

Enhancement of a dietary analysis program to facilitate education

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A dietary analysis program has been adapted to include a wide range of colourful teaching aids for students learning about nutrition. These include teaching relating to portion weights, nutrient analysis, dietary interpretation and food labels.

Keywords nutrition; dietetics

1. Introduction

Dietary analysis programs have traditionally been developed to facilitate the work of a nutritionist or dietitian, performing a large number of calculations to describe diets in terms of their nutrient content. WinDiets is a program that performs these functions with many additional research features that can also help students during their research projects (available at www.windiets.co.uk). It has also been enhanced to facilitate nutrition education, using ideas based on web pages [1], and the extra features have been tested on students over the last year and some of them may be of general interest. The program is written in Visual Basic.NET, which hosts a webbrowser control that enables a wide variety of output, including material on the Internet, to be presented to the user.

2. Portions

It is important that students get an understanding of portion sizes of food so they can look at photographs of different weighed portions of a variety of foods.

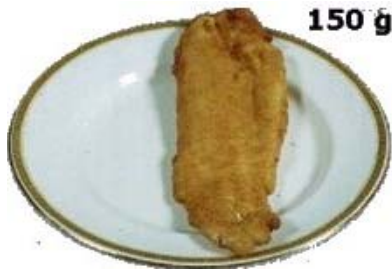


Fig. 1 Example of a picture of a food portion.

3. Nutrient Analysis

It is also important that they learn the main nutritional features of foods so that they can give sensible advice. This is facilitated by providing a list of foods that match search criteria, each with a background colour, the intensity of which relates to the amount of a chosen nutrient in the food. Students can preview the main nutrient content and information about portion weights of the foods on the screen by clicking those that appear in the list. A particularly novel feature of using colour intensity is a screen that permits students to compare two foods directly for energy content; this is important to help provide advice to clients who want to lose weight. Students are also shown a screen in which they can choose activities

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according to their potential contributions to energy expenditure, again shown with different colour intensities. Colour intensity is also employed to show visually what foods contribute most to the main nutrients in a meal.

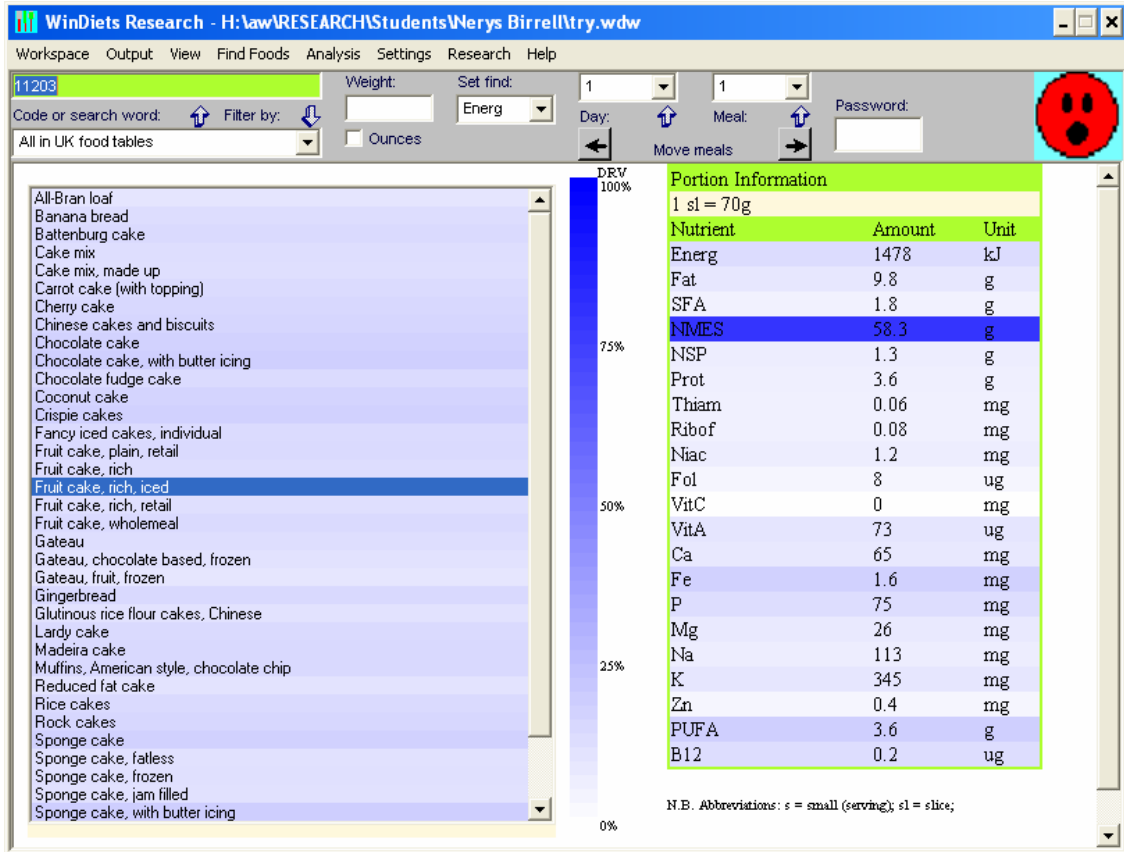


Fig. 2 Use of Colour Intensity. The energy content per 100g of foods is shown on the left as different intensities of blue and when a food is selected, a more complete analysis of it appears on the right.

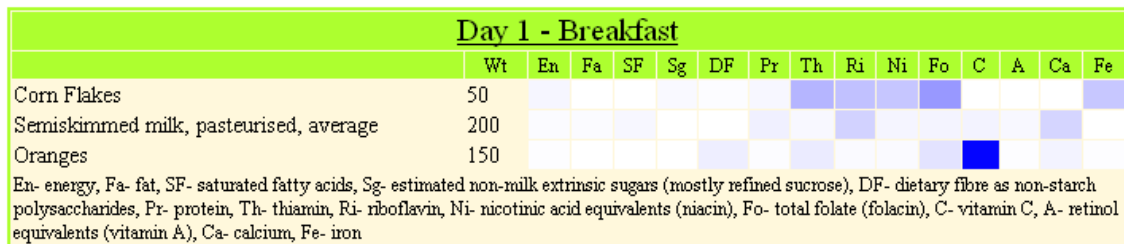


Fig. 3 Use of Colour Intensity in meal analysis.

A further way that the program can help students learn about nutritional composition is provided by a quiz. Since the webbrowser control can run programs written in JavaScript, this feature has been employed to permit interactivity in WinDiets. A list of 10 foods appears on the screen with a bar chart showing the nutritional composition of one of the foods. Students have to choose which food is correct and obtain a score to motivate them to learn. This idea has been tested previously in a web-based program [2]. Teachers can make up their own lists of foods that they want students to learn about and output a web page containing a quiz that they can put on the Internet; this then works independently of WinDiets.

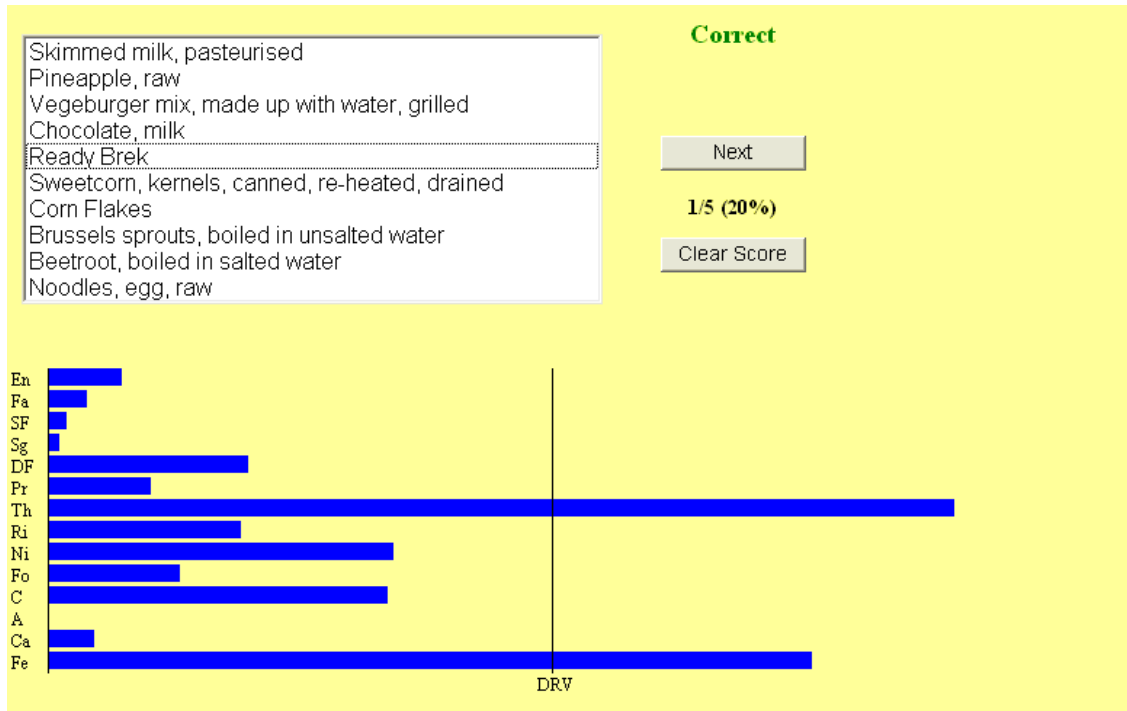


Fig. 4 Quiz to teach food composition.

4. Dietary Interpretation

A screen is also provided to help children learn about how to interpret simple dietary data. In this case, food names appear in boxes on the screen and these can simply be selected by the mouse, which alters the background colour of the box. A simple bar chart illustrates the main features of the diet as the foods are clicked on and off. The 'healthiness' of the diet selected is shown in terms of a face that has various possible degrees of happiness or sadness. Since this is a program working in the webbrowser control, it is also possible to output a web page containing foods chosen by the teacher for use on the Internet.

Nutrition and dietetics students need to learn some advanced concepts of dietary interpretation that can be learned by using the report generator. This analyses the activity and food intake diaries of the students and explains the main features including what aspects of the diet need to be improved. An exercise that students are given to do involves the provision of a 'bad' diet that they have to try to improve; they are assessed on the report they write in this exercise during which they are taught to use a wide range of functions in WinDiets that help to locate more appropriate foods and recipes.

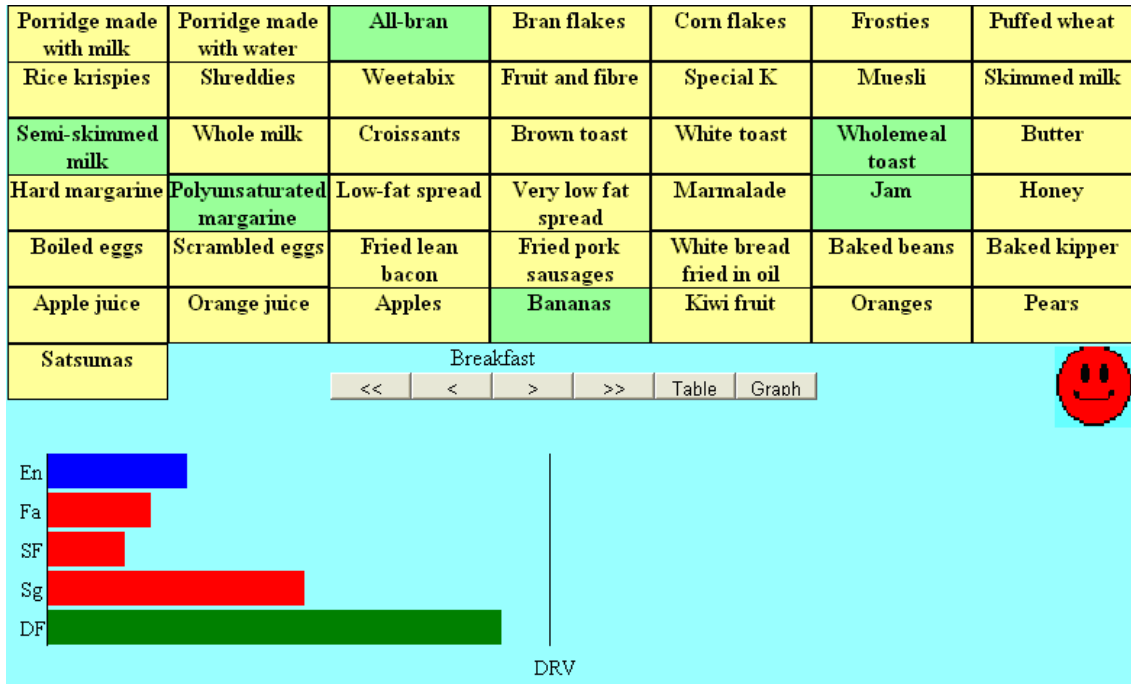


Fig. 5 Simple analysis of a diet.

5. Food Labels

Nutrition students need to learn how to make a legally acceptable food label. This is facilitated by a screen that takes data from a recipe and shows what nutrient information can be included in the label under different circumstances. On the left of the screen is a column of nutrients that are allowed on the label. In default we have ticks against the big four: energy, protein, carbohydrate and fat. At the bottom are other lipid components, but if you want to include any of them, you also have to include saturates which appear in the big eight. Students will see this happen automatically. If the item serves one portion and this is greater than 100g, you are allowed to use that weight to calculate what proportion of RDAs are provided rather than using 100g of the food. The program will take this into account when students click the 'Validate' button in working out whether at least 15% of the RDA is supplied by the food (portion greater than 100g or 100g weight itself). For any nutrients that are then allowed on the label, an empty box will appear next to the nutrient so students can decide if they want it on the label. There is also a large box containing the list of ingredients of the recipe in order of amount. For any recipe, this screen can be output by the teacher as an independent web page and put on the Internet to help students learn about this aspect of nutrition.

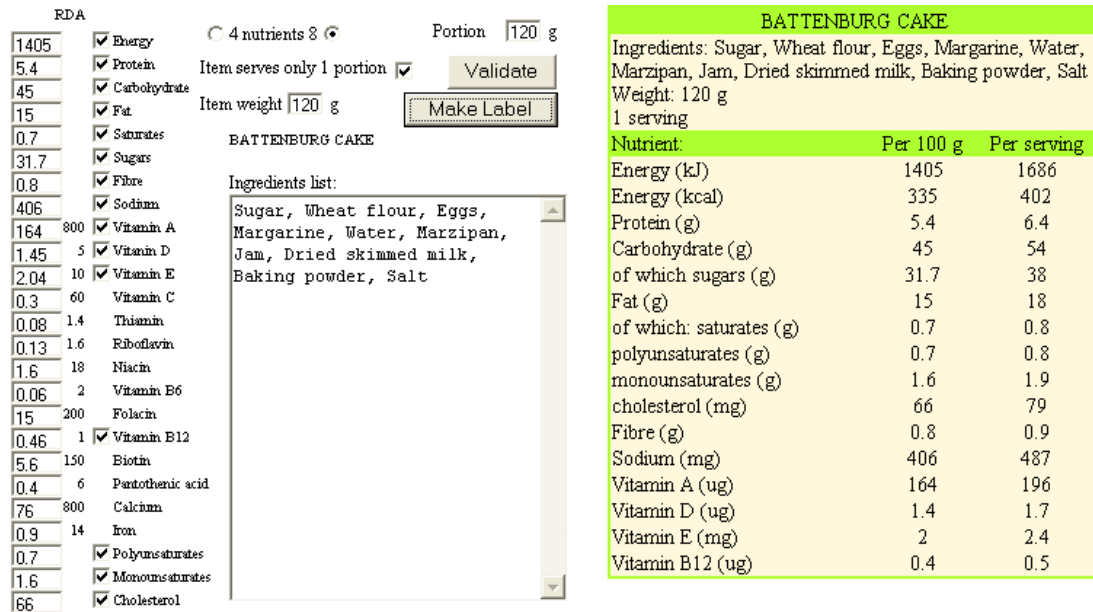


Fig. 6 Food Label. WinDiets takes information from a recipe to permit a nutritional label to be produced; this permits certain nutrients to be included depending on the proportion of RDA supplied.

6. Conclusion

WinDiet's design requires integration of a webbrowser control in a Visual Basic program, which is relatively complex but permits a more flexible approach to education and production of some novel screens, some of which can run independently on the Internet. A wide range of educational screens in WinDiets has been used in teaching successfully over the past year.

References

- [1] A Wise, Nutrition and Food Science **34**, 77-79 (2004).
- [2] A Wise, Proceedings of the Nutrition Society **61**, 54A (2002).