

Review Article

SCHOOL GARDENS IN THE REPUBLIC OF TRINIDAD AND TOBAGO: POTENTIAL AND POSSIBILITIES

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ABSTRACT

This paper examines the practice of school gardening in Trinidad and Tobago. It describes major benefits of school gardens and discusses issues in the primary school curriculum, including societal and administrative perceptions that hinder the realization of objectives of school gardening practice. The creation and development of indigenous knowledge is a major benefit of school gardening, hence its suitability as a medium for change and improvement, especially in Caribbean states where issues of food security arise. Additionally, this paper assesses the impact of the pandemic on implementing school gardens and proposes feasible solutions to sustain the practice in an online teaching and assessment environment in the face of pandemic restrictions, based on the adaptation of an approach used by tertiary education students of the Centre for Education Programmes at the University of Trinidad and Tobago. Benefits and limitations of this approach are discussed and recommendations proposed for educators and administrators.

Keywords: primary schools, school gardens, indigenous knowledge, agricultural practices, pedagogy.

INTRODUCTION

One vital pragmatic and social activity in schools is the school garden (SG). It represents development of 'head, hand and heart' and it should be of importance to all learners. School gardens should be activities used to support learning in the learning-teaching process (Kuru et al., 2020). Additionally, establishing SGs can serve academic, social, environmental remediation, and other purposes while positively impacting students' achievement. This may play a key role in curriculum enhancement (Blair, 2009). SGs as settings for outdoor learning are not just landscapes for practical agriculture, but rather resources that have potential application across the curriculum. These outdoor laboratories connect students to their biotic and abiotic environment. In a SG, children are set to work cultivating mini estates of fruits, vegetables, and flowers, thus, giving a refreshing change from books and whiteboards. It encourages the inclusion of more practical intensity into learning, while creating a healthy lifestyle. SGs have been an active part of the school system of the United States of America (USA) since 1890 (Duncan et al., 2016). In other regions, SGs are familiar resources in education and have been reported to positively contribute to pedagogical and affective experiences of pupils at the Primary Education level (Ambusaidi et al., 2019). The lack of vegetable consumption among children is a global public health concern that is linked to communicable diseases such as diabetes, hypertension, and obesity (Boeing et al., 2012). Generally, children's dislike for eating vegetables (Cooke & Wardle, 2005) is influenced by environmental and personal eating choices (Birch, 1999). Berezowitz et al., (2015) reported a positive correlation between vegetable consumption and pupils' SG activities. Improvement in pupils' artistic abilities while working collaboratively to solve local environmental challenges was another positive outcome (Inwood, 2009). The SG experience also assisted in training students to make responsible economic decisions (Sarti et al., 2017), such as calculating the vegetables required for home consumption and planning for any excess harvest. Changing the school yard into a SG may lead to positive development of self-esteem, peer to peer

socialization, as well as enhanced teacher-student relationships and a positive attitude towards school (Diaz et al., 2018). Authors also reported improvements in students' language skills and their increased inquisitiveness leading to expansion in their scientific and mathematical cognizance (Brown et al., 2017). SGs have transcended the boundaries of the traditional hands in the soil approach and entered the virtual world. One such extension is a smart phone application named "Garden Science Game" developed for kindergarten pupils to sensitize them about living entities in their environment. These organisms included plants and plant parts (flowers, fruits etc.), insects, and birds (Hong et al., 2017). Reports indicated that participants' knowledge increased as they progressed through the various levels in the game. SGs were also designed as interdisciplinary entities to include subjects such as visual arts, English, mathematics, and science (Brown et al., 2017). Sarti et al., (2017) concluded that giving the students the autonomy in the SG to grow and harvest their vegetables allows them to become agents of change. The immediate context considered in this paper is the Republic of Trinidad and Tobago (T&T), a twin, Small Island Developing State (SIDS) in the Caribbean. Despite the many positive educational and social benefits of creating SGs, teachers and students continue to experience implementation and institutional challenges in primary schools in T&T. Towards the end of the first quarter of 2020, many face-to-face learning activities, including outdoor practical activities, moved to the online delivery mode to minimize any disruption to education due to the restrictions imposed to control the spread of COVID-19 (Knysch & Dudziak, 2020). Teachers and administrators were especially stressed as new challenges arose when attempting to convert school gardening activities to the virtual realm. Solutions for continuity of outdoor applications during the pandemic require very creative interventions (Moore et al., 2020). SG programs and garden-based education are positioned to become fixtures in the educational landscape. Agricultural education professionals have integrated school gardens into core subject areas such as science, social studies, mathematics, and language arts courses at primary and secondary school levels (Diaz et al., 2018). Therefore, this paper focuses on the major challenges and solutions perceived when integrating the School Garden into the primary school curriculum to diversify teaching and learning, and enhancing students' output.

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Major challenges

The main challenges to promoting the democratic values and practices that school gardening activities espouse in the Primary Schools include but are not limited to:

- the lack of appreciation for indigenous knowledge of agricultural practices;
- lack of sensitivity to the importance of agricultural science;
- changing societal values that have negatively impacted education;
- increasing teacher workload, gardening pedagogical training and lack of supportive resources; and
- the impact of a global pandemic on the success of school gardens

School gardens and associated activities are undoubtedly influenced by the culture of a society or community since they are immersed in traditional and/or cultural practices. SGs serve as agents of indigenous knowledge (IK) which must be recognized and valued at every level of the school system. IK refers to people's cognitive and wise legacy because of their interaction with nature in a common territory (Semali & Kincheloe, 1999). Native people, with a common history of colonization by Western culture, constantly regenerate this knowledge (Adzahlie-Mensah & Dunne, 2019). IK is immersed in the whole culture of a society and is modified and accumulative through generations. Unfortunately, IK of gardening practices may be highly underutilized. Agricultural stakeholders (teachers, students, producers, and policy makers) in T&T are passionate about their discipline (Hurst *et al.*, 2015). However, the ability to develop agricultural technicians, producers and other professionals facilitated by pedagogical training for agriculture educators is hindered by the general public's demagnetization of agriculture, agricultural workers and work. Further challenging the inclusion of IK of agricultural practices in the primary school garden is the shifting of teaching and learning in the classroom to the virtual world due to the global pandemic. The introduction and/or expansion of e-learning platforms in the education systems has occurred in Liberia (Sondah, 2020), Nigeria (Oyeniran & Oyeniran, 2020), Kenya (Peter, 2020), USA (Paterson, 2020), and most global territories. Teachers must now contend with new and emerging demands in their schools and classrooms while educating students. Valli and Buese (2007) also have contended that teachers' roles have changed significantly as high stakes accountability has become an increasingly pervasive factor in their daily work with the continued challenge of integrating technology into teaching. Changes in expectations for teachers' roles have been quite striking over decades of educational reform (Valli & Buese, 2007, p. 519) and teachers are expected to play various new roles in the course of their teaching career taking into consideration that most classroom instructions are technology-based. Technology-driven instruction is more complex unlike the traditional classroom which is simple (Okojie, 2011). Therefore, a major challenge for teachers involves changing their pedagogical practices to facilitate the success of traditional school gardening efforts. Adapting teaching garden skills to the online mode is even more challenging as we live with the COVID-19 pandemic.

Appreciation for indigenous knowledge (IK) of agricultural practices

IK could be exploited and blended into the Primary School's curriculum through SG activities. Students growing up in agriculture-based communities interface daily with the IK associated with their communities' agricultural practices. It is critical that this knowledge be recognized and valued at the level of the school curriculum and be incorporated into the teaching-learning process, especially in rural

schools. Practical skills are vital to the educational development of children (Eisner, 1985) and provide educational sustainability in our future leaders (Barter, 2014). The lack of emphasis on agricultural science related activities can be attributed to innate historical factors associated with education in T&T; specifically, the education system inherited from British colonial rule. Noticeably, the elitist and examination-oriented system is designed to filter, segregate and retain students based on perceived meritocracy, as defined solely by performance in public examinations (De Lisle *et al.*, 2010). A curriculum that drives school gardening and its associated activities clearly possesses the benefit of integrating and addressing examination-oriented weaknesses. School gardening fosters the development of thinking skills of children through their participation in authentic and practical problem-solving activities. It also sensitises students to the importance of agriculture and agriculturally based activities as issues of national, societal and personal relevance. School gardening activities reflect curriculum as technology because learning experiences are carefully and precisely planned through systematic formulation of goals and objectives, dissemination of content through planned and sequenced learning experiences as well as formative and summative evaluation of the products of learning. The curriculum development of school gardening activities reflects the Tyler model, which is still considered by many to be the strongest model for curriculum development (Oliva, 2004). School gardening as a structured component of the Agricultural Science syllabus reflects the academic rationalism of a discipline worth studying. Ultimately, the aim of an agriculturally based curriculum is to sensitize learners to the need for social adaptation as well as to become agents of social change and reconstruction. The effects of the global pandemic have impacted on occupations locally and internationally, and learners need to be sensitized to practices of social adaptation to practices of everyday life, as well as to socially reconstructed habits of thinking to survive in a rapidly changing society. Therefore, school gardening can provide a vital catalyst for effective and timely curriculum change.

Lack of sensitivity to the importance of agricultural science

The philosophy of pragmatism argues that practical subjects such as gardening are vital in the development of a learner's brain, mind, and soul, and therefore should be made compulsory for learners (Bhebhe & Nxumalo, 2017). However, this is not always the case in developing or Third World countries such as T&T. These societies face challenges in establishing a positive and revered perception of the value of practical subjects in the curriculum of primary education (Chimombo, 2005). Campbell (1997) outlines societal perceptions of curriculum reform in T&T in the early twentieth century and much has not evolved since then. Efforts to introduce practical and vocational subjects into the curriculum tended to be hindered by a dominant societal perception of their insignificance. To this end, efforts and policies must be fortified with SG incentives to encourage integration into the school's curriculum. It is therefore justified and timely to conduct robust, systematic research into the health and educational benefits of SGs to support and inform further development of this school-based intervention (Ohly *et al.*, 2016). Beckford (2002) commented on the negative stereotyping toward agriculture in some quarters in Jamaica and explained it as stemming from lack of knowledge and understanding of and sensitivity towards the factors that influence and inform farmers' decisions. Furthermore, Lowitt *et al.*, (2015) indicated that CARICOM (Caribbean Community and Common Market) faces complex socio-ecological challenges related to historical legacies of plantation agriculture. For example, while secondary school students highlighted the importance of agriculture to T&T, they were unwilling to pursue careers in agriculture (Ramdwar & Ganpat, 2015). Historical legacies continue to engender negative attitudes, even though it was found that integrating the SG

with the curriculum improves performances in other subject areas such as English, Mathematics, Science, Environmental Education, ICT and Art (Pascoe & Wyatt-Smith, 2013). Khadar (2010) suggested that the needs of stakeholders or intended user or user groups should be put before the product or service. Therefore, the overall agricultural learning experiences at the primary schools may increase children's interest in agricultural professions and create more positive sensitivities towards agriculture in future generations.

Changing societal values that have negatively impacted education

Even though centuries have passed, and the education system has evolved considerably, the effects of high stakes testing in the primary school still present a major obstacle to harnessing the importance of school gardening as an educational activity to drive learning. In primary schools, the Secondary Entrance Assessment (SEA) is part of the admission process for public secondary schools in T&T. Although significant modifications were made to its structure and format, this summative test is the only selection mechanism since the country's independence in 1962. Over the years, this has resulted in the narrowing of the enacted curriculum at schools to focus on the core subjects of this 'gatekeeper examination' which are mathematics and language arts. This has led to a culture of assessment in schools which has significantly diminished the emphasis placed on aesthetic and practical areas. Similar to the introduction of the No Child Left Behind Act in the USA, focus on this national examination in T&T has "squeezed out development of aesthetic areas like school gardening because there is no testing and certification for that anymore" (Berliner, 2011, p.300). According to Berliner (2011) primary schools ignore a lack of growth in these other areas because the 'payoff' or recognition for schools is increased test scores in Language Arts and Mathematics. Thus, curricula areas that will contribute to intelligent and democratic citizenship in T&T's future economy are sacrificed for the possibility of scoring higher on prominent high stakes tests. It is also important to note that when implementing curriculum change, among factors that contribute to the success is the commitment of all stakeholders towards change; a process which ideally should take place incrementally over time (Beauchamp, 1975). Passy (2014) presented evidence which suggests that while SGs are an interesting and effective way of engaging children, there is a divide between teachers who are willing to use SGs in their teaching and those who are not. One of the most significant challenges of shared appreciation for school gardening is sustainability of initiatives and activities. There is a need for support systems to assist teachers in sustaining these meaningful curricula changes which the introduction of SGs demands. Systemic change requires wider systems of support and acknowledgment that teachers by themselves cannot accomplish. There are challenges to sustainability, including lack of funding (at the local and national levels), space and gardening expertise (Burt et al., 2018) to support these educational reforms. In some instances, the recognition that higher political and administrative priorities inevitably overtake genuine educational reform efforts is of great concern.

Increasing teacher workload, gardening pedagogical training and lack of supportive resources

Infrastructural deficiencies may also serve as a challenge to the successful implementation of SGs. The World Bank has produced nine internationally recognized indicators of educational quality which include: libraries, instructional time, homework, textbooks, teacher subject knowledge, teacher experience, laboratories (including SGs), teacher salaries and class size (O'Sullivan, 2006). Steinbach (2012) suggests that an important factor affecting the quality of the education system, common to almost all countries but more acute in developing

countries, is the general economic situation and lack of resources for education. To effectively teach practical subjects, especially to develop and maintain SGs in primary schools, teachers need to be trained how to transfer the necessary skills to students. The greatest single factor in teaching and learning is the teacher. No technique, method, device, nor gadget can guarantee success, but only an effective qualified teacher can adequately execute the requirements of the subject (Dlamini, 2011). The skills that teachers possess can greatly influence student participation and motivation in vocational and practical school-based activities. There is therefore a need for critical pedagogical competence. It is crucial that teachers use the appropriate pedagogy to achieve success in practical gardening tasks. The challenge of pedagogical skill is even more critical in today's primary environments of large classes, limited spaces and staff shortages. Teachers in Swaziland were asked to describe the challenges that they faced when teaching practical subjects or facilitating practical school-based activities such as agriculture in the school (Bhebe & Nxumalo, 2017). Teachers' responses generally included a lack of time for teaching practicals, and support from principals to provide materials for practical work. Teachers also stated that they were not adequately trained to teach practical subjects hence they did not feel comfortable having to teach them. The results of this study suggest that preliminary research should be carried out in primary schools in T&T to ascertain needs to be addressed before embarking on a robust school gardening programme.

The impact of a global pandemic on the success of schoolgardens

Unexpectedly, approximately half a million pre-school, primary and secondary school students across the Eastern Caribbean were forced to trade the familiar classrooms, the ring of the school bells, the laughter with friends, their notebooks and other school scenarios which collectively improve student wellness. The replacements were laptops, tables, and smart phones (Knight, 2020). The normality was disrupted in mid-March 2020 because of the pandemic COVID-19. In T&T, and the wider Caribbean, students are safely attending online classrooms and anticipating the moment when it is once again safe to don their school garbs and return to the familiar learning environments. An estimated 144 million students in Latin America and the Caribbean are experiencing this new but bewildering reality (Jaramillo, 2020). This has increased the difficulty of participating in SG activities (FAO, 2010) inclusive or exclusive of any form of indigenous knowledge. Physical restrictions on entering the primary schools' compounds and limits on number of persons allowed to gather in any area at a given time have almost but eliminated these outdoor school events (CNW, 2020). Authors such as Kuru *et al.*, (2020) have articulated the effectiveness of the SG's integration in the primary school curriculum and the overall development of the students. Therefore, no effort must be spared to find a way for the continued application of this vital learning and teaching resource throughout the COVID-19 pandemic (Lochner, 2019). One solution for primary schools can be derived from an adaptation implemented by the Centre for Education Programmes at the University of Trinidad and Tobago (UTT) in the delivery of a course "Agriculture in the Primary School". Part of the practical fulfillment required that students establish and maintain a container garden from seeds/seedlings to harvest, previously assessed in the UTT's field laboratories. For the adaptation, Semester I (September to December 2020) was delivered and accessed via online platforms. Prospective teachers were instructed to conduct the following activities at their homes: select and prepare containers for planting, fill the containers with prepared soil, transplant the seedlings or sow seeds, and place the containers in a location where the plants would receive the necessary sunlight. Students were required to take photographs of the establishment

phase, and thereafter at weekly intervals until harvest. The results were entered on preformatted reports and upload to the designated platform for assessment and feedback. At the end of this blended experience of authentic practical work and online communication, students of the Centre for Education Programmes who participated in this activity were asked to share their experiences of performing these practical activities in an adjusted online environment. Among the perceived benefits highlighted by prospective teachers were involvement of parents and building of supportive relationships between school and home, sensitization to the importance of gardening as a collaborative and productive activity, as well as increased motivation and a sense of responsibility and independence. It was generally believed that this activity is highly beneficial for the development of primary level students (AGSC3018 Course Reflection, 2020). This experience has shown that despite pandemic restrictions and other physical limitations, within the primary school, school gardening has tremendous potential.

Some solutions for Trinidad and Tobago and wider Caribbean

We are living through one of the most extraordinary times of history, resulting in peculiar experiences for students (Lock, 2020). Many societies struggle to cope with the ravages of COVID-19 and as their education systems adjust to teaching and learning facilitated via the Internet, the practical curriculum may be left behind (Moyi, 2020). These hands-on undertakings are critical amenities to the understanding of the subjects' concepts. The SG as a resource provides opportunities to integrate the curriculum and excite the students' curiosity, thereby building positive characteristics in the future citizenry. In T&T, indigenous knowledge has been applied by farmers over time (Boney et al., 2014). However, this has not effectively transcended into the SG at the primary school level to influence the teaching of agriculture. The integration of this old age understanding in the practical curriculum at the primary school level could reap benefits to the students, teachers and schools who participate in SG activities (Adzahlie-Mensah & Dunne, 2019). The UTT container garden approach should also be adapted and modified for the continuation of school gardening during the COVID-19 pandemic in T&T, and other Caribbean territories, thus minimizing the disruption to SG activities and the delivery of vital concepts through hands-on involvement. The integration of SGs in the curriculum may also facilitate avenues for generating revenue, which could be valuable funding for the maintenance of the garden and other school projects (Block & Johnson, 2009). These entrepreneurial skills and experiences gained by the pupils can be transferred to home gardens thereby reducing market budgets and increasing household incomes. Key weaknesses in subject areas in the education system or curriculum at the primary school level must be identified and integrated into the SG, where this diverse resource can contribute to the teaching and learning experiences of the pupils. Many primary schools, mainly in the urban areas in T&T, lack earthen areas and/or enough yard space for a traditional SG. In such cases container gardening and grow boxes (Rye et al., 2015) could be an appropriate solution capable of covering most necessary agricultural concepts, curriculum linkages and pedagogical experiences as the traditional outdoor units. The creative use of a garden program can promote the development of students' academic performance through integration with the school syllabi (Swank & Swank, 2013). Consequently, this builds the resolve and problem-solving ability of pupils, and positions learners for future leadership. Thus, it provides myriad opportunities for involvement (Starbuck & Olthof, 2013).

CONCLUSION

Delivery of the practical component via the virtual sphere could be very challenging in any academic discipline. This could be made more difficult for practical based subjects such as agriculture and some vocational certification. The rapid shift to remote teaching and learning has the potential to engender pedagogical innovations and digital tools in agricultural education. However, it may always be tiring to compensate for the practical component in the SG once the fallout from the pandemic persists for a protracted period. The situation requires training in the appropriate use of distance education delivery strategies to meet these needs. Simultaneously, careful assessment of home contexts is required to ensure that students are able to develop the necessary practical skills. Effective integration of the SG into the primary school curriculum is necessary to avoid increased teacher workload. This would require administrative will, planning, innovation and stakeholders' collaboration. Teacher training and expertise could be the key to beneficial and sustainable school gardens. The recognition of indigenous knowledge by educational administrators and the inclusion of such in primary school agriculture programs can peak students' interest and cultivate changes to appreciate the subject in a future world.

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