

## Research Proposal Cover Page

<b>Title of Proposed Research</b> Addressing K-12 Students' Pandemic Learning Loss Through Equitable Collaborative STEAM Activities in Makerspaces	
<b>Abstract (less than 250 words)</b> Due to the COVID-19 pandemic, K-12 students have faced significant losses as a result of social isolation. Prior to the COVID-19 pandemic, research has suggested that makerspaces provide benefits to K-12 students. Thus, further research is necessary to determine how innovative methods of integrating makerspaces in school libraries can alleviate the social, emotional, and economic disparity that K-12 students have faced as a result of the COVID-19 pandemic.	
<b>Project Start Date</b> July 5, 2021	<b>Project Completion Date</b> July 26, 2021
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# Addressing K-12 Students' Pandemic Learning Loss Through Equitable Collaborative STEAM Activities in Makerspaces

## Needs Assessment

Gadermann et al. (2021) write that “the COVID-19 pandemic has posed new threats to families through social isolation due to physical distancing measures, school/child care closures, financial and employment insecurity, housing instability and changes to health and social care access.” Their research states that “These shifts have profoundly interrupted the systems and structures that previously operated to both support the mental health and well-being of families and mitigate the risks that contribute to health and social inequities” (p.1). Gaderman et al. believe that, “Population-level responses are required to adequately respond to families’ diverse needs and mitigate the potential for widening health and social inequities for parents and children.” Of the participants, 24.8 % indicated that their child(ren)’s mental health had deteriorated at the onset of the pandemic (p.1). Gadermann et al. state that “Schools/child care, communities and government systems play an essential role in protecting and supporting parents and children” (p.10). Thus, schools should offer creative and collaborative avenues for students that can counter the barriers of social isolation and lower socioeconomic status through in makerspaces.

## Literature Review

Stycker (2015) praises the low- to no-stress learning opportunities that makerspaces offer while addressing classroom curricula, and fostering collaborative opportunities and emotional stability (p. 28). Li and Todd (2019) found, prior to the pandemic, that young people in grades 6-11 viewed makerspaces as “resourceful” places where they could use “otherwise unavailable tools and technologies.” In addition, young people felt makerspaces allowed them to “drive their own learning,” (Li and Todd, 2019), particularly with regard to STE(A)M-related knowledge. Yamyin et al. (2020) studied the perceptions that Thai students had about makerspaces in their schools, showing via both qualitative and quantitative data that a number of factors must be in place for the makerspace to be utilized as intended by the students of

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these schools, regardless of where in Thailand the students are located or their ages (this study is based on surveys completed by students in grades 7-12).

Kye (2020) examined the growth of the maker movement as a means to democratize science and engineering education. Kye's study focused on makerspaces seeking infusion of science and engineering with approaches to equity through the use of Culturally Responsive Pedagogy (CRP) with hopes of cultivating academic success and higher self-efficacy.

With existing research showing the benefits of makerspaces, the goal of Nichols' research was to discover the outcomes of when making and innovations "are grafted onto formal school structures." (Nichols, 2020) The distinction that the researcher sought was not simply having a makerspace in a school, but integrating it within a curriculum and making it a practice in literacy learning.

### **Significance of the Study**

An investigation of the impact of schools' contributions to students regaining their social and emotional equilibrium through the use of collaborative STEAM activities in makerspaces during this time of the world's recovery from the effects of the COVID-19 pandemic is crucial. Stryker (2015) refers to Dougherty who "offers a partial solution via how the Maker Movement can help to transform education" by stating the need to bring the "magic" of makerspaces to schools because they "share some aspects of shop class, home economics class, the art studio, and science labs" (p.29). Such a transformation is necessary in this newly transformed world.

These alternative educational experiences offer a more equitable measure of students' current state in a less intimidating environment. For instance, some learners saw play as a separate entity than science. "The more fun it is, the less scientific, the more scientific, the less fun," and therefore they were also not seen as science-doers (Kye, 2020). A makerspace can

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offer participants a place to collaborate over scientific and other educational activities and allow students to “develop a better understanding of STE(A)M” standards (Li and Todd, 2019). Yamyin et al. (2020) suggests that preliminary research into makerspaces shows that makerspaces are “important for school-age children because it helps to develop their thinking at a very early stage,” which in turn can set the stage for boosted economies in the future, and may help post-pandemic recovery.

Similarly, Nichols (2020) writes that, “For decades, educators have argued for more expansive understandings of literacy—those that include the full range of semiotic modes that underwrite composing and interpretive processes. Nichols’ research states that in order to offer alternative assessments to students in an effort to ensure equitable access to literacy, educators have integrated various activities (p.58). Makerspaces provide additional equitable options for students of varying abilities.

### **Research Goal & Research Question**

This proposed research aims to determine the best use of equitable, collaborative STEAM activities in makerspaces.

RO1: To understand the level of K-12 student interest post-pandemic in equitable, collaborative STEAM activities in makerspaces.

RQ1-1: To what extent are K-12 students interested in engaging in equitable, collaborative STEAM activities in makerspaces post-pandemic?

RQ1-2: In what specific equitable, collaborative STEAM activities in makerspaces would K-12 students prefer to participate post-pandemic?

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## References

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