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Evaluating the educational environment of an international animal model-based wet lab course for undergraduate students



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HIGHLIGHTS

- ESMSC is an International Surgical Science and Wet Lab course aimed at undergraduates.
- Students seem to positively rate the ESMSC educational environment.
- Year 3/4 Students have a significantly positive "Perception of Learning", when compared to Year 5/6.
- KCL Students gave a more feedback on the course compared to their Greek counterparts.
- Further research should focus on involving and motivating students early in BST.

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ABSTRACT

Background: Essential Skills in the management of Surgical Cases – ESMSC is an International Combined Applied Surgical Science and Wet Lab course aimed at the undergraduate level. ESMSC combines interactive basic science workshops and case-based learning, with basic surgical training modules (BST) on Ex Vivo and In Vivo swine model. In Vivo Dissections include more advanced modules i.e. Abdominal Anatomy Dissections and Cardiac Transplant.

Aim: To evaluate the educational environment of a novel course, as well as to compare Medical students' perceptions across various groups.

Materials and Methods: 83 Delegates from King's College London (KCL) and several Hellenic Medical Schools attended the ESMSC course. The DREEM inventory was distributed upon completion of the modules.

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Results: The mean overall score for DREEM inventory was 148.05/200(99–196, SD = 17.90). Cronbach's Alpha value was 0.818, indicating good internal consistency of the data. Year 3/4 Students have a significantly positive "Perception of Learning", when compared to Year 5/6 (36.43 vs. 33.75, $p = 0.017$). KCL Students have a more positive view of the course compared to their Greek counterparts (155.19 vs. 145.62/200, $p = 0.034$). No statistical significant difference was noted when comparing male vs. female students ($p > 0.05$).

Conclusions: Students seem to positively rate the ESMSC educational environment. Junior as well as KCL students appear to be more enthusiastic. Further research should focus on the optimal strategy for early involvement and motivation of various students' groups in BST.

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1. Introduction

The educational environment is considered to be a crucial parameter that reflects directly onto the students' satisfaction, academic aspirations and overall perception of well-being [1]. It is important to note that, most of the curricula are shifting toward a student-centered pattern, where evaluation of the educational environment has been possible through various tools, that aim to objectively measure various parameters [1–3]. Recent evolution in Medical Education, diversity in the personality of Medical Students, as well as occasional misinterpretation by teachers of students' perceptions regarding the educational environment [4], have underlined the need of effective evaluation of the latter [1]. Apart from the educational environment's role in students' learning [5–7], its continuous evolving character, sets the need for an objective, unbiased tool to assess the impact of various changes directly onto the educational process.

Various tools have been designed to assess educational environment [8,9]. The Dundee Ready Education Environment Measure (DREEM) [10–12] is a validated 50-statement questionnaire, which is used to effectively evaluate the educational environment. The overall evaluation is based on the aggregate scores, as well as the 5 subscales, and many authors include and comment on each of the 50 statements individually [1,13]. DREEM inventory has been used to evaluate various educational environments [1,4,13–29], mainly in undergraduate curricula, as well as postgraduate training [30].

Although some studies question the 5 factor structure of DREEM [13,31], Soemantri et al. [8] conducted a systematic review on various tools, and concluded that DREEM is the most comprehensive measure of the educational environment. Nevertheless, Miles et al. [1] notes in their systematic review, that despite DREEM being an effective tool, consensus on statistical analysis and interpretation of the findings should be reached to avoid misconceptions.

Essential Skills in the Management of Surgical Cases – ESMSC [32] is an International Combined Applied Surgical Science and wet lab course aimed specifically at the undergraduate level. It combines basic science workshops (ABGs, ECG, Shock), case-based learning on various surgical cases with basic surgical skills (BST) training on ex vivo and in vivo swine modules. In Vivo Dissections involve various basic and more advanced modules on swine model. Delegates also have the chance to be actively involved in the Cardiac Explantation under bypass In Vivo experiment as well. Ex Vivo stations include basic suturing, fundamental laparoscopic skills (FLS), Open Reduction Internal Fixation (ORIF) of long bone fractures, wound debridement and tendon repair. The unique component of ESMSC curriculum lies in the mixture of high-fidelity In Vivo SBL, with other wet or dry lab lower fidelity modules with Basic and Applied Surgical Science interactive workshops. It also offers a unique opportunity for exchange of ideas between various educational background delegates as well as faculty

members and it involves, motivates and inspires students at an early stage to pursue a surgical career.

In the context of developing a novel, international, two-day course, involving intense basic, as well as more advanced skills-based training, we considered it essential to objectively evaluate the educational environment using DREEM questionnaire.

2. Aims

The primary aim of this study is to evaluate the overall educational environment of a novel international wet lab course (ESMSC). Additionally, we wanted to compare the overall and the subscale scores among different groups of students.

3. Materials and Methods

Delegates from the UK (King's College London), as well as Greek Medical Schools register their interest to attend the ESMSC course online (esmsc.gr). Selection of participants is performed via our online portal, based on CV criteria including number of publications, presentations in conferences etc. A relevant statement, where participants advocate their interest and motivation towards a surgical career, is attached to the application. The application, as well as the course is run in English, and good operational command of the language is mandatory. A panel of two senior faculty members independently assesses the applications. This is to assure that the best candidates are selected, while at the same time, homogeneity, in terms of previous exposure and background knowledge, is still maintained. This was performed on the basis to eliminate selection bias i.e. selecting only very competent students. With regards to the faculty members, all of them are proficient or native English speakers and comprise from junior to senior trainees as well as Consultants and Academics from the UK, Greece or other various countries from the EU and abroad. The ratio between delegates and faculty members is almost 1:1 to ensure highest quality teaching is assured.

Delegates were asked to fill the DREEM inventory anonymously, in the teaching room, immediately following completion of the ESMSC. Data on Demographics (Age and Sex), as well as Medical School and Year of Studies were recorded and demonstrated in Graph 1.

Reliability analysis, using Cronbach's Alpha coefficient, was performed to evaluate internal consistency of the DREEM. Acceptable level of internal consistency was considered if Cronbach's Alpha is between 0.5 and 0.7, and good level if above 0.7 [33]. Interclass Correlation Coefficient (ICC) was used to evaluate the level of agreement between measurements. $ICC < 0.2$ is considered as poor agreement, 0.21–0.40 as fair, 0.61–0.80 as good and 0.81–1.0 as very good.

Scoring, as well as Interpretation of the DREEM inventory was

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