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The Trinity Technique: A novel 3-step approach for debriefing interprofessional major incident simulation

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Abstract

Debriefing is conducted following serious or unexpected incidents to support well-being, uphold professional standards and help organisations pledge a duty-of-care. Debriefing skills can be honed through simulation-based-learning activities and a range of studies have shown this approach effective at transforming experiences into meaningful reflection. Immediately congregating learners after the conclusion of a simulation to identify areas of strength, and opportunities to enhance future practice has been shown to help cement key learning objectives. Despite this, the wider literature lacks a validated tool for interprofessional major incident simulation, highlighting an important research-knowledge gap. As part of a quality improvement initiative to advance teaching and learning practices within this domain, a novel 3-step, interprofessional major incident simulation debriefing strategy, titled The Trinity Technique was fashioned and pilot-tested amongst a sample of 521 students studying Paramedic Science, Adult Nursing, Physician Associate Studies and Forensic Science, across twelve cohorts of students at The University of the West of England. Utilising a case study design, a proof-of-principle study was conducted to debrief a variety of interprofessional, major incident simulations. The Trinity Technique received positive feedback from students and staff, valuable insight into learner experience was gained; and the novel approach had a unique ability to debrief an institution, as well as learners. Further research is now required to formally validate this pioneering approach.

Keywords: ***acute stress disorders, crisis intervention, high fidelity simulation training, mass casualty incident; simulation training***

Background

Hot Debriefing (HD) describes a structured team-based discussion immediately after serious or unexpected incidents to support colleagues, uphold professional standards and help organisations

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pledge a duty-of-care (Allen et al., 2018; Gilmartin et al., 2020; Maloney, 2012; Sugarman et al., 2021; Sweberg et al., 2018). HD stems from a humanistic philosophy and the paradigm that when humans are exposed to trauma, they instinctively desire to establish the wellbeing of those around them (DeCarvalho, 1991). HD has been evidenced as an effective method for supporting the psychological wellbeing of healthcare professionals by facilitating the sharing of situational awareness, mitigating for cognitive biases and promoting reflective practice (Eppich & Cheng, 2015; Gilmartin et al., 2020; Howard et al., 2018; Mayville, 2011; Vaithilingam et al., 2008). Despite these benefits, HD is infrequently undertaken in clinical practice (Sugarman et al., 2021).

Exposure to emotionally traumatic experiences within the emergency environment can seriously impact healthcare workers, giving rise to moral injury and burnout (Howard et al., 2018; Lawn et al., 2020; Mildenhall, 2019; Miller, 2021; Shalev et al., 2017). Mental health conditions such as Acute Stress Disorder (ASD) and Post-Traumatic-Stress-Disorder (PTSD) are at record highs within the emergency services and undertaking HD may serve to protect service personnel developing mental health conditions (Barnhill, 2023; Everly & Flynn, 2006; Petrie et al., 2018; Rose et al., 2002; Shalev et al., 2017; Turner, 2018). Nightmares, flashbacks, digestive disturbances, emotional outbreaks, difficulty sleeping, and a state of sustained restlessness or hyper-arousal are just some of the symptoms responders can endure following exposure to traumatic incidents (Musgrave, 2013; Barnhill, 2023). This can be a debilitating ordeal, progressive in nature and typically occurring once a responder's initial state of heightened adrenaline has subsided, the 'threat' extinguished and normal life resumed - typically 48-72 hours post incident (Bennett et al., 2020; Musgrave, 2013). Whilst symptom severity can vary, out-of-character actions and behaviour require sympathetic management and should be recognised as a normal reaction to an abnormal event (Megnin-Viggars et al., 2019).

In critical or major incidents, responders typically arrive at different time intervals and are subjected to a range of diverse tasks. Each responder will therefore unlikely be exposed to the full spectrum of communications, decisions or proceedings and this prevents comprehension of a definitive incident timeline. This intrinsic disconnect creates emotive processing challenges, to unpick, rationalise and comprehend lived experiences. The human brain rarely stores lived experiences as accurate accounts and instead, episodes of care will be reconstructed as a biased representation, tainted by existing knowledge, world views and occasionally events which never actually happened (Kolbe et al., 2021). The human brain also stores memory sequences in reverse order, thereby encouraging responders to ask 'who', 'what', 'why', 'where', 'when' questions (University of Birmingham, 2019). HD can help mitigate this recognised phenomenon by facilitating discussions which foster more factually accurate incident accounts (Kolbe et al., 2021).

Failing to communicate effectively or engage with HD is commonplace and has been linked with shortcomings during an incident (Dayton & Henriksen, 2007). Even when buy-in from staff is sub-optimal, HD should still be attempted because human beings are naturally predisposed to processing through falsification, experiencing recall bias, and developing feelings of tension and heightened anxiety (Arriaga et al., 2019; Couper & Perkins, 2013; Gilmartin et al., 2020; Khare & Vedel, 2019; Kolbe et al., 2021; Nickson, 2021; Sugarman et al., 2021). When utilised effectively, HD possesses scope to mitigate for potential suffering following distressing incidents. The "TAKE STOCK" HD model (Figure 1) is a tool widely utilised in professions spanning the breadth of the emergency medicine world (Sugarman et al., 2019). It is advocated by the Royal College of

Emergency Medicine (RCEM) and frequently utilised in paramedic practice (Sugarman et al., 2022).

Figure 1

TAKE STOCK, Hot Debriefing Tool

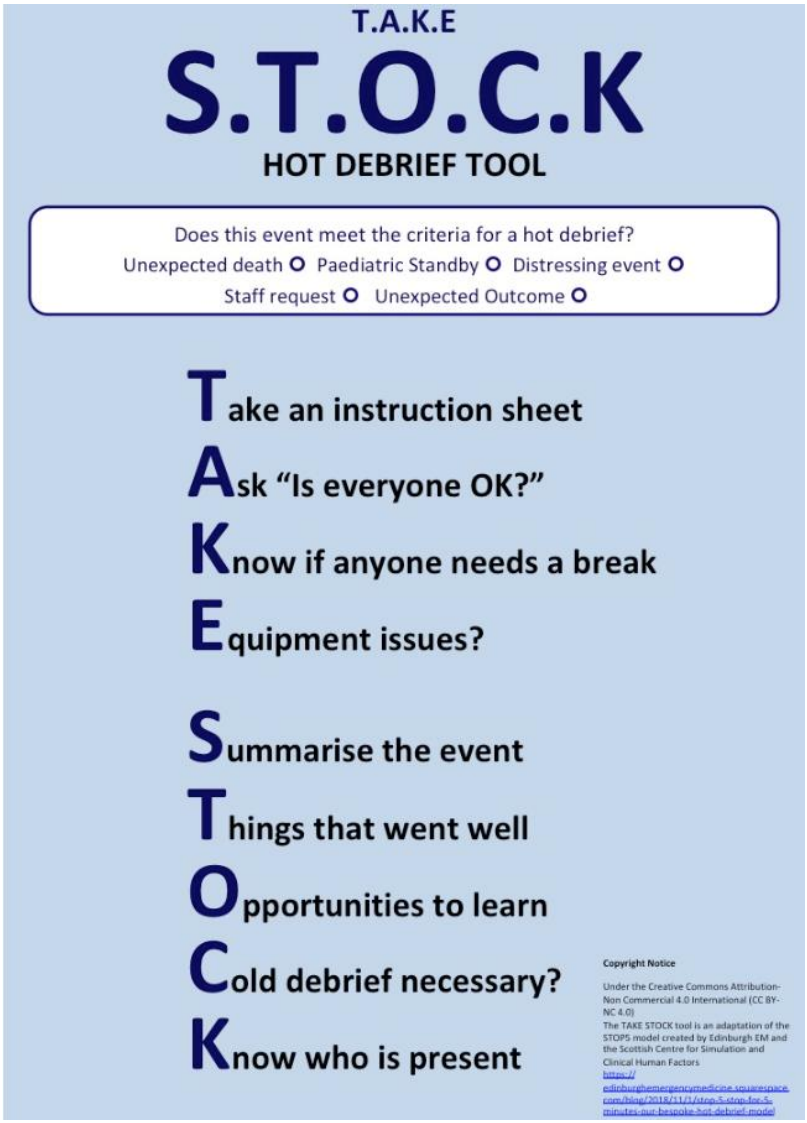

Figure 1 is presented with written permission from the author Max Sugarman

It is important to recognise HD differs from critical incident stress debriefing - which represents a psychological intervention aimed to reduce post-traumatic stress (Nickson, 2021). HD should not therefore be regarded as a therapy, yet its value should not be underestimated. HD has scope to address unanswered questions and help responders make sense of traumatic incidents (Edwards et al., 2021; Lightowlers et al., 2017; Salas et al., 2008; Vaithilingam et al., 2008). However, the quality, duration and impact of HD can vary significantly. Heterogeneity between individual responders and the confounding variables unique to every emergency call, make authenticating the reliability and validity of HD challenging.

Following a major incident, Cold Debriefing (CD) may also be conducted, typically one month post event. It is anticipated that at this stage, emotions will be 'cold', and a less formal structure may be utilised (in comparison to the HD) to conduct proceedings. The wider literature currently lacks a validated major incident CD tool, and a sparsity of high-ranking studies are available to offer a 'best-practice' debriefing approach.

The primary objectives of CD are to: (1) evaluate reflective practices undertaken by staff, (2) identify 'lessons learnt' by an organisation, and (3) ascertain if future practice changes on a wider level are required. CD is not typically undertaken within simulation-based-learning (SBL). This is likely because reviewing outcomes in such depth may not correspond with a module's learning objectives, may lead to additional time pressures for academic staff; and might be considered clinically unnecessary. However, if we accept that interprofessional major incident simulation possesses the same reflective objectives as 'real-world' incidents, it is reasonable to argue training in CD is a necessity.

As part of a quality improvement initiative to advance teaching and learning practices in interprofessional major incident simulation, a new CD tool was fashioned by the author, titled STOCK TAKE (Figure 2). The tool incorporates elements of TAKE STOCK (Figure 1) yet poses alternative questions to instigate a post-event evaluation to identify 'what do we actually have now'; as if commencing a 'stock take'. The "STOCK" aspect provides structure to guide reflective practice learning for students, educators and institutions; and the "TAKE" element facilitates opportunities to appraise key successes, areas for improvement, gained assets, future opportunities and the sustainability of a simulation. The newly fashioned tool supports the concepts underpinned in David Kolb's 'experiential learning cycle', which is considered the most scholarly influential and cited model in reflective practice history (Preceptor Education Program, 2015; Morris, 2019). STOCK TAKE aims to address a frequently reported disadvantage of experiential learning which is that learners may leave with unanswered questions (i.e., pertaining to the "concrete experience" aspect of Kolb's model).

Figure 2

STOCK TAKE, Cold Debriefing Tool

TAKE STOCK (for HD) and STOCK TAKE (for CD) alongside an end-of-curriculum 'Question and Answer' session (Q&A) were then amalgamated to formulate a novel 3-step, interprofessional debriefing tool named The Trinity Technique. This article aims to: (1) highlight important concepts surrounding HD and CD, (2) share the newly fashioned debriefing tool named the Trinity Technique with a wider audience, and (3) evaluate its potential as an interprofessional, major incident simulation debriefing tool in preparation for an independent proof-of-principle study.

Methods

The Trinity Technique was utilised to debrief a variety of interprofessional major incident simulations at The University of the West of England, Bristol, United Kingdom, between January 2022 and September 2024. The simulations portrayed a variety of mass-casualty incident types such as an aviation disaster, a serious house fire and a marauding terrorist attack. Twelve student cohorts, comprising of 521 participants attached to BSc(Hons) Paramedic Science (n=339), BSc(Hons) Adult Nursing (n=80), MSc Physician Associate Studies (n=76), and MSc Forensic Science (n=26) were subjected to the novel 3-step debriefing approach. The university lecturers responsible for supporting each programme of study within the simulations also participated in the debrief, alongside a representative from the school's technical services team, and a senior manager responsible for each department. This helped ensure viewpoints from all groups involved in the simulation could be heard and considered.

A formal application for ethical approval and consent to participate in this study was submitted to the Institutional Research Committee at The University of the West of England and approved as an exempt study. An informed consent waiver was provided due to the observational nature of the study within normal educational practice. Therefore, participants did not provide consent because they were undertaking routine debriefing practices as part of standard curricula. The only difference from standard practice was the use of The Trinity Technique, in place of more traditional debriefing tools or techniques. The study author is an experienced clinician and senior lecturer in trauma and mass-casualty management, with expertise designing, directing and debriefing some of the United Kingdom's (UK's) largest high-fidelity major incident simulations. The authors intention to enhance teaching and learning practices by pilot-testing this novel debriefing approach was supported by his institution.

Process

As previously outlined, The Trinity Technique comprises a 3-step debriefing process: (1) a Hot Debrief, (2) a 'Question-&-Answer' session, and (3) a Cold Debrief.

Step 1: The Hot Debrief

HD commenced immediately after conclusion of each major incident simulation, using the TAKE STOCK tool (Figure 1). To mimic real-world practices and facilitate the opportunity to develop skills in a peer-to-peer context, this component was 'learner-led' and undertaken by the 'first crew on-scene' (or those adopting a team leader role for their respective professions). Learners were supported to do this by experienced educators with expertise debriefing teams in clinical practice. All learners participating in the major incident simulation were included in the debrief. Feedback was captured on an Instruction Sheet (Appendix 1) which comprised a simple template document with the letters TAKE STOCK written vertically down the left-hand side of the page and a corresponding text box next to each letter. The educator completed the Instruction Sheet systematically to capture the salient points raised within each debrief. A summary of the information captured was reiterated for clarity by the educator upon conclusion of the debrief to promote reflective learning and support student wellbeing.

During the study period we conducted 34 major incident simulations, comprising eight different scenarios (Table 1). Each simulation was categorised as: 'small scale' (< 50 participants in the simulation),

'medium scale' (50 - 150 participants in the simulation) or 'large scale' (> 150 participants in the simulation).

Table 1

Details of the 34 interprofessional major incident simulations conducted in the study period

Simulation No. and category	Simulation Details	Exercise Participants
Simulation 1 (small scale)	Scenario: Carbon monoxide poisoning in a care home Approximate length of the simulation: 60 minutes (excluding debriefing) Number of times the simulation was conducted during the study period: 3 Total number of participants: 20	Students studying: • Paramedic Science (n=14) Working in conjunction with personnel from: • Avon Fire and Rescue Service (n=1) • Avon and Somerset Police (n=1) • Southwestern Ambulance Service (n=1) And supported by students studying: • Drama (n=3)
Simulation 2 (small scale)	Scenario: Deliberate incident chemical exposure in a garage Approximate length of the simulation: 30 minutes (excluding debriefing) Number of times the simulation was conducted during the study period: 3 Total number of participants: 21	Students studying: • Paramedic Science (n=15) Working in conjunction with personnel from: • Avon Fire and Rescue Service (n=1) • Avon and Somerset Police (n=1) • Southwestern Ambulance Service (n=1) And supported by students studying: • Drama (n=3)
Simulation 3 (small scale)	Scenario: Industrial accident in a nature reserve Approximate length of the simulation: 60 minutes (excluding debriefing) Number of times the simulation was conducted during the study period: 3 Total number of participants: 26	Students studying: • Paramedic Science (n=20) Working in conjunction with personnel from: • Avon Fire and Rescue Service (n=1) • Avon and Somerset Police (n=1) • Southwestern Ambulance Service (n=1) And supported by students studying: • Drama (n=3)
Simulation 4 (medium scale)	Scenario: Marauding terrorist attack on the London Underground Number of times the simulation was conducted during the study period: 12 Total number of participants: 61 *due to timetabling clashes, Physician Associate and Adult Nursing students could not consistently attend all 12 runs of this simulation. The participant numbers shown in the right-hand column represent the typical number of students involved in this simulation.	Students studying: • Paramedic Science (n=30) • Physician Associate studies (n=12*) • Adult Nursing (n=8*) Working in conjunction with personnel from: • Avon Fire and Rescue Service (n=2) • Avon and Somerset Police (n=2) • Southwestern Ambulance Service (n=2) And supported by students studying: • Filmmaking (n=5)
Simulation 5 (large scale)	Scenario: Mass 'spiking' incident in a nightclub Approximate length of the simulation: 120 minutes (excluding debriefing)	Students studying: • Paramedic Science (n=26) • Physician Associate studies (n=15) • Adult Nursing (n=6) • Forensic Science (n=6)

	Number of times the simulation was conducted during the study period: 2 Total number of participants: 194 Senior Managers present in the Cold Debrief: 1	Working in conjunction with personnel from: • Avon Fire and Rescue Service (n=14) • Avon and Somerset Police (n=3) • Southwestern Ambulance Service (n=16) And supported by students studying: • Children's Nursing (n=2) • Filmmaking (n=4) • Drama (n=5)
Simulation 6 (large scale)	Scenario: An aviation disaster Approximate length of the simulation: 180 minutes (excluding debriefing) Number of times the simulation was conducted: 4 Total number of participants: 505 Senior Managers present in the Cold Debrief: 3	Students studying: • Paramedic Science (n=33) • Physician Associate studies (n=12) • Adult Nursing (n=6) • Forensic Science (n=9*) Working in conjunction with: • Avon Fire and Rescue Service (n=20) • Avon and Somerset Police (n=6) • Southwestern Ambulance Service (n=22) • Other partner agencies (n=10) And supported by students studying: • Children's Nursing (n=2) • Mental Health Nursing (n=2) • Drama (n=3) • Filmmaking (n=4) • Law (n=2) • Medicine (n=2) *a single 'crime scene' investigation conducted
Simulation 7 (large scale)	Scenario: A house fire Approximate length of the simulation: 180 minutes (excluding debriefing) Number of times the simulation was conducted: 3 Total number of participants: 248 Senior Managers present in the Cold Debrief: 3	Students studying: • Paramedic Science (n=30) • Physician Associate studies (n=12) • Adult Nursing (n=4) • Children's Nursing (n=2) • Forensic Science (n=5*) Working in conjunction with: • Avon Fire and Rescue Service (n=12) • Avon and Somerset Police (n=2) • Southwestern Ambulance Service (n=11) And supported by students studying: • Drama (n=3) • Filmmaking (n=4) • Law (n=1) *a single 'crime scene' investigation conducted
Simulation 8 (large scale)	Scenario: Organophosphate poisoning Approximate length of the simulation: 150 minutes (excluding debriefing) Number of times the simulation was conducted: 4 Total number of participants: 372 Senior Managers present in the Cold Debrief: 2	Students studying: • Paramedic Science (n=30) • Physician Associate studies (n=6) • Adult Nursing (n=4) • Forensic Science (n=11*) And supported by students studying: • Occupational Therapy (n=3) • Journalism (n=2) • Filmmaking (n=2) Working in conjunction with:

		• Avon Fire and Rescue Service (n=20) • Avon and Somerset Police (n=4) • Southwestern Ambulance Service (n=12) *a single 'crime scene' investigation conducted

On conclusion of each of the 34 major incident simulations, a Hot Debrief was conducted using the TAKE STOCK tool (Step 1); followed by a supporting Q&A session at the end of the module run (Step 2). Four simulations within the study period had more than 150 participants, so were classified as 'large scale' simulations, and met The Trinity Technique criteria for a Cold Debrief using the STOCK TAKE tool (Step 3).

Seven additional high-fidelity simulations were conducted to support the larger major incident exercises we delivered. These depicted a courtroom experience following simulations four, five, six and seven. Participants in these simulations were contacted by police officers and asked to complete Witness Statements. Participants were later contacted and summoned to court as 'core participants' to give evidence in a mock Public Inquiry. The seven courtroom simulations also incorporated multi-agency debriefing - but these were led by experienced barristers with the objective of providing learners with medico-legal advice following their courtroom experience. These debriefs were excluded from this study because the TAKE STOCK tool was not utilised.

Step 2: A 'Question & Answer' (Q&A) session

A Q&A session was conducted on completion of each cohort's major incident module to address any knowledge gaps or clinical uncertainty. Students were asked to add 'post-it note' responses to three separate, A0-sized information boards titled: "things I enjoyed about the simulation", "things I did not enjoy about the simulation" and "unanswered clinical questions". Once completed, the students took a refreshment break whilst the information boards were reviewed by the author and two faculty members supporting the simulation as a reflective and collaborative undertaking. The aim was to better understand the experiences of each group of learners and identify the strengths and weaknesses of each simulation. The 'post-it' notes on the "unanswered clinical questions" information board were then arranged by the author into emergent themes. The questions were grouped based upon similarity and linked to a specific week of teaching within the module. After reconvening the learners, the author and the two faculty members answered each question that had been posed - supported by a clinical rationale and reference to local/national guidelines where applicable.

Step 3: The Cold Debrief

CD was undertaken using the 'STOCK TAKE' tool (Figure 2) via a Microsoft Teams meeting, two to four weeks after completion of the major incident simulation. Those participating in the debrief were members of the project team responsible for the simulation, at least one representative from the technical services team and a university manager who held the role of either: Director of Teaching and Learning, Deputy Dean, or Dean and Head of School. Where possible, one student representative from each programme of study who took part in the simulation also attended. The discussions that took place in these online meetings were captured as transcribed video recordings, and upon completion, a written report was also compiled by an administrator to summarise the salient points raised in conjunction with each letter of the STOCK TAKE acronym.

Findings

A noteworthy finding was that each time the Trinity Technique was utilised it was well-received by the students, educators, and university managers participating in the debrief. This was evident by the high level of academic engagement apparent at all three stages - reflected by the focus, enthusiasm and

readiness to participate by each of the twelve student cohorts. Educators recognised the value of using a 'real-world' practice HD model; and routinely found that when TAKE STOCK was applied within the SBL environment, it extrapolated seamlessly.

Five key themes emerged from the Q&A session (Step 2) obtained through the 'post-it' note responses added to the 'unanswered clinical questions' information board: (1) uncertainties relating to patient triage categories, (2) appropriate implementation/ability to perform effectively in a major incident 'Functional Role', (3) termination of resuscitation and/or withdrawing care, (4) managing moral/ethical dilemmas, and (5) challenges associated with pre-alerting or handing over in the emergency department. The specific challenge learners found here was how to clinically navigate 'bottleneck' situations and managing patients queuing in (or outside) the emergency department.

We found that learners appreciated the opportunity to pose their questions anonymously, and for the answers to be shared in an open forum. This enabled entire cohorts of learners to reflect on a broad range of topics, benefit from the sharing of knowledge in a psychologically safe learning environment. Learners expressed their appreciation of having the opportunity to discuss individual experiences and their 'stand out' observations from the simulation. The Q&A element also enabled learners to recognise error or omission, and the opportunity it provided to safeguard them against potential knowledge shortfalls. This element of The Trinity Technique was found to help learners ask questions which they may not have felt able to ask within a formal lecture environment, or whilst in the middle of their major incident simulation. Questions surrounding moral or ethical dilemmas represented the biggest area of clinical uncertainty overall; and all twelve student cohorts struggled to make decisions when faced with situations which required decision-making which did not align with Southwestern Ambulance National Health Service (NHS) Trust guidelines, or when algorithmic aids could not provide clear solutions.

On the 'things I enjoyed about the simulation' noticeboard we routinely found that learners reported that they really valued the opportunity to participate in interprofessional simulation; and witness complete episodes of patient care. For example, treating patients in the prehospital environment, conveying them to a simulated Accident and Emergency (A&E) department, observing the Recognition-of-Life-Extinct[1] process; or helping support a simulated patient be discharged from hospital, were amongst the most reported situations learners valued. Conversely, on the 'things I did not enjoy about the simulation' noticeboard we commonly found learners felt disproportionate levels of clinical leadership had been allocated within the scenarios, which suggests these groups of learners felt the simulations lacked parity of experience. Paramedic learners also frequently reported frustrations that not everyone was provided with the opportunity to undertake the 'first-crew-on-scene' role. Similarly, negative views were reported surrounding Functional Role allocation. This was because those arriving as 'back-up' ambulance crews within the later phases of a scenario felt they did not receive comparable opportunities with those who arrived nearer the beginning. Despite this, most learners acknowledged these situations represented the reality of real-world practice.

The newly fashioned STOCK TAKE framework (for CD) provided a structure which enabled future improvements to be discussed, whilst identifying tangible institutional gains. Conducting this element via a recorded Microsoft Teams meeting and using the transcription function acted as a useful resource for the author to evaluate, review, and improve planning of the next simulation. Positive feedback was also received from students either verbally following each debrief, or later by email. A genuine sense of appreciation was communicated to the team; and several learners (now alumni) also emailed asking for permission to return to participate in future major incident simulations as volunteers, because they felt the

[1] Recognition-of-Life-Extinct: When a person dies, several steps must be completed before the legal registration of death and any funeral takes place. The first step, Recognition-of-Life Extinct, which denotes the verification process performed by paramedics to confirm that death has indeed occurred (Department of Health, 2019; Shrehorn, 2009).

learning had been so beneficial to developing their clinical practice. Industry professionals offered their support to participate in future events too and felt the debriefing sessions offered all-round learning opportunities and facilitated vital inter-professional knowledge exchange.

Discussion

Our first key finding was that the HD tool TAKE STOCK extrapolated seamlessly to the interprofessional major incident simulation environment. This is perhaps a unique discovery because to the best of our knowledge, no published works currently exist suggesting such implementation has previously been attempted. As a result, this observation provides scope for further research and development. However, multiple studies do exist that support the use of TAKE STOCK within the emergency medicine setting.

Of the five emergent themes we identified in the Q&A element of our case study (Step 2 of The Trinity Technique), Themes One, Three and Five align robustly with the findings presented in the systematic review by Ledbury et al. (2022) who synthesised the learning themes gained from 22 major incident simulations. We identified that emergent Theme Two represented a key area for further teaching and learning development. Learners found recognising, selecting and implementing major incident Functional Roles challenging, and consistently found performing the associated duties difficult. Clear guidance on the duties of each major incident Functional Role has been published by The National Ambulance Resilience Unit (NARU) alongside how these dovetail with The Joint Emergency Services Interoperability Programme [JESIP] (Joint Emergency Services Interoperability Programme, 2022). However, it is anecdotally recognised that opportunities to develop the 'muscle memory' needed to perform these duties through major incident simulation (particularly for undergraduate learners) is lacking. To the best of our knowledge, a study is yet to be conducted which evaluates the lived experiences of learners undertaking Functional Roles in a major incident simulation.

Our final emergent theme from the Q&A sessions, corresponded with challenges associated with managing 'ethical and moral dilemmas'. Despite the fact most of the learners within our study were in their final year, most had not faced incidents involving traumatic cardiac arrest in clinical practice. These learners also had limited, or no experience of the ethical dilemmas associated with terminating a resuscitation attempt or withholding care. A phenomenological exploration on the ethics of mass-casualty triage by Watson et al. (2024) demonstrated identical moral and ethical dilemmas were experienced by those who participated in the 34 major incident simulations outlined in this study. Similarly, this finding also suggests further research and development is required to enhance learner skills and confidence in managing ethical and moral dilemmas in the prehospital setting. We opine that building resilience and emotional preparedness can be achieved through SBL activities, in conjunction with robustly structured debriefing techniques (Newton & Smith, 2024; Szyld & Arriaga, 2021). The wider literature also suggests structured debriefing to be crucial, becoming increasingly prevalent yet lacking in standardisation (Ngo et al., 2025). The Trinity Technique provides educators a clear and structured approach for interprofessional major incident simulation debriefing alongside a 3-step approach to aid developments in structural standardisation.

This preparatory study indicates the Trinity Technique yields potential as an interprofessional major incident simulation debriefing tool and may serve to advance teaching and learning gains within this field. Positive experiences were consistently reported by staff and students throughout the 32-month study and high levels of engagement were observed. Perhaps the greatest strength of the Trinity Technique we identified when pilot-testing the tool was that it possessed a unique ability to debrief an institution as well as the learners. This separates it from all other debriefing tools. The Trinity Technique also facilitated in-depth discussions about learner experiences, provided a clear framework to evaluate important teaching and learning gains and promoted reflective practices in line with Kolb's experiential learning principles. Organisations wishing to adopt The Trinity Technique may do so with minimal instructor training because TAKE STOCK and STOCK TAKE follow simple algorithmic formats and the Q&A session is largely a discussion-based activity. Despite this, expertise is required to effectively lead a debrief (especially an interprofessional one) and subject-matter expertise would be required to ensure students (across all disciplines) leave the Q&A session without any unanswered clinical questions. Clear direction,

intention and an acute awareness of potential participant distress is also required. Individuals who have been emotionally affected in the simulation may not easily identify themselves and signs of distress can develop during (or post) debrief. When these situations occur, it is recommended that the debriefing process is steered away from clinical learning advancement, to listening, acknowledging and normalising the emotions demonstrated. For all 34 simulations we delivered (including the courtroom simulations not featured in Table 1) we ensured all learners had ease of access to the university's wellbeing services team and were informed that they could contact their academic personal tutor, the study author, or another member of the faculty for pastoral support.

Utilising the TAKE STOCK for HD following a major incident simulation enables learner skills and confidence to grow using a real-world practice tool. This can empower learners to conduct peer-to-peer debriefs and cultivate the skills/confidence needed to later support them in clinical practice. Generic SBL debriefing frameworks may be insufficiently robust for emergency services training because these often fail to facilitate opportunities for learners to simulate managing the type of real-world practice encounters they will later face; and hone their ability to practice handling difficult conversations. As a result, it is reasonable to suggest generic SBL tools do not satisfactorily narrow the intended theory-practice gap.

Throughout the study period, the Trinity Technique enabled data to be gathered repeatedly, reliably and without significant difficulty. However, careful co-ordination of those facilitating each debrief was required to ensure expectations were managed and detailed record keeping consistently obtained. Going forwards, this aspect may be challenging for exercise co-ordinators to facilitate. Moreover, The Trinity Technique represents a comparatively time-consuming debriefing method, which may deter fellow organisations from adopting this pioneering approach.

Limitations

Firstly, this was a preparatory project for a proof-of-principle study, so no formal qualitative or quantitative data was compiled, and a control group was not integrated. Our aim was to help develop the concept of The Trinity Technique and ascertain whether further independent research was warranted. Secondly, the creator of The Trinity Technique composed this manuscript; and led many of the interprofessional major incident simulation debriefs collated within this study. Unintentional biases could therefore be considered present.

Whilst a team of experienced university lecturers independently found The Trinity Technique beneficial for debriefing groups of learners following a wide variety of major incident simulations, the tool cannot yet be considered validated. The initial application of The Trinity Technique was found to be effective, although comparable results may not be achieved in other institutions. The attitudes, values and behaviours demonstrated by the students, educators and managers in this study may also not represent those of the wider population, thereby impacting external validity. It is also noteworthy that because several of the large-scale simulations could not be consistently delivered as mandatory undertakings, those who did not feel compelled to participate may not have done so. This may have unintentionally led to selection bias. Additionally, students studying Adult Nursing were required to complete an email Expression of Interest to participate in the simulations, because several of the large-scale simulations could not be scheduled during periods when they were on hospital placement; thus, potentially further contributing to the risk of bias. This is because it is likely that only those with a keen interest in the simulation would have applied. It is also noteworthy that some students participated in more than one of the major incident simulations, so our analysis cannot be considered a reflection of a learners 'first impression' of The Trinity Technique. Despite this, the positive experiences repeatedly reported by the 521 learners within the 34 debriefing sessions outlined in our study does enhance reliability and internal validity. To improve transparency and aid reader clarity in relation to these numbers, we reported on the total number of students (per professional discipline) involved in this study. Additionally, we provided explicit details of who and how many participants were present in each simulation (Table 1) to further enable readers to draw conclusions from our findings.

Finally, observation bias could not be eliminated due to the nature of the case study design. Students taking the major incident module also had prior awareness that they were going to be taking part in several large-scale, major incident simulations and heightened expectations surrounding these

opportunities may have subjected them to the Pygmalion Effect. This concept reflects the psychological phenomenon resulting from improved performance when expectations are high, and reduced performance when expectations are low (Rosenthal & Jacobson, 1968). The Pygmalion Effect was first observed in classroom-based settings and was harnessed to examine the influence of teachers' expectations on student performance; but it has since been applied within the fields of management, business, and sports psychology (Nikolopoulou, 2022).

Conclusion

The Trinity Technique demonstrates promise as a major incident simulation debriefing tool. Positive feedback was consistently received from students and staff upon implementation; and at all three stages of the advocated debriefing process. Further research is now required to formally evaluate the tool to better understand its strengths, weaknesses and overall worth.

Consent for publication

Not applicable.

Availability of data and materials

The data supporting the findings of this study are available from the corresponding author upon reasonable request. All data associated with this manuscript has been stored in a repository at the University of the West of England.

A pre-print of this article has been posted: https://doi.org/10.21203/rs.3.rs-3145646/v2

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Ethical approval

All methods were carried out in accordance with the Declaration of Helsinki; as well as all other relevant guidelines and regulations. Ethical approval and consent to participate was reviewed by the Institutional Research Committee at the University of the West of England and approved as an exempt study; with an informed consent waiver provided due to the observational nature of the study and the involvement of normal educational practices. Therefore, participants were not consented because they were participating in routine debriefing practices as part of standard curricula.

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Appendix 1

Hot Debriefing Instruction Sheet

T	Take an Instruction Sheet	
A	Ask/assess if all participants are ok	
K	Know if anyone needs a break	
E	Equipment issues to report?	
S	Summarise the event (create timeline of simulation and obtain input from each group/crew/discipline of responders in the order they arrived on-scene)	
T	Things that went well	
O	Opportunities to improve	
C	Cold debrief necessary?	
K	Know who is present (take a register)	