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## Full Length Article

# Is community-based electrocardiography education feasible in the early phase of an undergraduate medical curriculum?



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## ABSTRACT

Accreditation authorities expect medical schools to increase their teaching standards and civic engagement, despite limited resources. The aim of this study was to investigate the feasibility of community-based (CB) electrocardiography (ECG) instruction in semesters 4 and/or 5 of the undergraduate MBChB programme at the University of the Free State in Bloemfontein, South Africa. A literature review and 34 structured interviews were employed, using a mixed-methods QUAN (+qual) research design. Regarding the preclinical phase, 18 interviewees strongly supported community-based learning (CBL) and 21 strongly supported task-based (TB) CBL. Responses were more conservative regarding the practicability of TB CBL. Twenty-two interviewees supported preclinical phase ECG-specific CBL. There was more support for implementing CB ECG in the clinical phase than in the preclinical phase. Challenges identified included finances, transport, personnel availability, clinic space, curriculum time constraints, student and driver absenteeism, and ethical aspects. Solutions for the preclinical phase included combining electrocardiography with other CBL tasks. Many interviewees supported preclinical phase TB CBL, although several factors determine its feasibility. Availability of human and other resources and curriculum time significantly impact CB ECG learning. Solutions necessitate additional location-specific research.

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## 1. Introduction

Globally social reform objectives influence medical curriculum reform (HPCSA, 2010; McLean, 2004; SAQA, 2013; WFME, 2003, 2012).

In 2000, the University of the Free State (UFS) in Bloemfontein, South Africa, introduced a five-year integrated outcome-based undergraduate medical curriculum, with exit-level outcomes appropriate for training general practitioners (HPCSA, 1999), in accordance with quality assurance policies (UFS, 2006, 2009). Currently (for electrocardiography; ECG) 230 min of classroom teaching and 100 min of practical (Clinical Skills Unit) instruction are included in semester 4 of the five semester preclinical phase. One hour of more advanced practical instruction is subsequently provided by clinicians in the Clinical Skills Unit during semester 5 (UFS, 2015–2016, 2016).

The paucity of documented research (from 1995 until the study commenced) regarding early phase community-based (CB) ECG learning in undergraduate medical curricula was possibly due to several other logistically easier and more cost-effective ECG educational strategies that can be employed (Burke, Gnall, Umrudde, Kyaw, & Schick, 2008; Celikkan, Senuzun, Sari, & Sahin, 2013; Jeffries, Woolf, & Linde, 2003; Mahler, Wolcott, Swoboda, Wang, & Arnold, 2011; Raupach et al., 2010; Romanov & Kuusi, 2009; Rubinstein, Dhoble & Ferencchock, 2009; Smith, Prybylo, & Conner-Kerr, 2012).

The principal aim of this study was to improve preclinical phase ECG training in the UFS undergraduate medical curriculum, in order to improve patient outcomes and promote more cost-effective patient care (Crawford & Doherty, 2010; Jevon, 2010). A secondary aim was to categorise key factors that impact early phase CB ECG learning, to provide a checklist that may streamline decision-making at medical schools (locally and abroad) in this regard.

Work-integrated learning (WIL) has multiple, diverse benefits for students' development (CHE, 2011). However, a distinction between the preclinical (basic sciences) and clinical phases of traditional curricula often results in late exposure of students to patients (McLean, 2004).

Effective CBE requires outcome-appropriate educational strategies, such as those included in the SPICES model (Harden, 2007; Harden, Sowden, & Dunn, 1984; Karim, Abdulghani, & Irfan, 2011), that address priority community issues (HPCSA, 2011; Magzoub & Schmidt, 2000).

Harden identified greater theory-practice integration and the development of a "reflective practitioner" as advantages of undergraduate task-based learning (TBL) (Parry, 1989), but initially less emphasis was placed on TBL in the earlier phases of undergraduate medical curricula (Harden, Laidlaw, Ker, & Mitchell, 1996; Ozkan et al., 2006; Virjo, Holmberg-Marttila, & Mattila, 2001).

The educational three-circle Dundee model (Harden, 2007; Harden, Crosby, Davis, & Friedman, 1999) (Fig. 1) indicates that progress in learning occurs by an increase in the breadth of mastery, depth or complexity of learning, knowledge application (in various contexts), and proficiency. Electrocardiography, as procedure, corresponds with the inner circle and electrocardiogram interpretation corresponds with the

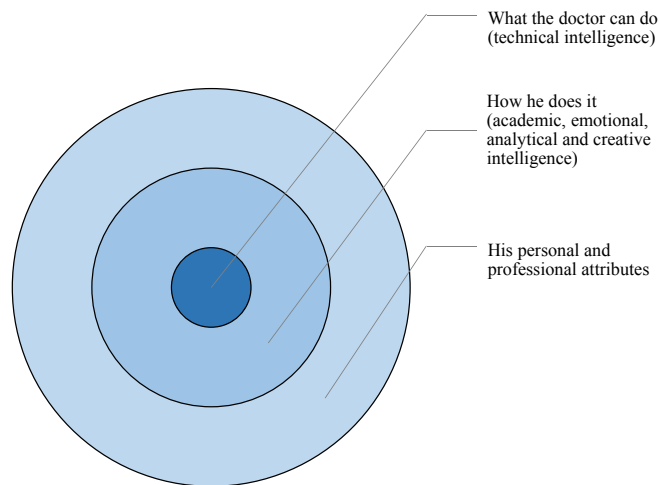


Fig. 1 – The three-circle Dundee model (Harden, 2007; Harden et al., 1999).

middle and outer circles of the Dundee model. However, optimally presented CB ECG learning also includes aspects of the outer circle (such as self-confidence, time management and initiative) which significantly increases the educational value thereof.

### 1.1. Research objectives

The following research objectives guided an investigation of the feasibility of CB ECG instruction during semesters 4 and 5 of the UFS undergraduate MBChB curriculum:

1. To identify the key challenges that influence the feasibility of introducing CB tasks in the preclinical phase of a South African undergraduate MBChB curriculum.
2. To obtain CB and CB ECG related feasibility data from:
  - a. senior faculty personnel involved in the UFS undergraduate medical curriculum
  - b. personnel teaching cardiovascular system-related content or involved in UFS undergraduate curriculum community-based learning (CBL).

## 2. Methods

The theoretical basis for the research (based on a comprehensive literature review, to formulate appropriate interview questions) was qualitative. A mixed-methods design (qualitative data embedded in a larger amount of quantitative data) was applied, to clarify and contextualize the quantitative data (Creswell & Plano Clark, 2011) and prioritize key challenges regarding CB ECG learning in the preclinical phase of the UFS undergraduate MBChB curriculum. The literature review and collection of qualitative data were used to address the first research question. The second research question was mainly addressed by collecting quantitative data (and subsequently integrating the quantitative and qualitative results). The researcher mainly applied a positivist (objective and deductive) approach with some elements of the interpretivist approach (UWE, 2007:Online). The point of interface, where

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