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Original Article

The distance learning tool 'Food Composition Study Guide' contributes to global capacity development in food composition

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ABSTRACT

Food composition data underpin most activities in nutrition, and yet few universities and courses provide information on this topic. To address this problem, FAO/INFOODS developed a distance learning tool, the 'Food Composition Study Guide', comprising 17 modules covering all relevant topics on food composition in the form of questions, exercises and answers. It was used by 109 health and nutrition specialists and chemists in conjunction with classroom-based food composition courses, in a university setting (in a classroom-based seminar and as distance learning course), and by self-learners. The different applications were compared in terms of settings, objectives of the setting, participants, languages, modules used, modalities of use, evaluation by users, assessment of users, and lessons learnt. The Study Guide was useful for teachers to prepare lectures and to carry out courses; and for learners to acquire, deepen and elaborate their knowledge and skills in food composition. It proved successful in all settings. The Study Guide is a good means to fill the existing global training gap in food composition and can be used in universities, courses and by self-learners, either as distance learning or in classrooms. This will be enhanced through French and Spanish translation and distribution through Internet and CD.

1. Introduction

Food composition has a central role in nutrition, dietetics and food-related sciences because of its important applications: calculating nutrient intake estimations; determining nutrient requirements; in epidemiological research to establish relationships between nutrient intake and disease; calculating nutrient content for food labels; assembling institutional and therapeutic diets; including nutritionally important plants and animals in breeding programmes; and informing consumers of good food choices. These applications have important implications for nutrition, health, and agriculture-related programmes and policies (Burlingame, 1998; Willett, 1998; Hagenimana et al., 1999; Charrondiere et al., 2002; Riboli et al., 2002; Englberger et al., 2003; Greenfield and Southgate, 2003; IOM, 2003; Burlingame, 2004; FAO/WHO, 2004; Toledo and Burlingame, 2006; Pennington et al., 2007; Vorster et al., 2007).

The quality of these data and their use depends on the knowledge of the professionals in food composition (Hollman et al., 2009). However, only about 550 professionals have been trained in food composition worldwide through expensive classroom-based postgraduate courses (Charrondiere et al., 2009a; INFOODS, 2010a) while it is hardly included in curricula of universities (Greenfield and Southgate, 2003). Especially in developing countries (Schoenfeldt, 2002), there is a great need to train more professionals in food composition and new approaches are needed to reach them in an economical and efficient way. As distance learning is increasingly used for education and training of professionals (University of Bridgeport, 2010; Learning centre, 2010; Codex Alimentarius, 2005; FAO, 2010a; Rosenberg, 2001), the Food and Agriculture Organization of the United Nations (FAO) and the International Network of Food Data Systems (INFOODS) published the distance learning tool 'Food Composition Study Guide' (Charrondiere et al., 2009b,c). It allows a wide range of learners (users, compilers and analysts) to fill their specific knowledge gap at their convenience at no cost, and to evaluate themselves. In this article it will be referred to as the 'Study Guide'.

The Study Guide covers food composition in the form of questions, exercises and answers. It is based on the principles of instructional design (Smith and Ragan, 1999), Bloom's taxonomy of cognitive objectives (Bloom et al., 1956); INFOODS documents, including Greenfield and Southgate (2003), Klensin et al. (1989), Rand et al. (1991), Klensin (1992), FAO (2003, 2004, 2008); and EuroFIR documents (2010). The Study Guide content compares well with classroom-based food composition courses (Charrondiere et al., 2009a), was peer reviewed and field tested, and is most relevant to users and compilers of food composition data, but also

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to analysts. The Study Guide is to be used together with the FAO/INFOODS Compilation Tool (Charrondiere and Burlingame, 2011; INFOODS, 2010b) to apply the compilation, calculation and documentation of food composition data. In September 2009, the Study Guide was published electronically in English on the INFOODS website http://www.fao.org/infoods/publications_en.stm and allows a wide range of learners to fill their specific knowledge gap at their convenience at no cost, and to evaluate themselves.

This article describes and analyses the different usages of the Study Guide in classroom-based food composition courses, in a university setting, and by self-learners, and illustrates new approaches food composition courses.

2. Materials and methods

The two volumes of the Study Guide were used (Charrondiere et al., 2009b,c) volume 1 containing the questions and exercises, and volume 2 providing the answers and feedback. The content of both volumes is presented in 17 modules (see Table 1).

The unpublished evaluation forms, oral feedback and tests from self-learners and course participants (three postgraduate food composition courses and two at the University of Vienna) were utilized to evaluate the Study Guide in the different settings. The test criteria were learning objectives, participants, language, modules used, modality of usage, and evaluation by users.

3. Results

Before field testing, all modules were peer reviewed and tested by 36 experts and professionals with knowledge on food composition. Experts found the Study Guide to be of high quality and their comments were used to rephrase and complete the questions, exercises, answers and additional information. Thereafter, the Study Guide was tested and implemented in three classroom-based international postgraduate food composition courses, in a university classroom setting as part of a nutrition curriculum, as a university-level distance learning course, and by self-learners (see Table 2).

3.1. In conjunction with classroom food composition courses

The Study Guide was field tested in three classroom courses in Iran, Benin and Ghana (INFOODS, 2010a) as an integrated part of a food composition course to reinforce understanding and performance of participants. The modules were used during all three courses, and in two courses also as an information management tool to increase the knowledge of participants beforehand. Participants completed the questions and exercises in small groups using hand-outs of the lectures and the reference documents before discussing the results in the whole group. At the time of the courses, the Study Guide was not yet published, meaning that participants did not have access to the answers. The modules created many discussions and motivated them to share their experiences and understanding. The modules were highly appreciated by participants and by instructors. The Study Guide also assisted instructors to prepare their lectures, to hold the course and to develop the final test. The final test was a subset of the modules discussed during the course and all participants passed the test by reaching 60–90% of the points (mean 65.1, 74.3 and 78.9).

Table 1
The 17 modules of the Food Composition Study Guide.

	Modules
Module 1	Basic principles of a food composition programme
Module 2	Use of food composition data
Module 3	Selection and nomenclature of foods in food composition databases
Module 4.a	Component selection
Module 4.b	Component nomenclature
Module 4.c	Component conventions and units
Module 4.d	Methods of analysing components
Module 5	Sampling
Module 6	Quality aspects of analytical data
Module 7	Resources for food composition Publishing food composition data
Module 8	Recipe and other calculations
Module 9	Food composition database management systems and data interchange
Module 10	Compilation and documentation
Module 10.a	Comparing food composition databases
Module 10.b	Case study – translating food intake into nutrient intake
Module 11	Quality considerations in data compilation
Module 12	Food biodiversity

3.2. In a university setting

At the University of Vienna, Austria, two courses on "Correct use of food composition data" were given, each counting for three ECTS credits (European Credit Transfer and Accumulation System).

Sixteen students attended the 3-day classroom course which consisted of 8 h of lectures including discussion, 9 h of exercises, 3–4 h of homework and a 2-h exam. In this course, modules 4.a, 4.b and 4.c were given as homework and parts of modules 2 and 10.b were used as exercises in the classroom. The course was innovative in two ways, first through the use of the modules and secondly that every lecture was followed immediately by an exercise using real data, i.e., the 28 foods from the Austrian Food Frequency Questionnaire (FFQ), developed by Freisling et al. (2009), were put into food groups, coded, and were disaggregated into more specific foods. The draft Austrian Nutrient Database (OELS) was used to identify foods to apply their nutrient values to the FFQ foods and to match the components of the OELS to those of the Compilation Tool (INFOODS, 2010b).

In 2009, a distance learning course was given in which the six students completed modules 1, 2, 3, 4.b, 4.c, 7, 8, 10, 11 (about 55 h) during three months. Thereafter, a one-day optional classroom interaction between students and instructors was held, queries were discussed, main points of the modules were summarized and some exercises were done based on module 10.b.

Both courses were successful as students acquired good theoretical knowledge and skills. In the classroom-based course, students increased their knowledge on food composition significantly between the initial and final test, corresponding to 2.8 grades on average (on a scale of 0–4). The tests for both courses had multiple-choice questions, which were selected from the modules covering the subjects treated during the course. About 90% of students obtained an A or B mark (on a scale of A–D).

3.3. By self-learners

In addition in 2009, the Study Guide was used by seven self-learners at FAO, Rome, and the University of Pretoria, South Africa. They needed to acquire relevant knowledge to carry out specific tasks related to food composition or food biodiversity. They used all modules, even though most of them completed modules 4.b–4.d, 8, 10, 12, which took them 5–12 h for each module. After completing the relevant modules, they were able to well calculate nutrient values of recipes using different recipes calculation systems and the Compilation Tool; to collect relevant food composition data on food biodiversity from different sources and compile them into a food composition database using the Compilation Tool; and to develop and collect data for Nutrition