UNDERGRADUATE CREATORS OF VIDEO, ANIMATIONS AND BLENDED MEDIA: THE STUDENTS' PERSPECTIVE

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ABSTRACT

More than half of all adults in developed countries have low health literacy levels and do not possess the necessary skills and ability to manage their own health. Therefore it is vital that new health professionals are equipped to recognize and effectively communicate with individuals with low health literacy. This paper will describe 4th year Pharmacy undergraduate students' perspective of the creation and use of video, animations and/ or a multimedia product to communicate diet-disease relationships to individuals with low health literacy. Prior to producing the multimedia product students were apprehensive, anxious and intimidated (27%, 39%, 26% respectively). Time and lack of technical skills were perceived as barriers (67% and 50% respectively). At the completion of the task 65% of students reported enjoying the creative aspect of the project and 79% found it fun. Importantly, the students recognized the importance of pictures (60%) and simple messages (43%) in communicating complex health messages to individual with lower health literacy levels, while 86% believed the multimedia product enabled them to engage their audience more so than print material to convey a scientific message. Overall, all students effectively produced multimedia products to successfully communicate health messages with 87% proud of their achievements.

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INTRODUCTION

HEALTH LITERACY

Health literacy is defined as an individual's ability 'to obtain, process and understand basic health information and services needed to make appropriate health decisions' (Nielsen-Bohlman, Panzer, & Kindig, 2004, p6). Currently less than half of all Australians aged between 18 and 65 years possess adequate health literacy levels and that figure dramatically drops to less than 20% for individuals aged over 65 years. Age, ethnicity, socioeconomic and cultural background, educational attainment, and in Australia, languages other than English spoken at home (Keller, Wright, & Pace, 2008; White, 2008) are known to impact on health literacy levels. Furthermore, when compared with their more health literate counterparts, individuals with low health literacy have a suboptimal knowledge of chronic disease, which is associated with poorer health outcomes and increased risk of hospitalization and mortality (Baker, Parker, & Williams, 1998). It is therefore essential that emerging health professionals are equipped with the skills to identify low health literacy and then successfully communicate these health messages (Osborne, Jordan, & Rogers, 2008).

EFFECTIVE COMMUNICATION: TOOLS AND TECHNIQUES

Traditionally health information has been communicated with a print or oral format. However, consumers frequently fail to fully comprehend health and medical information conveyed via either format citing 'information overload', frequent use of medical 'jargon' (Howard, Gazmararian, & Parker, 2005) and lack of understanding of issues surrounding culture and language (Adams, 2002). Inevitably, this results in consumers remembering less than half the information discussed and failing to adequately manage their medical condition(s) (Schillinger, Bindman, Wang, Stewart, & Piette, 2004).

Although print material offers the advantage of supporting verbal communication with a 'take home' resource, many resources are too long and fail to use language readily understood by the majority of consumers (Sand-Jecklin, 2007). Similarly, examination of electronic material suggests most websites also contain material difficult to read or understand (Croft & Peterson, 2002). However, compared to consumers provided only with print material, visual aids when combined with either oral communication or print materials significantly improved comprehension by as much as 71% (Houts, Witmer, Egeth, Loscalzo, & Zabora, 2001). Perhaps most importantly, individuals with low health literacy frequently report better comprehension, understanding and compliance with lifestyle changes

and health regimes when print or oral communication was combined with images (Park, Gutchess, Meade, & Stine-Morrow, 2007).

EFFECTIVE COMMUNICATION: DIGITAL STORY TELLING

Digital stories are instructional multidimensional electronic narratives created using computer based software and images, music, narration, animation or video clips and have already been shown to be very effective in improving comprehension and understanding in low literacy (Volandes et al., 2013). Just as importantly, digital presentation had been shown to catalyse behavioural change in high volume settings in otherwise underserviced communities without increasing workloads (Silver & Oakes, 2001). Under the framework of 'health literacy', short digital stories use dynamic rather than static images and require the distillation of complex health messages into simplified key concepts, communicated in a form readily understood by the lay public. This is particularly important when teaching health literacy to emerging health professionals, as it employs multiple literacies such as 'communication', 'information', and 'multimedia' literacy, which are pertinent in health promotion.

Traditionally multimedia construction has not formed part of (allied) health tertiary education curricula. However, as digital technology advances, opportunities arise for the evolution of new pedagogical models to keep pace with the digital culture (Clark, 2010). In addition, digital story telling and multimedia production is evolving as a platform to develop graduate qualities such as team work, oral and written communication skills, critical thinking and problem solving skills (Meeks & Ilyasova, 2003).

THE STUDENTS' USE OF TECHNOLOGY

Prenksy, in his seminal article on Digital Natives states 'our students are clamouring for these [new] technologies to be used as part of their education, in part because they are things that the students have already mastered and use in their daily lives, and in part because they realise just how useful they can be' (Prensky, 2007, p41). Digital Natives (students born after 1980) are described as students who favour receiving information quickly, proficiently process information, are skillful in multitasking, favour active rather than passive learning, dislike lectures and are dependent on digital technologies to find and access information (Prensky, 2012).In contrast, a large study of 2120 first year students at an Australian university suggests otherwise; although many students are 'tech savvy' particularly in the use of email, mobile phones, computers to produce word documents and the like, over half have never created a web page, or edited either music or a video (Kennedy, Judd, Churchward, Gray, & Krause, 2008). Similar studies in the US of 4,374 (Kvavik, 2005) and 18,000 freshman and senior college students (Kvavik & Caruso, 2009) suggest that high levels of technological hardware use did not necessarily translate into competent use of technology in the classroom, and in fact 26% of students indicated they would prefer limited or technology free classrooms.

THE STUDENTS' PERSPECTIVE ON THE CREATION AND USE OF MULTIMEDIA

Recent advancements in digital technology have certainly made it possible for students with very limited technology skills to create movies, animations and various forms of multimedia with digital editing software standard on Windows and Macintosh software packages, and copyright free images and music available through 'creative commons' on the Web. While a number of studies have investigated the effect of digital composition on Digital Natives (Selfe & Hawisher, 1999), minimal empirical research has been performed to gain insight into science students' reactions when faced with an assessment task to create a multimedia product and whether they view the skills and competencies to produce the multimedia product as a legitimate (professional) competency.

Although clear communication is fundamental to patient-centered healthcare (Ong, De Haes, Hoos, & Lammes, 1995), a large number of studies reported many health professionals had little understanding of the influence of low health literacy levels on client care (Jukkala, Deupree, & Graham, 2009; Logan, 2007; Rogers, Wallace, & Weiss, 2006). Furthermore, best practice was not employed to effectively communicate health messages to clients with low health literacy levels (Castro, Wilson, Wang, & Schillinger, 2007). It is therefore imperative that health care graduates are competent communicators, particularly with clients with lower health literacy levels. This study will report on how 4th year Pharmacy students training to become health care professionals accustomed to a traditional science based curriculum reacted to the series of activities to help promote an understanding of health literacy and effective communication to members of the community through the construction of a 'creative' multimedia product and their perception of the benefits and pitfalls to the task.

METHODS

Nutrition and Therapeutics is a 4.5 unit intensive course offered to 4th year Pharmacy students at an Australian university over a 4 week period. The course consists of 8 lectures and 8 tutorials, all of these of 2 hour duration, with the expectation that 180 hours of work would be conducted both inside and outside the classroom. Students were introduced to the concept of health literacy in the first tutorial and a subsequent 2 hour tutorial allocated to the production of a multimedia product. Students worked in groups of 4 or 5 and chose one of the following scenarios,

- Osteoporosis in elderly men and women (> 70 years) living in their own homes.
- High salt intake, fast foods and hypertension in men aged > 50 years living in a lower SES area.
- Sugar sweetened beverage intake and obesity in children from low SES areas.

There were 4 key components of the activity and assessment;

1. Survey members of the public from their target demographic to establish the diet–disease knowledge and conduct a subsequent literature review (occurred out of class)
2. construction of a storyboard and audio script (occurred out of class)
3. construction of the multimedia product (occurred in class)
4. confirm an understanding of the diet-disease relationship in the target demographic after education from the multimedia product and self-evaluation of the task (occurred out of class)

The aim of the initial survey was to provide students with an authentic understanding of the knowledge (and gaps in the knowledge) of diet-disease relationships of minority groups within the Australian community. It was envisaged that the students would also gain an understanding of the other factors such as gender, socioeconomic status, educational background, cultural background, languages typically spoken, response-efficacy, self-efficacy, and motivation to change, which may influence the way they should convey their scientific message. A subsequent review of the academic literature should have then supported their findings and provided an opportunity for the students to develop their academic writing skills. The survey and literature review also formed the basis of the multimedia presentation. Students received written feedback before constructing a storyboard.

A storyboard was used to define the parameters of their ‘message’ within available resources and organize and focus the ‘message’ to determine the resources required for each part of the story. Construction of an audio script also ensured the presentation remained focused. Written feedback was provided before the multimedia product was constructed. Students were free to create any form of multimedia (video, slowmation animation or multimedia) with the caveat ‘Surprise me!’

Students prepared their products during a 2 hour tutorial session to ensure all students had support to use the software having selected props, freeware pictures, music and backgrounds etc. Numerous craft resources were provided. The multimedia products were constructed using standard Windows software (moviemaker), standard Microsoft headphones and a camera from a mobile phone. No formal training was provided for multimedia production, with students directed to methods described elsewhere e.g. ("Slowmation animations," 2009). Feedback was provided before the students sought evaluation of their multimedia products from the public to ensure only correct information was provided to a potentially vulnerable group of the community. Students were also encouraged to re-evaluate their health messages using a range of methods such as surveys or the ‘teach back’ technique and submit a formal self evaluation of their learning. A more detailed description of the activity and associated marking rubrics are available online (Pearce, 2013).

Qualitative and quantitative data to evaluate the students’ perceptions of the creation of the multimedia product was gained through a survey, the use of the ‘one minute memo’ and a self evaluation at the completion of the task. The ‘one minute memo’ was used to assess the students’ understanding of health literacy and their knowledge of the proportion of the Australian population with acceptable health literacy levels before and after training. The surveys consisted of four parts: demographic information, confidence with technology, experience with multimedia production and the ability of multimedia production to influence their understanding of health literacy. Confidence with technology was determined by evaluating the types of electronic technology commonly used and the types of tasks performed on a computer (the descriptors are outlined in table 1). Frequency of use ranged from daily, weekly, monthly, annually and less than once a year. Five point hedonic scales ranging from not skilled to expert were used to rate computer skills and scales from none to expert were used to rate previous involvement in multimedia production. The initial perception to making the multimedia product and problems encountered during production were evaluated through a range of

multiple choice and free text answers. The ability of the multimedia product to effectively engage and convey a scientific message more so than print material to members of the community, to promote an understanding of health literacy and effective communication to the students, the benefit as a professional communication tool and ability to promote graduate qualities were assessed through 7 point hedonic scales ranging from completely disagree to completely agree. At the completion of the activity, students prepared a self evaluation of the series of tasks. Key themes were identified, themed and analysed. Descriptive statistics were calculated using the software IBM SPSS Statistics 20 (IBM Corp., Armonk, NY, USA, 2011, version 20.0). Ethics approval was gained through the University of South Australia Human Ethics Committee no: 0000030493.

DISCUSSION

SOCIO-DEMOGRAPHIC CHARACTERISTICS

Ninety two of the 109 students enrolled in a Nutrition and Therapeutics course offered to 4th year Pharmacy students during 2014 provided anonymous feedback. The majority of students were under 25 years (86%) and female (78%). Just under one third of the students were International students, 44% were working part time for a Pharmacy while studying and 41% indicated that English was not their first language.

USE OF ELECTRONIC TECHNOLOGIES

Students were surveyed about their frequency of access to a variety of electronic hardware and their access to the Internet. As expected, Table 1 shows that all students use mobile phones on a daily basis and either desktop or laptop computers most days of the week. Similarly, almost three quarters used mobile music devices at least on a weekly basis with just over a half reporting daily use. Similar patterns were observed with the use of computers to play digital music. Kennedy et al. (2008) reported that 75% of students had unrestricted access to memory sticks. This study also showed that 72% of students accessed and backed up data on electronic devices daily, however 23% of the sample accessed data storage in a cloud.

Table 1: Students use of electronic hardware and computer software

Frequency of Electronic hardware use (%)	Daily	Weekly	Monthly	Annually	Never
Mobile phone	100	0	0	0	0
Computer (desktop or laptop)	96	4	0	0	0
Electronic music device (IPod, MP3)	54	21	11	2	12
Digital camera	32	32	9	9	10
Memory stick / hard drive	49	36	11	0	4
Cloud storage	23	17	13	8	39
Frequency of computer software use (%)					
write documents	70	25	5	0	0
create presentations i.e. Powerpoint	12	21	36	25	7
play digital music (iTunes)	57	27	4	3	9
manipulating digital images/ creating graphics	16	25	23	0	36
manipulate digital photos	32	32	19	9	10
create web pages	2	3	11	0	80
edit audio / video	5	8	19	17	51
create animations	5	2	3	8	79
play games offline	21	4	16	19	40
play games online	20	20	5	13	42

As predicted, students were proficient in using computer software to prepare assignments using word processing packages and most had used a computer to manipulate digital photographs or create a graphic, however the vast majority had never created an animation or web page. Combined, these findings support those of Kvavik (2005) and Kennedy et al. (2008), who also concluded that frequent use of technological hardware did not necessarily translate into regular use of technological software in the classroom (Kennedy et al., 2008; Kvavik, 2005; Margaryan, Littlejohn, & Vojt, 2011).

SELF REPORTED SKILL LEVELS

The self-reported routine technical computer skill levels of the students varied, with less than 14% believing their skill level was basic and 35%, 35% and 13% respectively indicating their skill level was

fair, good or expert. When specifically asked about their multimedia (animation, video or blended media) skills, only one quarter had created or edited these forms of media on an amateur level, 30% reported limited skills (divided equally between watching friends performing these activities or having attempted them themselves) and finally 44% reported no experience at all (however 12% stated they had a keen interest in technology).

BARRIERS AND ENABLERS OF THE TECHNOLOGY

The students were asked to describe how they felt about creating a multimedia production prior to the task. While approximately a third of students indicated they were apprehensive, anxious and intimidated, the students were equally excited, wanted to have 'fun' or use their creative talents (45%, 40%, 37% respectively). However, half of the students were worried that they did not possess the necessary technical skills, despite being directed to Garry Hoben's Slowmation website to view the efforts of primary school students ("Slowmation animations," 2009). Similarly, 67% were concerned about the time required to complete the production. Table 2.

Links were provided for the Creative Commons websites for freeware music and pictures, however 10% described frustration in locating suitable music or pictures. Surprisingly, 86% of the students expressed concern in accessing the software to 'practice', even though they were made aware that Windows software was standard on all university computers in the student computer pools, suggesting many students did not spend a lot of time on the campus. Furthermore, 23% expressed difficulty in accessing instructions to prepare the multimedia product, despite this information discussed in class and links being available on the course home page.

Table 2. Students experiences in preparing the multimedia product

Perception of making the multimedia product (prior to the task)	**% responses**
Anxious	39
Apprehensive	27
Intimidated	26
Excited	45
Use of creative talents	40
Fun	37
Lack of time	67
Lack of technical skills	54
Other loved something completely different quality of final product not acceptable software only on campus	8 5 2 1
Difficulties in making the multimedia product	
[a]suitable freeware picture	10
[a]suitable freeware music	10
access to instructions to prepare multimedia product	23
access to software	86
access to a camera or mobile phone	4
other	0

[a]available under the creative commons licence

EDUCATIONAL OUTCOMES

Anderson (2008) affirms when situated in sound paedology, unfamiliar entry level technologies such as those used to create a slowmation animation can form the 'low bridge to high benefits'. This can act as a framework to facilitate motivation, engagement and literacy enriched critical thinking and problem solving which may in turn promote innovation and deep learning (Anderson, 2008). Prior to the course, the majority of the students were unable to define the term health literacy. After being informed of the definition of health literacy, 85% of the students over-estimated the percentage of Australians aged between 18 to 65 years with adequate health literacy. At the completion of the activity only 22% overestimated levels of low health literacy. This agrees with the findings in previous cohorts in 2011 and 2012 (Pearce, 2014).

After evaluating the multimedia product in the community, 86% of students either somewhat agreed, agreed or strongly agreed the creation of a video or animation enabled them to connect with and engage their audience more so than print material to convey a scientific message. Furthermore, 87% either somewhat agreed, agreed or completely agreed that the creation of a storyboard, audio script and multimedia product helped them to understand the issues around communicating scientific health messages to individuals with low health literacy more so than a formal academic literature review and 87% were proud of their achievements This is supported by work with an earlier cohort which demonstrated using SOLO taxonomy that the majority of students understood the communication issues when conveying scientific information to clients with low health literacy (Pearce, Birbeck, & May, 2013).

Overall, the students were very engaged with the process and most either somewhat agreed, agreed or strongly agreed the skills gained through the series of activities will benefit them in their further academic (77%) and professional life (66%). They also indicated that the series of tasks developed the graduate qualities of problem solving, critical thinking, oral communication, written communication skills, team work and also time management skills (75%, 80%, 94%, 87%, 90% and 90% respectively). Others have reported significant educational gains through the use of multimedia in a classroom setting; Young (2011) reports a number of universities 'are considering adding video-making to a list of core skills required for graduation' (Young, 2011).

Self reflections on the process of creating a multimedia product reinforced the initial survey findings particularly with respect to the perceived lack of technical skills contributed to initial anxiety (52% and 35% respectively; n=54). Time was also a resounding issue, with 85% commenting on their perceived lack of time to complete the series of scaffold activities, irrespective of the 180 hour work load expectation for a 4.5 unit 4 week course. (The only other assessed piece during this time frame was a portfolio of work completed during tutorials, followed by an exam 2 months later). Surprisingly, the 2 hour allocation of tutorial time to make the animation did not appear to be problematic. Other themes that emerged were the opportunity to have fun (79%), be creative (65%), the importance of pictures when communicating with individuals with low health literacy (60%), opportunity to select a real life topic that engaged them (54%), simple messages could very effectively convey complex health information (43%), interact with the public (37%), engaging story lines result in good products (10%), and frustration with software crashes (8%). Student comments captured during the production of multimedia products were perhaps best summed up by,

> 'This is the only class in my whole degree where I have had the opportunity to be creative and where 'mistakes' were seen as 'opportunities' for problem solving and critical thinking and grades awarded for growth! I really wish there had been more of these assignments'. 'I was initially terrified of this assignment – I have no technical skills and neither did my team mates, but over the course of the tasks the continuous feedback really set us up for success and my crippling anxiety turned to sheer delight when we completed something we were really proud of'. On completion…'Having the public endorse our product was such a rewarding experience and has definitely changed the way I communicate and my professional practice!'

CONCLUSION

In conclusion, the scaffolded series of activities to create a multimedia product effectively engaged students in the understanding and skill development to effectively translate complex scientific messages into lay language. They also appreciated the importance of pictures and simple language when communicating with individuals with low health literacy. Students reported valuing the context of a 'real life scenario', while enjoying the opportunity to have fun and be creative. This study also provided academic teaching staff with an insight into the students' perceptions of creating multimedia presentations in the context of digital and health literacy, which may be useful in designing engaging, appropriate, multimedia tasks for other (health) science students.

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