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Transforming simulation in clinical education: is pre-placement hybrid learning valuable to healthcare students?

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ABSTRACT

Innovation in clinical learning is reported as being useful in preparing health and social care students for clinical patient care, but historically these learners have relied on traditional pedagogies including didactic classroom learning and apprenticeship ‘practice’ on live patients in a clinical environment. This paper investigates whether students find it useful to augment traditional learning methods with simulation and video (hybrid learning) as a pre-junct to learning in clinical placement. Replacing the usual initial clinical placement with a 12-week study block employing hybrid-teaching techniques reformed the traditional curriculum for Operating Department Practitioner students. An interpretative phenomenographic methodology was adopted for this study and data was collected through anonymous focus group interviews. The data support two concepts that 1) confidence and self-belief perpetuate the desire for new learning and 2) multi-professional learning develops a professional approach in terms of communication, care intervention and thinking processes. The data presented was obtained using a qualitative phenomenographic approach and the results infer specific advantages of hybrid learning to the participants to supplement traditional teaching methods by addressing theoretical limitations of learning and inequity of placement experiential learning. Limitations to this study are the absence of a control group to directly compare against apprenticeship learning methods alone and the sample group being single site, single cohort.

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INTRODUCTION

Apprenticeship is an historic, popular method used to teach skills to the health and social care workforce [1]. This is mainly due to the understanding that an “expert” needs to have psychomotor skills, clinical judgment, decision-making ability and patient-centred interaction in order to communicate and treat patients [2-4]. To attain these skills, a variety of methods are employed to offer ‘clinical experience’ including practicing on animals, live and/or cadaver patients and/or models [5]. Owen and Plummer [1] refer to these learners being “allowed” to practice on live patients who are in deep comas, or on the recently deceased should clinical placement allow, by following the consultant physician and attempting to emulate the master in order to attain and develop skill. Thankfully

these practices are now deemed unethical unless there is no other way to obtain the training or if the patient’s family specifically consents to such practice [6-9]. An obvious limitation to this approach to teaching medical or clinical skills (these terms are used interchangeably) is that there is a perceived risk to the patient’s welfare physically or mentally (if alive) where the student is practicing a skill or technique and that holistic patient care cannot be at the forefront of this method of education [9]. Instead the “expert” was trained in mastering a series of skills and techniques or schema in order to have a repertoire of experience that could be used to treat a patient [1]. However, these approaches have been considered to be ineffective and/or unethical [10, 11] thus, there has been a pressing need to replace

such historical teaching methods with a way that is both effective and safe.

Modern day medical and allied health students are taught and prepared as thoroughly as possible but there are still significant gaps between the theories employed within the education establishments and the workplace realities [12]. This develops a learning and implementation gap that can only be resolved within the clinical setting and hence this can develop into safety issues and the potential for poor care to be delivered to the patient [13].

There has been a growing emphasis on the use of technology, including simulation, to support students learning in a wide range of professions and domains [14-16]. To the learner the manikin, as part of a simulation, is reported to provide a reference to a real world event and offer opportunities to learn simple tasks such as palpating a pulse or listening to heart and breath sounds. Developed further it can simulate a range of physiological and pathological states [17-19]. Simulation can be used to practice normal investigations and offers systematic or holistic approaches to treatment of a disease/complaint in a patient. In addition it can be used to rehearse clinical patient compromise or disastrous emergencies by bringing the 'patient' (simulator) to life creating a sense of realism [18].

Simulation has commonly been used in the psychomotor training of nurses and doctors but is being developed in countries across the globe and used in more and more complex ways such as disaster debriefing, multi-professional learning, communication development and crisis management [6, 20-23]. Such opportunities for learning have been less available to learners from allied health professions such as Operating Department Practitioners (ODPs) other than as part of inter-professional learning, which often focuses on surgical simulation [24-26]. However, issues relating to student attrition and lack of confidence in the practice environment suggest that hybrid learning as a pre-junct to clinical experiential learning might facilitate retention and the development of self-confidence [2, 27, 28].

Many educational theories are applied to clinical learning including behaviourist theories, cognitivist theories and constructivist theories [29-38]. The building blocks of this type of placement/University clinical education have its roots in the educational theory of constructivism. Constructivism has two main domains, that of individual and social. Individual constructivists report that knowledge is always constructed by the exploration and development of meaningful accounts of phenomena [39]. These constructs take place when the individual assimilates

through the interaction with the environment that they engage with, these interactions are then transformed into individual interpretations that develop meaning [40]. Knowledge from this meaning is then "individually and idiosyncratically constructed" [32]. Different participants will develop different meanings in given situations. This is due to conceptual differences and abilities of the individual. Changes in meaning are the result of the adaptation of interpretation according to the situation and requirements.

Major contributors to this approach include genetic epistemology [34] radical constructivism [36] and personal construct theory, which examines how individuals construct and extrapolate a meaning from external phenomena through their own mental processes [41]. Emphasis is placed on the individual developing meaning and offers a defensible basis for the creation of meaning [30, 35, 42]. Whilst the theory of constructivism is prevalent in traditional approaches to teaching these students there are several observable weaknesses. As a theoretical approach to the education of ODPs its limitation is that the allocation of placement learning and the apprenticeship model of education means that exposure to adequate experience cannot be guaranteed for all, also the meaning developed by the individual may not be wholly accurate, therefore not reducing the error consequence that is desired. Individual constructivism also views all individual meanings of a phenomena as equal [43] but interpretation by the learner, if left unchecked can be erroneous which means that there can be no critical comparison of meaning [44]. Finally it does not offer explanation of how an individual can adopt a more complex construction whilst still working at a less complex level (the development of learning through a cyclic phase of the ODP curriculum). So it raises a question of how could the ODP be accountable for their actions (as they have to be) when they may not understand what has been asked of them, based upon their mental process of the phenomena that they have been exposed to? And how does that compare across a whole cohort of students in different placements with different placement learning exposure?

In direct comparison, social constructivists propose that social group interaction as well as the individual construct knowledge. This means that any knowledge constructed socially is intersubjective by the collaborators and, as such meaning is based in a specific social context [45]. Knowledge is gained, and meaning developed through social participation and so is subject to a wider range of social, cultural and historical influences. Meaning develops, through time as practices change, or in the case of the ODP as clinical knowledge evolves. Differences in meaning

are ascribed to variations in social practice as well as normative beliefs within the social group [44]. Major contributors to social construction theory include a range of interesting psychological, epistemological, sociological and historical directions [33]. And include situated learning theorists [37] social constructionists [31] and other scholars [46, 47]. Whilst social constructivism plays a legitimate vital role within the development and advancement of knowledge for the ODP, because of the shared repertoire and reification, there are limitations. The first is that social meaning takes priority over individual meanings, within the perioperative field this can cause conflict, i.e. the “team” take a decision that the individual disagrees with but goes along with, democracy in care is not always equal based on individual knowledge, i.e. an individual may have more knowledge of a specific problem but is overruled by a democratic (social) team decision. Conversely there are occasions where a democratic and equal decision making process is essential (such as a decision to cease resuscitation attempts on a patient). Secondly as the social meaning evolves, there is an assumption that the individual extrapolates the same meaning as the group or “each individual sees these influences and responds to them in the same way as others” [44, 48] and this may not be entirely correct if meaning is not developed and checked. Finally social constructivism does not fully encompass how individuals who inevitably belong to multiple social groups (family, hobbies, work etc) deal with potentially conflicting meanings (confidentiality, advice) [49]. It is these limitations that do not lend themselves to the holistic education of the ODP. From social constructivist perspective knowledge, skill and practice for the ODP is constructed by engaging with the social practice of the perioperative environment in a contextual role by caring and intervening with patients and other staff members. Whilst this theory fits amicably with the practical component of educating ODPs it does not answer the question of parity throughout knowledge evolution for this group, nor does it fully answer how valid and reliable the knowledge constructed is, if left unchecked by the University. It is these questions that are vital to this study, can simulation as a pre-junct to clinical placement learning and traditional teaching methods address the theoretical and practical limitations of the historical curriculum and therefore be useful to the learners?

The aim of this study was to research student perceptions and beliefs of the usefulness of hybrid learning by manipulating the historical curriculum for ODP students, instead adopting a new curriculum. The adoption of this new curriculum sought to address the challenges of individual and social constructivism that

are reported when using traditional teaching and learning methods alone.

METHODS

ODP students engaged in an alternative curriculum in which the students remained at University for 12 weeks followed by two weeks leave and their primary clinical placement. This replaced a four-week study block followed by clinical placement. During this new 12-week study block the students engaged in traditional teaching and learning methods including lectures, seminars, tutorials and part-task clinical training. In addition they were introduced to two simulated clinical environments (one operating theatre and one ward/post anaesthetic recovery area) in order to augment the traditional methods and create a manipulated curriculum employing a hybrid technique the purpose of which was to develop the individual learners equally in an environment that could be staged and repeated ensuring that all had similar access to ‘patients’. This also offered the advantage of controlling the social development of the learners by facilitating group work in a ‘placement’ where all were exposed to the same experiences.

Learning through simulation was carefully mapped to the traditional teaching and learning methods in an attempt to accelerate the student’s cognitive, psychomotor and affective ability in specific perioperative learning events. These events included assisting an anaesthetist to safely perform all required pre-anaesthesia checks and assisting with a general anaesthetic; safely preparing a surgical environment for simulated surgery using aseptic techniques and finally monitoring the physiology of the manikin during the post anaesthetic recovery phase. Normally the students would not engage in such learning opportunities until after their primary clinical placement. Towards the end of the 12-week study block the students were randomized into focus groups for data collection of salient reflections, learning points and perceptions of their learning to date. The research team met and discussed themes following each focus group to ensure saturation of data by identifying new themes to be investigated in the next focus group.

In order to collect meaningful data, a qualitative phenomenographic approach was adopted as it attempts to explore and describe the perceptions ODP students have of their learning experiences [50-52]. This was achieved by encouraging participants to use the richness of their own words to explore and describe their experiences in relation to their learning and their self-efficacy.

Phenomenography in etymological terms is derived from the Greek words “Phainemenon” (to manifest) and “Graphein” (picture or word description) [53]. Phenomenography was first developed in Sweden in the 1970’s in the field of education research and is the empirical study of peoples experience, perception, apprehension and conceptualization of phenomena in, and aspects of, the world around them [54]. This entails the researcher who is using a phenomenographic methodology to attempt to see the phenomenon of interest not from an inward personal perspective but from the perspective of the respondent. This is known as the second order perspective or experiential perspective (second order perspective is preferred) [55]. The terms afforded phenomenography such as; perspective, experience, conceptualization and understand, collectively reflect the totality of this second order perspective. Because of this, phenomenography does not differentiate between pre and post reflective thought. It also does not describe or account for the phenomena being studied, but it does make statement to the respondent’s experience of the phenomena, a vital distinction to make [56].

Data collection

The study participants consisted of first year students at the beginning of their academic studies (n=30). The age and gender demographics of the cohort were similar to previous cohorts, and had no formal experience of the ODP course but had 12 members (39%) who had previously worked within a perioperative environment as un-registered healthcare support workers. Owing to this experience, these students had a preconceived idea of what an ODP is and does professionally.

An important aim of the data collection was to achieve saturation of information and thus the cohort size lent itself to a series of focus group interviews where each group had shared experiences and offered the opportunity for data saturation [57]. The focus group facilitator who was an academic with no educational connection to the students made initial contact. This was an important ethical measure, protecting participants from feeling pressure to participate because course educators were involved in the research [57]. In addition this research proposal had received approval from the University research ethics committee. After a briefing by the facilitator that explained the background to the research, participants were given an information sheet and consent form, all students consented to take part in the research and the focus groups were set for week 11. The facilitator had a background in technology-enhanced learning and so in order to reduce the potential for bias whilst conducting the focus groups another member of the research team was sequestered behind a one-way mirror and took field

notes during the focus groups [57, 58]. The facilitator’s behaviour included non-direction of participants and the minimal use of prompts or probes, allowing the participants to express their thoughts and perceptions [59-62]. The cohort of students was randomized into 5 groups, consisting of six participants each (n=30). Discussions were digitally recorded using an Edirol R-1 digital recorder. The audio records from each interview were transcribed by an independent professional and anonymous hard copies of the transcriptions were prepared for concept analysis [63-65].

Data analysis

The primary aim of the data analysis was to retain the ‘voice’ of the participants [66-68]. This provided in-depth second order conceptions of the participants beliefs of whether hybrid learning as a pre-junct to clinical placement learning was deemed useful to the year one cohort and if so why? Equally what was their understanding of using simulation to support traditional teaching and learning methods and reflectively how did they understand these phenomena. Unlike positivist data analysis the focus group transcriptions were analysed immediately post focus group and not at the end of perceptual data saturation. Data analysis identified significant codes, which were then organized into higher order conceptions. These could then be managed and expanded upon with each focus group until saturation was reached [69, 70]. Data analysis was facilitated by the use of an electronic data management software package (Max QDA™). Bias risk was mitigated by triangulation of conceptions between the focus group facilitator, the second researcher using field notes and from a third member of the research team. In addition the focus group facilitator mitigated pre-conception through reflexivity and identification apriori of potential bias in order to assist with bracketing [71-73].

RESULTS

Saturation of data was achieved during the final group interviews, as there were no new responses, ideas or thoughts articulated by the participants. The transcriptions elicited 285 meaningful units of data, which were separated into two conceptions consisting of 7 codes, and it is these that provide structure to the paradigm of using hybrid techniques as a pre-junct to clinical placement learning as Figure 1 shows.

The vignettes and quotations from the transcriptions are verbatim, anonymous to the researchers and from across the data sets. Participant classification is square bracketed and relates to the participants gender, age, focus group number and previous clinical experience for example: [F37-FG1 NPE]= female age 37 from

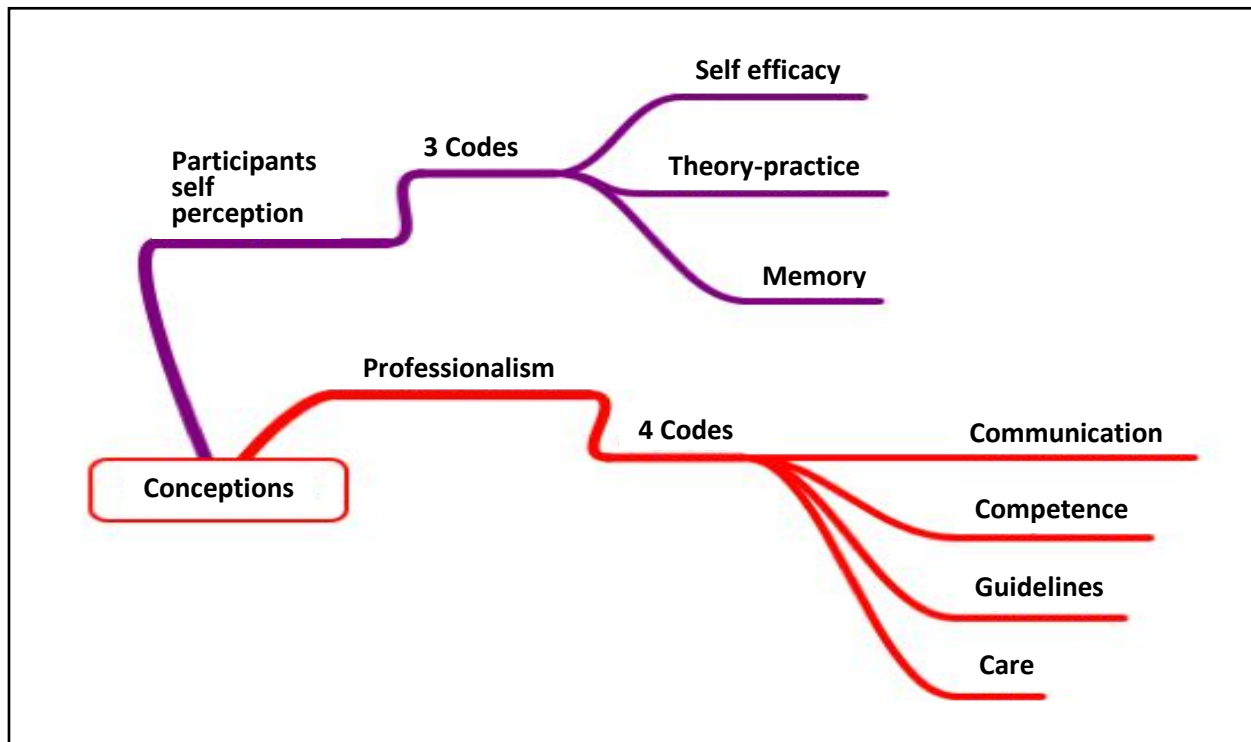


Figure 1: Phenomenographic conceptions of using hybrid techniques as a pre-junct to clinical placement learning.

focus group 1 with no previous clinical experience; [M21-FG5 PE] = male age 21 from focus group 5 with previous clinical experience. This allowed for holistic data representation and exemplifies the transparent approach to data management.

The conceptions sit within individual, social and pedagogic domains. Beginning with self-perception of the participants, this conception is concerned with the individual and what was happening whilst being exposed to the phenomena of hybrid learning. Codes generated from the units of data relate to the disassembling of pre-conceived concepts and constructing knowledge through theoretical application to simulated clinical scenarios. The second conception introduces the individual to the notion of professionalism but drives that further from the individual to a collective, moral dualist approach [good & bad or right & wrong].

The first year cohort was split into two distinct groups; those that had some experience of the operating theatre environment prior to the ODP course beginning and those that had none. This presents a challenge to any educator in that those with some experience are deemed 'experienced' whilst those without are a 'blank canvas'. Therefore the aim of undertaking hybrid learning is to address both of these difficulties through the process of

unlearning any poor practice and knowledge of the 'experienced' whilst instilling evidence based and appropriate strategies to cope with new learning for the 'blank canvasses'. Discussions around self-belief, efficacy, confidence, application of knowledge and retention of new clinical constructs forge the basis for this category, there were some strong conceptions that demonstrate what hybrid learning meant to this first year cohort, for example:

[M24-FG4 PE]- I thought that...I'd seen people do this course that I thought well, they're not that good, if I get better at my job then it should make it easier..

This statement was from an 'experienced' participant who had made the assumption that they understood what was expected in order to be successful on the ODP course and how that could be achieved. Field notes show that this participant had a pre-conceived notion that the course would be an extension of their previous un-registered role and therefore one would benefit the other.

Another experienced participant reported that he felt equal to or better than, observed qualified staff members and this was motivating him to learn more.

[M33-FG5 PE]-yeah, that's good and I know some

trained staff that can't do that, but we can already, I go home and think wow and it makes me want to do more...

[F33-FG3 PE]- Whereas if here, you've had a little practice and been taught the slides [powerpoint™], then you get that bit of confidence rather than feeling 'I bet they [theatre workers] think I'm a right idiot' it's all about confidence, that's what makes me do it right

Respondent F33-FG3 PE articulated that her learning experience had enhanced her confidence and self-efficacy, clearly linking the concept of confidence and competence in practice, with taught theory.

Six weeks into their 12 weeks study block of using hybrid learning at the University, the participants watched a short film that showed the simulation manikin being anaesthetised for proposed surgery. The educational purpose of the film is to visually reinforce the process of administering a general anaesthetic to a patient in real time, whilst allowing the individual student to cognitively follow the process of a safe anaesthetic and the interventions therein of the anaesthetist. One participant without previous experience commented:

[M28-FG2 NPE]-....And it was realistic. You felt like it was actually happening. It was just really sticking and your sort of 'huh'

Suggesting that the act of observation was enhancing their understanding and their learning through absorption into the learning event and individual construction of meaning. This meaning was offered similarities of clinical learning that draw a referent from a 'real' patient scenario and this participant reflects the phenomena was actually happening to them. A participant with previous experience commented:

[M29-FG1 PE]- You were sort of thinking 'I'm not going to remember that' but then as they went through it and injected the adrenaline you thought 'yeah, that's when you do that and this' and it makes much more sense.

Suggesting that the process of observation was stimulating reflection and level of cognitive anticipation of the next psychomotor action to be performed to safely anaesthetise the patient for surgery. This is a good illustration of conceptual construction that bridges theory and practice. The participant discusses the process of treatment and field notes identify that they have their eyes closed and are following the scenario in their own mind.

The data above infers that the participants experienced the realism and were able to follow what was happening by cognitively processing what they saw

facilitating conceptual construction. The participants had experienced their own physiological response to witnessing the simulation. For pre-reflection to become memory and then transfer, the participants would need to both follow the evolving situation on film and be able to anticipate what to do next, which [M29-FG1 PE] clearly illustrated.

Participants described their physiological and motor responses to the emotion evoked by watching the simulation.

[F47-FG5 PE]-We did feel like we wanted to get up and go in there..just to see if there was anything we could do....I mean how often do you get to see a cardiac arrest or an anaphylaxis

Interestingly the simulation and description given of the frequency of such emergencies are synonymous with lived experience. That is to say that they refer to the simulated phenomena whilst relating it to their perception of the 'real life' phenomena occurring. Other participants also conceptualised a motor response to the simulation, indicating that they were appropriately following the emergency treatment of the 'patient'.

Professionalism

Professionalism and imparting professional behaviour and communication are aspects of the ODP curriculum instilled at the beginning of the course using traditional teaching techniques. Specific aspects of professionalism are usually learned from the clinical placement mentor, and include appearance, dressing to suit particular environments, speech/communication and terminology. This enables the student to 'talk the talk' in a professional way. Usually the student's clinical mentor (progressively throughout the duration of the course) completes assessments of professionalism. The students in this study did not go into a clinical placement at the usual point but instead undertook explicit hybrid learning and assessment of knowledge and competence at the University. Participants reflected on this aspect of their learning experiences and recognised its anticipated relevance to clinical practice:

[M40-FG2 NPE]- And you know it's alright team working. That's what you do in theatre, You're all working as part of a team, that's what happens in here [simulation] and then when we go out [into placement] we're all doing our little bit and it's all coming together.

Teamwork is a consistent conception and at the forefront of the participants thinking, discussing that they are able to do these things because of the practice and simulation scenarios, thus developing inter-

professional and multi-professional team working. The participant is discussing the theory of social constructivism and the process of decision making as a team. Usually on clinical placement these students would be on the fringes of the team, but this simulation has offered the opportunity for participants to be central team players and decision makers.

In addition, they recognised how simulation demonstrated the need for good communication within and between teams:

[M28-FG3 PE]-Simulation....it's comparison of a good situation and a bad situation. To be able to highlight the point, and say to people in a team where there was very poor communication and what happens, why that is important, why you need to tell people. It reinforces that and allows me to practice that.

Several participants raised the issue of placement / HEI dissonance between what a mentor does and how the student has been taught to do the same thing.

[M26-FG5 NPE]- I wanted to ask, what if we do things the way that we have been taught here but they say we're wrong?

[F32-FG4 PE]- It might be a case of double standards.....don't forget they'll be signing you off

[M24-FG2 NPE]- If there is confusion or double standards, you've got the time to ask the questions here in scrubs or not...but I guess where a patient is involved it won't always be appropriate at that time, the thing is to trust what we know and everything is always backed up with evidence...

Therein lies a challenge which participant [F32-FG4 PE] identifies. Does the student capitulate to the ways of the mentor in order to be favourably assessed? These are the beginnings of the moral self within this focus group because the participant trusts what they have been taught at the University and projects that they will rely on that learning at a later date in that given scenario i.e. the participant will stay good to what they know and will not let bad practice threaten that.

Participant [F38-FG1 NPE] refers to watching and doing whilst relating to differences between the lecturer and peers as a method of understanding what to do.

[F38-FG1 NPE]-the thing is I know how to react....watching the powerpoint is fine but how will that work? Particularly with the language thing and masks on....I watched you [all] in the scenarios and I watched [lecturer] and I get it, I see the difference then it's my turn and it's almost a reaction, just like the film [anaphylaxis]....I can't wait to get out there...

In essence this participant is evaluating good and bad

and deciding on their own actions in advance, querying the instinctive reaction. This experience has resulted in her being excited about going into placement suggesting that the preparation has resulted in enhancing her self-efficacy.

DISCUSSION AND RECOMMENDATIONS

This research was designed to address the problems evident in an ODP curriculum of potential poor preparation of students prior to clinical practice and inequity of individual clinical placement experience. The curriculum was re-designed to provide an extended University study block prior to clinical placement, extending formal study time to 12 weeks. Usually this time would be spent between the university and clinical placement but the revised curriculum sought to better prepare students by replacing a four-week clinical placement with hybrid learning methods.

The findings are consistent with existing literature in that using simulation is reported to provide a submersive environment that provides a real world referent analogy [74]. It provides a method for students to practice the psychomotor ability they will hone in clinical placement in an attempt to provide sound, evidence-based and holistic care to the patients they encounter whilst also allowing for exposure to similar clinical experiences and phenomena for all [75-77]. In addition, the data infers learning through repetition, enhances confidence and understanding [3,78]. However, this research offers some new insight into why and how hybrid learning has impacted on these participants. In addressing the theoretical limitations of individual and social constructivism, simulation offered the students the opportunity for individual psychomotor rehearsal resulting in reported increasing self-efficacy and perceived ability. This construction was practised and then developed in a controlled way by teaching staff. Essentially the learners having exposure to the same 'experience' through simulation addressed the potential inequity of placement learning due to exposure to different clinical experiences. This went some way to addressing the potential for disparity of individual meaning construction by offering conceptual similarities and rehearsal to develop ability that was the same as their peers; adaptation of meaning was controlled and simplified by the simulation staying the same.

The participants report that the feeling of achievement was the catalyst for elevated self-efficacy and confidence. Perhaps more importantly, participants identified that doing things correctly and achieving a defined standard was important in perpetuating their desire to learn. They also discussed the concept of being able to work as a team and therefore expand their

professional frame of reference from the self, to (anticipation of) the professional team approach to patient care. Importantly there is also the concept that simulation has been the catalyst to that teamwork and to the individual being able to take part professionally in the management of the care of the patient by understanding or 'deciphering' the difficult language and communication skills required in an operating theatre in order to prepare to care for a patient. That is, the participant has moved from doing, into a state of experiential pre-reflection, by learning how to talk-the-talk and anticipating process. In terms of addressing the potential weaknesses of social constructivism the data infers that social meaning was developed and accelerated by facilitating the students decision-making ability as part of a team. Experience such as this is not usual for a new learner but the hybrid learning sought to draw together the individuals into a group and together they changed and developed their social practice and cognitive skills. The data infers the participants project themselves into a position akin to the master (rather than the apprentice) by understanding the deeper levels of complex situations and why appropriate communication is so important. Vignettes support that this phenomena was facilitated by controlled social constructivist approaches using simulation, deploying the students into teams and guiding their meanings of experienced patient scenarios. One potential disadvantage to hybrid learning that was perceived by several respondents was that experienced practitioners on clinical placement might challenge knowledge and ability constructed by the students during the prolonged study block. Participant F32FG4PE discusses in particular that there is a perceptual tension where the social constructs within placement may not be the same as the University. This is an area for further research and is a limitation of this study.

The cohort undertook an intensive and long University study block that presented different challenges for different students depending mostly on their previous clinical experience. The phenomenon of time was embedded into simulated scenarios to facilitate learning using four dimensions. This is a critical component of simulation, particularly where trying to instil error consequence to poor practice or when anticipating a physiological change in a patient due to clinical intervention. It is possible therefore that teaching using traditional techniques, which are then blended and enhanced through hybrid learning, is the answer to addressing shortfalls of one singular technique whilst also maintaining participant engagement.

This study infers that by managing the learning process for these students, engaging in innovation and hybrid learning has advantages that are reported through the

focus groups. The participants are believed to be at no disadvantage by undertaking a 12 week study block in the University and this is supported by success at a level of required assessment greater than that of previous cohorts. It would, however, be appropriate to further evaluate this concept through further research to ensure that this is truly the case. An obvious limitation to this study is that it is single site, single cohort and so the findings are not generalizable between other learners or even other sites that utilise simulation as a teaching method. There have not been any other studies with this particular professional group using such techniques and so offers a potentially important contribution to professional and educational knowledge. Further research to establish consistency across the different types of health and social care students and additional studies eliciting data from second year cohorts following the same methodological process would enhance and further develop the philosophical and operational design of employing hybrid learning.

Declaration: The authors can declare that there are no conflicts of interest, consent was obtained for ethical purposes and individual consent from participants gained prior to study commencement.

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