Smart First Aid - Leading the world in 1st aid innovation: Pilot Study Report 2018

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SMART FIRST AID - LEADING THE WORLD IN 1ST AID INNOVATION

Pilot Study Report 2018

RESCUE SWAG® FIRST AID SLING SPLINT IMMOBILISATION

ADVANCE QUEENSLAND

BOND UNIVERSITY

The Original Rescue Swag
439 Shanty Creek Road
Mareeba, QLD 4880
rescueswag.com.au

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: PROJECT OVERVIEW

There is growing evidence that the use of enhanced multimedia instruction in education is a key means of improving learning, skills, and outcomes, particularly for practical skills.

In the health sciences, the use of mobile mixed reality has been shown to be ideal for reducing cognitive load and enhanced learning.

The context of this study, is skills acquisition and familiarity in snake bite treatment. The intervention aims to assist learners through multimedia instruction using virtual reality (VR) stereoscopic video on the correct procedure and application of snake bite treatment using a Snake Bite Indicator Bandage.

The VR intervention has been compared with a traditional method (paper based pamphlet) provided with the Snake Bite Indicator Bandage in line with current educational practice.

A survey was administered to measure learner perceptions and post testing was conducted with a trained first aid staffer to measure skills and familiarisation from video recorded footage from the pilot intervention session.

A complete usability pilot study with (n=20) participants occurred on the 16th May to test VR in enhancing confidence of end users while performing first aid, and has been completed by comparing training through VR video and a standard industry paper pamphlet.

In analysing the results, the stereoscopic VR video method had some problems and therefore a decision was made to use immersive 2D VR video which showed promise out performing the traditional method on all indicators, however the study size of (n=20) split across the interventions is under powered.

Therefore, using the mean results of the usability pilot study it has been identified that a second round study should occur with an approximate sample size (~n=140) with participants to achieve greater understanding of the use of the VR intervention across two university campuses, Bond University and James Cook University in Queensland. This will also address usability issues with the proposed method outlined in the report.

RESEARCH QUESTIONS AND AIMS

In this usability pilot study we aim to explore the pedagogical possibilities of a mobile stereoscopic VR video application to delivery spatial content on treating snake bite through the use of the Rescue Swag – Smart First Aid Kit - Snake Bite Indicator Bandage.

The aim is to guide the user in learning and applying first aid correctly improving familiarisation with the skill and general confidence. In particular we want to answer the research question:

“Can mobile stereoscopic VR video improve learner familiarisation and skills compared with traditional 2D image delivery in treating snake bite?”

: PROJECT BACKGROUND

New accessible learning methods delivered through mobile mixed reality (MR) (Birt, Stromberga, Cowling & Moro, 2018) are becoming possible in educational training, shifting pedagogy from traditional education practice of didactic lectures and two-dimensional (2D) images (Stirling & Birt, 2014), to facilitating learning via self-direction (Murad, Coto-Yglesias, Verkey, Prokop & Murad, 2010) and interactive mobile environments (Birt, Moore & Cowling, 2017).

This is especially important in medical and health education, where the required knowledge acquisition is typically much more experiential, self-directed and hands-on than in many other disciplines (Moro & McLean, 2017).

Additionally, educators and trainers, are increasingly surrounded by a new breed of individual who tackles problems in new and different ways through technology (Clark & Mayer, 2016).

In fact, Jones, Ramanau, Cross, and Healing (2010) point out that these learners expect to be engaged by their environment through interactive, sensory-rich and experimental activities. They are more oriented to visual media than previous generations and they prefer to learn visually, by doing, rather than by telling or reading.

To assist with this, innovative technologies such as augmented reality (AR), virtual reality (VR) and mobile bring your own (BYOD) smartphones are becoming ubiquitous and available for use in general educational training.

AR looks to augment the digital world with physical objects, allowing a real world user to seamlessly interact with digital components. VR provides an immersive experience, removing the physical and putting the user into a totally virtual environment. BYOD provides a mechanism for these technologies to be delivered seamlessly using commercially available devices to a majority of users. MR, a continuum of these innovative technologies, provides a framework to position real and virtual worlds (Milgram & Kishino, 1994), resulting in the development of new paradigms, tools, techniques, and instrumentation that allow visualisations at different and multiple scales and the design and implementation of innovative pedagogy across multiple disciplines (Magana, 2014).

Bacca et al. (2014) and Radu (2014) summarise the benefits of AR/VR in their systematic reviews including: increased content understanding, providing additional contextual information, long term memory retention, improving learner performance, improving physical task performance, learner motivation, learner engagement, learner interaction and collaboration.

The NMC Higher Education Horizon Reports specifically highlights AR/VR (Johnson et al., 2016) and BYOD (Johnson et al., 2015;2016) as key educational technologies and drivers for learner engagement. However, the uptake of these technologies in education has been hindered by cost, expertise and capability. This is now changing with the recent wave of low cost immersive 3D and 360/stereoscopic VR video technology by vendors such as Google through cardboard (vr.google.com/cardboard) and Samsung through Gear VR (samsung.com/global/galaxy/gear-vr). This presents an opportunity to explore methods to provide accessible smartphone driven BYOD training to learners using cutting edge mobile MR.

: PROJECT DESIGN

The proposed pilot project was undertaken at James Cook University (JCU) campus in Cairns, Queensland under the ethics clearance of Bond University JB03447.

The project employed a qualitative survey research method as per the NHMRC guidelines (nhmrc.gov.au/book/chapter-3-1-qualitative-methods).

The small pilot usability study sample of (n=20) was conducted inline with the Nielsen Norman Group on how to conduct testing in early stage technology usability studies (nngroup.com/articles/how-many-test-users).

The Participants in the pilot study were assigned a group (Traditional or VR) and this was the only recorded detail assigned to an identification coding number.

Participants were asked to be video recorded but only their lower limb, arms and hands were recorded which is not identifiable (participants were asked to cover any identifiable marks such as tattoos).

The video data provided to the first aider for observational assessment is only of the lower limb of the participant and is coded as the identification coding number to remove all identifiable data.

The observer did not know which group the video had come from and recorded pass and fail for a specific coded participant - which cannot be traced back to a specific individual (by name) only by email by the primary author of this report Dr James Birt.

DESCRIPTION OF THE PARTICIPANT

(n=20) participants over the age of 18 were sourced for the pilot study as per the following guidelines:

- Must not have a current first aid certificate
- Must not be aware of the Snake Bite Indicator bandage method of treatment
- Must not be of Aboriginal or Torres Straight Islander decent

DESCRIPTION OF THE OBSERVER

(n=1) independent observer was sourced per the following guidelines:

- First aid qualified trainer

TCB Innovations invited participants, to attend the pilot experiment. These voluntary participants were recruited from James Cook University through a voluntary email sent to all students at the institution via the weekly student notification email - outlining the research project and details of the participant consent. These participants were offered a $10 Apple iTunes voucher. Participants had two weeks to respond to the email providing details of contact information to TCB Innovations. Participants were selected on a first come method where (n=20).

It was the responsibility of Dr Birt to receive signed consent from the participants on the day of intervention which was recorded through a Qualtrics administered survey – stored and recorded through the Bond University data management policy.

: PROCEDURE DESCRIPTION

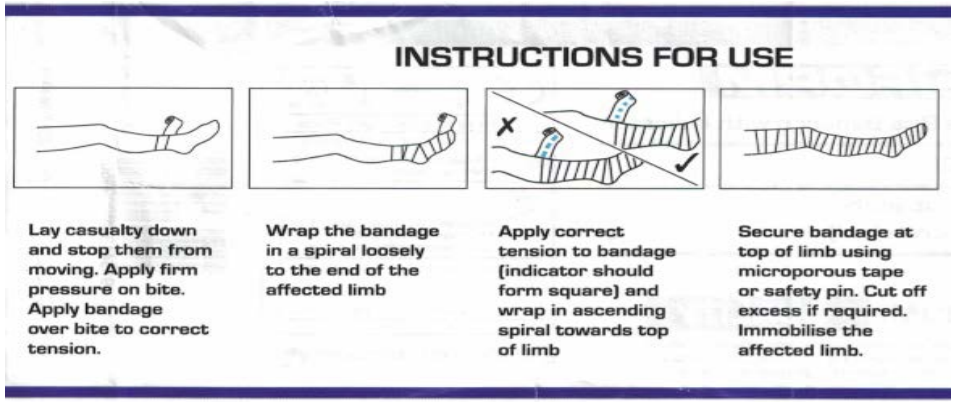
SPECIFIC PARTICIPANT ACTIVITES

The cohort was split into two groups a control group (n=10) using a traditional paper based pamphlet method provided by the bandage manufacturer and a second group (n=10) using the stereoscopic VR video learning method. All participants were provided with access to 1 x Snake Bit Indicator Bandage and 1 x safety pin. The learner acted as the snake bit victim and was marked with two dots (by the research assistant), to show the bite site on their leg. Utilising the learning method of instruction, the participant was requested to demonstrate the use of the indicator bandage on their own leg using the following procedure.

PROCEDURE

- Learner selects bandage and pin
- Learner notices rectangle printed on bandage provided in the kit
- Learner sits down to apply bandage
- Learner applies bandage to bite site
- Learner wraps bandage to the end of limb
- Learner ensuring rectangles are stretched to become squares
- Learner wraps bandage from end of limb back towards the body
- Learner secures the bandage at the top of the limb using the safety pin

The intervention was designed so that a participant could complete the learning and recording within 40 minutes – broken down into four specific activities (i) instruction, (ii) intervention, (iii) video recording & (iv) survey.



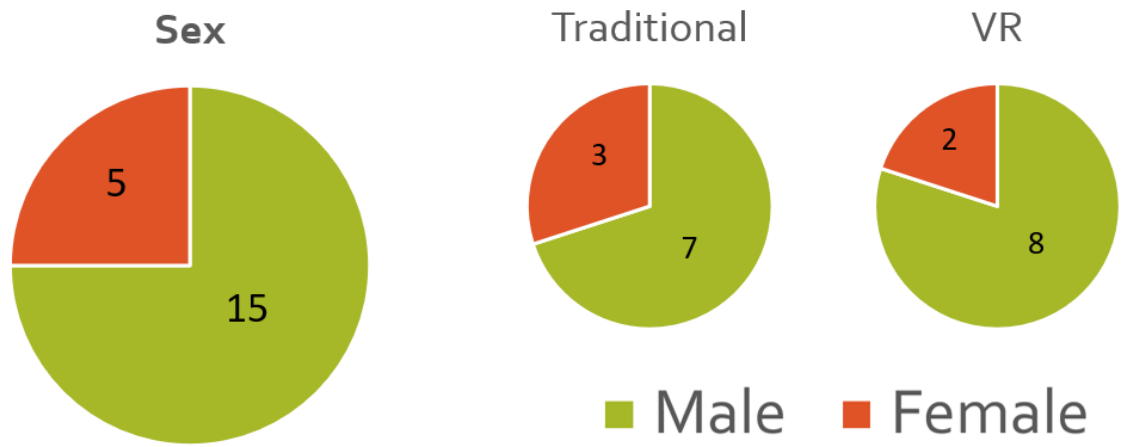
Traditional Intervention (Paper Pamphlet)

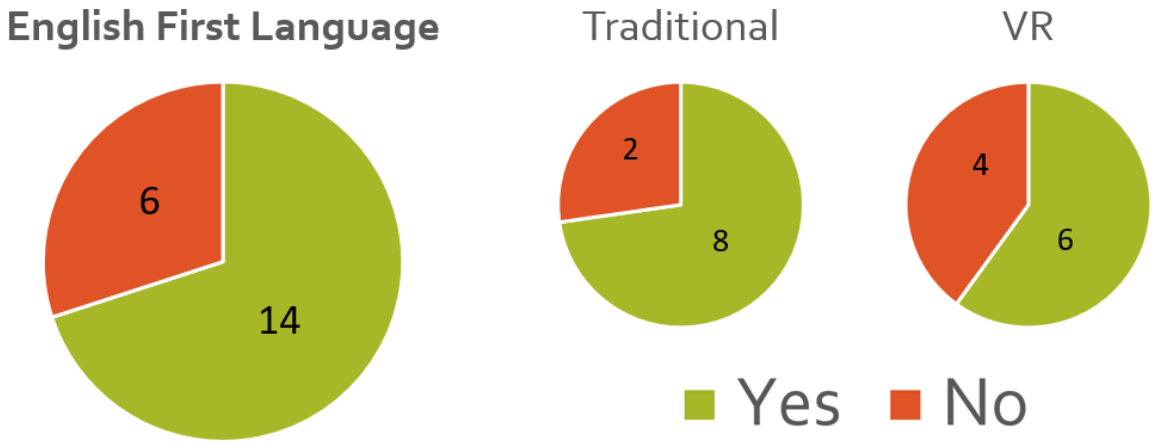
Stereoscopic VR Video Intervention

DEMOGRAPHIC SURVEY

Results of the 4 survey questions
(excluding: Intervention Results)

Learner Demographics [Sex & English Language] (n=20)

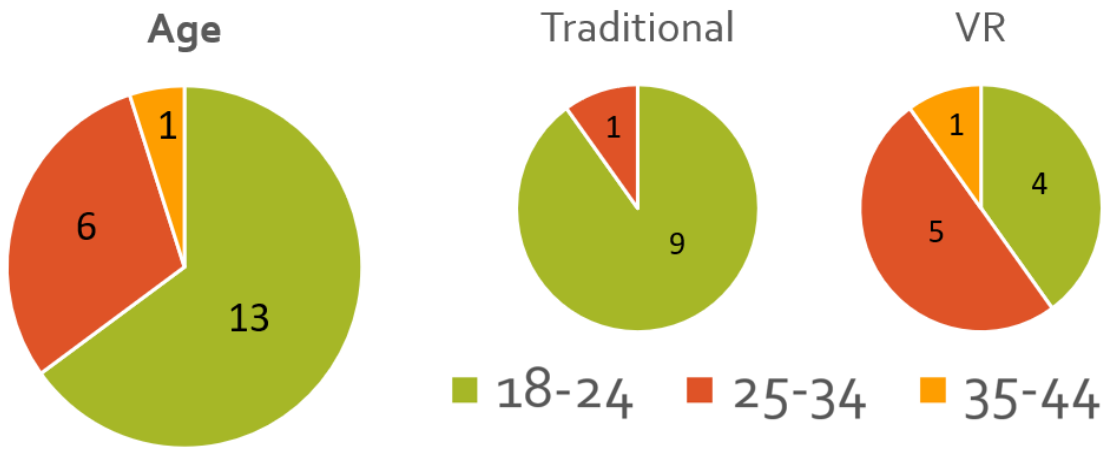


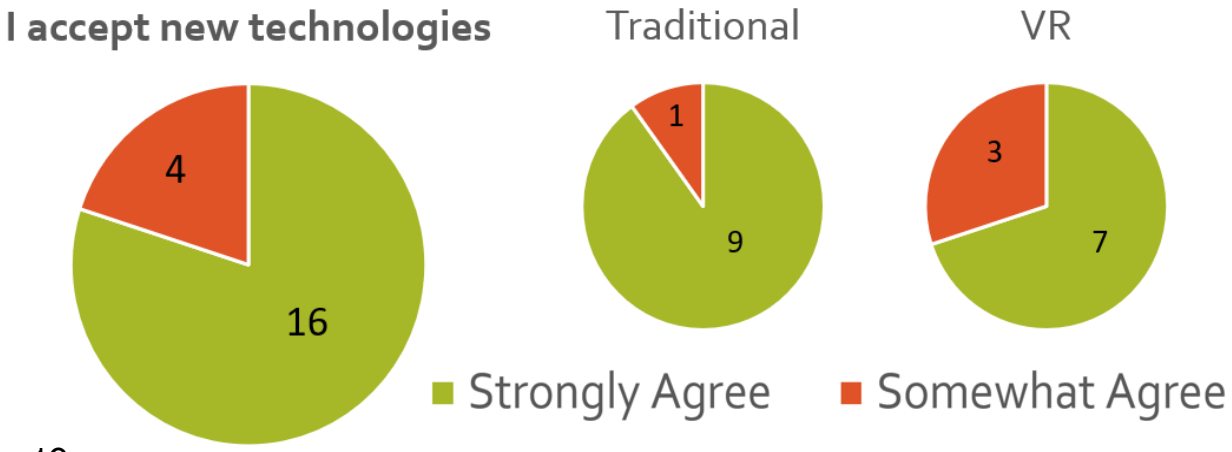


Analysis

• (75%) of participants are male with (25%) female, this would be in keeping with the sample predominantly from engineering and ICT highlighted later in the report by the session administrator. (70%) of participants have English as a first language with (30%) having English as a second language, this would be in keeping with JCU demographics of domestic and international students. It is the opinion of the author that the English first language did have some significance on the results as highlighted later in the report especially with understand the instructions and language in the survey.

Learner Demographics [Age & Technology Acceptance] (n=20)





Analysis

• (65%) of participants are 18-24 with (30%) 25-34 and (10%) 35-44, this would be in keeping with the university student sample. (80%) of participants strongly accept new technologies compared with (20%) that somewhat accept new technologies, this would be in keeping with the student sample predominantly from Engineering and ICT highlighted later in the report by the session administrator. It is the opinion of the author that this has not had a significant effect on the results but did result in some participants in the VR scoring slightly lower in some sections of the survey.

QUALITATIVE COMMENTS

Learner and administrator comments regarding intervention method

Session Administrator Comments

"[Participants sourced] from tech-based backgrounds"
"[n=2] participants … not impressed with [VR] … [participants use Hololens]"
"[n=2] participants [struggled with English] and [provided with VR]"
"Oculus Go [reduced logistics and provided higher fidelity] … however … [Oculus Go] not adjustable [caused fuzziness impairing participants learning] … [therefore] used a 2D version [not per pilot study stereoscopic requirements]"
"[Some participants experienced disjointed start because], YouTube does not stay on the same screen view when you move it from your face [resulting in multiple steps to get the user] to view the video in the right format"
"Some participants had glasses, which took a bit of tweaking with the headset to get it to fit comfortably"
"[Intervention to complex] … noticed that participants were nervous and fumbled a bit with the bandage, which then affected the outcome of their demonstration … [suggest] task [simplification].
"learning time [10 minutes] was appropriate … [pamphlet participant] averaged (3/4 mins) [compared to] [VR participant which was longer]"
"good practice to ensure the bite site is consistently placed on participant"

Analysis

• The session administrator highlighted some potential bias to the participants "tech-based backgrounds". This resulted in some comments related to the presented VR learning method being less than expected. There were several issued with regards to English language and these participants were "[provided with VR"]. There were some significant problems with the presentation of the video due to the technology and video player and therefore the decision was made to use a 2D version of the video in immersive VR and not the stereoscopic VR video. This may have some impact on the "[Intervention complexity]" and general user acceptance. It was noted that consistency could be a problem with respect to the headset and bite site.

Learner Intervention Comments (Traditional)

"[Intervention] offers very little [task] clarification … hard to understand and ambiguous … [dual modality (text and images) compounds the issues] …" (18-24, Male)
"[Intervention] is meaningful but not engaging" (18-24, Female)
"[Intervention] does not take into account [anatomical differences] … restricted to 2-dimensional viewing … causing [spatial] confusion on what to do (depth-wise)." (18-24, Male)
"… squares on the [intervention] were hard to follow and understand what was meant." (18-24, Male)
"[Intervention] was concise and short … steps are easy to remember, but vague in interpretation … more [spatial detail required] in manoeuvring the limb while wrapping the bandage …" (18-24, Male)
"[Intervention] steps were difficult to replicate." (18-24, Male)

Analysis

- The learners found the traditional method "concise", "meaningful" and "easy to remember" but struggled with the lack of "[spatial details]" which lead to "ambiguity", "confusion" and "difficulty" in replicating the required steps.

Learner Intervention Comments (VR)

Analysis

• The learners found the VR method "focused", "[concise]" and "interesting" but struggled with the lack of "[immersion]" which lead to "ambiguity", with relation to the "[bandage tension]. This is in line with the reported feedback from the session administrator that indicated that the video was presented in 2D and not in immersive stereoscopic as per the planned experimental design due to problems with the video playing correctly in the immersive headset. Another factor presented by the session administrator was that certain participants wore glasses which caused some issues with the headset presentation in stereo.

"[Intervention] is focused … speed of demonstration is good." (18-24, Male)

"… experience [not fully immersive] … perhaps using augmented reality where [learner] can follow instructions step by step in real-time would be more immersive and interactive." (18-24, Male)

"[Intervention] lacked a stereoscopic view … I had some ambiguity about [bandage] tension at certain spots that were not covered in the video i.e. large flat areas and how much overlap there should be and whether to use the markers on the bandage to judge amount of overlap." (25-34, Male)

"[Intervention] was amazing to watch … very useful for [learning]." (18-24, Male)

"Consider adding text instructions [dual modality] to your [future intervention] visuals." (25-34, Female)

"[Intervention] did not provide [3D representation] of applying a bandage, as viewing the video was not immersive … [supplied bandage] could use a loop at one end to secure before wrapping … challenge to correct tension." (25-34, Male)

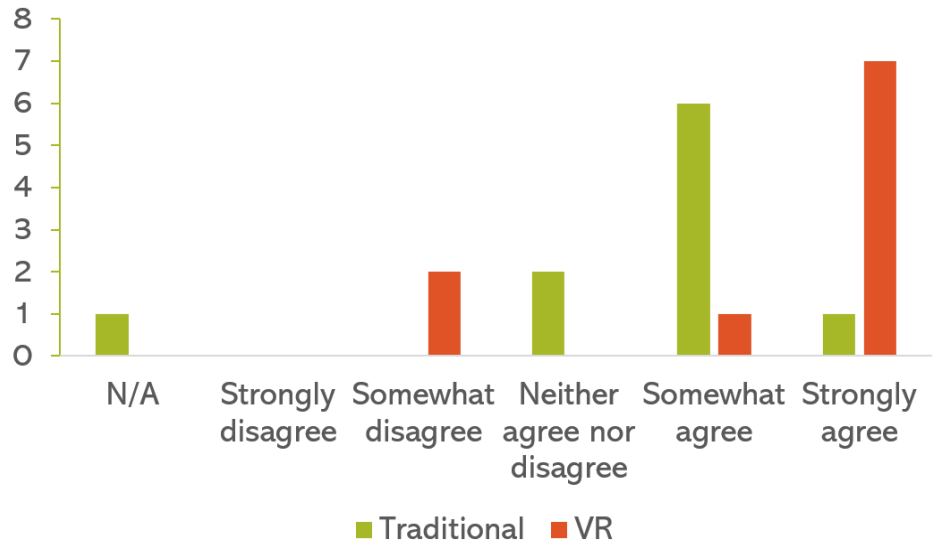
"Interesting." (35-44, Male)

INTERVENTION SURVEY

Results of the 21 intervention survey questions
Cronbach's Alpha (0.930), indicates very high internal consistency of questions

Survey Response (Accessibility)

The snake bite learning method is readily accessibly



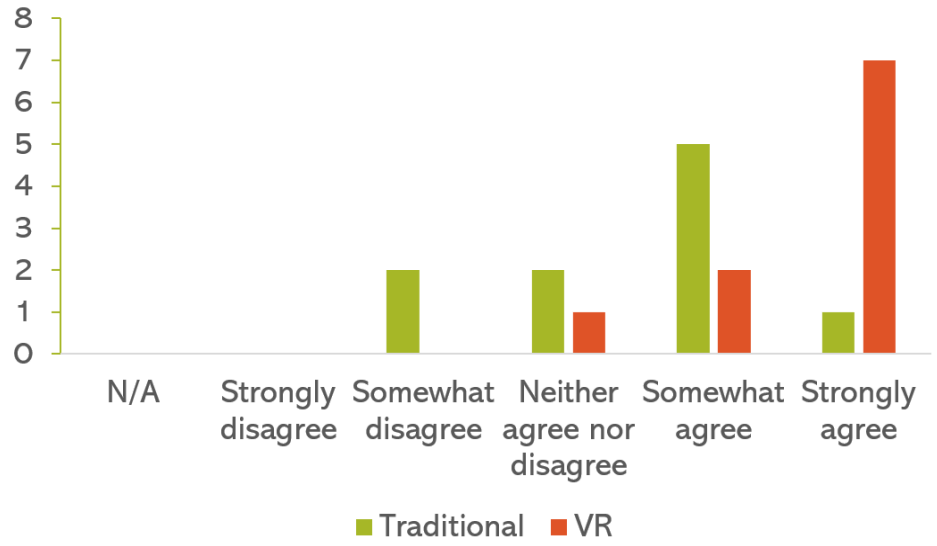
Analysis

• (80%) of VR participants agreed that the learning intervention was accessible compared to the (70%) of participants that used the traditional pamphlet approach. These results are unexpected as the author would have thought the VR intervention would have scored lower and paper higher given the access to the technology. Results were higher for non native English language learners.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	5	0	5	3.50	4.00	1.354	0.428
VR	3	2	5	4.30	5.00	1.252	0.396

Survey Response (Learnability)

The snake bite learning method is easy to learn



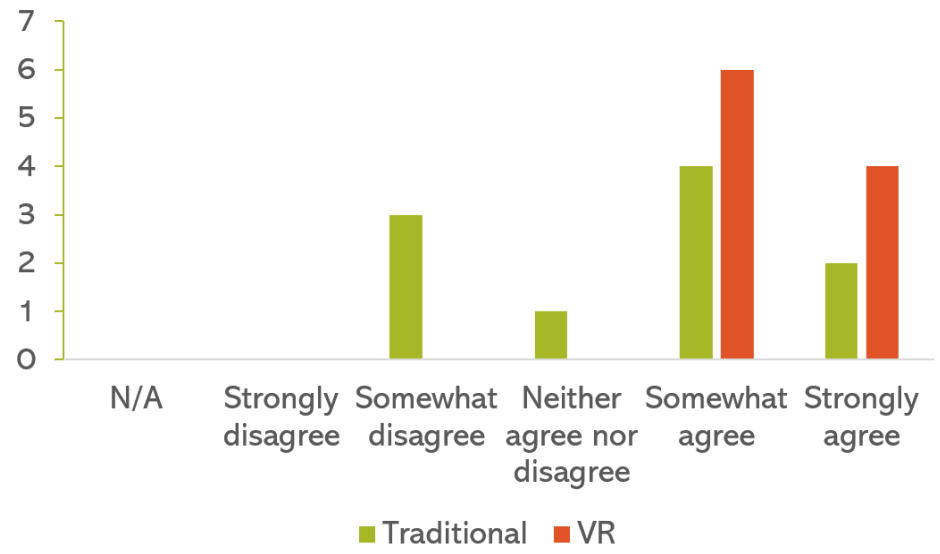
Analysis

• (90%) of VR participants agreed that the learning intervention was learnable compared to the (60%) of participants that used the traditional pamphlet approach. This is not unexpected given the demographics and literature.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	3	2	5	3.50	4.00	0.972	0.307
VR	2	3	5	4.60	5.00	0.699	0.221

Survey Response (Efficiency)

The snake bite learning method is efficient to use



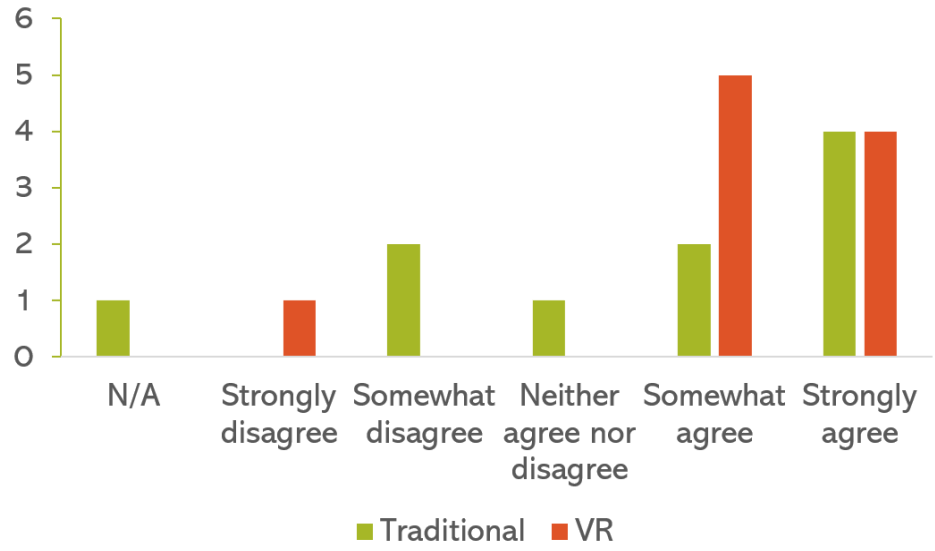
Analysis

• (100%) of VR participants agreed that the learning intervention was efficient compared to the (60%) of participants that used the traditional pamphlet approach. This is not unexpected given the demographics and literature.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	3	2	5	3.50	4.00	1.179	0.373
VR	1	4	5	4.40	4.00	0.516	0.163

Survey Response

(Satisfaction – Bandage and pin selection)



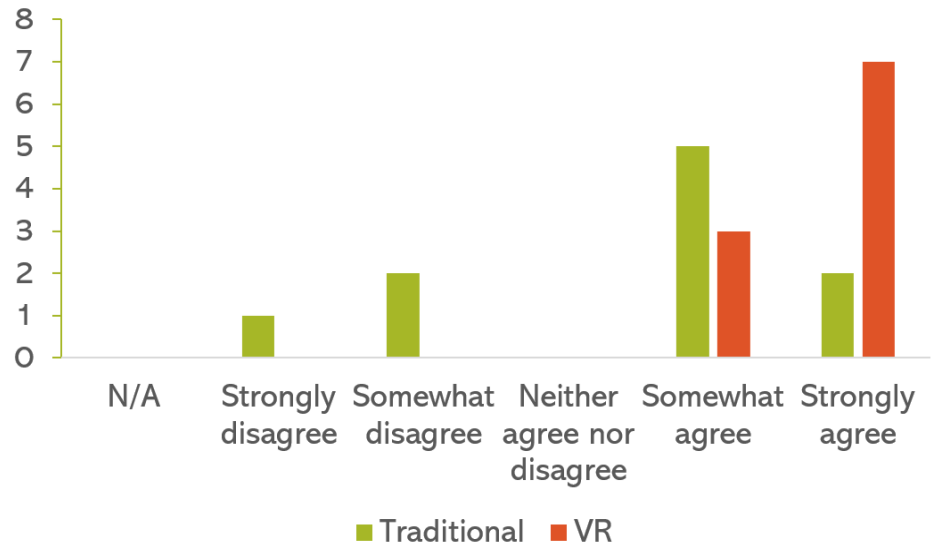
Analysis

• (90%) of VR participants agreed that the learning intervention provided satisfaction (confidence) of the required – bandage and pin selection step compared to the (60%) of participants that used the traditional pamphlet approach. These results were surprising as the participants were provided with the bandage and pin without requiring additional selection.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	5	0	5	3.50	4.00	1.716	0.543
VR	4	1	5	4.10	4.00	1.197	0.379

Survey Response

(Satisfaction – Noticing the rectangle printed on bandage)



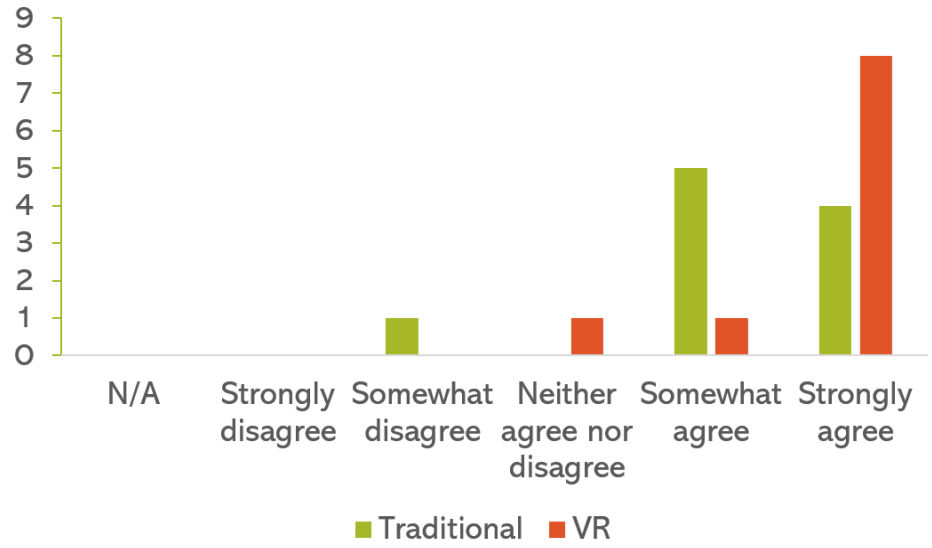
Analysis

• (100%) of VR participants agreed that the learning intervention provided satisfaction (confidence) of the required – noticing the rectangle printed on bandage step compared to the (70%) of participants that used the traditional pamphlet approach. This was surprising for the traditional approach given the highlighting of this step in the instructions and in analysing the English language results highlighted these learners scoring lower in this step.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	4	1	5	3.50	4.00	1.354	0.428
VR	1	4	5	4.70	5.00	0.483	0.153

Survey Response

(Satisfaction – Sitting down to apply the bandage)



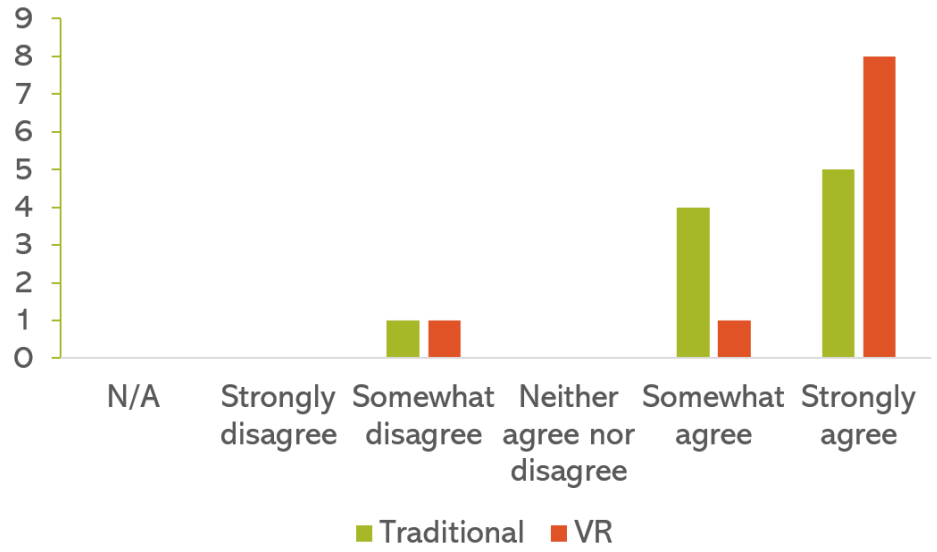
Analysis

• (90%) of VR and traditional pamphlet participants agreed that the learning intervention provided satisfaction (confidence) of the required – sitting down to apply the bandage step. This is not unexpected as it would be necessary to sit down to apply the bandage therefore it would not necessary be a result of the learning.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	3	2	5	4.20	4.00	0.919	0.291
VR	2	3	5	4.70	5.00	0.675	0.213

Survey Response

(Satisfaction – Applying the bandage to the bite site)



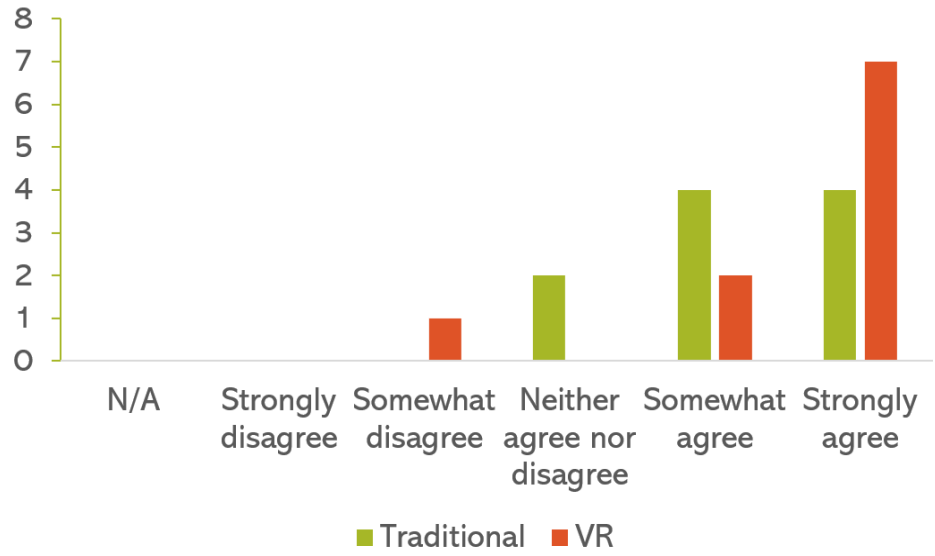
Analysis

• (90%) of VR and traditional pamphlet participants agreed that the learning intervention provided satisfaction (confidence) of the required – applying the bandage to the bite site step. This is not unexpected as the application of the bandage to the bite site would seem to be common sense and not necessarily part of the learning.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	3	2	5	4.30	4.50	0.949	0.300
VR	3	2	5	4.60	5.00	0.966	0.306

Survey Response

(Satisfaction – Wrapping the bandage to the end of the limb)



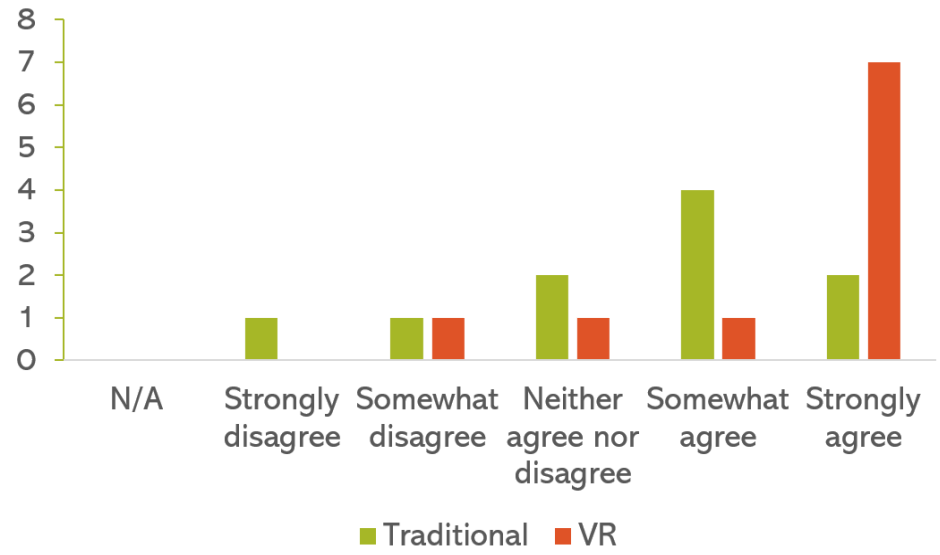
Analysis

• (90%) of VR participants agreed that the learning intervention provided satisfaction (confidence) of the required – wrapping the bandage to the end of the limb step compared to the (80%) of participants that used the traditional pamphlet approach. Both methods provided adequate understanding of this step in the learner materials.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	2	3	5	4.20	4.00	0.789	0.249
VR	3	2	5	4.50	5.00	0.972	0.307

Survey Response

(Satisfaction – Bandage tension – ensuring rectangles become squares)



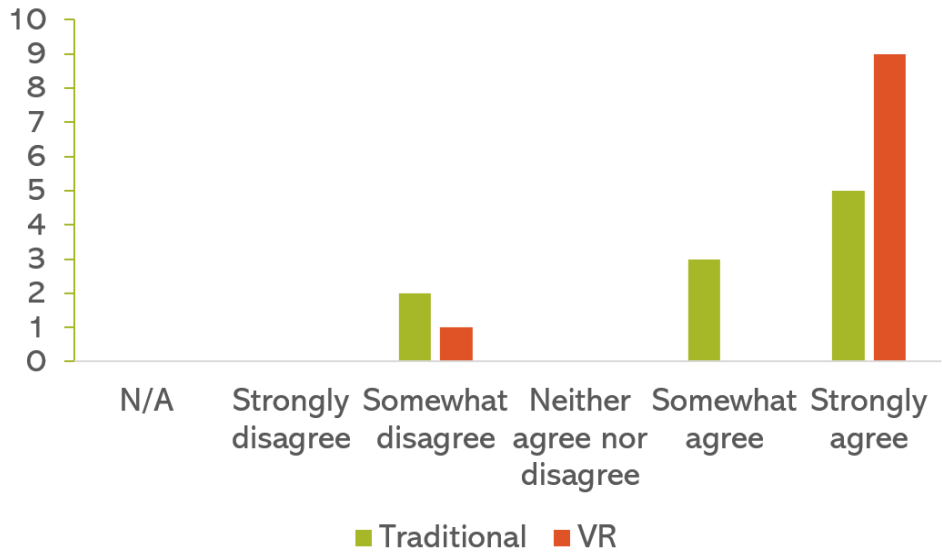
	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	4	1	5	3.50	4.00	1.269	0.401
VR	3	2	5	4.40	5.00	1.075	0.340

Analysis

• (80%) of VR participants agreed that the learning intervention provided satisfaction (confidence) of the required – bandage tension – ensuring rectangles become squares step compared to the (60%) of participants that used the traditional pamphlet approach. It was expected that participants would find this step easier in the VR intervention given the spatial nature but the author would have expected this to be higher and it might be due to the fact the 2D video was presented and not the stereo VR.

Survey Response

(Satisfaction – Wrapping the bandage from the end of the limb back towards the body)



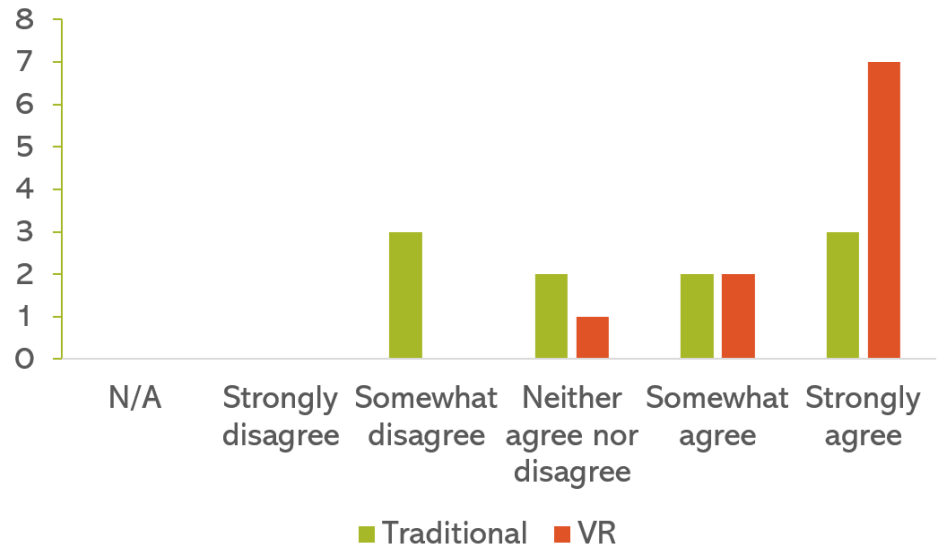
Analysis

• (90%) of VR participants agreed that the learning intervention provided satisfaction (confidence) of the required – wrapping the bandage from the end of the limb back towards the body step compared to the (80%) of participants that used the traditional pamphlet approach. Both methods provided this step in the learner materials.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	3	2	5	4.10	4.50	1.197	0.379
VR	3	2	5	4.70	5.00	0.949	0.300

Survey Response

(Satisfaction – Securing the bandage with the safety pin)



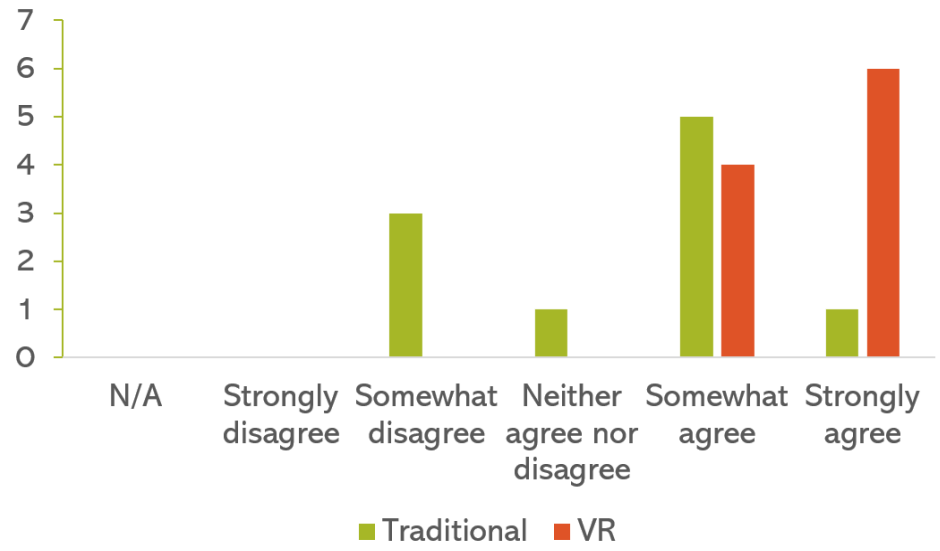
	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	3	2	5	3.50	3.50	1.269	0.401
VR	2	3	5	4.60	5.00	0.699	0.221

Analysis

• (90%) of VR participants agreed that the learning intervention provided satisfaction (confidence) of the required – securing the bandage with the safety pin step compared to the (50%) of participants that used the traditional pamphlet approach. The results for the traditional group were surprising as the pin securing would seem an obvious pre learned behaviour but perhaps given the age demographics most participants had never used a safety pin before and got confused with the step from the traditional instructions.

Survey Response (Memorability)

The snake bite learning method is memorable



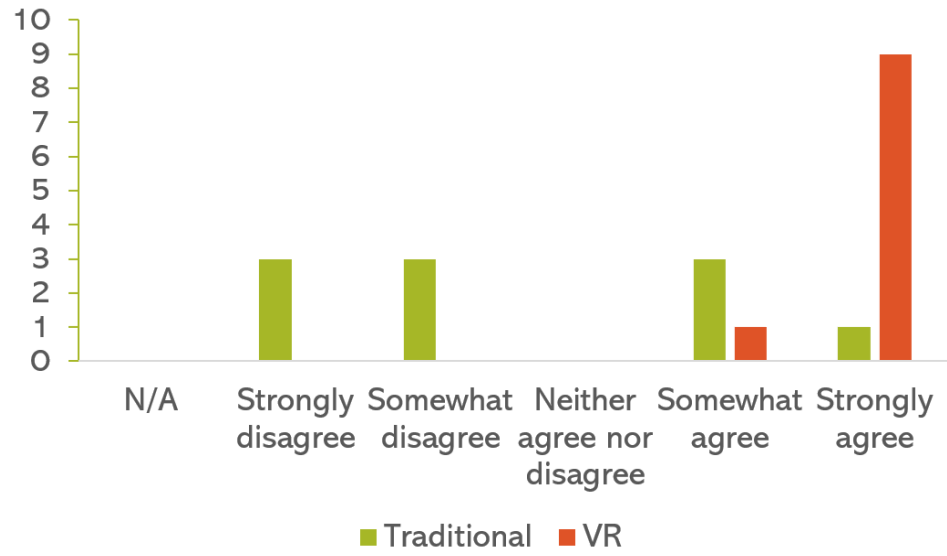
Analysis

• (100%) of VR participants agreed that the learning intervention was memorable compared to the (60%) of participants that used the traditional pamphlet approach. This is not unexpected as the video method would be considered more targeted to the demographic as per the literature on interactive engagement and age demographics.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	3	2	5	3.40	4.00	1.075	0.340
VR	1	4	5	4.60	5.00	0.516	0.163

Survey Response
(Error Free)

The snake bite learning method is free from visual and design errors



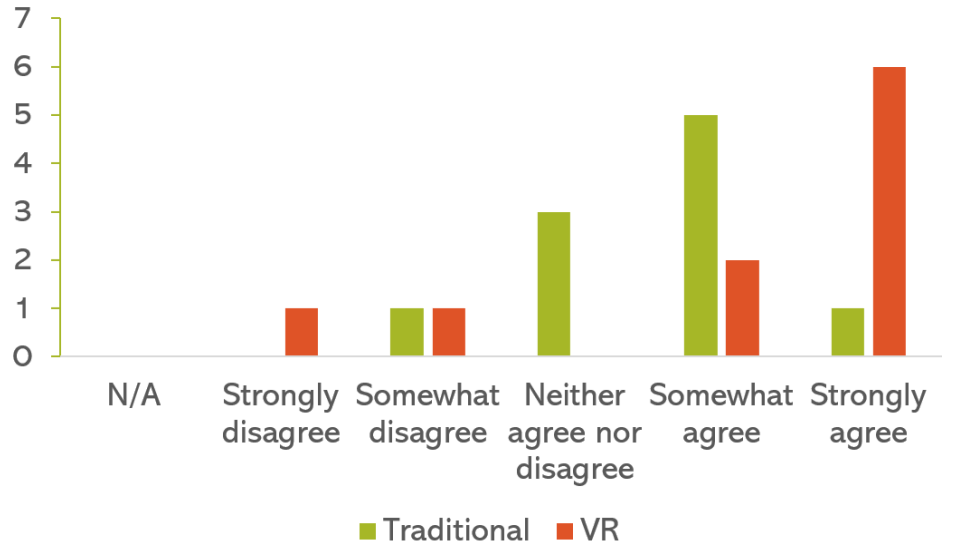
Analysis

• (100%) of VR participants agreed that the learning intervention was error free compared to the (40%) of participants that used the traditional pamphlet approach. This was surprising given the issues reported with the VR intervention approach highlighted earlier in the report by the session administrator. The author also finds the traditional intervention result surprising and concludes that perhaps the participants mistook visual and design error for visibility and fidelity.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	4	1	5	2.60	2.00	1.506	0.476
VR	1	4	5	4.90	5.00	0.316	0.100

Survey Response (Manipulability)

The snake bite learning method can be manipulated



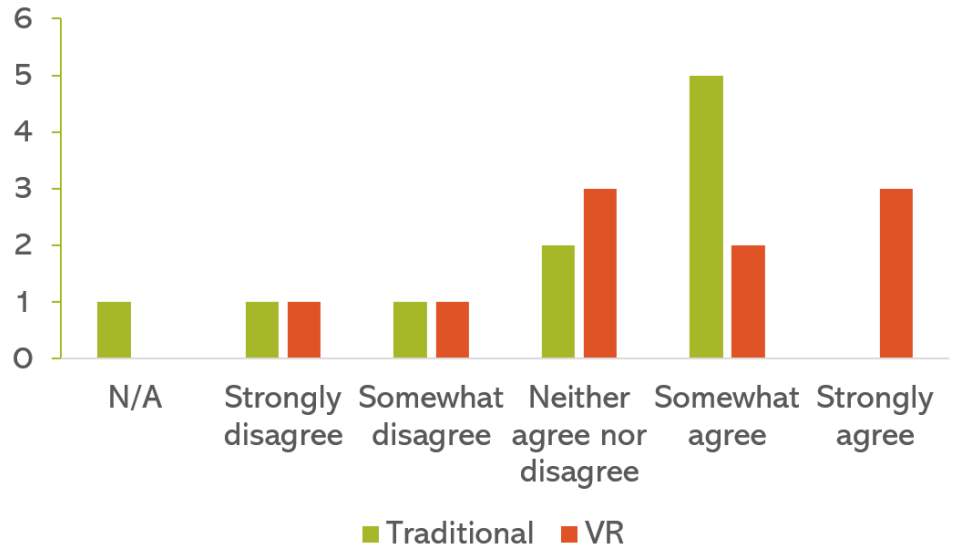
	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	3	2	5	3.60	4.00	0.843	0.267
VR	4	1	5	4.10	5.00	1.449	0.458

Analysis

• (80%) of VR participants agreed that the learning intervention was manipulable compared to the (60%) of participants that used the traditional pamphlet approach. The VR intervention results are not unexpected as the participants indicated the given headset and video (not being AR). The traditional intervention results are a surprise given the paper form is not very manipulable and in analysing the results found that those students that had English language as a second language scored the intervention higher than expected.

Survey Response (Navigability)

The snake bite learning method allows the user to change their viewpoint



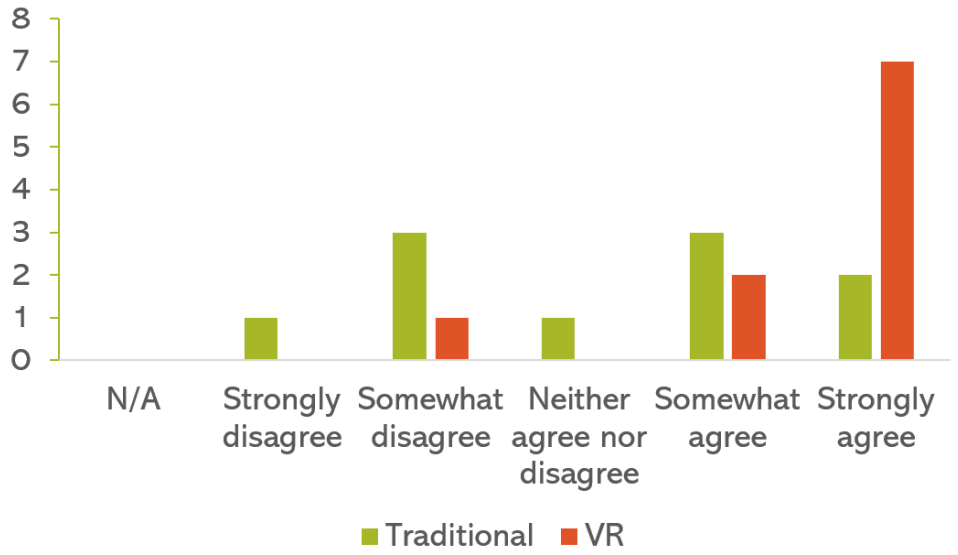
Analysis

• (50%) of VR and traditional pamphlet participants agreed that the learning intervention was navigable. The VR results are not unexpected as the participants complained in regards to the given headset and video (not being 360). The traditional results are a surprise given the paper form is not navigable and in analysing the results found that those students that had English language as a second language scored the intervention higher than expected.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	4	0	4	2.90	3.50	1.449	0.458
VR	4	1	5	3.50	3.50	1.354	0.428

Survey Response (Visibility)

The snake bite learning method provides clear detail to interpret required steps



Analysis

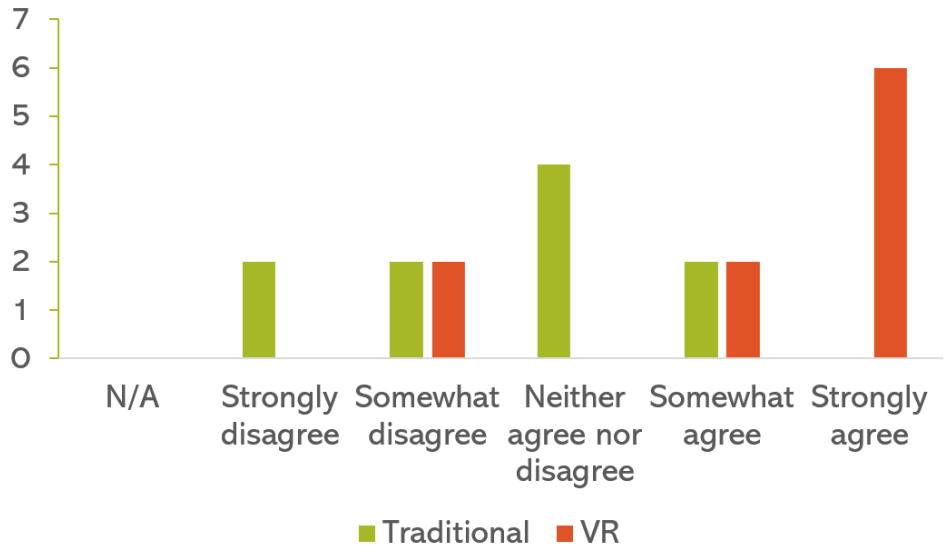
• (90%) of VR participants agreed that the learning intervention was visible and provided clear details to interpret the required steps compared to the (50%) of participants that used the traditional pamphlet approach. The VR intervention results are not unexpected as the participants commented on how they liked the experience for the most part. The traditional results are also not a surprise given the age demographics and the comments regarding confusion and spatial misunderstanding.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	4	1	5	3.20	3.50	1.398	0.442
VR	3	2	5	4.50	5.00	0.972	0.307

Survey Response

(Real world)

The snake bite learning method provides a match to the real world



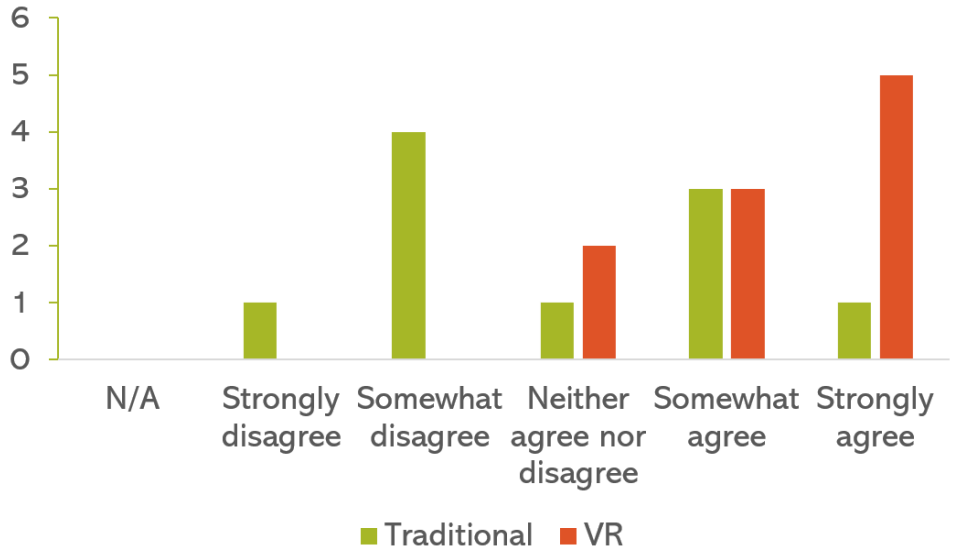
Analysis

• (80%) of VR participants agreed that the learning intervention was a good match for the real world compared to the (20%) of participants that used the traditional pamphlet approach. These results are not unexpected given the fidelity and age bias towards interaction and video technology and confirms the VR intervention superiority in this space.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	4	1	5	2.80	3.00	1.398	0.442
VR	3	2	5	4.20	5.00	1.229	0.389

Survey Response (Communication)

The snake bite learning method aids communication



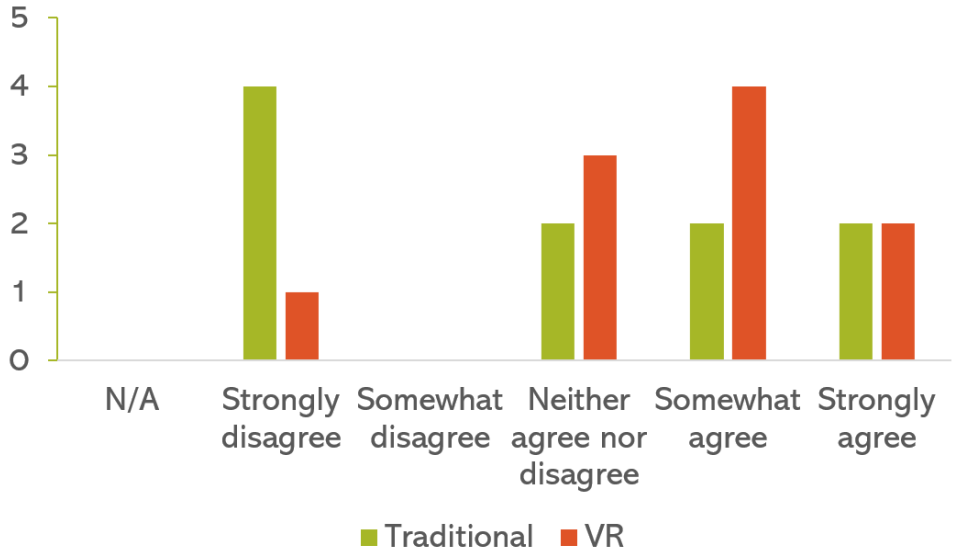
Analysis

• (80%) of VR participants agreed that the learning intervention aided communication compared to the (40%) of participants that used the traditional pamphlet approach. These results are not unexpected given the fidelity and age bias towards interaction and video technology and confirms the VR intervention superiority in this space.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	4	1	5	2.90	2.50	1.287	0.407
VR	2	3	5	4.30	4.50	0.823	0.260

Survey Response (Creativity)

The snake bite learning method is playful and creative



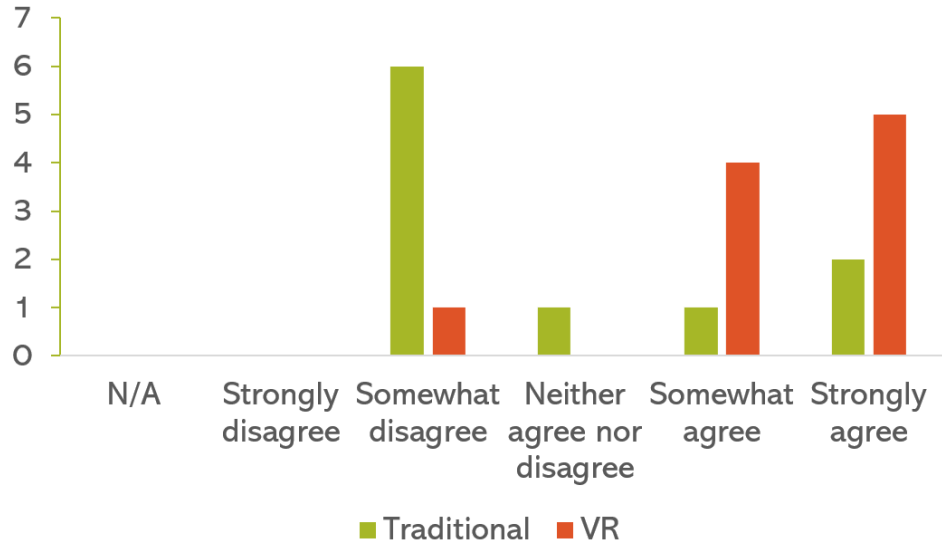
	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	4	1	5	2.80	3.00	1.687	0.533
VR	4	1	5	3.60	4.00	1.174	0.371

Analysis

• (60%) of VR participants agreed that the learning intervention was playful and creative compared to the (40%) of participants that used the traditional pamphlet approach. These results are not unexpected given the fidelity and age bias towards interaction and video technology and confirms the VR intervention superiority in this space. It should be noted that the intervention was not that playful and there was limited interaction and control and the results most likely would be based on creativity of the design.

Survey Response (Engaging)

The snake bite learning method is meaningful and engaging



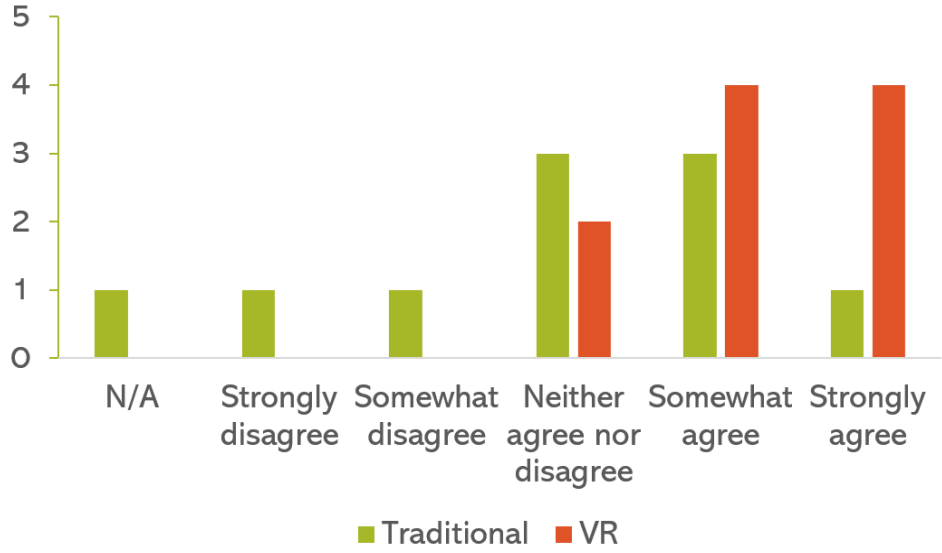
Analysis

• (90%) of VR participants agreed that the learning intervention was engaging and meaningful compared to the (30%) of participants that used the traditional pamphlet approach. These results are not unexpected given the fidelity and age bias towards interaction and video technology and confirms the VR intervention superiority in this space.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	3	2	5	2.90	2.00	1.287	0.407
VR	3	2	5	4.30	4.50	0.949	0.300

Survey Response (Motivating)

The snake bite learning method provides acceptance of the steps and is motivating



Analysis

• (80%) of VR participants agreed that the learning intervention was motivating and provided acceptance of the required steps compared to the (40%) of participants that used the traditional pamphlet approach. These results are not unexpected given the fidelity and age bias towards interaction and video technology and confirms the VR intervention superiority in this space.

	Range	Min	Max	Mean	Median	Std. Dev	Std. Error
Traditional	5	0	5	2.90	3.00	1.524	0.482
VR	2	3	5	4.20	4.00	0.789	0.249

OBSERVATION DATA

Results of the video observation focusing on the 8 key observation factors. It must be noted that due to the sample size these results are not significant and further testing is required

Observation

(Bandage and pin selection)

Analysis

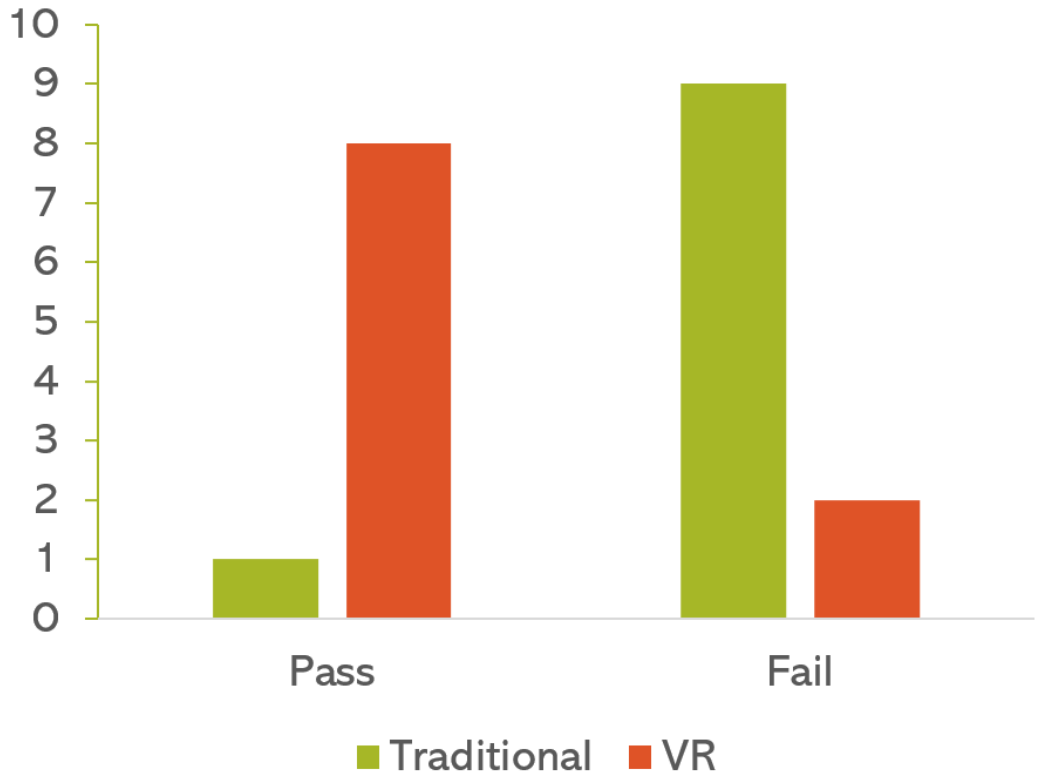
• (100%) of VR and traditional pamphlet participants passed this skill observation. These results were not surprising as the participants were provided with the bandage and pin without requiring additional selection. The author notes that only (60%) of traditional intervention participants felt confidence in this step when surveyed compared to (100%) of learners that used the VR intervention.

Observation

(Noticing the rectangle printed on bandage)

Analysis

• (80%) of VR participants passed this skill observation compared to the (10%) of participants that used the traditional pamphlet approach. The author notes that (70%) of traditional intervention participants felt confidence in this step when surveyed compared to (100%) of learners that used the VR intervention. This would indicate that the learning was not conveyed as effectively using the traditional approach.



Observation

(Sitting down to apply the bandage)

Analysis

• (100%) of VR and traditional pamphlet participants passed this skill observation. The author notes that (90%) of participants felt confidence in this step. This is not unexpected as it would be necessary to sit down to apply the bandage therefore it would not necessary be a result of the learning.

Observation

(Applying the bandage to the bite site)

Analysis

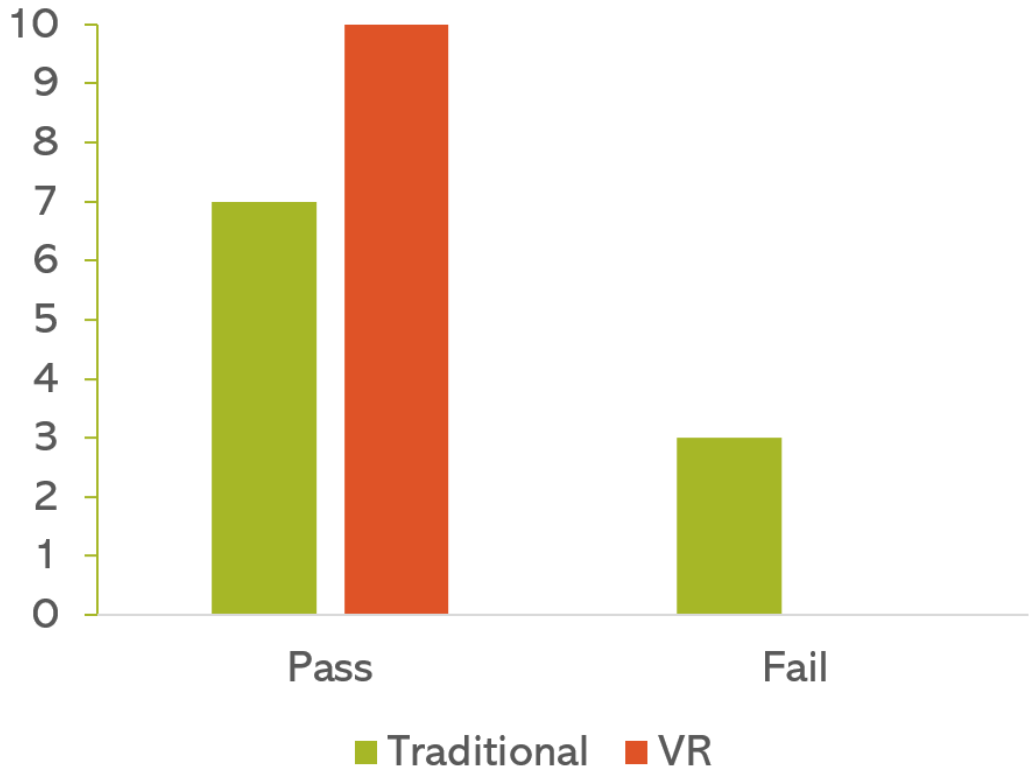
• (100%) of VR and traditional pamphlet participants passed this skill observation. The author notes that (90%) of participants felt confidence in this step. This is not unexpected as the application of the bandage to the bite site would seem to be common sense and not necessarily part of the learning.

Observation

(Wrapping the bandage to the end of the limb)

Analysis

• (100%) of VR participants passed this skill observation compared to the (70%) of participants that used the traditional pamphlet approach. The author notes that (80%) of traditional intervention participants felt confidence in this step when surveyed compared to (90%) of learners that used the VR intervention. Both methods provided adequate understanding of this step in the learner materials.

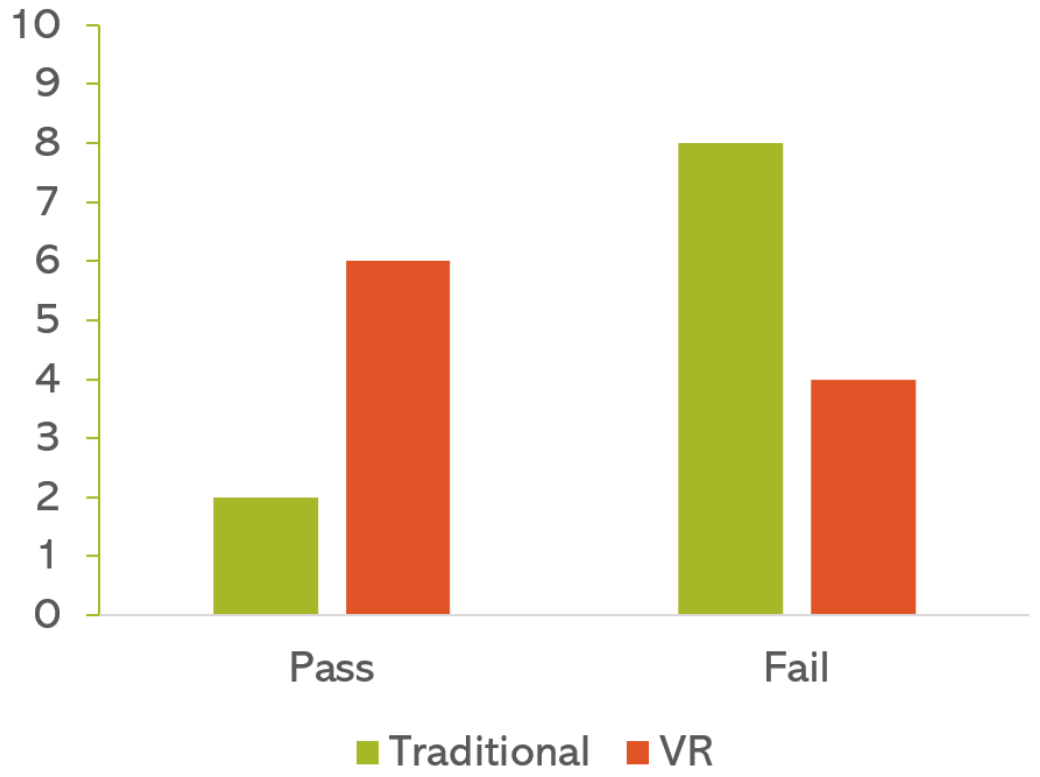


Observation

(Bandage tension – ensuring rectangles become squares)

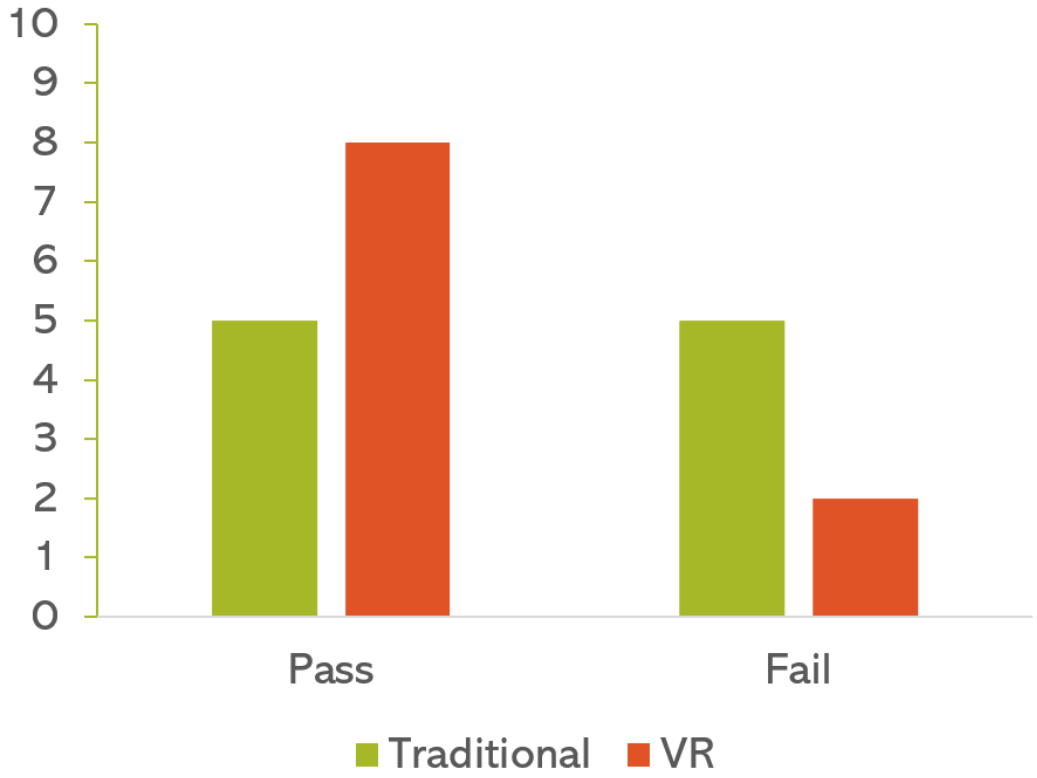
Analysis

• (60%) of VR participants passed this skill observation compared to the (20%) of participants that used the traditional pamphlet approach. The author notes that (60%) of traditional intervention participants felt confidence in this step when surveyed compared to (80%) of learners that used the VR intervention. It was expected that participants would find this step easier in the VR intervention given the spatial nature of the presentation but the author suggests the results were limited due to the lack of stereo immersion. This was highlighted by several participants in their comments. The surprising figure was that of the traditional group. The author suggests that the language concerns and lack of spatial and rectangle scale information in the paper intervention would have contributed to this outcome.



Observation

(Wrapping the bandage from the end of the limb back towards the body)



Analysis

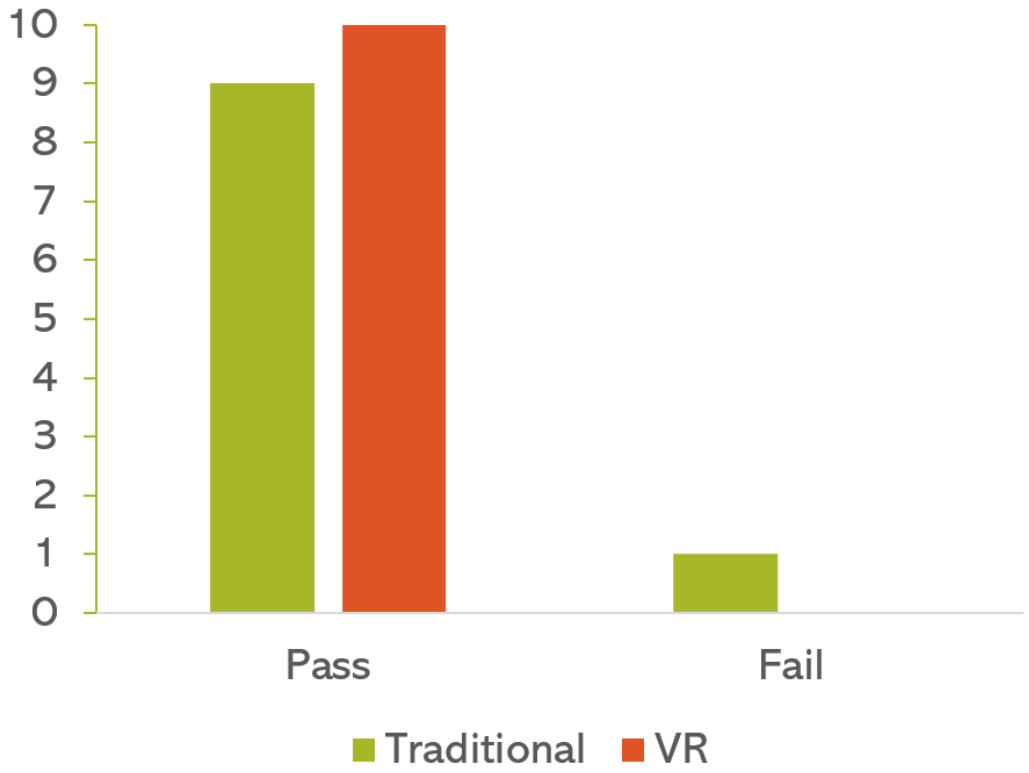
• (80%) of VR participants passed this skill observation compared to the (50%) of participants that used the traditional pamphlet approach. The author notes that (80%) of traditional intervention participants felt confidence in this step when surveyed compared to (90%) of learners that used the VR intervention. The surprising figure was that of the traditional intervention group. The author suggests that the language concerns and lack of spatial understanding led to confusion. In revising the videos for the traditional participants many of them had the bandage in awkward positions and looked lost and confused at this step.

Observation

(Securing the bandage with the safety pin)

Analysis

• (100%) of VR participants passed this skill observation compared to the (90%) of participants that used the traditional pamphlet approach. The author notes that (50%) of traditional intervention participants felt confidence in this step when surveyed compared to (90%) of learners that used the VR intervention. The surprising figure was that of the traditional intervention group. The author suggests that the age demographic may have contributed to not all participants completing this step and the lack of confidence in the traditional group.



: OBSERVATION VIDEO IMAGE SAMPLES

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