Blockbuster videos: Using complementary video-based learning to augment first-year block-model teaching

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Abstract

Introduction: The first year of university is fraught with obstacles and challenges for students. Of particular concern is the often high level of student disengagement encountered at this juncture. Consequently, universities are reimagining what their first-year student experience can be like. The aims of this study were to, firstly, investigate the effects that complementary video-based practical skills resources have on first-year osteopathy student engagement and, secondly, if these effects differ in block-model when compared to traditional-model delivery format.

Methods: This study utilised a two-part mixed-method sequential exploratory design consisting of a quantitative and qualitative survey and focus-group interviews. The quantitative data were analysed using descriptive and inferential statistics, while the qualitative data were thematically analysed.

Results: The results demonstrated that the majority of students found the video-based learning (VBL) activities to have an overall positive effect on their learning experience and that VBL improved their perceived psychomotor skill acquisition. Furthermore, the reported positive responses appear to be enhanced in an intensive block-model setting.

Conclusion: VBL appears to be a useful tool for clinical skills training in an intensive-style tertiary education setting. Further research should be performed to see if this effect is seen across other health professions courses.

Keywords: video-based learning; student engagement; block model; health professional education; mixed-methods research; intensive learning

Introduction

The first year of tertiary education can be a daunting experience for students, with many new obstacles to navigate and overcome. Specifically, passivity is high amongst first-year students, where prior educational experiences have led students to expect answers

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to be given freely to them (Dixon & O'Gorman, 2019). In efforts to try and counteract these levels of passivity—in the process increasing student engagement—universities are constantly re-evaluating the teaching and learning methods used to educate first-year undergraduates (Clocksin & Greicar, 2017). Student engagement can be defined as the quality of effort students themselves devote to educationally purposeful activities that contribute directly to desired outcomes (Hu & Kuh, 2002) and encompasses not only the physical participation with the content but also academic results and emotional responses (Bevan et al., 2014). Researchers have conceptualised student engagement into four key concepts: (1) academic engagement (learning process behaviours), (2) cognitive engagement (the time spent on comprehension), (3) social engagement (the extent to which a student follows classroom rules and etiquette) and (4) affective engagement (students' involvement and inclusion within the learning community) (Finn & Zimmer, 2012). It is important to note that these four components are interrelated and require sufficient input from both educators and students to fully develop (Witkowski & Cornell, 2015).

The learning approach students adopt is dependent on the time the student has to study, an interest in the content they are learning and the medium through which the content is delivered (Delgado et al., 2018). Students who are time poor, do not engage or resonate with the subject material and have low self-efficacy often gravitate to a surface learning approach (Gerritsen-van Leeuwenkamp et al., 2019; Lindblom-Ylänne et al., 2019). The surface learning approach often involves a lower level of student engagement and/or a focus on rote learning and/or memorisation (Howie & Bagnall, 2013). Students utilise this approach to learning with the intention to simply pass a subject without gaining a greater understanding of the content (Lindblom-Ylänne et al., 2019). Surface learning, whilst time efficient, is not sustainable for long-term memory recollection or knowledge application (Delgado et al., 2018; Dolmans et al., 2016; Gerritsen-van Leeuwenkamp et al., 2019). In contrast, a deep approach to learning is characterised by a commitment to understanding information and a search for meaning (Dolmans et al., 2016). Students can pivot between both surface and deep approaches to learning depending on their learning environment and other internal and external life factors (Bevan et al., 2014; Delgado et al., 2018). Therefore, it is important for tertiary educators to foster an environment where students engage with a deep learning approach to facilitate improved student learning outcomes (Delgado et al., 2018). Despite the need for a more complete understanding of the factors that influence student engagement, video-based learning (VBL) is one teaching method that can be used to optimise students' learning and engagement in the modern tertiary education environment (Dolmans et al., 2016; Yousef et al., 2014).

With the expansion of the digital age, VBL is now entrenched in tertiary pedagogy, and further, Generation Z students entering undergraduate study expect some sort of digital medium in their education (Clocksin & Greicar, 2017). VBL is a broad term that incorporates the use of digital mediums, both visual and auditory, to deliver educational

content (Choi & Johnson, 2005). The use of these resources has been researched heavily in the traditional tertiary context and has facilitated greater student engagement and satisfaction with learning overall (Yousef et al., 2014). This engagement is achieved, in part, through the promotion of peer-to-peer collaboration, facilitating both engagement with the content and each other (Chen et al., 2010; Hu & Kuh, 2002). Additionally, VBL can foster active and deep learning by facilitating students to solve problems, contrast and analyse information and develop their creativity (Bevan et al., 2014; Clifton & Mann, 2011; Smeda et al., 2014).

VBL is especially pertinent for those students studying in the health professions, as these fields rely on a psychomotor skill set. With this comes the need to continually refine practical skills in order to generate mastery (McGaghie et al., 2011). The benefit of VBL in healthcare education is that it facilitates a deeper understanding of more complex tasks and reinforces previous knowledge (McGaghie et al., 2015; Weeks & Horan, 2013). Multiple studies have demonstrated the efficacy of VBL across other medical, nursing and health professional domains, such as physiotherapy (de Lima Lopes et al., 2019; Koch et al., 2010; Reedy, 2015; Weeks & Horan, 2013). Weeks and Horan (2013) found the use of VBL with first-year physiotherapy students to be effective in perceived preparedness for practical examinations. Similarly, the use of YouTube videos increased student engagement and critical awareness and facilitated deep learning in undergraduate nursing students (Clifton & Mann, 2011). The convenience to review content anytime, anywhere and as often as required was a benefit these students also noted (Clifton & Mann, 2011). Furthermore, VBL is now considered a hallmark of surgical preparedness, with a 2018 online survey demonstrating that 98.6% of surgical residents and specialists used videos to help prepare for surgical training (Mota et al., 2018).

Block-model (BM) delivery is a relatively new concept in tertiary education. It involves short "blocked" forms of teaching and learning, where one unit is studied intensively and completed before proceeding to the next (Klein et al., 2020; Tripodi et al., 2020). This style is said to offer greater flexibility for this current generation of learners (Daniel, 2000) while achieving greater than or equal to the semester-based concurrent-subject "traditional model" (TM) of tertiary education with regards to student engagement and academic performance (Burton & Nesbit, 2008). That said, there remains limited evidence to demonstrate the advantages of BM when compared directly to TM. Recently, a large university in Melbourne, Australia, underwent a large-scale shift, whereby all undergraduate and non-higher degree by research post-graduate courses are now delivered in BM. Given these institutional changes, in combination with the small amount of literature directly comparing TM to BM, our aim is to investigate, in a cohort of health professional students, how complementary VBL affects self-reported student engagement in BM. Additionally, we aim to compare these results to previously published analogous work in a TM setting.

Methods

Ethical approval was obtained from the Victoria University Human Research Ethics Committee under the Victoria University First-Year-Model block ethics application (Approval Number: HRE 17-192).

Institution, unit and VBL resource details

"Clinical Skills 2" is a practical unit/subject within the university's osteopathy course, focusing on the assessment, diagnosis and management of conditions of the lower limb, specifically the hip, knee and ankle. In BM, the unit consists of two 3-hour classes per day, 3 days per week, for a total of 18 compulsory contact hours per week. The unit is completed in 4 weeks, with all the assessments taking place within the 4-week study period. In TM, the unit ran over a 12-week semester, consisting of 5 hours of face-to-face class per week. All assessments were completed during the semester, with the exception of the final assessment, which took place in the designated exam period, 2 weeks after the final class.

The students have four assessments for the unit: a history-taking video assessment (15%), three case-based learning worksheets (15%), a practice observed performance in a simulated setting (OPSS) (10%) and a final OPSS (60%). An OPSS is a form of competency-based assessment relevant to health professional education and training (Khan & Ramachandran, 2012). As a part of the pre- and post-class activities for each class, the students are instructed to revise the complementary VBL material provided and practise these techniques in small groups at home, where appropriate. The VBL material is composed of narrated videos of each practical assessment and management technique studied in class, e.g., active range of motion of the knee. The videos were filmed in a clinical setting, with one of the educators as the clinician using a senior student as a model. The videos were either narrated during filming or post-production and filmed in a medium shot frame (Figure 1).

Figure 1

An Example of an Image of a VBL Resource

Participants

One hundred and thirty first-year osteopathic students who were enrolled in "Clinical Skills 2" in BM in the current year (November 2018) and 114 students who were in TM the previous year (November 2017) were invited to participate in this study through an email in the last week of the unit. The participants completed the survey via the Qualtrics (SAP, Utah, U.S.A) portal. There was no identifying information collected in the survey, and there were no incentives for participating in the project. Students who were interested in participating in the focus groups were asked to contact the principal researcher via email. Participant consent for focus-group participation was obtained via a separate form.

Evaluation

We used a two-part mixed-method sequential exploratory research design. Part one was a questionnaire that evaluated the students' perceptions of, and engagement with, the VBL resources (Appendix A). The survey employed had been used in a previous study with the same TM cohort (Tripodi, 2018), which was based on work by Weeks and Horan (2013) and Jang and Kim (2014). The questionnaire was a 4-point Likert scale, ranging from *never* to *very often* (Questions 1.1–1.5) or *disagree* to *strongly agree* (Questions 2.1–2.5). Additionally, the questionnaire contained four open-ended questions exploring similar themes to the Likert-type items. These additional questions were designed to obtain qualitative data and provide the participants who did not participate in the focus groups with an opportunity to comment on the VBL resources. Part two consisted of focus-group interviews. The focus-group interviews were conducted by an associate researcher who was not part of the clinical skills teaching team, and they were guided by a set of questions that were an extension of the original survey also used in previous work by Tripodi (2018) (Appendix B). The surveys were completed by the final workshop of the semester (before the final assessment), and the focus-group interviews were conducted 1 week after the completion of the unit and final assessment, which was identical for both cohorts.

Data analysis

Quantitative data were exported from Qualtrics (SAP, Utah, U.S.A) and then entered into SPSS 25 (IBM, U.S.A) for descriptive and inferential analysis. The questionnaire responses were reported as mean Likert response ± standard deviation (SD) (1 = *never/strongly disagree*, 2 = *sometimes/disagree*, 3 = *often/agree*, 4 = *very often/strongly agree*). Survey items answered as 1 or 2 were classified as negative, while those answered as 3 or 4 were classified as positive. Cronbach's alpha was used to evaluate the internal consistency of the Likert-type scale questions for each cohort independently, using the Likert-type scale. An independent t-test was used to compare mean questionnaire response frequencies between TM and BM deliveries.

The focus-group interviews were recorded on an electronic recording device then manually transcribed. The focus-group transcriptions and the long-answer survey

questions were analysed using qualitative data analysis software NVIVO, Version 11 (QSR International, Melbourne, Victoria, Australia). Underpinned by constructivist epistemological and ontological assumptions, and a post-positivist theoretical perspective, the transcriptions were thematically analysed using a deductive approach based on the framework by Vaismoradi et al. (2013). Briefly, this method consisted of, firstly, data familiarisation, followed by searching for and reviewing themes by identifying phrases and concepts, then defining themes and finally by report production. This process was performed individually by three of the authors, with the final thematic analysis being internally validated via group consensus (Vaismoradi et al., 2013).

Results

Participant demographics

There were 65 BM participants who completed the survey, representing a 50% response rate, while 74 TM participants completed the survey, representing a 65% response rate. Twelve students from each BM and TM took part in the focus groups (9% and 11% of respondents, respectively). There were a total of four focus-group interviews, with 6 participants in each group. The mean age in both cohorts was 21.2 years old.

Quantitative survey responses

Cronbach's alpha demonstrated that there was high internal consistency of the survey in both the BM (α = 0.893) and TM (α = 0.901) cohorts. Although most questions were scored positively across both cohorts, the BM participants reported a significantly increased positive response to Questions 1.1, 1.2, 1.4, 1.5, 2.1, 2.3 and 2.5 (Table 1).

Table 1

BM Survey Responses and Comparison of BM and TM Mean Quantitative Responses

Question	Mean Likert Response BM (± SD)	Mean Likert Response TM (± SD)	TM and BM Mean Response Differences
1.1 I use the online videos to review techniques before class.	2.49 (± 0.87)	1.80 (± 0.78)	$t(137) = 4.984, p = 0.000$*
1.2 I use the online videos to review techniques after class.	3.25 (± 0.77)	2.36 (± 0.97)	$t(137) = 5.860, p = 0.000$*
1.3 I use the online videos to revise for the final assessment (OPSS).	3.74 (± 0.57)	3.70 (± 0.57)	$t(137) = 0.371, p = 0.711$
1.4 I use the online videos to review difficult techniques.	3.57 (± 0.66)	3.14 (± 0.90)	$t(137) = 3.212, p = 0.002$*
1.5 I use the online videos to learn techniques that I could not practise in class.	3.23 (± 0.90)	2.57 (± 1.04)	$t(137) = 4.010, p = 0.000$*
2.1 The online videos allow me to learn independently.	3.66 (± 0.51)	3.31 (± 0.52)	$t(137) = 4.002, p = 0.000$*

Question	Mean Likert Response BM (± SD)	Mean Likert Response TM (± SD)	TM and BM Mean Response Differences
2.2 The online videos reduce my need to take notes.	3.09 (± 0.82)	2.93 (± 0.78)	$t(137) = 1.173, p = 0.243$
2.3 The online videos improved my final assessment performance (OPSS).	3.57 (± 0.53)	3.30 (± 0.52)	$t(137) = 3.062, p = 0.003$*
2.4 The online videos should be used in my other subjects.	3.45 (± 0.64)	3.26 (± 0.58)	$t(137) = 1.841, p = 0.068$
2.5 The online videos have improved my overall learning experience in this unit.	3.62 (± 0.52)	3.27 (± 0.48)	$t(137) = 4.076, p = 0.000$*

Note: * denotes statistical significance ($p < 0.05$)

Focus-group and long-answer survey responses

As the qualitative responses between both cohorts where similar, the two data sets were analysed as a whole. The researchers identified multiple themes within the data: (1) improved understanding and skill refinement through revision and knowledge gap identification, (2) perceived improvement in assessment performance, (3) study habits, (4) assessment-related exam anxiety attenuation through increased assessment confidence and (5) assessment-centric utilisation.

Theme 1: Improved understanding and skill refinement through revision and knowledge gap identification

Throughout the interviews, it became clear that the video-based resources had good utility as a revision tool, in particular for pre-assessment revision. Additionally, the participants utilised the videos when they were absent from class, which could be due to work and family commitments or due to sickness. They also appeared to have good use to assist students in content understanding and to address any knowledge gaps they encountered. It was also clear that participants appreciated being able to get an introduction to the content via the videos and then practise and refine the more nuanced details in class:

> *[The videos] provide a visual resource of how to properly complete techniques when I don't have the ability to ask a teacher.* (TM1, focus group)
>
> *[The videos] allowed me to revise at home and make sure my technique is right.* (BM4, survey)
>
> *[The videos] allowed me to review techniques that I was unable to get to in class due to time* (BM8, survey)
>
> *We wouldn't always get time to clarify all the techniques with the teachers … the videos allowed us to seek some of that clarification at home.* (BM12, focus group)

Theme 2: Perceived improvement in assessment performance

Most of the students agreed that the videos increased their performance in their practical exam. The students reported that this was achieved by the videos accurately reflecting what they had studied in class and what the assessment required of them. They appreciated the direct alignment that the videos had with what was required in the assessments and saw the consistency as a vehicle for memory retention:

> *I loved how everything lined up—the videos, the class content, the assessments—everything was easy to find, and I think it really helped me in doing well in the unit.* (BM11, focus group)

> *[The videos] improved my performance in the final assessment because they allowed me to make sure I am studying and practising correctly.* (TM2, survey)

> *I believe [the videos] helped my ability to complete the final assessment as they help to jog my memory on techniques.* (BM6, survey)

Theme 3: Study habits

The participants described how the videos increased their total revision volume to what it otherwise would have been without the resources. Furthermore, they agreed that being able to revise and practise the practical skills before and after class allowed them to use class time to work on finer skill refinement with help from educators and peers:

> *[The videos] make it much easier to study at home and revise techniques.* (BM6, survey)

> *It certainly made it easier to study outside of class. I can't see how I would have done as much study as I did without them [videos].* (BM7, focus group)

Theme 4: Assessment-related exam anxiety attenuation through increased assessment confidence

The participants appeared to associate the increased assessment preparedness facilitated by the video resources with a reduction in practical exam anxiety. This appeared to occur directly, through better preparedness, and also indirectly, by instilling greater confidence in students' skills:

> *[The videos] reduced my anxiety regarding the exam and being able to remember how to stand, how to hold and how to do the actual movements.* (TM5, focus group)

> *[The videos] assist in my preparation and ultimately confidence in the assessment.* (TM6, survey)

> *The prac[tical] exam wasn't easy, and it was pretty nerve racking, but I think the videos helped me prepare, and I certainly wasn't as nervous because of that.* (BM12, focus group)

Theme 5: Assessment-centric utilisation

Participants revealed a tendency to access videos predominantly during the final assessment period, attributing this inconsistency to time constraints and decreased motivation after long days of learning other unit content:

> *We're only revising [the content] because of the exams.* (TM9, survey)

Discussion

The aim of this study was to investigate, in a cohort of health professional students, how complementary VBL affects self-reported student engagement in BM and to compare these results to previously published analogous work in a TM setting. Currently, BM teaching is not well researched in the tertiary education sector, hence this project's aim was also to address the literature gap comparing BM to TM delivery. The results of this study have demonstrated that when comparing BM to TM, BM students reported higher engagement (in the form of total positive survey responses) with the VBL material before and after class when reviewing difficult techniques and for techniques that the students did not have time to practise in class. This indicates that in a similar learning setting, the delivery of this clinical unit within BM may promote a greater engagement in both the pre- and post-class activities. This may be because in a TM setting, students have a lengthy examination period to "catch back up" on the content since they have to juggle competing learning assessment demands, as opposed to BM, where they have a limited 4-week period to concentrate on one subject only, covering all content, and complete all assessments.

Our results revealed that students felt they could learn and familiarise themselves with the practical technique fundamentals before and after class and focus on the finer details of skill acquisition in class, by working collaboratively with staff and their peers. This finding underscores the benefits of designing the VBL resources as a complementary activity, contextualised in a flipped-classroom approach. The flipped classroom approach has been reported to have multiple positive effects on student learning, namely, increased engagement (Strayer, 2007), improved student performance (Tune et al., 2013) and improved student preparation for real-world challenges (Abeysekera & Dawson, 2015), all critical in the health professional education setting. It is likely that this design underpinning is why the students in this study so unanimously reported that the VBL resources facilitated an improvement in their assessment performance and overall learning experience. Our findings of increased self-reported engagement, independent learning and improved understanding and skill refinement also echo findings from other health professional areas. Multiple studies within these fields have shown VBL to increase engagement and course satisfaction and enhance learning across both qualitative and quantitative designs (Jang & Kim, 2014; Koch et al., 2010; Stebbings et al., 2012). Taken together, these findings indicate that VBL seems to have a universal positive effect on health professional education and should be considered across all courses in this area. The

effect of VBL on student engagement may be enhanced in BM, but further research is needed to elucidate this finding.

Our findings also align with the components of student engagement proposed by Finn and Zimmer (2012), most notably the academic and cognitive engagement dimensions, where it specifically links to augmenting learning through further learning activities and studying extra sources of information (Finn & Zimmer, 2012). Our results support this link with students reporting that the VBL resources facilitated skill refinement and improved understanding whilst simultaneously demonstrating a greater uptake of the VBL resources. However, the effect of the VBL resources on the social and affective dimensions of engagement appear negligible, and hence, further complementary resources and teaching strategies should be developed in conjunction with VBL to increase engagement in these dimensions, which could lead to overall improved student learning outcomes (Finn & Zimmer, 2012).

As with any psychomotor skill development, refinement is paramount to learner success (Gonzalez & Kardong-Edgren, 2017). VBL as a complementary learning tool in tertiary education has been shown to improve student psychomotor skill development whilst promoting the development of skill mastery (Barsuk et al., 2016; de Lima Lopes et al., 2019; Gonzalez & Kardong-Edgren, 2017). The concept of mastery denotes a higher level of performance than competence alone. Once a skill or task is mastered, the length of skill maintenance without decay increases significantly (McGaghie, 2015; McGaghie et al., 2011). The data from our study indicate that the students perceived that the VBL resources assisted their practical skill development and engagement with the content. The increased revision outside of the classroom and the increased engagement that took place within the classroom appear to have facilitated practical skill competence and may have set up the beginnings of psychomotor skill mastery. Therefore, resources that improve psychomotor skill acquisition, such as VBL, in the early years of tertiary education may have downstream effects, whereby students become more confident and capable in their practical ability. This, ultimately, may promote future improved patient care and health outcomes (McGaghie et al., 2015).

Future research directions

Future research should more closely evaluate the link between VBL and student grades. This could involve this cohort, specifically, or evaluate any health professional teaching program more broadly. Additionally, longitudinal studies on the efficacy of VBL will assist in evaluating memory retention and skill acquisition over a longer period and not just on completion of assessments. As BM delivery is an emerging field in tertiary education, additional research into its effects on student engagement and learning approaches will be valuable in underpinning further, and more widespread, implementation of this style of teaching and learning.

Limitations

Limitations of this study include an increased risk of selection and collection bias (Rhodes et al., 2020). As the more compliant participants who filled out the survey are more likely to have used the videos more regularly, this may have skewed the study results. However, given our results mirror much of the analogous literature, we are confident that these forms of bias did not have a major impact on this study. Fundamentally, this study investigated self-reported perceptions and should be interpreted with that limitation in mind. Additionally, although the questionnaire was based on previous research, it had not been piloted. However, Cronbach's alpha was used to measure the internal consistency, which was found to be high. Despite the lead researcher being part of the clinical skills teaching team, the participants were under no pressure to complete the survey itself, and the focus-group facilitator was independent from the teaching team. Further limitations include inability to access student grades and, therefore, an inability to draw conclusions between improved assessment outcomes and VBL usage.

Conclusion

The findings from this study indicate that complementary VBL can be an effective teaching and learning tool in a cohort of first-year health professional students, across both BM and TM settings. The qualitative and quantitative results show that VBL can positively affect student engagement, which appears to be enhanced in BM. More specifically within the engagement domain, the complementary VBL resources enhanced academic and cognitive engagement. Further, students almost unanimously reported that the VBL tools contributed to an overall improved performance and satisfaction with the subject, which importantly has positive implications for long-term psychomotor skill mastery. Future research should be aimed at a more comprehensive quantitative analysis of the correlations between VBL, student grades and engagement and also the effects of BM on these variables more broadly.

Conflicts of interest and funding

The authors have no conflicts of interest or funding to declare.

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Appendix A

Qualitative Open-Ended Survey Questions

Open-ended section

1. How did the online videos influence your study during the clinical skills block?

2. What affect did the online videos have on your final assessment study and performance?

3. What impact did the online videos have on your anxiety and confidence levels for the final practical assessment?

4. How easy were the videos to find and play?

5. In what ways could the online videos be improved?

Appendix B

Focus-Group Question Guide

1. When were you most likely to view the online videos?
2. What did you like best about the online videos?
3. How did the online videos influence your study during the clinical skills blocks?
4. What effect did the online videos have on your final practical assessment performance?
5. What influence did the online videos have on your final practical assessment performance?
6. What impact did the online videos have on your anxiety levels for the final practical assessment?
7. What impact did the online videos have on your confidence for the final practical assessment?
8. How easy were the videos to find and play?
9. What were (if any) your reasons for not watching the online videos?
10. What ways would you suggest that the online videos could be improved?
11. Overall, what effects have the online videos had on your learning experience in this unit?