



A questionnaire based study on student preparedness to web 2.0 at I MBBS entry level

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ABSTRACT

Objective: Various studies have reported the effectiveness of online teaching vis a vis traditional methods. But hardly have they reported whether the subjects involved in their studies have adequate access and working knowledge of computer/internet and they do not provide the exact framework to assess the preparedness of the students. Before moving on to adopting new teaching tool, it is necessary to determine whether the students are aptly prepared to accept and utilize the tool. **Methodology:** This project was designed to assess the preparedness of students for Web 2.0 teaching at I year MBBS entry level in a medical college using a questionnaire of 14 items to be responded on a Likert format. The data was analyzed for individual item responses and factor loadings. **Results:** Two predominant constructs came out as determinant of preparedness of students. In our results, students were in favour of implementation of web 2.0 teaching but most were inadequately prepared for the same. **Conclusions:** In previous studies, there have been conflicting results regarding the superiority of internet based teaching over traditional methods. Studies reporting the effectiveness of web 2.0 tools should also report on student preparedness for determining the actual effectiveness of the tool.

KEY WORDS: E learning, factor analysis; Likert, medical education, web 2.0

INTRODUCTION

The involvement of computers and internet in day to day life has become intricately involved with each and every aspect of life. From a very small to very extensive information can be easily obtained by access to internet. Apart from being a passive information gathering means, an interactive forum Web 2.0 is being explored for teaching online. One of the key elements characterising web 2.0 are social networking sites including facebook, you tube, wikis and blogging sites (25).

Medical educators and designers of educational software applications can benefit from understanding and applying Web 2.0 concepts to the curriculum and related websites (14). Web 2.0 technologies represent a quite revolutionary way of managing and repurposing/remixing online information and knowledge repositories, including clinical and research information, in comparison with the traditional Web 1.0 model. (10). Twitter is likely to become a useful adjunct for more personalized teaching and learning in medical education (19). If effectively deployed, wikis, blogs and podcasts could offer a way to enhance students', clinicians' and patients' learning experiences and research should be conducted to determine the best ways to integrate these tools into existing e-Learning programmes for students, health professionals and patients (1).

Usefulness for integrating web 2.0 into formal education courses has been previously studied (16) where students have positively reported and supported its integration. Still, there is no solid evidence base within the literature that social-networking is equally or more effective than other media available for educational purposes (2). Internet-

based learning effects when compared with non-Internet instructional methods are heterogeneous and generally small, suggesting effectiveness similar to traditional methods. (5).

One of the potential barriers to usefulness of technology is effective student participation. (20, 24). Moreover effectiveness of teaching module can only be tested on those who participate in the new resource. There are studies which reported the predictors of participation in online course. (21). But these predictors are mostly related to features of technology rather than characteristics of participants themselves. It has been reported that researchers should conduct implementation-profiling studies in advance of any intervention-based research to account for the constructing nature of educational ecologies on their interventions. (7). The preparedness of students to web based teaching is a participant based predictor which is highly underreported in the assessment of effectiveness of new teaching tool.

The willingness of students to participate depends on student resource, working knowledge of computer, student inertia, and the quality of web based resource developed. Before the introduction of web 2.0 teaching, it is judicial to know whether the students are willing and adequately prepared for it to take care of student factors becoming hindrance in their involvement. For example, if instructors are planning to use twitter as a medium for teaching and interaction it would be advisable to know that how many students have active twitter accounts. Foley N M et al establish the prevalence of social networking accounts among a group of second-level students (aged 15-18 years). (18).

The aim of the present study was to assess the preparedness

of students to web based teaching before the introduction of new teaching tool.

METHODOLOGY

Participants

The study population included 1st year MBBS students (male = 67 and female=83) aged 18- 20 years from a private medical college. The fee structure of private medical colleges in India entails admission of students of high socioeconomic background. Sample population was representative of students in other private medical colleges in India as the fee structure and entrance criteria are similar throughout the country.

Development of questionnaire

A questionnaire of 14 items was prepared comprising of questions related to access to web, their knowledge and use of internet and computer operations and students view regarding the role of online teaching along with traditional methods of teaching. The questionnaire was prepared by 3 members one of whom had already used web based teaching previously, and the other two were planning to implement. The content validity of the questionnaire was tested by 3 different members. After minor changes the questionnaire was uploaded on google form.

Administration of the questionnaire

On the first day of admission in the college, students were explained the plan of using web based teaching and its potential advantages were shared with the students. They were explained that before the implementation we were interested in their perception about web based teaching. Students were then provided the URL (<https://goo.gl/z9zCjI>) of the google form and were requested to answer the questionnaire .It was ensured that all of them had access to internet as it was freely accessible in the college premises. They had to answer the questions on a 5 point

Likert response format ranging from strongly disagree to strongly agree or very frequently to never. To ensure better participation, students were repeatedly approached and persuaded that answering the questionnaire could help us improve our teaching – learning methods for their potential benefit. To avoid duplication of the response, a note of the email address of the respondents was kept and later duplicate responses were deleted.

Analysis

The analysis was done in three steps. First the reliability of the questionnaire was analyzed. Second, the percentage of responses in each category was calculated and finally, factor analysis was done to extract the predominant constructs.

RESULTS

This report outlines the result of a survey conducted to determine the preparedness of 1st year MBBS students to web teaching.70 out of 150 students responded to the questionnaire. Data was analyzed using SPSS 16.0. Software excluded 2 subjects on account of missing values. Descriptive statistics of the variables is given in table 1. Cronbach α (0.854) confirmed the reliability of the questionnaire. The data was first analyzed for individual item responses. Strongly disagree/disagree responses and strongly agree/agree responses were clubbed together. Similar clubbing was done for very frequently/frequently and rare/never responses. Percentage of responses in each category was calculated .Results are summarized in Table 2 and Table 3. 23% of all students depended on college facility for access to internet. 5 students who responded as never having access to internet also responded that they would access internet using college facility. 62.5% of students who preferred to use college facility had personal access to internet connection either sometimes, rarely or never. 7% disagreed that web based learning should supplement lecture. All of these who disagreed, had either rare or no access to internet.

Table 1. Descriptive statistics of the variable

	Mean	Std. Deviation	N
Do you have access to internet?	2.49	1.191	68
Do you spend time gathering information from internet?	2.43	.869	68
Do you think that computer or web based learning should play a role in your course of study?	1.84	.874	68
Do you think you can learn to use this system in your method of study very quickly?	1.90	.794	68
In your opinion is online teaching (web 2.0) conducive?	2.19	.815	68
Should web based learning be a supplement to lectures?	2.22	.944	68
Should web based learning replace lectures?	3.51	1.015	68
Should online teaching be restricted to distribution of notes only?	2.71	1.037	68
Do you participate in online discussion fora?	3.07	1.124	68
Will you find it easier to participate in a discussion online rather than discussion while in lecture?	2.43	.997	68
Do you think you need to learn a lot (typing, word processing, interacting in facebook – web 2.0) before moving on to online teaching/learning?	2.90	1.223	68
What is your extent of exposure to online learning programs (ebooks, Wikipedia,blogs etc)	2.53	1.190	68

Table 2. Summary of responses

Questions	% Response		
	Strongly agree/ Agree	Not sure	Strongly disagree/ Disagree
Do you think that computer or web based learning should play a role in your course of study?	83	13	3
Do you think you can learn to use this system in your method of study very quickly?	74	21	2
In your opinion is online teaching (web 2.0) conducive?	66	30	2
Should web based learning be a supplement to lectures?	65	26	7
Should web based learning replace lectures?	13	37	48
Should online teaching be restricted to distribution of notes only?	27	29	43
Will you find it easier to participate in a discussion online rather than discussion while in lecture?	59	26	14
Do you think you need to learn a lot (typing, word processing, interacting in facebook – web 2.0) before moving on to online teaching/learning?	38	21	40

Table 3. Summary of responses

Questions	% Response		
	Always/Very frequently/ Frequently	Sometimes	Rarely/Never
Do you have access to internet ?	50	30	20
Do you spend time gathering information from internet ?	50	43	7
Do you participate in online discussion fora?	32	37	30
What is your extent of exposure to online learning programs (ebooks, Wikipedia,blogs etc) ?	56	20	9

Patterned relationship among the variables was then assessed from the correlation matrix. Question related to typing speed had large number of low correlation coefficient ($r < + / - 0.30$) with other variables, so it was removed for the re run of analysis. After rerun, there existed a patterned relationship among the variables, which was confirmed by Bartlett's test of sphericity ($p = 0.000$). Determinant score was 0.003 which suggested absence of multicollinearity. Sampling adequacy was tested using Kaiser-Meyer Olkin (KMO) test (0.750) which suggested the sample was factorable. Factor analysis of the 12 variables (excluding open ended question relating to how they would access internet and how fast is their typing speed) questionnaire was done using principal axis factoring (PAF) and principal component analysis (PCA) to extract predominant factors. PCA model was not found to be good fit so PAF was chosen. Communalities of the

variables are given in table 4. Loadings > 0.3 was taken as cut off for including a variable in the factor. In unrotated factor solution, 3 factors were extracted based on eigenvalue > 1 rule (table 6), and confirmed by scree plot (graph 1). These 3 factors accounted for 64.75 % of the variance of the variables (table 5). Model was found to be good fit as 19% of nonredundant residuals were of absolute value > 0.05 . Varimax rotation with Kaiser normalization was done for better interpretation of the factors. It identified 3 factors (Table 7). 3rd factor was excluded because it had only 2 variables. Factor 1 included questions relating to their opinion about inclusion of web based courses in teaching and factor 2 included questions relating to their previous activity on computer and online. So 2 underlying constructs were determined, 1st one was labelled as "willingness", 2nd one as "prior initiative".

Table 4. Communalities of the variables

	Initial	Extraction
Do you have access to internet ?	.568	.731
Do you spend time gathering information from internet ?	.617	.682
Do you think that computer or web based learning should play a role in your course of study ?	.736	.766
Do you think you can learn to use this system in your method of study very quickly?	.541	.449
In your opinion is online teaching (web 2.0) conducive?	.622	.659
Should web based learning be a supplement to lectures?	.334	.280
Should web based learning replace lectures?	.392	.418
Should online teaching be restricted to distribution of notes only?	.614	.481
Do you participate in online discussion fora?	.542	.643
Will you find it easier to participate in a discussion online rather than discussion while in lecture?	.479	.446
Do you think you need to learn a lot (typing, word processing, interacting in facebook – web 2.0) before moving on to online teaching/learning ?	.537	.261
What is your extent of exposure to online learning programs (ebooks, Wikipedia,blogs etc)	.572	.766

Table 5. Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.135	42.792	42.792	4.725	39.378	39.378	3.397	28.310	28.310
2	1.614	13.450	56.242	1.174	9.786	49.164	1.776	14.801	43.111
3	1.020	8.503	64.746	.682	5.683	54.847	1.408	11.736	54.847
5	.754	6.280	78.368						
6	.617	5.144	83.512						
7	.485	4.040	87.552						
8	.439	3.657	91.210						
9	.361	3.012	94.221						
10	.305	2.541	96.762						
11	.259	2.162	98.924						
12	.129	1.076	100.000						

Extraction Method: Principal Axis Factoring.

Table 6. Factor Matrix

Question	Factor		
	1	2	3
Do you have access to internet?	.653	.143	.532
Do you spend time gathering information from internet?	.706	.380	-.199
Do you think that computer or web based learning should play a role in your course of study?	.811	-.293	-.150
Do you think you can learn to use this system in your method of study very quickly?	.634	-.210	-.046
In your opinion is online teaching (web 2.0) conducive?	.784	-.047	-.206
Should web based learning be a supplement to lectures?	.518	-.081	.071
Should web based learning replace lectures?	.494	-.410	.078
Should online teaching be restricted to distribution of notes only?	.636	-.250	-.116
Do you participate in online discussion fora?	.672	.098	.427
Will you find it easier to participate in a discussion online rather than discussion while in lecture?	.643	-.118	-.137
Do you think you need to learn a lot (typing, word processing, interacting in facebook – web 2.0) before moving on to online teaching/learning?	.271	.421	.101
What is your extent of exposure to online learning programs (ebooks, Wikipedia,blogs etc)	.521	.662	-.236

Extraction Method: Principal Axis Factoring.a. 3 factors extracted. 23 iterations required.

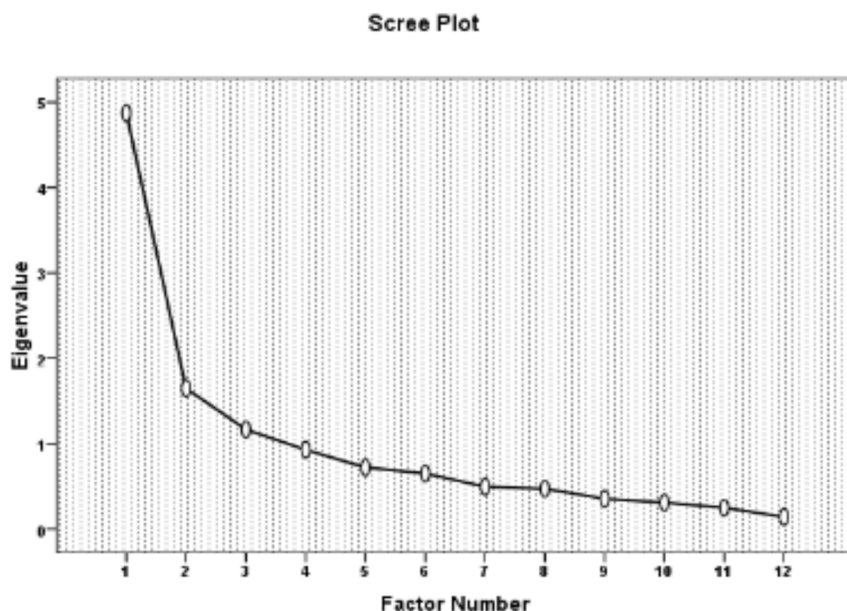
Table 7. Rotated Factor Matrix

Question	Factor		
	1	2	3
Do you have access to internet ?	.287	.231	.772
Do you spend time gathering information from internet ?	.427	.687	.167
Do you think that computer or web based learning should play a role in your course of study ?	.845	.148	.170
Do you think you can learn to use this system in your method of study very quickly?	.630	.109	.199
In your opinion is online teaching (web 2.0) conducive?	.713	.362	.140
Should web based learning be a supplement to lectures?	.435	.131	.272
Should web based learning replace lectures?	.584	-.160	.226
Should online teaching be restricted to distribution of notes only?	.674	.098	.133
Do you participate in online discussion fora?	.357	.234	.679
Will you find it easier to participate in a discussion online rather than discussion while in lecture?	.616	.220	.133
Do you think you need to learn a lot (typing, word processing, interacting in facebook – web 2.0) before moving on to online teaching/learning ?	-.033	.440	.258
What is your extent of exposure to online learning programs (ebooks, Wikipedia,blogs etc)	.144	.858	.092

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization

a. Rotation converged in 6 iterations.



Graph 1.

DISCUSSION

Preparedness of the students to web 2.0 can be an overwhelming driving factor for the student participation in the new tool of learning. In our study we identified 2 factors one relating to their “willingness” and other to “prior initiative” as the predominant constructs. Second construct would ultimately effect the usability of the learning tool. It has been previously suggested that careful attention needs to be made to the main factors that determine usability one of which is learner issues.(13). Third factor was excluded from consideration both statistically and logically as access to internet forms the basis of web based education.

Our results were favourable for the use of web based teaching when “willingness” of the students was concerned but same cannot be said about “prior initiative” as whopping 38 % agreed and 21% were not sure that they need to learn a lot before moving on to online teaching. Initiative can be determinant factor in ensuring active student participation which can directly affect their performance (3). If proper implementation of web 2.0 based learning has to be done, a pre assessment of the students needs to be done regarding working knowledge of internet and computer operations. Students come to medical college from different family and educational backgrounds. Whatever the means of education, the output should focus on the excellence of the student. If means are not reached, the inappropriateness of tasks given by teacher to students might act as teacher and learning related stressor (17). If particular students are found lagging, they can be given a mini training for the same as perceived ease of use and perceived usefulness are both behavioural determinants of potential users (22).

Barrier identification for continuation and effective

implementation of a new teaching tool need to be one of the first processes for application. Potential barriers include resistance to online learning, inadequate computer skills, insufficient time, or perception that the curriculum is a low priority (6). Erik Langenau et al findings exposed challenges with technology and human factors (8). The students have previously identified variables such as the need for information about the course and orientation to using technology to be considered as additional benchmarks for best practices in web-based courses. (11)

We cannot exclude those students who don't have any access to internet. As education means has to be all inclusive, firstly we need to make sure that all students have access to internet. Students who did not have access to internet were dependent on college facility for the same. So, that can be an easy, practical and first step if web based teaching is to be implemented.

Though only 4% of students disagreed with web based learning should play a greater role in their studies but 27% of students agreed that web based learning should be restricted to distribution of notes only. Additionally, though most of the students agreed that discussing online is easier than in a lecture class, 14% disagreed. Web 2.0 is an interactive tool and not just passive information gathering tool. It can be used as an accessory for passive distribution of information but the full potential can be explored only when it is used for active learning and as a discussion igniting tool. The students who disagreed might be apprehensive about the new methodology of teaching. In order to allay the apprehension that may accompany such change, curriculum development and implementation should be an inclusive process, with both staff and students being well informed of the planned reform (15)

In our results, most of the students are in favour of implementation of web 2.0 teaching, though only 13% agreed that it can replace lectures. It is better to use and tune a “blended learning environment” that integrates the strengths of both e-learning and lecture to provide the most efficient and effective instruction and overcome the deficiency of limited skills and resources (12).

The response rate in our study even after repeated reinforcements was only 46.7%. Variable learner participation has been cited as one of the most common challenges in the use of social media in medical education (4). The 2 factors which came out of our study and not ours study might explain the variable response. It could be due to lack of motivation and willingness to involve in computer based questionnaire or due to apprehension because of no or minimal working knowledge of computers. It has been stated before that nonresponder to satisfaction surveys are less likely to be satisfied than people who reply. (9) If correctible steps are taken for those having problems with internet/computer, then web 2.0 can be used as a great tool for teaching. Students certainly need some kind of formal introduction to the new ICT for learning purposes. But due to the wide range of previous experience and computer skills, there is no one-size-fits all course design available (23)

We suggest, that further studies reporting the usefulness of web 2.0 resources should also report on the preparedness of students for the same so that actual implication of the teaching tool can be understood. If proper care is taken of considering preparedness of students to web 2.0, using the extracted factors from our study, then it would be a step forward for better use of interactive networking websites for teaching.

DECLARATION

Authors report no conflict of interest

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