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Developing health professional students' handover skills through a virtual, interprofessional handover workshop

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ABSTRACT

Inter-professional education has been identified as a core theoretical pillar for improving learners' non-technical skills (NTS) and consequently promoting safe patient handover in clinical practice. However, specific handover education, especially in an authentic interprofessional fashion, is rare. Contributing factors include pragmatic and logistical elements, which can potentially be addressed through virtual delivery. We developed a virtual inter-professional handover education programme for undergraduate healthcare students, based on a classroom-based version that we designed and piloted previously. The workshop used interactive large and small group activities to develop understanding of the reasons for poor handover, its implications for patient safety and the skills to undertake structured, focused handover. It specifically included exercises which emphasised the differences between single-profession and interprofessional handover and how miscommunication may arise and lead to errors. The workshop was delivered using Blackboard Learn, Microsoft Teams (version 12) and Vevox (November 2021 version) and based on materials which are readily available in the public domain. 37 students from four professions attended the workshop, which was evaluated using both in-workshop assessment and formal research elements. Handover knowledge and skills, attitudes towards inter-professional handover and confidence in giving and receiving handover increased following the workshop; in addition, students enjoyed taking part and were keen to apply their learning in practice. Content analysis of individual interviews also provides insights into how and why students learned and suggests that the underpinning SECTORS model is appropriate for explaining NTS acquisition in theoretical learning settings, as well as practice. Workshop delivery was both cost and resource effective.

1. Format

As junior doctors' hours have decreased[1], the frequency of shift changes and handovers has subsequently increased, with a corresponding rise in handover errors and the potential for patient harm.[2,3] Despite inclusion in most healthcare education curricula, handover teaching is frequently inadequate or absent[4,5] and when provided, it is usually to mono-professional groups.[6] However, research indicates that interprofessional delivery[7,8], training in structured handover[9,10], a focus on developing non-technical skills (NTS), and learners working in authentic roles[6] are essential for gaining competence in patient handover.[11,12] Furthermore, the theoretical and educational bases of programmes are often poorly reported.[13,14]

We developed an inter-professional handover education programme, incorporating interactive and didactic large and small group activities, adapted from a classroom-based version run as a pilot programme in 2018.[15] It is underpinned theoretically by the SECTORS model[16] and pedagogically by the Three Pillars of Handover Education[17] and Gagne's Nine Events of Instruction.[18] It was delivered virtually using Microsoft Teams and Blackboard. Virtual education methods developed significantly during the COVID-19 pandemic[19] and we utilised these to make the workshop more accessible and to determine whether they could help overcome the challenges of delivering IPE at our institution.

2. Audience

Final-year undergraduate medical, nursing (adult and mental health), trainee nursing associates (TNAs) and operating department practice (ODP) students, recruited through emails to the respective cohorts. Participation in both the workshop, and the additional research elements (ethical approval HEALTH 0226), was voluntary. Currently only medical students receive specific handover education in their programme, which was last undertaken several months previously.

3. Objectives

● Improving knowledge, skills and attitudes towards patient handover through:
  1 Identifying the causes and impact of poor handover

 2 Structuring patient handover using the SBAR (Situation-Background-Assessment-Recommendation) format
 3 Giving and receiving effective interprofessional handover

● Assessing the viability/practicalities of running a cross-faculty IPE programme

4. Activity description

The 3-h workshop had six parts (Fig. 1). The facilitator was a nurse/ODP:

A: Problems with handovers (25 min): following a brief introduction to the workshop, students used the Vevox audience voting system to answer five icebreaker questions (derived from[20] and[21] about their handover knowledge, skills and attitudes. They then considered a time when they had given important information to someone during everyday life (e.g. a list of items for their partner to purchase from the supermarket) and it was not clearly conveyed. We asked them why communication failed and their responses were collated using Vevox and used to generate a word cloud and brief discussion. Students then observed the facilitator giving a poor patient handover and answered the following questions using Vevox:

1. How easy was it easy to understand?
2. What was done well?
3. What could be improved?

Word clouds generated from the answers were compared to the word cloud from the previous exercise to show that the same factors help or hinder the communication of information in both clinical practice and everyday life.

B: Human factors as a source of error (25 min): students watched the 'crash of the century' video about the 1977 Tenerife air disaster, then answered four questions using Vevox:

● What went wrong?
● Why did it go wrong?
● How could it have been prevented?
● How does this relate to healthcare?

Word clouds generated for each of the questions were used to identify the key issues and show that the same ones are responsible for errors in healthcare.

C: Handover and SBAR short teaching session (25 min): the facilitator delivered a short, didactic teaching session (using PowerPoint) which highlighted the importance of good patient handover and the potential implications of errors. Students were then introduced to the SBAR tool and mnemonic and taught how to use them to structure, give and receive handover in a meaningful way. SBAR was selected as it is widely used within the UK healthcare system. The students then watched a video of patient handover (deterioration in a hospital setting) without SBAR and answered the question 'how easy was it to understand the information being handed over?' using Vevox. They then watched the second version of the handover, structured using SBAR, and answered the question again. We used their responses to generate star ratings for the two handovers. These were compared and discussed to illustrate the importance of structuring information clearly, and the potential implications of not doing so.

D: Structuring handover using SBAR in single-profession groups (25 min): this exercise had two purposes: 1. Using SBAR to structure and focus handover information 2. Showing that vital information 'hidden' in a poorly organised handover can become apparent when handover is structured well. We gave students handover information to restructure using SBAR and they delivered their version in the interprofessional handover exercise in section 'E'. All professions used the same scenario (e.g. orthopaedic surgery) (Fig. 2) and received identical general information and documentation e.g. observation charts. They also received information and documentation specific to their profession e.g. ODP students were given surgical and anaesthetic charts. The focus was on handing over to different professionals for the next stage of the patient's care journey. We were interested in how students from different professions would tailor the handover and whether 'hidden' information (e. g. indicating compartment syndrome) would be noticed and emphasised.

We planned for groups of three participants, but this was sometimes adapted on the day due to non-attendance (Fig. 3). Each group worked in a separate Teams meeting room and the facilitator rotated through the rooms to provide support and answer questions. Following the exercise
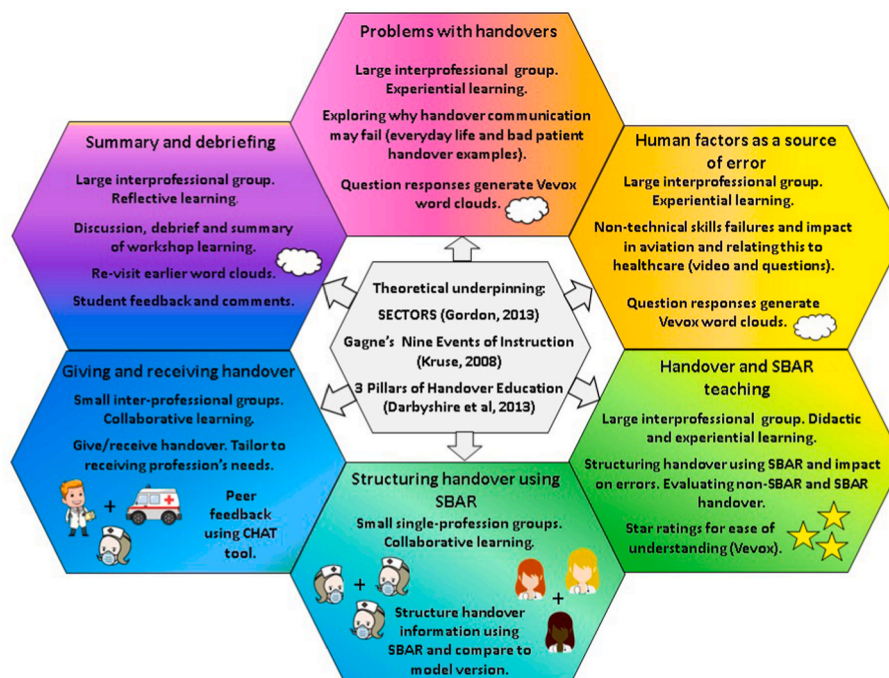

Fig. 1. Workshop structure infographic.

students received a model version of the restructured information for comparison so they could make revisions.

E: Giving and receiving interprofessional SBAR handover (60 min): students returned to the main Teams meeting room. The facilitator introduced the CHAT handover assessment tool[22] and explained how to use it to assess patient handover. We chose CHAT as it is easy to use and sent it to students the week before the workshop so they could familiarise themselves with it in advance. Students used the CHAT tool to rate a good handover by the facilitator and the reasons for their ratings were discussed.

Students then worked in interprofessional groups to practice giving and receiving handover, using the information they had prepared in the single-profession groups. We intended to place students into groups of three, with each student from a different profession, but this was sometimes adapted on the day if professional imbalances arose due to non-attendance, so more than one student from a specific profession might be present (Fig. 3). Each student handed over their patient to another in the group, whilst the third student (or more) provided peer assessment using the CHAT tool. We were interested in whether the handover would be easy for other professions to understand and

Scenarios

Hospital-based orthopaedic scenario (Suitable for medical, ODP, adult and mental health nursing* and TNA students)

Patient: Georgina Smith, 17 years old.

Incident: Mountain bike accident yesterday. Sustained closed fracture of left tibia. No other injuries.

Intervention: Insertion of left tibial nail under general anaesthetic earlier today. One wound drain.

Documentation provided to all students:

1. Observation chart and recordings, wound drainage
2. Prescription chart/allergy information and medications given
3. Completed National Early Warning Score (NEWS) chart
4. Surgeon's instructions
5. Social history
6. The hospital safeguarding documentation has been completed

'Hidden' information indicating possible development of compartment syndrome:

Georgina is experiencing intermittent throbbing and pain in her left lower leg, both at the surgical site and in the calf area. She has received analgesia but the throbbing and discomfort persist.

Community scenario (suitable for medical, adult and mental health nursing and TNA students)

Patient: Stella Musgrave, 58 years old.

Incident: Fell at home yesterday and cut and bruised her right forearm. Stella also has a history of depression and self-neglect.

Intervention: Visited the accident and emergency department yesterday evening where the wound was sutured and dressed. It is for review by the community nurse today. Her family doctor and community mental health nurse have been informed.

Documentation provided to all students:

1. Discharge information from accident and emergency department
2. Observations (in hospital and at home next day)
3. Completed National Early Warning Score (NEWS) chart (hospital)
4. Social history
5. The hospital safeguarding documentation has been completed

'Hidden' information indicating likely reasons for the fall:

Stella has not been eating or drinking properly, and consequently her blood sugar level, and blood pressure, are low.

Fig. 2. Workshop scenarios.

Hospital-based medical scenario (suitable for medical, adult nursing and TNA students)

<u>Patient</u>: Ebenezer Adebayo, 36 years old.

<u>Incident</u>: Sudden onset of left-sided chest pain at work – he is a tree surgeon.

<u>Intervention</u>: ECG and other investigations, no evidence of a myocardial infarction. He also has asthma and regularly uses a salbutamol inhaler.

<u>Documentation provided to all students</u>:

1. Observation chart and recordings
2. Prescription chart/allergy information and medications given
3. Completed National Early Warning Score (NEWS) chart (hospital)
4. Social history
5. The hospital safeguarding documentation has been completed

<u>'Hidden' information indicating a possible left-sided spontaneous pneumothorax</u>:

Left-sided chest pain (of non-cardiac origin), increased heart and respiration rates and difficulty breathing. The latter is not relieved by using his inhaler.

<u>Additional information given to ODP students</u>: ● Surgical and anaesthetic charts.	<u>Additional information given to medical students</u>: ● Completed medical admissions form, including detailed medical assessment and test results.	<u>Additional information given to student nurses and TNAs</u>: ● Nursing care notes ● Detailed social history ● Mental health information

*There are four specific registerable nursing qualifications in the UK – adult nurse, children's nurse, mental health nurse and learning disabilities nurse. TNAs may also specialise in a similar way.

Fig. 2. (*continued*).

whether the 'hidden' information would be highlighted through using the SBAR format. As individual professions focused on different information, and used distinctive terminology, the receiving professional needed to seek clarification if they did not gain the information expected. Students discussed the reasons for variations in professional focus and language, and whether the 'hidden' information was apparent, then handed over again, with modifications to improve clarity if required.

F: Summary and debriefing (20 min): Students returned to the main Teams room. The workshop was reviewed through revisiting word clouds from the earlier exercises and assessing whether the problems identified had been addressed in the education provided. Students also answered the five icebreaker questions again to determine for themselves whether their knowledge, skills and attitudes had changed. All participants received a Certificate of Attendance for their professional portfolios.

5. Assessment

37 students participated in the workshop and 12 of these workshop attendees participated in the formal research/evaluation (Table 1). The validated tools used to gather the formal research/evaluation data are listed in Table 2. The responses of all participants to the in-workshop assessments, and the data gathered using the formal/research tools, were evaluated using[23] framework. The facilitator also undertook 30-min, individual, semi-structured interviews with the formal research/evaluation participants to determine how and why the workshop enabled students to learn.
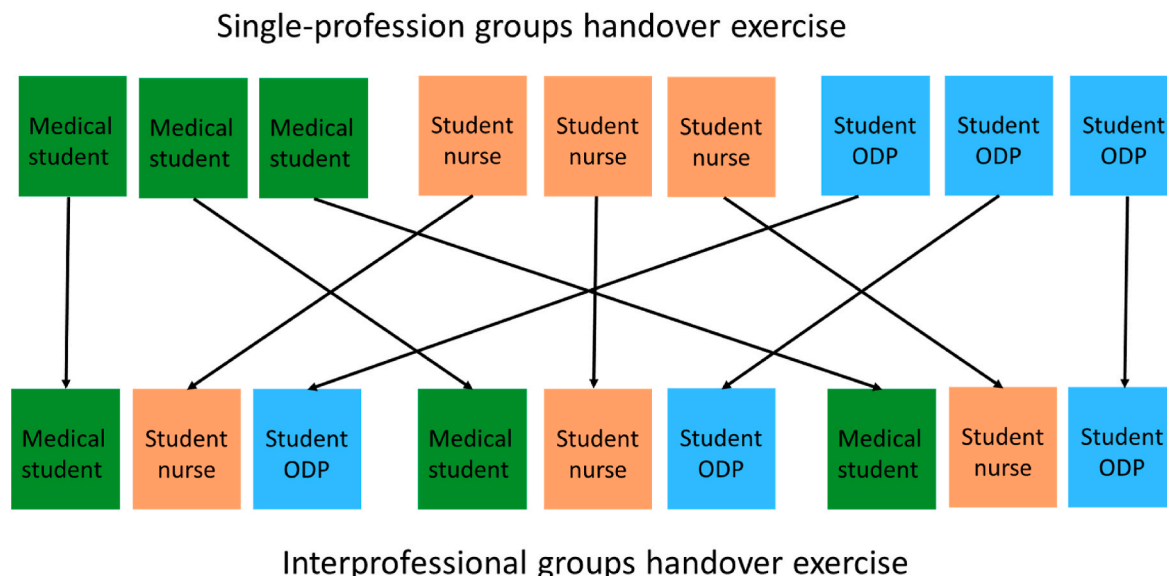
6. Evaluation

Responses from the in-workshop assessments showed outcomes at levels 2a (attitudes) and 2b (knowledge and skills) on[23] framework. 63.6% of students felt confident giving handover before the workshop and 100% afterwards (Fig. 4); feedback indicated their self-rated abilities to structure and deliver handover using SBAR, and tailor this to the needs of the receiving profession, also increased (level 2a). Analysis of word clouds showed that students correctly identified the causes of NTS failures, and they realised that the same factors were responsible for handover errors in healthcare (Fig. 4). Analysis of star ratings indicated they recognised that handover information structured using SBAR was more comprehensible. The overall percentage of correct answers to icebreaker multiple-choice questions increased from 47% pre-workshop to 67% post-workshop (level 2b).

Analysis of the formal/research data showed outcomes at levels 1 (reaction), 2a (attitudes) and 2b (knowledge and skills) on[23] framework

Workshop groups

<u>As planned</u>

Single-profession groups handover exercise

Interprofessional groups handover exercise

<u>Example showing adaptation to accommodate non-attendance</u>

Single-profession groups handover exercise

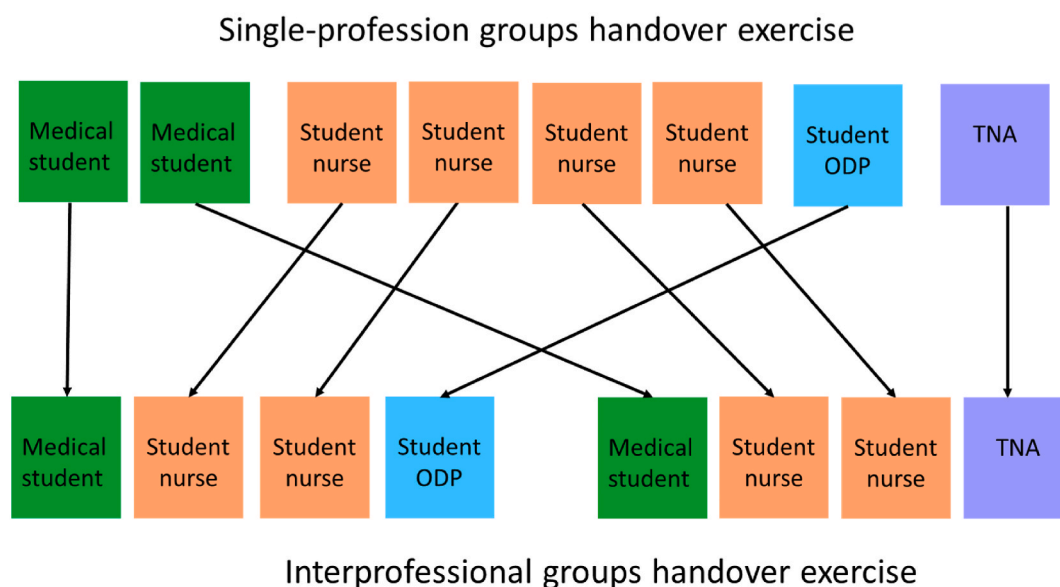
Interprofessional groups handover exercise

Fig. 3. Workshop groups.

(Fig. 4).

6.1. Quantitative data

Participants showed a statistically significant improvement on all assessment measures following the workshop (Table 2)

6.2. Qualitative data

Content analysis identified three themes (Fig. 5) which support the underpinning SECTORS model[16] for explaining the acquisition of NTS in theoretical, as well a practice-based, education. 'Enabling learning' was addressed by providing a safe and supportive learning environment, relevant materials/exercises, accommodating a variety of learning styles and making the workshop highly accessible by delivering it using systems which were familiar to the students. These provided a practical context in which the workshop exercises and materials to develop skills and knowledge in teamwork, communication and error awareness were situated.

'Changing perspectives' was addressed by developing error

Table 1
Student demographics.

Workshop participants (n = 37)			
Profession	Number	Gender	
		Female	Male
Medicine	10	5	5
Nursing	20 (Adult = 19, Mental Health = 1)	17	3
Trainee Nursing Associate	4 (Adult = 2, Mental Health = 2)	3	1
Operating Department Practitioner	3	3	0
Workshop participants undertaking the research elements (n = 12)			
Medicine	4	2	2
Nursing	4 (Adult = 3, Mental Health = 1)	3	1
Trainee Nursing Associate	1 (Mental Health)	1	0
Operating Department Practitioner	3	3	0

awareness as students comprehended why handover errors arose and their impact on patient safety. They also realised (situational awareness) they could reduce the risk of errors by tailoring handover to the receiving profession and through using SBAR correctly (structured communication) to organise and highlight key information. This realisation occurred when students moved from the single-profession exercise to the inter-professional exercise. Finally, students' confidence was increased as professional hierarchies were reduced and they felt able to ask questions, which prompted intentions to apply their new knowledge and skills in practice (level 2a). Content analysis also showed that students enjoyed the workshop (level 1) and that delivering it using familiar systems helped them to engage.

7. Impact

Students developed the necessary skills, knowledge and attitudes to give effective interprofessional handover and they enjoyed the workshop. Content analysis indicates that structuring handover communication using SBAR improved the accuracy and quality of communication, in line with previous research.[9,10] It suggests that working with learners from other professions helped students to break down perceived professional hierarchies as they realised that the unique knowledge and perspective of each profession were of equal value, and each was needed to provide a comprehensive representation of the patient. This is important as effective inter-professional working is fundamental to safe patient handover and care.[26,27] Previous research

has shown that power gradients between professions contribute to handover errors and that raising awareness of their impact[28], and finding ways to reduce them, empowers healthcare staff to ask questions[14] and improve patient safety. Delivering the workshop using systems which were familiar to the students also aided learning as they could focus on the content, rather than the technology.

This is the second NTS educational intervention underpinned by the SECTORS model of learning[16] to demonstrate changes in knowledge and skills. Content analysis supports the model for explaining how and why the workshop enabled learning to occur and shows the importance of having strong theoretical and pedagogical underpinnings for educational programmes. Research shows these are often absent from pivots to virtual learning arising from the COVID -19 pandemic, which can limit replicability.[29] Understanding how and why learning occurs is essential for enabling educators to design effective educational programmes.

The design of the workshop proved viable for delivering cross-faculty, multi-professional handover education. The structure and mode of delivery allowed it to be tailored to varied numbers of students and professions, attending from different geographical locations. It also proved sufficiently flexible to cope with unexpected professional imbalances and participant numbers. Consequently peer-feedback in the inter-professional handover was often given by more than one profession, resulting in more in-depth discussion of different professional perspectives and handover needs. It is also feasible to run more than one scenario simultaneously in a workshop, provided that all of the students using a particular one are placed together in both the single-profession

Table 2
Quantitative data.

Quantitative data								
Level of outcome on[23] framework		Pre-workshop		Post-workshop		t(11)	p	Method of assessment	Timeframe
		M	SD	M	SD				
2a	Improved self-assessed handover knowledge and skills	17.42	2.91	11.83	2.82	6.80	<.001	Pre/post questionnaires Four-point Likert-style questions (Derived from[20] and[21] [a]	Completed using Qualtrix immediately before and after the workshop
	More positive attitudes towards interprofessional working	43.25	5.10	37.67	3.42	3.13	.01	Pre/post RIPLS questionnaire[b] Five-point Likert-style questions[24]	Completed using Qualtrix immediately before and after the workshop
2b	Improved knowledge and skills	1.58	.90	2.67	.65	−3.77	<.003	Pre/post questionnaires. Multiple choice questions[20]	Completed using Qualtrix immediately before and after the workshop
	Improved competence in giving and receiving structured handover	36.44	10.24	49.78	8.3	−10.69	<.001	Individual pre/post assessments. Video recorded in Teams and independently rated by two assessors using the validated Handoff CEX tool[25] [c] Inter-rater reliability was moderate (k = 0.59) using Cohen's kappa statistic.	Up to seven days before and after the workshop

[a] Strongly agree = 1, Agree = 2, Disagree = 3, Strongly disagree = 4.
[b] Strongly agree = 1, Agree = 2, Undecided = 3, Disagree = 4, Strongly disagree = 5.
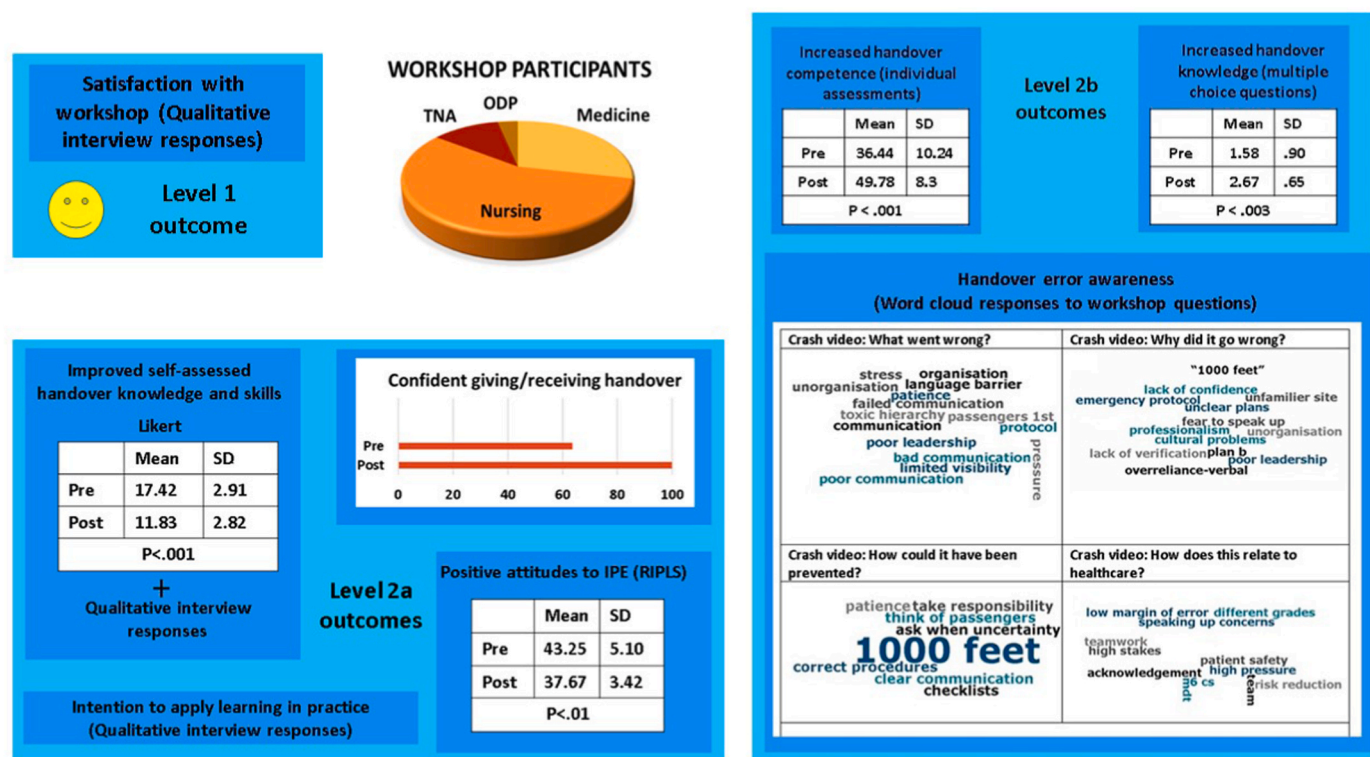[c] Higher score indicates greater competence.

Fig. 4. Workshop outcomes infographic.

Fig. 5. Content themes.

(section 'D') and the interprofessional groups (section 'E'). Following set-up, development of scenarios and familiarity with the technology used, the workshop can be delivered to 40 students by one member of staff at a cost, including 2 h's preparation time, of £164 ($197) for a senior lecturer at the top of their pay band.

The principal challenge was learners' equipment and variations in the quality of internet connections, which affected download speeds. We addressed this by providing links to videos, rather than playing them to the group through Teams. Occasionally internet connections were lost and students had to re-join the group. However, the drawbacks were greatly outweighed by ease of access and the potential to cope with variable numbers of attendees.

The workshop is relevant to educators of any healthcare professions which undertake handover who wishes to carry out interprofessional handover education. Whilst it has been developed for undergraduate learners, we believe that the structure is appropriate for healthcare professions at any educational level, provided that the design principles are adhered to and no more than 3–4 professions are included in a single workshop.

Evaluation of the workshop was limited by small participant numbers, especially for the formal research elements. Whist the research data supports findings from the in-workshop assessments we acknowledge that the reliability of statistical tests may be affected. Colleagues have reported difficulties in recruiting students for extra-curricular activities and research since the COVID-19 pandemic and students whose studies were disrupted, and who remained on clinical placements throughout, have described struggling to re-engage with non-essential activities. These factors may account for the small sample size and are worthy of future investigation.

8. Required materials

Blackboard, Microsoft Teams, PowerPoint, Vevox, 'crash of the century' video, SBAR tool, NHS handover videos, own good and bad handover videos or live delivery, materials (scenarios, documentation, handover exercises, model answers), CHAT tool. Alternatives to Teams could be used e.g. Zoom and likewise alternative voting tools, handover videos and non-clinical videos about how disasters have occurred. The workshop could also be run entirely within Teams, without using Blackboard.

Vevox: www.vevox.com free

Crash of the century: https://www.dailymotion.com/video/x5mfcyq

NHS handover videos: https://www.youtube.com/watch?app=desktop&v=MVaOmoTuiVU

SBAR tool: widely available on-line

CHAT tool:[22] in reference list.

Microsoft Teams: https://www.microsoft.com/en-gb/microsoft-teams/log-in

Microsoft PowerPoint: https://www.microsoft.com/en-us/microsoft-365/powerpoint

Blackboard: https://www.blackboard.com

Declarations of interest

None

References

1. Temple J. Doctors' training and the European working time directive. *Lancet*. 2010; 375(9732):2121. https://doi.org/10.1016/S0140-6736(10)60977-4.
2. Joint Commission. Inadequate hand-off communication. *Sentinel Event Alert*. 2017; 58:2–6. Last accessed 3rd July 2022 available from: https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/sentinel-event/sea_58_hand_off_comms_9_6_17_final_(1).pdf.
3. Scott A, Li J, Oyewole-Eletu S, et al, Project ACHIEVE Team. Understanding facilitators and barriers to care transitions: insights from Project ACHIEVE site visits. *Joint Comm J Qual Patient Saf*. 2017;43(9):433–447. https://doi.org/10.1016/j.jcjq.2017.02.012.
4. Lee J, Mast M, Humbert J, Bagnardi M, Richards S. Teaching handoff communication to nursing students: a teaching intervention and lessons learned. *Nurse Educat*. 2016;41(4):189–193. https://doi.org/10.1097/NNE.0000000000000249.
5. Moore M, Roberts C. Handover training in the workplace: having a CHAT. *Clin Teach*. 2019;16(3):248–252. https://doi.org/10.1111/tct.12931.
6. Gordon M, Box H, Halliwell J-A, Farrell M, Parker L, Stewart A. Enhancing health care non- technical skills: the TINSELS programme. *Clin Teach*. 2015;12:413–417. https://doi.org/10.1111/tct.12433.
7. Ryland H, Akers E, Gowland E, Malik N. How do we develop health educators for the future using an interprofessional approach? *J Interprof Care*. 2017;31(1):5–7. https://doi.org/10.1080/13561820.2016.1246433.
8. Hedegaard J. Communication about patients during ward rounds and verbal handovers: a gender perspective. *J Interprof Care*. 2019;33(6):753–761. https://doi.org/10.1080/13561820.2019.1593116.
9. World Health Organization. Communication during patient hand-overs. Patient safety solutions, 1 (solution 3). Last accessed 3rd July 2022 available from: https://cdn.who.int/media/docs/default-source/integrated-health-services-(ihs)/psf/patient-safety-solutions/ps-solution3-communication-during-patient-handovers.pdf?sfvrsn=7a54c664_4&ua=1; 2007.
10. Burgess A, Van Digele C, Roberts C, Melling C. Teaching clinical handover with ISBAR. *BMC Med Educ*. 2020;20(Suppl 2):459. https://doi.org/10.1186/s12909-020-02285-0.
11. Wood K, Crouch R, Rowland E, Pope C. Clinical handovers between prehospital and hospital staff: literature review. *Emerg Med J*. 2015;32(7):577–581. https://doi.org/10.1136/emermed-2013-203165.
12. Golling M, Behringer W, Schwarzkopf D. Assessing the quality of patient handovers between ambulance services and emergency department – development and validation of the emergency department human factors in handover tool. *BMC Emerg Med*. 2022;22:10. https://doi.org/10.1186/s12873-022-00567-y.
13. Gordon M, Findlay R. Educational interventions to improve handover in health care: a systematic review. *Med Educ*. 2011;45(11):1081–1089. https://doi.org/10.1111/j.1365-2923.2011.04049.x.
14. Gordon M, Hill E, Stojan J, Daniel M. Educational interventions to improve handover in health care: an updated systematic review. *Acad Med*. 2018;93(8): 1234–1244. https://doi.org/10.1097/ACM.0000000000002236.
15. Gordon M, Grafton-Clarke C, Hill E. Teaching handover in undergraduate education: an evidence-based multi-disciplinary approach. *MedEdPublish*. 2019;8:100. https://doi.org/10.15694/mep.2019.000100.1.
16. Gordon M. Building a theoretically grounded model to support the design of effective non-technical skills training in healthcare: the SECTORS model. *J Contem Med Educat*. 2013;1(2):77–82. https://doi.org/10.5455/jcme.20121217125557.
17. Darbyshire D, Gordon M, Baker P. Teaching handover of care to medical students. *Clin Teach*. 2013;10(1):32–37. https://doi.org/10.1111/j.1743-498X.2012.00610.x.
18. Kruse K. Gagne's nine events of instruction: an introduction. Last accessed 3rd July 2022 available from: http://kvccdocs.com/online-certification/content/L-09/Gagne.pdf; 2008.
19. Power A, Sy M, Hutchings M, et al. Learning in lockdown: exploring the impact of COVID-19 on interprofessional education. *Br J Midwifery*. 2021;29(11):648–652. https://doi.org/10.12968/bjom.2021.29.11.648.
20. Smith C, Peterson G, Beck G. Handoff training for medical students: attitudes, knowledge, and sustainability of skills. *Educat Med J*. 2015;7(2):15–26. https://doi.org/10.5959/eimj.v7i2.360.
21. Tacchini-Jacquier N, Hertzog H, Ambord K, Urben P, Turini P, Verloo H. An evidence-based, nursing handover standard for a multisite public hospital in Switzerland: web-based, modified Delphi study. *JMIR Nursing*. 2020;3(1), e17876. https://doi.org/10.2196/17876.
22. Moore M, Roberts C, Newbury J, Crossley J. Am I getting an accurate picture: a tool to assess clinical handover in remote settings? *BMC Med Educ*. 2017;17:213. https://doi.org/10.1186/s12909-017-1067-0.
23. Kirkpatrick DL. Evaluation of training. In: Craig R, Bittel L, eds. *Training and Development Handbook*. New York, NY: McGraw-Hill; 1967.

24. Parsell G, Bligh J. The development of a questionnaire to assess the readiness of health care students for interprofessional learning (RIPLS). *Med Educ*. 1999;33: 95–100. https://doi.org/10.1046/j.1365-2923.1999.00298.x.
25. Horwitz L, Dombroski J, Murphy T, Farnan J, Johnson J, Arora V. Validation of a handoff assessment tool: the Handoff CEX. *J Clin Nurs*. 2013;22(0):1477–1486. https://doi.org/10.1111/j.1365-2702.2012.04131.x.
26. Keogh B. Review into the quality of care and treatment provided by 14 hospital trusts in England: overview report. Last accessed 3rd July 2022 available from: http://www.nhs.uk/NHSEngland/bruce-keogh-review/Documents/outcomes/keogh-review-final-report.pdf; 2013.
27. Reed K, Reed B, Bailey J, et al. Interprofessional education in the rural environment to enhance multidisciplinary care in future practice: breaking down silos in tertiary health education. *Aust J Rural Health*. 2021;29:127–136. https://doi.org/10.1111/ajr.12733.
28. Sugawara T, Kasahara S, Ishimatsu K. Personal factors related to the attitude toward physician-nurse collaboration in children's hospitals. *J Jpn Acad Nurs Sci*. 2020;40: 47–55. https://doi.org/10.5630/jans.40.47.
29. Grafton-Clarke C, Uraiby H, Gordon M, et al. Pivot to online learning for adapting or continuing workplace-based clinical learning in medical education following the COVID-19 pandemic: a BEME systematic review: BEME Guide No. 70. *Med Teach*. 2022;44(3):227–243. https://doi.org/10.1080/0142159X.2021.1992372.