BODYMODELS uses biomechanics to teach STEM

By Kristin VanWyngaarden

Elementary teachers desire to integrate technology and engineering content into their practices in a creative fashion. Designing these types of experiences and lesson plans can be difficult when utilizing only curriculum standards. This necessity for creative lesson planning in science, technology, engineering, and mathematics (STEM) content resulted in the National Science Foundation (NSF) funded program Biomechanics to Offer Diverse Young Minds Opportunities to Develop, Explore, and Learn, STEM (BODYMODELS), which was designed by the University of Nebraska at Omaha.

This program brings Biomechanics, the study of the body in motion, and elementary education together to investigate the integration of STEM teaching practices and implementation in the classroom. The BODYMODELS project is intended to raise awareness of, promote interest in, and enhance understanding of biomechanics in young children in grades 3-6.

BODYMODELS intends to accomplish this by training 3rd-6th grade teachers to effectively and confidently apply Science, Technology, Engineering, and Math (STEM) content while utilizing inquiry-based biomechanics lesson plans. These teachers will then develop and pilot biomechanics lessons that are hands-on, culturally sensitive, and enhanced by technology. These lesson plans will be interdisciplinary, using current STEM concepts, curriculum content, and teaching strategies.

BODYMODELS will then partner with community organizations in order to develop and facilitate lesson plan development while enhancing interest in STEM content among elementary students in grades 3-6. After these teachers have participated in the biomechanics workshop, their confidence in teaching STEM content and attitudes toward STEM content will be investigated in order to refine the BODYMODELS project.

Additionally, students’ confidence in learning STEM content and attitudes toward STEM content will be assessed in order to facilitate effective adoption of biomechanics curriculum in elementary schools at the national level.
I joined Noyce as an intern because at that point, although I was already majoring in mathematics, I wasn’t 100% sure that going into education was my best option. I thought participating in the STEM Camp, Eureka, would be an interesting experience to explore math further. Eureka was a great experience, and I made connections with professors that opened new opportunities like being a TA, going to conferences, and engaging the community in outreach events, all while getting many great experiences that many undergrads don’t get.

Before Noyce, I was a just math major and decided to go into education when I was provided the opportunity to TA in a class at Metropolitan Community College, where the majority of students were from minority populations and struggled with understanding mathematical content. Throughout that class, I really connected with these students and I enjoyed what I was doing. I also know that they benefited from having someone like me there with them. So after that I was, why not try it, and then I went in to Noyce as an intern and that continued to shape that decision.

After my internship year I decided to become a scholar because that would mean I could continue to participate in all these cool activities, as well as get a leadership role within Noyce. I joined, and I am starting my second semester as a scholar.

Joining Noyce has opened me up to endless opportunities. I feel I am better preparing myself for teaching in a high need area while obtaining experiences that will be worthwhile. I am able to participate in outreach events and training that we get through Noyce (like culturally responsive teaching [CRT] workshops, Eureka, and now BODYMODELS). I’m also making very beneficial connections with university faculty as well as teachers in the area that may be potential employers. I’ve also been given the opportunity to travel and represent the university at state and national conferences.

Mentorship has probably been the best part of the whole Noyce experience because my mentor, Dr. Neal Grandgenett, has always opened up doors for new things to try, like BODYMODELS. Dr. Grandgenett provides me opportunities rather than simply offering helpful advice, which has been a beneficial aspect of this program. I’ve been lucky to be paired with Dr. Grandgenett because I’m certainly getting a lot from him.

One of my favorite opportunities was a recent presentation I was able to take part in. The presentation was in Washington DC, and our presentation was different than all the other schools who also have Noyce Programs because our program is drastically different than everywhere else’s. Other places simply see it as a scholarship with maybe one or two projects or classes required, but in our program, being in Noyce means that one commits plenty of time to disseminating STEM education and activities to communities in need while also committing oneself to enhance his or her own expertise in teaching math. We are always out and about doing things through on campus and, more meaningfully, the community. Our poster shared some of the events we participated in throughout the year. Noyce has offered me such amazing opportunities, and I continue to feel gratitude for joining an exceptional program.
Eureka! STEM is a camp designed to increase girls’ interest in STEM-based content in order to increase diversity within STEM-based careers. University of Nebraska at Omaha and Girls Inc. have teamed up to introduce STEM-based content through breakout sessions while also teaching personal development to girls in the Omaha area. Themes of the camp range from learning basics about coding and robotics to extracting DNA. The camp is four weeks long and is comprised of two cohorts: the rookies (girls who have not yet participated in the camp) and the vets (girls who are in their second year of the program).

This program is unique in that inquiry-based experiences expose young females to the content. For example, when learning about force and robotics, the girls go on a field trip to Adventureland to experience it in action.

While science is an important facet of the program, the girls are also introduced to different fitness activities. The girls attend swimming lessons every other day, but also are exposed to activities such as wheelchair basketball, indoor rock climbing, and yoga (to name a few). This gives the girls a better understanding of how to keep not only their mind active, but also their body.

For more information regarding Eureka! STEM, please contact Dr. Sheryl McGlamery at smcglamery@unomaha.edu or by phone at 402.554.3525.

---

For information regarding STEM outreach activities and upcoming events, please contact Dr. Tracie Reding at treding@unomaha.edu or by phone at 402.554.3995.