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ARTICLE

Students' Perceptions of Webcast Lectures and Online Video Materials: Results of a Survey at a Higher Education Institution in Singapore

Marie Anne F. MANICLANG, Zoe L.T. ANG, Regina Y.H. HONG, Edmund J.D. LEE, and Judy C.G. SNG

Department of Pharmacology, Yong Loo Lin School of Medicine, National University of Singapore

Correspondence:

Name: Dr. Judy Chia Ghee SNG

Address: Department of Pharmacology, Yong Loo Lin School of Medicine, MD3, 16 Medical Drive #4-01, National University of Singapore, Singapore 117600.

Email: phcsngj@nus.edu.sg

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ABSTRACT

Background: More institutions are integrating technology within their curriculum with increasing frequency, premised upon the school's idealised expectations of students' needs. However, many studies have shown that despite the availability of online resources, these resources take a supplementary role to traditional modes of curriculum delivery. This study therefore aims to confirm whether the practice of using online resources as mere supplementary instead of primary material exists within the Singaporean context for online learning. We also aimed to find out the real needs and expectations of students with regards to online learning resource, specifically video materials.

Methods: A questionnaire was designed and administered at the beginning of the academic year to students enrolled in Life Science, Pharmacy, Nursing, and Medicine undergraduate degree programmes at the National University of Singapore (NUS). We then compared the data across years and disciplines.

Results: Majority of the students still preferred traditional modes of curriculum delivery such as live lectures and lectures notes as opposed to relatively newer modes such as webcast videos. Most students also report watching webcast videos in less than half of their lectures. They also tend to use webcasts as a supplement to their live lectures. With regards to webcast lectures, students preferred improvements in audio and visual quality of the videos, and indicated a need for subtitles and the provision of lecture summaries.

Conclusion: Our results confirm the common practice seen in many studies which investigated student preferences and usage for webcast videos. A factor to why this trend may exist is due to technological issues that may be a barrier to the webcast lectures' accessibility and usability, as well as institutional norms.

Keywords: Medical education research, Singapore, curriculum delivery, e-learning, webcasts, videos

INTRODUCTION

Technology has been increasingly utilised within educational institutions globally, and has reframed the teaching and learning paradigms in these institutions. Educational materials have been digitised and integrated into different multimedia forms, such as e-textbooks, virtual learning environments, and webcast video materials, among many others. These online multimedia educational materials, termed as e-learning, offer many potential benefits for students and educators alike. For students, they allow for flexible and active learning, where students can learn curriculum content at their own convenience and preferred pace (Cardall, Krupat, & Ulrich, 2008; Maxwell & Mucklow, 2012; McLaughlin *et al*., 2014; Zhang, Zhou, Briggs, & Nunamaker, 2006). By being able to accommodate such differences, having online multimedia educational materials ensures that no student would be left behind due to his or her preferred pace for learning. Having quality online multimedia material also fosters a navigationist learning approach, one that advocates student-directed learning, which encourages students to learn concepts beyond what is covered in the curriculum and be better prepared to apply concepts learnt in formal lectures in novel and real-world situations (Brown, 2006). For educators, e-learning allows for greater ease of providing and updating curriculum materials (Maxwell & Mucklow, 2012). Research has shown that e-learning can be just as effective as traditional methods of curriculum delivery such as live lectures in conveying curriculum content to students (Giannakos, 2013; Schreiber, Fukuta, & Gordon, 2010; Vaccani, Javidnia, & Humphrey-Murto, 2016). The continuous development and research of e-learning resources therefore paves the way for a paradigm shift in educational practices—from a teacher-centred approach to a more learner-centric one (Brown, 2006; Ruiz, Mintzer, & Leipzig, 2006)

However, many studies also note that students tend to make use of these materials as a supplementary tool rather than a primary source of lecture content (Billings-Gagliardi & Mazor, 2007; Cooke *et al.,* 2012; Gupta & Saks, 2013; McCann, Schneiderman, & Hinton, 2010; McNulty *et al.,* 2009; Schreiber, Fukuta, & Gordon, 2010; Wang, Mattick, & Dunne, 2010). Some studies indicate that students consistently prefer live lectures over webcast content (Lovell & Plantagenest, 2009; Schreiber, Fukuta, & Gordon, 2010; Wang, Mattick, & Dunne, 2010).

In line with this, it is important to identify and distinguish between the prevailing forms of e-resource materials used by the different disciplines at a higher education institution in Singapore which include the aforementioned webcast lectures. Webcast lectures or webcasts, are also known as video podcasts or lecture-capture. Specific to live lectures in higher education

institutions, webcast lectures are the video recorded versions of actual lectures made available on an online platform for students to access at their convenience (Schreiber, Fukuta, & Gordon, 2010). Meanwhile, screencasts are an alternative form of e-resource which refer to the digital recording of a computer screen output, for instance lecture slides, alongside an audio narration. In this case, unlike a webcast lecture, students viewing a screencast will not be able to see the lecturer; instead, they can only follow the narration along with the video screen capture. This paper focuses mainly on these two e-learning resources as they are the predominant forms of video materials used in the specified university.

Literature on webcast lectures suggest that while they may be useful for the comprehension of simple tasks with the traditional lecture format, they may not be as effective for complex comprehension that rely less on the traditional lecture approach (Giannakos & Vlamos, 2013; Lovell & Plantegenest, 2009). Schreiber, Fukuta, and Gordon (2010) also suggest that even though students enjoy the convenience of webcast lectures which provide them the flexibility to stop, review and repeat the lectures at their preferred pace, Schreiber and colleagues concluded that webcast lectures were less engaging as a teaching method in comparison to live lectures. There are, however, contradicting views as studies by McCann, Schneiderman, and Hinton (2010) note that students saw these e-resources as a must-have in lectures, while studies by Saat *et al.* (2012) and McNulty *et al.* (2009) show that students rarely utilised webcast lectures. The results of these studies seem to indicate that learning in institutions is still teacher- rather than learner-centric, despite the prevalence of e-learning technologies which should, in theory, mean that more universities are adopting a reversal in how their classes are structured.

With these observations in mind, we first sought to explore if teaching in our university, the National University of Singapore (NUS), within the Singaporean context is still teacher-centred or has there been a shift to student-centred curricula in the disciplines of Life Science, Pharmacy, Nursing, and Medicine. We focus on these disciplines as a myriad of e-learning studies have been done primarily on the medical curricula, including Dentistry and Health Studies. Therefore, it will allow for a more accurate comparison. Next, we seek to understand why these observations may exist. Through our findings, we also hope to find plausible solutions that would increase the utilisation of webcast lectures and other online resources, and hence, perhaps even replace live lectures as a preferred format of curricular delivery.

METHODS

Study design

To collect data on student preferences of curriculum delivery methods as well as their perceptions specifically towards webcast lecture materials, an anonymous self-administered questionnaire (approved by the NUS Institutional Review Board, IRB-15-168) comprising 24 questions was designed. These questions were either dichotomous, multiple-choice, Likert scale questions, or forced ranking questions. The questionnaire aimed to first establish that the students had the means to watch the video materials in terms of technology and space, to eliminate the possibility of the absence of it. Later, it sought to identify their intentions behind why students accessed these video materials, specifically webcast lectures. The survey moved towards a closure with central questions that determined the usefulness and expectations of the webcast lectures and ways to improve the current standards. This survey was then administered to students in NUS at the beginning of the academic year of AY2015/16.

Study participants

All NUS undergraduates enrolled in Life Science, Pharmacy, Nursing, and Medicine were eligible for the study. We compared students across courses and years, looking for differences in their preferences and perceptions of webcast lecture materials. Students were recruited by liaising with lecturers who taught the Medical, Nursing, Pharmacy, and Life Science cohorts, and requesting consent from these lecturers to conduct the survey during their lecture periods. These are modules that have to be taken by students from different courses, and are usually taught by the following methods: 1) didactic face-to-face lectures, 2) small group tutorials, 3) e-learning materials (could be PDFs or video links). The survey itself was not specific to the module but their overall experience as students matriculated within our university. Attendance was not compulsory for lectures and the students have the option of watching the day's recorded lectures as webcasts or they could use it as a supplement. Screencasting is also referred to as video screen capture[1], and lecturers can pre-record their slides in place of conducting live lectures or use them as a supplement. Students in these cohorts might choose to voluntarily "opt in" and fill in their responses for their survey, or "opt out" of the survey. Students who were not matriculated or were absent the day the survey was administered were excluded from the study.

[1] An example of a video screen capture is described in the following link: https://www.techsmith.com/blog/4-screenshots-start-using-immediately/.

Data analysis

The survey responses were analysed using the IBM Statistical Package for the Social Sciences (SPSS) Version 23. We obtained a two-tailed statistical and descriptive analyses at 5% level of significance ($p \leq 0.05$). A parametric one-way ANOVA test was used to analyse responses between groups. The collated data were plotted out and graphically represented in the sections below.

RESULTS

Participant data

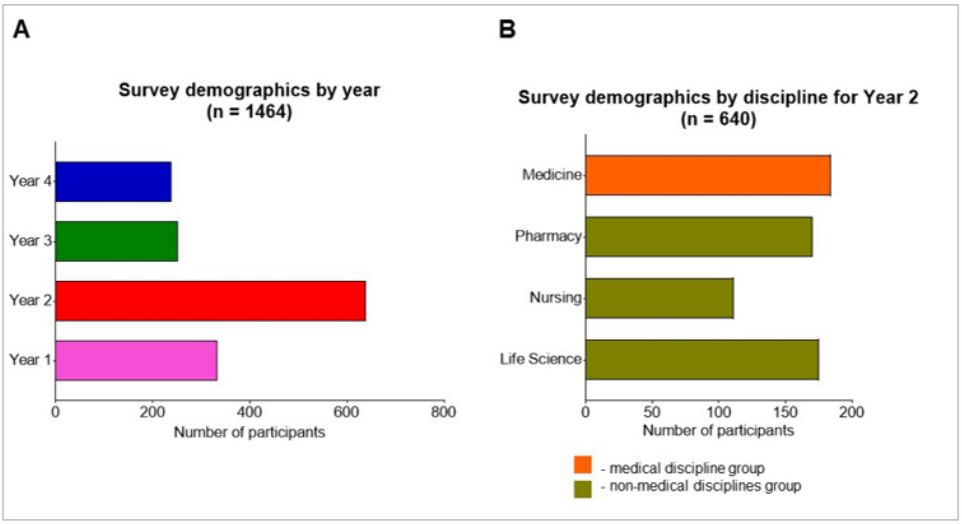


Figure 1. Demographics of the survey population.

(A) Bar graph of the different groups of students who participated in the survey, divided by their year of study.

(B) Bar graph of the different groups of students who participated in the survey, divided by their discipline of study (Medicine, Pharmacy, Nursing and Life Science degree course).

A total of 1464 students participated in the survey. 333 were first-year students (freshmen aged 19-22 years old), 640 were second-year students (sophomore students aged 20-23 years old), 252 were third-year students (junior university students aged 21-24 years old), and 239 were students in their final year (senior university students aged 22-25 years old), as shown in Figure 1A. Also, when identified by disciplines, 184 were Medicine students, 611 were Pharmacy students, 343 were Nursing students and 326 were Life Science students (Figure 1B).

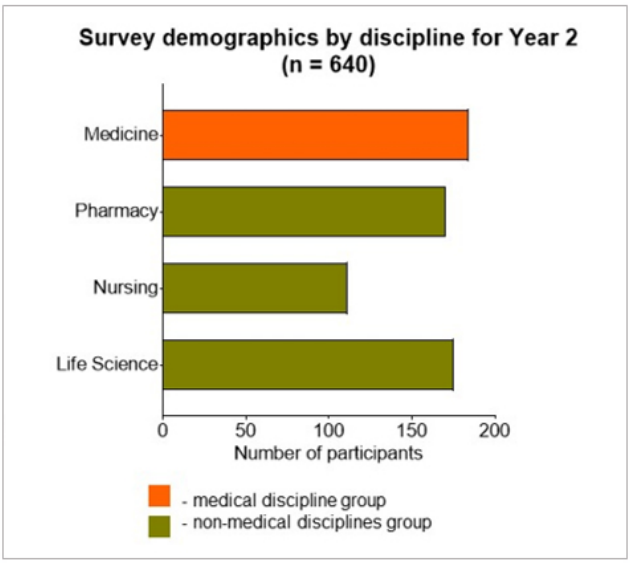


Figure 2. Demographics of the Year 2 survey population.

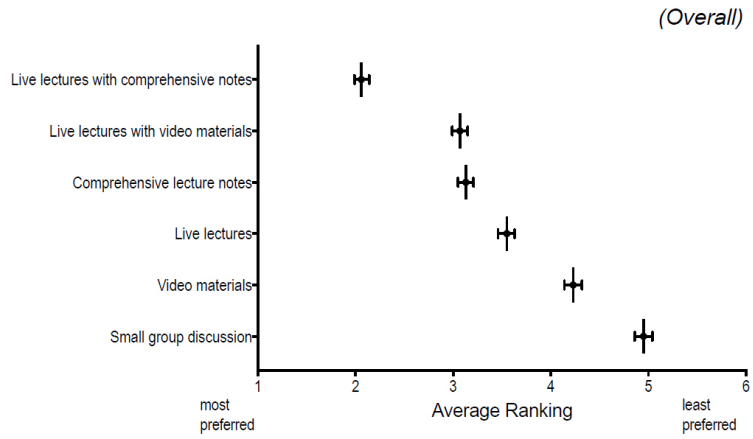
Bar graph showing the different discipline groups represented in the Year 2 survey sample, divided into the medical discipline group (consisting of students in the Medical degree course) and the non-medical discipline group (consisting of students in the Pharmacy, Nursing, and Life Science degree course).

Out of the 4 disciplines, all respondents from Medicine were Year 2 students. As such, the survey demographics for Year 2 students had been singled out for this study, so that we could make comparisons between the medical and non-medical groups. Within the Year 2 survey group, 27.3% (175⁄640) were from Life Science, 17.3% (111⁄640) were from Nursing, and 26.6% (170⁄640) were from Pharmacy (Fig. 2). These groups, from this point on in the study, would be grouped together under the "non-medical discipline group". 28.8% (184⁄640) of the Year 2 students surveyed were from Medicine, and they were grouped under the "medical discipline group".

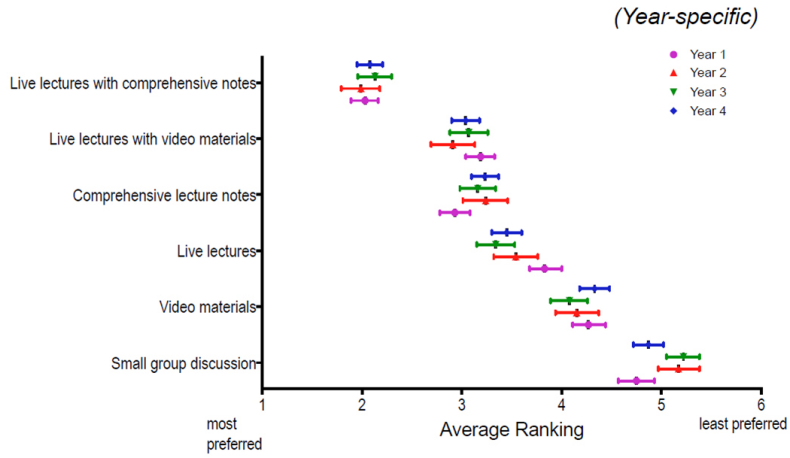
Preferences in curriculum delivery methods

Overall, students preferred methods which coupled live lectures with other forms of curricular delivery. This was consistent among all levels and between the medical and non-medical disciplines. Among the singular modes of curricular delivery, students had a greater preference for traditional forms of curriculum delivery such as live lectures and lecture notes compared to video materials and small group discussions (Figure 3A). We noticed that all groups across all years still preferred live lectures and seemed to dislike small group discussions. This could be due in part to the culture in an Asian university setting, where there is discomfort in speaking up in group settings (Figure 3B).

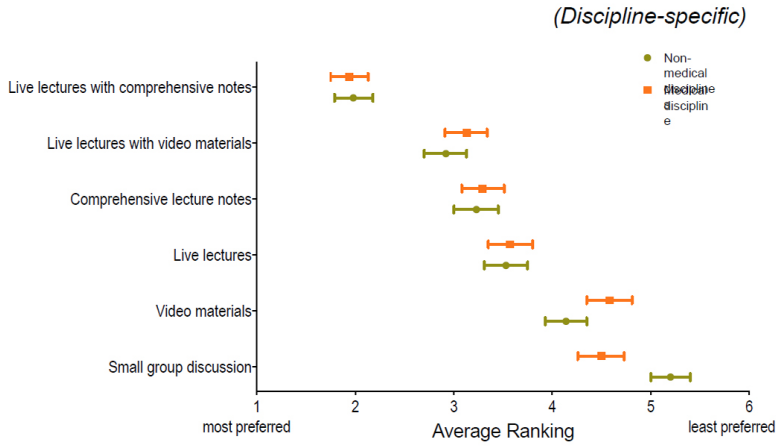
Figures 3A-3C. Scatter plot diagrams of student preferences in teaching delivery methods.



3(A) Scatter plot diagram of the overall student preferences in teaching modes. Each response was ranked from 1 being "Most Preferred" to 6 being "Least Preferred". The data was represented as means ± S.E.M.



3(B) Scatter plot diagram to student preferences in teaching modes, broken down to year-specific groups. The purple points represent the responses from the Year 1-specific group, the red upward-facing triangle points represent the responses from the Year 2-specific group, the green downward-facing triangle points represent the responses from the Year 3-specific group, and the blue diamond points represent the responses from the Year 4-specific group. The data was represented as means ± S.E.M.



3(**C**) Scatter plot diagram to student preferences in teaching modes, broken down to discipline-specific groups from the Year 2 group**.** The green points represent responses from students from the non-medical discipline groups, whereas the orange square points represent responses from students from the medical discipline group. Data in this diagram was represented as means ± S.E.M.

It is also worth noting that for video materials, students in non-medical disciplines indicated a greater preference for this curricular delivery method (mean rating = 4.14, s.e.m. = 0.11) than students in the medical discipline (mean rating = 4.58, s.e.m = 0.12). This trend was reversed for small group discussions, in which students in the medical discipline group displayed a greater acceptance for this curricular method (mean rating = 4.50, s.e.m. = 0.12) than their non-medical discipline counterparts (mean rating = 5.20, s.e.m. = 0.10, Figure 3C).

Student usage characteristics

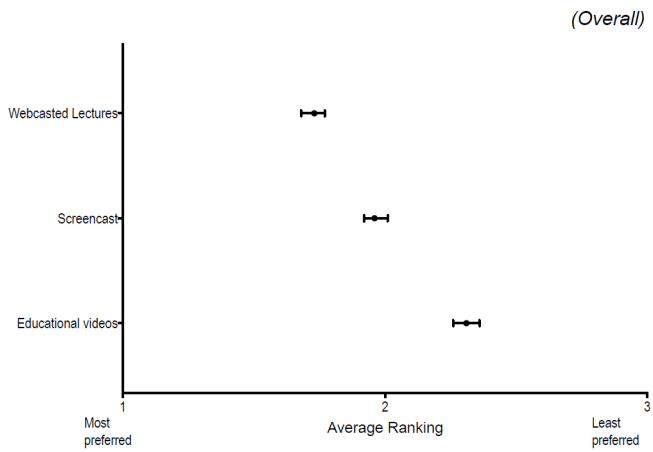
Overall, students tended to access online video materials via their laptops (mean = 1.83, s.e.m. = 0.05). Majority of the students also indicated that they usually watched the video materials at home, where they tended to have a stable connection to the internet. The most popular reasons students cited for watching video materials was that it helped them to better understand the lecturer as well as in reviewing and annotating the lecture notes. Many students also made use of video materials to make up for missed lectures.

Student preferences for video materials

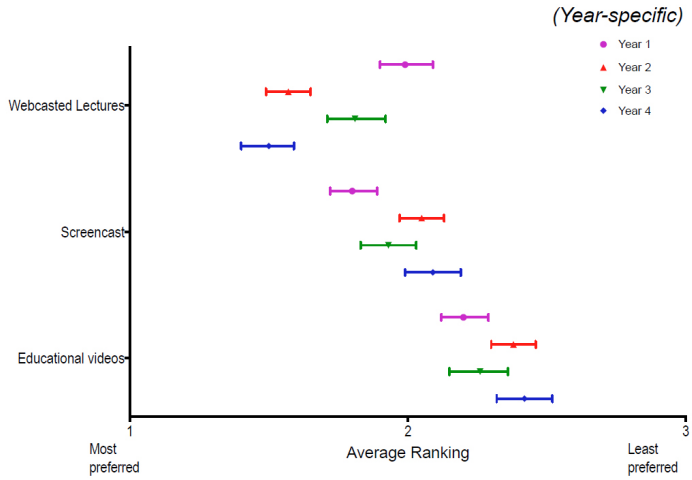
For video materials, students indicated that webcast lectures, which are recorded versions of live lectures, were the "most preferred" (Figure. 4A). Increasingly, more and more lecturers are turning to screencasts, which refer to pre-recordings of their computer screens that can be either a supplement to live lectures or a substitute of live lectures. However, our findings show that only Year 1 students (purple circles, Figure 4B) tend to like screencasts but not their seniors, perhaps due to the insecurity of not being "told" and also reflecting the high academic and exam-oriented environment prevalent in our university. Students also showed the least preference for educational videos, which includes videos such as documentaries. This was consistent across all levels and discipline groups (Figures 4B and 4C).

According to the survey findings, students perceived webcast lectures to be accessible, useful for learning and exam preparation, and engaging. This was true across all levels of study (Figure 4B). However, unlike their non-medical counterparts, medical students indicated that they did not perceive webcast lectures to be as useful and engaging, which is consistent with the differences in preferences for curricular delivery methods between the medical and the non-medical discipline groups (Figure 4C).

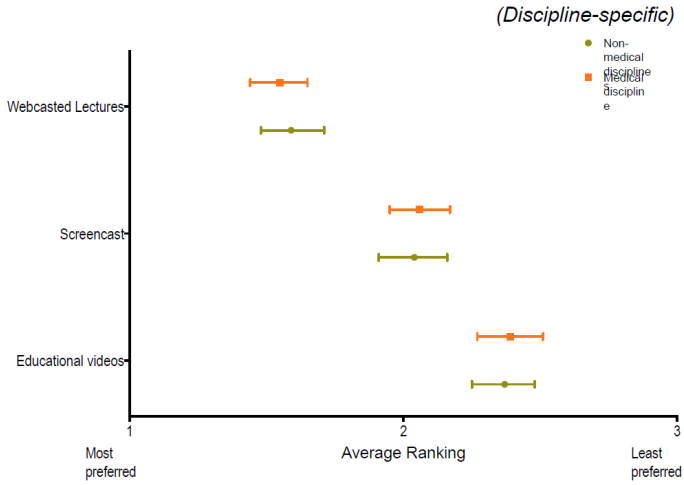
Figures 4A-4C. Scatter plot diagrams of student preferences in video materials.



4(A) Scatter plot diagram of the overall student preferences for video materials, with 1 being "Most Preferred" and 3 being "Least Preferred". The data was represented as means ± S.E.M.

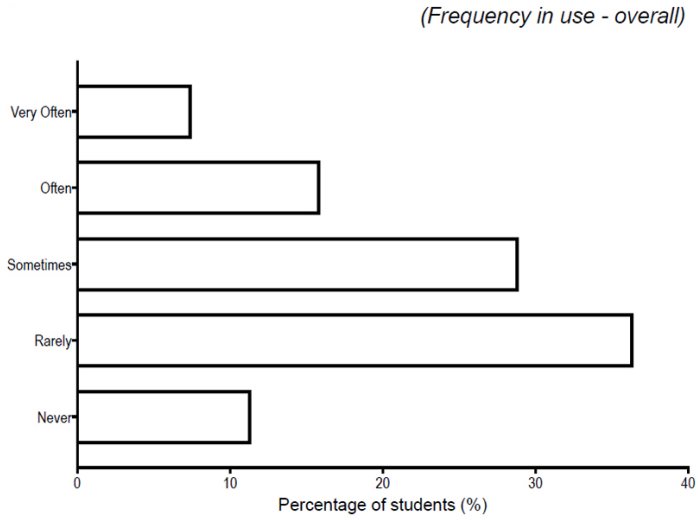


4(B) Scatter plot diagram of the survey responses broken down into year-specific groups, each option ranked as the same as A. The purple points represent the responses from Year 1-specific group, the red upward-facing triangles represent the responses from Year 2-specific group, the green downward-facing triangles represent the responses from the Year 3-specific group, and the blue diamonds represent the responses from the Year 4-specific group. The data was represented as means ± S.E.M.

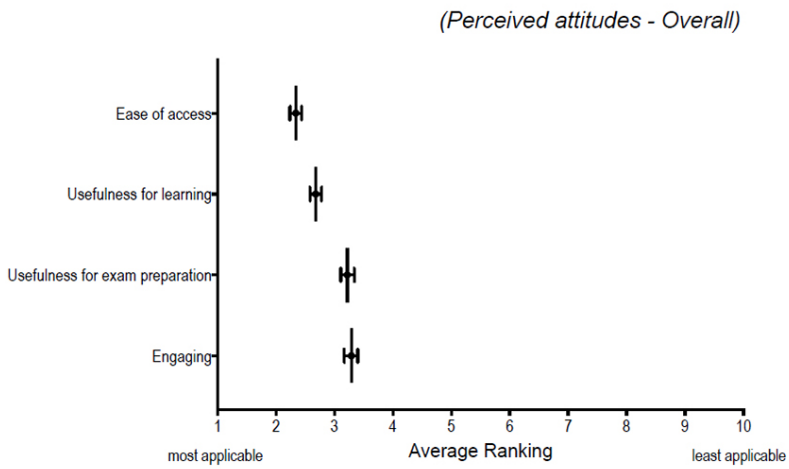


4(C) Scatter plot diagram of student preferences broken down into discipline-specific groups from the Year 2 cohort, each option ranked the same as with A. The green points represent responses from students from the non-medical discipline groups, whereas the orange squares represent responses from students from the medical discipline group. Data in this diagram are represented as means ± S.E.M.

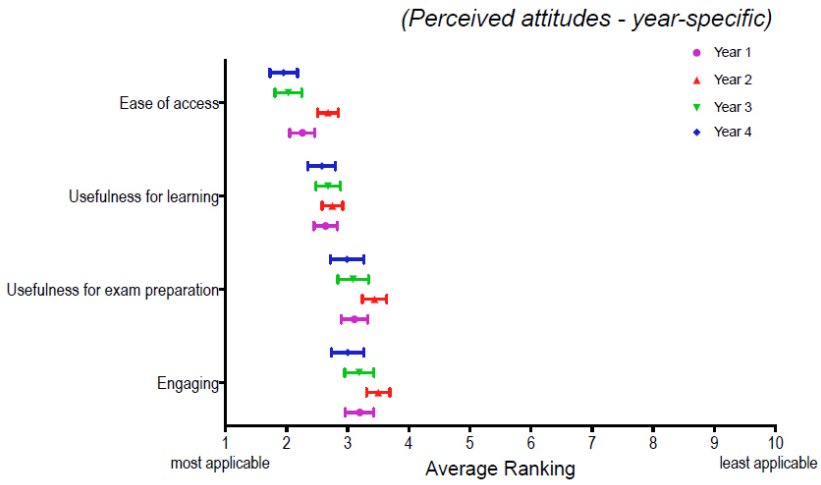
Figures 5A-5D. Graphs describing student perceptions towards webcast material.



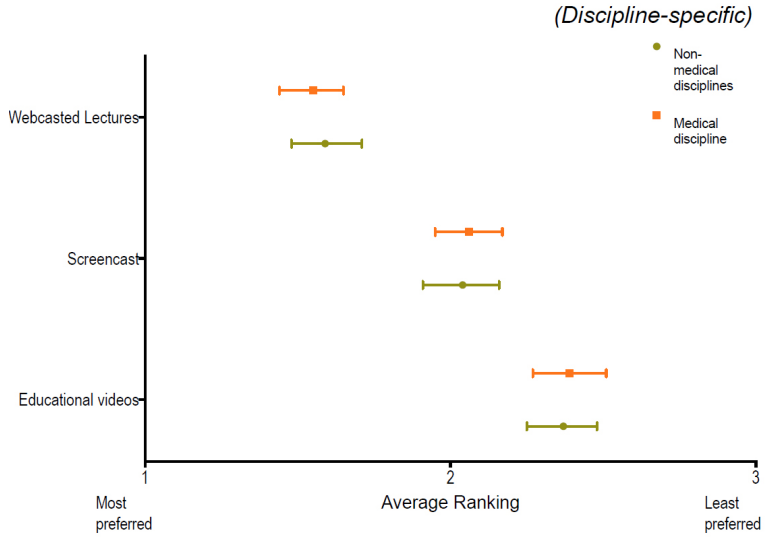
5(A) Bar graph representing overall frequency in use of webcast lecture materials among students. "Rarely" meant <25% of lectures, "Sometimes" represented 25-50% of their lectures, "Often" meant 51-75% of their lectures, and "Very Often" meant >75% of their lectures. Data in this graph represented the percentage of students from the overall survey population which indicated one of the options given.



5(B) Scatter diagram representing overall student response to their perceived attitudes towards webcast lecture materials—from how they perceive their ease of access to webcast lecture material to its utility, to how engaging students perceive webcast lecture materials to be—from 1 being "Most Applicable" to 10 being "Least Applicable". The data from the responses was represented as means ± S.E.M.



5(C) Scatter plot diagram of the students' perceived attitudes broken down into year-specific groups, each being ranked the same as B. The purple points represent the responses from Year 1-specific group, the red upward-facing triangles represent the responses from Year 2-specific group, the green downward-facing triangles represent the responses from the Year 3-specific group, and the blue diamonds represent the responses from the Year 4-specific group. The data were represented as means ± S.E.M.



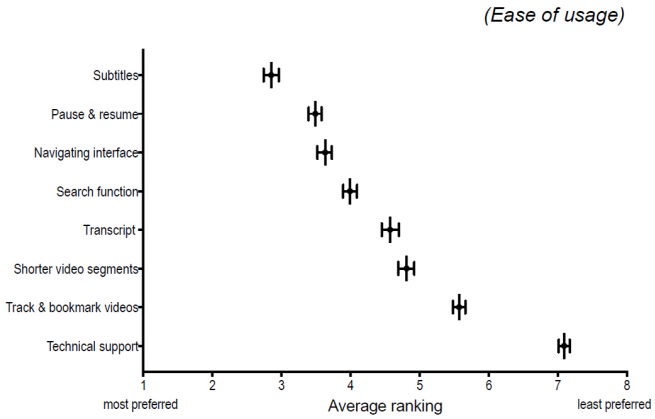
5(D) Scatter diagram of students' perceived attitudes towards webcast lecture material broken down into discipline-specific groups for the Year 2 cohort. As with B, each is ranked from 1-10. The green points represent responses from students from the non-medical discipline groups, whereas the orange squares represent responses from students from the medical discipline group. Data in this diagram were represented as means ± S.E.M.

Despite the preference for webcast lectures over other forms of videos as well as their relatively favourable review towards webcast lectures, we also found that students rarely made use of webcast lectures. Due to the nature of these webcast lectures reflecting the live lectures, it shows that our students regularly attend the live lectures and perhaps see less of a need to use webcast lectures to supplement their learning, unless they are unclear about a particular section of the lectures. 36.4% of the students surveyed indicated they only used webcast lectures for less than 25% of their lectures, while 28.9% of the students reported watching them in 25-50% of their lectures (Figure 5). This shows that not many students watch webcast lectures in more than half of their lectures and reinforces the notion that webcast lecture materials are utilised more as supplementary materials.

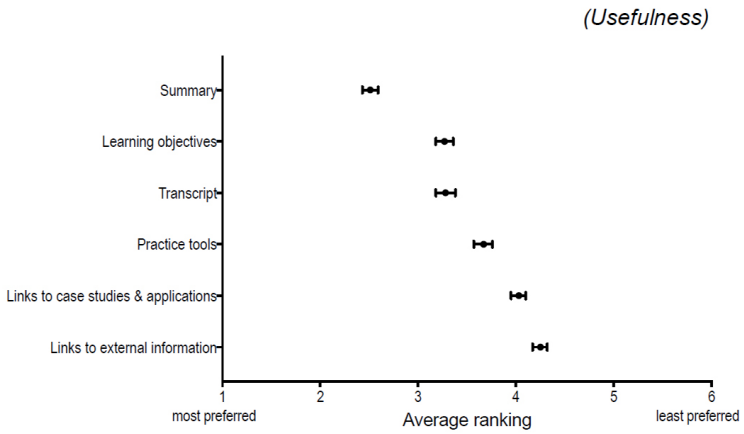
Current webcast lectures: What can be improved?

Out of the different online video platforms we were evaluating for this study, we focused more on the usefulness of webcasts published after live lectures, without any editing. This is the norm and somehow a "push" from the university for academic staff to publish the webcast lecture immediately after conducting the live version. Overall, students ranked the audiovisual aspects of a webcast lecture as the most important features that would increase its usefulness and ease of usage (Figures 6A and 6B). This is evident from how students ranked the list of features that could enhance the quality of webcast lectures. Subtitles, as well as better audio and graphics, were among the webcast features that were consistently ranked by students as being the most preferred features that would improve the quality of webcasts. Summaries were another feature that students thought could be a feature that could improve the usefulness of webcast videos (Figure 6B).

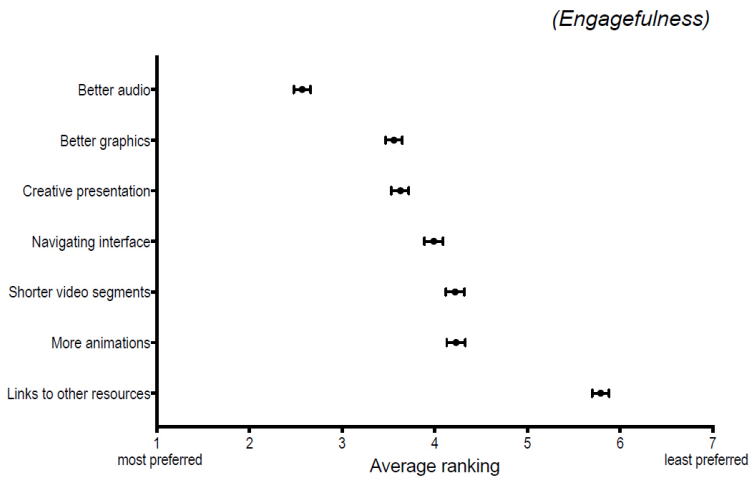
Figures 6A-6C. Scatter plot diagrams showing student preferences to improvements in webcast material.



6(A) Overall student preferences in improvements to ease of usage were represented in a scatter plot diagram. Each option is ranked from 1 (Most Preferred) to 8 (Least Preferred). Data in this diagram was represented as means ± S.E.M.



6(B) Overall student preferences in improvements to webcast lecture materials' usefulness was represented in a scatter plot diagram. Each option is ranked from 1 (Most Preferred) to 6 (Least Preferred). Data in this diagram was represented as means ± S.E.M.



6(C) Overall student preferences in improvements to make webcast lecture materials more engaging was represented in a scatter plot diagram. Each option is ranked from 1 (Most Preferred) to 7 (Least Preferred). Data in this diagram are represented as means ± S.E.M.

Another set of features which students thought were important in improving webcast lectures were those which improved its navigability, that is, making it easy for users to pause, fast forward, and rewind the webcast lecture to any point of the video that they deemed to be important. Features such as a pause and resume function, a better navigation interface, and a search function were features which also had a relatively high ranking in terms of being those which students indicated would enhance the ease of usage of webcast videos. Shorter video segments were also another feature which students desired in webcast videos (Fig. 6A).

Students did not indicate the need for improved technical support as being important in increasing the ease of usage of webcast lectures. Students were also generally ambivalent towards features such as hyperlinks to additional information and the provision of practice tools (Figure 6A).

DISCUSSION

Our results show that students still prefer traditional forms of curriculum delivery such as live lectures and the provision of lecture notes over e-learning. This confirms the findings seen in many other studies, where if given a choice between live lectures and webcast videos, students would prefer attending live lectures (Lovell & Plantegenest, 2009; Schreiber, Fukuta, & Gordon, 2010; Wang, Mattick, & Dunne, 2010). Our results also confirm the way students make use of webcast lectures—as a supplement to live lectures rather than as a main source of curricular content. It also shows that students rarely use these resources, confirming the trend seen in studies by Saat *et al*. (2009) and McNulty *et al*. (2012). However, these results do not mean that students dislike webcast lectures. They still find these resources accessible, useful, and engaging, which is consistent with the findings found in the study by Soong, Chan, Cheers, and Hu (2006).

What our results do indicate is that there are aspects about live lectures that webcast videos lack, which students find to be very important to their learning experience. Lectures tend to create an environment in which students felt facilitated their retention of the information delivered (Schreiber, Fukuta, & Gordon, 2010). Another perspective is that live lectures facilitate observational learning, as outlined by Kearsley and Schneiderman's framework (1998), in which live lectures were found to better maintain students' interest on the topic, retain the information they have learnt for longer, and led to improvements in their academic performances due to the impact of social presence (i.e. face-to-face interaction with professor) and social interactions (i.e. being asked to answer a question) (Kearsley & Shneiderman, 1998; Varao-Sousa & Kingstone, 2015). Live lectures also provide greater interactivity that most webcast platforms currently lack. This is especially important for medical students, where the curriculum demands students to not only be knowledgeable in factual content but also be equipped with a hands-on understanding and relevant skills to practice Medicine. This might explain the differences in preferences in curricular delivery methods between medical and non-medical students. In a study by Burgess (2003), students remarked that webcast platforms lacked the interaction that live lectures provided, and did not provide the instantaneous feedback from lecturers that they had been used to in traditional face-to-face lectures. Clarification of concepts that may be unclear during the lecture is delayed in a webcast setting when these doubts can be cleared up quickly in a traditional live lecture. Learners tend to possess poor judgement of the learning path that their lecturers may have intended, and in order to set learners on the right track, it is essential that instructors would be able to address these doubts in time (Alonso, Lopez, Manrique, & Vines, 2005; Clark, 1982).

Another potential reason for the preference for live lectures over webcast videos and the low viewership of webcast videos could be the norms that are in place within the institutions which reinforce the preferences for certain learning approaches. In Singapore, students expect their lectures to explain curricular content rather than take on the role of facilitators of exploratory and independent learning (Amin, Tani, Eng, Samarasekara, & Huak, 2009). Such expectations are not unique to Singapore alone—a similar trend also exists among medical students in Australia (Ho & Tani, 2007). This indicates that students still value a traditional teacher-centric rather than a learner-centric approach in learning, an approach that may have been ingrained over the years.

The low viewership of webcast lectures also indicates that there may still be issues regarding their ease of accessibility that need to be addressed. In our survey results, while it is a minority within the cohort, there is still a notable number of students who do not possess devices to access webcast media or have easy access to these resources. These results could be attributed to reasons such as student personality—students who are unfamiliar with and averse to new technology may be reluctant to use webcast media and experience difficulty gaining access (Bassili, 2006). Another potential reason may be because they may come from lower-income families who lack financial resources to afford devices to access these webcast media. Faculties may also be reluctant to make webcast lectures available for access for reasons such as fears of low attendance during lectures (Billings-Gagliardi & Mazor, 2007; Cardall, Krupat, & Ulrich, 2008; Rowe, Harley, Pletcher, & Lawrence, 2001; Young, 2008), which may hinder students gaining access to webcast lectures in the first place.

Audio-visual quality is another key issue which could have been behind the low utilisation of webcast lectures. In this present day and age of advanced content management and availability of video editing tools, we as educators together with our institutions, have the resources to create better video materials rather than the mere uploading of recorded webcast lectures. In our study, students across the years and faculties have consistently indicated the need for better audio-visual quality, ranking the need for features such as better audio and video as well as subtitling very highly on the Likert scale. Other studies have also shown that students are less likely to have a positive response towards webcast lectures if they encountered issues with the audio and video quality (Franklin, Gibson, Samuel, Teeter, & Clarkson, 2011; Wang, Mattick, & Dunne, 2010). This is a concern because, as outlined by Mayer (2005) in his cognitive theory of multimedia learning, for learning to occur, humans process information visually as well as verbally, and that effective learning through multimedia can only occur if these resources do not impose a heavy cognitive load (Mayer, 2005; Mayer & Moreno, 2003; Sweller, 1994). Having poor audiovisual quality in a webcast lecture can impose a heavy cognitive

load as it puts students under considerable aural and visual strain as they try to understand and follow the lecture in its webcast format. This would decrease its usefulness and render webcast videos ineffective for learning. This may explain the usage patterns by students for webcast videos seen in our study, as students have been shown to make decisions based on the resource's perceived usefulness (Cardall, Krupat, & Ulrich, 2008; Von Konsky, Ivins, & Gribble, 2009). Therefore, improvements in the audiovisual quality of webcast lectures may be one of the key factors in increasing student usership of such webcast platforms. We demonstrated the possibility of this with a better version of edited webcasting our recent study (Maniclang, Hong, Marzin, Amellal, Rajendran, Lee, & Sng, 2018).

Another key improvement that could also increase webcasted video's usefulness, as indicated by our survey results, would be the segmentation and navigability of webcast videos. Having lectures segmented into bite-sized chapters could lessen the cognitive load these videos would impose on students, making them more effective as learning tools (May & Moreno, 2003). Furthermore, having a variable playing speed allows students to learn the lectures at their own preferred pace, which is one of the reasons why students perceived webcast lectures favourably in other studies (Burgess, 2003; Lovell & Plantegenest, 2009; McCann, Schneiderman, & Hinton, 2010; Schreiber, Fukuta, & Gordon, 2010).

Considering that students see webcast lectures as a supplementary source of curriculum content, they must therefore be developed in a way that will help them retain curriculum content that was already covered in lectures more effectively. The students we surveyed included science students as well as medical students—students who have been shown to score highly on the Entwistle Inventory of Approaches to Learning (Chessell, 1986; Entwistle, 1981). This indicates that these students tend to value learning concepts such as rote learning and memorisation. This is consistent with the results of the study by Amin and colleagues (2009) on motivation and study habits among Singaporean medical students, where these students were shown to make use of past assessments and class tests and exercises to better understand curricular content, indicating a rote learning approach in which they reproduce content learnt from lectures in order to score well academically. The fact that students can replay lectures at their own convenience and pace already makes webcast lectures appealing for students during exam preparations, as it would help with rote memorisation (Von Konsky, Ivins, & Gribble, 2009). Furthermore, webcast lectures would help offload the cognitive load that may arise in lectures, as students try to make notes on what was being discussed during formal lecture time (Franklin, Gibson, Samuel, Teeter, & Clarkson, 2011). Therefore, the content of webcast lectures must be able to

relate back to what is assessed in the curriculum. Including and enhancing features such as summaries, chaptering, and better audio and video quality—which would aid students in rote memorisation—would be key in improving the usefulness of webcast videos.

If online multimedia materials such as webcast lectures were to serve as replacement of live lectures, it is therefore imperative that not only should the key issues surrounding the material's usability—such as poor audiovisual quality—be addressed, institutions must take one step further and develop these online multimedia materials in a more thoughtful manner. In a later study, we plan to test the feasibility of a webcast platform which makes use of digital tags to enrich multimedia content. It is our hope that with enhancements like these, we could encourage a shift towards a more learner-centric type of learning and hopefully replace live lectures with online multimedia resources, which would give students the opportunity to spend more time on other interactive aspects of learning.

CONCLUSION

In conclusion, our survey results show that students still prefer traditional methods of curricular delivery such as live lectures over webcast videos. Instead, they perceive webcast videos as a supplement to live lectures, using it to fill in gaps of what they may have missed during the live lectures. This may be due to the webcast lectures lacking features that students value highly in live lectures, such as interactivity, as well as practical issues such as barriers to access and technical issues which may prove to be obstacles to effective learning. Therefore, more improvements need to be made to webcast lectures in order to increase their usefulness and utilisation among students.

Furthermore, webcast lectures can only serve as a tool rather than the primary means of making a shift from a teacher-centric to a learner-centric learning approach. As our survey results show, despite the availability of e-learning resources such as webcast lectures, we observe that the norms in learning continue to be highly teacher-centric. Therefore, institutions must be more thoughtful in how they plan to make that paradigm shift from a teacher-centric to a learner-centric learning approach.

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ABOUT THE LEAD AUTHOR

Marie Anne F. MANICLANG is a research assistant at the Department of Pharmacology in the Yong Loo Lin School of Medicine, NUS. Her research interests include technology-enhanced teaching and learning.

ABOUT THE CORRESPONDING AUTHOR

Judy Chia Ghee SNG is a senior lecturer at the Department of Pharmacology in the Yong Loo Lin School of Medicine, NUS. Her teaching and research interests include curriculum design, experiential learning and enhancing learning with technology and storytelling through cases and documentaries.

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APPENDIX. SURVEY QUESTIONNAIRE

Greetings! This is a Research Project titled Preference for e-Learning Platforms conducted under the guidance of Professor Edmund Lee and Professor Judy Sng from the Department of Pharmacology. We wish to understand students' attitudes and preferences towards video materials (i.e. a form of e-learning). The information obtained from this survey would help us further improve the designing for future video materials to enhance students' learning experience. Thus, we're seeking your assistance to **voluntarily** complete this **anonymous** short survey. This survey can be completed in about 15 minutes. Thank you for your help!

For any queries, please contact:

Dr Judy Sng

Tel : (+65) 6516 3676; Fax : (+65) 6873 7690; Email: phcsngj@nus.edu.sg

For an independent opinion regarding the research and the rights of research participants, you may contact a staff member of the National University of Singapore Institutional Review Board (Attn: Dr Chan Tuck Wai, at telephone 65- 6516 1234 or email at irb@nus.edu.sg).

1a. Do you possess any smartphone, tablet or laptop?

*Please **TICK ONLY ONE** option. If No, please state the reason.*

☐ Yes

☐ No (Reason: _____)

b. What personal mobile technology do you own?

*You may **TICK MORE THAN ONE** option.*

☐ Smartphone

☐ Tablet

☐ Laptop

2a. **If you own a smartphone**, which operating system does your smartphone use?

*Please **TICK ONLY ONE** option.*

☐ I don't have a smartphone.

☐ Android

☐ Windows

☐ iOS

☐ Others: _____

b. **If you own a tablet**, which operating system does your tablet use?

*Please **TICK ONLY ONE** option.*

☐ I don't have a tablet.

☐ Android

☐ Windows

☐ iOS

☐ Others: _____

c. **If you own a laptop**, which operating system does your laptop use?

*Please **TICK ONLY ONE** option.*

☐ I don't have a laptop.

☐ Windows

☐ Apple/Macintosh

☐ Others: _____

The term **'video materials'** in the *following questions* refer to webcast lectures (recording of live lectures), screencast (audio recording over PowerPoint Slides) and other video formats.

3. Please **RANK** the frequency of these electronics usage for video materials according to the following: with - *'1' being MOST frequent to '4' being LEAST frequent*. **DO NOT** repeat the numbers.

*(Please write **N.A.** (Non-Applicable) IF you do not own a particular electronic device from the following.)*

☐ Home desktop computer

☐ Laptop

☐ Tablet

☐ Smartphone

4. In general, rate the ease you are able to access video materials?

*Please **TICK ONLY ONE** option with - '1' being EXTREMELY inaccessible to '10' being EXTREMELY accessible.*

☐ 1 ☐ 2 ☐ 3 ☐4 ☐ 5 ☐ 6 ☐ 7 ☐8 ☐ 9 ☐ 10

5. What is the consideration in determining where you watch these video materials?

*Please **RANK ALL THE OPTIONS** with - '1' being MOST important to '5' being LEAST important.* **DO NOT** repeat the numbers.

- ☐ Having a long stretch of available time
- ☐ Quiet environment
- ☐ Stable internet access
- ☐ Cost of internet access
- ☐ Availability of power socket to charge electronic devices

6. Where do you watch these video materials?

*Please **RANK ALL THE OPTIONS** with - '1' being MOST often to '5' being LEAST often.* **DO NOT** repeat the numbers.

*(Please write **N.A.** (Non-Applicable) IF you do not watch video materials from the following places.)*

- ☐ At home
- ☐ Hall/Residences (e.g. Prince George's Park, Raffles Hall, Residential colleges at UTown)
- ☐ School
- ☐ Public transport
- ☐ Public places (e.g. Library, Cafes)

Others: _____

7. In general, how comfortable are you in using electronic devices to watch these video materials?

*Please **TICK ONLY ONE** option with - '1' being extremely UNCOMFORTABLE to '10' being extremely COMFORTABLE.*

☐ 1 ☐ 2 ☐ 3 ☐4 ☐ 5 ☐ 6 ☐ 7 ☐8 ☐ 9 ☐ 10

8. In general, how frequently do you watch video materials?

*Please **TICK ONLY ONE** option.*

- ☐ Never
- ☐ Rarely (<25% of your lectures)
- ☐ Sometimes (25-50% of your lectures)
- ☐ Often (51-75% of your lectures)

☐ Very often (>75% of your lectures)

9. Have you experienced watching video materials in your previous school (before coming to NUS)?

*Please **TICK ONLY ONE** option.*

☐ Yes

☐ No

10. If you were to watch video materials today, which of the following most describe your feeling? Please **TICK *ONLY ONE*** *option.*

☐ I am looking forward to it

☐ I have no choice

☐ I am dreading it

☐ I hate it

11. Why do you watch video materials?

*Please **RANK ALL THE OPTIONS** with - '1' being MOST relevant to '6' being LEAST relevant.*

☐ To better understand the lecturer

☐ To review and annotate lecture notes

☐ To replace a missed lecture

☐ To skip a lecture

☐ Revise for exams

☐ I prefer watching video materials to attending a live lecture

12. What type of layout do you prefer when watching video materials?

*Please **TICK ONLY ONE** option.*

☐ Lecture recording (i.e. Video recording of the live lecture from the back of the hall)

☐ Only the multimedia (e.g. PowerPoint slides) shown during lecture accompanied with audio recording

☐ Both multimedia (e.g. PowerPoint slides) and lecture recording

☐ Both multimedia (e.g. PowerPoint slides) and video clip of professor's face at a corner lecturing

13. Which is your preferred form of video materials?
*Please **RANK ALL THE OPTIONS** with - '1' being MOST preferred to '3' being LEAST preferred. **DO NOT** repeat the numbers.*

- ☐ Webcasted Lectures (i.e. Video recording of the live lecture from the back of the hall)
- ☐ Screencast (i.e. audio recording over PowerPoint Slides)
- ☐ Educational videos (i.e. Documentary-style)

14. In general, how do you think we can improve on the ease of use of video materials?
*Please **RANK ALL THE OPTIONS** with - '1' being MOST appropriate to '8' being LEAST appropriate. **DO NOT** repeat the numbers.*

- ☐ Simple and convenient navigating interface
- ☐ Search function to navigate to the topic of interest within the video
- ☐ Break-up the video into shorter viewing segments
- ☐ Pause and resume function from where you left off
- ☐ Track and bookmark videos previously watched
- ☐ Subtitles
- ☐ Accompanying hard copy verbatim transcript of the lecture
- ☐ Online technical support

Others: _____

15. In general, how do you think we can improve on the usefulness of video materials?
*Please **RANK ALL THE OPTIONS** with - '1' being MOST appropriate to '6' being LEAST appropriate. **DO NOT** repeat the numbers.*

- ☐ Defined learning objectives
- ☐ Summary points of the lecture content
- ☐ Accompanying hard copy verbatim transcripts of the lecture
- ☐ Direct links to external sources of information
- ☐ Direct links to case studies and other applications
- ☐ Online practice tools (e.g.: assessment, quiz etc.)

Others: _____

16. In general, how do you think we can improve on making video materials more engaging? *Please **RANK ALL THE OPTIONS** - '1' being MOST appropriate to '7' being LEAST appropriate. **DO NOT** repeat the numbers.*

- ☐ Better graphics
- ☐ Use more animations
- ☐ More creative ways of content presentation
- ☐ Shorter video segments
- ☐ Better audio recording
- ☐ Simple and convenient navigating interface
- ☐ Insert links to other learning resources

Others: _____

17. In general, how useful are video materials in helping you to learn?

*Please **TICK ONLY ONE** option with - '1' being extremely NOT USEFUL to '10' being extremely USEFUL.*

☐ 1 ☐ 2 ☐ 3 ☐4 ☐ 5 ☐ 6 ☐ 7 ☐8 ☐ 9 ☐ 10

18. In general, how useful are video materials in helping you to prepare for examinations?

*Please **TICK ONLY ONE** option with - '1' being extremely NOT USEFUL to '10' being extremely USEFUL.*

☐ 1 ☐ 2 ☐ 3 ☐4 ☐ 5 ☐ 6 ☐ 7 ☐8 ☐ 9 ☐ 10

19. In general, how effective are video materials in engaging you in the learning process?

*Please **TICK ONLY ONE** option with - '1' being extremely UNSATISFYING to '10' being extremely SATISFYING.*

☐ 1 ☐ 2 ☐ 3 ☐4 ☐ 5 ☐ 6 ☐ 7 ☐8 ☐ 9 ☐ 10

20. Which e-learning platforms are you **aware of previously** other than video materials?

*You may **TICK MORE THAN ONE** option.*

- ☐ None
- ☐ Games
- ☐ 3D simulation models
- ☐ Blogs
- ☐ Virtual classroom

Others: _____

21. Have you **experienced** other e-learning platforms apart from video materials (i.e. webcasted lectures, screencast and other video formats)?

*Please **TICK ONLY ONE** option.*

☐ Yes

☐ No

22. Which is your preferred teaching delivery method?

*Please **RANK ALL THE OPTIONS** with - '1' being MOST preferred to '6' being LEAST preferred.*

☐ Live lectures

☐ Video materials (i.e. webcasted lectures, screencast and other video formats)

☐ Live lectures supplemented with video materials

☐ Comprehensive lecture notes

☐ Live lectures supplemented with comprehensive lecture notes

☐ Small group discussions

23. How do you feel about replacing live lectures with video materials?

*Please **TICK ONLY ONE** option with - '1' being strongly AGAINST to '10' being strongly SUPPORT.*

☐ 1 ☐ 2 ☐ 3 ☐4 ☐ 5 ☐ 6 ☐ 7 ☐8 ☐ 9 ☐ 10

24. How do you feel about replacing video materials with a set of comprehensive lecture notes?

*Please **TICK ONLY ONE** option with - '1' being strongly AGAINST to '10' being strongly SUPPORT.*

☐ 1 ☐ 2 ☐ 3 ☐4 ☐ 5 ☐ 6 ☐ 7 ☐8 ☐ 9 ☐ 10 ■