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Australian Teachers' Perceptions and Experiences of Food and Nutrition Education in Primary Schools: A Qualitative Study

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Abstract: Teacher delivered food and nutrition education (FNE) can be effective in improving children's food literacy and eating habits. However, teachers are known to face some barriers to the delivery of FNE globally. To obtain a deeper understanding of Australian primary school teachers' experiences and views, 17 teachers were interviewed. The results of the thematic analysis showed that teachers acknowledged the importance of FNE and were willing to include more FNE content into their teaching. We also identified the FNE topics taught, resources used, their teaching partners, and barriers encountered. The discussion presents strategies to overcome these barriers.

Introduction

There have been considerable changes in the current food systems, including increasing availability and consumption of processed and convenience food, increasing corporate control of the food system and a reduction in the use of basic food preparation skills over the several decades (Slater et al., 2018; Winson, 2014). These changes parallel shifts globally associated with rising rates of obesity, the onset of chronic diseases (Kearney, 2010) and deteriorations in adults' and children's diets globally with increased consumption of energy-dense, nutrient-poor foods (Popkin et al., 2012). Given the contemporary food environment, it is becoming increasingly important for children to have sufficient food-related knowledge and skills to sift through the plethora of nutrition misinformation and make ethical food choices that incorporate health, social and environmental considerations (Slater, 2017). Therefore, it is clear that education can play a critical role in improving children's current food literacy and diets. Primary (elementary) schools, in particular, can equip children with food skills to ensure equitable health outcomes among children through food and nutrition education (FNE). FNE can be defined in different ways and from various perspectives. The FAO defines school FNE as

a series of coherent and progressive sequences of educational activities, with environmental supports that will help schoolchildren (along with school staff and parents) to achieve lasting improvements in their diets and other food practices as well as their outlooks and knowledge... (p. 4)

(Food and Agriculture Organisation, 2020). Children who are educated in FNE can be effective contributors to solutions to the food-related problems of the 21st century, such as feeding the world in healthy, equitable and culturally acceptable ways without continuing to degrade the ecosystem (Pendergast & Dewhurst, 2012). Therefore, there have been numerous global calls for integrating and improving FNE in school curricula as a key strategy to curb all

forms of malnutrition and support the transformation of food systems (Food and Agriculture Organisation, 2020; GLOPAN, 2015; Hunter et al., 2017; WHO, 2017).

In response to these calls, some countries, such as England have introduced new FNE curricula (Ballam, 2015), whereas others like Brazil have amended their already existing curricula (de Freitas Zompero et al., 2019; WFP, 2019). In Australia, at present, some aspects of FNE are addressed in the Australian curriculum (ACARA, 2021) as well as in the States' and Territories' own curricula (e.g., Victorian Curriculum and Assessment Authority, 2021). For example, in the Victorian primary school curriculum (Preparatory/Foundation to year 6, approximately 5-12 years old), FNE mainly falls into two learning areas: 'Technologies' and 'Health and Physical Education' (Victorian Curriculum and Assessment Authority, 2019). According to the recent mapping of the Victorian curriculum (Victorian Curriculum and Assessment Authority, 2021), 11 out of the 52 Technologies curriculum items and four out of the 52 Health and Physical Education curriculum items include references to food or nutrition. However, due to the level of autonomy teachers have in curriculum delivery and the diversity of interests and limited knowledge base among schoolteachers, FNE might differ from school to school (Bouterakos et al., 2020; de Vlieger et al., 2019).

In many countries, including Australia, primary school FNE in the curriculum is delivered mainly by classroom teachers, although there are a few exceptions where specialised diet and nutrition teachers deliver the content, such as in Korea and Japan (Ishida, 2018; Yoon et al., 2012). There is evidence demonstrating the effectiveness of the delivery of nutrition education content by classroom teachers. Studies comparing nutrition education interventions delivered by classroom teachers versus guest nutritionists or researchers found that teachers were more effective at improving students' healthy eating behaviours than the guest 'experts' (Ozcan & Ercan, 2021; Panunzio et al., 2007). It has been claimed that this could be due to teachers' authority over children and the fact that children look to teachers as role models. Another reason suggested was the time they spend with children, which brings many opportunities to integrate food and nutrition concepts into all classroom activities (Ozcan & Ercan, 2021; Panunzio et al., 2007). In a recent systematic review and meta-analysis of 34 studies, nutrition education programs delivered by classroom teachers had small or medium effects in reducing children's energy intake and sugar consumption, increasing their fruit and vegetable consumption and improving their nutritional knowledge. Research into teachers' experiences in delivering FNE can provide some useful insights that may help improve the effectiveness of FNE delivered by teachers on targeted behaviours of children.

Overseas studies, however, show that teachers experience many barriers in teaching food and nutrition in the classroom, including lack of suitable curricula, lack of time for teaching, lack of training in these subjects, lack of supporting resources, unhealthy school food environments, poor support from school management, and competing for academic expectations (Bergling et al., 2021; Hart & Page, 2020; Jones & Zidenberg-Cherr, 2015; Kupolati et al., 2015; Lee & Hong, 2015; Li et al., 2020). However, to date, there has been limited research on Australian teachers' views and experiences with FNE (Bouterakos et al., 2020; de Vlieger et al., 2019; Love et al., 2020). One study adopted a quantitative approach to investigate the phenomena (de Vlieger et al., 2019). Two other studies used qualitative methods, at least in part: Bouterakos et al. (2020) only interviewed one teacher, and Love et al. (2020) did not focus solely on teachers' views. The use of qualitative methods can provide rich details about FNE program functioning that may help improve the impact of teacher delivered FNE programs. Therefore, the current descriptive study focussed exclusively on teachers and explored their perspectives and experiences with FNE in depth. Findings from this study can provide insights into strengthening FNE in Australia and elsewhere with similar education systems.

Methods

A qualitative research design was employed to provide a comprehensive understanding of teachers' views and experiences with FNE primary schools in Victoria (Harris et al., 2009; Swift & Tischler, 2010). Social constructivism was adopted (Denzin & Lincoln, 2011) as the study's theoretical paradigm. Social constructivism encourages the researcher to look for the complexity of views rather than narrowing meanings into a few categories or ideas (Creswell & Poth, 2016). Thus, the questions directed to teachers were broad so that they could construct the meaning of the circumstance under investigation (Creswell & Poth, 2016). The qualitative descriptive methodology was employed for the study in order to provide a rich description of the experience depicted in daily language (Sandelowski, 2010).

Participants and Recruitment

Purposive sampling (Kelly et al., 2010) was used to identify teachers who have been teaching FNE in primary schools. Teachers were recruited from schools in the suburbs of the city of Melbourne and rural areas of the State of Victoria, Australia. Recruitment was conducted via advertisements in teacher Facebook groups. The study advertisements were also posted on community notice boards in public libraries and supermarkets. Twenty-six teachers responded to the advertisement via emails. The names and suburbs of their school were asked to ensure that no more than one teacher was included from any particular school to achieve maximum variation sampling (Patton, 2002). The type of school was recorded when selecting teachers to ensure that they represented government, Catholic, and independent schools, including other religious schools.

Before each interview, the study's plain language statement and consent form were emailed to the participants. They all gave their consent and permission for the interview to be recorded. Each teacher was offered a \$20 shopping voucher as compensation for their time. The researchers and the teachers had no prior relationships. Seventeen teachers (twelve women and five men) working full-time or part-time in a Victorian primary school were interviewed from February 2020 to June 2020. The recruitment ceased after the 17th interview when data saturation was reached. This occurs when further data gathering no longer adds new themes or enhances the thematic information obtained (Guest et al., 2006). Ethics approval was granted by the Deakin University Health Human Ethics Advisory Group (Project No HEAG-H 24_2018).

Interview Procedure

A semi-structured qualitative interview guide was used to obtain a comprehensive understanding of teachers' perspectives. The broad question asked was, *'How would you describe your experiences in teaching food and nutrition at school?'* Some example follow-up questions, as well as prompt questions, are presented in Table 1. The lead researcher (GA) conducted individual interviews either face-to-face (two) or via phone (fifteen). Face to face interviews were held in the schools of the participants after school hours. Interview duration ranged from 28 to 62 minutes, with an average of 47 minutes. The teachers varied widely in terms of their teaching experience. The duration of their teaching experience was categorized as: 0-5 years (n=6), 5-10 years (n=3), 10-15 years (n=3), 15-20 years (n=2), and 20+ years (n=3).

What do you teach in terms of FNE?
Do you think it is important to teach food and nutrition to children? Why/why not?
How much time do you think students should spend learning these skills at school?
Prompt questions:
“Could you tell me more about that?”
“Is there anything else?”
“Why?” “What do you mean by ...”

Table 1. Example follow-up questions from the interview guide

Two pre-test interviews were used to evaluate the face validity of the questions. As only minor language changes were made to the questions after pre-testing, the data from the pre-testing was merged with information from the subsequent interviews.

Data Analysis

The interviews were audio-recorded and transcribed by a professional service (Rev.com) verbatim as soon as possible after each interview. The lead author re-checked all the transcripts for accuracy. The teachers were given a chance to review their interviews; one teacher accepted this invitation but did not request any changes. Data collection and analysis were done simultaneously to allow them to shape each other (Thorne, 2000). The qualitative data analysis software package NVivo (SR International Pty Ltd Version 12,2015) was used for manual data coding. Template analysis was used to carry out the thematic analysis of the transcribed information. In the template approach, an initial set of a priori codes (the ‘Template’) are created based on the research questions or relevant previous literature. When the investigator reads and deduces the textual material, these codes are updated, and new codes are added to the template (King, 2012). The codes identified by the senior author (GA) and research context were discussed with the study's other researchers for interpretation accuracy during weekly research meetings. This helped prevent a single investigator's personal or disciplinary biases from significantly impacting the findings (Creswell & Poth, 2007; Morse et al., 2002). A detailed description of the teachers' experiences and views is provided below by portraying the main themes and relevant quotations.

Results

Importance of Food and Nutrition Education

All the teachers felt that teaching FNE in primary schools is very important; four of them discussed the relative importance and mentioned it was as important as the other core subjects of the primary school curriculum, such as literacy and numeracy.

‘I think it's very important, just as important as other subjects, like literacy and numeracy. Because I know there is a big focus on literacy and numeracy as being the main things. But it's really, really important’ Teacher 17

‘It's very important. We probably should allocate more time to food and teaching children basic cooking skills and focus more on that.’ Teacher 5

Different reasons were given to explain the importance of FNE. The teachers believed FNE would help children acquire vital life skills, which would have major impacts on their current learning and physical health as well as their future health status.

‘When they come with chips and lots of things, they're tired, and they're irritable, and there's definitely a huge difference in kids' behaviour....If kids are

full of sugar compared to full of a variety of foods, there's a whole difference with their concentration after recess even.' Teacher 14

'A lot of money that's going to obesity, diabetes type 2, so it would be sort of like the next level of subjects that need to be included is nutrition' Teacher 2

'These children are our future parents. It's important for them' Teacher 5

The teachers also believed FNE should start from the earliest year possible because it would be harder to change children's habits as they grow older.

'I feel like the earlier you start teaching them about it, the more it gets into their mind, and you can hopefully mould them in a way that they have such a broad understanding.' Teacher 12

'I think it's definitely important to cover, especially in the earlier years as well, starting off from prep because it's harder to change habits in grade five and six, I guess, compared to prep and grade one.' Teacher 1

They also felt responsible to some extent to ensure their students would have healthy eating habits in their future lives.

'My food education comes from grandparents and parents who used to have a vegetable garden and who would cook food from scratch, but I know that the next generation does not see the same. If we want to have children to be healthy, schools have a responsibility to educate. It's not just up to families to do that.' Teacher 4

Most of the teachers (n=15) suggested that FNE should be taught one to two hours weekly or fortnightly or at least once or twice per term at every grade level. The importance of continuity of the education provided was emphasised. Two teachers suggested that FNE topics should be revisited every day for 30 mins.

'Maybe like two hours a week, or at least one hour a week. So at least it's like a weekly thing. But maybe two hours where there's one set of theory-ish lesson, so it's learning about why we do what we do. And then one lesson outside, cooking, physically learning about what we're growing. A lot more hands-on, or gardening practice, sort of something like that.' Teacher 17

'I think the equivalent of one lesson every week or every fortnight for at least a term would not hurt. But maybe some years the focus might be more outdoors on growing food, and other years, it might be more focused indoors on producing meals or cooking or talking about it differently.' Teacher 4

Teachers' Experiences with Teaching FNE ***FNE Topics Taught In Victorian Primary Schools***

The teachers mentioned various FNE topics during the interviews. Although there is no stand-alone FNE subject in most Australian primary schools, the participants reported that they included some aspects of FNE in their classroom teaching. Practical classes such as cooking and gardening were cited by most of the participants (n=13). However, the time spent on these items, the grade level taught, and the frequency of teaching these subjects varied widely between the primary schools. For example, the inclusion of these subjects was more common and frequent in schools with a kitchen and garden program. In some schools, younger children (for example, those in preparatory classes) were included in these cooking and gardening classes, whereas in other schools, only students from higher grade levels, such as grades 3 and 4 were involved.

'What we have here is the Stephen Alexander Kitchen Garden program. So that's in grades three and four. Then the idea is whatever we harvest from the garden,

we can then cook up in the kitchen. I think we're making capsicum frittata next week, with the capsicums that we got from the garden' Teacher 1

'Once a term, we do a cooking class because we have 800 students in my school, so they can only fit it in once a term.' Teacher 3 'I remember we had Jamie Oliver who was actually going to do a kids program in schools and we were one of the pilot schools for him. We all went over to the hall and did cooking sessions and the kids loved that. But then it stopped, it was only kind of once-off.' Teacher 6

These practical classes, especially gardening, were only available at some schools for students who were interested or joined a relevant club.

'There are gardening clubs, and they do grow vegetables. I believe that at lunchtime, they open up the gates and every student can come in and have a look at what's going on, but the actual club is limited to a certain number of students who are very committed and interested.' Teacher 10

Many teachers (n=12) stated that they taught healthy eating in their classrooms. Some referred to the Australian Guide to Healthy Eating, which is recommended in the current Victorian primary school curriculum. They also mentioned having incidental discussions on healthy eating during lunchtime.

'I've taught units on health and food and the healthy diet pyramid, and also discussed with children healthy lunchboxes, like the importance of a healthy diet' Teacher 10

Another teacher commented when asked what she taught in terms of healthy eating: *'Eating fruits, vegetables and meat if you like meat, dairy products if you like dairy products, and eat less junk food, less cakes. You can have them, but they should be just a treat only.' Teacher 2*

A teacher with a nutrition background held different opinions to these other teachers. She commented on children's food literacy and age-appropriateness, for example:

'I don't talk about healthy, unhealthy. I actually challenge the children and the teachers and say to them, "Today we're going to be talking about food and learning about food, but our challenge today is not to use the word healthy, unhealthy. I don't want you to use the words good or bad or tasty. We want to use other words to describe food," because we know that food literacy standard is quite low. So, people expect that children have this understanding of food that's well beyond their age-appropriate level, basically. So, I have a very neutral approach to food. I just talk about food as food.' Teacher 9

Food sustainability which includes food waste, recycling and composting, was mentioned by 11 teachers. They reported that discussions on food waste usually occur in the classroom during the practical (cooking and gardening) classes and more formal teaching sessions as well as at lunchtime. These teachers also stated that they had recycling and/or composting bins at their schools, and they usually had casual conversations with children about recycling and composting at any time within school hours.

'In science, we've done food packaging. We do a lot on waste. We've analysed our bins, our soft plastics and trying to come up with action plans. I think that even in the curriculum, there's a much greater emphasis on that sustainability across the board, but obviously, sustainability, one of the reasons we do it so often related to food, is because the kids can relate to it.' Teacher 8

'We might touch on sustainability in term four. We touch on that a little bit just in the garden, we use compost bins in our classrooms. That opens a bit of discussion about food wastage, ... Like some kids were just throwing an entire apple in the bin without even eating it. I'll say, "You just can't waste food. Like

people have bought that and people have produced it and grown it, and you can't just throw it away." I guess incidental conversations about it.' Teacher 1

Food cultures were amongst the reported FNE topics. Teachers aimed to teach this topic through events, special cultural days or classroom discussions during class teaching time and lunchtime.

'We always talk about each other's lunches, it's a time to teach them healthy eating habits and to learn about different cultures. Like our Asian children bring food in containers rather than bringing sandwiches, and it always smells different, and we always ask.' Teacher 5

'We also invited children to talk to and investigate food traditions in their cultures and families and to share those ideas with their classmates.' Teacher 4

Five teachers reported teaching lessons on food advertising via an English/literacy subject while teaching persuasive texts. They provided a meaningful example of integrating FNE into other primary school subjects.

'Advertisements. We'll definitely cover, we're doing persuasive texts at the moment. A few of the kids even said like, "Oh, ads do that to you to make you try and buy the product." I've definitely used that in the past, looking at fast food ads and Doritos and all of those things.' Teacher 1

Agriculture (n=3), food hygiene (n=2), reading food labels (n=2), writing a recipe (n=2) and table manners (n=1) were amongst the least cited topics by these primary teachers.

Resources Used

Teachers listed various resources (both free and requiring payment) they used to teach FNE related topics in their classrooms. These were mainly from the Internet accessed via different reliable websites such as Dietitians Australia and Diabetes Australia. They also reported purchasing the resources of various companies such as MAPPEN, Twinkl and Teach Starter, which create teaching resources for teachers. The use of resources provided by the Stephanie Alexander Kitchen Garden Program (SAKG), Cultivating Community The use of resources provided by the Stephanie Alexander Kitchen Garden Program (SAKG), Cultivating Community and Coles Supermarkets: the organisations that support and collaborate with primary schools in the delivery of FNE were also cited by teachers. For example, two teachers commented:

'They (MAPPEN) provide a package to teachers of teaching materials which we can use to roll out different curriculum-based learning and inquiry [inquiry-based learning which encourages students to explore and understand the application of concepts in a real-world context] ... With the kitchen garden, because it's new this year, every teacher has been looking into their own resources. So, I personally researched through the online SAKG resources. I also paid for a lot of my own resources with the expectation that I would continue to use them. I also researched through government-based websites in terms of what is considered healthy eating and nutrition guidelines for Australia.' Teacher 4

'Recently, we used the Coles [an Australian supermarket chain] resources that they sent out about the five fruits and vegetables a day. They have a whole program about healthy eating, and they had these free placemats that you could get for the students.' Teacher 3

Several teachers also mentioned using the printed resources that were already available or provided by their school or their colleagues.

'We have an inquiry thing called Unit Hero, and other schools have different things. We follow Unit Hero when we do our inquiry. But usually, it's actually just whatever teachers make up. And I know that we look at the food pyramid because we used to have posters in our room with the food pyramid on them'
Teacher 6

Teaching Partners

The teachers reported that they had some partners involved in their teaching of FNE related topics. These for-profit or non-profit bodies/organisations came to their schools, and their trained staff delivered such education. In most cases, these organisations helped in the delivery of practical FNE lessons such as cooking and gardening. To name a few, these were the Stephanie Alexander Kitchen Garden (SAKG) Program, Cultivating Community,

'The Life Education Van comes with visits and teaches the kids about healthy eating. And I have someone take the session, a one-hour long session with each grade. And they do little activities, and their mascot is Healthy Harold.' Teacher 1

'We're working with a company called Cultivating Community. So, they go out and they start school gardens.' Teacher 12

'At our school all from grades three to six, we have the Stephanie Alexander Kitchen Garden Program. So that's taught by a teacher who's trained in that program. It's not just cooking and a lot of knife safety, it's hygiene too' Teacher 15

'The school in general still uses an education program called Food Web, so Food Web Education, those educators come out and they maintain our gardens, and they have a specific scheduled gardening lesson with the children once a week for approximately an hour, where they're learning about working in the garden and also how to prepare food.' Teacher 7

Barriers to FNE

Reported barriers to FNE included time scarcity; lack of professional development (PD); lack of resources, school facilities and funding; lack of staff to help deliver practical classes; and lack of support from the principal. Time was cited as a barrier by almost half (n=8) of the teachers. They reported that prioritising other subjects usually reduced the amount of time available for FNE. They believed the curriculum was too crowded for FNE to be covered adequately.

'You'd be hard-pressed to, I guess, be able to find enough time during the week to be able to teach it [FNE] alongside the core skills.' Teacher 12

A few teachers also believed that the resources needed to teach FNE were limited.

'The school could have a resource, a go-to, somewhere to go to for nutrition.'
Teacher 16

One teacher suggested that having more cross-curriculum resources would help teachers incorporate more FNE into other subjects:

'At least resources that link to the curriculum... It might just be more natural like, "Today in writing, we're going to look at how ads are formed, and here's an example of an ad trying to convince you to buy McDonald's," So, I think if those resources were there for teachers, it would just make it a lot easier because a lot of the time, teachers have to create the resources and then deliver them as well' Teacher 1

None of the teachers mentioned attending any PD in FNE though four pointed out the need for it.

'I think the curriculum is broad enough to be able to unpack this really well, but teacher knowledge is really poor. To be honest, I've been teaching for 25 years, so I haven't done any professional learning in this health area at all.' Teacher 9
'Those people who create those curricula are extremely knowledgeable people, and so I'm one of these ones that does follow a curriculum. Some people don't, but I think probably we need more professional development, or time, to analyse and look at the curricula.' Teacher 2

Teachers mentioned that they required funding, facilities and helpers, especially for practical classes (such as cooking, gardening or visiting a farm or supermarket), mainly for safety reasons. Some believed they needed food professionals or experts to deliver FNE but mentioned the lack the funding to bring these people into the school.

'I know that we've got access to a little oven, but that's really it. I know at my school that I was at previously, there was a lot more food education because we had the Stephanie Alexander Kitchen program, which was an amazing program and kids had the facilities to go and cook and create that healthy food, but that's not running in a lot of schools, due to funding and equipment and area.' Teacher 11

'It was one of the cereal brands, we were talking about getting them to come out and talk to our students, and it was so expensive to have somebody come out. Then with the Woolworths [supermarket chain in Australia] tours, even though the tour is free, we would have to book buses to go to a Woolworths, and then that's just so expensive.' Teacher 3

Two teachers also felt that the principal's support was necessary for the delivery of FNE, especially for the practical classes.

'... The aide and I were both very committed to doing some kind of food preparation every week. The principal, to be honest, thought it was a waste of time. He wasn't on board at all. He thought what we were doing was not part of the curriculum, so why were we doing it?' Teacher 10

Discussion

The current study has demonstrated that teachers believe that FNE is important, and teaching time dedicated to FNE should be expanded. Teachers reported they taught various FNE topics, sometimes in collaboration with several teaching partners. Teachers varied in their preferences for FNE teaching resources they used and underused the ones provided for teachers by VCAA. They also believed PD opportunities to teach FNE, FNE resources linked to the curriculum and receiving sufficient funding and the support of school administration people would facilitate the delivery of FNE in primary schools.

The teachers believed that teaching FNE helps children to acquire vital life skills, which likely impact children's current learning and physical health as well as their future health. This finding is encouraging for the future of FNE as it demonstrates the support of primary

implementers of FNE in primary schools. In addition, national and international research aligns with our findings. Previous research demonstrates that Australian teachers (Bouterakos et al., 2020; de Vlieger et al., 2019; Love et al., 2020), as well as teachers across the world, value FNE in primary schools (Hall et al., 2016; Lee & Hong, 2015; Li et al., 2020).

Moreover, teachers believed that starting FNE at an early age was crucial. This finding was also in agreement with the findings of an international study, which showed that most home economics teachers believed that food literacy education should start early in childhood (Pendergast & Dewhurst, 2012). The teachers in our study suggested teaching FNE one to two hours weekly or fortnightly or at least once or twice per term at every grade level. The British Nutrition Foundation suggests a minimum of 18 hours per year for teaching FNE, of which 12 hours are recommended to be in the form of practical classes (Ballam, 2018; Jamie Oliver Food Foundation, 2017). However, we would argue that even this amount of teaching will not be satisfactory when the world is facing serious complex food-related health and environmental problems (Willett et al., 2019), and we need the education provision to prepare today's children to meet the challenges (Pendergast & Dewhurst, 2012).

Although the Victorian Curriculum and Assessment Authority (VCAA) provides online resources for teachers (<https://fuse.education.vic.gov.au/>) and links to websites that provide free resources for FNE teachers such as <https://phenomenom.com.au/>, only one teacher reported using the site to find resources. They instead reported the use of various online resources from different sources. A recent study from the UK investigated teachers' use of resources created by the British Nutrition Foundation on the 'the Food—a fact of life' website and reported how teachers benefitted from the website for their teaching (White, 2021). A similar investigation might be required to explore why teachers in Victoria do not appear to use the resources of VCAA.

The teachers reported having a number of external teaching partners. Globally, primary schools often engage outside providers for several reasons, such as broadening the curriculum experiences of students or compensating for the lack of expertise within a school (Ball, 2007; Sperka & Enright, 2018). However, Enright et al. (2020) have questioned the expertise of these outsourced services and their professional competence. Macdonald et al. (2020) also raised concerns about the limited accountability measures between the school and the external provider and claimed that these programs might be insufficient to offer tailored approaches to suit students' needs and interests. As studies on the impact of these outside providers in Australia are limited to SAKG (Block et al., 2012; Rossi & Kirk, 2020), the impact of the teaching delivered by other outside providers and the pedagogies they use, should be audited and investigated in future studies.

Teachers reported that they taught various food and nutrition topics, including practical components such as cooking and gardening as well as environmental sustainability and food production related topics. Although a holistic approach by schools and teachers in teaching FNE is positive, there were inconsistencies among schools in terms of teaching frequency, the inclusion of topics and resources used. This might be a result of the common barriers they encounter when teaching FNE. The teachers in the present study reported similar barriers to those previously reported in the global literature (Food and Agriculture Organisation, 2021; Hart & Page, 2020), including scarcity of funds and time, lack of support from school administration, competition for time allocation with other compulsory subjects, and a lack of professional development (PD). These challenges have also been reported in the Australian primary education context (Bouterakos et al., 2020; de Vlieger et al., 2019; Love et al., 2020).

Some solutions have been proposed by researchers in the existing literature to enable teachers to overcome these barriers. These include: the nomination of a Food Education Lead in schools, who co-ordinates, monitors and reports on food education activities throughout the school (Ballam, 2018), integration of FNE into other core subjects to overcome time barriers

(Love et al., 2020), and supporting teachers with sufficient PD and resources (Jamie Oliver Food Foundation, 2017). Unfortunately, an established evidence base for teacher PD and review of the quality and availability of the resources for FNE is lacking in the literature. Previous research has only focussed on PD (Dunn et al., 2019; Peralta et al., 2020) and resources for teachers to teach the nutrition component of FNE (Dudley et al., 2015). However, future studies that review the resources and PD options for other components of FNE, such as environmental sustainability or cooking, are also required.

It is also important to note that children are not the main decision-makers on food available in their homes, and some families may not be able to make good food choices according to the recommendations for several reasons such as financial constraints and lack of food literacy (Nepper & Chai, 2016; Velardo et al., 2020). However, the existing research demonstrates that children who acquire some food-related knowledge at school can act as “the agents of change” for food-related practices, such as improving cooking practices at home and incorporating new dishes and food (Drummond, 2010; Ensaff et al., 2015) and purchase and consumption of healthier food (Gunawardena et al., 2016; He et al., 2015; Yuasa et al., 2015). Thus, it was crucial to explore the views and experiences of teachers in teaching FNE, which has the potential to impact children’s eating behaviours and food perceptions as well as can lead to changes in children’s home food environment.

To the best of the authors’ knowledge, this study was among the very few studies which have examined Victorian primary school teachers’ views and experiences of teaching FNE. Other qualitative research has not yet demonstrated such complex perspectives and experiences among Australian primary school teachers. The participating teachers had varied work experiences and had been working in different types of schools, which allowed the identification of a broad spectrum of opinions and experiences. The use of in-depth interviews offered detailed contextual insights into primary school teachers’ experiences and views of teaching FNE. Nonetheless, some limitations need to be considered when interpreting the findings of the study. First, the current study was based on convenience samples like most qualitative studies. However, it is essential to note that qualitative studies do not aim to represent populations but identify themes or meanings that are likely to exist in the general population without quantifying their prevalence. Furthermore, self-selection bias may have been present; teachers who took part in the study may have been more interested in the research topic than other teachers. Since self-selection bias is common in exploratory studies, it should be borne in mind that the participants’ views are unlikely to be reflective of the broader population of Victorian primary school teachers. Finally, further survey research is required to investigate the prevalence of these identified themes among a wider population of Victorian primary school teachers as well as the interrelationships between the themes and the demographic characteristics of teachers.

Overall, the study suggested that primary school teachers acknowledged the importance of FNE and were willing to include more FNE content into their teaching. However, the study also highlighted that their needs should be addressed to improve FNE at schools. The findings have implications for teachers, school principals and education policymakers. Teachers should consider cross-curriculum approaches to overcome time barriers to teaching FNE. School principals and education policymakers should provide teachers the required support to facilitate their FNE teaching experience. Evidence-based professional development would support teacher access to current food, nutrition and health research and its implications for teaching. In collaboration with its partners, the British Nutrition Foundation provides professional development for teachers (Ballam, 2018). Similarly, the Victorian Department of Education and other State Departments of Education could supply the financial resources for universities or professional teacher associations to conduct short courses on teaching FNE and the

provision of sound online resources. The improvement of FNE in schools will help raise children who are capable of dealing with the food challenges of the 21st century.

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