

# Teacher evaluation of an experiential vegetable education program for Australian primary schools: does Face-to-Face training add value above digital training?

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**Abstract:** Teacher-led implementation of healthy eating programs in schools is cost-effective and potentially impactful. Teacher satisfaction is important for uptake, however process evaluations are scarce. This study evaluated the effect of two intensities of teacher training on the evaluation of a vegetable education program for Australian primary schools by teachers. Teachers (n=65) who implemented the program as part of a cluster-RCT (25 schools in two states, New South Wales and South Australia) received either low (provision with materials and online training) or high (additional face-to-face (F2F) training) intensity training prior to implementing a 5-week vegetable education program. They evaluated the program by indicating level of agreement with 18 statements using 5-point Likert scales. Average item scores ranged from 3.0 to 4.3. Sixteen items, including student engagement, alignment to the curriculum and intent for re-use of the program, had a median score of 4. Teachers who received additional F2F training were more agreeable to the statements around the number (3.5 vs 3.9,  $p = 0.02$ ) and duration (3.0 vs 3.6,  $p = 0.02$ ) of lessons being reasonable, with no differences for other statements. In conclusion, teacher satisfaction was good and additional F2F training had few benefits over solely digital training of teachers.

**Keywords:** vegetable; primary school; implementation science; child health; acceptance; school teacher; process evaluation; cluster-RCT

## 1. Introduction

Schools provide an important and equitable opportunity to support healthy eating amongst students [1,2]. From a public health perspective the rationale for school based programs to support healthy eating is evident: schools reach all students regardless of background, and thereby provide opportunities to improve children's population health and bridge health inequality gaps [3]. In addition, they provide opportunities for development of skills, knowledge and attitudes towards healthy eating behaviours [1] irrespective of the family dynamics [4] and other parental barriers [5,6]. A strong evidence-base in behavioural outcomes is important for government health promotion agencies and policy makers to justify endorsement and implementation of programs on a large scale [7].

Evaluations of nutrition and other health promoting programs most often focus on impact and/or effect evaluations, whereas process evaluations are less frequently undertaken [8-10]. Process evaluations offer insights into whether the program is implemented as intended and whether the program is perceived as acceptable and appropriate

by participants [11,12]. Process evaluations allow to make modifications prior to undertaking large-scale effect studies and/or the commencement of full implementation, and it this way maximizes potential success of a program [11].

Acceptability (appreciation) is perceived to be amongst the most important process indicators [12]. To maximize uptake and adoption, it is critically important to ensure teacher satisfaction with healthy eating classroom resources. School curricula are crowded and teachers are stressed and time-poor [13,14]. Moreover, teachers have considerable influence on deciding which materials and programs are being used in order to meet curriculum standards [15].

Effect and process evaluation was undertaken on a newly developed vegetable education resource for primary schools to increase children's vegetable acceptance and willingness to try [16,17]. Children's intake of vegetables is far below recommended intake in Australia, as in most other Western countries [18], with low (sensory) acceptance of vegetables a critical barrier [19,20]. The vegetable education program, Taste & Learn™, consists of a teacher-led classroom-based program for Australian primary schools to increase children's enjoyment of vegetables. The scientific framework is based on evidence from food and vegetable preference development [19,20] and sensory education [21,22]; key elements are building exposure and familiarity with vegetables through tastings, verbalization of sensations, science experiments and a positive and fun environment. The program consists of 5x1hr lessons for three different stages of primary school. Vegetables are tasted in each lesson and the program is aligned to the Australian primary school curriculum [23]. The program was initially evaluated in a pre-post pilot study in 4 NSW schools. Results demonstrated the program positively influenced mediating factors associated with vegetable consumption amongst students, including vegetable knowledge and acceptance [17]. A quantitative teacher survey showed that teachers positively evaluated most aspects of the program, including student engagement and alignment to the curriculum [16]. However, preparation effort for preparing fresh vegetables was seen as considerable [16]. Interviews with teachers further showed the lesson program was very content dense (unpublished data).

Information from the pilot study on effect and its process evaluation was used to refine the vegetable education program and its supporting materials. Considerable attention was given to minimise preparation effort and specifying produce quantities needed for each lesson to manage teacher's expectations; this was done by calculating minimal required quantities needed for tastings and translate those to amount of vegetables needed on a classroom level (e.g. one small broccoli floret per student for tasting, requiring one medium head of broccoli per classroom), and reducing the variety of foods offered in lessons where a vegetable meal was prepared. Other changes included a reduction in content-density of lessons, whilst simultaneously ensuring that content retained both a behavioural change focus as well as strong curriculum alignment. The 5E pedagogical framework [24] was changed to move through the 5 steps of Engage, Explore, Explain, Elaborate, Evaluate, throughout the 5 lessons, rather than in each individual lesson. Additionally, an online training module for teachers was developed.

A cluster randomised controlled trial (cluster-RCT) amongst 25 schools involving 1639 students was subsequently undertaken to measure the effect on behavioural outcomes [25]. This study used two intervention arms that differed in level of intensity of training of teacher, low (provision with materials and online training) and high (additional face-to-face (F2F) training), therefore differing in cost structure (one-off versus ongoing costs) impacting on potential scalability of the intervention. Results showed that the program increased students' knowledge, verbalization ability, vegetable acceptance, behavioural intentions, willingness to taste and consumption of new vegetables at

post-test, with knowledge sustained at 3-month follow-up. No difference was found between level of intensity of training on student outcomes [25].

The current study was a process evaluation undertaken as part of the cluster-RCT and focused on teacher appreciation of the program. The aims were two-fold: 1) to compare the effect of a low and high intensity training program on evaluation by teachers of a vegetable education resource, 2) to compare teacher acceptability results from the modified version of the vegetable education resource with the previous version of the resource. Results will be used to support implementation on a larger scale and identify if there are areas for further improvement.

## 2. Materials and Methods

A quantitative evaluation of the online training module and program was conducted amongst teachers who had implemented the vegetable education program Taste & Learn™ in their classroom as part of a cluster randomised controlled trial to measure behavioural outcomes on students.

### 2.1. Teacher training and vegetable education program

The vegetable education program, Taste & Learn™, is designed to increase children's enjoyment of vegetables. It is a teacher-led classroom-based program designed for Australian primary schools. Detailed lesson plans were provided which included suggested vegetables for each lesson. Schools were responsible for sourcing the vegetables themselves and they were reimbursed upon production of receipts. Further details of this program have been reported elsewhere [25].

Prior to implementing the program in their classrooms, teachers received one of two forms of training: 1) Low intensity training: teacher received written lesson materials and an implementation manual as well as an individual link to a Learning Management System (LMS) to undertake an online training module which took around 20 minutes to complete. Adherence was monitored through the LMS platform. The implementation manual and online training module both covered the objectives of the program, theoretical information on the senses and the development of food acceptance in children, and practical information to implement the program. The implementation manual also contained detailed information on alignment to the Australian curriculum. 2) High intensity training: teachers received lesson materials, manual and online training module as in the low intensity training, but additional interactive face-to-face (F2F) training was provided. F2F training (45 min) was delivered by research staff involved in the study and contained information on the same elements as delivered through the online training and written resources. In addition, implementation plans for their school were discussed with staff. Adherence to the intervention was monitored through phone contact with the 'champion' for the study in each intervention school (both low and high) and through reimbursement of costs for materials to implement the program.

### 2.2. Participants

Eligible participants in this study were primary school teachers who had implemented the vegetable education program Taste & Learn™ in their classroom as part of a cluster randomised controlled trial to measure behavioural outcomes on students [25]. The cluster-randomised controlled trial was undertaken in 25 schools in Sydney, New South Wales (NSW) and Adelaide, South Australia (SA), Australia, and consisted of 19 intervention schools in which teachers received a high (n=10) or a low (n=9) intensity version of a teaching training prior to implementation the program, as well as 6 control schools, who received no training and continued to implement their regular school curriculum. Teachers in both intervention arms were eligible to take part in the teacher evaluation. Ethical approval for this study was provided by the CSIRO Human Research

Ethics Committee (HREC24/2016), the NSW Department of Education and Communities (SERAP2017036) and the SA Department for Education (2018-0032). This trial was registered with the Australian New Zealand Clinical Trials Registry (ACTRN12620000392965).

### 2.3. Outcome measures

Participants took part in an online survey (SurveyGizmo) after the intervention in which they evaluated the online training module and the vegetable education program by rating their level of agreement with statements using five-point Likert scales (1=strongly disagree, 5=strongly agree). The evaluation of the online training module consisted of 15 statements (Table 1), 14 of which were based on the Learning Object Review Instrument (LORI), a framework for evaluating the quality of multimedia learning resources [26]. This framework consists of 9 key dimensions of which 6 were relevant to the online training module: content quality, learning goal alignment, motivation, presentation design, interaction usability and reusability. The other dimensions of the LORI framework were deemed as not applicable (feedback and adaptation) or not relevant (accessibility and standards compliance) to the online module. A further statement on duration of the module was included. Participants could also provide comments.

**Table 1.** Statements used in the evaluation of the online training module and their classification according to the dimensions from the LORI framework [26]

Dimension	Statement
Content quality	The content of the online training module was relevant to teaching the vegetable education program
	The level of detail in the module was appropriate
Learning goals	The module enhanced my knowledge about how to teach enjoyment of vegetables
	The module enhanced my knowledge to teach students about the senses and how to verbalise their sensations when eating vegetables
Motivation	The module helped me with the practical implementation of the lessons
	The information provided prepared me well to teach the program to my students
	I found the module interesting
Interaction usability	The module motivated me to teach the program to my students
	The training module was easy to navigate
Presentation design	It was easy to download the resources (lesson plans, shopping lists) from the module
	The training module was appealing (visually and auditory)
Re-usability	The presentation design (graphics, text, voice-over etc.) supported the content well
	The online training module is suitable for teachers at different levels
Other	The online training module is suitable for teachers working in different school environments
	The duration of the module was appropriate

The vegetable education program was evaluated using 18 statements, covering all 9 key dimensions of the LORI framework. The statements covered various aspects of the suitability and relevance for students, the suitability of materials and alignment to the curriculum, as well as whether the teacher would re-use the program and recommend it to other teachers (for wording of statements see Results section Table 3). Eleven of the 18 statements were the same as used in the teacher evaluation of a previous version of the program [16] so that results could be directly compared. In addition, participants provided an overall score (out of 10) for the program. As open questions, teachers were asked what the best features of the program were and what features could be improved.

#### 2.4. Data analysis

Data analysis was conducted using SPSS (IBM Corporation, v25, 2017). A value of  $p < 0.05$  was used as measure for statistical significance.

For the online training module, first internal consistency of the items pertaining to the same construct (e.g. learning goals, content quality) were calculated using Cronbach's alpha. An average score was calculated for constructs with sufficient internal consistency (Cronbach's alpha  $> 0.70$ ). Where internal consistency was lower, the individual items were retained. To determine if there were differences in responses between teachers from different intervention arms and states for the online module, two-way analysis of variance (ANOVA) was conducted with the dimension or item ratings as dependent variables, with training intensity (low/high) and state (NSW/SA) as independent factors in a full-factorial model.

The same two-way analysis of variance (ANOVA) was conducted on each of the 18 items for the vegetable education program. As several statements related to multiple dimensions of the LORI framework, all items were analyzed separately. In addition, an independent samples t-test was conducted to compare the teachers' ratings from the pilot program to the current program; this analysis was only undertaken with teachers from NSW to match the participant group of the pilot study [16].

### 3. Results

#### 3.1. Participants

A total of 65 teachers (state: 58% NSW, 42% SA; training intensity: 57% high, 43% low) completed the survey, which was a response rate of 78% of eligible teachers. Feedback from teachers from 17 out of 19 intervention schools was received, with an average of  $3.8 \pm 2.5$  teachers per school. The teachers represented a mix of all year levels, with 23% of teachers who had taught Unit 1, 40% Unit 2, 15% Unit 3 and 22% taught multiple units.

#### 3.2. Evaluation of online training module

Seventy-eight percent of teachers ( $n = 51$ ; state: 51% NSW, 49% SA; training intensity: 59% high, 41% low) indicated having conducted the online training module. There was good internal consistency for the dimensions content quality, learning goals, motivation, presentation design and re-usability (Table 2); for these dimensions the average ratings were calculated. The dimension interaction usability had a Cronbach's alpha of 0.69 and its items were analysed separately.

Average dimension and item scores ranged from 3.0 to 4.3. All dimensions and items had average score of 4 (rounded to the closest whole number), with exception of 'easy to navigate', which had a rounded average score of 3. There were no statistically significant differences in ratings as a factor of state, intervention arm (training intensity) or their interaction (Table 2).

Open comments provided positive feedback (e.g. interesting, easy to use, informative), comments related to accessing materials (time consuming to download and some technical difficulties, primarily from NSW teachers where the program was rolled out first) and comments related to the content. On the latter, two teachers wished the module to provide detailed training on a lesson by lesson basis, whereas another teacher commented the module was not needed as sufficient background information was given in the lessons themselves.

**Table 2.** Average (SD) level of agreement for various dimensions (Cronbach's alpha) and statements evaluating the online training module evaluated by teachers ( $n = 65$ ) who

implemented the program, and statistical significance as a factor of intervention (high vs low intensity training), state (NSW vs SA) and their interaction. Ratings ranged from 1-5.

Dimension / statement	Average	SD	Intervention <i>p value</i>	State <i>p value</i>	Intervention by state <i>p value</i>
Content quality (0.89)	4.11	0.55	0.56	0.10	0.71
Learning goals (0.89)	3.88	0.69	0.54	0.27	0.99
Motivation (0.84)	3.86	0.71	0.91	0.42	0.87
Re-usability (0.83)	3.95	0.49	0.37	0.07	0.95
Presentation design (0.82)	3.95	0.49	0.97	0.62	0.26
The training module was easy to navigate	3.03	1.17	0.52	0.81	0.79
It was easy to download the resources from the module	3.86	0.71	0.30	0.16	0.99
The duration of the module was appropriate	4.25	0.47	0.47	0.08	0.72

3.2. Evaluation of vegetable education program

Average item scores for the vegetable education program ranged from 3.0 to 4.3 (Table 3). Sixteen items had a average rating of 4 (rounded to the closest whole number), including student engagement, suitability for students of all backgrounds and abilities, alignment to the curriculum, perception of long-lasting impact on students, use of suggested vegetables and intent to re-use the program and recommend it to other teachers. Two items had a average score of 3 (neutral level of the scale), these related to the amount of preparation prior to the lesson and the lesson duration. The overall program rating was  $7.3 \pm 1.9$ .

**Table 3.** Average (SD) level of agreement (range 1-5) to statements evaluating the vegetable education program by teachers ( $n = 65$ ) who implemented the program.

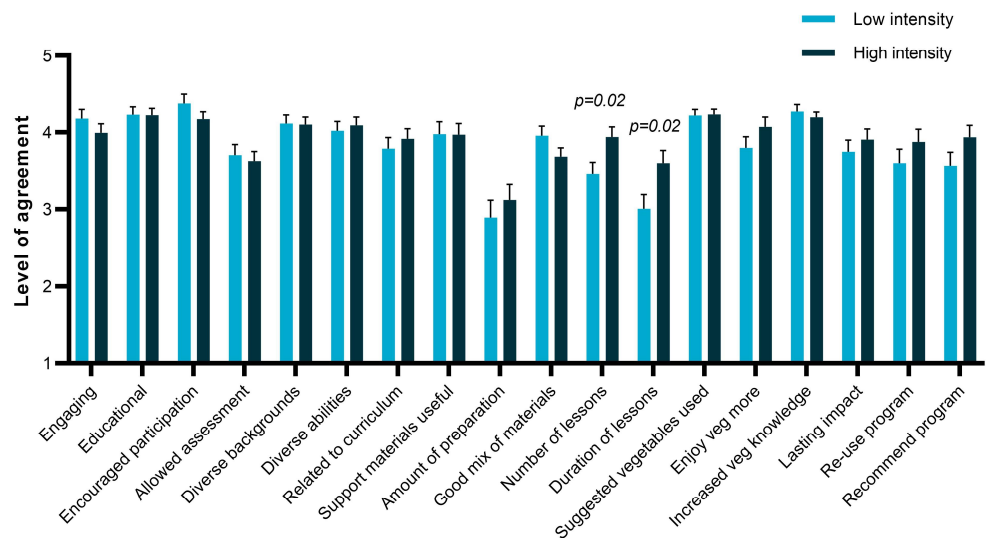
Statement	Average	SD	Intervention <i>p value</i>	State <i>p value</i>	Intervention by state <i>p value</i>
<b>The program was engaging for students (M<sup>1,2</sup>)</b>	4.13	0.72	0.30	0.003	0.91
<b>The program was educational for students (CG, LG)</b>	4.23	0.58	0.96	0.32	0.36
<b>The program encouraged student participation (CQ, M)</b>	4.30	0.66	0.19	0.02	0.22
The program contained activities that allowed to gauge how much students had learned (FA)	3.70	0.73	0.68	0.09	0.21
The program was suitable for students from various backgrounds (A, R)	4.14	0.59	0.92	0.01	0.86
The program was suitable for students of all abilities (A, R)	4.09	0.66	0.67	0.01	0.11
<b>The program related well to the curriculum (CQ, LG, S)</b>	3.86	0.73	0.51	0.79	0.87
<b>The program support materials were useful (CG)</b>	4.02	0.85	0.97	0.07	0.61

Statement	Average	SD	Intervention <i>p value</i>	State <i>p value</i>	Intervention by state <i>p value</i>
<b>The amount of preparation for each lesson was reasonable</b>	3.03	1.17	0.45	0.80	0.12
There was a good mix of pictorial, text and audio materials in the teaching package (PD)	3.86	0.71	0.11	0.01	0.04
The number of lessons was appropriate	3.77	0.83	0.02	0.02	0.02
The duration of the lessons was appropriate	3.39	1.06	0.02	0.01	0.01
I used the vegetables that were suggested for the lessons	4.23	0.46	0.92	0.64	0.33
<b>The program is likely to encourage students to enjoy vegetables more (LG)</b>	3.95	0.74	0.16	0.74	0.28
<b>The program helped students gain knowledge of vegetables (LG)</b>	4.25	0.47	0.48	0.21	0.45
<b>The program is likely to have a lasting positive impact on the students (LG)</b>	3.83	0.79	0.44	0.66	0.66
<b>I would use this program again (R)</b>	3.78	0.95	0.26	0.45	0.56
<b>I would recommend this program to other teachers (R)</b>	3.80	0.91	0.12	0.54	0.48

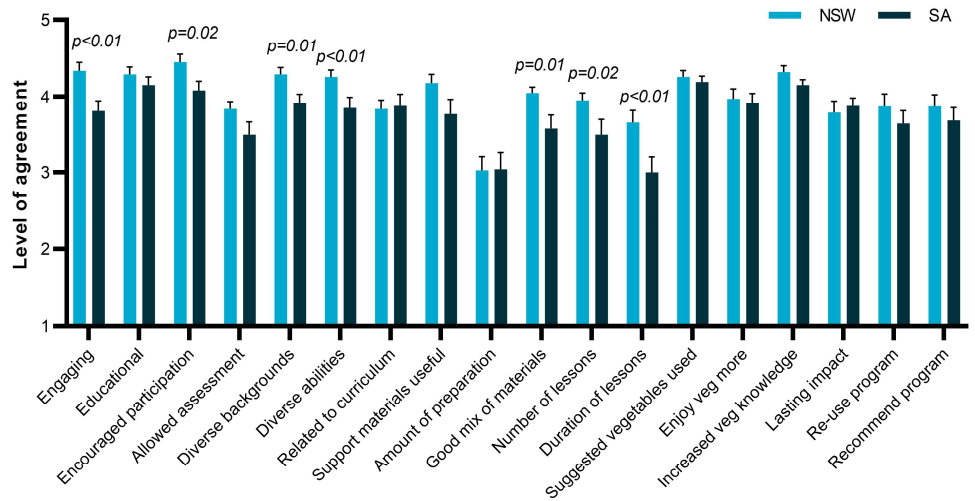
<sup>1</sup> Relates to the dimensions of the LORI instrument: CG = Content Quality, LG = Learning goals, FA= Feedback and Adaption, M=Motivation, IU = Interaction Usability, PD = Presentation Design, R = Reusability, A=Accessibility, S=Standards.

<sup>2</sup> Items in bold were also used in the pilot evaluation [16]

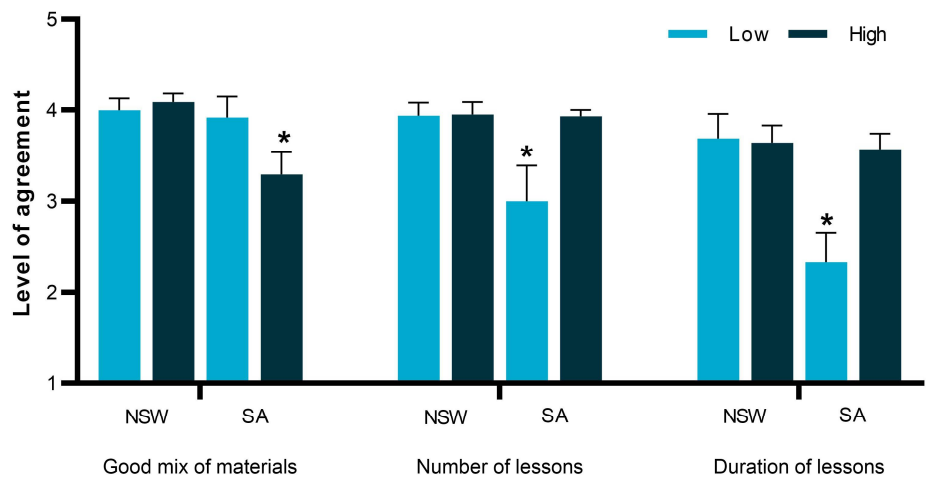
Two-way ANOVA showed that teachers who had received F2F training (high intensity training) were more positive about the number and the duration of the lessons than teachers who only conducted the online training (low intensity training), and did not differ in other areas (Figure 1). Teachers from NSW rated the vegetable education program higher than teachers from SA on seven items: engaging, encouraging student participation, suitable from student of various backgrounds and abilities, good mix of materials and number and duration of lessons (Figure 2).



**Figure 1.** Ratings (mean and SE) for 18 items evaluated for the vegetable education program by teachers ( $n = 65$ ) as a function of low and high intensity training. Ratings ranged from 1-5.  $P$ -values indicate statistically significant differences in the ratings between low and high intensity training.



**Figure 2.** Ratings (mean and SE) for 18 items evaluated for the vegetable education program by teachers ( $n = 65$ ) as a function of state. Ratings ranged from 1-5.  $P$ -values indicate statistically significant differences in the ratings between teachers from the two states.



**Figure 3.** Ratings (mean and SE) for three elements of the vegetable education program evaluated by teachers ( $n = 65$ ) where as significant interaction effect between training intensity and state was obtained. Ratings ranged from 1-5. \* indicates a statistically significant difference with the other three categories ( $p < 0.05$ )

A significant interaction between intensity of training level and state was found for three variables: mix of materials, duration of lessons and number of lessons (Table 2). Teachers in NSW rated these items similarly regardless of the intervention arm, but there were differences amongst SA teachers depending on whether they had received F2F training or not (Figure 3). SA teachers in the low intensity arm evaluated the number and duration of lessons less positive than the other three groups, whereas SA teachers in the high intervention arm rated the mix of materials lower than the other three groups.

Teachers provided comments on the best features of the program and potential for improvement. The most commonly mentioned best features included the vegetable

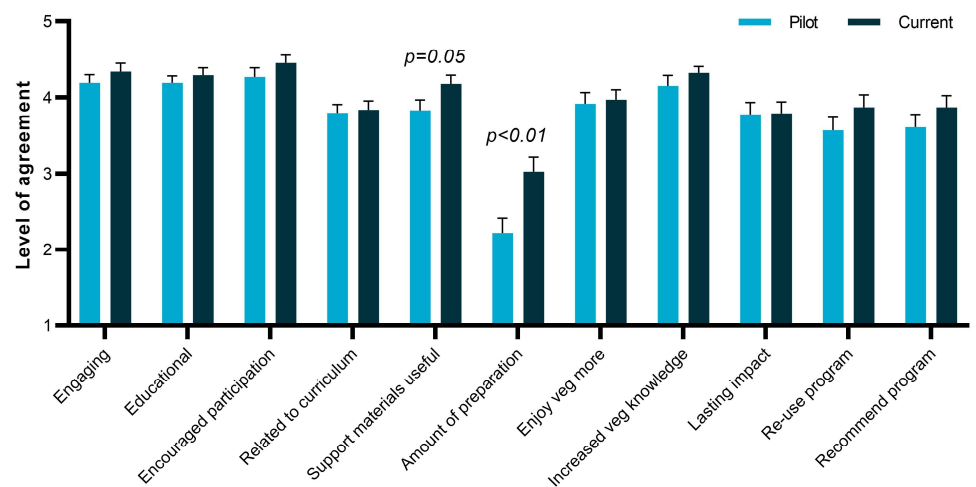


tastings and students trying new foods/vegetables, the high student engagement through the hands-on learning aspect and the good resources of the program overall. Further positive comments were also made about specific program aspects, particularly the last lesson (where students eat and prepare a dish together) which was very well received, the concept of food adventurer and the information that the program provided about vegetables. Several teachers also mentioned that the program was important in challenging pre-conceived ideas and allowed students to take some risks, which they liked.

Suggestions for improvements related to the time/duration of the lessons in relation to content density, with some teachers suggesting to break up material in smaller lessons or to reduce the amount of material. Preparation time involved for the practical aspects was also mentioned, and involvement of others suggested (e.g. teacher aid, parents, students). Some teachers also suggested adding a recording element for the students (journal/workbook/scrap book). There were two teachers who commented that students in their first year of schooling found it difficult to come up with describing words and suggested buddy-classes with older students.

### 3.2. Comparison with pilot evaluation

Data for 11 of 18 statements (Table 1) was also collected quantitatively in an evaluation of a previous version of the program [16]. Compared to this earlier version of the program, the current program rated higher on the usefulness of the support materials ( $p = 0.05$ ) and the preparation effort needed for the program ( $p < 0.01$ ) (Figure 4), with no difference between the two versions for other statements.



**Figure 4.** Comparison between pilot and current version of the vegetable education program on 11 statements (mean and SE) on a scale of 1 - 5. *P*-values indicate statistically significant differences in the ratings between pilot and current version of the program.

## 4. Discussion

The current study aimed to compare the effect of a low and high intensity training program on teacher acceptability of a vegetable education resource, Taste & Learn™, and compared evaluations with a previous version of the program. Results showed that the vegetable education resource had good satisfaction amongst teachers regardless of type of training, but teachers undergoing high intensity training were more positive about number and duration of lessons being reasonable, mainly driven by SA teachers. Compared to a previous version of the program, teachers evaluated preparation effort and materials more positively.

Acceptability of the Taste & Learn™ program by teachers was good. Not many process evaluations of comparable programs have been undertaken, but acceptability of the Taste & Learn™ program was similar to teacher acceptability of a Dutch sensory education program *Taste Lessons* [27]. The most appreciated elements of the Dutch *Taste Lessons* program by students themselves were the taste tests and conducting experiments [27]. The current study measured teachers' perceptions of student engagement and found similar results, which was supported by the open comments teachers provided. In addition to being enjoyable, experiential learning activities are also amongst the most effective activities in healthy eating programs [28,29].

The current study shows that revision of resource materials positively contributed to teacher acceptability of the program. Notably, response to the statement "The amount of preparation for this program is reasonable" changed from a score of 2 ("Slightly disagree") [16] to 3 ("Neutral"). Barriers to implementation of fruit and vegetable (FV) distribution program in schools include lack of time to cut FVs [8], which may lead to serving FVs that require no or little cutting [30]. Thus, specific attention to this aspect of the program has lowered a potential barrier for uptake. Moreover, teachers mostly used the suggested vegetables for each lesson, thereby ensuring students were exposed to a broad variety of vegetables. The vegetable tastings are a critical success element to the experiential learning component of this program in terms of building vegetable enjoyment as well as student and teacher appreciation of the program, and short of providing pre-cut vegetables, it is unlikely that further improvements can be made. Resource materials were also more positively evaluated, which shows that modifications based on previous evaluations [16,17] were successful. It is also important to note that teacher appreciation for all other aspects remained the same. In particular, despite reduced content of the resource, perception of alignment to the curriculum remained the same.

Teachers who received additional F2F training were more positive about the number and duration of the lessons than teachers who received online training and written materials alone. These results may indicate that F2F training provides teachers with a better and more realistic expectation about the workload involved to implement the program. There were some differences between states, i.e. differences in training intensity were driven by teachers in SA, whereas NSW did not show differences. Further, teachers in NSW rated the program higher than SA on several aspects. The potential reasons for these differences are unclear. At time of study, the NSW government had an active framework of promoting healthy eating programs in schools (*Live Life Well @School*) [3] whereas SA did not, which perhaps raises perceived importance of such programs amongst NSW teachers, however this remains speculative. It might also be that there are differences between states in how teachers access training for educational programs. It is clear however that it did not impact on student outcomes, as no differences in behavioural outcomes were found as a function of state [25].

An effect evaluation of the vegetable education program showed that level of intensity of teacher training did not affect student outcomes [25]. The current study shows that evaluation of all but two aspects of teacher acceptance of the training and the program were also independent of intensity of training. These results seem to favour the implementation of the program using a low(er) intensity training, as the program can be made available with no on-going costs, e.g. through a website, and implemented regardless of geographic location. Although the high costs of F2F training are not warranted based on the results of this study, provision of some form of personal interaction may still be beneficial when/where possible to raise awareness of the program and support discussion around implementation. This could take the form of a combined infor-

mation session and training webinar, thereby lowering costs compared to F2F and enabling wide reach.

This study has demonstrated good acceptability of the vegetable education program and its supporting resources. It has also highlighted some further development opportunities. The online module was well received on all aspects but there were some technical difficulties with accessing materials. It would also be recommended to undertake further process evaluation of the program when full implementation begins to determine reach and impact on a larger scale, for example using the RE-AIM framework [31].

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## References

1. De Bourdeaudhuij, I.; Van Cauwenberghe, E.; Spittaels, H.; Oppert, J.M.; Rostami, C.; Brug, J.; Van Lenthe, F.; Lobstein, T.; Maes, L. School-based interventions promoting both physical activity and healthy eating in Europe: a systematic review within the HOPE project. *Obesity Reviews* **2011**, *12*, 205-216, doi:10.1111/j.1467-789X.2009.00711.x.
2. Story, M.; Nannery, M.S.; Schwartz, M.B. Schools and obesity prevention: creating school environments and policies to promote healthy eating and physical activity. *The Milbank Quarterly* **2009**, *87*, 71-100, doi:10.1111/j.1468-0009.2009.00548.x.
3. Bravo, A.; Foley, B.; Innes-Hughes, C.; O'Hara, B.; McGill, B.; Rissel, C. The equitable reach of a universal, multisector childhood obesity prevention program (Live Life Well @ School) in Australian primary schools. *Public Health Research & Practice* **2020**, *10*;30(1):3012003, doi:10.17061/phrp3012003.
4. Norman, Å.; Berlin, A.; Sundblom, E.; Elinder, L.S.; Nyberg, G. Stuck in a vicious circle of stress. Parental concerns and barriers to changing children's dietary and physical activity habits. *Appetite* **2015**, *87*, 137-142, doi:10.1016/j.appet.2014.12.208.
5. Pocock, M.; Trivedi, D.; Wills, W.; Bunn, F.; Magnusson, J. Parental perceptions regarding healthy behaviours for preventing overweight and obesity in young children: a systematic review of qualitative studies. *Obesity Reviews* **2010**, *11*, 338-353, doi:10.1111/j.1467-789X.2009.00648.x.
6. Nepper, M.J.; Chai, W. Parents' barriers and strategies to promote healthy eating among school-age children. *Appetite* **2016**, *103*, 157-164, doi:10.1016/j.appet.2016.04.012.

7. Nelson, M.; Breda, J. School food research: building the evidence base for policy. *Public Health Nutrition* **2013**, *16*, 958-967, doi:10.1017/S1368980012005162. 419  
420
8. Ismail, M.R.; Seabrook, J.A.; Gilliland, J.A. Process evaluation of fruit and vegetables distribution interventions in school-based settings: A systematic review. *Preventive Medicine Reports* **2020**, *21*, 101281, doi:10.1016/j.pmedr.2020.101281. 421  
422
9. Oakley, A.; Strange, V.; Bonell, C.; Allen, E.; Stephenson, J. Process evaluation in randomised controlled trials of complex interventions. *BMJ* **2006**, *332*, 413-416, doi:10.1136/bmj.332.7538.413. 423  
424
10. Wang, D.; Stewart, D. The implementation and effectiveness of school-based nutrition promotion programmes using a health-promoting schools approach: a systematic review. *Public Health Nutrition* **2013**, *16*, 1082-1100, doi:10.1017/S1368980012003497. 425  
426  
427
11. Saunders, R.P.; Evans, M.H.; Joshi, P. Developing a Process-Evaluation Plan for Assessing Health Promotion Program Implementation: A How-To Guide. *Health Promotion Practice* **2005**, *6*, 134-147, doi:10.1177/1524839904273387. 428  
429
12. Steckler, A.B.; Linnan, L.; Israel, B. *Process evaluation for public health interventions and research*; Jossey-Bass San Francisco, CA: **2002**; Vol. 28. 430  
431
13. Mansfield, C.F.; Beltman, S.; Price, A.; McConney, A. "Don't sweat the small stuff:" Understanding teacher resilience at the chalkface. *Teaching and Teacher Education* **2012**, *28*, 357-367, doi:10.1016/j.tate.2011.11.001. 432  
433
14. Beltman, S.; Mansfield, C.; Price, A. Thriving not just surviving: A review of research on teacher resilience. *Educational Research Review* **2011**, *6*, 185-207, doi:10.1016/j.edurev.2011.09.001. 434  
435
15. Penuel, W.; Fishman, B.J.; Gallagher, L.P.; Korbak, C.; Lopez-Prado, B. Is alignment enough? Investigating the effects of state policies and professional development on science curriculum implementation. *Science Education* **2009**, *93*, 656-677, doi:10.1002/sce.20321. 436  
437  
438
16. Poelman, A.A.M.; Cochet-Broch, M.; Cox, D.N.; Vogrig, D. VERTICAL: a sensory education program for Australian primary schools to promote children's vegetable consumption. *Journal of Nutrition Education and Behavior* **2017**, *49*, 527-528. e521, doi:10.1016/j.jneb.2017.04.001. 439  
440  
441
17. Poelman, A.A.M.; Cochet-Broch, M.; Cox, D.N.; Vogrig, D. Vegetable Education Program Positively Affects Factors Associated With Vegetable Consumption Among Australian Primary (Elementary) Schoolchildren. *Journal of Nutrition Education and Behavior* **2019**, *51*, 492-497. e491, doi:10.1016/j.jneb.2018.11.002. 442  
443  
444
18. Mahrshahi, S.; Myton, R.; Partridge, S.R.; Esdaile, E.; Hardy, L.L.; Gale, J. Sustained low consumption of fruit and vegetables in Australian children: Findings from the Australian National Health Surveys. *Health Promotion Journal of Australia* **2019**, *30*, 83-87, doi:10.1002/hpja.201. 445  
446  
447
19. Mennella, J.A. Ontogeny of taste preferences: basic biology and implications for health. *The American Journal of Clinical Nutrition* **2014**, *99*, 704S-711S, doi:10.3945/ajcn.113.067694. 448  
449
20. Bell, L.K.; Gardner, C.; Tian, E.J.; Cochet-Broch, M.O.; Poelman, A.A.M.; Cox, D.N.; Nicklaus, S.; Matvienko-Sikar, K.; Daniels, L.A.; Kumar, S., et al. Supporting strategies for enhancing vegetable liking in the early years of life: an Umbrella review of systematic reviews. *American Journal of Clinical Nutrition* **2021**, *in press*, doi:10.1093/ajcn/nqaa384. 450  
451  
452
21. Puisais, J. *Le Goût chez l'enfant: L'apprentissage en famille*; Flammarion: Tours, **1999**. 453
22. Reverdy, C.; Schlich, P.; Köster, E.P.; Ginon, E.; Lange, C. Effect of sensory education on food preferences in children. *Food Quality and Preference* **2010**, *21*, 794-804, doi:10.1016/j.foodqual.2010.03.008. 454  
455
23. Australian Curriculum Assessment and Reporting Authority (ACARA). Foundation to year 10 curriculum. Available online: <https://www.australiancurriculum.edu.au/> (accessed on 4 March 2021). 456  
457
24. Bybee, R.W.; Taylor, J.A.; Gardner, A.; Van Scotter, P.; Powell, J.C.; Westbrook, A.; Landes, N. The BSCS 5E instructional model: Origins and effectiveness. *Colorado Springs, Co: BSCS* **2006**, *5*, 88-98. 458  
459

- 
25. Poelman, A.A.M.; Cochet-Broch, M.; Wiggins, B.; McCrea, R.; Heffernan, J.E.; Beelen, J.; Cox, D.N. Effect of experiential vegetable education program on mediating factors of vegetable consumption in Australian primary school students: a cluster-randomized controlled trial. *Nutrients* **2020**, *12*, 2343, doi:10.3390/nu12082343. 460  
461
26. Leacock, T.L.; Nesbit, J.C. A framework for evaluating the quality of multimedia learning resources. *Journal of Educational Technology & Society* **2007**, *10*, 44-59. 463  
464
27. Battjes-Fries, M.C.; van Dongen, E.J.; Renes, R.J.; Meester, H.J.; van't Veer, P.; Haveman-Nies, A. Unravelling the effect of the Dutch school-based nutrition programme Taste Lessons: the role of dose, appreciation and interpersonal communication. *BMC Public Health* **2016**, *16*, 737, doi:10.1186/s12889-016-3430-1. 465  
466  
467
28. Dudley, D.A.; Cotton, W.G.; Peralta, L.R. Teaching approaches and strategies that promote healthy eating in primary school children: a systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity* **2015**, *12*, 1-26, doi:10.1186/s12966-015-0182-8. 468  
469  
470
29. Charlton, K.; Comerford, T.; Deavin, N.; Walton, K. Characteristics of successful primary school based experiential nutrition programs: A Systematic Literature Review. *Public Health Nutrition* **2020**, 10.1017/S1368980020004024, 1-37, doi:10.1017/S1368980020004024. 471  
472  
473
30. Potter, S.C.; Schneider, D.; Coyle, K.K.; May, G.; Robin, L.; Seymour, J. What works? Process evaluation of a school-based fruit and vegetable distribution program in Mississippi. *Journal of School Health* **2011**, *81*, 202-211, doi:10.1111/j.1746-1561.2010.00580.x. 474  
475  
476
31. Glasgow, R.E.; Vogt, T.M.; Boles, S.M. Evaluating the public health impact of health promotion interventions: the RE-AIM framework. *American Journal of Public Health* **1999**, *89*, 1322-1327, doi:10.2105/ajph.89.9.1322. 477  
478  
479