

Impact of the Fine Arts and Language Studies on STEM Students at the University Level

Megan A. Tepe

The Ohio State University

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The engineering and language fields often do not interact at the collegiate level; in fact, Ohio State requires taking language courses of almost all majors except engineering. They are so distanced, in fact, that I am the first engineering student who has petitioned to overlap more language courses with my general education courses than the standard language minor allotment of credit hours. This in and of itself was a testament to myself about how few and far between it is for engineering students to minor in a language, let alone pursue a double major in language.

This lack of language learning stems from the desire for engineering students to minor or double major in a technical area, in hopes of improving their engineering knowledge and being more desirable to employers. However, as the world becomes a more global society, the desire for a bilingual workforce increases across the country. Especially when nationally, one in five Americans spoke a language other than English in 2017; and that number will only continue to increase.

Therefore, I want to research how language can improve a student in engineering (or other STEM-related field), as research shows the correlation between better performance/grades, more consistent involvement in extracurriculars, and improved overall mental & physical wellness when STEM students are engaged in activities outside of the STEM field.

I plan on interviewing students in the STEM fields across Ohio State's campus, and determine how students are engaging outside of their STEM coursework. From both an extracurricular and fine arts coursework perspective, I want to know how deviating from the typical exclusively-STEM curriculum/activities that is common of undergraduate majors can improve a student's performance, employer interest, and overall quality of life.

Planning

The components of this study were split into smaller tasks with the aim of maintaining a schedule as well as improving overall organization of the project. The timeline has been adjusted for the updated academic schedule after COVID-19 pandemic was announced.

	ePortfolio Introduction Post	Background Research	ePortfolio Planning & Methodology Posts	Create Survey	Interpret Survey Data	Eportfolio Update 1 Post	Relevant Research	ePortfolio Update 2 Post	Drawing Conclusions	ePortfolio Conclusion Post	STEM Paper	STEM Poster Presentation
August/September 2019												
October/November 2019												
December 2019												
January/February 2020												
March/April 2020												
May/June 2020												
July 2020												

*adjusted for COVID-19 extension

Methodology

In the planning portion of this project, I split up every portion of this research project into different tasks and designated their completion to a specific time frame. I will follow the rest of the guidelines within my self-imposed timelines in order to stay on task and bring this project to fruition.

The next part goal I have is to create a survey using Google Form that helps assess the impact that language learning and the fine arts have on STEM students at Ohio State. The demographic of this survey will be limited to the undergraduate experience, as the large realm of STEM majors at Ohio State will provide sufficient variability to obtain the data I am seeking. Additionally, this Google Form will be tailored to students who are bilingual/non-native English

speakers, and how that portion of their identity has influenced their studies in a STEM field. As it is highly important to be respectful of peoples' identities, and I myself am not bilingual nor a non-native English speaker, I will be having these questions proofread and adjusted by people who do hold these identities. This will help ensure that my questions are both respectful as well as relevant to this research project. After the survey has been screened, I will ensure its clarity and ease of use in order to gain the most responses. Students are much more likely to fill it out if I designate how long the survey will take (ideally around 5-10 minutes) and streamline the questions so only relevant questions will be asked based on previous responses (such as a monolingual person not being asked about bilingual experiences).

Using the data collected from the survey, I will compile the responses given and draw conclusions based on these findings. Reporting will then originally occur in this ePortfolio, and will be transferred eventually to the final paper and poster. Additionally, I will compare the findings to other research that has been previously completed, allowing for a more holistic understanding of this topic, and how the fine arts interact with the STEM field's success from multiple perspectives. These will be incorporated into my paper and poster in order to back up my own finding, and iterate that the positive correlation between the fine arts and STEM fields is not solely within the confines of a limited sample of undergraduate students from Ohio State.

Finally, I will combine the findings from my own survey with the outsourced research, incorporating them into a cohesive paper that articulates the ways in which studying and practicing the fine arts can be beneficial to the success of students in STEM.

Results

The survey I created was based around a number of identifying questions, to better understand my demographic and how their responses correspond to their identities specifically. The overarching STEM/Fine Arts questions, however, remained equivalent. The description of the survey is as follows:

“This study is being conducted to research the impact that the fine arts, specifically language, have on students studying in traditionally STEM majors. Ohio State does not require its engineering students to take a language, but other STEM fields based in the College of Arts & Sciences do have this requirement. Previous research shows the correlation between better performance/grades, more consistent involvement in extracurriculars, and improved overall mental & physical wellness when STEM students are engaged in activities outside of the STEM field. This study aims to see how Ohio State students are engaging outside of their STEM coursework from both an extracurricular and fine arts coursework perspective.”

Distribution of the survey occurred through social media, online classroom discussion boards, and direct contact (such as texting/word-of-mouth). My response rate was small but acceptable to find preliminary data that I can draw conclusions from. It is important to note the demographic of my study, in which 96.3% of students who responded are in the College of Engineering and 25.9% are bilingual.

The major findings of this study showed a number of statistics that demonstrate a positive correlation between studying the fine arts/language and personal, professional, and academic benefits. For example, 100% of students who responded studied a language in high school

(either for a college requirement or by choice) and 74% said that they benefited from it. A three-quarter majority demonstrates that college STEM students should have the opportunity to continue their studies at the university level, if they desire it. However, 61.1% of students said they haven't and won't be studying a language at the collegiate level, with 87% stating the reason is a lack of space in their schedule to do so. To reiterate, only 13% of students are forgoing language classes because that is their preference. Additionally, a majority of students (66.7%) reported that they participate in coursework outside of their STEM curriculum in college; 90.9% of those students believe that it also helps them excel in the main academic coursework.

These findings show that a majority of students feel that they benefit from academic language/fine arts courses, but the most common reason for not pursuing these endeavors is a lack of room in their schedules. This is in direct contrast with Ohio State's belief in a holistic approach to education, as their engineering students are pressured into taking technical courses, even for the general education requirements.

At their core, general education (GE) courses should develop skills that foster students' achievement in their academic pursuits and beyond. However, Brian A. Vander Schee notes that these goals should be met through studying diverse cultures, lifestyles, and backgrounds in order to build objective and informed perspectives within a student (2011). This does not occur when a general education requirement is met through the context of a major-specific GE class. The article goes on to say that "critical thinking, open minds, and varying perception of situations will make [students] very versatile candidates for future jobs and endeavors" (Vander Schee, 2011). This is why the holistic approach to collegiate education is so influential in determining

the success of a STEM student; Ohio State employs this holistic approach, yet adopts it to be less influential for their STEM majors. Other research shows that STEM students at other large universities have the same sentiments: STEM students need the fine arts. At the Massachusetts Institute of Technology, nearly a quarter of a STEM students' education is in the humanities. An article by the AAC&U News explains that MIT's curriculum allows students to "gain historical and cultural perspectives and develop the communication skills that allow them to listen to the concerns of others and explain their own perspectives and reasoning" (Fitzgerald, 2017). After graduation, many of these students testified to the usefulness of studying a broad range of disciplines, citing courses in history, literature, and philosophy as crucial to developing their empathy and critical thinking skills. This emphasizes the need for all students to develop creativity, teamwork, and communication skills when the job market is full of candidates who are well-versed in their field-specific knowledge. Employers are looking for graduates who can succeed holistically in a time of rapid globalization and economic change— and the universities that educate them must step up to ensure their students are able to meet a market that demands social skills as well as technical ones.

Conclusion

As the world moves towards a more virtually connected and global society, it is imperative that education moves with it. The COVID-19 pandemic has caused many companies to transition their STEM field employees to remote work, and it will open up more remote opportunities for STEM workers even after the pandemic has ended. The desire to live in a more globally and virtually connected world is bound to allow for more interactions between people who speak different languages. The importance of language-learning has never been more

desired in the workplace than now. Schools must adapt to an increasingly global society and the requirements of these new jobs, meaning critical decisions on STEM education must move to allow for language courses to fit into their students' schedules. Additionally, fewer commutes and more personal time will allow for more STEM students and workers to enjoy their passions for other fine arts and creative endeavors outside of the STEM field.

The necessity of my findings and outside research will prove increasingly relevant in today's world. Both the quantitative and qualitative results have proven the importance of incorporating language and fine arts with STEM-related requirements. I hope to share this information with other students, professionals, and academics in the hopes of educating others on the importance of diversifying their interests outside of the STEM realm. The positive impact of both language and the fine arts will often improve STEM students' mental health, physical health, and interactions with others. A future research study should be conducted over a 5- and 10-year period to obtain a more holistic understanding of how language and the fine arts positively impact STEM students in their education and over their careers.

References

Fitzgerald, D. K. (2017, August 15). At MIT, the Humanities Are Just as Important as STEM.

Retrieved from

<https://www.aacu.org/aacu-news/newsletter/mit-humanities-are-just-important-stem>

Vander Schee, B. A. (2011). Changing General Education Perceptions through Perspectives and the Interdisciplinary First-Year Seminar. *International Journal of Teaching and Learning in Higher Education*, 23(3).