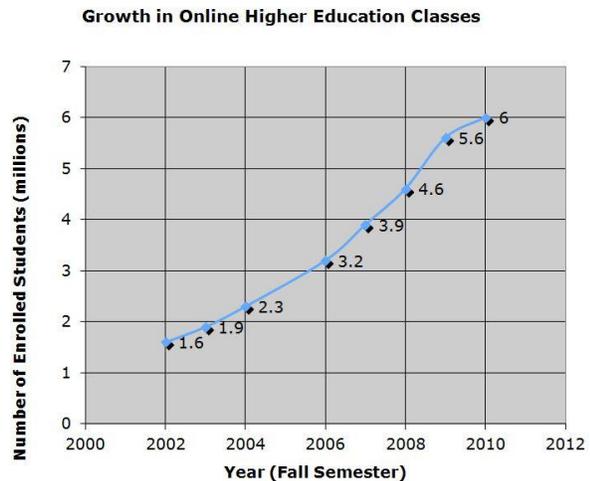


## INTRODUCTION

Distance learning has dramatically increased and evolved in the last decade. Between 2002 and 2010 the number of students enrolled in online courses rose from 1.6 million to 6 million.<sup>1,2,3</sup> Higher education institutions have historically used virtual private networks to host professors’ files on secure servers, often documents consisting of syllabi, lesson assignments and grades. This has expanded to audio/video lecture recordings and podcasts (i.e., new media or on-demand learning).<sup>4</sup>

These new teaching modalities are also increasing within medical education institutions, but has never been studied in the premedical population.<sup>5</sup> This relatively young population uses multimedia technology to consume information about everything from hobbies and audio books to learning languages and career advising. The average age of premedical students at the time they take the Medical College Admissions Test is 22.7 for men and 22.4 for women, based on a confidential survey of 29,230 premedical students.<sup>6</sup>

Coinciding with this technology revolution is equally impressive metrics tools. Since 2007, web-based user statistics and metrics have made it possible to track user behavior and provide valuable insight into usage patterns of the various education mediums. Services such as Google Analytics, YouTube, SurveyMonkey.com, Aweber.com email management, and Podpress statistics for audio podcasts have dramatically increased the ability to objectively study media consumption.



To assess the global usage of the new media communication methods among the English-speaking population consuming information online about premedical topics, a comprehensive curriculum was created and published. The curriculum was developed from surveys and conference feedback from 54 undergraduate premedical majors from the American Medical Student Association’s Pre-Med Club at the University of Houston in December 2007. From their anonymous survey responses and a series of three live conferences, a podcast entitled “So, You Want To Be A Doctor?” was developed and maintained in iTunes (for playing on iPods, iPhones, and the like) from March 2008 until January, 2010. In addition, a website and email list was created and maintained during the same time period. Metrics were obtained on the usage of competing methods of multimedia consumption and the results are reported here.

Usage of “New Media” Channels For Pre-Medical Curriculum In Classrooms And Distance Learning Environments, Daniel Williams, Chanhee Jo.

**METHODS**

This project was completed in two parts. First, undergraduate premedical majors from the American Medical Student Association’s Pre-Med Club at the University of Houston were surveyed using Survey Monkey© in December 2007 to inform the creation of an informative and appealing premedical curriculum. A combination of open-ended questions and multiple choice questions were used to assess the academic and personal issues that they face, and methods for overcoming barriers to entry into medicine as a career.

Second, a table of contents was created based on the survey results and a series of three live conferences utilized the video teleconferencing software GoToMeeting©. The lectures were organized with a didactic portion at the beginning of each session, followed by group discussion. The didactic portions were recorded as video lectures, made available online for later use, saved on DVD’s, and formatted as audio lectures in iTunes at no cost to the students. Physical media such as books, slide handouts, checklists and DVDs were bundled as one item. This required filling out an additional online form. Further, this multimedia content was then marketed online using free directories, keyword research, and Really Simple Syndication (RSS). RSS allowed each new addition of multimedia content to be added to the collection, with notifications and directory updates to hundreds of media channels and websites, automatically. Metrics were performed using a variety of tools (Table 1).

<b>Media Type</b>	<b>Metrics Tool Used For Usage</b>
Email	Aweber.com
Website	Google Analytics
Live Lectures	Sign-In sheet
Audio MP3	Podpress Statistics
Video	Yahoo.com

Table 1: Metrics tools used to track media consumption.

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RESULTS

*Curriculum development*

Table 1 demonstrates that among the 54 premedical students at the University of Houston that attended the three live conferences, 38 (70.4%) completed the survey (see Table 2). The average age was 26.89 with an age range of 18-45. Twenty-three were white or Caucasian, 6 were Asian, 2 were American Indian or Alaskan, 2 were Black or African American, 2 were Hispanic or Latino and 1 was Native Hawaiian or Other Pacific Islander. Eighteen (47.4%) were female and 20 (52.6%) were male.

Thirty-three (86.8%) were in the United States during adolescence, 2 in Canada, and one each in India, Japan, and Zimbabwe. One survey respondent had a Ph.D., 6 had master’s degrees, 20 had bachelor degrees and 5 had associate degrees. Twenty-six (68.2%) had a science major and 12 (31.6%) had non-science majors.

Only 33 students responded to the grade point average (GPA) question and their overall GPA was 3.46. Their science and math GPA was 3.44.

Twenty-eight (73.6%) had no publications, 5 (13.2%) had one, three (7.9%) had seven or more, 1 had four publications and 1 had five publications.

*Usage data of media consumption*

In this study, 66,373 audio podcasts were downloaded, 11,782 people visited our website, 1,618 people signed up for our email opt-in list, and our videos were viewed 77,661 times.

Table 3 shows that within the first 17 months of release of the multimedia curriculum to the general public, a total of 66,373 audio podcasts were consumed. More than 95% of these (63,537) podcasts were fed through Really Simple Syndication (RSS) channels into the audio players iTunes, Podpress, Podbean, Google Reader, and other (automatically updating) online directories; and 85% of these were all accessed through

**Table 2:** Characteristics of the initial 38 survey respondents.

Category	Number (%)	Characteristic
Age	Total number of students: 38	Average age 26.89 Median age 25 Age range 18-45
Race/ethnicity	23 (60.53) 6 (15.79) 2 (5.26) 2 (5.26) 2 (5.26) 2 (5.26) 1 (2.63)	White or Caucasian Asian American Indian or Alaskan Native Black or African American Hispanic or Latino Native Hawaiian or Other Pacific Islander Chinese
Gender	18 (47.37) 20 (52.63)	Female Male
Country of Adolescence*	33 (86.84) 2 (5.26) 1 (2.63) 1 (2.63) 1 (2.63)	United States Canada India Japan Zimbabwe
Number of College Credit Hours	9 (23.68) 9 (23.68) 5 (13.16) 6 (15.79) 4 (10.53) 3 (7.89) 2 (5.26)	> 120 (not in a post-bach program) >120 (in a post-bach program) 91-120 61-90 31-60 0-30 Still in high school
Current Degrees	1 (2.63) 6 (15.79) 20 (52.63) 5 (13.16)	Ph.D. Master’s degree Bachelor degree Associate degree
Undergrad. Major	26 (68.42) 12 (31.58)	Science Non-science
Grade Point Average	Total number of students: 33	3.46 Overall GPA 3.44 Science and Math only GPA
Number of Publications	28 (73.68) 5 (13.16) 1 (2.63) 1 (2.63) 3 (7.89)	0 1 4 5 7 or more

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iTunes. Only 611 (0.92%) of these audio consumption events occurred directly on our website, while 2,225 (3.4%) were played from other websites and directories.

Total number of audio podcasts consumed	66,373
Number of audio podcasts fed through RSS to remote player such as iTunes, iPhones, and iPods	63,537 (95.7%)
Number of audio podcasts played on other web sites	2,225 (3.4%)
Number of audio podcasts played from our website	611 (0.92%)

**Table 3:** Audio podcast consumption during the first 17 months of release of comprehensive premedical curriculum online.

Table 4 shows the results of website traffic measured by Google Analytics. Between December 2008 and August 2009, there were 14,611 visit to our website, 11,782 were unique individuals. Eighty percent were new to the website. The largest traffic referral source was Google, originating 9,871 (67.5%) of the leads. The second traffic source was “direct” traffic whereby individuals typed the website name directly into the internet browser, accounting for 22.6% (3,302) of the traffic sources.

Total number of website visits	14,611
Number of unique visitors	11,782
Percentage of visitors that were new	80.5%
Number one traffic source: Google	9,871 (67.6%)
Number two traffic source: Direct	3,302 (22.6%)

**Table 4:** Website usage data for the first 9 months after release of premedical curriculum.

In contrast to these large numbers, only 12 (0.01%) people from the general public used the physical bundle of books, handouts, and DVD media to consume the content (0.1%), despite 31.6% of the students surveyed in our pilot sample that stated they would use DVDs.

The website hosting the premedical curriculum had an email opt-in list that students could voluntarily join (Table 5). The total number of students that signed up to be on the email list was 1,618, which was 13.7% of the people that visited the website. The only way to get on this email list was through the website. Two hundred-forty seven (15.3%) unsubscribed from the list and the average percentage of people that opened the weekly emails was 48.5%.

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Total number of email opt-ins	1,618
Number of unsubscribed opt-ins	247 (15.3%)
Number of active opt-ins	1,371 (84.7%)
Average percentage of emails opened (n=10)	48.5%
Average percentage of email complaints (n=10)	0.09%

**Table 5:** Usage of opt-in email list for consuming premedical curriculum.

Table 6 shows the usage data for YouTube video consumption of the premedical curriculum. Thirty-three videos were published with a total of 77,661 views. The number of views per video ranged from 31 to 13,293 with an average number of views per video of 2,353.

Total number of videos	33
Total number of views	77,661
Range of number of views	31 – 13,293
Average number of views per video	2,353

**Table 6:** Usage data of YouTube videos for consuming premedical curriculum.

## CONCLUSIONS

Audio podcasts and videos appear to be the preferred method of consumption of premedical curriculum online, with email lists and directly visiting the author’s website falling well behind. The Apple iTunes platform and YouTube videos are exceptionally effective. The days of physical text books, CD’s, DVD’s and paper handouts are practically obsolete for the self-directed premedical online learner.

Limitations of this study include the lack of a control population, such that cross-pollination occurred whereby individual students were known to sign up for more than one method of media. For example, listeners of the podcast frequently signed up for the email list and visa-versa. Also, survey data on demographic and academic characteristics of the at-large population was not gathered for comparison to the sample group that helped create the content. This weakness is ameliorated somewhat by the fact that the sample group really only helped create our table of contents, which did not differ much from existing books on the subject, online blogs and forums. A forum was not set up for this study, but they are known to be a popular resource for students to learn about premedical issues.

Formal online education has become widespread and the multimedia delivery technologies are becoming more sophisticated. This research project demonstrates that mentorship and career guidance can be successfully integrated with traditional curriculum, and supports the idea that new media is actually preferred by many students. Future research can assess the efficacy of using new media channels for recruitment at the program level as well as classroom supplements.

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<sup>6</sup> Facts: Applicants, Matriculates, Enrollment, Graduates, MD/PhD, and Residency Applicants Data, Association of American Medical Colleges.  
<https://www.aamc.org/data/facts/>