

**Improving Secondary School Students Mental Health: The Applicability of
Sociohorticultural Reusable Learning Objects**

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Introduction and Conceptual Framework

Public health has become an increasingly important aspect of global consciousness (United Nations, 2015) in recent years due to the effects of high levels of poor nutrition, lack of physical activity, and lack of access to affordable, quality healthcare (World Health Organization, 2015). Mental health is an important subset of overall public health, with mental illness contributing to around 7.4% of disease globally (Becker & Kleinman, 2013). Further data shows that mental health issues contribute to almost one-third of adolescent diseases globally (Kutcher et al., 2013). Secondary students are particularly susceptible to mental health issues due to their stress-heavy lives and the likelihood of mental disorders arising during adolescence (Jorm et al., 2010). Outside of the secondary school population, the success of such programs conducted with different age populations has been widely utilized (Linden, 2015; Strong & Harder, 2011) especially in cooperative extension programming (Posadas et al., 2021).

Strong (2013) reported Reusable Learning Objects (RLOs) increased goat producer's knowledge. Post-secondary student learning from RLO dissemination was assessed by Roberts et al. (2016). However, there has been little research conducted on the potential benefits of creating reusable learning objects in the field of horticultural therapy or sociohorticulture for secondary school audiences. In order to conceptualize such implementation, Rogers' (2003) theory of diffusion was utilized to explain potential paths to adoption. To investigate the potential for adoption, the relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003) of reusable learning objects in sociohorticulture was assessed and examined for potential dissemination to secondary school teachers.

Purpose and Objectives

The purpose was to explore sociohorticulturally based models of educational programming for secondary school students as a tool for improving student learning and mental health. Specifically,

1. Identify existing precedents and models for programming among other populations.
2. Investigate the potential effectiveness and application of reusable curriculum to improve secondary school teacher knowledge of sociohorticulture.

Methods

Qualitative research methods were used to investigate teacher implementation of sociohorticulture concepts through reusable learning materials as a potential solution to mental health in secondary classrooms (Fraenkel et al., 2019). A qualitative systematic review was conducted of the existing body of knowledge (Lee et al., 2021). In order to better understand recent contributions to a greater understanding of the potential future of RLOs in secondary school settings, the review was limited to articles published in the last ten years. A comprehensive review of any existing literature was conducted to examine the forms of sociohorticultural programming utilized in other populations. Similarly, a literature review also included documents determining the merit of RLOs and whether they have been utilized in the field of sociohorticulture. Keywords included in the literature search included sociohorticulture, horticultural therapy, mental health, and horticultural programming. Systematic reviews more

precisely classify scientific innovations and lessen biases than an expert review (O'Hagan et al., 2018).

Results and Conclusions

Existing Precedents for Horticultural Programming

Current data shows that while teachers are becoming more aware of the need for mental-health-related resources for secondary school students, they typically lack access to training, support, or professional expertise around the issue (Shelemy et al., 2019). Teachers indicate that despite this lack of support, they feel they can be a part of the solution to the global mental-health crisis (Froese-Germain & Riel, 2012) and highlight the need for practical, individualized solutions to student mental health. Documented benefits of horticultural programming that are particularly suited to classroom environments include increased focus in both general and attention deficit disorder (ADD) populations (Faber Taylor & Kuo, 2009), improvements in engagement (Yin et al., 2018), reduced cortisol and stress levels (Han et al., 2018), increased respect for nature and others (Acar & Torquati, 2015), increased environmental consciousness and sense of place (Gillis, 2015), and increased development in both social and cognitive skills (Acar & Torquati, 2015). A study conducted among elderly mentally ill populations in South Korea following a horticultural therapy program resulted in both reduced stress and improved physical function (Han et al., 2018). Horticultural programming enhanced youths' emotional well-being through improving pride, self-worth, coping skills, confidence, care for others and increased patience (Fontanier et al., 2019).

RLOs Effectiveness to Teacher Learning

Secondary school teachers are in an ideal position to support students first developing mental health problems. However, most resources for horticulture programming are used for youth in primary school settings and even fewer examples exist in the literature of such programs for secondary students (Rogers, 2018). However, teachers are often overburdened with responsibilities and have neither the access nor the training to address such issues on their own (Graham et al., 2011). The nature of RLOs makes them a logical fit to improve teacher understanding of student mental health. Previous study of the application of RLOs in primary education has resulted in increased levels of engagement and motivation in student learning (Cameron & Bennett, 2010). Similar results of improved learning, improved class engagement, and knowledge retention have also been found among undergraduate student populations (Onofrei & Ferry, 2020). However, studies from Greece show that barriers exist in the adoption of such technologies due to teacher apprehension and lack of knowledge (Poultsakis et al., 2021). There is limited research on the application of RLOs in secondary schools, specifically in the areas of sociohorticulture.

Recommendations

Reusable learning materials could provide the necessary tools to improve student learning and mental health without placing the weight of program planning and implementation on agricultural teachers' shoulders. It is recommended that researchers and secondary school teachers collaborate to conduct further research on the potential applicability of pre-constructed sociohorticultural RLOs in classroom settings. Careful identification of related stakeholders, such as extension professionals, school administrators, and parents should be utilized in the future in order to create such programs for secondary students. Such an approach would allow a

greater understanding of the benefits of sociohorticultural RLOs and their potential impacts. While agricultural extension systems offer grade-level appropriate programming for younger children as well as for adults (Palmer & Strong, 2022), there is a lack of intentional programming for secondary students.

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