

Validation of a canine blood donor model in veterinary nursing skill education

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Introduction

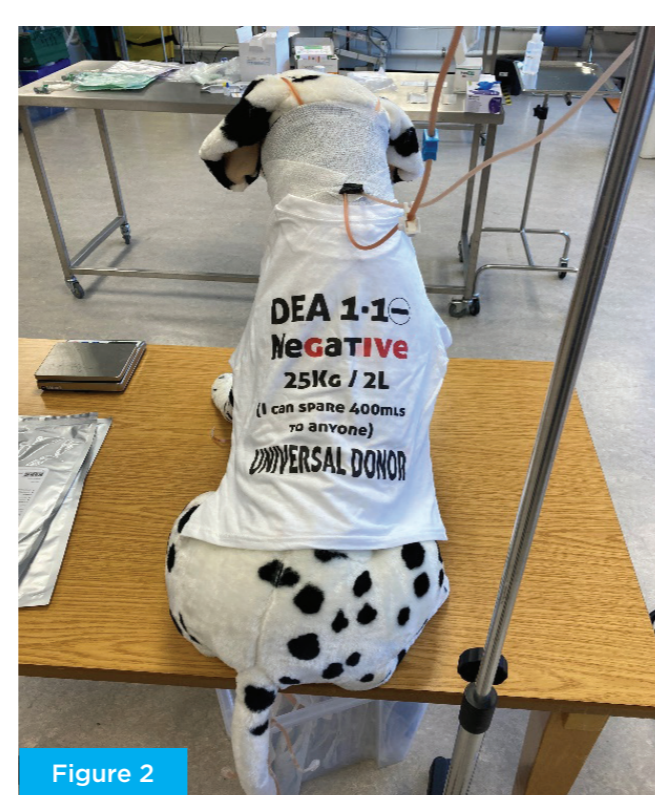
Canine blood donation collection technique is a frequently performed and often life-saving or emergency procedure in small animal critical care (Webb 2019). Training student veterinary nurses (SVNs) to correctly perform this technique with confidence involves repetitive training using simulation prior to clinical practice with real patients. Teaching methods including training models must be validated to demonstrate suitability for teaching, appropriateness for learning and reliability for assessment (VCI 2019, Langebaek et al 2016). Inappropriately developed models risk incorrect learning with increased confidence (Kneebone & Baillie 2008). Incorrect performance of this technique risks patient harm via trauma for the donor patient and increased morbidity and mortality for the recipient patient (Webb 2019, Hogg et al 2006). Clinical effectiveness and patient safety are vital aspects of clinical care (Mosedale 2020).

Objective

This study aims to evaluate two low-fidelity canine blood donor simulators designed to teach correct blood donation collection technique as part of transfusion therapy in critical care and medical nursing.

Materials and Methods

Two training models were developed to mimic theoretically suitable canine blood donor patients and to enable repetitive student practice of the skill of transfusion collection (Figure 1). The models were used in practical classes of the Veterinary Nursing programmes at Dundalk Institute of Technology (DkIT), Ireland. Existing canine plush toys were modified to include jugular veins using infusion lines connected to red tinted fluid bags, representing the estimated total blood volume of each patient in context. For training purposes, printed t-shirts served as visual cognitive aids to remind students of safe donation parameters (Figure 2).



For performance training and assessment, a stepwise checklist was developed to guide and assess student performance. For assessment purposes, a clinical scenario was outlined and students instructed to calculate donor patient estimated blood volume, safe donation parameters, prepare for and perform the technique of donation collection and describe the aftercare to be provided.

VN educator colleagues from three different VN programmes, each with previous transfusion therapy experience agreed to participate in this study as experts. They were invited to use the model and evaluate its appropriateness for teaching and assessment, and its usefulness for learning with regard to the degree of realism of the models (face validity) and the comprehensiveness of the concept represented by the model (content validity) via questionnaire. Veterinary simulation experts Kneebone & Baillie (2008) state the 3 potential outcomes of simulator use as improved performance with confidence, no effect and incorrect learning with confidence: it is therefore imperative to establish which outcome a developed simulator may produce.

Learning experiences using the model were evaluated by SVNs that were due to use the model in class. Students of the critical care module with varied levels of clinical experience were informed of the study prior to the relevant class and invited to complete a confidential online survey afterwards.

Results

Face and content validity ratings were provided by eight expert participants on a Likert scale of 1-5 (disagreement-agreement) and their responses are shown in Figure 3.

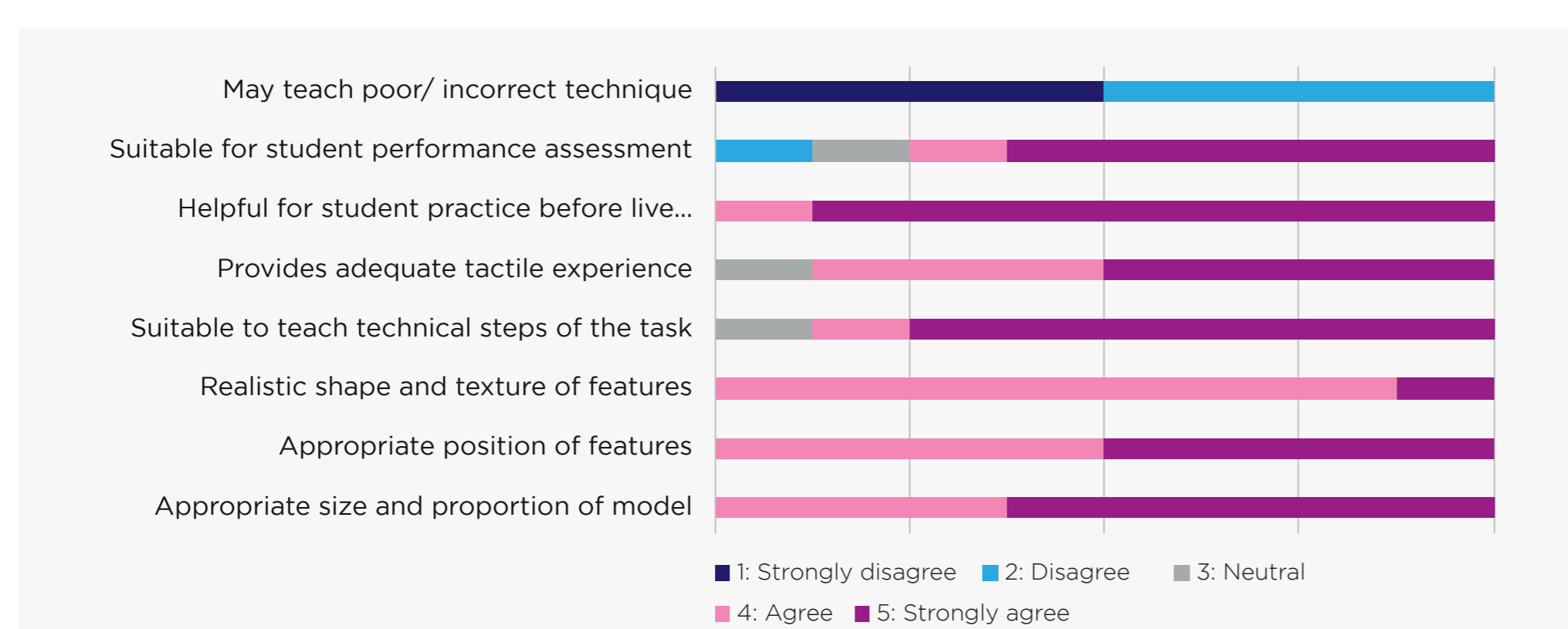


Figure 3; Expert ratings

All experts confirmed adequate model validity and provided positive qualitative feedback about the models' design and practical application.

11 students used the model in class and six opted into the study to provide feedback. Students rated face validity, content validity, overall model suitability for learning along with their existing experience levels in transfusion therapy and their confidence in performing the skill post model use. Responses provided are shown in Figure 4.

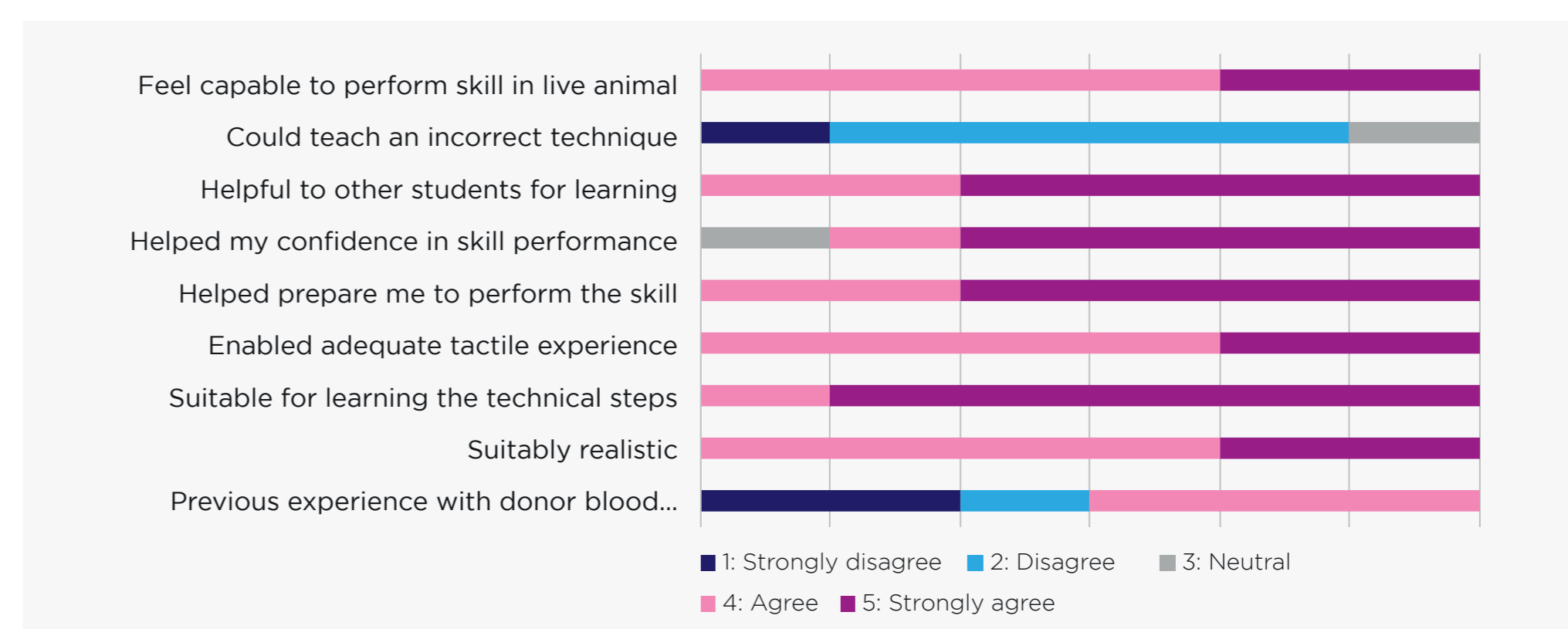


Figure 4; Student ratings

The majority of students (83.33%, n=5) reported increased confidence levels having used the model. All six students rated the model as suitable and helpful for learning and that they feel capable of performing the skill in real patient having used the model in class.

No participants in the study (N=14) felt that the model could teach an incorrect technique.

Discussion

Validity was confirmed by all 14 participants with highly complimentary qualitative feedback provided. Criticism of the model surrounded their inability to facilitate lateral recumbency collection, as preferred by many patients and practitioners, and that procedural site preparation should be included in the task to enhance content validity according to 12.5% (n=1) of experts. Suggestions for improvements included the use of softer materials for jugular veins as stated by 75% of experts (n=6), and of these 33% (n=2) suggest that current materials may result in needlestick injury to students/ novices. Qualitative expert responses provided suggest that despite its importance, the concept of correct canine blood transfusion collection is not currently taught in other VN training programmes, which was reinforced by qualitative feedback that these models would be useful for training in other VN programmes. Other expert comments suggest adaption of the model concept for use in other species such as bovine.

Conclusion

Educators found the models to be suitable for teaching and assessment of correct technical skill performance. Students found the models to be helpful to correctly learn the skill and develop confidence prior to live performance. The models are a useful precursor to skill performance in live animals and may have potential value outside of the classroom in training veterinary staff to promote clinical effectiveness and patient safety, including donor patients via error identification and reduction.

Ethics

Ethical approval for this study was granted by the Dundalk Institute of Technology School of Science Research Ethics Committee and co-approved by the University of Glasgow Research Ethics Committee.

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