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Reflective Piece

The Development and Use of a Novel Clinical Vignette as a Blended Learning Adjunct for Simulation-Based Learning During and Beyond COVID

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ABSTRACT

Case-based learning (CBL) is an important teaching tool for encouraging students to think as medical experts. Using blended learning principles to present a case where students can choose which information they require has the potential to improve learning where contact time is limited, as was the case during the COVID pandemic. This paper reports on a de novo online clinical vignette used as a foundation for a blended, case-based learning vignette that used follow-on Blackboard activities to improve teaching and learning. Student users were positive about the online CBL vignette and indicated that it provided several advantages to improved learning within the practical simulation environment, including improved confidence. In addition, integration with existing knowledge and other subjects was confirmed and immersion was improved. Benefits identified by student users included improved understanding of the real world of practice and encouraging thinking out of the box. There were suggestions that more multimedia would be a valuable improvement as well as students having access to additional similar activities. The implications of this research are that the online CBL vignette is a viable tool for enhancing blended learning within the practical, simulation-based teaching environment. More research is required on its applicability to other healthcare settings.

Introduction

Case studies, as the precursor to case-based learning (CBL) and vignettes, have traditionally been used to evaluate learners' ability to recognise and interpret data deemed important and to support decision making related to management of the case. Case studies are widely used in healthcare education, including in emergency medical care (EMC). Case studies can also be used to evaluate the ability of the learner to organise and communicate their ideas (Herreid, 2006). Case studies are limited in that they have been perceived as time-consuming, repetitive and allowing for limited student participation (Kathiresan & Patro, 2013). CBL and vignettes have been suggested as substitutes for isolated case studies and are often used in healthcare education with the aim of preparing students for clinical practice by using realistic clinical scenarios (McLean, 2016). CBL takes clinical cases and uses these as a background to encourage students to think actively as medical experts (Duan, Li, Wang, Gao & Zhang, 2021). In addition, CBL vignettes should address present learning objectives, should be logical in flow and should be student-centred in design (Ma, Hubal & McLaughlin, 2020).

Traditionally, the cases upon which CBL vignettes have been based are unidirectional descriptions of a specific scenario that provide a predetermined set of information. However, this does not necessarily cater for the dynamic nature of a real-life scenario. A comprehensive vignette for one student may be seen as overly brief to another student. The underlying theory behind vignettes is that if students are able to determine their own line of questioning, this would improve not only their engagement with the vignette but would also allow an exploration of their line of questioning and how they had structured their information gathering. This also allows for a blended learning approach where face-to-face classroom activities such as simulations could be expounded upon in an online platform and additional information provided or focussed on in the online vignette that may not have been included in classroom discussions.

In-person teaching creates better interaction and engagement from both a student-tutor and student-student perspective (Kunin, Julliard & Rodriguez, 2014). The COVID pandemic resulted in lockdowns and translated into limitations related to class sizes, venue capacities and contact time with students. Within healthcare education, students are often kinaesthetic learners who prefer multimodal teaching strategies (Bokhari & Zafar, 2019). This is particularly pertinent within the practical domain where face-to-face and simulation-based interaction forms the mainstay of teaching and learning activities and the COVID pandemic had significant negative effects on practical

classes. Paramedic students have highlighted that online learning is challenging and that a lack of social connectedness and inability to attend face-to-face laboratories were some of the significant effects of the COVID pandemic (Whitfield, Perkins, Kelly & Dumbleton, 2021). In an effort to mitigate some of these effects, the CBL vignette was conceptualised.

The CBL vignette was originally structured using MS Excel using standard Excel functions. The Excel-based system presented challenges related to viewing the data as well as the student's ability to use the system on a mobile device. The solution involved developing the vignette into a web-based learning platform that used simple follow-on logic. This avoided the need for students to read a lengthy narrative that may have included information that the student may have considered redundant and contextualisation of which may have been more related to English reading proficiency than to clinical reasoning. Using specific questioning strategies and avoiding verbose narrative would also allow the student to gather information following their own preferred chronology.

Phase One involved students accessing the system and determining the information that they would like to access. A simple flow diagram is depicted as an appendix. Phase Two required students to submit their data list into an activity in BlackBoard that then used adaptive release to ask follow-up questions related to the case at hand. As a new teaching and learning tool, the novel clinical vignette requires research to determine student perceptions related to its use. There is a paucity of literature related to online vignettes, specifically in the format used by the tool described in this research proposal. The aim of this study was to explore student perceptions related to the use of a novel clinical vignette that had been developed de novo by the author as a blended learning teaching method.

Methods

This study aimed to examine student perceptions and experiences related to the use of a novel clinical vignette. A purpose-designed, online survey was used to gather data from students who had used the clinical vignette in their first year of study within an Emergency Medical Care program at the University of Johannesburg, South Africa. The study was pre-tested by requesting five senior students to review the questionnaire and to evaluate each question for its phrasing and any possible ambiguities. There were no significant comments from the pre-testing group and the questionnaire was considered appropriate for distribution. The questionnaire was then loaded into the Blackboard

LMS and a selective invitation email sent within the LMS to all students who had been registered for the module and had used the vignette. An information document was placed in the section where the questionnaire was housed and participants were required to click a consent button prior to being allowed into the questionnaire. Participants were able to withdraw at any point up to submission of their responses whereafter, given the anonymous nature of the submission process, their responses would be unidentifiable within the dataset. The questionnaire was available for four weeks after which a reminder was sent to participants within the LMS. Access to the questionnaire was closed eight weeks after the initial invitation was sent. There were 29 attempted responses, 24 of which were completed responses from a total of 71 invited participants, a response rate of 34%. The data from the five incomplete submissions were discarded.

Data Analysis

Data were imported from Blackboard into Excel as a .csv file and non-numerical data were converted into a corresponding numerical scale for analysis. Data were imported into IBM SPSS, version 27 for analysis. Data are reported on descriptively for the Likert-type scales as frequencies and percentages. Response data from the Likert-type questions were analysed for normality using the Shapiro-Wilk test and were found to not be normally distributed ($p<0.05$) (Shapiro & Wilk, 1965). Data from open-ended questions were analysed using thematic analysis to determine common trends and themes.

Ethical Approval

The study was approved by the University of Johannesburg's Faculty of Health Sciences Research Ethics Committee (REC-771-2020). Gatekeeper access was provided by the Division for Institutional Planning, Evaluation and Monitoring as well as by the Head of Department: Emergency Medical Care.

Results

Most participants agreed that the clinical vignette was a positive learning experience (n=22, 96%) and that the clinical vignette helped develop a more structured approach to patient assessment (n=20, 83%). All participants found the question branching logical (n=24, 100%) and most found the patient presentation to be realistic (n=23, 96%). All participants (n=24, 100%) enjoyed having the

ability to choose the information that they thought important and 71% (n=17) indicated that they used the responses to reflect on areas where their knowledge may have been lacking. Most participants indicated that the clinical vignette's use improved confidence when doing simulations (n=18, 75%) although four participants (17%) indicated that this was not the case. Most participants indicated that the vignette helped solidify their understanding of patients and their illnesses (n=23, 96%) and that the addition of pictures and sounds created a more realistic impression of the patient (n=19, 79%). All participants (n=24, 100%) indicated that the follow-on activity in Blackboard helped them reflect on what they had found during the information gathering phase using the vignette and that having to motivate their findings and diagnosis helped integrate other knowledge such as anatomy and physiology (n=22, 96%). There were mixed perceptions of the time taken to complete the vignette with 38% (n=9) indicating that it did not take a lot of time to complete, 33% (n=8) indicating that they were neutral or unsure and 29% (n=7) indicating that the vignette did take a lot of time. One participant highlighted the contextual nature of time taken: "the vignette would take as much time as what one invested into the learning activity". Most participants indicated that it was easy to immerse themselves into the vignette activity and to imagine the patient (n=21, 88%) and would recommend having vignette activities for each of the major systems covered within the curriculum (n=21, 88%). Most participants agreed that the vignette should be used for less common or unusual cases (n=18, 75%) and that it could be used in other student groupings (n=22, 92%). The comprehensive results are depicted in Table 1.

Aspects that students enjoyed most about the vignette included that it allowed for variety of self-directed information gathering, encouraged thinking, and provided links to real-world application. This can be seen in quotes from the students such as: "it allowed us to have so much variety in what we could ask", "The clinical vignette made me think a bit out of the box", and "scenarios that were created made it seem like real patients".

Aspects that students thought could improve the clinical vignette included that more multimedia should be made available and that more patient information options should be made available. Students stated that: "more images of the situation that the clinical vignette is all about" should be provided, so as to "introduce a lot more pictures and make it more visual". One student argued that "there should be an option to ask any additional questions and perform additional tests other than the options that had already been provided". General comments included that there should be more activities made available and that it improved learning: "we should have more vignettes in the future", and "clinical vignette will improve more aspects of our learning".

Table 1. Student perceptions of the novel online clinical vignette

	Strongly disagree n (%)	Disagree n (%)	Neutral/ Unsure n (%)	Agree n (%)	Strongly agree n (%)	Total n (%)
I found using the clinical vignette during lockdown a positive learning experience	0 (0)	0 (0)	1 (4)	10 (44)	12 (52)	23 (100)
The clinical vignette helped me to develop a more structured approach to patient assessment.	0 (0)	0 (0)	4 (17)	9 (37)	11 (46)	24 (100)
I found the question branching logical.	0 (0)	0 (0)	0 (0)	13 (54)	11 (46)	24 (100)
I found the patient presentation to be realistic within the context of the illness.	0 (0)	0 (0)	1 (4)	12 (50)	11 (46)	24 (100)
I used my responses to the clinical vignette to reflect on areas where my knowledge may be lacking.	0 (0)	1 (4)	6 (25)	11 (46)	6 (25)	24 (100)
I enjoyed having the ability to choose what information I thought was important.	0 (0)	0 (0)	0 (0)	12 (50)	12 (50)	24 (100)
Having used the clinical vignette before I started simulations improved my confidence when doing simulations.	0 (0)	4 (17)	2 (8)	8 (33)	10 (42)	24 (100)
The clinical vignette helped me solidify my understanding of the patients and their illnesses.	0 (0)	0 (0)	1 (4)	18 (75)	5 (21)	24 (100)
The addition of pictures and sounds created a more realistic impression of the patient that I was treating.	0 (0)	0 (0)	5 (21)	7 (29)	12 (50)	24 (100)
The diagnosis follow-on questions in BlackBoard helped me reflect on what I had found during the information gathering phase.	0 (0)	0 (0)	0 (0)	15 (63)	9 (37)	24 (100)
I found the clinical vignette took a lot of time to complete.	3 (13)	6 (25)	8 (33)	3 (12)	4 (17)	24 (100)
Having to motivate my findings and diagnosis helped me integrate my other knowledge (such as anatomy and physiology) within the context of the patient presented.	0 (0)	0 (0)	1 (4)	15 (65)	7 (31)	23 (100)
It was easy for me to immerse myself into the vignette and to imagine the patient.	0 (0)	1 (4)	2 (8)	14 (59)	7 (29)	24 (100)
I would recommend having a clinical vignette activity for each of the major systems that are covered in Emergency Medical Care.	0 (0)	2 (8)	1 (4)	6 (25)	15 (63)	24 (100)
I would recommend using the vignette for less common or unusual cases.	1 (4)	3 (13)	2 (8)	6 (25)	12 (50)	24 (100)
I would recommend using this vignette for other students.	0 (0)	0 (0)	2 (8)	6 (25)	16 (67)	24 (100)

Discussion

This study aimed to explore the perceptions of students who had used a novel online vignette as a blended learning adjunct to simulation-based learning during the COVID pandemic. The majority of participants indicated that the online vignette was a positive learning experience implying that its use as a blended learning adjunct has future potential. Khan, Erasmus, Jali, Mthiyane & Ronne (2021) demonstrate a positive attitude towards blended learning in a South African university not dissimilar to this study setting and linked blended learning to enhancing the learning experience and fostering a student-centred approach (Khan et al, 2021).

The online vignette introduced in this study links well to the advantages of CBL, namely providing relevance to the adult learner, allowing the lecturer more input into the direction of learning and introducing learning on a deeper level (McLean, 2016). In the first year of study, it is particularly important to ensure that any CBL activities link closely to learning outcomes and that there is cognisance for the limited theoretical knowledge that students may have. The levels of control that the online vignette provides the lecturer is a significant advantage over traditional case studies. This is evidenced by the perception of logical flow and realism identified by participants.

Participants indicated that the vignette encouraged reflection on what they had found as well as on areas of knowledge that may have been lacking and helped solidify participant understanding of patients and their illnesses. Additionally, integration into Blackboard and having to motivate their findings helped integrate other areas of knowledge such as anatomy and physiology. This links well into the aims of CBL which are to discourage memorisation of theoretical knowledge and rather to encourage the practical application and integration of theoretical knowledge (Duan et al, 2021). The results also link into the findings by Whitfield et al (2021) that students using blended learning have more time to think about and grasp complex clinical concepts than they would have, had they only had in-class practical interactions and that they were able to build greater critical thinking and reasoning skills.

Conclusions and Implications

This paper has described the perceptions of EMC students related to a novel online CBL vignette that was introduced during the COVID pandemic. This CBL vignette potentially addresses some of the issues associated with limited contact time within the practical teaching and learning domain but

also has potential relevance in other areas of education where practical classes seek to integrate theoretical principles.

The study was limited in that it was dependent on a user having an active internet connection to complete the questionnaire, despite the fact that it used very little data to engage with. There were only a limited number of students who were exposed to the CBL vignette limiting the sample size, and the response rate was relatively low. It must be acknowledged that as an online tool, there is limited interpersonal student-tutor or student-student interaction, highlighting the importance of its use within a blended learning methodology. Internet access can serve as a challenge for students who have financial or network limitations. Further research is required on the CBL vignette in other areas of healthcare education to explore its applicability as a blended learning tool within those domains.

It is clear from this study that the CBL vignette has potential to provide educators and students with a valuable adjunct within the blended learning space. Self-directed measurement and assessment of specific variables means that students are able to focus on only information that they would normally elicit in a particular patient. This also means that English reading proficiency is less of a prerequisite to being able to identify important information within the context of a case study-like narrative. Further research and a wider user base are required to establish its usability in other domains where practical teaching is used.

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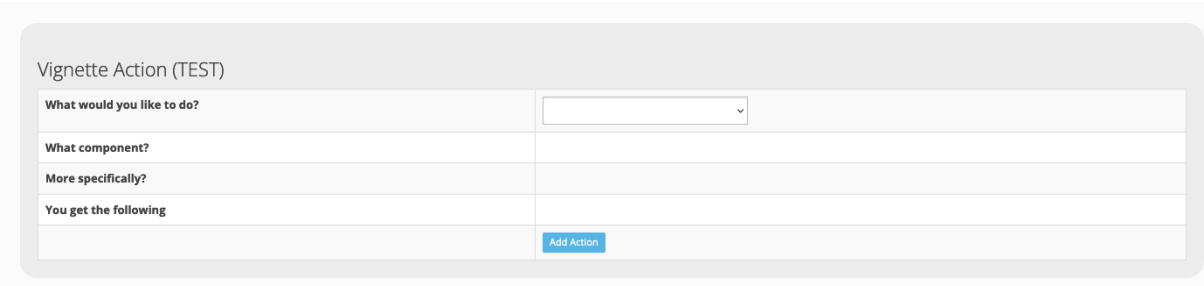
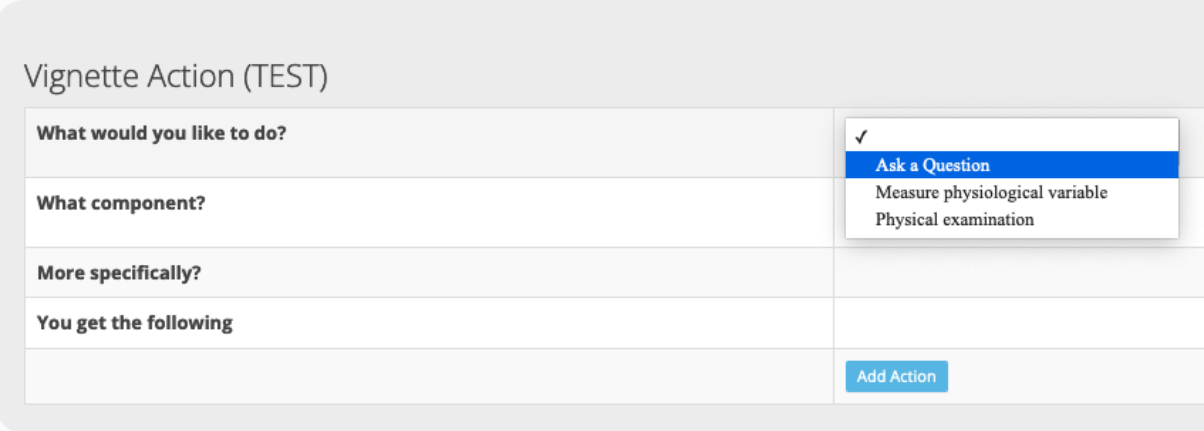
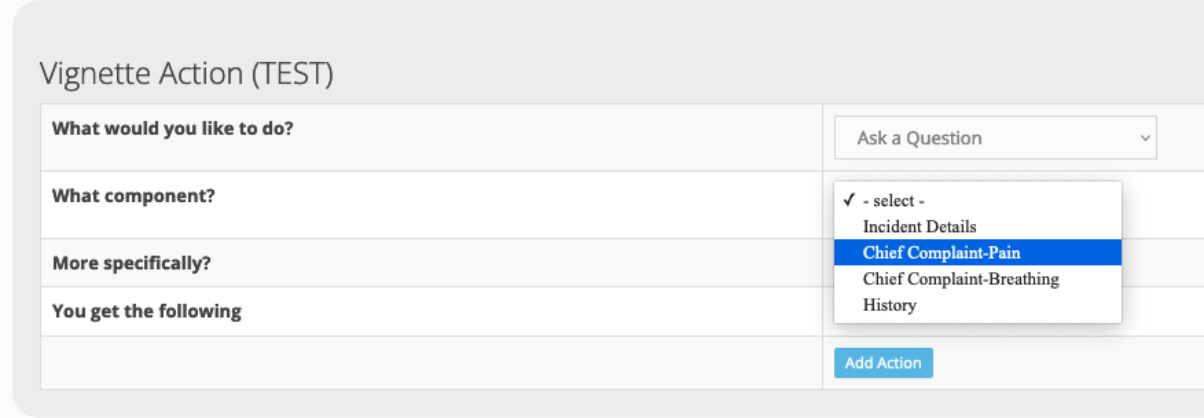
Appendix

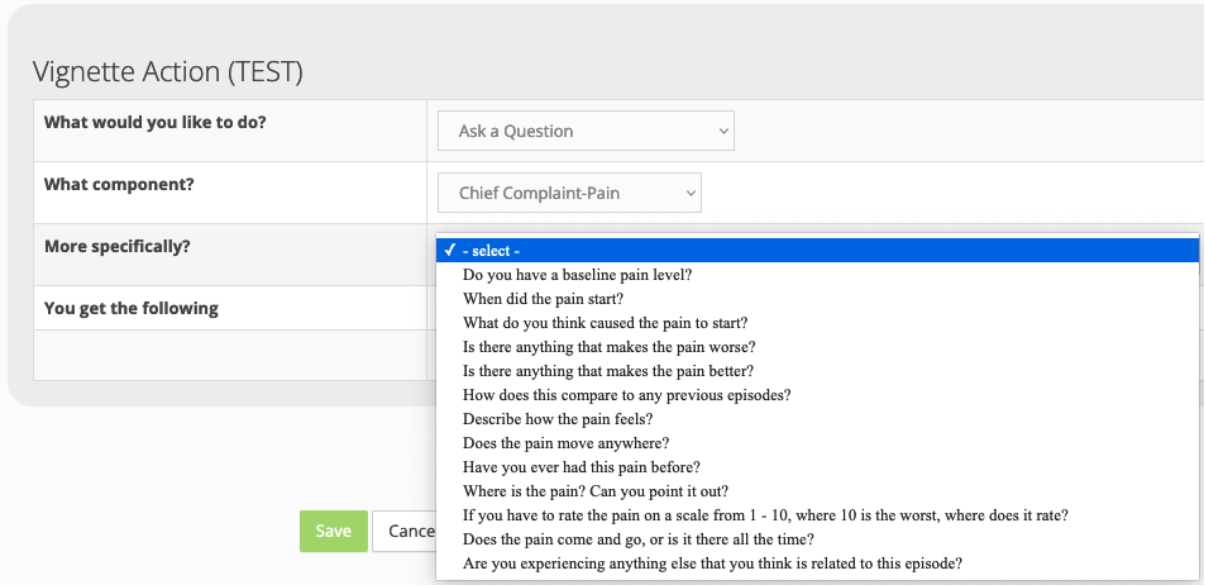
Step 1: Student accesses platform



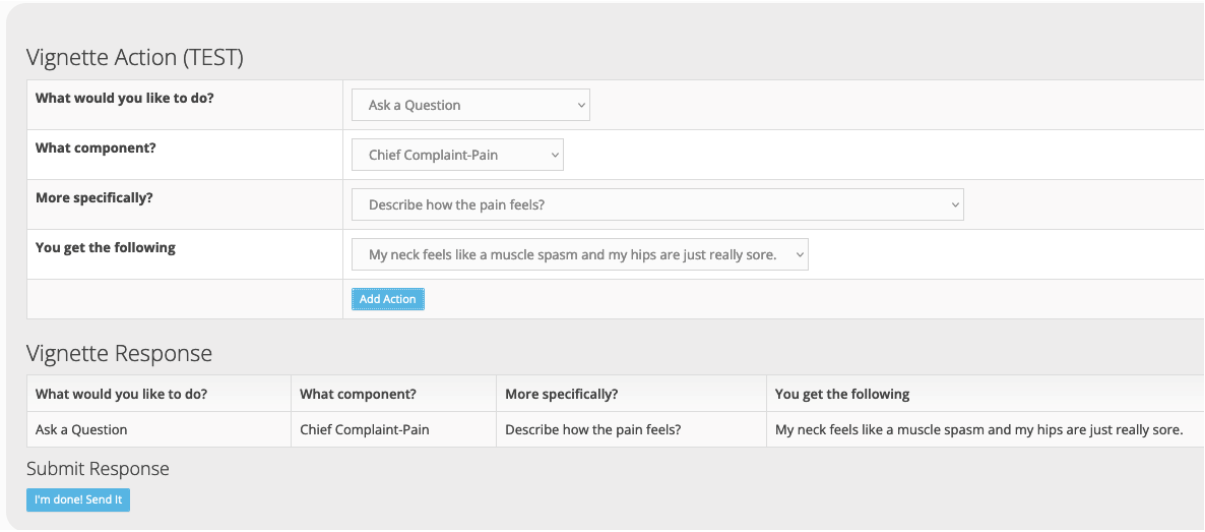
Step 2: Student uses options to narrow down what they would like to do/ask. Each option selected provides a drop-down list of associated responses.







Step 3: Once the student is satisfied they would like to include the question, they click the "Add Action" button and the question is placed into a response list.



Step 4: When the student has exhausted the information that they require, they click the "I'm Done! Send it" button. The student is then sent an Excel-compatible sheet that includes all the information that can then be imported into Blackboard or any other LMS.