USE OF CLOUD-BASED GRAPHIC NARRATIVE SOFTWARE IN MEDICAL ETHICS TEACHING

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ABSTRACT

Although used as a common pedagogical tool in K-12 education, online graphic narrative ("comics") software has not generally been incorporated into advanced professional or technical education. This contribution reports preliminary data from a study on the use of cloud-based graphics software Pixton.com to teach basic medical ethics concepts and the human dimension of medical ethics dilemmas in a premedical program at an American medical college in the State of Qatar. Qualitative and quantitative end-of-semester data (open-ended and 7-point Likert scale questions) were collected from randomized control and study groups from 22 total students in a 4-week medical ethics module, half of whom wrote an argumentative essay on a contemporary medical ethics dilemma and the other half who created a 10-15 panel graphic narrative consisting of a real-life doctor-patient-family encounter involving a contemporary ethical issue.

KEYWORDS

E-learning; Cloud computing – graphic narrative software; narrative medical ethics; medical education; Qatar.

1. INTRODUCTION

The study aimed to provide preliminary data for larger sample size randomized controlled trials investigating student learning about medical ethics questions by comparing two pedagogical modalities: a argumentative / persuasive research paper and a graphic narrative using a cloud-based online graphics software program called Pixton.com. The research attempts to answer the general question about the effectiveness of using graphic narratives (stories) in order to help students understand the human dimension of biomedical conundrums that they will eventually face in their professional practice. A total of 22 students participated in a 4-week medical ethics module and then qualitative and quantitative end-of-semester data was collected from the students via questionnaires.

2. BACKGROUND

The narrative medicine movement began in the 1990s and seminal overview treatments of the topic by Rita Charon and Brian Hurwitz appeared a decade later, such as Charon's *Narrative Medicine: Honoring the Stories of Illness* (2006), and Hurwitz's *Narrative Research in Health and Illness* (2004). Narrative medicine is a clinical and research perspective in the healthcare field that investigates how stories (narratives) structure medical experiences, ranging from formalized case histories, ethics dilemmas, the patient experience of disease, and events in the medical workplace. Narrative medicine is an important and growing branch of the medical humanities (medical sociology, medical history, literature and medicine, etc.) which similarly seeks to explore humanistic elements in medical care both as an end in and of itself, and as a means to improve medical outcomes and patient satisfaction (Weber, 2010). In an editorial in the *Australian Journal of Medicine*, Jill Gordon aptly pointed out: "To appreciate whether the humanities are indeed foreign to medicine, try to imagine a health care facility in which no ethical issues are explored, no lessons have been learnt from the past, no cultural awareness is displayed, no written words (other than technical communications) appear, and no books, films, television programs, plays or concerts are discussed by patients or staff. Imagine that there are no artworks, no music and no other aesthetically pleasing elements.

Although some of our hospitals are admittedly run down, the products of the arts and humanities are nevertheless all around us" (2008, p. 420).

The author's experience in working in the Persian (Arabian) Gulf at an American medical college has reinforced the realization that medical practices, although grounded in the shared biomedical model of disease dominant in wealthy industrialized countries, can vary considerably from culture to culture, particularly with respect to medical ethics, doctor-patient relations and the patient experience of disease (Weber, 2009). Therefore the stories that both patients and medical practitioners tell about disease and their lived experiences are impacted by a range of socio-culture, religious, and economic factors. From a pedagogical perspective, the medical humanities has three key characteristics in medical education, according to Shapiro et al. (2009):

1. They use methods, concepts, and content from one or more of the humanities disciplines to investigate illness, pain, disability, suffering, healing, therapeutic relationships, and other aspects of medicine and health care practice.
2. They employ these methods, concepts, and content in teaching health professions students how to better understand and critically reflect on their professions with the intention of becoming more self-aware and humane practitioners.
3. Their activities are interdisciplinary in theory and practice and necessarily nurture collaboration among scholars, healers, and patients.

Graphical imagery is immediate, visceral and can communicate different kinds of information (and is especially effective at expressing human emotion), and has particular practical use for illiterate populations in conveying meaning. Therefore graphical language is pervasive in modern society, from advertising, the Internet, and all forms of print media as well as embedded within the design of objects. The nexus between images and story-telling may stretch back to the Paleolithic cave paintings of Lascaux in Montigac, France which possibly depict a narratological and even cinematic sense of reality (Noxon, 1964). William Hogarth (1697-1764) is generally credited, however, with developing modern sequential art, also known as a comic or cartoon. His often reproduced engravings *A Rake's Progress*, *A Harlot's Progress* and *Marriage à-la-mode* take on a genuine moralistic tone satirizing libertinism, prostitution, and marriage for financial gain; thus he established the genre of sequential art as serious social commentary and as a didactic form of expression. He also was interested in medical topics (Haslam, 1996). Various forms of sequential art developed into the modern period, from the purely humorous comics often found in daily newspapers, to related forms which combine parody, satire, and social commentary (such as *Doonesbury*, *Pogo*, and the political cartoon) to book-length illustrated stories such as Art Spiegelman's *Maus* (depicting his father's survival of Auschwitz and its effect on his son) and Joe Sacco's *Palestine*, an exploration of the social plight of Palestinians.

Graphical techniques are also beginning to impact diagnostic and therapeutic techniques in medicine. For example, The Pictorial Representation of Self and Illness Measure (PRISM) employs simple graphical shapes such as circles in order to measure levels of pain and suffering. It has been validated and applied to a variety of patient populations, such as fatigued cancer patients (Gielissen et al., 2013), vertigo sufferers (Weidt et al., 2014), and victims of orofacial pain (Streffer et al., 2009).

Since the range of topics which occupy modern graphic artists encompasses all of human experience, it is not surprising that a substantial body of graphic narrative specifically related to illness, disease and healing exists. The most frequent topics that have been dealt with recently are cancer and mental illness, undoubtedly due to the complexity of these diseases and the vastly different responses of families and sufferers when facing these conditions. Representative book-length examples of this genre include Marisa Marchetto's *Cancer Vixen* (2006), an autobiography (Marchetto is a professional cartoonist) that describes her personal struggle with cancer, and Brian Fies's *Mom's Cancer* (2006) which focuses on the effects of the disease on family members. Other notable medical graphic narratives include: Lesley Fairfield's *Tyranny* about anorexia nervosa; Tucky Fussell's *Mammoir: A Pictorial Odyssey of the Adventures of a Fourth Grade Teacher with Breast Cancer*; David B.'s *Epileptic*; and Darryl Cunningham's *Psychiatric Tales*, another autobiographical work detailing his employment in a psychiatric ward.

Pixton online comics can easily create the kind of graphic narratives that have appeared from professional artists; the comics are built in frames which consist of user controlled pre-defined background templates. Background images such as .jpgs can also be imported and over-laid in various ways. In addition to objects, character forms from templates can be introduced into the panels and posed in various configurations using

pivot points that can be grabbed by the cursor, normally along the body joints. Most importantly, many aspects of the characters' faces can be configured by selecting predefined elements and then dragging these elements to resize them. Thus, a wide variety of emotional responses can be custom drawn with Pixton. Two similar simple graphics tools include a desktop application by Plasq called *Comic Life* (http://plasq.com/downloads/comic-life-desktop/) and the cloud-based *Make Beliefs Comix* (www.makebeliefscomix.com). As Shamburg points out, "these programs simplify the more technical aspects of comic creation and let a user focus on the creative aspects of production. These programs allow you to save, edit, revise, and share your work" (2014, p. 2).

A growing number of research studies are reporting successful educational outcomes using Pixton in the educational setting. In a technology graduate-level seminar, Kovalik et al. demonstrated increased engagement when students used Pixton as an advanced organizer before engaging in online discussion, i.e. in a flipped-classroom modality (2011). In addition, Meyers (2014) introduced creative practice via Pixton into an undergraduate course in communications theory.

3. STUDY OBJECTIVE

The purpose of this preliminary study, to be followed by a larger randomized controlled trial, was to compare differences in learning outcomes related to basic medical ethics concepts in a premedical department following an American medical curriculum (Weill Cornell Medical College in Qatar, a satellite campus of Weill Cornell Medical College, located in New York City) when students wrote a traditional argumentative research-based paper versus a graphic novel scenario using online graphics software. Thus the study investigated both modes of learning (blended online learning versus completely face-to-face instruction) and rhetorical modes (written essay versus graphic narrative).

4. METHODOLOGY

Exploratory investigations to test the viability of using an online graphics software program for medical ethics training among premedical students began in March of 2014 in a four-week module on Islamic bioethics within a sixteen-week history of medicine course entitled Perspectives on Islamic Medicine offered at WCMC-Q. All nine students were instructed to choose as a final project a controversial medical ethics question (scenario or case) in Islamic medical ethics, a growing field of scholarship which investigates the intersections among customary Muslim modes of thought and behavior (*al 'urf*), shariah law, contemporary juristic reasoning (*ijtihad*), and novel bioscientific innovations such as stem cells, animal cloning, artificial life support, assisted suicide, Artificial Reproductive Technologies (ART) and organ transplantation. After reviewing peer-reviewed literature and formulating arguments and counterarguments on a specific ethics question, students translated their dilemma into a narrative using online comics software Pixton (www.pixton.com). These scenarios were required to be evidence-based, i.e. students were asked to imagine a real-life medical ethics encounter that could occur in an Islamic context, either involving Muslim patients and Muslim doctors or taking place in a nation following shariah law.

In Spring, 2015, this assignment–broadened to include general and Western medical ethics–was repeated with 22 premedical students who were divided equally into control and study groups, one writing an argumentative paper and the other a graphic narrative. The objective was to compare differences in self-reported learning about medical ethics between the two different types of final project using an end of semester 10 question self-report questionnaire. The primary bases of evidence (3 peer reviewed sources were required both to write the argumentative paper and to construct the graphic narrative scenario) were drawn from the student's personal experience, peer-reviewed articles and book chapters from the course readings, and research obtained from the Georgetown SFS in Qatar's Islamic Medical and Scientific Ethics (IMSE) Database and related reference collection.

5. DISCUSSION AND RESULTS

Pixton was first introduced into the author's Spring, 2014 course. Two out of the 9 students encountered serious difficulties in using Pixton.com and subsequently used the accounts and assistance of other students in the class in order to complete the assignment. Follow-up revealed that these students were from first-generation college-goer families and did not possess full computer literacy. Standard end of semester feedback evaluation forms indicated that the software was successful in teaching the learning outcomes of Islamic medicine and Islamic medical ethics, and made the experience of learning more enjoyable. Thus the author proceeded to a more formalized and randomized pilot study in the Spring, 2015 semester.

In a Spring semester 2015 medical ethics module, 22 students participated in the following activities: course readings from Beauchamp and Childress's *Principles of Biomedical Ethics*, 7th edition (2013), class discussions, role-playing, and online YouTube videos (documentaries of the Terri Schiavo case and AIDS activism). During the second week of the module, students were randomly assigned to a control group who were instructed to write an argumentative / persuasive essay and an experimental group who used Pixton.com to create a graphic narrative. Due to time limitations, instructors assisted students in choosing appropriate peer reviewed medical ethics sources to complete their final projects. Sources included standard bioethics journals, as well as the AMA's *Virtual Mentor American Medical Association Journal of Ethics* (http://virtualmentor.ama-assn.org/). Students who chose a topic in Islamic medical ethics made use of the Islamic Medical and Scientific Ethics (IMSE) Database at Georgetown School of Foreign Service in Qatar (http://imse.library.georgetown.edu/), the first database in the world dedicated to Islamic bioethics.

After the completion of the final projects, students were administered a 10-question questionnaire containing 5 free response questions, and 5 seven-point Likert Scale questions with a scale ranging from "Entirely Disagree" to "Entirely Agree." Seventeen students completed the questionnaire. The mean score for the question "Enough training and support was provided to use Pixton software" was 5.8 indicating that the majority of students did not encounter difficulties in using the software. However, 5 out of 11 students reported problems writing the graphic narrative; 3 problems were related to creating a story and difficulties with narratives in general and relating the story to medical ethics, and 2 problems related to technical issues with Pixton. For the follow-up study described below, the author plans to provide more detailed in-class training using Pixton with a hands-on workshop and online tutorials. Also, although a medically related graphic novel was assigned as course reading, little time was spent in class doing an in-depth analysis of the graphical and narrative elements. The mean response for the graphic narrative writers for the question "the final project was helpful in learning about medical ethics" was 5.0, while for the argumentative paper students the mean response was 4.7. In an unpaired t-test at the 95% confidence level, the two-tailed P value was 0.6876, demonstrating that in student self-report, there was no statistically significant difference in graphic narratives and argumentative papers in learning about medical ethics. This preliminary data on a small sample may indicate that the two rhetorical modes are equally effective in teaching medical ethics concepts. Thus the graphical narrative could be added to the range of pedagogical approaches in teaching medical ethics, such as the traditional argumentative paper.

From the observational notes of the instructors, the observors noted that most of the students, except for the few encountering technical difficulties, enjoyed the experience of using Pixton.com since it was a unique and new approach to learning that they had not encountered in high school. This confirms a growing body of literature in serious gaming and edutainment that adding both an online component and entertainment aspects to learning ('making learning fun') can positively impact student motivation for learning.

5.1 Follow up Study

The author is planning to carry out a more rigorous experimental design (a randomized controlled trial) by comparing the pre- and post-test scores on a validated multiple choice exam measuring knowledge of basic medical ethics concept related to the human dimension of medical ethics. The test will measure student mastery of factual medical ethics decisions which relate to interpersonal relations, affective responses, the narrative structure of ethics cases, and human motivation. This perspective contrasts with other modalities of medical ethics teaching, such as policy-based approaches (following and applying rules) or legal medicine (complying with state and federal statutes).

In the follow-up research, the Jefferson Scale of Empathy-S–a widely used psychometric test that measures medical student empathy, will be additionally administered as a pre- and post-test to elucidate differences in empathy change when comparing learning through a traditional argumentative essay versus the graphic novel. The Jefferson Scale of Empathy-Student version (JSE-S), is a 20 question self-administered 7-point Likert scale scored test available from the Center for Research in Medical Education and Health Care at Thomas Jefferson University in Philadelphia, Pennsylvania, USA. A preliminary reliability study of the JSE-S will first be carried out on a target population in Qatar. Reliability of questions will be measured through Alpha – item-deleted, item-total correlation, and inter-item correlation.

6. CONCLUSION

Ethnologists have yet to uncover a human society which does not include some form of music or storytelling, including cosmogonies, myths, memorializations of past events, heroes and deities, etc. This suggests that narrative may be genetically encoded and fundamental to human cognitive functioning, stretching to perhaps neurolinguistic structures of the human brain. Further investigation into the microstructures of the human brain at the neuronal level, such as The NIH BRAIN Initiative (Brain Research Through Advancing Innovative Neurotechnologies) started in 2013 or the related European Union collaboration called the Human Brain Project (which collectively will map all the neurons of the human brain, and create informatics models) will undoubtedly reveal how narrative and graphic narrative structures specifically organize, affect, and impact the phenomenological properties we call memory, experience, emotion and cognition. In the meantime, various qualitative (narratology, discourse analysis, postmodern philosophy, Philosophy of Mind) and quantitative (randomized controlled trials) research methods can perhaps elucidate how graphic narrative, and specifically electronically-enabled experiential learning in the creation of graphic narrative, can impact learning.

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