The Integration of Multimedia for Online and Blended Learning at the University of the South Pacific

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Abstract
The University of the South Pacific (USP) a regional university, established in 1968, serves twelve independent island nations of the South, Central and North Pacific. The University is moving towards providing more of its programmes and courses through flexible delivery using online and blended modes. As a result there has been a gradual increase in the integration of multimedia components such as audio, video, graphics, animations, and simulations as part of courseware or course packages. This increase in demand is anticipated to have further growth.

This paper focuses on the current status on the different types of multimedia currently integrated in USP coursewares, and discusses the areas of multimedia that is anticipated to grow over the next few years at USP.

Keywords: multimedia, online and blended courses, coursewares, videos, interactive media, games

Introduction

In today's digital age, educators around the globe are demanding for more cost-effective, engaging and social learning practices in education. Higher education institutions have over the last decade gravitated to the use of multimedia technologies and multimedia content to facilitate these practices and enhance the delivery of learning and teaching experiences. Multimedia offers instructors myriad of delivery possibilities with different types of media, adaptively, affording diverse learning styles, bringing about personalisation in learning and leading to enhancements and effectiveness of learning and teaching experiences.

The University of the South Pacific (USP) is no different, being a pioneer in the use of technology in education in the South Pacific region. The University in its bid to transform itself, has undertaken a large-scale conversion of USP courses for flexible delivery, thus moving towards providing more of its programmes and courses using online and blended modes. Hence, the need for multimedia in the delivery of learning and teaching experiences in USP's online and blended modes. The Multimedia Team is a dedicated section within the University's Centre for Flexible Learning, tasked with the development of multimedia.

This paper focuses on the current status on the different types of multimedia currently integrated in USP coursewares, and discusses the areas of multimedia that is anticipated to grow over the next few years at USP. It draws heavily on the literature to rationalise these.

Literature review

"Literally, multimedia is the integration of two or more communications media. It is the use of text and sounds, plus still and moving pictures to convey ideas...it is built around the premise that anything words can do, words with sounds and pictures can do better" (Kalmbach, 1994, p. 29). Reddi (2003) defines multimedia as an "integration of multiple media elements (audio, video, graphics, text, animation, etc.) into one synergetic and symbiotic whole", while Lau, Yen, Li and Wah (2013) broadly described as the use of various types of media and communication technologies to enhance content visualization and user interaction.

In education, particularly in the delivery of learning and teaching experiences, multimedia can be used to supplement course content and activities in innovative or interactive ways (McFarland, 1996), and research in educational psychology suggests that "learning is affected positively by presenting text and illustrations together" (Mayer & Sims, 1994, pp. 389-401). Research have also demonstrated that the use of multimedia, either alone or in conjunction with other instructional supports, as effective for promoting knowledge (Gormley & Ruhl, 2007; Kennedy et al., 2013; Thomas & Rieth, 2011).

Montegomery (1995) submitted that the use of multimedia enhanced learning by learners with different learning styles. He also viewed that multimedia fill in the gaps created by dichotomy in teaching and learning styles. Furthermore, Chun-hui and Fu (2015) highlights that multimedia can increase the sensory stimuli of learners by the integration of sound, image, text, and animation, and making the teaching and learning process become figurative, three-dimensional, and vivid, thus, improving learners' interest, attention, and learning efficiency.

Recent surveys such as the 2013 Speak Up survey by Evans (2013) as cited in Reidel (2014), highlights some of the key emerging trends in educational media technology being: (a) increase number of the learners having access to mobile devices with 3G or 4G enabled internet connectivity, and using it transform their own learning processes, (b) the rise in the use of video as a learning and teaching tool by both instructors and learners, (c) growth in learner gaming, particularly its application in the learning processes, and (d) increase in learner expectations of using social media (Facebook, Twitter, Instagram, etc.) as pervasive learning tool.

The use of multimedia in learning can help to promote deeper meaningful learning and has positive impact in creating a learner-centred educational environment (Li, 2016). Several studies (such as Demirer & Sahin, 2012; Low, Low & Koo, 2003; Mackay & Ho, 2008)) highlights that the use of multimedia in learning is considered to be effective in the transformation process from traditional approach of face-to-face delivery of learning and teaching experiences to blended and also to online learning approaches. The integration of multimedia and multimedia technologies has become a core part in the design, development and delivery of e-learning, online learning or blended learning courses. Lau et al. (2013) categorized these into multimedia that bring substantial changes to the learner learning processes (such as communication technologies, social networks and games as a medium of e-learning) and content that improves learner learning effectiveness and experience (such as text, audio, images, animation and video). This paper focuses on the latter; multimedia content.

Context

The University of the South Pacific (USP) a regional university, established in 1968, initially in face to face mode, is now a multi-mode institution (print-based distance education started in 1971 and online in 2000). It serves twelve independent island nations of the South, Central and North Pacific of the Pacific (Cook Is., Fiji, Kiribati, Marshall Is., Nauru, Niue, Solomon Is., Tokelau, Tonga, Tuvalu, Vanuatu and Samoa) with 14 regional campuses around the Pacific. The main campus is located in Suva, Fiji. USP is the only regional university of its type in the world with regionalism in the core components of its organisational structure: financial, physical, academic, and political as the twelve Pacific island nations which are, as proprietors, exercise collective governance. The USP member island nations are geographically dispersed, culturally, linguistically and economically diverse, spanning across 33 million square kilometres and four time zones.

The total population within this area is less than 1.5 million and is situated in countries which range from groups of small coral atolls, to one island countries and volcanic groups of islands and within its four major ethnic groups, Melanesian, Micronesian, Polynesian and Indian, there are 265 distinct languages and 60 distinct cultures prevalent. Many island communities are rural, remote and sparsely populated with traditional societies blending the indigenous

cultural norms with forces of modernisation and development. USP offers more than 400 courses per semester through four modes; face-to-face, print, online and blended. The University, in its bid to transform itself, has undertaken a large-scale conversion of USP courses for flexible delivery (The University of the South Pacific, 2012). Thus USP's moving towards providing more of its programmes and courses using online and blended modes.

Reporting to USP's Deputy Vice-Chancellor (Learning, Teaching and Learner Services), the Centre for Flexible (CFL) Learning is a support section tasked to lead the enhancement of quality in all aspects of Flexible Learning (FL) design and development at USP. Specifically the role of CFL is to: (a) leverage technology and integrate new pedagogies for designing and developing all USP programmes in Flexible and Online modes that exemplify excellence in knowledge creation, and (b) develop collaboratively with faculties, campuses and regional agencies, high quality and innovative learning courses and programmes for the region in both formal and continuing and community education. The Centre has three other sub sections/teams: Learning Design & Development, Learning Systems and the Multimedia Team, each having respective roles and duties.

The Multimedia Team
The Multimedia Team (MMT) is a section of the Centre for Flexible Learning (CFL) offering a wide range of services in quality, creative and innovative educational media technology, including services in audio, video, graphics, photography, animation, interactive multimedia, web design, electronic publishing and digitization.

Some of MMT's audio video services include: (a) audio video production for online and blended delivery, (b) professional screen-casting, synching presentations with voice-overs, (c) live lecture recordings and guest lecture recordings (in-Studio, and on-Location), (d) production of promotional and documentary videos, and (d) production of instructional and training audio video. MMT services also include the development of interactive web content and animations, or interactive media combining the elements of audio, video, graphics and animations, such as interactive inforgraphics, animated videos, interactive learning simulations and HTML5 applications. MMT also offers professional graphic design, layout, illustration, digital photography, and electronic publishing services. MMT works with the Learning Design and Development section of CFL and the respective instructors to produce multimedia content for flexible (online or blended) courses.

The last four years - Multimedia in USP coursewares
MMT works with the Learning Design and Development section of CFL and the respective instructors (content specialist) to produce multimedia content for flexible (online or blended) courses. Some of the most common forms of media content the MMT have produced over the last 4 years for online and blended courses are:

- *Voice over PowerPoint videos and Screencasting*
  This is basically the synchronisation of a instructor's voice, narration or audio recordings with the accompanying PowerPoint slides produced into a video, and uploaded on the learning management system thus providing learners access to an entire traditional face-to-face classroom lecture experience online. These videos sometimes might be an entire lecture or just short lecture bites; sometimes summarising key points of a topic or lecture. Another form of this is screencasting; the digital recording of action on the computer screen (including cursor movements and mouse clicks), not necessarily PowerPoint presentation, synced with voiceover narration, all combined into a single video.

- *Talking head style videos*
  The 'talking head' style videos are where the instructors is delivering a lecture, usually pre-recorded in a studio environment. This can vary from the delivery of an entire lecture, to just short lecture bites; sometimes summarising key points of a topic or lecture, or talking heads combined with cutaways of the PowerPoint slides.

- *Course audio or podcast*
  The 'course audio' or podcast involves pre-recording lecture audio usually recoded in a Studio environment. The recorded audio is then uploaded on the learning management system as a part a courseware for a respective course. This can vary from the pre-recording delivery of an entire lecture, to just short lecture bites; sometimes summarising key points of a topic or lecture.

- *Interactive simulations*
  These are animated, interactive, and game-like environments or activities in which learners learn through exploration usually by interacting with the environment or activity.

- *Course banners (mastheads), graphics, illustrations and icons*
  These include graphic designing of customised course banners or mastheads and graphics, illustrations and icons to support course concepts.

The MMT keeps a portfolio of multimedia work undertaken by the team. The following data was retrieved from the portfolio of work over the last 4 years (from 2012-2015) and provides data on the number of different types of multimedia produced for online and blended courses at USP. The data presented below, only reflects the work undertaken by MMT, however, there are other multimedia used for online and blended courses at USP that are not produced by MMT.

Table 1: *Volume and types of multimedia developed by MMT from 2012-2015 for USP coursewares*

Multimedia type	Year			
	2012	*2013*	*2014*	*2015*
Voice Over PPT (screencasting)	3	4	18	27
Live Lecture Video Recording	1	0	2	5
Talking heads videos	0	10	10	11
Field Work Video Recording	0	3	0	3
Course audio (podcasts)	17	13	11	8
Online graphics (banners, illustrations, icons)	6	8	5	9
Interactive simulations	0	0	7	4

The next few years - Multimedia in USP coursewares
The multimedia content developed by the MMT at USP (data presented on Table 1) will continue to grow over the next few years. However, two particular multimedia types are anticipated to have significant growth in terms of scale, volume and application to learning and teaching. These are videos and interactive multimedia.

Videos on demand
Several recent studies (such as Hsin & Cigas, 2013; Kay, 2012; Moore & Smith, 2012) have shown that videos, particularly, can be a highly effective tool for the delivery of learning and teaching experiences. The advances and easement in video recording technology and growing enthusiasm for the "flipped classroom" model have seen increased momentum on the use of pre-recorded lecture videos as learning and teaching strategy across the education sector (Pardo et al., 2015). More instructors have and will start to utilize some form of videos in their courses, as technology is enabling the understanding, creation and usage of videos in the delivery of education, relatively easier. The massive growth of video sharing sites such as YouTube and Vimeo, popularization of Khan Academy's short instructional videos, and university-specific equivalents, assisting even those non tech-savvy or digitally immigrant instructors to make use of videos easily for their delivery of instructions.

Over the next few years, there will be an increase in the development and use of videos in in the delivery of blended and online courses at USP, either as a direct replacement (for fully online courses) or to supplement (for blended courses) the traditional face-to-face delivery of learning and teaching experiences. There are few reasons why the videos will be on rise in USP coursewares: (a) USP's push for large-scale conversion of USP courses for flexible delivery of its programmes and courses using online and blended modes, will require some form of videos in it; (b)

This "push" from USP, will see the use of flipped classroom models of delivery of learning and teaching, lecture or class videos will be pre-recorded and distributed to learners, and actual face-to-face time utilized for classroom and tutorial discussions which is far more engaging and effective contrast to traditional lecture delivery during face-to-face time; (c) Increasing internet bandwidth and connectivity within USP's campuses and as well as by other internet service providers in the region and increasing number of learners having access to high speed internet enabled smart phones, will lead to greater demands for videos for delivery of learning and teaching experiences; (d) USP's increasing efforts and commitment to providing an accessible and inclusive learning, will lead to more development of multimedia (for e.g. videos) as it is effective for learners with different learning styles (Montegomery, 1995). With these rationales, the areas of videos that are anticipated to be of more demand and on the rise within the USP coursewares are discussed below.

From the data given above on (Table 1), it is evidently clear that it can be anticipated that over the next few years, there will be a rapid increase in the development of voice over PowerPoint style videos and screencasting. Several studies also showed that learners generally perceive this style of videos beneficial (Evans, 2011; Falconer et al., 2009, Harpp et al., 2009). More recently, a study by Winterbottom (2015) concluded that learners overwhelmingly favoured delivery of instructors using the screencasting or voice over PowerPoint method compared to traditional delivery of lectures, noting learners were able to learn more, being able to take better notes, and gain a better understanding of the lecture material using this method of delivery.

The development of 'talking head' style videos is also anticipated to grow in the next few years as per the data given on (Table 1). However, it is envisaged that the 'talking head' style video may take a different form, possibly moving more towards the popular Khan Academy styled or MOOC styled videos which would include video of instructors drawing freehand on a digital tablet or smart boards, and these videos will be short, optimally between five to ten minutes in duration, and succinct in nature. Guo, Kim and Rubin (2014) noted that this style of videos allows instructors to situate themselves on the same level as the learner offering more learner engagement rather than talking at the learners in instructor's mode. Davis (2012) also highlighted the short duration of this style of video enables reinforcement of key learning concepts, promoting mastery learning, which has advantages over traditional lecture-based learning.

Online video annotation is another area, which is anticipated to see some traction over the next few years in USP coursewares, although this will be not from video production/development end, but more from the learner end. Advancements in video technologies have afforded opportunities for learners to annotate videos, by adding comments, notes, links, hotspots, and sharing it with peers and instructors, which in turn helps in "searching, highlighting, analysing, retrieving, and providing feedback, without modifying the resource itself" (Khurana & Chandak, 2013). Video annotation offers the potential for learners for reflection, analysis and connections to curriculum content (Lemon, et al., 2013). Although there has not been any real work done on the use of online video annotation in any of the existing USP coursewares, initial research has begun in this which could be followed by pilot projects.

Video captioning or subtitling is the process of converting the audio content of a video into text, synchronising and displaying the converted audio text during the playing of the video. Together with displaying words as the textual equivalent of spoken voice, video captions can also include speaker identification, sound effects, and music description and are commonly produced/incorporated during the video production and recording stage. Captioning makes videos more accessible and inclusive, especially for hearing impaired learners who can obtain the necessary information from texts. It also assists in the comprehension of a video for those learners who have difficulty in understanding the accent and the speed of spoken word by different speakers in a video. Studies (such as Gulliver & Ghinea, 2003; Yoon & Choi, 2010) demonstrate that video with captions leads to the highest levels of comprehension. Currently at USP, few videos that have been produced by the MMT for USP coursewares that have video captions, but they are done mainly on request basis by the instructors. However, captioning of videos is anticipated to be on the rise over the next few years at USP, and this will be during the development/production phase of videos by MMT. This increase will also be because of USP's increasing effort, commitment and mobilisation resources to providing an accessible and inclusive learning and environment and to give effect to the University's legal obligation to provide an environment free from human rights discrimination, as articulated in the USP Disability Inclusiveness Policy (2013).

Interactive multimedia rises

Interactive multimedia is the combination of text, pictures, audio, video and animation organized a cohesive system which empowers the learner to interact and control the environment (Philips, 2014), and these include simulations, games and virtual and augmented reality. They can be used to deliver learning and teaching experiences where learning materials are difficult to visualise (such as three-dimensional), covers broad and complex contexts, and are simulated to real-life scenarios (such as robotics). Interactive multimedia can have positive effect on learning and facilitates deep learning by actively engaging the learner in the learning process (Evans & Gibbons, 2007), addressing several learning styles and modalities, and shown to elicit the highest rate of information retention and results in a shorter learning time (Neo & Neo, 2001). Interactive multimedia (such as decision tree simulations, video simulations, and animations) enables learners to learn-by-viewing, learn-by-doing, or learn-by-coaching (Mishra & Sharma, 2005).

Over the next few years, it is anticipated that there will be slight increase in the development and use of interactive media, particularly, learning simulations and games, in the delivery of blended and online courses at USP. These will be used to support a learning activity either as a direct replacement (for fully online courses) or to supplement (for blended courses) the traditional face-to-face delivery of learning and teaching experiences. There are few reasons why the interactive multimedia will be on rise in USP coursewares: (a) USP's push for large-scale conversion of USP courses for flexible delivery of its programmes and courses using online and blended modes, will require some form of interactive multimedia to simulate a real world classroom expereince; and (b) Increasing internet bandwidth and connectivity within USP's campuses and as well as by other internet service providers in the region and increasing number of learners having access to high speed internet enabled smart phones, will lead to greater and faster access to interactive multimedia applications for.. With these rationales, two areas of interactive multimedia are anticipated to be of more demand and on the rise within the USP coursewares over the next few years – interactive learning simulations and multimedia games, and they are discussed below.

Interactive learning simulations are instructional products that combine simulation, pedagogy, and social learning situated within real-life contexts and scenarios creating a truly engaging, meaningful and behaviour-changing form of learning and are used to help learners better understand complex concepts and processes that is entirely driven by their experiences within the environment (Beckem & Watkins, 2012).The development and use of interactive learning simulations is anticipated to grow in the next few years at USP. Offering a "safe environment", interactive learning simulations can allow learners to practice skills that otherwise could be dangerous to practice in the real life situations (Merchant et. al.2014).

The data presented on (Table 1), only reflects the infancy stage of the use of interactive media in USP coursewares, as this is a relatively new area for USP and the MMT. However, this is anticipated to grow, with the Science disciplines (such as Physics, Chemistry, Biology, Geosciences) predicated to be the early adopters of the use of interactive learning simulations due to its affordances in providing cost-effective practice of procedures using virtual apparatus that in real life could be cost prohibitive and for providing "lab" experiences to learners of blended and online courses without the need for physical geographic presence.

Games (also referred to as computer or video games) are interactive multimedia environments set within a competing or challenging context, include story lines with specific objectives to be achieved and conducted with specific rules of participation (Tobias & Fletcher, 2012). Games stimulate learners and provide them with opportunity to play an active role in their own learning (Ghanbaran & Ketabi, 2014). Multiple studies have shown that games have positive effect on learner achievement, interest, task learning engagement and problem solving (Kim, Park, & Baek, 2009; Robertson & Howell, 2008; Tuzun et al., 2009; Wideman, et al. 2007).

The development and use of multimedia games in the USP coursewares are anticipated to grow over the next few years. Currently, basic games such as interactive puzzles and treasure hunt searches have been developed by MMT for USP coursewares. The games will be used as a learning task or activity set to achieve a learning outcome, or as experimentation task to try out alternative courses of action and experience a range of different outcomes or to reinforce a learning concept. Moreover, it is also anticipated (at a very limited and basic scale), that games will be combined together with augmented reality (similar to Pokemon Go and Blippar apps) and will be used in USP coursewares such as for courses in geo-location, history, climate change and environmental sciences.

Conclusion

There are several benefits and possibilities with the use of multimedia in the delivery of learning and teaching experiences, especially more for online and blended courses. Its development and application in enhancing delivery of learning and teaching experiences would become inevitable and more widespread, as the University of the South Pacific progresses towards offering more of its programmes and courses on online and blended modes. Current types of multimedia content being developed by MMT will increase and it is anticipated that over the next few years videos (such as voice over powerpoint/screencasting, talking heads and, video annotation and captioning), and interactive multimedia (such as simulations and games) to be on the rise in USP coursewares. Future work should focus on the efficacy of multimedia content developed by MMT on the learner achievements and enhancement of learner experiences.

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