

A SWOT Audit for the Educator Role of the Biomedical Physics Academic within Faculties of Health Science in Europe

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Abstract

Although biomedical physics academics provide educational services in the majority of Faculties of Health Science (alternatively known as Faculties of Medicine) 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. This has often led to role ambiguity and role conflict and their associated ensuing effects, role stress and role strain. In order to address this issue we are conducting a research project with the purpose of producing a strategic development model for the role. Central to the study is a position audit for the role which we have carried out via the well-established SWOT (Strengths, Weaknesses, Opportunities, Threats) methodology. 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 within Europe. External environmental opportunities and threats were inventorized via a systematic survey of the healthcare, healthcare professional education and higher education literature. This paper reports the results of the SWOT audit.

Introduction

Although biomedical physics (BMP) academics provide educational services in the majority of Faculties of Health Science (FHS) in Europe, their precise role with respect to the education of the healthcare professions (HCP) has not been appropriately defined nor studied in a systematic manner. To address this issue we are conducting a research project with the purpose of producing a strategic development model for the role. Central to the study is a position audit which we have carried out via the SWOT methodology. This paper presents some of the SWOT themes.

Research Design

The fundamental research paradigm of this study was practitioner research, the research approach qualitative, and the philosophical perspective pragmatic. The conceptual frameworks guiding the study were:

- a) The open-systems model of organizations which emphasizes that role development occurs within an environment (political, economic, social, technological-scientific) and as a response to changes in that environment,
- b) The marketing paradigm which emphasizes that in the current higher education (HE) economic climate BMP services will only be requested (and paid for) by HCP because they are perceived as *being of value to them*.

The SWOT methodology (Wehrich, 1982) is a framework that can be used to match the internal strengths and weaknesses of a role to external environmental opportunities and threats in order to help role-holders strategically position their role. The methodology has already been used extensively in higher education (Dyson, 2004). Internal strengths and weaknesses of the role were inventorized via a Europe-wide qualitative multi-case-study

survey of BMP departments and BMP components of HCP curricula. Criteria of choice of sample BMP departments included: level of BMP educator activity, range of health professions serviced, and higher education structure. The total number of faculties studied was 115 and were from all states which were EU members either before or which became EU members on the first of May 2004. The main data collection technique was document analysis. Document analysis has several main advantages in terms of improving the validity and reliability of a study namely: public documents represent data which has been given thoughtful attention by the authors since they are expected to be seen by many people, the technique is unobtrusive and avoids the biasing of responses or observations created by the researcher's presence during interviews and direct observation and as written evidence provides hard data. On the other hand documents may not always accurately describe the current situation. To reduce the effect of the latter only faculties with updated websites were included in the sample. The document analysis was supplemented when necessary with semi-structured interviews, e-mail correspondence and direct observation during on-site visits. Results of the pilot case studies were reported by us during a previous GIREP conference (Caruana & Plasek, 2004). Data was collected from web-sites, published documents, curricular materials and textbooks with the help of a purposely designed thematic datasheet which was divided into the following sections: country-university-FHS data, BMP organization-'location within faculty structure'-mission, stakeholder analysis (extent of BMP educator involvement in the compulsory and elective programme modules of the various HCP), analysis of content of present BMP curricula, role expansion opportunities (programme modules which would be enhanced through the involvement of a BMP educator), curriculum development themes within the FHS impacting the BMP role, exemplars of good BMP curricular practice and research carried out by the BMP. External environmental opportunities for the role and threats to the role were inventorized via a comprehensive systematic review of the HE, biomedical and HCP education literature. The synthesizing and formulations of the conclusions were done mainly by the first author of the paper who is himself a practicing BMP educator. Practitioner research has the advantage that the researcher has a thorough knowledge of the context, however bias in favour of the studied profession has to be constantly guarded against.

Results

Strengths of the role:

S1) High level of subject pride

BMP academics have enormous pride in their subject. This is a very positive factor that we have found throughout practically all the universities we have studied and visited. It is a feeling based on an awareness of the achievements of physics throughout the last century, including the achievements in biomedicine.

S2) High esteem for BMP amongst HCP

A common theme among the HCP educational leaders that we have talked to was the high standing with which these professions regard BMP. In the words of one HCP educator:

"Although we are having a lot of difficulties with the quality of the servicing of physics we insist on keeping it in the curriculum as it looks good on our curriculum document and on the cv of the students"

S3) Strong medical device competences

BMP educators have a level of expertise regarding the principles underlying the scientific, effective, safe and efficient use of medical devices which is vastly superior to that of the other HCP. Essential device competences such as evaluation of device specifications, calibration, considerations of accuracy and precision, statistical analysis of data, quality control are second nature to the BMP but often lacking in other HCP.

S4) Strong competences regarding safety with regard to *physical agents*

BMP educators are strongly positioned to teach protection of patients, staff and others from physical agents (e.g., electrical, electromagnetic, ionizing radiation, thermal, laser). Safety measures for protection from these agents are a regular feature of physics laboratories. They are also increasingly a legal requirement in the clinical areas.

S5) Strong research competences

BMP staff have strong research records which make them highly suitable for undertaking clinical research - in particular when the research is biomedical device and modeling based.

S6) Strong scientific norms and values

BMP academics tend to have strong scientific and research norms and values. Such standards of behaviour are becoming increasingly important as the movements for ensuring that healthcare and educational practice become more evidence-based gain momentum. The insistence on rigour in instrument choice, data collection and analysis, which are the hallmark of the physical sciences, have often been sadly lacking in healthcare and education.

Weaknesses of the role:

W1) Absence of a clear mission and role ambiguity

There is clearly a lack of a well-defined, agreed role definition, whilst mission statements are practically non-existent. In the absence of such a definition each BMP educator practices according to his self-perceived role modulated to local expectations. The result is a high level of role ambiguity.

W2) Inappropriate role boundaries

The self-perceived role varies enormously within Europe. In some BMP departments the prevailing perspective is the very general "physics is the basis of all things including all areas of healthcare" paradigm. Such a perspective would appeal to physics audiences but has little meaning to non-physicists who judge content by relevance to future professional practice and who actively demand justification for its inclusion in congested curricula. These BMP educators often set up syllabi which involve a range of topics which is too wide - leading to role overload and shallow learning. We have also encountered the other extreme. Some BMP academics refuse to teach what does not have strictly established legal foundations leading to role underload and impoverishment.

W3) Absence of international networking

There is very little networking between BMP educators at international levels (and in big states even at national levels). Europe is full of BMP educators who work on their own with little feelings of international collegiality.

W4) Absence of harmonization of curricular content

There is no international consensus (and often especially in the larger states no national one either) over BMP content for the HCP. This contributes further to role ambiguity.

W5) Low awareness of importance of educational research

There is a low level of systematic curriculum development and pedagogical research and low awareness of the increased importance being given to quality in HE. As a consequence many curricula are not really clinical practice-oriented and do not address the learning needs of HCP students. Most BMP educators have not yet reacted sufficiently to modern developments

in HE and HCP education, such as, integrated vs. discipline based learning, problem-based vs. presentation based learning, outcome competence vs. discipline-based curricula.

W6) Low educator competences

The educator role requires a different set of competences than other academic component roles and many BMP educators lack educator competences. This needs to be addressed if BMP educators are to be able to play an active part in present educational developments in Europe.

W7) Low strategic planning, marketing and publicizing competences

BMP professionals and academics have low planning, marketing and publicizing competences - they are either unable or perhaps unwilling to analyze, develop, publicize and 'sell' their services.

Opportunities for the role:

O1) EU goal of facilitating worker mobility within Europe

Facilitating worker mobility through the creation of a European Higher Education Area involving greater harmonization of HE qualifications and curricula is a major EU goal. The Tuning initiative is targeted to the establishment of common agreed programme outcome competences. The EU Commission is financing the initiative and many HCP networks are being set-up. It is the perfect opportunity for working on the needed international harmonization of BMP curricula.

O2) EU directives

The EU has set out several directives regarding medical devices, safety from physical agents and the use of personal protective equipment. These directives lead to pressure on health authorities for inclusion of corresponding topics within HCP curricula. These issues are all physics based and hence offer enormous opportunities for the role.

O3) Increased awareness of patient safety standards in healthcare

The EC in its 'Luxembourg Declaration on Patient Safety' (2005) recommends that a safety culture needs to be established within hospitals and that a fostering of this safety culture must start from the FHS. Medical devices and protection from physical agents are priority areas.

O4) The rise of the new HCP: HE based programmes, new HCP and expanded roles

Traditionally HCP education within universities catered only for medicine, dentistry and pharmacy whilst the other HCP were catered for by lower level non-degree awarding institutions. This is rapidly changing all over Europe as HCP make a 1st cycle degree the basic entry qualification for their respective professions. At the same time, these HCP have been rapidly developing their roles into areas involving more sophisticated medical devices. Moreover as healthcare expands new professions are continuously being created. Many new HCP are device intensive and offer new opportunities for the BMP educator.

O5) Increased awareness of occupational safety issues

Awareness of occupational safety is also on the increase and HCP are expected to take responsibility for their own safety and that of colleagues. The inclusion of competences concerning protection from physical health hazards within HCP curricula are a legal requirement.

O6) The explosion in the number and sophistication of medical devices

The rapid increase in the number and sophistication of medical devices coupled with an insufficient level of BMP education within the curricula of the HCP has led to a situation in which hospitals are full of expensive devices, which are often either not used according to recommended protocols or underutilized owing to insufficient competences on the part of the users. The situation is a golden opportunity for the BMP educator.

Threats to the role:

T1) Resistance to multi-disciplinarity in HCP education

Unfortunately in some countries BMP professionals and academics have to work within healthcare organizations which have a history of inter-professional strife. One negative effect of such situations is a resistance to multi-disciplinarity in HCP education. Some HCP insist that they do all the teaching of their own profession themselves (including the physics) even at the expense of reduced standards!

Conclusion and implications

Although the role of BMP educator has various intrinsic strengths which can be exploited, the role has been generally weakened by neglect from role holders who have not practiced proper role balance with respect to their various academic roles - in particular the educator role is sometimes sidelined as a result of an over-emphasis on the discipline research role. However, the opportunities for the role are tremendous and should role holders rise to the occasion a good future for the role is assured. The SWOT themes will in the near future be used as inputs to the formulation of a strategic development model for the role which would ensure its future well-being. The 'absence of international networking' weakness which is so detrimental to the role will be addressed by organizing the BMP educators within GIREP and the EFOMP (European Federation of Organizations for Medical Physics).

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