

[P11] Activity diary program to enhance teaching of energy balance

A. Wise and E. Cowie

School of Life Sciences
The Robert Gordon University
alan.wise@rgu.ac.uk

This paper describes a web-based program that can be used to illustrate the importance of exercise to energy balance. The program was written in JavaScript and works in Internet Explorer. First year university students who are studying nutrition have used it and completed an evaluation questionnaire. Energy requirements depend on the basal metabolic rate (BMR), which can be applied during sleep and the extent of physical activity during the day. The Government publication on reference nutrient intakes suggests a method for calculating individual energy requirements based on BMR and activity (Department of Health, 1991). The web program shows how manipulating these two factors can alter energy requirements. It helps students to test out the effect of varying lifestyles on energy requirements.

METHOD

The screen has a grid of numbers on the right. Each of these represents what a person is doing for a 5-minute period. There are 12 figures per hour and scrolling down can reveal the full 24-hour period. When a student enters the program, the data are all set at 1 to represent the physical activity ratio (PAR) of sleep. The student selects a time of rising by clicking the relevant part of the grid. The student can select from one of eight PAR buttons on the left of the screen. Next to each of these buttons is a list of activities suggested to be included at each of the eight PAR values (Department of Health, 1991). The numbers chosen replace the values in the grid and the student can continue clicking the buttons on the left of the screen and the data is entered into the grid until it is time to

retire to bed again. It is not important to try to be precise in an educational exercise of this nature. Students can alter the sex and age group and set the weight.

The program was used as part of a practical class that also involved measurement of the energy content of foods by bomb calorimetry and their resting metabolic rate by indirect calorimetry. Students rotated through these activities in groups and when they used the program they operated it on a single computer so that they could all see and discuss the results. The first task was to estimate the energy requirement of an 18-year-old female student in energy balance during a typical day spent attending classes at University and an evening of studying/relaxing. Then students were asked to find out how much weight she is likely to lose by taking up swimming for 1 hour a day for a year. Students were then supplied with a snack bar and asked to find its energy content and calculate how much of the snack the subject could eat in order to return to energy balance. The last task was to investigate the difference in energy requirement between a female and a male of equal age and weight doing the same physical activities. They were asked whether a male would require less, the same or more snack bars than a female, to provide the energy for 1 hour of swimming.

RESULTS

The students clearly considered the program worthwhile as shown in Table 1. In particular a high proportion considered that computer programs are a good way to help them learn. There were two questions that asked the

Table 1: The attitudes of students to the program

| | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|--------------------------|-----------------|----------------|--------------|-----------------------|
| The activity program is user-friendly | 0 | 3 | 5 | 22 | 8 |
| The activity program is clearly laid out | 0 | 0 | 6 | 26 | 6 |
| The activity program is difficult to understand | 8 | 20 | 8 | 2 | 0 |
| I learned about energy balance using the activity program and the exercises | 0 | 2 | 9 | 23 | 4 |
| I think the best way to lose weight is to take more exercise | 0 | 0 | 2 | 20 | 16 |
| I think the best way to lose weight is to cut down on snacking | 0 | 4 | 3 | 23 | 8 |
| I think that energy requirements and energy balance could be better taught using a textbook | 8 | 25 | 3 | 2 | 0 |
| Computer programs are a good way to help us learn | 0 | 1 | 4 | 18 | 15 |

students the best way to lose weight; they thought that both exercise and reducing snacking were best.

DISCUSSION

This study shows that a simple JavaScript program that works in a browser was considered useful by students, but they showed an elementary lack of understanding of the question about the 'best' method, since they could not both be the 'best'. Probably more time using the program and trying out different ideas would be necessary to demonstrate that generally it requires much more exercise than many people would expect to oxidise what appears like a relatively small snack. The time constraints of the practical class limited the extent to which they grasped

this important aspect of energy balance. Probably the question should have been phrased differently to make it clear that the two possible answers were mutually exclusive. The web page has been incorporated into a commercial program called WinDiets, which includes other dietary calculations aimed at teaching nutrition (www.windiets.co.uk).

REFERENCES

Department of Health (1991) *Dietary Reference Values for Food Energy and Nutrients for the United Kingdom*. London: HMSO.