"PBL on 'roids"- Application of an adapted Constructivist Learning Environment Survey to investigate the perceptions of students in a community-based undergraduate obstetrics learning placement

JK Marcus

University of Cape Town

B Leibowitz

University of Stellenbosch

Corresponding author:

JK Marcus

University of Cape Town Obstetric Skills Laboratory

Mowbray Maternity Hospital

Hornsey Road

Mowbray

7925

Cape Town

South Africa

Telephone: +27 21 659 5579

Email: jason.marcus@uct.ac.za

<u>Abstract</u>

Background: Community-based placement of students provides an ideal opportunity to develop constructivist learning environments for learning. Students are placed in a low risk obstetric care facility where they required to interview, examine and manage uncomplicated pregnancies under supervision of a lecturer.

Aims: The aim of this study was to investigate the appropriateness of using a validated Constructivist Learning Environment Survey (CLES) to gauge the perceptions of students in a community-based health sciences placement. A further aim of the study was to evaluate whether the learning environment was compliant with constructivism.

Methods: An adapted CLES was administered to 99 students and 44 students were interviewed using the instrument scales as a schema.

Results: The surveys were analysed and mean scores at or above 20 were obtained, where the 5 different scales would have a maximum score of 30 each. No gender or racial differences were elicited from the survey responses. Interview data supported the data of the survey that demonstrated the constructivist nature of the learning environment.

Conclusion: The CLES appears to be an appropriate and useful instrument in evaluating a community-based constructivist learning environment in low-risk obstetric care.

<u>Practice Points:</u>

- Learning environment research instruments developed for other settings may be appropriate to use in more specific training in health sciences education.
- The adapted CLES proved useful in evaluating a constructivist clinical learning environment.

<u>Introduction</u>

Community-based education has become an important aspect of contemporary health science education where patient care is moving away from hospital facilities to community settings. The emphasis is on addressing the health needs of the local community and priming the student to work in that community (Worley, 2006). Placement in the community has been found to be "valued by students" in a study conducted in the United Kingdom by Alderson and Oswald (1999, p429). It is widely believed that clinical placement serves as a valuable learning exercise across all health science disciplines (Papp et al, 2003, Saarikoski et al, 2002, Bandiera et al, 2005, Chamberlain, 1997). Clinical placement fulfils a role in providing a platform to merge theory and practice and makes provision for "real world experiences"; furthermore the success of any clinical programme is dependant on the "effectiveness of the clinical experience" in a real world setting (Rosie and Murray, 1998, p228, Henderson et al, 2006, p565).

The University of Cape Town (UCT) reorientated its curriculum towards a primary health care approach in 1994 to equip graduates from all disciplines in the health professions with the necessary skills and attitudes to better serve the communities in which they will be expected to work as graduates (Irlam, Keikelame and Vivian, 2009). The reorientation is aimed at allowing students to better understand members of a community in a more holistic way, within their own contexts, applying a bio-psychosocial model of care rather than just viewing people as biological beings (Mennin and Petroni-Mennin, 2006).

Students in year 4 of a 6 year undergraduate medical programme at UCT spend a morning at a dedicated student learning centre (SLC) attached to a community health centre at which a Midwife Obstetric Unit (MOU) is situated as part of a clinical rotation in Obstetrics. A MOU provides low risk perinatal care to pregnant women and newborns in the Cape Town metropolitan area in a tiered perinatal care system (Marcus and Clow, 2009). The SLC has

been specifically built and developed, by the university, to allow students to interview, examine and manage patients in a setting that is purpose-built for clinical encounters without compromising space and time in the adjacent community health centre. These patient encounters are supervised by a qualified medical or midwifery practitioner who also takes responsibility for the management of the patient. The learning tasks for the event are the following:

- Taking a comprehensive obstetric history
- Examination of the pregnant mother with emphasis on abdominal palpation and foetal heart auscultation
- Patient communication
- Basic assessment of foetal wellbeing
- Formulating a management plan
- Information gathering to inform evidence-based practice
- Information sharing
- Reflective practice

The cycle that students follow within this setting begins with them interviewing a pregnant woman in pairs, presenting the history to the supervising practitioner, examining the patient under supervision with real time feedback about technique and findings, deciding on and discussing a management plan with the patient and decision-making about follow up. This is followed by a short session between the clinical supervisor and student pairs on what needs to be further learned as identified by the students who then have an opportunity to research the self-identified issue/topic (e.g. anaemia in pregnancy) in the computer laboratory which has web access. This is followed by a group discussion on the topic investigated where students have the opportunity to present their patients to the group, sharing the information they gathered around the identified topic and engage with each other on the various topics identified during the consultation with the patient.

The perceptions of these students in this setting warrant investigation as the learning environment has been created to include the following androgogic approaches: experiential learning and "learning to learn" as described by Brookfield and Kolb (Bhat, no date, p5). A constructivist concept of learning underpins this learning environment with the assumption that learning is both individually and socially constructed as a result of experiences in the real world (Jonassen, 1999). The application of constructivist theory in this setting is demonstrated by the teacher accepting that the students have some understanding of engaging with patients clinically, Activities are aimed at building on their current understanding by exposing them to new information (the patient history and examination), providing opportunities to find information and engaging with them to confront their existing concepts (Brooks and Brooks, 1993, p ix) It may then be asserted that the techniques employed in this learning environment conforms to a constructivist approach, because the environment takes into account the various learning styles and strategies of different students. In addition, students form ideas differently from information presented to them in different ways (Loyens, Rikers & Schmidt, 2006).

Various studies have reported on the perceptions of students in settings such as operating theatres (Lyon, 2007). There have also been published works around student experiences and perceptions of the psycho-social learning environment (Henderson et al, 2006) and maternity settings (Chamberlain, 1997). These studies have all been conducted in what can be described as First World countries. A feature of the public health care system in Cape Town is that of a developing country and it is against this background that the perceptions of students in a Constructivist Learning Environment were investigated using an adapted Constructivist Learning Environment Survey (CLES) as developed by Taylor and Fraser (1991). The aim was to investigate the perceptions of students in this environment and whether the CLES would be an appropriate tool for this. The student perceptions of the learning environment for low risk obstetrics training in this setting, has not formally been investigated in South Africa and this is what provided the motivation for this study.

Furthermore, it was attempted to find an instrument that could be applied in this setting in order to measure the perceptions of the students so as to inform the design and possible improvement of the learning climate and environment.

The CLES is a validated instrument which uses the following scales to determine the extent to which the students view the learning environment as constructivist: Personal Relevance, Uncertainty, Critical Voice, Shared Control and Student Negotiation. These scales are asserted to be key elements of a critical constructivist learning environment by Aldridge, Fraser, Taylor and Chen (2000). The instrument was originally developed to measure the degree of constructivism in science and mathematics learning environments in high schools. The scales used in the survey attempt to measure these key elements where the students' perceptions of the extent to which their studies have relevance to their lives (Personal Relevance), the environment allows for them to share control over their learning (Shared Control), whether they feel free to express themselves (Critical Voice), whether they can improve their understanding of the work by interacting with their peers (Student Negotiation) and the degree to which the discipline they are studying can be viewed as ever-changing with culturally and socially determined influences where human experience and values are involved (Uncertainty) (Aldridge, et al, 2000). The CLES has five scales each containing 6 items which amounts to 30 items with a choice of responses ranging from Almost Always, Often, Sometimes, Seldom and Almost Never. The instrument was adapted to make it contextually appropriate. the adapted instrument was piloted with some students before the study was conducted where feedback was sought around its content and clarity.

<u>Ethical considerations</u>

Ethical approval was obtained from the Stellenbosch University Health Research Ethics Committee to conduct the study.

<u>Methods</u>

A mixed methods approach was used to conduct the study where both quantitative and qualitative data were collected. Quantitative data was collected using the CLES, which was administered to students at the end of their session in the student learning centre, they were also requested to participate in an unstructured group interview to gauge their perceptions of the learning environment to see if a comparison could be drawn between the data from the survey and interviews Confidentiality was ensured in that no identifying data was required except age, gender and population group, and in the group interviews no names would be recorded. The rationale behind recording age, gender and population group was to establish whether these variables would have any influence on the perceptions of students because of the diverse cultural backgrounds of the student population. Furthermore, the CLES has been used in situations where there was cultural homogeneity which is different from the situation in South Africa (The CLES did demonstrate cultural differences in perceptions between Australia and Taiwan). Students were given the option not to participate after it was explained what the data was to be used for. Consent forms were provided and the researcher was available to clarify any uncertainty around the consent forms. Instructions were given around the completion of the instrument where they were informed that they were only to circle or mark their responses on the printed instrument. They were given the option of returning the completed survey the following day if they so wished as the researcher was to see them again for an obstetrics emergencies teaching session. Interviews were conducted the day after completion of the questionnaires with students who consented to participate. The scales of the CLES were used in the interview schedule. Interview data was recorded on a digital voice recorder and transcribed verbatim. The interview sessions were informal and allowed for students to express how they perceived the learning environment in the Student Learning Centre.

A sample size for the collection of quantitative data amounted to 99 students, out of a group of just over 200 students who rotated through the Obstetrics rotation over the course of the

year, who completed the adapted CLES over a period of 13 weeks. 44 students agreed to participate in the group interviews. The interview group sizes ranged from 2 to 5 students per week over the same period of time.

Data from the adapted survey was entered into a Microsoft Excel® spreadsheet and exported to Stata/IC 11® for analysis. The mean was calculated for each scale; the differences in the mean of the responses for the various population groups and gender were also established by means of calculating the P-values where the significance was set at < 0.05. Mean scores closer to 30 indicated that the students perceived the learning environment as constructivist in nature. Interview data was analysed by examining transcribed interview data to identify themes, which were compared with the scales of the adapted CLES.

<u>Results</u>

The results of each of the scales will be presented in turn in the following order: Personal relevance, Uncertainty, Critical Voice, Shared Control and Student Negotiation. The mean scores for each scale are presented in **Figure 1**. Differences in the perceptions between the genders and amongst the population groups were calculated using the Kruskall-Wallis test, with a significance level determined at <0.05.
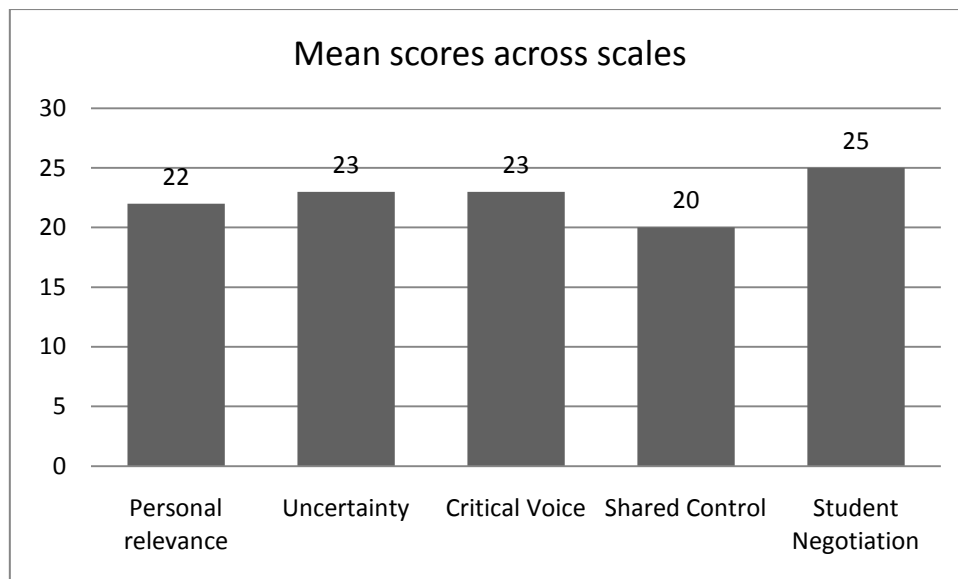
Figure 1

The scores for the Personal Relevance scale ranged from 14 and 30, where 30 is the maximum score for the scale. In the sample the mean score for this scale was 22 with a standard deviation (SD) of 3.11. There were no statistically significant differences in the scores amongst the population groups (P-value = 0.05) and between genders (P-value = 0.20) in this scale. The data suggests that students did perceive the learning environment as having personal relevance to them and in the interviews it was elicited that students saw the learning environment as a "reality check" and realizing "I need more practice, I was not where I thought I was". The latter statement centred around the student being concerned that despite having a fair degree of confidence in dealing with patients in a hospital setting, she was not as confident around dealing with a patient who was not ill, but dealing with a normal process of life in the absence of disease or pathology. This presents an opportunity for students to apply health promotion strategies in an attempt to maintaining maternal and foetal wellbeing. Another issue that emerged from the interview data was language. South Africa is a multi-lingual society, the majority of patients who use the public health care system do not use English as a first language and student interview responses suggest that "patients are more comfortable with their own language". This is a reality of practice in the South African healthcare context.

The Uncertainty scale showed a range from 18-30 with a mean score for the whole sample of 23 and a SD of 2.89. There were no differences in the perceptions of this scale amongst the different population groups and genders (*P*-values=0.24 and 0.64, respectively). A student stated "I realize that there is a lot be learned" which alludes to the students' assessment of their own level of knowledge and skills that still need to develop. A theme that was elicited was that there was an intention "to find a diagnosis" when the nature of the patient encounter was to ensure that no abnormality existed and to provide reassurance rather than seeking pathology. Another theme that emerged was an uncertainty about certain areas of history taking because the students were *au fait* with this skill in general medicine but realized that obstetric history taking needed "a different approach" to get the right information especially around previous pregnancy outcomes, such as determining the differences in whether there was stillbirth or a neonatal death which have different implications for managing the pregnancy.

On the scale that measured Critical Voice, the mean was found to be 23 with a range of 10-30, the SD was 5.3. The *P*-value for any differences amongst the different race groups was 0.42 and therefore not statistically significant. The same was true for the differences in the perceptions of this scale between the two gender groups (*P*-value=0.78). Student interviews showed that some perceived that they could challenge information given to them in both the clinical encounter and group discussion sessions as suggested by the statement "I felt comfortable to say what I thought". It was challenging to elicit more themes that spoke to this scale. The likely cause here would be that the researcher was the teacher and that students might have felt less comfortable with exploring this scale with the researcher. This can be considered a weakness of this paper.

The scale measuring Shared Control showed a mean score of 20 with a range of 10-30, the SD was 4.7. The gender and population group differences on this scale not significant (*P*-4.73 and *P*-0.08, respectively). The scale measures to what extent students could decide what they wanted to learn. The structure of the environment implies that the students were

less likely to control what they learn as the patient encounters dictated what they were required to learn. Albeit that students decided what they wanted to learn based on their own identified needs. Interestingly, the student-identified topics were usually in keeping with the core learning topics of the fourth year obstetrics course with some variation depending on the clinical or social issues that the patient presented with. This phenomenon was not further explored within this study. Interestingly this scale scored the lowest of the 5 scales and would warrant further investigation into this aspect of the learning environment.

The Student Negotiation scale had a mean score of 25 with arrange of 16-30. The standard deviation was 3.7. The differences between gender and population groups were again negligible, P-0.60 and P-0.82 respectively. Interview data around this scale on student negotiation demonstrated that students found conferring with their colleagues "like life where you would talk to others to better understand things you come across". A comment "I liked telling others what I found….it helped me remember what I read….cemented in my mind" indicated that the opportunity to engage with each other assisted with learning and assimilation of information.

<u>Discussion and conclusions</u>

The data presented above suggest that the CLES can be applied in learning environments that follow constructivist approaches other than secondary school classrooms. The instrument provides an easily accessible and appropriate tool to evaluate the learning environment in health sciences education at tertiary level. With a few modifications to the wording of the questions in the tool, to make it contextually applicable, it provided valuable insights into an intuitively created teaching endeavour. The CLEs also provided more useful information that the interviews, but this could be attributed to the teacher being the researcher in this study where student possibly lacked agency to provide more data where they were less anonymous. The cultural and gender diversity of the students did not appear

to influence the results. The instrument thus seems well suited to the South African higher education milieu where cultural and racial diversity is a reality of health sciences education.

The presence of unstructured, real-life problems in the learning environment makes the instrument appropriate in that it gauges the uncertainty with which students are faced when dealing with real patients. The presence of these types of problems is considered a core assumption of constructivist learning along with cooperative learning and knowledge construction (Loyens, et al, 2006). Cooperative learning in this learning environment is facilitated by students working in pairs and then sharing ideas and information in a larger group. In as far as personal relevance is concerned; students did find the learning environment significant in providing them with insights into their own knowledge and skills gaps. These self-identified gaps then allow for students to find, discuss and assimilate information based on the patient they saw. One student described the session as "PBL on 'roids" (Problem-based learning on steroids), the point that the student was trying to bring across was that they faced real patients, with real problems requiring real interventions to promote health. The described learning environment does promote constructivist learning to a certain extent, as suggested by the data. It would however be worthwhile to look at other variables which could influence the processes of learning within the learning centre.

References

Alderson TStJ. Oswald NT. (1999) Clinical experience of medical students in primary care: use of an electronic log in monitoring experience and in guiding education in the Cambridge Community Based Clinical Course. Medical Education, 33: 429-433

Aldridge JM. Fraser B. Taylor PC, Chen C. (2000) Constructivist learning environments in a cross-national study in Taiwan and Australia. International Journal of Science Education, 22: 1, 37-55

Bandiera G. Lee S. Tiberius R. (2005) Creating effective learning in today's emergency departments: How accomplished teachers get it done. Annals of Emergency Medicine, March ; 45, 3, pp 253-261

Bhat VD. No date. Experiential Learning: A Handout for Teacher Educators. Online at http://wikieducator.org/images/b/b5/EXPERIENTIAL_LEARNING.pdf accessed 10 July 2010

Brooks JG. Brooks MG (1993) In search of understanding: The case for constructivist classrooms. Alexandria, Virginia, Association for Supervision and Curriculum Development

Chamberlain M. (1997) Challenges of clinical learning for student midwives. Midwifery, 13: pp 85-91

Henderson A. Twentyman M. Hell A. Lloyd B. (2006) Students' perceptions of the psych-social clinical learning environment: An evaluation of placement models. Nurse Education Today, 2006; 26, 564-571

Irlam J. Keikelame MJ. Vivian L. (2009) Integrating the primary health care approach into the medical curriculum: a programme logic model. In The African Journal of Health Professions Education, Vol 1, 1, December: 8-10

Jonassen D. (1999) Designing constructivist learning environments in Reigeluth CM (Ed) Instructional design theories and models: A paradigm of instructional theory. Volume II. Lawrence Erlbaum Associates, Inc, New Jersey

Loyens SMM. Rikers RMJP. Schmidt HG. (2006) Students' conceptions of constructivist learning: A comparison between a traditional and a problem-based learning curriculum. Advances in Health Sciences Education, 11: 365-379

Lyon P. (2007) Students' experiences of learning in the operating theatre. In: Brew A and Sachs J (Eds) Transforming a university: The Scholarship of Teaching and Learning in Practice. Sydney: Sydney University Press

Marcus JK. Clow SE. (2009) Response times of ambulances to calls from midwife obstetric units of the Peninsula Maternal and Neonatal Services (PMNS) in Cape Town. Curationis, March: 59-66

Mennin S, Petroni-Mennin R. Community-based medical education (2006) The Clinical Teacher, 3: 90 – 96

Papp I. Markkanen M. von Bonsdorff M. (2003) Clinical environment as a learning environment: student nurses' perceptions concerning clinical learning experiences. Nurse Education Today, 23: 262- 268

Rosie J. Murray R. (1998) The evaluation of clinical placements learning in radiography. Medical Teacher. 20:3: 227-236

Saarikoski M. Leino-Kilpi H. (2002) The clinical learning environment and supervision by staff nurses: developing the instrument. International Journal of Nursing, 39: 259-267

Stata/IC 11.0 for Windows StataCorp LP, College Station, Texas, 2009

Taylor PC. Fraser BJ. (1991) Development of an instrument for assessing constructivist learning environments. Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

Worley P. In the community. In Dent JA. Harden RM (Eds). (2006) <u>A practical guide for medical teachers</u>, second edition, Edinburgh, Elsevier