Grant Proposal: Toshiba America Grant

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LIBS 674: Management and Leadership in Library and Information Studies
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April 13, 2022

C. Jolly Grant Proposal

Project Title: Whitman Middle School Makerspace: 3D Printer

Amount Requested: $2,565.73

Primary Topic or Subject: 3D Printing/STEM Support/Social-Emotional Learning

Number of Students Directly Involved in the Project: 911

Grade(s) of Involved Students: 7th and 8th Grade

Will this project be completed by the end of the year? Yes

Please summarize your project:

Project Summary

The Whitman Middle School Library is seeking new funding for materials to create an innovative new Makerspace. As we began the planning process, it was important to take multiple factors into consideration. After reaching out to peer librarians, it was shared that often the Makerspace materials are purchased and then never used. Often high-priced equipment collects dust after the novelty wears off or the consumable materials are used up and never replenished. While it would be easy to thumb through a Makerspace catalog and spend money, it would not be fiscally responsible nor would it truly benefit the mission and vision of the library. There is consideration that the Makerspace should be connected to furthering the student's learning experience with 73% of students in the general education. (Fairfax County Public Schools Profile, 2021). In order to do that, a survey was sent out to the Math department chair asking a short series of questions on what lessons are most difficult to teach or for students to grasp, as well as units of inquiry that would lend itself to further extension. Tying the Makerspace materials to instruction, will not only build collaboration between the library and the core teachers, but also provides information on what resources would be best utilized for our students. The materials can also be a way to scaffold lessons for the 19% of the population that receive

special education services. (Fairfax County Public Schools Profile, 2021) In addition to the responses on the Makerspace survey, we ponder other ideas for the space. The FCPS library mission statement clearly states, “students can find a space to concentrate or destress…” (2022). The entire 2021-2022 school year has been incredibly stressful for faculty and students alike. We would like to align the Makerspace with social-emotional learning. Tying the Makerspace activities to supporting kindness and empathy, relaxation and centering ourselves, could be extremely beneficial to our students.

The Toshiba Grant would offer funds for Whitman Middle School to purchase a 3-D printer that would allow students to create 3D visualizations of mathematical equations and help solidify their understanding of math concepts. 3D printers would spark engagement and interest of students and allow for extensions of learning. The survey results from the math department have asked for hands-on manipulatives and the 3D printer would allow students and teachers to create personalized materials that would further enhance their learning. Research shows, “3D printing requires higher levels of thinking, innovation and creativity. It has the power to develop human imagination and give students the opportunity to visualize numbers, two dimensional shapes, and three-dimensional objects.” (Huleihil, 2017).

The 3D printer would also be used to create stress relieving sensory objects such as fidgets and pop-its. These items could be created for personal use or used as incentives for students. Having the resources to address the stress and create opportunities for healthy outlets would be extremely beneficial to the social and emotional wellbeing of the Whitman students. Further research has shown that, “Makerspaces are fertile ground for students to develop innovative products infused with STEM principles and cross disciplinary content knowledge; build technology fluency; and support positive developmental growth. (Lahana, 2016). The

Toshiba Grant would provide Makerspaces tools and materials that would be too expensive or impractical for most students or teachers to have as individuals or in a classroom. (Weisgrau, 2015). Access to high-tech materials creates an atmosphere of pride in the school community that will resonate to staff, students and parents.

Learning Objectives and Assessment

- Students will use critical thinking to create new objects with a 3D printer.
- Students will create a three-dimensional representation of mathematical concepts.
- Students will create stress-relieving objects for personal community.

Students will be assessed through digital design journals prompted to write about their process but also to sketch their ideas and explore their creativity. The digital design journals will provide opportunities for students to collaborate on projects and receive feedback from multiple users. Teachers and other instructors can mentor students both in-person as well as through posting comments in their digital design journals. The journals will provide a timeline of growth in both the user's capability of the 3D printer technology as well as their growth mindset in what they try, accomplish or fail to accomplish and then try again in a new way. Assessment of the journal will be marked quarterly to insure participation and growth in ability. Summative assessments will be graded based on creation of the objects specified in the lesson plans. Rubrics will be created to insure students meet the desired competencies.

Project Management:

The Makerspace 3D printer will be in the care of the Whitman Library Staff. Makerbot offers an instructional course for teachers and students certified by the International Society for Technology in Education. (Makerbot, 2022). Completion of course will be required so that all

users are safe and competent using the 3D printer materials. To provide further access to students, the after-school program will offer a weekly Makerspace club. The Makerspace will be staffed with a trained professional who will maintain the care and use of the 3D printer.

Budget:

Data collected from the math department survey was used to assess the best use for Toshiba Grant Funds. The decision to allocate funding for a new 3D printer was determined by a cross-curricular collaboration and will serve the students and faculty of the Whitman community both academically and as well as support their well-being. After exploring multiple vendors, Makerbot offered the best value and support for a school use 3D printer. With the special pricing for two 3D printers, a printer can be dedicated to the 7th and 8th grade students and will insure access if one printer is in need of a repair, the other printer will still be operating. To save time and materials, the librarian and other instructors will combine multiple student projects into one large print file to maximize the limited amount of printers. Makerbot recommends starting out with a minimum of two spools per printer. Whitman will purchase two different types of filaments to give diversity of weight in the projects. Six spools come with the Makerbot SKETCH Classroom 3D printers and Whitman will purchase an additional nine spools of filament. These materials will allow the librarian to invest in the startup of the program and allot for nearly 4 spools per semester.

Toshiba America Grant Budget Template:

Toshiba America Foundation Grant Application itemized budget

Item	$	Notes
TWO MAKERBOT SKETCH™ DESKTOP 3D PRINTERS	$ 1,999.00	Includes: 2 printers, materials, MakerBot Certification for Teachers and Students, CloudPrint Software and 600+Certified Lessons
MAKERBOT SKETCH FILAMENT 5 PACK (5 PLA)	$260.00	Materials for Use
MAKERBOT SKETCH FILAMENT 4 PACK (4 TOUGH)	$245.00	Materials for Use
BUILD PLATE FOR MAKERBOT SKETCH (2 PACK)	$23.09	Materials for Use
MAKERBOT EDUCATOR'S GUIDE BOOK (2021)	$38.48	Materials for Use
SHIPPING	FREE	
TOTAL:	$2,565.73	

References:

Fairfax County Public Schools. (2022). *About FCPS school library programs.* Retrieved from: https://www.fcps.edu/node/28849

Fairfax County Public Schools School Profile. (2021). *Walt Whitman Middle School.* http://schoolprofiles.fcps.edu/schlprfl/f?p=108%3A50%3A%3A%3A%3A%3AP0_CURRENT_SCHOOL_ID%3A221

Huleihil, M. (2017). 3D printing technology as innovative tool for math and geometry teaching applications. *IOP Conference Series.Materials Science and Engineering, 164*(1)http://dx.doi.org/10.1088/1757-899X/164/1/012023

Lahana, L. (2016). The Tech Café, a Social Action Makerspace: Middle School Students as Change Agents. Retrieved from: https://www-proquest-com.proxy.lib.odu.edu/pagepdf/1794656046?accountid=12967#

Weisgrau, J. (September 24, 2015). *School libraries and makerspaces: can they coexist?* Edutopia. Retrieved from: https://www.edutopia.org/blog/school-libraries-makerspaces-coexist-josh-weisgrau

Makerbot. (2022) Maker SKETCH classroom. Retrieved from: https://store.makerbot.com/3d-printers/sketchs/sketch-classroom?_gl=1*1gr112u*_gcl_aw*R0NMLjE2NDk3ODM1NzIuQ2owS0NRand4dFNTQmhEWUFSSXNBRW4wdGhTSFJsaTJmTGpDWjhucFQ0N0Q1eHlramxidWtTS3F4RTVvMWYzREZHTXRET1oyY2Utc29od2FBdEVtRUFMd193Y0I.

Appendix: Toshiba Grant Proposal
Website: https://www.toshiba.com/taf/

Grants For Grades 6 - 12

- Do you teach in a middle and high school classroom?
- Do you have an innovative idea for improving STEM (Science, technology, engineering and math) learning in your classroom?
- Is your idea project based learning with measurable outcomes?
- What do you need to make learning STEM subjects fun for your students?

Sixth to 12th grade teachers are invited to apply on-line for a Toshiba America Foundation grant of up to $5,000 and more than $5,000 to help bring an innovative project into their own classroom.

With a Toshiba America Foundation grant, sixth to 12th grade teachers can bring their best new teaching ideas to life.

Typical Toshiba America Foundation Grant Schedule:

K-5 Less than $1K	10/1	11/15	12/15
6-12 less than $5K	3/1	4/15	5/15
	6/1	7/15	8/15
	9/1	10/15	11/15
	12/1	1/15	2/15
6-12 greater than $5K	5/1	7/1	8/15
	11/1	1/1	2/15

To begin the application process, please click here and you will be redirected to short questionnaire.

Please note the following:

- We only accept on-line applications through the designated links above.
- **Applications must be for project based learning. We do not consider requests for computers, laptops or tablets.**

Things TAF does not fund >>

What TAF wants to see in your applications >>

We are trying to consider the impact of the Corona virus on teachers and education. Once again, it is for the teachers to determine how to work in or without the live classroom. We cannot presume to suggest how teachers should deal with the obstacles that social distancing and safety concerns place in your way. Our practice has been to consider only one application at a time from any single teacher. Now, however, we will consider alternative proposals contingent upon how, when, and if schools are open as usual. Under the circumstances, we will also try to be more accommodating in considering the kinds of equipment or expenses we can fund.