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Studying Behaviors Among Neurosurgery Residents Using Web 2.0 Analytic Tools

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BACKGROUND: Web 2.0 technologies (e.g., blogs, social networks, and wikis) are increasingly being used by medical schools and postgraduate training programs as tools for information dissemination. These technologies offer the unique opportunity to track metrics of user engagement and interaction. Here, we employ Web 2.0 tools to assess academic behaviors among neurosurgery residents.

METHODS: We performed a retrospective review of all educational lectures, part of the core Neurosurgery Residency curriculum at the University of Toronto, posted on our teaching website (www.TheBrainSchool.net). Our website was developed using publicly available Web 2.0 platforms. Lecture usage was assessed by the number of clicks, and associations were explored with lecturer academic position, timing of examinations, and lecture/subspecialty topic.

RESULTS: The overall number of clicks on 77 lectures was 1079. Most of these clicks were occurring during the in-training examination month (43%). Click numbers were significantly higher on lectures presented by faculty (mean = 18.6, standard deviation ± 4.1) compared to those delivered by residents (mean = 8.4, standard deviation ± 2.1) ($p = 0.031$). Lectures covering topics in functional neurosurgery received the most clicks (47%), followed by pediatric neurosurgery (22%).

CONCLUSIONS: This study demonstrates the value of Web 2.0 analytic tools in examining resident study behavior. Residents tend to "cram" by downloading lectures in the same month of training examinations and display a preference for faculty-delivered lectures. (J Surg Ed ▮:▮▮▮-▮▮▮. © 2017 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: Web 2.0, education, blog, neurosurgery, resident curriculum

COMPETENCIES: Medical Knowledge, Interpersonal and Communication Skills

INTRODUCTION

Educators in all fields, even outside medicine, are beginning to move away from primarily paper-based learning resources and embracing newer electronic mediums.[1] Web 2.0 is the general term for dynamic resources including blogs, websites, and wikis, which rely on user-generated content.[2] There has been a rapid shift toward Web 2.0 channels for the education of medical residents, with significant discussion in the current literature on the usage of these resources for resident education.[3] Residents in contemporary training programs appear highly receptive to the use of Web 2.0 tools in their didactic education, particularly after training initiatives for those uninitiated to these online avenues. For instance, after a social media–based education initiative, one program reported an increase in the percentage of internal medicine residents using Twitter for educational purposes from 9% to 85%.[4]

By allowing for learning activity to be tracked, Web 2.0 platforms provide a unique opportunity for real-time feedback on temporal patterns and characteristics of resident learning, and promoting rapid optimization of medical education curriculums.[5] To our knowledge, there have been no publications describing the use of Web 2.0 technologies in surgical education. Herein, we report our experience with the introduction of a relatively

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simple and freely available Web 2.0 tool to supplement our neurosurgical curriculum. We show that not only was it a popular tool for our residents, but it also provides insight into their studying behavior, which can be useful to further optimize how we educate the next generation of neurosurgeons.

METHODS

The Neurosurgery Core Curriculum "The Brain School"

The Neurosurgery Residency Training Program at the University of Toronto includes 32 clinical faculty, 9 research faculty, 32 residents, and 26 fellows. Residents rotate among 4 teaching hospitals (St. Michael's, Sunnybrook, Toronto Western, and the Hospital for Sick Children) on clinical service, but meet every Friday morning for 3 hours of dedicated didactic teaching (The Brain School), by faculty, fellows, or coresidents. Lectures cover topics spanning the range of neurosurgery,[6,7] and are split into 6-month topical blocks covering spine, pediatrics, neuro-oncology, cerebrovascular, and functional neurosurgery. At the conclusion of each block, residents sit for in-training written examinations, which follow the format of Royal College of Physicians and Surgeons of Canada examinations for neurosurgery board certification. The Table shows an example of the current month schedule for the pediatric block at The Brain School.

In mid-2013, we created a blog-style website (www.thebrainschool.net), using the "WordPress" platform (https://wordpress.com/) to improve medical clerks and residents' access to online educational materials (clerkship manual and lectures from our courses and The Brain School). All pages for lectures on the website are password-protected and passwords are only provided to residents enrolled in our program (Fig. 1). The "WordPress" platform provides real-time metrics of all visits and clicks on lectures from the website.

Data Extraction and Collection

We performed a retrospective review of all lectures posted to our website from September 2013 to November 2016 and extracted the following data from the embedded "WordPress" statistical package, which only can be accessed by the website administrators (B.D. and N.M.A.): title, date, and number of clicks of each lecture. We also examined each lecture file, that were posted using Adobe Acrobat Portable Document Format (PDF) or Microsoft Office PowerPoint (PPT) format, to determine the topic and the lecturer's academic position at the time of lecture. Timings of examinations were determined by retrospectively examining the program director office records.

TABLE. The Brain School Schedule for the Current Pediatric Block in January-March 2017

Date	Topic	Speaker
Friday, Jan 20	Vein of galen malformations	Dr. Timo Krings
	Third ventricle anatomy	Dr. Todd Mainprize
	Case presentations	Dr. Jefferson Wilson
Friday, Jan 27	Radiation therapy	Dr. Normand Laperriere
	Neuroimaging in pediatrics	Dr. E. Widjaja
	Nonaccidental injury in children	Dr. Abhaya Kulkarni
Friday, Feb 3	Visiting professor day: "The 2nd Annual Labatt Chair in International Neurosurgical Education"	Dr. Robert Dempsey
Friday, Feb 10	Supratentorial tumors in childhood	Dr. Uri Tabori
	Neuropathology of pediatric brain tumors	Dr. Cynthia Hawkins
	Case presentations	Dr. Abhaya Kulkarni
Friday, Feb 17	"Annual Canada-Wide Neurosurgery Practice Exam"	NA
Friday, Feb 24	"In-training Practice Oral Exam for Senior Residents"	NA
Friday, Mar 3	Craniosynostosis	Dr. Christopher Forrest
	Positional plagiocephaly	Dr. Christopher Forrest
	Essentials of communication in neurosurgery	Dr. Abhaya Kulkarni
Friday, Mar 10	Shunt complications	Dr. Abhaya Kulkarni
	Lipomyelomeningocele, dermal sinus tract	Dr. Abhaya Kulkarni
Friday, Mar 17	Hemorrhagic stroke in pediatrics	Dr. Peter Dirks
	Moya-Moya	Dr. Peter Dirks
	Case presentations	Dr. Abhaya Kulkarni
Friday, Mar 24	Craniopharyngioma/optic glioma	Dr. James Drake
	Case presentations	Dr. James Drake
Friday, Mar 31	Visiting professor day: "The 3rd Annual Alan Hudson Lectureship"	Dr. Raymond Sawaya
	Encephalocele	Dr. James Rutka
	Hydrocephalus and shunting	Dr. James Rutka

NA, not applicable.