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Medical students' views of clinical environments.

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SUMMARY

Background: Monitoring the quality of clinical learning environments (CLEs) is immensely important in medical education. Objective indicators of the quality of the CLE can be used to measure learner perceptions and to inform educational improvements; however, many established tools were not designed for use in clinical settings and are not theoretically grounded. Our aim was to apply a new tool to the new context of a UK setting to explore the perceptions of senior medical students in a number of different CLEs.

Methods: The four-factor Undergraduate Clinical Education Environment Measure (UCEEM) was translated into English, and used to gather final-year medical students' perceptions of four different specialties they had rotated through: Emergency Medicine (EM), General Surgery (GS), Medicine for the Elderly (ME), and Obstetrics and Gynaecology (O&G). The UCEEM was distributed in paper form.

Students were asked to complete it in relation to two of the four specialties.

Results/findings: Year-5 medical students ($n = 132$) returned a completed UCEEM. For opportunities to learn in and through work experience EM was reported the most positively. ME was perceived to be the most prepared for student entry. Students reported being well received by staff and made to feel part of the team within GS, EM and ME, but less so in O&G.

Discussion: UCEEM appears to be a useful tool for evaluating medical student perceptions of CLEs. Theoretically robust, UCEEM is straightforward to administer and to score. It has the potential to be used by time-pressured educators to collect baseline and comparative data for evaluation and improvement purposes.

INTRODUCTION

Senior medical students spend most of their time embedded in the clinical workplace, rotating through specialties to gain insight and experience across a range of medical settings. These clinical learning environments (CLEs) are considered to comprise a range of elements, such as learning opportunities, role modelling, and attitudes towards teaching and patients, all of which can influence learning, learner well-being and satisfaction.¹ More recent evidence shows that students' perceptions of the CLE also affect the ability of the learner to attain the necessary achievements to progress in training,² and affects how they practice after finishing their training.³

As a consequence, how a clinical organisation (e.g. a hospital) functions as a learning environment is under scrutiny by regulatory organisations such as the UK General Medical Council,⁴ which has set standards for undergraduate and postgraduate medical education, and carries out annual national trainee/ trainer surveys. These standards empower educators by placing requirements on organisations to commit to and support learning. Assessing learners' perceptions of the CLE is crucial in this endeavour to assess what works and what is less effective.

Various tools have been developed to do just this. Most existing tools approach the CLE as an educational arena, however, rather than a working environment that provides authentic conditions for applying prior learning, but where there are often tensions between providing the best care to patients and ensuring the quality of the education delivered.⁵ Moreover, many popular tools have also been criticised for their apparent lack of theoretical basis, including a failure to evaluate explicitly important phenomena such as the invitational qualities of a CLE.⁶

Box 1. Development and evaluation of the UCEEM⁸

The UCEEM was developed to measure how undergraduate medical students perceive the educational climate in clinical environments in a sample of Swedish medical students. It is grounded in workplace sociocultural learning theory,⁷ and was developed through qualitative data from focus groups ($n = 5$) and in-depth interviews with students, clinical supervisors and medical educators ($n = 7$), as well as through continual feedback from key stakeholders. Once piloted (350 completed questionnaires), the 25-item instrument was produced with two overarching dimensions – experiential learning and social participation – with four subscales: opportunities to learn in and through work, and quality of supervision; preparedness for student entry; workplace interaction patterns and social inclusion; and equal treatment (Box 2).

The UCEEM was further evaluated using a longitudinal, mixed-methods approach, comparing score interpretations (between baseline and intervention points; $n = 463$) and qualitative data (10 student focus groups; 33 semi-structured interviews with students, clinical supervisors and management) within and between settings in two departments in a Swedish teaching hospital.⁹ The interpretation of the scores was supported by evidence of content, internal structure, relations to other variables (Maastricht Clinical Teaching Questionnaire) and, to an extent, by response process.⁹ It was highlighted that further validation within other contexts would be advantageous, but that it was valuable for assessing aspects of the clinical learning environment and providing feedback in order to direct improvement within the departments.

The new Undergraduate Clinical Education Environment Measure (UCEEM) seeks to address these shortcomings (Box 1).⁷ It is specifically aimed at measuring learner perceptions of the CLE. Based in workplace learning theory, it examines multiple organisational qualities that stress social inclusiveness and experiential learning. It gathers feedback on how learners perceive the social, emotional and cognitive dimensions of the CLE, and allows for comparison across groups and across environments.⁷

The UCEEM was developed in Sweden and although anecdotal evidence suggests it is being applied in other countries and languages, there are no published reports of its use outside Sweden to date. Working closely with the developer of UCEEM (PS), we translated UCEEM into English, taking care to ensure that the translation was accurate, and piloted it locally. The aim of the present study was to use the UCEEM in the new context of a UK setting, and to explore the perceptions of senior medical students of a number of different CLEs.

METHODS

This was a cross-sectional questionnaire study accessing the entire fifth-year medical student population at the end of the year. Ethical approval was granted by the local Ethical Review Board (CERB/2015/8/1231). Data collection occurred in April 2016.

Context

We focused on evaluating the CLE in four clinical specialities in one health care organisation that had been identified as receiving mixed reviews from students in routine, internal evaluations: Emergency Medicine (EM); General Surgery (GS); Medicine for the Elderly (ME); and Obstetrics and Gynaecology (O&G). We had no insight into the reason for these mixed reviews, and wished to explore this further through the study.

Sample and data collection

Participants were (final) Year 5 medical students at one medium-sized UK medical school who had rotated through the CLEs presented above throughout Years 4 and 5. Information about the study was sent out by e-mail to the year group in advance, and then the study was briefly presented during an end-of-year session at which the entire Year 5 was present, the focus of which was reflecting on clinical learning experiences. Students were then invited to complete the questionnaire in relation to two of the CLEs that they had recently rotated through (out of EM, GS, ME or O&G, of which every student would have rotated through at least three of the four), and return it at the end of the session. Participants were advised to select rotations that were memorable for either positive or negative reasons. The length of each rotation was 8 weeks. Demographic information was also collected (gender, year of study, year of entry to medical school, school leaver or graduate/mature student). No identifiable data were requested.

Questionnaire

The UCEEM consists of 25 items scored on a five-point Likert scale (ranging from fully disagree to fully agree) relating undergraduate students' perceptions of the invitational, organisational and pedagogical quality of the clinical learning environment (Box 2).

Invitational quality refers to students' perceptions of opportunities to participate and learn from work experiences, interaction patterns and students' inclusion in the department, and student agency and engagement. Organisational quality encompasses the preparedness of all parties (including consultants, nursing staff and other health care professionals, as well as senior learners and junior doctors) for student entry, as well as space and resources.

Pedagogical quality refers to autonomy-supportive environments that enhance student reflective capabilities.

Box 2. UCEEM survey items*

1. I received useful induction to this placement.
2. My supervisors were expecting me when I arrived.
3. My (work) tasks are relevant to the learning objectives.
4. I am sufficiently occupied with meaningful (work) tasks.
5. My tasks are suitably challenging for my level of knowledge and skills.
6. I am encouraged to participate actively in the work here.
7. I have adequate access to computers.
8. There is sufficient physical space for the number of medical students on placement here.
9. I have a supervisor to whom I know I can turn.
10. I have sufficient access to supervision.
11. The supervisors are well prepared for supervising.
12. It is clear that my supervisors are familiar with the learning objectives.
13. I receive useful feedback from my supervisors.
14. I feel able to ask my supervisors any question I wish.
15. I get the opportunity to provide a rationale for my actions during supervision sessions.
16. My problem-solving skills are developing well in this placement.
17. I have the opportunity to put my theoretical knowledge into practice in this placement.
18. I have the opportunity to learn together with other medical students in this placement.
19. As a student I am received in a positive way by the staff here.
20. I feel included in the team of people who work here.
21. I feel welcome in the staff room/lunch room here.
22. Communication between those working here is good.
23. Everyone is treated equally here, regardless of cultural background.
24. Everyone is treated equally here, regardless of gender.
25. I feel I have influence over my learning in this placement.

*The responses are scored on a Likert scale: 1, fully disagree; 2, agree to a slight extent; 3, neutral; 4, agree to a large extent; 5, fully agree.

RESULTS

Of the 165 students present, 138 returned the UCEEM (84% response rate from the whole cohort). Six questionnaires were incomplete and were not entered into the analysis. Thus, 132 final-year medical students returned a completed UCEEM questionnaire, rating the four departments a total of 256 times (some students only rated one department). The majority of respondents were female (59%, commensurate with the class gender ratio), and 88 per cent were school leavers (compared with 12% mature or graduate students, again roughly proportionate to the class ratio). The reported medical student perceptions of

the CLE and examples of specific items are shown in experiences. Students were then invited to complete the questionnaire in relation to two of the CLEs that they had recently rotated through (out of EM, GS, ME or O&G, of which every student would have rotated through at least three of the four), and return it at the end of the session. Participants were advised to select rotations that were memorable for either positive or negative reasons. The length of each rotation was 8 weeks.

Table 1. UCEEM scales (shown in bold), subscales and example items

	General Surgery Median (L-UQ)	Emergency Medicine Median (L-UQ)	Medicine for the Elderly Median (L-UQ)	Obstetrics & Gynaecology Median (L-UQ)
Number of students who rated each department	87	42	60	67
Scale 1: experiential learning	3.6 (3.0–4.2)	3.9 (3.2–4.4)	4.0 (3.3–4.4)	3.6 (2.7–4.0)
A, opportunities to learn in and through work and quality of supervision	3.8 (3.1–4.3)	4.0 (3.3–4.6)	4.0 (3.4–4.3)	3.2 (2.6–4.1)
5. My tasks are suitably challenging for my level of knowledge and skills.	4.0 (3.0–5.0)	4.0 (4.0–5.0)	4.0 (3.0–4.0)	4.0 (3.0–4.0)
13. I receive useful feedback from my supervisors.	4.0 (3.0–5.0)	4.0 (3.0–5.0)	4.0 (3.0–5.0)	3.0 (3.0–4.0)
B, preparedness for student entry	3.5 (2.5–4.2)	3.7 (2.8–4.5)	4.0 (3.2–4.7)	3.50 (2.6–4.0)
1. I received useful induction to this placement.	3.8 (3.0–5.0)	3.6 (3.0–5.0)	3.3 (2.0–4.0)	3.4 (2.0–5.0)
2. My supervisors were expecting me when I arrived.	3.7 (3.0–5.0)	3.6 (3.0–4.3)	3.6 (3.0–4.0)	3.4 (3.0–4.0)
Scale 2: social participation	4.2 (3.5–4.7)	4.0 (3.5–4.7)	4.0 (3.4–4.6)	3.8 (3.2–4.4)
C, workplace interaction patterns and student induction	3.8 (3.2–4.5)	3.9 (3.1–4.5)	4.0 (3.0–4.0)	3.3 (2.5–4.2)
20. I feel included in the team of people who work here.	3.4 (2.0–4.0)	3.6 (3.0–5.0)	3.6 (3.0–4.0)	3.3 (2.0–4.0)
22. Communication between those working here is good.	3.3 (2.0–4.0)	3.7 (3.0–5.0)	3.7 (3.0–5.0)	3.3 (2.0–4.0)
D, Equal treatment	4.5 (4.0–5.0)	5.0 (4.0–5.0)	4.5 (4.0–5.0)	4.0 (3.0–5.0)
23. Everyone is treated equally here regardless of cultural background.	5.0 (4.0–5.0)	5.0 (4.0–5.0)	4.0 (4.0–5.0)	4.0 (3.0–5.0)
24. Everyone is treated equally here regardless of gender.	4.0 (4.0–5.0)	5.0 (4.0–5.0)	5.0 (4.0–5.0)	4.0 (3.0–5.0)

L-UQ - Lower-upper quartiles.

Table 1 (see Appendix S1 for all item results, published online as supporting information), which also illustrates similarities and differences of learner perceptions of different clinical departments.

Overall, O&G was reported as poorer and ME was reported as stronger in relation to key aspects of the CLE. Students reported ME and EM as having more opportunities to learn in and through work experience (Table 1, section 1, A). O&G scored lower than the other units in relation to receiving feedback and being able to ask questions (Table 1, section 1, A, item 13). ME was also perceived to be the most prepared for student entry (Table 1, section 1, B), particularly in reference to inductions (Table 1, section 1, B, item 1), with the other three scored as lower/neutral. GS was reported as lower/neutral in terms of supervisor readiness and availability (Table 1, section 1, B, item 2). GS, EM and ME were reported as stronger than O&G for social participation (Students reported ME and EM as having more opportunities to learn in and through work experience (Table 1, section 2, C). Students reported being well received by staff and made to feel part of the team within GS, EM and ME, but less so within O&G, which was reported as neutral (Table 1, section 2, C, item 20). All departments scored highly on good interpersonal communication and on equal treatment (Table 1, section 2, D).

DISCUSSION

The UCEEM can provide useful information about how medical students perceive CLEs, having been applied in a new context of a UK setting.^{7,8} Its theoretically robust scales and subscales, based upon workplace sociocultural learning theory,^{6,7} provided much information on what students liked and disliked about each environment in terms of learning and social participation. We fed this back to the four clinical departments, who used their unit-specific data as the basis for initiating discussions and workshops around optimising their clinical learning environment for this group of learners.

A welcome introduction to the department, a sense of belonging and teamwork, and student-centred supervision have been identified as prerequisites for effective learning and patient care.¹⁰ Our data add to this by highlighting a number of points that may be valuable for practitioners to consider when looking to better understand and perhaps direct improvements in their own CLE. These included: what students should expect both in terms of tasks and interaction; time and space set aside for teaching; and consideration of the impact of teacher/ trainer behaviour on learner perceptions of the CLE. Put simply, how are:

- student induction and learning opportunities organised;
- students made to feel welcome and part of the clinical team;
- learner tasks planned and evaluated?

A more general reflection on the educational ethos of the unit, and how this may be perceived by learners, would also be beneficial as part of LE improvement purposes, such as before commencing interventions or before/during auditing.

Our study is limited by several factors. First, a cross-sectional design can give only a 'snapshot' in time; however, as with similar instruments, UCEEM can be used as a baseline measure and then used subsequently for follow-up, to evaluate the effectiveness of interventions to improve the CLE. Second, it is possible that the length of time since the placements, and subsequent placements, could potentially have skewed the students' perceptions reported in the data. Students' experiences (e.g. very good or very poor) are also likely to influence which placements they selected to report upon. In the future it may be advantageous to coordinate data collection with placement and rotation end dates, examine potential differences between the times elapsed since rotations and examine the perceptions of all rotations. Third, although our response rate is good, the study may be potentially limited by response bias, with certain students more likely to complete surveys; however, our respondents were representative of the final-year student population, at least in terms of gender and age. Our study was carried out in one context, albeit in four different departments. Further validation of the UCEEM in different populations and contexts will allow for statistical comparisons across clinical specialities and environments to extrapolate to what extent the results reported in this study are context specific. The UCEEM is also useful as a means for directing further in-depth qualitative research, such as examining the role of belonging in the CLE in O&G.

In conclusion, the UCEEM feeds back learner perceptions of the CLE to educators and organisations, in theory-based, consistent and clear language.⁷ Our data, in conjunction with evaluation data,⁸ suggest that the UCEEM has the potential to provide departments with insights into behaviours, and thus insights into their own culture, in units and within teams. We recommend its use to direct discussion, assist with managing the tensions between organisational and educational priorities, and to facilitate quality improvement initiatives.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article at <http://onlinelibrary.wiley.com/doi/10.1111/tct.12691/suppinfo>

Appendix S1. UCEEM scales (shown in bold) and all item*median responses (lower - upper quartiles (L-UQ)) for each of the four departments.

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Appendix S1. UCEEM scales (shown in bold) and all item* median responses (lower – upper quartiles (L-UQ)) for each of the four departments

Appendix A. UCEEM scales (shown in bold) and all item* median responses (lower – upper quartiles (L-UQ)) for each of the four departments.

UCEEM – UK Factors & Items *	General Surgery Mean (L-UQ)	Emergency Medicine Mean (L-UQ)	Medicine for the Elderly Mean (L-UQ)	Obstetrics & Gynaecology Mean (L-UQ)
Number of students who rated each department	87	42	60	67
Scale1: Experiential Learning	3.6 (3.0-4.2)	3.9 (3.2-4.4)	4.0 (3.3-4.4)	3.6 (2.7-4.0)
1:A: Opportunities to learn in and through work & Quality of supervision	3.8 (3.1-4.3)	4.0 (3.3-4.6)	4.0 (3.4-4.3)	3.2 (2.6-4.1)
3. My (work) tasks are relevant to the learning objectives.	3.9(3.0-5.0)	3.7 (3.0-4.3)	3.8 (3.0-4.0)	3.5 (3.0-4.0)
4. I am sufficiently occupied with meaningful (work) tasks.	3.8 (3.0-5.0)	3.7 (3.0-5.0)	3.5 (3.0-4.0)	3.1 (3.0-4.0)
5. My tasks are suitably challenging for my level of knowledge and skills.	4.0 (3.0-5.0)	4.0 (4.0-5.0)	4.0 (3.0-4.0)	4.0 (3.0-4.0)
6. I am encouraged to participate actively in the work here.	3.9 (3.0-5.0)	4.0 (3.8-5.0)	3.8 (3.0-5.0)	3.3 (3.0-4.0)
13. I receive useful feedback from my supervisors.	4.0 (3.0-5.0)	4.0 (3.0-5.0)	4.0 (3.0-5.0)	3.0 (3.0-4.0)
14. I feel able to ask my supervisors any question I wish.	3.5 (3.0-5.0)	3.7 (2.6-5.0)	3.8 (3.0-5.0)	3.3 (3.0-4.0)
15. I get the opportunity to provide a rationale for my actions during supervision sessions.	3.5 (3.0-5.0)	3.9 (3.0-5.0)	3.8 (3.0-5.0)	3.2 (3.0-4.0)
16. My problem-solving skills are developing well in this placement.	3.7(3.0-5.0)	4.0 (3.0-5.0)	3.7 (3.0-4.0)	3.2 (3.0-4.0)
17. I have the opportunity to put my theoretical knowledge into practice in this placement.	3.8 (3.0-5.0)	4.0 (3.0-5.0)	3.7 (3.0-4.0)	3.2 (3.0-4.0)
18. I have the opportunity to learn together with other medical students in this placement.	3.7 (3.0-5.0)	3.7 (3.0-5.0)	4.0 (4.0-5.0)	3.4 (3.0-4.0)
25. I feel I have influence over my learning in this placement.	3.7 (3.0-5.0)	4.2 (3.0-5.0)	3.8 (3.0-5.0)	3.4 (3.0-4.0)
1:B: Preparedness for student entry	3.5 (2.5-4.2)	3.7 (2.8-4.5)	4.0 (3.2-4.7)	3.50 (2.6-4.0)
1. I received useful induction to this placement.	3.8 (3.0-5.0)	3.6 (3.0-5.0)	3.3 (2.0-4.0)	3.4 (2.0-5.0)
2. My supervisors were expecting me when I arrived.	3.7 (3.0-5.0)	3.6 (3.0-4.3)	3.6 (3.0-4.0)	3.4 (3.0-4.0)
9. I have a supervisor to whom I know I can turn.	3.8 (3.0-5.0)	4.0 (3.0-5.0)	3.8 (4.0-5.0)	3.5 (3.0-4.0)
10. I have sufficient access to supervision.	4.0 (3.0-5.0)	4.0 (3.0-5.0)	4.0 (3.0-5.0)	3.0 (2.0-4.0)
11. The supervisors are well prepared for supervising.	3.8 (3.0-5.0)	3.7 (3.0-5.0)	3.5 (2.0-5.0)	3.3 (2.0-4.0)
12. It is clear that my supervisors are familiar with the learning objectives.	4.0 (3.0-5.0)	4.0 (3.0-5.0)	4.0 (4.0-5.0)	4.0 (2.0-4.0)
Scale 2: Social Participation	4.2 (3.5-4.7)	4.0 (3.5-4.7)	4.0 (3.4-4.6)	3.8 (3.2-4.4)
2:C: Workplace interaction patterns & student induction	3.8 (3.2-4.5)	3.9 (3.1-4.5)	4.0 (3.0-4.0)	3.3 (2.5-4.2)
7. I have adequate access to computers.	3.0 (2.0-4.0)	4.0 (2.0-4.3)	4.0 (4.0-5.0)	4.0 (2.0-5.0)
8. There is sufficient physical space for the number of medical students on	3.0 (2.0-4.0)	3.0 (2.0-4.3)	4.0 (4.0-5.0)	4.0 (2.0-5.0)

placement here.				
19. As a student I am received in a positive way by the staff here.	3.3 (2.0-4.0)	3.7 (2.8-5.0)	3.5 (3.0-4.0)	3.2 (2.0-4.0)
20. I feel included in the team of people who work here.	3.4 (2.0-4.0)	3.6 (3.0-5.0)	3.6 (3.0-4.0)	3.3 (2.0-4.0)
21. I feel welcome in the staff room/lunch room here.	3.4(2.0-4.0)	3.7 (3.0-5.0)	3.7 (3.0-5.0)	3.3 (2.0-4.0)
22. Communication between those working here is good.	3.3 (2.0-4.0)	3.7 (3.0-5.0)	3.7 (3.0-5.0)	3.3 (2.0-4.0)
2:D: Equal treatment	4.5 (4.0-5.0)	5.0 (4.0-5.0)	4.5 (4.0-5.0)	4.0 (3.0-5.0)
23. Everyone is treated equally here regardless of cultural background.	5.0 (4.0-5.0)	5.0 (4.0-5.0)	4.0 (4.0-5.0)	4.0 (3.0-5.0)
24. Everyone is treated equally here regardless of gender.	4.0 (4.0-5.0)	5.0 (4.0-5.0)	5.0 (4.0-5.0)	4.0 (3.0-5.0)

*The responses are given on a scale of 1- Fully Disagree; 2 - Agree to a slight extent; 3 – Neutral; 4 – Agree to a large extent; 5 – Fully agree.