Immersive formative assessment: building a holistic experience of pharmacy practice

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University versus hospital setting
Paper case: medical history

CLINIC PREVIEW SHEET

Patient Name: Smith, Tom - 3333
Reason for visit/consult: First Visit - For Primary Care

Active Issues:

1. Diabetes x 2 yrs - Poor control

2. Renal CVM
   CAD: 5/10 CCA, PTCA (? vessel) @ outside hosp '95 - no recent CP
   ETT Thur at VA '96 - 10 mets with angina
   & CHF

3. ETOH: &
   Smoking: &
   Soc Hx: & working
   Former construction worker
   Lives w/ girlfriend
   Family Hx: & hx CAD, malignancy

VS: 150/90, 75 wt 208

Meds:
Glyburide 10 mg PO
Metformin 500 mg
ASA 325 mg
Fosinopril 20 mg
Isordil 10 mg
Dilt 30 mg
Issues and challenges in preparing pharmacy students

› Lack of confidence
› Limited field experience
› Working on paper-based cases
› Not enough professor-student interactions during the internship
Connecting emerging technology with learning possibilities in the 21st century
Intended learning outcomes through VR environment

Preparing Year-3 pharmacy students:
› Integration of pharmacology with pharmacy practices
› Preparing a safe environment [VR setting] to practice before practising with real patients in the internship
› Practising types of questions when meeting a patient
› Rehearsing responses when communicating with a doctor
From planning, production to implementation of 360 VR videos

› Cases [more than just medical history of a patient]
› Core concepts addressing in each case
› Storyboard
› 360 video filming
› Piloting with students [with the teacher]
› Setting up before the class
› Trial in class
Story for Virtual Reality learning - Clinical ward setting

**Case 1: Heart Failure**

**Background Information:**
Ms. Chan was a 64-year-old female admitted to PMH on 25th Aug. Upon investigation, it was confirmed that this was a case of congestive heart failure (CHF). Ms. Chan was later transferred to the cardiology ward on the same day. You are now on the clinical ward with cardiologist, Dr. Wong. Before the round, please refer to the case handout for more information.

**Location & Background:**
- Female Ward in Prince Wales Hospital
- Patients’ room
- 64 yrs old
- Dr. Wong (Cardiologist)
- Ms. Chan (patient)
- Ms. Ting (the ward pharmacist)

**Situation:**
The doctor is performing assessments and physical examinations on the patient’s clinical status. Ms. Chan also talks about what happened on the day of admission and how she felt for this week.

**Question 1:**
What are the clinical signs of CHF?

**Question 2:**
Dr. Wong: What are the choices for medication options?

**Choices for medication options:**
- ACE inhibitors: what are the choices for medication options?
- Beta-blockers: how should they be used?
- Calcium-channel blockers: what are the choices for medication options?
- Diuretics: what are the choices for medication options?
- Aldosterone antagonists: what are the choices for medication options?
### Shot selection

<table>
<thead>
<tr>
<th>Name</th>
<th>Take1</th>
<th>Take2</th>
<th>Take3</th>
<th>Take4</th>
<th>Take5</th>
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<tbody>
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<td>Shot7 GRACE</td>
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<td>Shot18</td>
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Pilot testing: Pharmacy students and Prof. Lee
Classroom – case - equipment

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Venue</th>
<th>Case to explore in class</th>
<th>HTC Vive</th>
<th>Google Cardboard</th>
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</thead>
<tbody>
<tr>
<td>23/Oct/2017 (Mon)</td>
<td>Mong Man Wai Building 707</td>
<td>1. Heat failure</td>
<td>1 set</td>
<td>30 sets</td>
</tr>
<tr>
<td>24/Oct/2017 (Tue)</td>
<td>Lady Shaw Building C1</td>
<td>1. Heat failure</td>
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<td>30 sets</td>
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<tr>
<td>31/Oct/2017 (Tue)</td>
<td>Lady Shaw Building C1</td>
<td>2. STEMI + Evaluation</td>
<td>1 set</td>
<td>30 sets</td>
</tr>
</tbody>
</table>
Instruction to students

Pharmacy Ward Cases VR - Installation Guide (Android)

Step 1 – Download ‘Cardboard’ app at Google Play Store.
Step 2 – Locate the Cardboard symbol on the View-Master Cardboard and scan it.
Step 3 – Download .apk file from the server.
Step 4 – Install the .apk file.
Step 5 – Now open the Cases App in your Android Mobile. Enjoy!
Installation guide for different digital devices

https://s3.amazonaws.com/aws-website-pharmacy-x6v13/index.html
During class
During class
Where does formative assessment take place?

› Each case was built in with a number of questions [from patient / doctor]
› Additional questions raised by the professor while the case is unfolded in the class
The first VR case experience

› Most students were overwhelmed with all the information provided in the first VR case. Therefore, they felt a bit lost and did not know how to response to some of the questions during the case discussion.

› They suggested the professor to provide the case questions and all the materials of the VR case posted to them in advance so that they could review and study before joining the VR case discussion.
The second VR case

› All the materials in the VR case and the case questions to the students were sent to students in advance to the second VR case.

› Students formed into smaller groups (4-5 students per group) to have group discussion, and received formative feedback by the professor in the class.
‘I found that the students were more responsive and attentive.’ said by the professor.
Feedback from students attending the class

› ‘Actually I think it gives me more engagement when using the VR. Because I think I can associate the impression with the clinical setting. Because when I was using the head set, the doctors and patients were looking at me, so it gives me slightly that kind of pressure, kind of sense, so it is...more likely to be in a clinical area.

› VR could complement what the limitation of just Powerpoint presentation slides, that VR could actually have got a patient, and then you can look at him from his face, or look at his foot, and that’s what we really need to have in order to have a better clinical sense.
1. Did you have a personal experience talking to a patient in hospital before?
34 responses

- Yes: 76.5%
- No: 23.5%

2. Have you ever had a personal experience talking to a doctor on drug prescription?
34 responses

- Yes: 2.9%
- No: 97.1%
3. I feel immersed in the virtual reality (VR) clinic environment.
   34 responses

4. I am being alert of non-pharmaceutical management (e.g. patient responses) in the VR clinic.
   34 responses
5. I learn to observe more about the patient as I am engaged in the VR clinic.

6. I learn to communicate with the patient in the VR clinic.
Student evaluation on VR learning experience (4)

2. Have you ever had a personal experience talking to a doctor on drug prescription?
34 responses

7. I learn to communicate with the doctor in the VR clinic.
34 responses
8. Discussion of VR cases gives me more engagement to help me understand the learning content.
34 responses

9. Discussion of VR cases can enhance my problem-solving capability.
34 responses

10. The VR clinical cases enhance my capability of knowledge construction.
34 responses
11. Discussion of VR cases can enhance my learning interest.
34 responses

12. Discussion of the VR cases helps me understand pharmacy practice.
34 responses

13. The VR experience enhances the overall quality of the course.
34 responses
14. I feel that I am better prepared for the clinical practice in the final year with the VR clinic experience.

34 responses

- Strongly agree: 26.5%
- Agree: 8.8%
- Fairly agree: 8.8%
- Neutral: 50%
- Fairly disagree: 0%
- Disagree: 0%
- Strongly disagree: 0%
‘the main purpose of VR is to bring us to the clinical settings, and teach us to look at different signs that the patient may exhibit, which we cannot simply learn them on paper.’
Conclusion

VR in Pharmacy

- Ward teaching in Classroom
- Address real-world problems
- Enhanced learning
- Enhanced in-class discussion with FORMATIVE feedback