

Training Institutions and Food in the Curriculum



Emily Motsi

Keywords Training · Curricula · Diet · Health · Behaviour · Nutrition · Knowledge

1 Introduction

There are rapid developments that have shaped the food environment. The food system has become increasingly difficult to navigate due to ever shifting societal issues, such as changes in food and food systems particularly the shift in global focus towards the Urban food Agenda which envisions the development of resilient, integrated, sustainable and food systems that ensure that urban dwellers are free from hunger and malnutrition [6], changing patterns of food eating and cooking; changes in food supply and marketing; changing dietary habits; growth in processed foods and increase in retailing of food through supermarkets, takeout meals or street-vended food. Individuals, families and communities need to adequately navigate the food system to ensure food intake that contributes to health and well-being. Procuring of food and maintenance of health and well-being has become a challenge. Food security and nutrition has also been recognised in the New Urban Agenda as a major challenge for cities and local government [25]. Food and nutrition education have emerged in literature as a viable approach to rectifying the issues raised above. This chapter examines efforts being made to transfer food and nutrition education and well-being knowledge and skills to primary and secondary school learners through educational institutions.

E. Motsi (✉)

Department of Art Design and Technology Education, University of Zimbabwe, Harare, Zimbabwe

e-mail: emymotsi@gmail.com

2 Literature Review

The aim of the review is to draw from literature and highlight factors influencing the incorporation of food in the school curriculum. The benefits of integrating food in the school curriculum are also interrogated. Food education approaches adopted in educational interventions are discussed. The review also explores three different curriculum frameworks that have been designed to guide the teaching of food in primary and secondary schools at international and local level. Issues emerging in the teaching of food in the school curriculum are also discussed. Finally, the review is concluded by highlighting lessons learnt and the implication this has to the development of food and nutrition programmes in educational settings.

3 Factors Influencing the Incorporation of Food in the School Curriculum

Shifting societal issues and government policy initiatives continue to create demands on the school curriculum in addressing public health concerns in both developed and developing countries. Societal issues that have been identified in literature as giving impetus to the inclusion of food in the school curriculum include; changes in food and food system, changing patterns of food eating and cooking, changes in food supply and marketing. Political driven policy initiatives used to intervene in curbing high incidences of under nutrition and micronutrient deficiency among children and youths are also the usual drivers of the inclusion of food in the school curriculum particularly in developing countries. Global United Nations driven policy initiatives such as the New Urban Agenda and FAO's Urban Food Agenda have set out frameworks which inform the core functions, outcomes and strategies that can be integrated in the school food curriculum for the development of resilient and sustainable food systems and urban settlements.

Changes are occurring in food and food systems of developed and developing countries. There has been a fundamental shift from consumption of whole food ingredients to processed and ultra-processed, low nutrient and energy dense food commodities and sweetened beverages that are mass produced and shelf stable for long periods of time [19]. This shift coined in literature as 'nutrition transition' or 'diet globalisation' [14, 18, 19] has been promoted through the opening up of foreign trade and is supported through shifts in global and local food industry production systems and marketing and changes in household life style and choice.

Of particular note is that in Southern Africa, industrial food processing and food supply systems have replaced traditionally nutritious foods still available in rural areas with nutritionally inferior energy dense, but cheaper food and drink [10]. Diets high in fats and sweeteners are thus, quite common among urban populations in Southern Africa including Zimbabwe. Coincidentally this is giving rise to incidences of chronic non-communicable diseases, such as hypertension, heart disease, Type 2

diabetes and the cancers associated with obesity, high salt and sugar intakes. The negative effect of the changes occurring in the food and food systems is the alteration of dietary habits and life-style patterns. Traditional knowledge and skills are no longer sufficient and appropriate for handling the dietary excesses and imbalances created by unhealthy eating habits. New knowledge and skills rendered through structured educational programmes are required to enable people to choose healthy diets consistent with nutritional needs.

Factors, such as globalisation and the growth of processed pre-prepared food, have created contemporary norms around food cooking and eating primarily characterized by convenience [3]. Pre-prepared, ultra-processed convenience food commodities free consumers from the burden of food preparation. As Caraher [2] argues, over-reliance on pre-prepared convenient food items has caused 'deskilling' among citizens as many people no longer possess the necessary knowledge and skills to prepare food from whole food ingredients. This has caused key gaps in food knowledge and skills, such as the selection of food and particular products (i.e. informed shopping), food storage and preservation, cooking and related activities of food preparation [13].

Political driven policy initiatives are implemented regularly in nations across the world to intervene on critical public health issues. For example, in Slovenia, a national nutrition policy was developed in 2004 that set measures and activities for improving nutritional habits of Slovenian citizens. One of the strategic goals was to develop healthy nutrition habits. The strategy adopted to achieve this goal was through the reshaping of educational content in the school curriculum [15]. In England, the rising prevalence of obesity had become a major issue. The government made a decision to include a programme titled 'Licence to Cook' in the school curriculum as a direct response to the growing concern about obesity in the population [4]. The 'Licence to Cook' programme ensured that learners aged 11–16 had the opportunity to learn practical cooking skills together with knowledge of nutrition, diet, hygiene and safety and wise buying.

In Zimbabwe, the government developed a National Nutrition Strategy (NNS) 2014–2018 whose vision was 'a Zimbabwe free from hunger and malnutrition'. Its mission was to implement an evidence-based nutrition programme for children and youths [28]. This initiative was developed after the government recognised that there was a growing level of chronic malnutrition exacerbated by food insecurity and poverty among children, youths and mothers of children less than five years of age [28]. One of the causal factors attributed to this situation was the inadequate knowledge and practices regarding appropriate healthy diets for children and adults. One of the eight key result areas set out in the intervention programme was focused on improving the quality of adolescent and maternal health. A strategy adopted for the implementation of the programme was through the review and update of the primary and secondary school curriculum that incorporated adolescent and maternal nutrition in the New Curriculum of 2014–2022.

Global policy driven initiatives such as the FAO framework for Urban Food Agenda have been developed to initiate a global change programme that seeks to eliminate hunger and malnutrition in communities and (urban and peri-urban) ensure food security through coordinated policies, plans and actions targeted at different levels

of government, institutions and stakeholders involved in urban and territorial development [6]. Institutions such as schools do therefore have a space in promoting this initiative through the food and nutrition curriculum. Empowerment of different actors at different levels is viewed within the FOA framework on the Urban Food Agenda as the key vehicle to achieving the development of inclusive and sustainable food systems and food security and nutrition [6]. This means that nutrition educators if empowered will be vital to the achievement of the targeted outcomes set out in Urban Food Agenda framework.

The FAO framework is guided by four cross cutting principles (i.e. rural-urban synergies, social inclusion and equity, resilience and stability and food systems interconnection) which inform the core functions required to achieve the targeted outcomes and guide implementation [6]. These four principles can be integrated in the food and nutrition curriculum as cross cutting themes that are explored in each content and skills segment of the food curriculum. The targeted outcomes for the Urban Food Agenda focus on the following five dimensions; mainstreaming and policy support, governance, knowledge generation and capacity development, outreach and advocacy and partnership and investments. Some of these dimensions can find space within the food curriculum for example through mainstreaming The Urban Food Agenda into the food curriculum at both primary and secondary school level.

Benefits of Integrating Food in the School Curriculum

There is a growing recognition of the critical role of the school context in the development of healthy dietary behaviours and nutrition-related knowledge among children and adolescents. In many communities in both developed and developing countries, schools have become the main place where children and adolescents learn about healthy eating and life-style habits [16, 22]. Studies have shown that food education in the classroom has numerous benefits to children and adolescents' health outcomes and academic performance. In developing countries, nutrition education has been reported to have contributed to positive impact on the micronutrient status of children and contributed to the prevention of obesity [16].

Studies conducted in the US have shown a decrease in risk of obesity among elementary school children [8]; improved cognitive development [11]. In addition, when the curriculum is linked to use of local foods and biodiversity there is a possibility of enriching the curriculum through integrating elements of cultural preservation and environmental sustainability [26]. Schools are also considered an ideal place for promoting healthy eating because they offer a unique opportunity to reach children on a large-scale even in rural areas [26]; schools also reach children at a critical age when food habits are being established [7]. Thus, the school is part of a network of influence that shape eating patterns and attitudes.

Food Education Approaches Adopted in Educational Interventions

Paradigms are used to provide a philosophical base for actions and activities in educational programmes. Within nutrition education, the main paradigm identified in literature as guiding approaches to teaching food and nutrition education is the 'depletion

paradigm' [27]. In the depletion paradigm, diets were viewed as deficient as they lack vital micronutrients (vitamins and minerals). This led to the design of nutrient-based interventions, such as fortification and supplementation. Food and nutrition education in the school curriculum is then focused on teaching learners' scientific information about nutrients and nutrient deficiencies. Food preparation and cooking skills development focused on cooking techniques that prevent micronutrients losses.

The main disadvantage of the 'depletion paradigm' highlighted in literature is that it tends to present a narrow view of nutrition [23, 24, 21]. Much of the nutrition education has focused on emphasising the health benefits of single nutrients in isolation of other nutrients thereby, failing to recognise what Jacob and Tapsell [12] refer to as 'food synergy', i.e. the interdependent functioning of nutrients in eradication of nutritional deficiencies. The 'depletion paradigm' has also been criticized for its over focus on single nutrients instead of food, meals and dietary patterns [27]. This has tended to create education that focuses on changing small aspects of people diets instead of having a more comprehensive approach to developing healthy eating behaviours and attitudes.

Calls are currently being made in literature for a shift away from emphasis on narrow knowledge focussed approaches to broader forms of food and nutrition education that enables people to put their knowledge into practice [20, 27]. Most food education programmes are viewed as emphasising declarative knowledge' what' rather than 'how'. As Wosley [27] explains, people tend to know the importance of a low-fat diet or effect of a high salt intake but, they do not know how to adopt them. Attention should now be drawn more towards the development of food competencies as these have greater potential in enabling people to access and utilise food effectively.

The rights-based approach to food systems is the intervention strategy recommended in the Urban Food Agenda for any initiative/programme that seeks to address food insecurity and nutrition [6]. Social justice and recognition of diversity are the two key elements emphasised in the right-based approach to food systems. This approach is of value and is appropriate for a school food curriculum as it enables nutrition educators to utilise transformative learning methods that enable learners to explore food insecurity and nutrition issues in advantaged and disadvantaged communities. The goal of transformative learning is to enable students to understand problems such as food insecurity whilst empowering them with skills, knowledge, values and attitudes to tackle the global and national problems [5, 17]. Transformative learning experiences that enable learners to have open conversation, learn collaboratively and engage in self-reflection are ideal for engaging issues dealing with social justice and diversity urban food systems.

Location of Food in the Curriculum and Its Historical Developments in Zimbabwe

Globally, the teaching of food is mainly located in Home Economics curricula. It has also found a place in Health and Physical Education curricula where food and nutrition are linked to exercise. In Zimbabwe, food was first taught as cookery in the '1890' as part of the formal training of African woman before their employment as

domestic servants for the white settlers [1]. Later in 1940, cookery was introduced into a formal primary school curriculum for girls in a subject called Domestic Science. Cookery with other subjects, such as sewing, laundry and first-aid, were meant to improve the livelihood of communities [1]. In the 1970s, Domestic Science was renamed Home Economics, cookery, together with needlework and housecraft was part of repertoire of practical subjects in this area. At independence, in 1980, a new education system was ushered in, where Home Economics subjects continued to be taught but under new names that saw Cookery being renamed Food and Nutrition. Currently, focus is on integration of the design approach to the teaching of practical oriented technical subjects. The curriculum has thus, shifted to design and technology and names have changed once again. To reflect this technological aspect of the subject, Food and Nutrition is now referred to Food Technology and Design.

4 Examples of Curriculum Frameworks for Integrating Food in the School Curriculum

Different curriculum frameworks have been designed to guide the teaching of food in primary and secondary schools. The curriculum framework illustrations presented in Figs. 1, 2 and 3 are examples drawn from international and local education systems. The curriculum framework in Fig. 1 is a guide to the knowledge and skills primary school children are expected to acquire as they learn about food. Primary schools are identified as particularly suitable vehicles for food and nutrition education as they catch children when they are younger and their habits are still being formed [7].

As reflected in Fig. 1, the core activity in this curriculum framework is the teaching of food preparation and cooking. This therefore entails the incorporation of practical food classes and the setting up of safe food preparation and cooking space in the classroom. The teaching of food preparation and cooking focuses on four key aspects that include, the selection and efficient use of a range of cooking equipment, an appreciation of cultural diversity through preparation of a broad range of ingredients and healthy recipes, ability to select food based on its nutritional, functional and sensory properties including other aspects, such as cost, seasonality and sustainability, ability to develop skills in planning cooking simple meals safely and hygienically for a healthy varied diet.

As reflected in Fig. 1, the aspects that are then integrated and support the teaching of food preparation and cooking are the nutrition component, consumer awareness, food safety and hygiene and the design, making and evaluation of food and food products. The nutrition component focuses on such areas the importance of a balanced diet, food requirement needs through the life-cycle, nutrients provided by the different foods and understanding healthy eating habits. In the consumer awareness component, students learn about the origins of food (from production to processing), they also need to recognise the range of factors involved in food choice, understand how to make informed choice to achieving a healthy balanced diet through utilising food

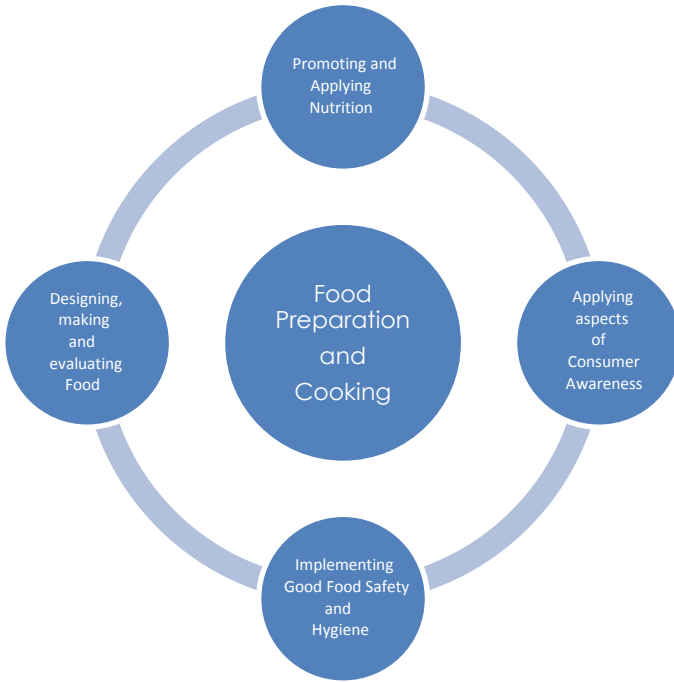


Fig. 1 Curriculum framework one. Adapted from Public Health England [20]. Teaching Food in the Primary school curriculum

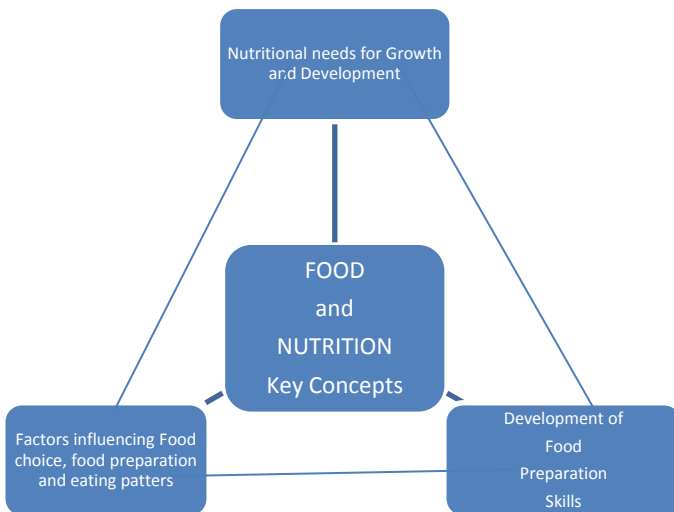


Fig. 2 Curriculum framework 2. Source Linking Food and Nutrition to Health and Physical Education in the New Zealand curriculum

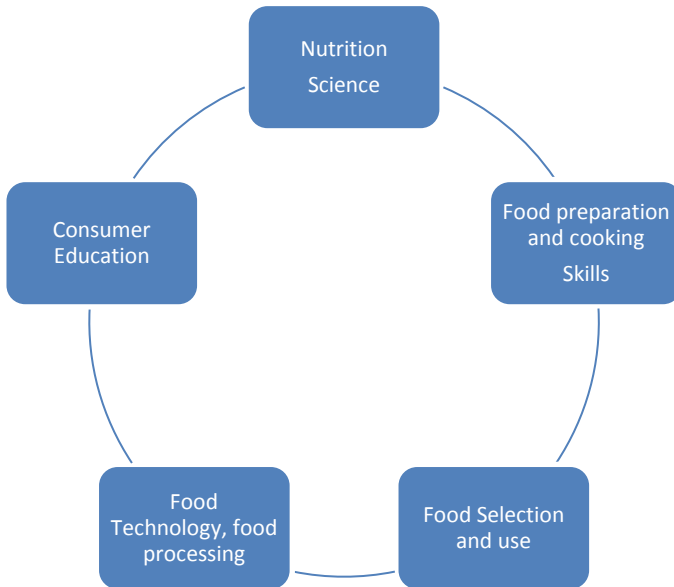


Fig. 3 Curriculum framework 3. *Source* Food Technology and Design syllabus, Form 1-4, 2015–2022, Ministry of Primary and Secondary School Education, Zimbabwe

labels and nutritional information. The food safety and hygiene component emphasise on the importance of good personal hygiene in food preparation, avoidance of food contaminants that can lead to food poisoning and food related illnesses. The design, make and evaluate food component provides opportunities for problem solving through the design and development of recipes/menus fit for purpose for particular individuals and groups.

The curriculum framework presented in this section has several merits. One merit of this curriculum framework is that it addresses a key gap created by contemporary norms around food cooking that emphasis over reliance on pre-prepared, ultra-processed convenient foods causing a decline in knowledge and skills on food preparation using whole food ingredients. Learners at these elementary stages are adopting food and nutrition practices that promote home healthy eating patterns. Secondly, the curriculum focuses on promotion of individual behaviour change (through the actions and activities in the practical food preparation lessons) and empowers learners to make appropriate choices directed at proper food selection, preparation, consumption and lifestyle.

Curriculum Framework Two

The second framework is for a Food and Nutrition curriculum offered at secondary school level. It is designed around three key concepts, i.e. nutritional needs for growth and development, development of food preparation skills and exploration of factors

influencing food choices, food preparation and eating patterns. The nutrition component enables students to understand the relationship between nutrition, exercise and well-being. Included in this component is an exploration of factors that influence the student's own food eating patterns and enables the student to take positive action in relation to food selection and preparation. With regards to the second key concept, i.e. development of food preparation skills, the aim is to enable students to prepare and cook nutritionally sound and safe food. In addition, the students need to know foods that are culturally, socially and economically accepted in various situations. The third key concept enables the student to examine the diverse cultural and other influences on selection and preparation of food and understanding how these factors impact their own and other people's health.

The merit of this curriculum framework is that it allows students to explore the food and nutrition related issues enabling them to be aware of the impact of their choices on their health. It also focuses a lot on promotion of individual behaviour change. It can lead to the adoption of a healthier diet and improve the students' nutritional well-being through changing their food and nutrition attitudes, knowledge and practices. The only demerit is that sufficient motivation must constantly be provided in order to create lasting effects and changes.

Curriculum Framework Three

The third curriculum framework is a Food Technology and Design curriculum offered at secondary school level. As reflected in Fig. 3, the framework has five components, i.e. nutrition, food selection and use, development of food preparation skills, food technology and food processing and consumer education. The nutrition science component focuses on content relating to nutrients for a healthy diet, nutritional needs and health of the individual, family, community and the nation, causes and effects of malnutrition and preventative strategies. The food selection and use component emphasises on use of indigenous foods and other locally available foods in the preparation of nutritious meals. In development of food preparation and cooking skills the aim is to equip students with skills to plan, prepare, cook and present different foods and beverages. Food technology and food processing is linked to food security and in this area, students learn how to process food safely to reduce nutrient losses and increase food reserves at household level. The consumer education component focuses on wise food shopping influences of advertising on food purchases and economic use of resources.

The merit of this curriculum framework is that it not only focuses on the individual learner but, anticipates that the acquisition of food and nutrition knowledge and practices at school will translate into better nutritional and health outcomes in families, communities and the nation. Secondly, it emphasises on the use of indigenous food knowledge and use of local food thereby, factoring in issues of a sustainable food supply within the food system where a populations' access to nutritious and affordable food may be a challenge. This approach is common in developing countries continually dealing with issues of improving the nutritional status of their rural and urban populations and ensuring food security at household level. The demerit of

this curriculum framework is its over emphasis on scientific knowledge about nutrients and nutrient deficiencies. This, as discussed earlier, does not provide a more comprehensive approach to the development of healthy eating behaviours and attitudes among the learner but, is rather narrow as it focuses on changing small aspects of people diets.

Emerging Issues

Key issues emerging from this review are described and explained in the forthcoming paragraphs.

- Shifting societal issues and government policy initiatives continue to create demands on the school curriculum in addressing public health concerns in both developed and developing countries. Public health concerns, such as the rising incidence of malnutrition and non-communicable diseases, are addressed through a school curriculum that teaches and promotes healthy dietary patterns.
- The negative effect of the changes occurring in the food and food systems is the alteration of dietary habits and life-style patterns. Ultra-processed and convenient foods are becoming a big part of diets of many rural and urban dwellers leading to the consumption of energy dense and low nutritional food in daily diets.
- Traditional knowledge and skills are no longer sufficient and appropriate for handling the dietary excesses and imbalances created by unhealthy eating habits. This knowledge has usually been centred on knowing what nutrients to include in one's diet, how nutrients are utilised for growth and development. Despite been armed with such knowledge dietary excesses still continue to exist among certain populations. Knowledge, skills and abilities that influence behaviour change is what is now required to promote adoptions of healthy eating patterns and lifestyles.
- Many people particularly among the affluent population no longer possess the necessary knowledge and skills to prepare food from whole food ingredients. This has caused key gaps in food knowledge and skills, such as the selection of food and particular products (i.e. informed shopping), food storage and preservation, cooking and related activities of food preparation. Inclusion of food preparation and handling knowledge and skills in any food curriculum is meant to develop in learners an appreciation and competency in planning and preparing food from a variety of source in the food system.
- The school plays a critical role in the development of healthy dietary behaviours and nutrition-related knowledge among children and adolescents. The school is able to teach and reinforce healthy eating behaviour through a well-structured competency-based curriculum.
- Food and nutrition education in the classroom have numerous benefits to children and adolescents' health outcomes and academic performance. Food and nutrition education is increasingly being explored as a way to the prevention of obesity and for the promotion of healthy eating and physical activity among children and youths. In addition, studies conducted in US and Europe has linked healthy food choices, improved self-esteem to better performance in the classroom particularly among adolescents.

- The ‘depletion paradigm’ tends to present a narrow view of nutrition as it creates education that focuses on changing small aspects of people diets instead of having a more comprehensive approach focusing on the development of healthy eating behaviours and attitudes.
- The rights based approach to food systems if integrated in the food curriculum enables learners to explore social justice and recognise diversity in food systems and food insecurity and nutrition issues in advantaged and disadvantaged communities.
- Different curriculum frameworks have been designed to guide the teaching of food in primary and secondary schools. These can have a personal approach focused on promotion of individual behaviour change or can target not only individuals but is anticipated to have a trickle-down effect that also causes changes in nutritional status of families, communities and the nation.

5 Lessons Learnt

Some lessons learnt are that:

- New knowledge and skills rendered through structured educational programmes are required to enable people to choose healthy diets consistent with nutritional needs.
- The current state of knowledge and skill set possessed by many people in both urban and rural populations and the content offered in school-based food and nutrition curriculum has to be re-evaluated as it is not providing the expected solution to countering the rise in incidences of NCDs and malnutrition. Poor dietary eating habits continue to have a negative impact on the population’s health in both developed and developing nations. The school-based food and nutrition curriculum thus, needs to be refocused moving away from emphasis on nutrition education to food education. Nutrition education focuses on nutrient intake and utilisation in the body for growth and development. Such an approach though providing important knowledge is deficient as it does not equip young people with knowledge, skills on how to feed themselves correctly. Focus when the food education approach is taken is on enabling children and adolescents to make informed food choices and develop healthier eating habits and lifestyles. It is no longer sufficient just to teach children and adolescents the effects of particular dietary patterns e.g. a high sugar or saturated fat intake. The new knowledge required is on how to adopt for example a diet low in sugar or fat intake through being equipped with competencies (knowledge, skills and abilities) on how to produce, plan, select, prepare and process food in a way that leads to optimal healthy lifestyles.
- Schools are an ideal place for promoting healthy eating as they reach children at a critical age when food habits are being established.
- Children’s experiences with food begin in infancy and continue to develop as they transition to solid food. At this point the parent or caregiver is the primary

influencer of a child's eating behaviour. When children enter school at ECD level the school and community environment become part of the network of influencers that has an impact on the child's eating behaviour. The school is critical in that it becomes an environment where healthy eating habits can be further taught and reinforced. As schools develop a food curriculum, they take cognisance of the fact that children and adolescents eating habits are susceptible to many external influences within their families, school and community. Currently, a number of these influences (television advertising, social media, internet) promote dietary patterns that predispose children and adolescents to obesity. Incorporation of current knowledge, skills and competences in the food and nutrition curriculum in the school coupled with the use of consistent, continuing and age appropriate strategies is essential in promoting optimal eating habits in children and adolescents.

- Attention in curriculum design should be focused more towards the development of food competencies as these have greater potential in enabling people to access and utilise food effectively.
- Competencies are broader in nature in that besides incorporating core skills and knowledge includes the individual's behaviour or ability in bringing about desired change. Food competencies enable children and adolescent to make healthy food choices, access and use food effectively using the core set of skills and knowledge they are equipped with. In a curriculum, food competencies are usually structured in a progressional manner with an outline of specific food related tasks and activities learners are expected to accomplish at particular ages. The merit of such an approach is that it allows healthy eating habits to develop over time and impact current and future dietary health.

6 Discussion

Several societal shifts that include changes in food and food system; patterns of eating and cooking; dietary patterns and public health concerns have created complexities that make it difficult for people to maintain good health and well-being. Improper food habits and nutrition related practices and the increase in incidences of non-communicable diseases, such as heart disease, Type 2 diabetes, hypertension and malnutrition are some of the major factors that influencing the incorporation of food in the school curriculum. Integration of food in the school curriculum is an effective strategy for teaching children and adolescents' desirable food and nutrition practices that enable them to adopt healthier diets hence, improving their nutritional well-being. The Urban Food Agenda cross cutting principles and targeted outcomes can be incorporated in the food curriculum. Through utilising the rights-based approach, nutrition educators can create transformative learning experiences that enable learners to develop knowledge, skills, values and attitude that contribute to the creation of resilient, inclusive and sustainable food systems in their communities. Several benefits of incorporation food in the school curriculum were identified in

literature and the significance of the school setting in shaping eating patterns of children and adolescents was also established. The teaching of food is mainly located in Home Economics curricula. The focus in the design of food and nutrition curriculum should be on empowering children and adolescents with food and nutrition knowledge and skills that enable them to make appropriate choices in food selection, preparation and consumption. Focus should also be on promoting the adoption of healthy eating patterns and lifestyles that last.

7 Conclusion

The chapter examined the integration of food in the school curriculum. Key issues included in the review were a discussion of factors that drive the inclusion of food in primary and secondary school curricula, paradigms that support the integration and benefits of including food in the school curriculum. Three examples of curriculum frameworks used in school settings to guide the teaching of food and an analysis of the merits and demerits of each framework were also presented. The chapter concluded by establishing issues of significance emerging from the review and highlighting lessons that have been learnt.

References

1. Atkinson NJ (1972) *Teaching Rhodesians: a history of educational policies in Rhodesia*. Longman, Salisbury
2. Caraher M (2012) *Cooking in crisis: lessons from the UK*. <http://arrow.dit.ie/cgi/viewcontent.cgi?article=1006&context=dgs>. Accessed 21 Jan 2020
3. Colatruglio S, Slater J (2014) Food literacy: bridging the gap between food, nutrition and well-being. In: Deer F, Falkenberg T, McMillan B, Sims L (eds) *Sustainable well-being: concepts, issues and educational practices*. ESW Press, Winnipeg, MB, pp 37–55
4. DES (2008) *Licence to cook*. <http://webarchive.nationalarchives.gov.uk/2010041351441/http://licencetocook.org.uk/information/faqs.aspx>. Accessed 21 Jan 2020
5. Edapp (2019) *Transformative learning*. <https://www.edapp.com/blog/transformative-learning/>
6. FAO (2019) *FAO framework for the urban food agenda*. Rome. <https://doi.org/10.4060/ca3151en>
7. FAO (2005) *Nutrition in primary schools, volume 1: the reader*. FAO Food and Nutrition Division. Publishing Management Service, Rome
8. Fairclough ST et al (2013) Promoting healthy weight in primary school children through physical activity and nutrition education: a pragmatic evaluation of change, randomised intervention study. *BMC Public Health* 13:626–637
9. *Food Technology and Design syllabus, Form 1-4, 2015–2022*. Ministry of Primary and Secondary School Education, Zimbabwe
10. Frayne B, Crush J, McLachlan M (2014) Global nutrition and development in Southern African cities. *Food Sec* 6:101–112
11. Ickovics JR et al (2014) Health and academic achievement: cumulative effects of health assets on standardised test scores of urban youths in the United States. *J Sch Health* 84(1):40–48

12. Jacobs DR Jr, Tapsell LC (2007) Food, not nutrients is the fundamental unit in nutrition. *Nutr Rev* 65(10):439–450
13. Jaffe JA, Gerther M (2006) Victual vicissitudes: consumer deskilling and the gendered transformation of food systems. *Agric Hum Values* 23(2):143–162
14. Keats S, Wiggins, S (2014) Future diets: implications for agriculture and food prices. ODI report. <http://www.odi.org.uk/files/odi-assets/publications-opinion-files/8776.pdf>. Accessed 20 Jan 2020
15. Kostanjevec S, Jerman J, Koch V (2011) The effects of nutrition education on 6th graders knowledge of nutrition in nine-year primary schools in Slovenia. *Eurasia J Math Sci Technol Educ* 74(4):243–252
16. Lobstein T, Jackson-Leach R, Moodie ML, Hall KD, Gortmaker SL, Swinburn BA, James WPT, Wang Y, McPherson K (2015) Child and adolescent obesity: part of a bigger picture. *Lancet* 385(9986):2510–2520
17. Mezirow J (2000) *Learning as transformation: critical perspectives on a theory in progress*. Jossey-Boss, San Francisco
18. Popkin BM, Adar LS, Ng SW (2012) Global nutrition transition and the pandemic of obesity in developing countries. *Nutrit Rev* 70(1):3–21
19. Proctor FJ, Bergegue JA (2016) Food systems at the urban-rural interface. Working paper series document no. 194. Rimisp, Santaigo Chile
20. Public Health England (2015) Food teaching in primary schools: a framework of knowledge and skills. PHE Publication, British Nutrition Foundation for Public Health England
21. Ruel M, Alderman H, Child Nutrition Study Group (2013) Nutrition-sensitive interventions and programmes: how can they help to acceralate progress in improving maternal and child nutrition. *Lancet* 383(9891):536–551. [https://doi.org/10.1016/50140-6736\(13\)60843-0](https://doi.org/10.1016/50140-6736(13)60843-0)
22. Scherr RE, Linnell JD, Dharmar M (2017) A multicomponent school-based intervention; the shaping healthy choices program improves nutrition-related outcomes. *J Nutrit Educ Behav* 49:368–379
23. Scrinis G (2013) *Nutritionism: the science and politics of dietary advice*. Columbia University Press, New York
24. The Update Team (2015) Project Phoenix nutrition: time to rise and fly in our new world. *World Nutrit* 6(9–10):683–693
25. UN (2016) Optimising investments for food security in the new urban agenda, Quito habitat III draft. <http://habitat.3.org/thenew-urban-agenda>
26. UNSCN (2017) Schools as a system to improve nutrition: A new statement for school-based food and nutrition interventions. <http://www.unscn.org>. Accessed 21 Jan 2020
27. Wosley A (2015) From nutrients to food literacy. *J Home Econ Inst Australia* 22(3):13–21
28. Zimbabwe National Nutrition Strategy, 2014–2018, www.fao.org/faolex/results/details/en/c/LEX-FAOC160334/. Accessed 21 Jan 2020