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Iterative development of an online dietary recall tool, INTAKE24

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Dietary intake is a complex behaviour to accurately measure[(1)]. Twenty-four hour recalls are a popular choice for dietary surveys as they are quick to administer, do not require the participant to be literate[(2)] and are less burdensome to complete compared to other dietary assessment methods[(3)]. Technology offers the potential to make dietary assessment more convenient, intuitive and engaging for users. It also ensures consistency of coding and significantly reduces the cost as nutritional output can be generated without the need for manual coding and data entry.

INTAKE24 is an online multiple pass 24hr dietary recall developed for use with 11–24 year olds in Scottish food and nutrition surveys.

INTAKE24 was developed from an original prototype tool called SCRAN24[(4)]. The system development was an iterative process involving four cycles of user interaction, evaluation and further development. Evaluation focussed mainly on the usability of the system (e.g. how easy it is to learn and use) and on the users experience while interacting with the system (e.g. how satisfying, enjoyable and motivating the system is to use)[(5)].

User evaluation was conducted with 80 participants; 20 at each stage. Researcher observation, 'think aloud' techniques, and eye tracking, were used to identify aspects of the system users found confusing. Feedback was gathered using semi-structured interviews and a system usability scale. In addition, each participant completed an interviewer led recall after completing INTAKE24 in order to identify any food and drink items missed. This fed into the development of the prompts within the system and served to gauge accuracy.

In response to user feedback and observations during user testing the system interface was flattened so a single interface screen handled all aspects of the recall (e.g. free text entry, looking up foods in the database, portion size estimation). Improved search functionality and navigation around the system were also influenced through feedback from users at each stage. The time taken to complete the system reduced significantly throughout the user testing and accuracy of reported intakes improved for all nutrients except Vitamin C as can be seen in the table below.

	Accuracy of estimation of foods			
	Round 1 (SCRAN24)	Round 2	Round 3	Round 4
Weight of food (g)	0·90	0·73	0·87	1·05
Energy (KJ)	0·84	0·80	0·84	0·89
Carbohydrate (g)	0·92	0·88	0·85	0·94
Protein (g)	0·80	0·77	0·86	0·96
Fat (g)	0·78	0·52	0·81	0·81
Vitamin C (mg)	1·09	1·15	0·89	1·22
Iron (mg)	0·81	0·78	0·84	1·03

Integrating observation and post-completion interviews allowed us to obtain maximum information to feed into the design process; refining the system to have the best possible tool for use in the field.

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1. National Obesity Observatory, *Review of dietary assessment methods in public health*. 2010, National Obesity Observatory.
2. Baxter SD, (2008) *Cognitive processes in children's dietary recalls: insight from methodological studies*. Eur J Clin Nutr, 63, p. S19–S32.
3. Subar AF, *et al*. *Formative research of a quick list for an automated self-administered 24-hour dietary recall*. J Am Diet Assoc, **107**(6), p. 1002–7.
4. Foster E, *et al*. (2007) *Reducing the cost of dietary assessment: Self-Completed Recall and Analysis of Nutrition for use with children (SCRAN24)*. *J Hum Nutr Diet*, 2013.
5. Rogers Y, Sharp H, and Preece J, (2011) *Interaction Design: Beyond Human-Computer Interaction*. Wiley.