473 (79.8)
Ownership of MP3/digital media player that can play video	75 (19.3)	17 (17.7)	13 (20.3)	145 (24.5)

**Table 3** Use of podcasts

	Consultant n = 389 (%)	General practitioner n = 96 (%)	Doctors in training n = 64 (%)	Medical student n = 593 (%)
Podcasts—not familiar with term	19 (4.9)	5 (5.2)	5 (7.8)	13 (2.2)
Podcasts—never used	220 (56.6)	50 (52.1)	32 (50)	270 (45.5)
Podcasts—only for personal use	86 (22.1)	24 (25.0)	20 (31.3)	20 (33.9)
Podcasts—for both personal use and professional learning	50 (12.9)	15 (15.6)	4 (6.3)	93 (15.7)

“A major problem is the ease of access and connectivity to these services in the workplace” — 40-year-old consultant (ID 4332)

## DISCUSSION

The survey has identified that overall for all groups there is high familiarity with Web 2.0 technologies for personal and educational purposes, but less actual use. Medical students have both greater familiarity and use of Web 2.0 technologies, especially instant messaging, media sharing and social bookmarking. There was interest in the use of Web 2.0 technologies for education by all groups but respondents stated that they would like to have more training on its use. Other barriers for use in education were learning preferences, concern about quality of resources, lack of time and difficulties with ICT access.

A limitation of this study is that the survey was limited to the BMA membership database and the majority of doctors were from the UK. The response rate was low and also there was under-representation of general practitioners and doctors in training. The response rate is typical of all readership surveys and the respondents are also likely to have higher levels of interest in the topic.<sup>6</sup>

We identified a “digital divide” between older and younger users of technology. This term was originally applied to inequalities in access to computer and web facilities,<sup>7</sup> but increasingly it is apparent that there are numerous inequalities.<sup>8</sup> An important difference is the high use of instant messaging, media sharing and social networking by young people, especially

those under 24 years of age.<sup>9–10</sup> It is essential for educators to use these Web 2.0 technologies if they wish to fully engage younger learners, usually as a blended approach.<sup>11</sup> This offers technology as an additional, but integrated, method to enhance learning. This has important implications to all medical educators since they are likely to be older users of technology. We recommend that all medical educators are trained on how to use Web 2.0 technologies to enhance teaching and learning.

Many respondents stated that they would appreciate training in how to use Web 2.0 technologies for education but any response requires careful consideration.<sup>12</sup> There has been an evolving change in the operation of the web, with a transition from a platform that previously only offered discrete packages of information, such as websites, from a few providers to one in which there is a wide range of user generated material, such as blogs or podcasts, provided by a large variety of individuals and organisations. The exciting potential for medical education is that a vast learning resource has suddenly become available. The “ecological” approach to e-learning describes a new type of education in which personalised learning can be created by assembling a wide range of learning resources that are of specific interest to the learner.<sup>13</sup> This requires new skills, such as identification, storage and quality appraisal of resources. We recommend that all medical educators and learners are trained in these essential skills. The role of the educator changes to one that helps the learner to navigate the complexity of the new learning landscape.

Inequalities in access to new technologies, due to both lack of time and computing facilities, was noted by consultants and general practitioners. It will be essential to remedy these

**Table 4** Usefulness of podcasts for assisting learning directly related to professional development

	Consultant n = 292 (%)	General practitioner n = 66 (%)	Doctors in training n = 64 (%)	Medical student n = 510 (%)
Not at all useful	163 (56)	39 (59)	38 (70)	299 (59)
Slightly or moderately useful	87 (30)	17 (26)	13 (24)	122 (24)
Very or extremely useful	23 (8)	4 (6)	2 (4)	72 (14)

Respondents were asked to rate the usefulness of podcasts for assisting their learning directly related to their professional development on a 5 point Likert scale. This table excludes respondents who indicated that they are not familiar with podcasts.

**Table 5** Familiarity and use of social software

	Consultant n = 389 (%)	General practitioner n = 96 (%)	Doctors in training n = 64 (%)	Medical student n = 593 (%)
Instant messaging—not familiar with term	37 (9.5)	10 (10.4)	4 (6.3)	2 (0.3)
Instant messaging—never used	32.5 (83.5)	57 (59.4)	31 (48.4)	143 (24.0)
Blogs—not familiar with term	23 (5.9)	5 (5.2)	4 (6.3)	14 (2.4)
Blogs—never used	265 (68.1)	66 (68.8)	39 (60.9)	345 (58.2)
Blogs—only read	76 (19.5)	15 (15.6)	18 (28.1)	118 (19.9)
Blogs—both read and write	13 (3.3)	8 (8.3)	2 (3.1)	9.5 (16.0)
Wikis—not familiar with term	121 (31.1)	39 (40.6)	13 (20.3)	166 (28.0)
Wikis—never used	174 (44.7)	38 (49.6)	27 (42.2)	113 (19.1)
Social bookmarking—not familiar with term	144 (37.0)	41 (42.7)	20 (31.3)	187 (31.5)
Social bookmarking—never used	225 (57.8)	54 (56.3)	39 (60.9)	374 (63.1)
Media sharing—not familiar with term	133 (34.2)	37 (38.5)	20 (31.3)	124 (20.9)
Media sharing—never used	238 (61.2)	54 (56.3)	35 (54.7)	376 (63.4)
Social networking—not familiar with term	61 (15.7)	18 (18.8)	9 (14.1)	9 (1.5)
Social networking—never used	242 (62.2)	59 (61.5)	33 (51.6)	114 (19.2)

## Main findings

- Overall there is high familiarity with Web 2.0 technologies for personal and educational purposes but less actual use.
- Medical students have greater familiarity and use of Web 2.0 technologies, especially instant messaging, media sharing and social bookmarking.
- There was interest in the use of Web 2.0 technologies for education by all groups, but respondents stated that they would like to have more training on its use.
- Other barriers for use in education were learning preferences, concern about quality of resources, lack of time and difficulties with information and communication technology access.

organisational issues before the potential of Web 2.0 technologies in education can be realised.<sup>14</sup>

## Conclusion

Web 2.0 technologies offer new opportunities in undergraduate and postgraduate medical education. There is an overall high awareness of a range of new Web 2.0 technologies by both medical students and qualified medical practitioners and high interest in its use for medical education. However, the potential of Web 2.0 technologies for undergraduate and postgraduate medical education will only be achieved if there is increased training in how to use these technologies to enhance teaching and learning.

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