Student radiographer perspectives on using a screen based computer simulator in diagnostic radiography

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Abstract

Background: The study set out to collect and explore student feedback from their time using either a screen based computer simulated diagnostic radiography environment (ProjectionVR™) or participating in physical simulation group-work in a real x-ray room. The aim was to identify their perspective with the hope of validating and improving both experiences.
Methods: Sixty novice students were included. They were prompted subsequent to the experience and were able to provide an anonymous free text response. This was collected independent from the researcher and in isolation from other students.
Findings: Twenty-seven (90%) of the computer simulation students provided a response, providing eighty-eight keywords words after analysis. Seventeen (57%) of the physical simulation group-work students provided twenty-two keywords. Participants identified both experiences as 'useful'; the physical simulation students placed emphasis on practical skills acquisition above knowledge whereas the computer simulation students indicated the converse. Provision of feedback was another differentiator.
Conclusion: Students found the use of both simulation experiences enabling, enjoyable and an aid to learning.

Keywords: Student Radiographers, Simulation, Skills-lab, Perspectives, Attitudes, Perceptions

Introduction

Simulation has gradually become accepted in healthcare skills training. An increasing number of professions are participating in the design and implementation of simulation curricula, particularly for 'high stakes' procedures. The goal is to allow training away from the clinical placement in a dedicated supervised HEI setting. A trainee can then become familiar with a procedure and develop skills required before touching a real patient for the first time.

Diagnostic radiography utilises ionising radiation, which is inherently dangerous; thus student training has always required very strict supervision. The use of simulation therefore opens up the possibilities of training in a more experiential fashion.

Among the types of simulation available for teaching procedural skills are physical anthropomorphic phantoms irradiated by real x-rays (physical simulation), and screen based computer simulations. ProjectionVR™ (Shaderware, UK) is a commercially

available screen based diagnostic radiography computer simulator. It attempts to simulate individual basic skills such as positioning the patient, directing the central ray, collimation, placing receptor and side markers and use of Bucky tray.

Student acceptability of their training environment is always a consideration. It is important to minimise attrition on government funded courses; and students are more likely to positively evaluate enjoyable experiences. Learning experiences must also account for student diversity.

Materials and Methods

Two cohorts of novice diagnostic radiography students enrolled on the first year of a BSc (Hons) Diagnostic Radiography programme in the UK were invited to comment on their recent experience of simulation sessions. Forty-four of sixty students provided comments. These text 'memos' were then considered using a simplification of Burnard's (1992) fourteen step analysis.

Findings

Table 1 shows the keyword count obtained for each group.

Table 1. *Qualitative keywords identified*

Theme	**SIM (C)**	**SKILL (P)**
Interesting	6	3
Enjoyable/fun	11	4
Good/excellent	7	
Problem solving	1	
Visual feedback	4	
Anonymous/No peer pressure	2	
Useful/helpful/valuable/vital/recommended	17	5
Improve practical skills	8	4
Improve knowledge	13	2
Improve understanding	9	1
Improve confidence	4	1
Tricky to learn	2	
Not help skills/collimation	4	
Not help knowledge		1
No feedback		1

The computer simulation group (C) preferentially engaged with the qualitative evaluation, providing 88 recordable keywords words compared with 22 for the physical simulation (P). Table 2. identifies the themes.

Table 2*. Themes emerging from the data*

Themes
Improvement
Enjoyment
Limitation
Enabling

Discussion

Improvement: This was a major theme and covered a range of outcomes including; practical skills, knowledge, understanding, and confidence. Students valued the experiences of simulation and found them helpful.

"I think the test had a positive outcome …for the 2nd test I felt more confident the tasks do help with your knowledge and understanding of the radiographic equipment."(P)
"I found the sessions helpful … to identify equipment … and also the different terminology used when positioning patients"(C)

Enjoyment: It was clear from the transcripts that students had had fun.

"An enjoyable experience + interesting"(P)
"I found it extermely (sic) fun and an enjoyable way to learn"(C)
"I think the simulated radiography curriculum is excellent!!... was massively impressed with the radiographs produced" (C)

Limitation: Some students spoke of limitations. This was not common, but appeared significant. Students had apparently compared the experience with an ideal.

"… I found it a bit more difficult as I have only studied this virtually when doing the collimation." (C)
"Clinical skills is good for getting used to the equipment, but you dont get to see an end result" (P)

Enabling: Significant number of comments mentioned acquisition of new skills and abilities – not just improvement of existing. Perhaps this indicates that simulation can engage students in novel and unfamiliar experiences. Some also valued the individual nature of the computer simulation.

"I can now appreciate the need for precise positioning … to create the best image possible!"(C)
"Allowed for some familiarity …without the pressure of having to 'perform'"(C)
"…it is OK to make a mistake…"(C)

Conclusion

Simulation experience was acceptable to novice student radiographers. Both computer and physical simulation had limitations, but they varied. Computer simulation is likely to enhance provision either when paired with physical simulation or on its own.