Original Article

Defining core elements and outstanding practice in Nutritional Science through collaborative benchmarking

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Benchmarking has been adopted by educational institutions as a potentially sensitive tool for improving learning and teaching. To date there has been limited application of benchmarking methodology in the Discipline of Nutritional Science. The aim of this survey was to define core elements and outstanding practice in Nutritional Science through collaborative benchmarking. Questionnaires that aimed to establish proposed core elements for Nutritional Science, and inquired about definitions of "good" and "outstanding" practice were posted to named representatives at eight Australian universities. Seven respondents identified core elements that included knowledge of nutrient metabolism and requirement, food production and processing, modern biomedical techniques that could be applied to understanding nutrition, and social and environmental issues as related to Nutritional Science. Four of the eight institutions who agreed to participate in the present survey identified the integration of teaching with research as an indicator of outstanding practice. Nutritional Science is a rapidly evolving discipline. Further and more comprehensive surveys are required to consolidate and update the definition of the discipline, and to identify the optimal way of teaching it. Global ideas and specific regional requirements also need to be considered.

Key Words: Nutritional Science, core elements, benchmarking

Introduction

Benchmarking is a method for organisational improvements that involves continuous evaluation of the outcomes, services and processes that represent best practice.[1] The process of benchmarking is recorded in the texts of 4th century Chinese artists, observed with the reconstruction of post-war Japan and, although IBM through the benchmarking process gained considerable competitive advantage in the 1960's, it is Xerox, in the 1970's that is credited as being the forerunner of the modern benchmarking movement. More recently, collaborative benchmarking has been adopted by educational institutions, as a potentially sensitive tool for improving learning and teaching.[1-4]

There is an increasing number of universities that offer Nutritional Science programs. These programs are varied and there is no accepted definition of core elements to ensure that students, and the Discipline of Nutritional Science, are being well presented to prospective employers. Establishment of core knowledge for inclusion in academic programs for a discipline as broad as nutrition is complex particularly as the relationship between Nutritional Science and other science–based disciplines is continually changing. In the USA, there are reportedly excellent training programs in Nutritional Science but the skills and knowledge-base of graduates is not clearly apparent.[5] This prompted the American Society of Nutritional Sciences to identify core knowledge for postgraduate students[6] who undertake coursework in nutrition as part of their doctoral studies. Further to this, there is no consensus on what constitutes good or outstanding practice for learning and teaching in Nutritional Science.

In 2000 the Australian Vice-Chancellors' Committee (AVCC) put forward a range of benchmarks for Australian universities[1] that included benchmarks for learning and teaching. Therefore a starting point for examining the quality of teaching within tertiary Nutritional Science programs is to make the benchmarks discipline-specific wherever possible, and then work towards identifying performance gaps. As the benchmarks have been accepted by members of the AVCC, it is anticipated that Nutrition Departments in universities would have similar interests in applying the benchmarks to their discipline. The aim of this project was to define core elements and outstanding practice in Nutritional Science through collaborative benchmarking.

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Table 1. Agreed core elements for Nutritional Science

- Food sources of nutrients and factors affecting nutrient bioavailability
- Nutrient (including water and alcohol) metabolism and requirements throughout the lifecycle, in health and disease
- Assessment of nutritional status
- Absorption, transport, storage and excretion of nutrients
- Use of food composition tables and appropriate software
- Effect of domestic and commercial food processing and handling on nutrient content and bioavailability
- Principles and techniques for analysis of biologically and nutritionally important macromolecules and small molecules
- Nutritional supplements, bioavailability, drug-nutrient interaction
- Physiological basis for nutrition-related diseases in major organs of the body
- Dietary bioactive components, functional foods, novel uses of food, prebiotics and probiotics
- Nutrition and gene expression
- Dietary recommendations, groups at-risk, models for healthy eating
- Food standards and regulation
- Nutritional toxicology, food additives and contaminants
  Ecological implications of food / nutrient production and processing

Methods

Eight Australian universities were invited to contribute their views on potential core elements and indicators of outstanding practice for Nutritional Science programs. The selection of participants was limited to one university per state or territory, our own institution plus another member of the "Group of 8" universities. The inclusion criteria were that each university offered undergraduate courses (or units of study) in Nutritional Science, and degree programs that were currently accredited for dietetic training. The number of invitations was small, though it represented 88% of the Australian institutions that met the selection criteria.

Contact was established with appropriate individuals at each of the proposed participating institutions to ascertain their interest in the project and their ability to respond within its limited timeframe. An invitation outlining the aims of the project was delivered to participants, together with a short questionnaire that listed proposed core elements for Nutritional Science. Once the replies to the questionnaire were received from participants, the revised proposed core elements were collated and returned to all participants for review and final comment. A second questionnaire that addressed benchmarks for establishing course processes, scholarly teaching and teaching environment, was sent to all participants. The focus of the questionnaire was the definition of GOOD and OUTSTANDING PRACTICES for the Discipline of Nutritional Science. The questionnaire was designed to incorporate the language, definitions and benchmarks used by McKinnon[1] as this was familiar to participating universities and aligned the present project with a nationally accepted document. The present report will focus on core ele-ments and benchmarks for scholarly teaching.

Results and Discussion

Seven of the 8 institutions that agreed to participate in this survey commented on the proposed core elements. The proposed core elements required minor wording changes before the respondents agreed on the core elements for Nutritional Science (Table 1). The core elements reflected the breadth of information that has been classically associated with the development of recommended dietary intakes[7] and were consistent with the recently published Giessen Declaration.[8] The agreed elements as listed in Table 1, included the "farm to plate" approach of illustrating concepts about food production and processing, modern techniques that could be applied to understanding nutrition, such as nutrigenomics, and incorporated social and environmental issues related to Nutritional Science. Postgraduate studies were expected to address, in greater depth, the same elements as undergraduate studies and for the students to appreciate the breadth of the discipline of nutrition. The ease with which consensus was achieved is possibly due to the participants' shared commitment to and extensive experience in teaching Nutritional Science. It is clear from the list of core elements that Nutritional Science does not necessarily include biochemical or physiological details, for instance, intermediary metabolism or the physiology of digestion, which suggests that these topics are the domains of cognate disciplines that should serve as co-requisite studies for students in Nutritional Science. One of the limitations of the present survey is its inability to provide an indication of the extent of integration or the holistic approach (if any) of the proposed core elements.

Four of the eight institutions who agreed to participate in the present survey responded to the benchmarking questionnaire. The questionnaire was consistent with McKinnon's document using the descriptors developed for each of the learning and teaching benchmarks. The present results reveal that a consistent indicator for outstanding practice is the integration of teaching with research (Table 2). Outstanding practice in teaching requires staff to be active in research; attend appropriate scientific meetings; and establish an environment where students are using their research skills to learn discipline content. The latter was believed to be enhanced if students are given the opportunity to use their department as "home base" with greater opportunities for interaction with fellow (and more senior) students within the Department. Whilst these issues are clearly relevant, the responses are derived from a small sample size. It is unclear why respondents who agreed to participate in the collaboration decided not to reply to the questionnaire aimed at establishing notions of good and outstanding practice.

This document is the summary of a larger report[9] that serves to open dialogue on core elements and outstanding

Table 2. Benchmarking scholarly teaching: good and outstanding practice in Nutritional Science

Good practice	Outstanding practice
Is demonstrated by • A stable timetable, secured access to resources, laboratories and other space. • Both academic and technical staff demonstrating a scholarly approach, revising lecture content based on latest knowledge and using examples to illustrate concepts. • Lecturers available for student consultation. • Student evaluations of all programs in alternate years • Annual review of programs to update nutrition. • Recognising excellence in teaching as the basis for reward and promotion.	*Is achieved when there is (are)* • Staff being research active and attending scientific meetings regularly to update their lecture content. • Research in teaching-related fields. • Peer and student review of all units of study and demonstration that the review results are considered. • Program mapping. • Opportunities for students to have extra curricular discussions on nutrition, interact with more senior students and "discover" concepts. • Opportunities for students to call their department a "base".

practice in Nutritional Science. Further and more comprehensive surveys are required to consolidate what is perceived as core knowledge, global ideas and specific regional requirements in the evolving Discipline of Nutritional Science.

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根据协作基准定义营养科学的基础原理和杰出实践

基准已经被教育机构作为潜在的改进科研和教学的灵敏工具而采用。到现在，基准方法论在营养科学这门学科中的应用有限。该调查的目标是根据协作基准定义营养科学的基础原理和杰出实践。问卷是以建立被提议的营养科学基础原理为目标，寄往澳大利亚八所代表性大学要求定义“良好”和“杰出”实践。七所大学所定义的基础原理包括营养素代谢和需求的知识、食品的生产和加工、现代生物医学技术，可应用于理解营养学和与营养科学相关的社会和环境问题。四所大学同意参与目前的调查，确定教学与研究的结合是杰出实践的指标。营养科学是一个快速的发展的学科。需要更多及更广泛的调查来巩固和修正营养学科的定义，来确定最佳的教学方法。全球的整体观点和特殊地区的需求也是要考虑的。

关键词：营养科学、基础原理、基准。