

Raw Data

Questionnaire A

1. Candidates pass their CPR test easily on their first try (please circle).

Strongly Agree	25
Agree	5, 13, 16, 19, 26, 29
Neutral	1, 3, 14, 20, 21, 24
Disagree	2, 4, 6, 7, 8, 9, 10, 11, 12, 15, 17, 18, 22, 23, 27, 30
Strongly Disagree	28

2. What are some common mistakes made by CPR test candidates?

1	<ul style="list-style-type: none">• Compression too hard/too shallow.• Breathing – not enough volume, delay in timing when switching.• Wrong/unsure steps especially at the beginning during assessment.
2	<ul style="list-style-type: none">• The steps.• Wrong landmark.• Depth <5cm.• Not enough ventilation.
3	<ul style="list-style-type: none">• Compression depth insufficient.• Ventilation insufficient.• Confused between FVAO and one-man CPR.
4	<ul style="list-style-type: none">• Theory.• Lack of application.• Wrong landmark.
5	<ul style="list-style-type: none">• Inability to do the compression to achieve target of 4-6mm (in adults).• Inability to perform ventilation >400mls in adults.
6	<ul style="list-style-type: none">• Wrong hand position.• No relaxation for recoil of the chest.

	<ul style="list-style-type: none"> • Not enough strength for compression.
7	<ul style="list-style-type: none"> • Chest compression not depth enough. • Sequences of event/CPR is not in order.
8	<ul style="list-style-type: none"> • Steps missed out or not familiar.
9	<ul style="list-style-type: none"> • Unfamiliar with steps. • Wrong landmarks. • Over/under ventilate.
10	<ul style="list-style-type: none"> • Unsure of landmarks. • No. of ventilations. • Inadequate compression.
11	<ul style="list-style-type: none"> • Unable to give good ventilations. • Not familiar with steps. • No proper compressions.
12	<ul style="list-style-type: none"> • Adequate relaxation for compression. • Wrong landmarks. • Insufficient depths.
13	<ul style="list-style-type: none"> • Never read before attend. • Not sure of steps. • Tracing of landmarks.
14	<ul style="list-style-type: none"> • Unable to perform ventilation and compression. • Wrong hand position. • Not enough depth for compression and ventilation volume.
15	<ul style="list-style-type: none"> • Remembering the steps and sequence. • The volume. • Depths.
16	<ul style="list-style-type: none"> • Position. • Depth of compression. • Breathing. • Interval.
17	<ul style="list-style-type: none"> • Sequence issue.

	<ul style="list-style-type: none"> • Compression (no relaxation, depth issue). • Breathing – less than required.
18	<ul style="list-style-type: none"> • Wrong landmark. • Wrong sequence. • Not able to give good ventilation/compression.
19	<ul style="list-style-type: none"> • Not updated on the guidelines.
20	<ul style="list-style-type: none"> • No recoil. • Too shallow/too deep. • Unable to deliver ventilation. • Some unable to recall steps but focus of assessment.
21	<ul style="list-style-type: none"> • Landmark position. • Did not lock the arms during compressions. • Physical limitation to use more of body weight during compressions.
22	<ul style="list-style-type: none"> • Compression depth not enough or too much. • Breath not enough.
23	<ul style="list-style-type: none"> • Locate landmark. • Sequence and steps. • Technique.
24	<ul style="list-style-type: none"> • Poor technique for ventilation. • Not enough ventilation volume/compression depth. • Most forget to danger before assessing “patient” – but not important.
25	<ul style="list-style-type: none"> • Techniques like pumping, breathing. • Major steps in CPR generally ok. • More complicated, e.g. AED, ACLS may be difficult to remember if not perform regularly.
26	<ul style="list-style-type: none"> • Stopping CPR while other staff are preparing equipment (distracted by other staff preparing equipment).
27	<ul style="list-style-type: none"> • Depth of compressions, timing, location. • Ventilation usually one out of the correct range.
28	<ul style="list-style-type: none"> • Never read manual.
29	<ul style="list-style-type: none"> • Incorrect chest compression.
30	<ul style="list-style-type: none"> • Wrong landmark for CPR.

	<ul style="list-style-type: none"> • Not familiar with sequence of ABC resuscitation. • Wrong technique of CPR. • Wrong breathing pattern.
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3. Why do you think such mistakes are made?

1	<ul style="list-style-type: none"> • No proper structure refreshing course/revision. • No experience and no practice in daily life.
2	<ul style="list-style-type: none"> • Did not study lack of knowledge. • Manikin types are different. • Poor technique, not enough strength, body weight.
3	<ul style="list-style-type: none"> • Not aware of the rationale behind each steps. • Come from department that seldom have resuscitation. • Did not read up before coming. • Informed by their supervisor too late, thus no time to study.
4	<ul style="list-style-type: none"> • Participants did not watch the e-learning or read the notes. • Materials not sufficient.
5	<ul style="list-style-type: none"> • Improper technique (depends on the participant background, e.g. AW may not have enough exposure). • Reading material provided online. Participants may not have time to read.
6	<ul style="list-style-type: none"> • Wrong hand position – hands sweaty and slide. • No relaxation – improper technique. • Not enough strength – small hands or small size staff. • No time to review materials. Expected further teaching.
7	<ul style="list-style-type: none"> • Not well-prepared. • The teaching material not very effective. Based on different learning style/approach. • Not updated teaching material such as to use old manual to conduct the training.
8	<ul style="list-style-type: none"> • Not familiar. • Not enough practice, every two years can be quite long and only depends on e-learning.
9	<ul style="list-style-type: none"> • Lack of training. • Lack of hands on practice.

10	<ul style="list-style-type: none"> • It is obvious that more of the participants do not study. Perhaps no time or complacency.
11	<ul style="list-style-type: none"> • Never study. • Not prepared. • Materials might not be clear – on paper only (manual).
12	<ul style="list-style-type: none"> • Unaware that did not release compression totally from the chest before initiate the next compression. • The hands hand shifted during compression. • Not enough strength to do compression.
13	<ul style="list-style-type: none"> • No reading. No practice.
14	<ul style="list-style-type: none"> • Wrong technique.
15	<ul style="list-style-type: none"> • Not a daily “bread and butter” skills unless one works in a acute setting e.g. ICU/ED.
16	<ul style="list-style-type: none"> • Lack of practice. • No opportunity to do “breathing” at work. • Lack of opportunity.
17	<ul style="list-style-type: none"> • May not have frequent resuscitation done in clinical areas. • Did not read the material/view video prior to test. • Some “very thin” staff has no “strength” to do compression continuously.
18	<ul style="list-style-type: none"> • No strength. • No pre-reading (time/no motivation).
19	<ul style="list-style-type: none"> • Techniques (CPR) for first-timers. • Lack of CPR experience in real-life situation so job-scope + age.
20	<ul style="list-style-type: none"> • Lack of strength. • Not enough practice time prior test. • Practiced too much run out of strength. • 2 years recert is suitable timing due to time and resource constraint.
21	<ul style="list-style-type: none"> • Anxiety. • Too “rush” during emergency.
22	<ul style="list-style-type: none"> • Different manikin may result in inability to capture accurately on the performing of CPR. • Nervous. • Unable to translate theory knowledge into practical scenario.
23	<ul style="list-style-type: none"> • Not practice frequently due to job scope.

24	<ul style="list-style-type: none"> • Not familiar with mannequin – different ones used from previous assessment, insufficient practice. • New staff – nervous?
25	<ul style="list-style-type: none"> • Lack of practice (or encounters). • Materials (education) ok but easily to forget if don't practice.
26	<ul style="list-style-type: none"> • Distracted by other staff. • More focused on intubation and drugs and defibrillation instead of performing CPR.
27	<ul style="list-style-type: none"> • Practice simulation tends to be not as realistic.
28	<ul style="list-style-type: none"> • They assume test easy to pass.
29	<ul style="list-style-type: none"> • Inadequate practice opportunity.
30	<ul style="list-style-type: none"> • Lack of supervised practice.

4. Virtual Reality (VR) is a technology which uses computers to generate 3-D portrayal of places in the real or imaginary world. Scenarios can be implanted for student training, e.g. cardiac arrest situation used to teach CPR.

a) Do you have any experience with VR technology? If yes, please provide details.

Yes	9 (DM), 13 (neurosurgery pre-op planning for registrars), 26 (games, movies, Samsung Oculus), 29 (gaming).
No	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 30.

b) What is your view on using VR as part of CPR education?

1	<ul style="list-style-type: none"> • Can try. Might have difficulty for older generation. Would be good if could hand on and feel the manikin to recognize the depth of compression.
2	<ul style="list-style-type: none"> • Maybe more real for the participant.
3	<ul style="list-style-type: none"> • New and fresh idea worth a try. It may work better than video (only resource prior to coming).
4	<ul style="list-style-type: none"> • It will be creative and innovative. • Can use as pre-course preparation. • Prepare their expectations.
5	<ul style="list-style-type: none"> • It is something new. I hope VR will allow and provide hands-on since CPR is very technical.
6	<ul style="list-style-type: none"> • It can be fun and interesting to study.

7	<ul style="list-style-type: none"> • Good try by using the VR tech in medical teaching.
8	<ul style="list-style-type: none"> • Could be something new and interesting for current generation. • New way of learning.
9	<ul style="list-style-type: none"> • It is very useful for the participants.
10	<ul style="list-style-type: none"> • It is still best to practice on the manikin.
11	<ul style="list-style-type: none"> • Interesting. Can try.
12	<ul style="list-style-type: none"> • More realistic and excited on using VR as part of CPR education.
13	<ul style="list-style-type: none"> • Yes. Can be useful as it look real.
14	<ul style="list-style-type: none"> • Simulation as real situation. • Easy visualised.
15	<ul style="list-style-type: none"> • Not sure yet.
16	<ul style="list-style-type: none"> • It is always good to have new teaching methodology. • The current teaching method has been in place for many many years.
17	<ul style="list-style-type: none"> • NIL.
18	<ul style="list-style-type: none"> • Will be interesting to know how this VR helps in them achieving competency.
19	<ul style="list-style-type: none"> • VR + “touch” will be useful in CPR education compared to just VR itself.
20	<ul style="list-style-type: none"> • Pre-programmed scenarios, may or may not need multiple instructor as normal classroom teaching. • Future trend for all sorts of training.
21	<ul style="list-style-type: none"> • Tapping into new ideas/technology to enhance learning.
22	<ul style="list-style-type: none"> • Can try out.
23	<ul style="list-style-type: none"> • It’s new to me. Open to try.
24	<ul style="list-style-type: none"> • Interesting.
25	<ul style="list-style-type: none"> • No idea.
26	<ul style="list-style-type: none"> • No previous experience of VR on CPR education.
27	<ul style="list-style-type: none"> • An excellent idea!!
28	<ul style="list-style-type: none"> • No idea. Will try out.
29	<ul style="list-style-type: none"> • May simulate real life scenarios.
30	<ul style="list-style-type: none"> • Not sure yet but sounds interesting.

Questionnaire B

This questionnaire is to be answered after interacting with the CPR+AED VR Simulation, to find out your thoughts toward its usefulness in CPR education.

1. What are your opinions towards using the CPR+AED VR Simulation as part of CPR education?

1	<ul style="list-style-type: none">• Able to refresh step. But limited to steps only.• If can have real manikin will be better.• Tend not to read the instruction, distracted by the indicator/icon on the body.• Encourages independent revision.
2	<ul style="list-style-type: none">• It's great idea, as the practitioners can keep on trying on the steps and reflect what has gone wrong.• The steps are very focus.
3	<ul style="list-style-type: none">• Advantages.<ul style="list-style-type: none">- Very fun, innovative and cool way for young learners.- May create interests by using a gaming approach.- Good concept.• Disadvantages.<ul style="list-style-type: none">- May always need a trainer to guide them or can have a simple guide to show learners how to do this.- Only focus on steps for memory, lack rationale and concepts behind the sequence of the steps.
4	<ul style="list-style-type: none">• It involves the participant participation.• Better visualisation of the practical steps.• Clear and precise.• Enhance clinical thinking.
5	<ul style="list-style-type: none">• The participant is tested (on VR) on the steps of CPR prior to the test day. An assurance that the participant has actually done the elearning• It can be used for CPR training.
6	<ul style="list-style-type: none">• Fun way to learn.• It will be good if simulation can include skills on hand movements.
7	<ul style="list-style-type: none">• Good combination via advanced technology to deliver better simulation medical teaching.
8	<ul style="list-style-type: none">• It is a interesting and new way of learning.• VR makes the learning more reality and involved like a real situations rather than just reading the notes.

9	<ul style="list-style-type: none"> • It is creative teaching strategies and attract the students and public.
10	<ul style="list-style-type: none"> • It is more fun for participants. • More realistic as participants can visualise themselves in a familiar surrounding rather than classroom.
11	<ul style="list-style-type: none"> • Fun and interesting way of learning.
12	<ul style="list-style-type: none"> • Able to be in the “real” environment to rescue the victims without a need to visualise or imagine the real environment.
13	<ul style="list-style-type: none"> • Good visual effects. • However, some questions not very cleared. • ? suitable for people with spectacles.
14	<ul style="list-style-type: none"> • Good for pre-course education and self learning. • Save time.
15	<ul style="list-style-type: none"> • Possible. But need to explore. • But limitations unable to assess skills.
16	<ul style="list-style-type: none"> • Good and interactive. • But would be better if can have touch the “victim”.
17	<ul style="list-style-type: none"> • Not “close” to victim, given the impression of “unreal”. • Image is pretty clear. • May be good for tutorial but not for skills assessment. • Can’t simulate breathing.
18	<ul style="list-style-type: none"> • It will be useful for knowledge assessment.
19	<ul style="list-style-type: none"> • Feels giddy + heavy goggle. • No clear instruction to move head from left to right – to check for danger in the VR game.
20	<ul style="list-style-type: none"> • Fun to learn. • Provide a real life situation rather than only teach using mannequin and verbalised the scenario. • Can attract different group of audience id use in exhibition who do not have interest to go to classroom to learn CPR.
21	<ul style="list-style-type: none"> • The simulation is interesting to mimic a real situation. • Makes learning fun = better understanding/willing students.
22	<ul style="list-style-type: none"> • Maybe younger folks would prefer. • Should not stop when mistakes happen and allow learner to continue other step but make known what was the mistake.
23	<ul style="list-style-type: none"> • Looks real. • Will be better if have sound when counting.

	<ul style="list-style-type: none"> • It's difficult to read the steps and look at the patient at the same time.
24	<ul style="list-style-type: none"> • More interesting than reading a manual to remember sequence.
25	<ul style="list-style-type: none"> • Need more real life scenario. • Need to do the CPR techniques rather than via the remote to check on steps.
26	<ul style="list-style-type: none"> • Has potential but lacks real hands-on for trainee. • However, better than pure didactic lecture (more interactive).
27	<ul style="list-style-type: none"> • Extremely positive! • An ideal option for teaching "routine"/"standardised" protocols – because steps can be programmed and checked off a list.
28	<ul style="list-style-type: none"> • Head set is very heavy. • Don't know where to direct laser jet to.
29	<ul style="list-style-type: none"> • Interesting concept. • May serve to engage students more.
30	<ul style="list-style-type: none"> • Good, definitely an advantage. • May be fun for younger generation.

2. What role can the CPR+AED VR Simulation play in CPR education?

1	<ul style="list-style-type: none"> • Cannot be use by itself without practical experiences. • Can be useful for practice before refresher course. • Alternative revision without presence of instructor/bulky equipment.
2	<ul style="list-style-type: none"> • Serve as a summary after E-learn. • Refreshment within 2 year. • Resources.
3	<ul style="list-style-type: none"> • Nurse can physically try it during their free time. • May entice learners to try before they come for class.
4	<ul style="list-style-type: none"> • Enhance staff participation and knowledge. • Quick revision of steps. • Useful for both pre-course and post-course.
5	<ul style="list-style-type: none"> • Provide an aid to elearning for both refresher and newbies.
6	<ul style="list-style-type: none"> • Can put together with e-learning for both new and recert.

	<ul style="list-style-type: none"> • Can replace the videos on e-learning.
7	<ul style="list-style-type: none"> • Good and useful for refresher course.
8	<ul style="list-style-type: none"> • Guide the learner in a more reality way of learning. • It is useful for new learner especially, they can get more clearer picture how does CPR AED was done.
9	<ul style="list-style-type: none"> • Prior the test. • Large cohort of participants.
10	<ul style="list-style-type: none"> • Just for practice maybe at home before coming for the real practical.
11	<ul style="list-style-type: none"> • Can help to familiar with steps first before practical. Can practice the steps several times. • Useful for both new learners and refreshers.
12	<ul style="list-style-type: none"> • Can be useful to revise the steps of CPR in the “real” environment, for new staff or recert (preknowledge is good).
13	<ul style="list-style-type: none"> • Visual effects. • To practice before actual test. • Can be used in both new trainee or refresher.
14	<ul style="list-style-type: none"> • Suitable for self study. • Learning pre-course/post-course at own pace.
15	<ul style="list-style-type: none"> • Not for assessment of skills but for steps and knowledge ok.
16	<ul style="list-style-type: none"> • Add on to elearning.
17	<ul style="list-style-type: none"> • Tutorial prior to skills assessment.
18	<ul style="list-style-type: none"> • Together with elearning. • Provide more visual attraction and draws learner attention and perhaps will increase their motivation to learn.
19	<ul style="list-style-type: none"> • It is innovative but no practical “hands on” simulation.
20	<ul style="list-style-type: none"> • Good as pre-course material for people who do not have previous certification on CPR.
21	<ul style="list-style-type: none"> • It can help the new learners to remember the CPR steps easily by simulating a real life scenario.
22	<ul style="list-style-type: none"> • In between 2 years as a refresher because time is a bit too long for 2 years and if learner can have own refresher via VR, it may help.
23	<ul style="list-style-type: none"> • May be good for training the new student/no experience public. • Pre-course material. • Good for visualisation.
24	<ul style="list-style-type: none"> • Probably better for new staff who may need to visualise the instructions and steps. • Can work together with elearning video in aiding the staff to remember CPR steps.

25	<ul style="list-style-type: none"> • Currently teaching and tests the steps on CPR. • Currently there are education methods and videos – good enough. • If need VR simulation, will be useful if can check on techniques.
26	<ul style="list-style-type: none"> • More suitable for re-certification (1-2 yearly recertification). • For 1st time trainees, still better for hands-on practice.
27	<ul style="list-style-type: none"> • Step checklist. • And instant feedback. • Mass teaching.
28	<ul style="list-style-type: none"> • Very artificial scenario with cartoons. Not real.
29	<ul style="list-style-type: none"> • Emphasize the importance of getting the sequence correct. • Reduce the requirement of manpower for tutors. • Useful for 1st timers and refreshers but may be more interesting for 1st timers.
30	<ul style="list-style-type: none"> • More realism. • New staff – virtual + hands on. • Refresher – virtual good enough, main problem steps rather than technique.

3. Any other comments?

1	<ul style="list-style-type: none"> • Step 3 should be more detail to explain the rationale behind if for new testee.
2	<ul style="list-style-type: none"> • To make the technology more user-friendly. • Add in others like infant, adult choking.
3	<ul style="list-style-type: none"> • 1 and 2 and 2 and 4 and 5 and 6... needs to align with what we are teaching currently. • To include voice over on rationale, rather than just testing the steps as we do not want learners to memorise steps only.
4	<ul style="list-style-type: none"> • NIL.
5	<ul style="list-style-type: none"> • VR to allow participants to have hands-on would be very ideal (CPR very skills based).
6	<ul style="list-style-type: none"> • Not really ideal for practical skills.
7	<ul style="list-style-type: none"> • NIL.
8	<ul style="list-style-type: none"> • NIL.
9	<ul style="list-style-type: none"> • Head set is a bit too heavy. • Need to have more clear and specific instructions.

	<ul style="list-style-type: none"> • Instruction font size could be bigger.
10	<ul style="list-style-type: none"> • NIL.
11	<ul style="list-style-type: none"> • More sensitive pointer.
12	<ul style="list-style-type: none"> • The VR headset can be lighter. • Propose to improve VR simulation play to explore to hands on practice teaching.
13	<ul style="list-style-type: none"> • NIL.
14	<ul style="list-style-type: none"> • Need a good eyesight to read the instruction. • Not easy to select options.
15	<ul style="list-style-type: none"> • Need to explore further. Feel very “artificial”.
16	<ul style="list-style-type: none"> • Keep it up.
17	<ul style="list-style-type: none"> • NIL.
18	<ul style="list-style-type: none"> • VR equipment is kind of heavy.
19	<ul style="list-style-type: none"> • Prefers hand-on practice. Realistic environment but not hands-on.
20	<ul style="list-style-type: none"> • Interest members of public who otherwise are not interested to go for CPR training.
21	<ul style="list-style-type: none"> • Would help with making it easy to remembers (theory). • Still would require staff to do practical test.
22	<ul style="list-style-type: none"> • NIL.
23	<ul style="list-style-type: none"> • Maybe can put in like animation with interaction.
24	<ul style="list-style-type: none"> • No.
25	<ul style="list-style-type: none"> • NIL.
26	<ul style="list-style-type: none"> • I am curious about the cost of VR technology. • Patient should not be “killed off” with just one omission/error (allow prompting of trainee where possible).
27	<ul style="list-style-type: none"> • An excellent idea and hopefully will be widely implemented.
28	<ul style="list-style-type: none"> • Mannequin teaching more realistic.
29	<ul style="list-style-type: none"> • Can consider incorporating this into training definitely.
30	<ul style="list-style-type: none"> • Resolution. • Content needs finetuning. • Benefit – learning sequence. • Disadvantage – no practicum of CPR.

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| | <ul style="list-style-type: none">• Graphics should be more real rather than computerised images. |
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Thank you for your participation.