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A cross-disciplinary approach to learning medical physiology and behavioural skills involving drama students performing as simulated patients

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1 **A Cross-Disciplinary Approach to Learning Medical Physiology and Behavioural Skills Involving**
2 **Drama Students Performing as Simulated Patients**

3

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22

23 **ABBREVIATED TITLE: Drama-Enhanced Medical Physiology Tutorials**

24

25 **ABSTRACT**

26 Early year's physiology education in medical curricula provides unique challenges. As well as
27 inculcating concepts that are seen as difficult, modern curricula require that students learn in
28 context in Case Based Learning courses. Additionally, regulating bodies stress that the soft skills of
29 compassion, communication and empathy are embedded throughout curricula. This has driven work
30 in our organisation involving drama and final year medicine students during which they collaborate
31 in realistic simulations of doctor/patient interactions. We adapted this transdisciplinary approach to
32 second year physiology tutorials. This emphasised the holistic importance of physiology to patient
33 care, while also embedding "human factors" skills from the very earliest stages of the curriculum.

34 After preparing by attending acting classes based on aspects of Konstantin Stanislavski's "System"
35 the authors supervised tutorials in which drama students participated in a "physiology of
36 hypofertility" session for second year medical students, playing a 34-year-old woman with
37 premature menopause (or their partner). Opinion (from all students) was evaluated by Likert
38 questionnaires (which included open questions). A focus group of drama students was also
39 interviewed, and the conversation recorded for thematic analysis.

40 Positive Likert scores were recorded for the authenticity of the tutorials, skills development,
41 fostering empathy and motivating students to improve. All participants evaluated the tutorial as
42 highly enjoyable. These scores are reflected in positive open commentary on the questionnaires and
43 in the focus group interviews. The results suggest that even basic science tutorials give opportunities
44 for interdisciplinary study and enhancement of behavioural skills while gaining enthusiastic student
45 acceptance.

46

47 **NEW AND NOTEWORTHY**

48 This work details how physiology tutorials for early years medical students are transformed by taking
49 the clinical case off the 2-dimensional page and instead having the case scenario acted by drama
50 students. This adds context and authenticity. Benefits are twofold; emphasising the importance of
51 physiology to the budding clinician and embedding empathy and compassion from the earliest
52 points in a clinicians career.

53

54 INTRODUCTION

55 Delivery of fundamental science as part of early Medical Education presents unique challenges. The
56 need to provide a firm scientific foundation supporting clinical practice is enshrined in the
57 documentation produced by accrediting bodies in the UK (1) and US (2). In the past 10-20 years,
58 however, there has been a move towards integrated medical curricula (3) to provide a clinical
59 context when teaching basic medical sciences, as this is a more effective means of promoting deep
60 learning and effective retention of the material (4). In addition to this, there has been a recognition
61 by educators and accrediting bodies that the “soft” behavioural skills of compassion,
62 communication, sharing and empathy have just as much an impact on clinical outcomes as the
63 clinical skills (1,5,6).

64 In addition to the subject specific challenges, the typical pre-clinical medical student population
65 considers these basic sciences “hard” to learn (7). The sheer volume of work in early medical
66 curricula results in a student body that learns strategically, often to the test (8), and, after third year
67 has noticeably displayed an alarming reduction in empathy (9).

68 In summary, fundamental science education in medical degrees is essential but difficult (7), should
69 promote integrated learning in context (4) as well as compassion (5,6). Basic science classes should
70 be taken seriously, but are often treated strategically (8). Pre-clinical years culminate in a tired
71 student population depleted of the empathy and passion that carried them into the profession in
72 the first place. Clearly, innovative and effective educational practices are needed during this crucial
73 formative phase to make the first years of a clinician’s career meaningful, productive and fun.

74 In modern pre-clinical and bioscience education many strategies have been suggested to address
75 these early year medical education challenges. Integrating the fundamental sciences with clinical
76 practice in simulation classes has been proposed by many authors (10,11,12). Stephen Di Carlo in
77 the 2009 Claude Bernard distinguished lecture (13) suggests that, “how we teach is more important
78 than what we teach” and stresses that teaching should be meaningful, enriching and fun above all
79 else. This is echoed by Dee Silverthorn (14), who emphasises moving away from merely “covering
80 content”. Ian Turner (15) extends this, suggesting that we make classrooms more theatrical and full
81 of spectacle to keep students engaged. This resonates with earlier work by Yucha (16) who suggests,
82 that students themselves should be encouraged to “act out” physiology concepts such as muscle
83 contraction, the reflex arc and capillary filtration using improvisation techniques and basic props
84 such as rope, candy and chalk. This approach garnered great student enthusiasm, suiting a wide
85 variety of learners and learning styles.

86 In our own institution, the drive towards making learning more meaningful has led to a collaboration
87 between medicine and drama in a final year patient safety course. During this course, medical and
88 drama students collaborate in realistic and emotionally charged simulations of doctor patient
89 interactions (17). In the present study, we adapted this transdisciplinary, high fidelity simulation
90 approach to second year fundamental science (physiology) tutorials. These lend themselves well to
91 the application of basic science skills to clinical (and behavioural) contexts (7). Benefits are manifold:
92 emphasising the holistic importance of physiology (and by extension the fundamental clinical
93 sciences) to patient care, supporting students in the conveyance of physiologically relevant scientific
94 information, while also embedding “human factors” skills of compassion, empathy and
95 communication at the earliest stage of the students’ career. This could potentially act to counter the
96 drop in empathy typically observed during the pre-clinical years (9). The tutorial chosen for the trial
97 was on “hypofertility in a 34-year-old woman” where instead of reading the case detail from a script
98 to answer questions, medical students took a case history from a drama student playing the female
99 (or her partner allowing male drama students to engage in the simulation). The drama students had
100 previously familiarised themselves with the patient’s background medical history and the general
101 details of the clinical scenario to develop the “given circumstances” of the role (18).

102 Following the tutorial, we sought to assess medicine and drama student responses to their
103 experience by seeking feedback in questionnaires completed immediately post class and in focus
104 groups completed a week afterwards. Extensive constructive feedback was also exchanged between
105 staff, drama students and the medical students participating in the tutorial immediately after it.

106

107

108 **METHODS**

109 *Cohort Studied and Ethical Approval*

110 Second year students (257 in number) participating in the Queen's University Belfast (QUB) medical
111 module "Physiological Basis of Clinical Practice" participated in the study. The drama students were
112 drawn from the final year drama module "Drama, Health and Social Care", 12 of whom provided
113 support for the physiology tutorial. Four staff members from the Centre for Biomedical Sciences
114 Education (CBMSE) in QUB facilitated the tutorial. Staff were selected for wide experience in small
115 group teaching to ensure that learning objectives would be met. Ethical approval for the study
116 design, distribution of questionnaires and conduction of focus groups was granted by the QUB
117 School of Medicine, Dentistry and Biomedical Science Research Ethics Committee.

118 *"Drama Enhanced" Tutorial*

119 Initial preparation for the study saw the authors attending acting classes based on aspects of
120 Konstantin Stanislavski's "System" (18). Students were also invited to these "Healthatre Club"
121 sessions with the aim being to foster an appreciation of the actors craft among current academic
122 and future clinical professionals. The chosen tutorial "Physiology of Hypofertility" was one of six
123 discipline specific tutorials undertaken as part of the second year physiology course. The remit of
124 these classes is to focus students on the clinical application of the basic science studied. The
125 scenario chosen for the drama collaboration involves a 34-year-old woman who has been
126 amenorrhic for a number of months. This was chosen because the clinical signs and symptoms can
127 be directly related to measured physiologic variables providing an excellent context for
128 understanding the basic science and how it applies to medicine. In addition to this, conversations
129 around sex can prove difficult for this young cohort, particularly those centring on the signs
130 described in this case of idiopathic premature menopause. This tutorial was therefore an ideal
131 behavioural skills challenge. Drama students familiarised themselves with the patient's background
132 medical history and general details of the clinical scenario to play the part of the 34-year-old woman
133 (or their partner, enabling male drama students to participate) in addition to the traditional tutorial
134 support material provided for medical students. Additional preparation was facilitated by educators
135 for the Drama students to enable them to work up the "given circumstance" (18) of the case.
136 Symptoms and signs were described for them in detail and the kinds of questions that patients
137 typically ask in these scenarios along with the kinds of internet resources that people may have
138 accessed before going in to see a medical practitioner. They were completely free to develop the
139 role as they saw fit. The aim was to make each interaction as unpredictable and authentic as

140 possible. Drama students were encouraged to relay the information contained in the case both
141 verbally and behaviourally, so heightening the verisimilitude of the session beyond merely an
142 embodied case study. This would take the scenario from the two dimensions of the page to three
143 dimensions of a high-fidelity simulation (17). Medical students were also prepared for the tutorial,
144 being given a “primer” on potential patient conversations, doctors observations and additional
145 information not in the case but potentially implied in the questions that the case asked. While this
146 cohort typically prepares well for tutorial classes, the authors were keen to ensure that this was a
147 true tutorial session where prior knowledge could be applied, not obtained for the first time. For
148 each tutor group of 20-25 medical students there were 2 drama students present, taking part.

149 *Drama student feedback to medical students*

150 After the tutorial, debriefing sessions were held in which the drama students provided feedback to
151 the medical students on how they felt the interaction went, how their queries were met and on the
152 students’ effectiveness in communicating the complex information about their condition. Staff were
153 present during this session too, to ensure that the physiology learning objectives of the class were
154 met and to respond to any queries remaining at the end of the class. All students (both drama and
155 medicine) were invited to email relevant academics with queries and impressions arising from the
156 tutorial in the weeks after it.

157 *Questionnaires*

158 At the end of the tutorial, questionnaires were distributed to all students (drama/medicine) and
159 educators (example in Fig. 1). They were informed that any results would be used for educational
160 research only and were in no way a means of student assessment. It was also made clear that
161 students were under no obligation whatsoever to complete questionnaires, giving them the
162 automatic right to withdraw. The questionnaires were completely anonymous. Submission of a
163 completed questionnaire by an individual was accepted as implied consent. Opinion on the drama
164 enhanced session was evaluated by questions in which the Likert scale was employed (5 - strongly
165 agree to 0 - strongly disagree). Questions focused on students’ affective response to the experience,
166 and to its effectiveness in authentically contextualising professional/biomedical knowledge and
167 showing its value. Final questions focused on the utility of the tutorial in enhancing communication
168 skills, empathy and professionalism (the so-called “non-technical”, “behavioural”, “soft” skills).
169 Scores were then averaged to give mean response out of $5 \pm \text{SEM}$. In addition to the Likert
170 questions, students were given space to write open commentary on what they liked/disliked about
171 the class as well as suggestions for future improvements.

172 *Focus Group*

173 One week after the tutorial series was completed a focus group interview of drama students was
174 conducted, recorded and transcribed for thematic analysis.

175 *Thematic Analysis*

176 Thematic analysis (19) was used to discover, interpret and report meaningful patterns within the
177 data. This involved systematically working through the transcribed dialogue from the focus group
178 and statements from the open commentary to identify topics that were gradually integrated into
179 higher-order key themes that informed discussion of the results.

180

181 **RESULTS**

182 *Response Rates*

183 Questionnaires were distributed to medical students of which 207 out of 257 were completed and
184 returned (80% return). A number of the drama students (12) supported the tutorial more than once
185 and submitted a questionnaire for each iteration (N=20) with all drama students returning at least 1
186 questionnaire (100% return). The focus group was attended by 6 of the 12 drama students.

187 *General description of results.*

188 Table 1 gives mean (\pm SEM) Likert Scores /5 in response to statements on the tutorials. For all
189 students the tutorial was deemed enjoyable, challenging and meaningful. It provided motivation to
190 excel both as actors and future clinicians. There was a difference between the 2 groups on how
191 authentic the interaction was with medical students being very impressed (mean Likert response to
192 question on authenticity 4.1 ± 0.06). However, as is explored in the open commentary (see below)
193 drama students were more critical of the interaction's fidelity citing concerns about medical
194 student:drama student ratio (mean Likert response to question on authenticity 3.6 ± 0.2).

195 *Themes explored in open commentary.*

196 Tables 2 and 3 summarise responses from medicine and drama students in open commentary with
197 themes identified (paraphrased), and the number of times a statement was made in support of the
198 theme in the open commentary section of the questionnaire.

199 *Theme 1; Authenticity*

200 As requested by the authors, the drama students added an authentic, unpredictable element to each
201 of the tutorial sessions. While some played the patient as withdrawn and shy, and some allowed
202 their "partner" to speak for them, others acted extremely confidently in asking the medical students
203 graphic questions about how the condition might affect their sex lives. As a result, in terms of
204 realism and simulating patient encounters in a safe way, medical students highly rated the tutorial as
205 providing an authentic experience of the clinical application of physiology (Likert score 4.1 ± 0.06)
206 with 65 students mentioning this in open commentary. Students (in 65 responses) commented that
207 the simulations were more realistic than family placement with specially chosen "ideal" and "well
208 behaved" patients. They remarked that "badly behaved" and "bolshie" simulated patients added to
209 the challenge of the occasion. Selected quotes from the open commentary included "Drama
210 students provided a very realistic portrayal of potential issues we may encounter in later life" and
211 "drama students were realistic in how the general population talk about sex". Drama students were

212 more critical of the realism of the class (Likert score 3.6 ± 0.2) saying that the ratio of medical
213 student:drama student (11:1) compromised the authenticity of the encounter (all drama students
214 mentioned this).

215 *Theme 2; Empathy/Communication/Behavioural Skills*

216 The tutorial gave both medical and drama students an opportunity to demonstrate empathy (Likert
217 Score 4.5 ± 0.04). Medical students lauded the “safe space” for discussing sensitive and personal
218 issues with 18 mentions of this in open commentary. Selected quotes from medical students
219 illustrating this; *“practicing empathy and stressful encounters in a safe environment”* and *“was a
220 little bit nervous at first to approach such a sensitive topic with a large group, but worth it for the
221 experience”*. A similar impression was relayed by overseeing educators *“the feedback from drama
222 students was fantastic – told them (the medical students) how their anxiety around asking personal
223 questions made her uncomfortable”*. In feedback, the drama students lauded the medical students’
224 professionalism, compassion and attempts at sensitivity, but did cite awkwardness on the part of the
225 students. This was also apparent from the phrases used by medical students during their
226 interactions with drama students where the atrophic vaginitis associated with the condition was
227 alluded to by the medical students as *“trouble south of the border”* and *“how are things.....down
228 there”*.

229 *Theme 3; Physiology in Context*

230 Medical students (51 in number) directly commented that the tutorial helped them contextualise
231 physiology and its application to real life situations (Likert Score 4.1 ± 0.06) with many mentions of
232 the link between communication skills and scientific knowledge. A typical quote illustrating this;
233 *“having the patient interaction made the topic of infertility more real and helped me understand the
234 effects of physiology on the patient”*. There were, however, some students less enthusiastic about
235 this aspect with 12 reporting that they found it less useful for learning physiology than subject
236 specific classes.

237

238 **DISCUSSION**

239 *Salient Results*

240 The findings suggest that the collaborative drama tutorial was a success across many modalities,
241 being considered authentic, facilitating both the application of basic sciences to clinical practice and
242 the development of essential soft skills of communication and empathy. This was evidenced by both
243 drama and medical students in Likert Scores and open commentary. Limitations (observed
244 particularly by drama students) were that more student actors were needed to improve fidelity of
245 the interactions (ratio of student doctors to patients was considered too high). The opportunity to
246 interact with students in other faculties was also seen positively by both cohorts of students.

247 *Integrated Medical Education in the Basic Sciences*

248 It has long been accepted that clinical science teaching in medicine is more effective if made
249 appropriate to the clinical context. Koens and colleagues (4) write of three dimensions of context in
250 clinical education; physical (authentic physical surroundings and equipment used), semantic
251 (application of the knowledge gained) and commitment (motivation to learn, willingness to invest
252 effort). Strategies for enhancing these three dimensions of context have included repurposing
253 clinical devices for the basic science classroom (20) and integrated simulation classes with manikin
254 devices or computer programmes (10,11,12). These simulation experiences have been shown to
255 enhance the learning of basic science phenomena, self-reported measures of learning and clinical
256 self-confidence (10,11), especially when followed by a debrief (12). They are seen as an effective
257 means of demonstrating the relationship between scientific fundamentals and patient care in early
258 year's medical education. While these strategies effectively address Koen's dimensions of context, it
259 could be argued that the unpredictable dimension of the living communicating human is lacking in
260 these interactions, despite their undoubted value.

261 In devising the subject material for our tutorial, we drew together elements of anatomy, physiology,
262 laboratory testing and clinical signs to fully contextualise the scientific basis of the material and
263 develop an integrated case. To this, we added the drama students to provide the final unpredictable
264 context of dealing with a potentially distressed human being. At the same time, students were
265 challenged to understand the science sufficiently to relay it to the patient (something regularly
266 mentioned in open commentary was that the physiology understanding helped them teach the
267 patients about their own condition and realise the importance of a deep understanding of basic
268 science). In addition to this, feedback is offered in the basic science context by the academic

269 facilitating and in the communication/compassion context by the drama student, allowing reflection
270 in all aspects of the material covered.

271 *The value of drama education in early year's medical curricula*

272 The utility of drama collaborations in medical education is being increasingly recognised in recent
273 years. These have manifested in many forms including unpredictable high fidelity simulations
274 involving drama students (17,21), theatrical performances (22), staged consultations and feedback
275 with an actress created patient character (23) and training in specific drama techniques such as
276 "being-in-role", "working with masks" and "body awareness drills" (24,25,26). Observing dramatic
277 performances on AIDS and ovarian cancer increased self-reported empathy and insight towards
278 patients in a self-selected group of students, doctors and university staff (22). These, however, were
279 passive observers of the one person shows being staged as part of the study. In Alraek and
280 Baerheim's work (23), an actress-created patient character interacted with 36 medical students
281 (stage of training not defined) in two sessions; "dealing with a withdrawn patient" and "breaking bad
282 news". Time outs during which the students asked questions of the actress "in role" were
283 incorporated in the training. Reflection on this training was seen to enhance student ability in
284 handling difficult conversations. Realistic interactions between drama students and medical
285 students/personnel have previously resulted in increases in improved self-perceived knowledge and
286 increased clinical team scores (17), as well as improved communication skills (21). It is interesting
287 that a comparable acting collaboration to ours from Hardmann and Schonmann (21) explored
288 similarly sensitive topics (menstrual periods, teenage smoking and contraceptive pill use with
289 revelations of early sexual abuse) and resulted in talk of similarly transformative emergent
290 phenomena from the interactions as in the present work. Drama workshops in specific techniques
291 have also been used in clinical education and shown to increase independent scores of empathy (the
292 Jefferson Scale of Physician Empathy (JSPE)), clinical skills (Observed Structured Clinical Examination
293 (OSCE)), and communication skills (Behaviour Change Counselling Index (BECCI)) (24). Work by
294 Macneill and colleagues (25,26) during drama workshops staged for medical personnel using masks
295 and body awareness drills has drawn attention to the parallels between theatre and medicine and
296 proposed that "*training as an actor offers the capacity to be simultaneously empathetic and*
297 *analytic*".

298 It is evident from these studies that drama collaboration provides a useful tool developing empathy
299 and communication skills and may have a role in providing authentic context to clinical scenarios.
300 The studies mentioned above, however, focus on final year medical students or already qualified
301 doctors and healthcare workers. It is apparent that this kind of communication focused context

302 driven education needs to happen much earlier in the students' career given the dramatic fall off in
303 empathy after third year (9). It is important to build up reserves of meaning, enthusiasm and
304 resilience in the pre-clinical years to offset this reduction. Given the increasing importance placed
305 on behavioural skills by the licencing bodies (1,2) it is vital that they are threaded through the entire
306 curriculum from the earliest years of medical education, even in discipline specific tutorials in the
307 fundamental clinical sciences.

308 *Limitations and potential solutions*

309 While the benefits of the drama collaboration are manifold, negative commentary focused on the
310 paucity of drama students available which compromised the authenticity of the interaction. This
311 could perhaps be offset by the kind of drama training described previously (24,25,26) enabling the
312 medical students themselves to act "in role" as patients. It may also be useful in future
313 collaborations to measure increases in independent (JSPE) (24) scores of empathy before and after
314 the interventions.

315 *Hidden benefits; fun and the value of interdisciplinarity across cultures*

316 Universal enthusiastic commentary was made on how enervating, enriching and fun it was to
317 participate in the collaborations and meet students from different faculties in the university.
318 Observing how people from different cultures deal with difficult personal topics centring on identity
319 and sexuality, and attempting to accommodate these differences in lived experiences has many
320 applications in personal development and may contribute to the decolonisation of undergraduate
321 medical curricula (27).

322 *Concluding comments.*

323 The collaborative programme was enthusiastically enjoyed, seen as authentic, relevant and useful
324 both in giving context to basic science and training in interpersonal skills. The opportunity to work
325 with students in different faculties was welcomed, despite the limitation in numbers of drama
326 students available. Given this paucity of drama students, it may be useful to develop a model where
327 future clinicians learn to perform the role of the patient. Collaborations with drama departments
328 may see training enabling medical students to "become" their own patients in the future. This has
329 obvious profound implications for behavioural skills, compassion and empathy in the "role" of the
330 doctor.

331

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387

388 **Figure Legend**

389 **Fig.1.** Questionnaire distributed to medical students immediately after participating in the drama
390 enhanced medical tutorial. Drama students filled in a similar questionnaire.

391

392 **Table Legends**

393 **Table 1.** Mean (\pm SEM) Likert scores in response to statements about the tutorial. Medical student
394 responses (n=207) are given in the upper panel and those from drama students (n=20) in the lower
395 panel.

396 **Table 2.** Summary of responses in “open commentary” section of questionnaires completed by
397 medical students (207 feedback sheets returned). Statement (paraphrased) is given along with the
398 number of times it was made.

399 **Table 3.** Summary of responses in “open commentary” section of questionnaires completed by
400 drama students (20 feedback sheets returned). Statement (paraphrased) is given along with the
401 number of times it was made.

402

403

Fig. 1

Questionnaire evaluating the “drama enhanced” physiology tutorial

Tick the relevant boxes to indicate your level of agreement with the following statements:
Strongly agree (SA); Agree (A); Neither Agree nor Disagree (NA); Disagree (D); Strongly Disagree (SD)

	SA	A	NA	D	SD
Working with drama students					
1. I was nervous working with the drama students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I was confident in my abilities to deal with the drama students	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I felt embarrassed discussing “personal” issues with the drama student as patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Value of the “drama enhanced” tutorial					
4. This tutorial provided an authentic experience of clinical application of physiology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. This tutorial tested my physiologic knowledge/diagnostic skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. This tutorial provided an opportunity to practice/demonstrate empathy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. This tutorial provided an opportunity to practice professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. This tutorial tested my communication skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. This tutorial was a poor learning experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disadvantage of the “drama enhanced” tutorial					
10. Physiology is best taught in isolation to other skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. This tutorial wastes valuable time that could be used to address academic issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General opinions					
12. I enjoyed this tutorial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. This tutorial motivated me to know my physiology better	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
What did you like about collaboration with drama students in physiology tutorials? (Continue over the page if necessary)					
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What did you dislike about collaboration with drama students in physiology tutorials? (Continue over the page if necessary)					
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Have you any further comments/opinions/suggestions for improvements for the collaboration. (Continue over if necessary)					

Table 1.

Medical Students (80% Return)				
This tutorial provided an authentic experience of the clinical application of physiology	This tutorial tested my physiologic knowledge/diagnostic skills	This tutorial provided an opportunity to practice/demonstrate empathy	This tutorial motivated me to know my physiology better	I enjoyed this tutorial
4.1 ± 0.06	4.1 ± 0.06	4.5 ± 0.04	4.1 ± 0.06	4.2 ± 0.05
Drama Students (100% Return)				
This tutorial provided an authentic experience of the Dr/patient relationship	This tutorial tested my acting skills	I challenged the medical students in a useful way	This tutorial motivated me to become a better actor	I enjoyed this tutorial
3.6 ± 0.2	4.5 ± 0.1	4.1 ± 0.1	4.6 ± 0.5	4.7 ± 0.1

Table 2.

Medical Student Responses (n = 207)		
	Statement	Number of times said
Like	Realistic, authentic, some going as far as to say that it felt more real than placement and certainly than Clinical Skills Education Centre work	65
	Contextualises physiology and its application to real life situations	51
	Shows the importance of and enhances soft skills training (communication, empathy, history taking)	41
	Fun, interesting, a change, can we have more please?	26
	Safe space to practice dealing with sensitive "personal" issues	18
	Drama student being difficult/badly behaved is a real authentic challenge for sure	10
	It's OK to mess up here with no consequences	5
	Feedback from Drama student useful	2
	Need to work with humanities more/Science isn't the be all and end all of everything in medicine	2
Dislike	Too few drama students in each group. Definitely needs a changed ratio	40
	Covered in clinical Skills, family attachment, placement classes already	14
	Made the tutorial very rushed	13
	Not good for learning physiology	12
	Scary, tough daunting	3
	Male drama student made it inauthentic	3
	Was artificial, slightly inauthentic	2
	Patient aggressive and didn't respond in an expected way	1
The drama students didn't know the answers about their own condition because they weren't actually patients	1	
Suggestions	We need more preparation time so we can investigate the disease symptoms and treatments	14
	The topic was too sensitive, try a less controversial one so we will be less stressed	4

Table 3.

Drama Student Responses (n = 20)		
	Statement	Number of times said
Like	Upskilling our acting skills in a non-traditional way/cross disciplinary work	11
	Sense of worth gained through helping future clinicians	3
	Authentic emotional experience	2
	Interaction with whole group	2
	Professional application of skill	1
	Fun	1
	Enhances Confidence	1
Dislike	Too many medical students for each drama student, reduces authenticity, allows some students to sit back	12
	Awkward in places	1
Suggestions	Worthwhile, thoroughly enjoyable	4
	Was a great opportunity to get feedback from end users	1