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No change no progress: why school-based nutrition education programmes should continue to evolve

School-based nutrition education programmes are often used to teach children about nutrition and provide them with skills to make healthy food choices. In the Netherlands, different programmes have been developed, each with its own characteristics. Taste Lessons is one of these nutrition education programmes for primary schools (Box 1). The programme aims to raise children's interest in food and nutrition by providing new experiences with taste and food products in a positive and playful way. Primary schools are free to implement Taste Lessons, as nutrition education is not mandatory in the Netherlands. Since its beginning in 2006, more than 65 percent of all primary schools in the Netherlands have participated in this programme. Taste Lessons has been developed with governmental funding and is jointly funded by governmental and non-governmental partners since 2013. The programme is developed in practice and evaluated in a real-world setting.

Changing political context

Chef Pierre Wind is the spiritual father of [Taste Lessons](#). In his vision, all children in the Netherlands should experience food with all their senses. In 2006, his idea was embraced by the Ministry of Agriculture, Nature and Food Quality, which made budget available for the development and large-scale implementation of the programme by 'Steunpunt Smaaklessen & EU-Schoolfruit' of Wageningen University & Research.

In the early years, Taste Lessons was fully funded by the national government but its

Box 1. Taste Lessons and Taste Missions

Taste Lessons consists of five lessons of maximal one hour discussing various topics in relation to the five themes: 'taste', 'nutrition and health', 'food production', 'consumer skills' and 'food preparation'. For each grade are specific lessons. Lessons include plenary group talks, taste testing, experiments, and cooking.

Taste Lessons can be extended with more comprehensive Taste Missions. A Taste Mission is an interactive e-learning focusing on one basic food group, such as vegetables, meat or dairy and is based on principles of gamification. A professional challenges children to assist in a specific problem. Each Taste Mission consists of an introduction clip and plenary lesson(s) in class, an excursion, a home assignment in the supermarket and a cooking challenge. The total duration is five hours, excluding excursion.

funding became subject to change due to the changing political landscape. Financing is now seen as a shared responsibility of public and private partners such as food industry and trade associations for fish, fruit and vegetables. This financing system facilitates the involvement of (local) partners in educational activities such as excursions to farms where children learn about the origin of food and food production.

Parallel to this, the government sets up a national infrastructure to stimulate quality improvement of intervention programmes. This '[Dutch Recognition System for Interventions](#)' is a grading system that provides insight into the quality, feasibility, and effectiveness of interventions. Taste Lessons is included in this

database. It was qualified as 'theoretically sound' and the quality level 'effective' has been granted recently. To further guarantee quality and avoid conflict of interest, a review committee is established with education and nutrition experts to monitor quality.

Since 2017, Taste Lessons is integrated in the four-year policy programme Juggling Food (In Dutch: Jong Leren Eten (JLE)) being implemented 2017-2020 by the Ministries of Economic Affairs and Health, Welfare and Sport (www.jonglereneten.nl). Other pillars of this policy programme are strengthening the Healthy School support system with respect to food and nutrition, opening up local hands-on activities like school gardens, cooking classes and excursions, and initiating an online information system with regional JLE brokers to stimulate nutrition education initiatives.

Aforementioned political developments determined how Taste Lessons has evolved over the years and the package is now an integral part of a nutrition education programme that focuses on the school and its surroundings.

Increase effectiveness

In the period 2011-2014, we evaluated the programme's aim to increase children's interest in food, and their knowledge and skills regarding healthy and conscious eating behaviour. Furthermore, the influence of adding experiential learning activities and implementation factors on effectiveness are investigated. Two evaluation studies were carried out using a quasi-experimental design and accompanied by a process evaluation.

The first evaluation study showed that partial implementation of the 10-12 lessons (average of 4.6 lessons) of Taste Lessons by the teachers during one school year resulted in small increases in psychosocial determinants towards the two target behaviours tasting unfamiliar foods and eating healthy - and a variety of foods. The highest increase was observed in children's knowledge four weeks after the programme (Cohen's $d=0.3$, $p < 0.01$), which persisted six months after the programme ($d=0.2$, $p < 0.05$). After four weeks, the intervention group showed also a significantly higher increase in the number of foods known and tasted, and significant increases in the subjective norm of the teacher and intention towards the target behaviours (Battjes-Fries *et al.*, 2015).

Analyses on process indicators revealed that teachers and children highly appreciated Taste Lessons and that children liked the experiential learning activities most. Moreover, children's programme appreciation and interpersonal communication about the programme activities after the lessons were found to be positively associated with their change in psychosocial determinants (Battjes-Fries *et al.*, 2016a). Based on these findings, two adaptations were made to the programme: 1) the number of taste lessons were reduced from 10-12 per two grades to five per grade, and 2) additional experiential learning activities with focus on one food group per grade were included.

A second evaluation was conducted to study the effectiveness of the revised version of Taste Lessons. The effect of Taste Lessons with and without additional experiential learning activities on children's (psychosocial determinants of) vegetable consumption and willingness to taste unfamiliar vegetables was investigated. Additional experiential learning activities consisted of an extended cooking lesson with a dietician and the parents, an excursion to a grower or food producer and a supermarket assignment with the parents. Results on dose, appreciation and effects were in line with the first evaluation study. Almost complete implementation of the five lessons of the programme resulted in an increase in knowledge of medium effect size ($d=0.5$, $p < 0.001$) for children who participated in additional activities and of small effect size ($d=0.4$, $p < 0.001$) for children who only took the lessons. Taste Lessons with additional hands-on activities showed more and stronger increases in several psychosocial determinants of vegetable consumption and these activities were highest rated (Battjes-Fries *et al.*, 2016b). Based on these experiences, more Taste Missions were developed focussing on one specific food group (see Box 1). No significant intervention effects were found on the level of behaviour (Battjes-Fries *et al.*, 2017). To achieve behavioural change, in addition to nutrition education at school, changes in children's social and physical food environment will be needed.

Directions for change

No change, no progress was stated in the title.

Changes in policy and financing have led to the current programme. Evaluation research has

yielded insights that contributed to the ongoing development of the programme. Moreover, evaluation research has given an impulse to new nutrition education policy. The following three directions for further improvement of Taste Lessons and its effects are proposed.

Firstly, continuous renewal is needed to keep teaching materials attractive. Materials and also teaching methods need to be in agreement with current societal developments, recent dietary guidelines and latest scientific insights on e.g. pedagogy and psychology. Besides, Taste Lessons can take advantage of the opportunities offered by digitization. Digital developments are creating possibilities for innovative learning activities, and can contribute to tailor-made education for schools situated in different areas (rural versus urban; high versus low socio-economic status), differing in pupil populations (high versus low cultural diversity) or organisation (private versus public; non-denominational versus religious; regular versus special education).

Secondly, Taste Lessons should be combined with other interventions, for example school policy on lunch and snack foods, and physical changes in the children's food environment. In addition to teachers, the involvement of parents is crucial for creating healthier environments. In the Netherlands, the policy programmes [Juggling Food and Youth at a Healthy Weight](#) offer opportunities for joining forces.

A school system is a dynamic environment and sensitive to change. Monitoring the implementation process is therefore important for keeping track of the actual delivery of the programme, for the acceptance by teachers and children, and for fitting in the professional working situation. Evaluation is further important for optimising Taste Lessons, and increasing its effectiveness by combining the programme with other initiatives. Further research can reveal which components in nutrition education programmes are most effective for specific groups of children, and how these components may be combined best to achieve strongest effects on psychosocial determinants and actual behavioural change.

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