



ORIGINAL PAPER

# A comprehensive SWOT audit of the role of the biomedical physicist in the education of healthcare professionals in Europe

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*Acronyms:* BMP, Biomedical physics; FMHS, Faculty of Medicine/Health Science (including dentistry, pharmacy when these are separate faculties); HCP, Healthcare profession; ICT, Information and Communication Technology; PEST, Political, Economic, Social-Psychological, Technological-Scientific; SWOT, Strengths, Weaknesses, Opportunities, Threats.

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**KEYWORDS**

Biomedical physics education;  
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**Abstract** Although biomedical physicists provide educational services to the healthcare professions in the majority of universities in Europe, their precise role with respect to the education of the healthcare professions has not been studied systematically. To address this issue we are conducting a research project to produce a strategic development model for the role using the well-established SWOT (Strengths, Weaknesses, Opportunities, Threats) methodology. SWOT based strategic planning is a two-step process: one first carries out a SWOT position audit and then uses the identified SWOT themes to construct the strategic development model. This paper reports the results of a SWOT audit for the role of the biomedical physicist in the education of the healthcare professions in Europe. Internal Strengths and Weaknesses of the role were identified through a qualitative survey of biomedical physics departments and biomedical physics curricula delivered to healthcare professionals across Europe. External environmental Opportunities and Threats were identified through a systematic survey of the healthcare, healthcare professional education and higher education literature and categorized under standard PEST (Political, Economic, Social-Psychological, Technological-Scientific) categories. The paper includes an appendix of terminology. Defined terms are marked with an asterisk in the text.

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## Introduction

Although biomedical physics\* (BMP) academics provide educational services to the healthcare professions\* (HCP) within Faculties of Medicine/Health Science (FMHS) in the majority of universities in Europe, their precise role with respect to the education of the healthcare professions has not been appropriately defined nor studied in a systematic manner [1]. To address this issue we are conducting a research project with the aim of producing a strategic role development model\* which can be used by members of the profession to advance this component of their role. Readers who are not familiar with the background to the project are referred to a previous article authored by our research group [1]. This set of articles is targeted specifically for those members of the profession whether in a faculty of medicine/health science or otherwise (e.g., department of physics in a faculty of science, hospital based medical physics department) providing such educational services to the healthcare professions.

## Materials and methods

The fundamental research paradigm was practitioner research i.e., research carried out by members of a professional group to improve the practice of their profession [2]. The conceptual frameworks guiding the study were:

- The open-systems model of organizations which emphasizes that role development occurs within an external environment (political, economic, social-psychological, technological-scientific) and that effective role development must take account of changes in that environment [3]
- The marketing paradigm which is a planning philosophy that emphasizes that the success of an entity hinges on the production of a good fit between client expectations and the services offered. This means that BMP

services will only be requested by HCP when they are perceived as being of value to them.

The SWOT methodology [4] is today the standard methodology used for position audits and strategic planning and has been used extensively in higher education and healthcare [5–7]. It is a two-step process: one first carries out an audit of SWOT (Strengths, Weaknesses, Opportunities, Threats) themes relevant to the development of the entity under study and then constructs a strategic development model by matching the internal strengths and weaknesses of that entity to external environmental opportunities and threats. This paper reports the results of a SWOT audit for the role of the biomedical physicist in the education of the healthcare professions in Europe. These SWOT themes will be used in future to provide input for a strategic role development model for the role. The research approach was qualitative, which is the most effective approach when one needs to uncover the range of themes (in this case SWOT themes) relevant to a specific issue. Qualitative research is inductive and thematic inferences are developed in cumulative increments based on the data acquired during each stage of the study. Data collection is stopped when no new significant themes are emerging [8]. Qualitative research has been criticized for its use of purposeful samples as opposed to random samples. However this type of criticism arises from a misconception of the main objective of this type of research – which is to uncover the range of themes relevant to an issue rather than the number of persons holding a particular point of view. This is particularly relevant in strategy studies where it is often the ‘early adopters’ who produce the new ideas.

Internal strengths and weaknesses of the role were identified via a EU-wide multi-case-study survey of BMP departments and BMP components of HCP curricula. A purposeful sample of 120 faculties from all EU states was chosen following a preliminary internet survey. Since the purpose of the research was theme generation, cases were chosen according to whether they presented new themes or

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