



Guiding the Future of Food Science and Safety in UAE through Advancing Curriculum Development: An Exploratory Study

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Abstract

The United Arab Emirates (UAE) currently considers the need to develop and integrate a School-based Food and Nutrition Education curriculum in its mainstream education system to prepare its populations for the emerging changes in the food environment and address the prevalence of diet-based issues in the country. However, the curriculum, named Food Science and Safety, is still under pilot study. The purpose of this study is to explore the relevance of and factors affecting the development of the Food Science and Safety curriculum in the UAE. Fifty-four secondary school international headteachers in Abu Dhabi participated in the study by filling semi-structured online survey primarily structured on a 5-scale Likert scale. Measures of central tendency and dispersion revealed that the curriculum development would be critical in improving sustainable family practices (Mean = 4.36, SD = 0.857), enhancing wage-earning skills (Mean = 4.33, SD = 0.876), promoting sustainable living through informed life choices (Mean = 4.25, SD = 0.939), making children take more active roles in their families (Mean = 4.19, SD = 0.735), and shaping future careers (Mean = 3.89, SD = 1.050). The study, however, established that various factors would limit the extensive development of the curriculum in the UAE. Insufficient resources, materials, and facilities was the most dominant factor at 39%, followed by lack of sufficient number of trained subject teachers at 35.2%, then unsupportive cultures and ideologies at 26%. The analysis also revealed that 44% of the headteachers called for flexible curriculum frameworks, 41% identified the need to intensify professional training, 31% recommended the need for seeking educational equity and diversity (SEED), while 11% called for quality teaching materials. The UAE's Ministry of Education (MoE) should consider such factors as they forge forward with the curriculum development process for effective future-proofing.

KEYWORDS: FOOD SCIENCE AND SAFETY, CURRICULUM DEVELOPMENT, CURRICULUM REFORMS, SUSTAINABILITY, DIET-BASED DISEASES, CAREER DEVELOPMENT

Introduction and Purpose

Background

UAE's Ministry of Education (MoE) has been making efforts to develop a curriculum aimed at helping students prepare themselves for the challenges of daily living and advance their career prospects based on their interests (UAE Ministry of Education, 2020). This would be the first

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curriculum pursued by the country's MoE to advance food and nutrition knowledge. The MoE forged a plan in 2020 to guide the development and implementation of Food Science and Safety in the national curriculum. As part of a pilot study, the MoE opened Science and Food Safety Academies in four schools, including Al Samaliya School for Boys and Al Samha School for Girls in Abu Dhabi and Musa Bin Nusair Primary School for Boys, and Al Dheet Primary school for Girls in Ras Al Khaimah (UAE Ministry of Education, 2020).

The introduction of the curriculum is pegged on four epistemological objectives (UAE Ministry of Education, 2020). First, it aims at building a foundational understanding of the fundamental science behind food and nutrition and advancing an understanding of how different elements of food and nutrition link together. Second, it focuses on promoting knowledge of the processes and engineering involved in food production with the goal of ensuring skilled and innovative food production. The third objective aimed at enhancing food safety and inspection to guarantee ethical and lawful practices of food production and use. Finally, the MoE projected that the introduction of the discipline in public schools would advance culinary skills to enhance appreciation of food as a culture, art, and health determinant. The implementation of the curriculum is still a work in progress.

In its National Agenda 2021, UAE's MoE devised a core education plan to ensure that its students become part of the world's most elite, especially in Reading, Mathematics, and Science, and ensure that over 90% of its students complete their high school education (Fadhil & Bin Belaila, 2018). The country has been consistently working towards this goal. 2018 education reports indicate that the quality of Education in UAE's primary and high schools ranks among the top 20 globally and the most competitive in the Arab world (Fadhil & Bin Belaila, 2018). In 2017, UAE's MoE launched the National Strategy for Higher Education 2030, in which it set out plans for the attainment of the highest scientific and professional educational standards to effectively serve the needs of future generations (UAE Ministry of Education, 2019). The plan identified 33 key initiatives to guide the implementation of the four core pillars of the new strategy; quality, efficiency, innovation, and harmonisation. Some of these initiatives include the National Quality Framework, the Transparent Classification of Outputs, the Expanded Professional Experience, the Investment in Knowledge, and the Competitive Research Funding (UAE Ministry of Education, 2019). These are to prove that UAE's education system is poised enough to identify curriculum opportunities and develop them appropriately as and when necessary. The country's MoE can effectively use such resources and opportunities to develop a curriculum that would effectively and directly address its social problems, especially obesity, diabetes, lack of Vitamin D, and other cardiovascular diseases, which have proven to be real problems begging for solutions.

As the MoE of UAE strives towards the full-range and holistic implementation of the Food Science and Safety curriculum, a fundamental question worth asking is 'why now.' For the past few decades, UAE has been placing much emphasis on STEM (science, technology, engineering, and maths) subjects (Cairns & Dickson, 2020; Dickson et al., 2019; Ismayani & Kusumah, 2017). However, the country has come to the realisation that despite the importance of the STEM subjects in nation-building, arts and sports subjects must not be shoved to the side as they form the foundation through which young people connect well with their work and daily living (Kharkhurin, 2015; Murshidi, 2019). Research evidence shows that a significantly high number of Emiratis and young people globally are ill-prepared to face life realities, especially with regard to consuming healthy food (Al Yateem & Rossiter, 2017; Brown et al., 2021; Fiteni, 2020; Liu et al., 2020; Odeyemi et al., 2019; Taillie et al., 2019). Al-Yateem and Rossiter (2017) examined nutritional knowledge and eating habits of 300 adolescents aged 9-13 years in Sharjah, UAE, and established that 76% of the students had unhealthy eating behaviours and recorded low vegetable intake accompanied by high dependence on fast foods. Another study

by Abdullatif et al. (2021) also established that 78.9% of adolescents in grades 8-12 in UAE schools eat fast foods more than once a week.

Such statistics greatly reflect among UAE populace. According to Abdullatif et al. (2021), 25.3% of adolescents in grades 8-12 are overweight, while 15% are obese, with obesity being more prevalent in males than in females. National statistics also show that 44.2% of adult women and 30.9% of adult men live with obesity (Global Nutrition Report, 2020). These rates are much higher than regional and international averages. Available reports show that an average of 10.3% of adult women and 7.5% of men in the Middle East and North Africa (MENA) region are living with obesity (Global Nutrition Report, 2020). World Health Organisation (WHO) also indicates that the global prevalence rates averaged 15% and 11%, respectively (WHO, 2021). The prevalence of obesity in the UAE is more than double the world average, indicating the need for the country to swiftly implement an intervention.

Public discussions and research efforts on finding interventions for the poor dietary practices and their consequences have been mounting. Experts concerned with the obesity epidemic have made a plea that "providing a mandatory food preparation curriculum to students may be among the best investments society could make" while emphasising that girls and boys should be taught the basic principles they need to make the best food and nutrition choices for themselves and their families within the contemporary food environment (Lichtenstein & Ludwig, 2010, pp.1857-1858). Al-Yateem and Rossiter (2017) also recommended culturally-specific school-based interventions to advance sound nutritional knowledge among adolescents noting that the intervention would build sound nutritional knowledge among students and promote behavioural changes critical in promoting sustainable health. Numerous other studies tend to uphold this position (Kupolati et al., 2017, De Medeiros et al., 2017; McGregor et al., 2012; Rathi et al., 2017; Teo et al., 2019).

Implementation of school-based food and nutrition education aimed at advancing food and nutrition knowledge is not a new practice on the global platform. Food and Agricultural Organisation (FAO, 2022) reports indicating that an increasing number of countries are integrating food and nutrition education into their national curricula and as part of their national health policies. Countries such as England, Ireland, New Zealand, Australia, and Malta have food education as a mandatory subject in public primary and secondary schools (Nickols & Kay, 2015). According to FAO (2022), over 100 countries across the globe have some form of school-based food and nutrition education as part of the national curricula. FAO visualises a curriculum that would help schoolchildren and school communities achieve sustainable improvements in their food practices, build the capacity to change and adapt to external forces, and share what they have learned with others (Nickols & Kay, 2015).

Despite the fact that the adoption of school-based food and nutrition education is intensifying in school education systems, FAO's vision of the curriculum is far from being achieved (De Medeiros et al., 2019; FAO, 2022; Tamiru et al., 2017). Food knowledge is still low as malnutrition cases keep soaring, calling for the need to do more to reach the full potential of food and nutrition education in schools. According to McGregor et al. (2012), limited food literacy and sustainable practice are a result of a disconnect between knowledge, skills, and critical thinking of the curriculum programmes, making it difficult to reverse the trends of obesity and other diet-related diseases.

As UAE's plan to implement Food Science and Safety as a school-based food and nutrition education curriculum, guiding its implementation and ensuring its fruition in the future cannot be overemphasized. Besides, the curriculum needs to be future-proofed so that it does not get superseded by unanticipated future developments but instead remains effective even in the face of change (McGregor et al., 2012). This study is aimed at forging the future of Food Science

and Safety in UAE education. The purpose of this study is to explore factors that underpin the development of the Food Science and Safety curriculum in the UAE and to investigate how to engender its development in the country's education system. In conjunction with the study purpose mentioned, the following research questions were explored.

- What is the relevance of Food Science and Safety Education curriculum development in the UAE?
- Which factors underpin the development of the Food Science and Safety Education curriculum in UAE?

Answering the mentioned research questions is critical in ensuring that the programme lives to its purpose. Bolstering knowledge about the relevance of the curriculum is critical in guaranteeing its acceptance in public schools. According to Yueh et al. (2010), some of the factors that influence the success of an emergent subject in public schools include outstanding support and involvement of the local environment, the subject's aptitude to generate a radical change in both thinking and action through whole school involvement, and national cooperation network that links together teachers, schools, parents, government, and other stakeholders. Expanding research-based awareness on the relevance of Food Science and Safety curriculum development is critical in informing each of the mentioned factors and triggering positive engagement of all relevant stakeholders. Understanding factors that influence the implementation of the curriculum is indispensable in its future-proofing to ensure that it meets the current and future needs of the target population.

Review of Literature

Curriculum development has always provided a fundamental foundation on which Education is built. It provides the basis on which the underlying principles, goals, values, education philosophies, and contents can be consistently and progressively assessed, evaluated, and influenced to better instructional programs and educational materials to support the growth of the education system (Handelzalts, 2019). Alsubaie (2016) posited that curriculum, as the epicentre of students' school experience, should be reviewed, designed, and regularly redesigned to guarantee its ability to serve changing and emerging needs of students and society at large. Through the development process, attainment of clear education purposes and goals, continuous quality improvement, selection of learning experience, and strategic learning and teaching are conceivable.

Van den Akker (2010) purported that the curriculum development process has three distinct components; intended, implemented, and attained curriculum. The *intended* curriculum constitutes documents, guidelines, and policies that the MoE or the equivalent body produces to outline and dictate what should be taught in schools and in specific classrooms. The *implemented* curriculum entails what happens in classrooms, especially the pedagogical processes that teachers use to dispense curriculum contents, the time they spend in the process, and the resources to aid the process (Van den Akker, 2010). The third component is the *attained* curriculum, which encompasses what students have learned from the curriculum contents. According to Law (2014), a curriculum cannot be deemed successful unless the intended skills, knowledge, and values are acquired, absorbed, and retained by the majority of the prospective learners. This study focuses on Food Science and Safety in UAE as a proposed intended curriculum. It is only after success as an *intended* curriculum that *implemented* and *attained* curriculum can be designed.

Various schools of thought have contested the ultimate goal of curriculum development. Social meliorists theory holds the perspective that the main aim of education and associated curriculum development should focus on reforming and changing the society for the better

(Hildebrand, 2013). It presumes that people are born with some level of intelligence, and it is the role of Education to improve that intelligence. According to the theory, people should never be judged based on socioeconomic statuses but rather by education achievements or lack thereof. Consistent with the meliorists perspective, John Dewey, in his curriculum theory, conceived that a curriculum and its development processes should eventually produce students poised to survive and deal effectively with the emerging issues in the modern world (Sikandar, 2016). The proponents of this theory portended that due to the volatility of the modern world when it comes to change and transformation, a curriculum should never be a finished abstraction but rather should incorporate a child's social, constructive, expressive, and artistic preconceptions about the world (Williams, 2017). In this sense, for a curriculum to attain its objective, it should be developed with a complete and informed sense of the world where the prospective learners live. It is hoped that connecting subjects with students' lives can generate a broader and deeper sense of the world, thereby enhancing the exposure to deal with issues in the modern world.

Food Science and Safety aims at preparing learners to deal with world diet problems, as conjectured in the theories. Previous studies and reports have connected social problems in UAE and MENA at large with a lack of some specific social skills and knowledge (Assaad Khalil et al., 2019; Farraq et al., 2017; Nasreddine et al., 2014; Silva et al., 2013). The prevalence of diet-based diseases is one of the most contested areas where researchers have consistently called for curricula supporting holistic school-based food and nutrition education. The development of Food Science and Safety would be a noble response to this consistent call.

The Relevance of Food Science and Safety Curriculum in Solving Emerging Social and Lifestyle Issues

With the ever-increasing number of lifestyle-related diseases such as diabetes, hypertension, obesity, lack of Vitamin D, and hypothyroidism in the UAE, GCC, and MENA regions, and more importantly, their implications on the quality of life of people living with these conditions (Al-Rifai & Aziz, 2018; Chaabane et al., 2020; Farrag et al., 2017; Traina et al., 2017); it is crucial to find a solution.

These problems are often rooted in poor eating habits and a lack of physical activity (Chaabane et al., 2020). The Food Science and Safety curriculum teaches students how to make healthy food choices while creating a sustainable lifestyle balance through cooking classes (Nanayakkara et al., 2018). These programs also introduce students to the various aspects of nutrition, such as food provenance aimed at understanding where food is grown, raised, or caught, and food forensics, which examines food ingredients and safety to engender students to adopt healthy behaviours for themselves (Nanayakkara et al., 2018). A study by Fiteni (2021) exemplified that knowledge about food forensics has a central place in influencing nutrition and health outcomes, carbon footprint reduction, and waste management.

Although no research has used the name 'Food Science and Safety' to explore school-based food and nutrition education in UAE, a handful of researchers have attempted to explore similar topics in the context of the country despite the fact that similar topics have greatly been contested across the globe. Gomathi et al. (2014) noted that lifestyle diseases were rising among the UAE population and identified the need to intensify nutrition education among primary physicians to advance their ability to advise patients on the benefits of nutritional modifications. Although this is a spending recommendation in advancing reactive interventions in dealing with lifestyle diseases, it gives no significant solutions to pre-empt them. People should grow up with abundant knowledge about their food choices and dietary behaviours and adapt to good practices rather than waiting for reactive interventions in hospitals. This is the foundation on which food and nutrition education should be built. Food choices and dietary

behaviours developed during childhood are difficult to change in adulthood (Perera et al., 2015).

Fiteni (2020) established the need to integrate food and nutrition education in the UAE mainstream education system as an imperative and pre-emptive response to the soaring prevalence of diet-based diseases. In addition to these two local studies, various other studies have explored the issue. A study by Slater and Hinds (2014) showed that over 95% of Canadian university students felt that food and nutrition education have a central place in schools and portray significant potential to reduce risks associated with obesity and other diet-based diseases. The study accentuated that food and nutrition courses had moralistic connotations by providing sufficient skills and knowledge necessary for making wholesome food from basic and natural ingredients. Numerous other studies, including Aydin et al. (2021), Perkins et al. (2020), Pendergast et al. (2011), and Vidgen (2016), hold similar positions. Although the relevance of food and nutrition education on a broad spectrum might be vivid, the specific relevance in the UAE context remains less explored. This has also limited the study factors that might be influencing its development in the region. This study attempts to fill this gap.

Factors Affecting Food Science and Safety Curriculum Development

Extensive research on online resources revealed that no research has been in a position to address barriers to the development of the Food Science and Safety curriculum or any other related curriculum in the context of the UAE. However, reviews reveal that various studies have attempted to address the issue from other contexts. Perera et al. (2015), who completed a study in the context of US elementary schools, noted that current approaches to teaching dietary behaviours are ineffective and cannot sufficiently change elementary school students' food choices. The 106 teachers who participated in the study perceived that nutrition education in elementary schools is either very important or somewhat important while noting that the success of the curriculum has been hampered by competing academic expectations, lack of sufficient time, lack of suitable curricula, and unsupportive food environment. They also recognised the need to have food cafeterias in schools as well as intensified parental involvement. Jones and Zidenberg-Cherr (2015) also ascertained that time constraints, unrelated subject matter, and lack of awareness of available resources continue to limit California teachers' ability to provide nutrition education. Hall et al. (2016) also identified time, resources, budgets, prioritisation of core subjects, and home environment as key barriers to food and nutrition education. The research findings tend to revolve around similar factors. It is therefore vital to assess them in the context of UAE and find viable solutions to ensure the curriculum's success in the country.

Methodology

Food Science and Safety can be a school-based curriculum that can help prepare young people to face social issues, problems, and concerns as they emerge in the turbulent world. This study is of the view that UAE should consider developing it within its education system. To do so, there is a need to understand the dynamics and circumstances that might shape its adoption and development. This study is based on interpretivism research philosophy, which is that reality can fully be understood only through subjective intervention and interpretation of reality (Ryan, 2018). The reality is that Food Science and Safety or its equivalents are less developed in the mainstream education system of UAE (Alashwal, 2020; Alharbi & Renwick, 2017; Stage, 2018). This is a reality that this study attempts to explore deductively.

Research Design

This study adopted an exploratory research design to address its purpose since the issue under study has not been well defined in the context of UAE. Research surveys were used to quantitatively explore the relevance of Food Science and Safety Education and the factors that underpin its curriculum development in UAE.

Participants

Fifty-four headteachers from international schools in Abu Dhabi, recruited through purposive sampling, participated in the study. Headteachers were targeted because they have a deeper knowledge of curriculum development and can effectively relate academic processes to social issues. This is because headteachers in secondary international schools, as curriculum supervisors in the UAE, take a core role in ensuring that curriculums instructions are well implemented, ensuring that relevant stakeholders are involved in the curriculum development process, guaranteeing that there are sufficient resources within the schools to support the curriculum instruction process, and warranting positive results (Nader et al., 2019). As part of curriculum leadership, it is anticipated that headteachers have extensive knowledge about the education system and environment, and their perspectives can greatly inform the future of Food Science and Safety education.

As shown in Figure 1, over half of the participating headteachers had served 4-9 years as headteachers. By academic qualifications (refer to Figure 2), the majority of the participants were either Bachelor's degree holders (46.3%) or Master's degree holders (35.2%). This is to amplify that the participants were experienced and knowledgeable enough to inform the development of Food Science and Safety or its equivalents.

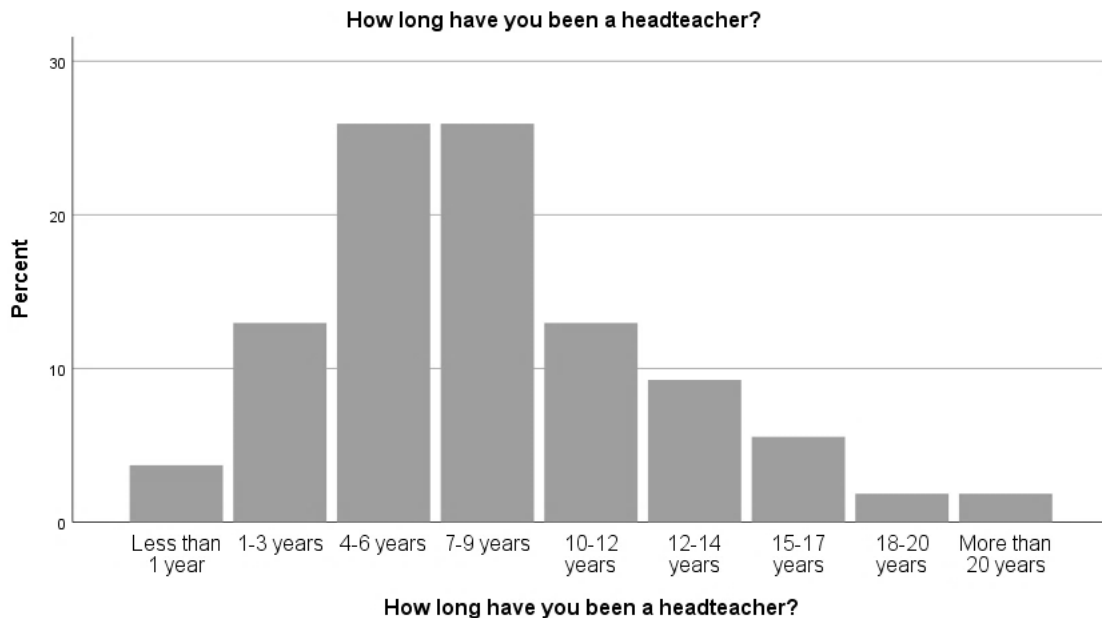


Figure 1. Distribution by Years of Experience

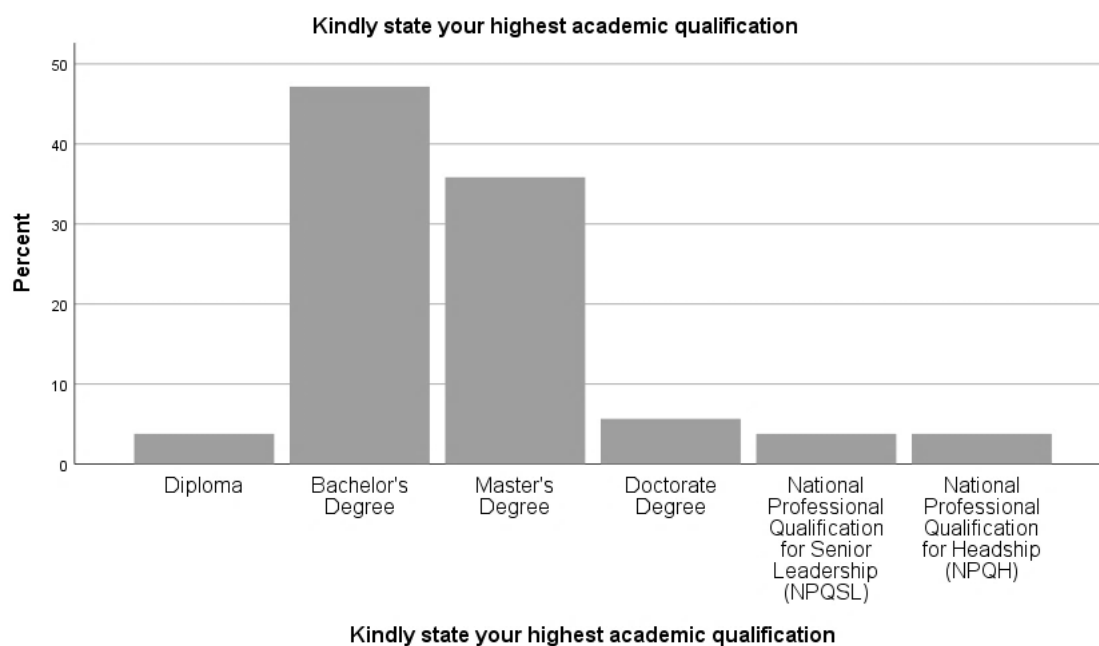


Figure 2. Distribution by Academic Qualification

Research Instrument

A semi-structured questionnaire was developed on the JISC Online Survey platform, and a link was sent to the participants. A measure of internal consistency of the collected data returned a Cronbach's alpha of 0.852, indicating a very good level of reliability of the questionnaire as a research instrument. A Research Ethics Panel from West London University reviewed and approved the research instrument. The questionnaire was structured in seven sections. The first section introduced the survey to the participants mentioning the title and what was expected of them. The second section requested the participants' biographic information, including age, gender, experience as a secondary headteacher, experience as a teacher, highest academic qualification, and subjects taught. The third section was a note introducing the participants to the concept of Food Science and Safety, including its definition, primary objectives, its core areas of concentration, and why it is of interest. The fourth, fifth, and sixth sections questioned the relevance of the curriculum, the role of the MoE in developing the curriculum, and reforms and policies to engender its development, respectively. Most of the questions in the three sections were developed on a five-point Likert scale. The literature reviewed guided the development of some questions in the questionnaire. As part of the policies and reforms to engender the curriculum development, the participants were asked to provide a recommendation on the future of the curriculum. This information was deemed critical in providing qualitative perspectives on feasible reforms. The final section was a sign-out note.

Data Collection Methods

Data were collected from 54 private secondary international school headteachers from Abu Dhabi. Being the Capital City and the leading Emirate in UAE, Abu Dhabi has a large network of schools, making it easy to collect data. The data collection process began with the recruitment of participants who were recruited through purposive and snowballing sampling techniques. Having practiced as a school instructor and leader in the city for years, the researcher relied on personal judgment, knowledge of the context, connections, and convenience to select headteachers to participate in the study. The researcher contacted headteachers known to her,

who then informed more headteachers about the study. In the process, contacts of 70 prospective participants were obtained. The participants were then supplied with participant recruitment forms, including the information sheet and consent form. Upon consenting to participate, the links to the questionnaire were sent to them. Data was automatically saved in JISC servers once the online questionnaires were filled. A total of 55 responses were received, but one was eliminated due to missing data. As part of ethical protocols, strict informed-consent rules were followed to ensure that each prospective participant was well informed of the purpose and objectives of the study and how the data they provided was to be used before they append their signatures. Although complete anonymity could not be promised since participants' data had already been retrieved, respect for confidentiality and privacy was highly emphasised.

Statistical Analysis Methods

Upon the completion of the data collection process, a dataset sheet was downloaded, edited, and transformed for further analysis. The data were analysed using Statistical Package for Social Sciences (SPSS v26). Frequencies means and standard deviation were used to rank the headteachers' perceptions.

Results

Various results were evident from the study. A significant majority of the participants reported having interacted with similar concept of Food Science and Safety in their schools and that they either had enough knowledge of the curriculum (54%) or little knowledge (31%). 13% of the headteachers reported having no knowledge at all of Food Science and Safety, while only 2% reported being very knowledgeable on the subject. Despite the disparities, there was a general agreement among the Abu Dhabi headteachers that the development of the curriculum would be beneficial in enhancing skills and knowledge on Home-based issues (mean = 4.44, SD= 0.572) as well as schools' orientation to solving social problems (mean = 4.02, SD= 0.739). It was vividly recommended that UAE curriculum leaders should consider including and developing Food Science and Safety or its equivalents in the country's mainstream education curriculum (mean = 4.13, SD= 0.728) and that it should be equally acceptable to both boys and girls without any form of gender-based segregation in the learning process (mean= 4.70, SD = 0.607). Over 80% of the participants agreed (51.9%) or strongly agreed (31.5%) that the MoE should consider developing the Food Science and Safety curriculum. 37.7% of the participants are convinced that the curriculum should definitely begin in secondary, while 26.4% are of the opinion that it should perhaps even begin in preschool.

The Relevance of Food Science and Safety in UAE

The headteachers rated various factors on a rate of 1-5 with an intention to rank the relevance of Food Science and Safety in UAE schools. The headteachers attached the significance of Food Science and Safety or its equivalents when implemented in Abu Dhabi for various reasons, as shown in Table 1 below. The most important reasons reiterated were the ability of the curriculum to enhance knowledge and skills necessary in improving family practices (mean = 4.36, SD= .857), the position of the curriculum in creating new opportunities (mean = 4.33, SD = .879), and the proficiency in promoting sustainable living (mean = 4.25, SD = .939). The least cited factor, yet imperious, was the propensity of the curriculum to shape future careers.

Table 1. Relevance of Food Science and Safety

| | N | Min | Max | Mean | SD |
|--|----|-----|-----|------|-------|
| The curriculum will enhance knowledge and skills vital to improving sustainable family practices | 53 | 1 | 5 | 4.36 | 0.857 |
| The curriculum will create new opportunities that would enhance wage-earning skills | 52 | 2 | 5 | 4.33 | 0.879 |
| The curriculum will be vital in promoting sustainable living. People will be more informed of their life choices | 53 | 1 | 5 | 4.25 | 0.939 |
| The curriculum will help parents be more successful as children take more active roles in family practices | 53 | 3 | 5 | 4.19 | 0.735 |
| The curriculum is an opportunity to address socioeconomic issues | 53 | 1 | 5 | 3.98 | 0.971 |
| The curriculum will help in shaping future careers. | 53 | 1 | 5 | 3.89 | 1.050 |

Factors that Hamper Food Science and Safety Curriculum Development in Abu Dhabi

The headteachers were asked to rate various factors that might limit Food Science and Safety curriculum development in UAE on a scale of 1 (strongly disagree) to five (strongly agree). Results indicate that 57% of the headteachers are convinced that the UAE's Ministry of Education is applying minimum reforms to engender holistic Food Science and Safety education, while 30% portrayed that the MoE is applying enough reforms (Refer to Table 2). This automatically reignites the need to reinvigorate sufficient and respective efforts to reform the education system with respect to the emerging needs.

Table 2. Frequencies on The MoE's reforms towards the education system

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|---|-----------|---------|---------------|--------------------|
| Valid | The MoE is doing nothing to reform the education system | 7 | 13 | 13 | 13 |
| | The MoE is applying minimum reforms | 30 | 57 | 57 | 70 |
| | The MoE is applying enough reforms | 16 | 30 | 30 | 100 |
| | The MoE is applying very high reforms | 0 | 0 | 0 | 100 |
| Total | | 53 | 100 | 100 | |

When asked to rate factors that might be limiting UAE's MoE from developing a Food Science and Nutrition curriculum in the mainstream education system, three core factors stood out: insufficient resources, materials, and facilities (39%), insufficient number of subject teachers (35%), and unsupportive culture and ideologies (26%). Other factors, though of comparatively less significance, are an unsupportive school environment, lack of support from interest groups, the complexity of assessments, limited instructional supervision, and low impact on learners, as shown in Figure 3 below.

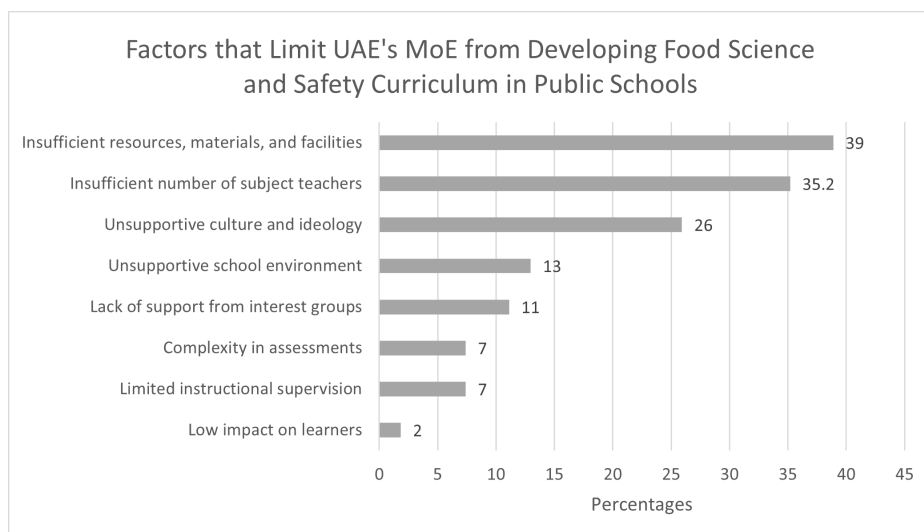


Figure 3. Factors Limiting the MoE from developing Food Science and Safety Curriculum in Public Schools

In addition to these factors, the culture of segregation in UAE public schools was also manifested. It was apparent that the participating headteachers were not supportive of the culture of segregation between boys and girls in UAE public schools (mean = 2.93, SD = .929); are not of the idea that female teachers should not teach male students in schools (mean = 3.00, SD = .932); and believe that UAE should consider abolishing segregation in public schools to promote curriculum development processes (Mean = 3.93, SD = .887).

Factors that Underpin the Development of Food Science and Safety in UAE

Fortifying Food Science and Safety curriculum development and educational reforms demand the need to assess factors limiting curriculum development and rethinking their redress. In this study, the participants were asked to rate educational reforms they believe could help create a better foundation for the development of the Food Science and Safety curriculum. The most outstanding factors were the need to make curriculum frameworks more flexible to accommodate curriculum change and reforms (44%), the need to train more teachers and professionals in Food Science and Safety and related curriculums (41%), and the need to seek educational equity and diversity in schools (31%). Quality of teaching materials (11%) and school-based support (9%) were also deemed indispensable.

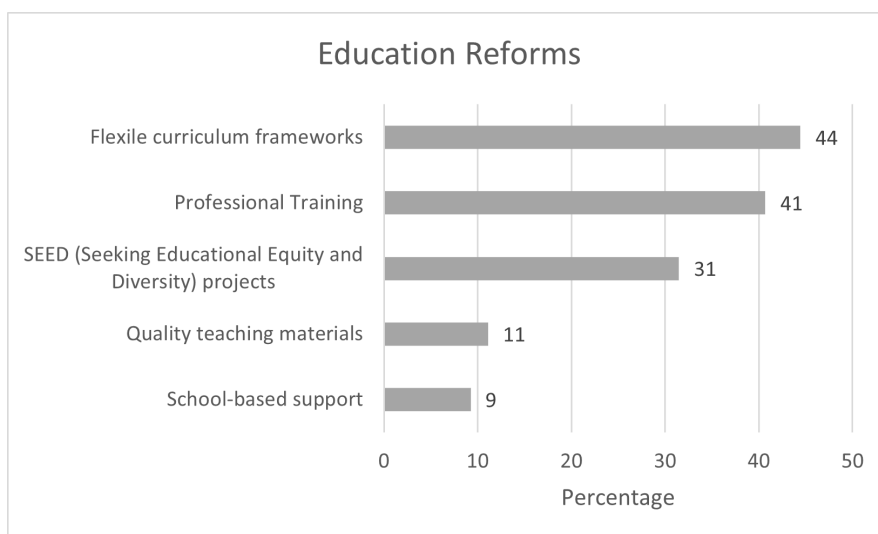


Figure 4. Factors underpinning education reforms

An open question in the questionnaire requested the participants to provide advice to the UAE's MoE concerning the development of the new curriculum. Most responses lauded the efforts of the curriculum developers while providing recommendations for further consideration. One of the respondents felt that the subject was narrow in scope and called for a more multidiscipline subject;

“Food Science and Safety curriculum is a great idea. However, I feel that the scope is narrow and that the country needs a subject that teaches students various life skills, not just food and related culinary skills. In addition to food knowledge, our students need more practical skills in textiles, home management, family finance, family relations, and health to effectively outsmart the challenges that come with the contemporary lifestyle.”

This response makes the thought of Home Economics surface. Home Economics is a multidiscipline subject that encompasses seven areas of study: food and nutrition, clothing and textiles, home management and design, child development, health and hygiene, home budgeting and finance management, and consumer education (McGregor et al., 2012). Consistent with the response, another respondent mentioned that;

“There is a need for comprehensive, creative, and applied subjects that allow students to develop their creative artistic skills in preparing and developing their cognitive development.”

Another respondent was of the perspective that;

“For the success of the new curriculum to be achieved, the ministry needs to develop and equip food labs in all public schools to allow students to interact with foods and ingredients in their purest forms. Food Science and Safety skills need more practical activities than classroom notes.”

Another respondent called for broader and more flexible teaching pathways noting that;

“UAE has conventionally depended on traditional teaching pathways where teachers have to physically meet the students in a classroom set up to dispense knowledge. I was hoping we can create environments where learning is not limited to classrooms but can take place online or non-school contexts.”

These extracted responses are sufficient to show that much needs to be done to achieve the full potential of the curriculum.

Discussions and Conclusion

As UAE's MoE plan to develop Food Science and Safety education in its mainstream education system, the need to explore its relevance to the targeted population and pre-empting factors that are imperative to the development process is unequivocal. It is critical for the curriculum developers and other stakeholders to clearly understand the need for the holistic development of the curriculum in the simplest way possible to engender acceptance, invigorate the development process, and limit barriers in the process of implementation (Love et al., 2020; Luesse et al., 2019; Walters & Stacey, 2009). This study contributes greatly in responding to these areas of inquiry. The first part of the research inquiry delved into exploring the relevance of the curriculum in the context of the UAE.

Data analysed from Abu Dhabi school headteachers reveal that the curriculum grants UAE an opportunity to improve family sustainability, enhance wage-earning skills, advance sustainable

living through informed life choices and decisions, enhance the success of households, effectively address socioeconomic issues, and shape future careers. As evidenced in the results, the relevance of the curriculum transcends the primary goal of addressing diet-based issues and instead provides an opportunity to develop new skill-sets that are valuable in shaping future careers. Careers such as food technologists, nutritionists, and dietitians are fast developing as healthcare facilities, food manufacturing companies, gym and fitness centres, public health organizations, government agencies, and academic institutions will continue to be in need of such expertise.

These results are similar to the findings of Park (2010), who concluded that food and nutrition education is an opportunity to change people's conception about good household practices and life decisions in general. Kim and Kim (2020) also showed that such a curriculum is a recommendable option for Education for Sustainable Development (ESD) and related content.

To guarantee Food Science and Safety curriculum development, especially as an intended curriculum, there is a need to identify opportunities and loopholes and attempt to address them (Oh, 2021). From the results, this study indicates that various factors hamper the development of Food Science and Safety or its equivalents in Abu Dhabi and extendedly the entire UAE. The most imminent factors identified are insufficient resources, materials, and facilities that can support the development of the curriculum, insufficient number of trained curriculum subject teachers, and culture and ideologies that are less supportive of food and nutrition curriculum.

The results imply that as UAE's MoE, through its policy makers, invigorates its efforts towards developing Food Science and Safety or its equivalents, there are core factors worth considering and planning for. In the context of this study, there is a need to make curriculum frameworks more flexible, train more teachers on the curriculum, establish education environments that support equity and diversity, advance the quality of teaching materials, guarantee school-based support, initiate some cultural reforms for the better, and solicit for support from interest groups. The following theoretical framework (Refer to Figure 5) summarises these projections.

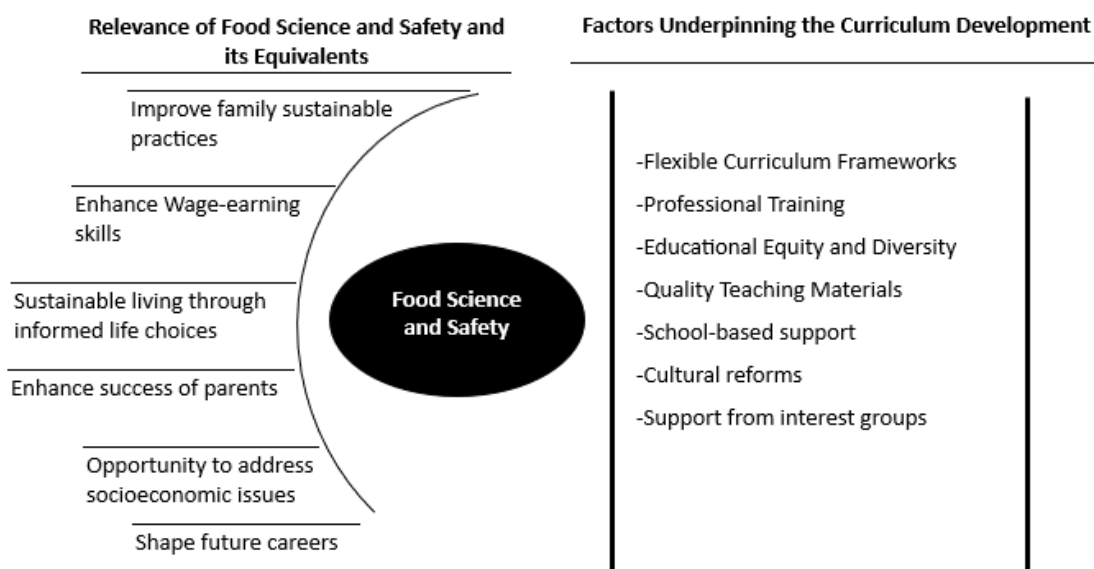


Figure 5. Food Science and Safety Curriculum Development Theoretical Framework

The results of this study are targeted to UAE curriculum developers, researchers, and school heads as curriculum practitioners. To the researchers, there is a need to further explore factors that underpin Food Science and Safety curriculum development and how the curriculum can be

made more efficient in the context of Abu Dhabi and UAE in general. The factors were descriptively assessed. Future studies require exploring these factors more inferentially to guarantee their statistical significance. To practitioners, this study makes some observations that can guide the improvements or reforms within the education sector. Some of these improvements, as identified in the study, include the need to make curriculum frameworks more flexible, guarantee quality teachers and materials, and ensure that curriculum implementation and cultural ideologies are in tandem with each other and can never be underrated. Despite the results, this study is limited by its scope. It depended on headteachers in Abu Dhabi to make generalised conclusions that extend to UAE at large. These might make such generalisations less dependable.

Biography

Denise Buttigieg Fiteni is currently living in the capital city of UAE known as Abu Dhabi. She is a Healthy School Lead and she has taught in various school contexts in different countries such as Malta, Italy, UK and UAE. She has a wealth of experience in various fields related to Home Economics and is a frequent guest speaker on nutrition, food science, textiles and apparel, interior design and family and consumer-related topics. She is an Advanced Skills Teacher, a certified Food Scientist, a certified Culinary Scientist (IFST-USA) and an active member of The Nutrition Society (UK) as a registered Public Health Nutritionist. She is currently following a Doctorate of Education at West London University.

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