

# Producing Children's Toys through 3-D Printing: A Multidisciplinary Approach

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*Name: Michael Walker*

*Project: "Social Design and 3-D Printing"*

*Program: Honors Summer Undergraduate Research Program – VCU Honors College*

*Mentor: Ramana Pidapart, Ph.D*

*Year: Sophomore*

*Major: Graphic Design*



*What was your motivation behind first applying to HSURP?*

One of the things that first attracted me to VCU was the opportunity for interdisciplinary discussions and interactions. I saw HSURP as a way to push my boundaries and interact with peers from different disciplines. When I saw the Social Design and 3-D Printing project, it just clicked. I saw the opportunity for engineering, for arts, for research, for graphic design. All of the things I was interested in learning about all came together.

*What specifically about your project allows all of those different disciplines to come together?*

The whole process of design starts off with an idea, just like a sculpture or a painting. You progress and you'll do the drawings, but they get much more technical. You'll work it out with more and more measurements. To me, it correlates with the artistic process in a way. But it's also about learning those sort of differences, such as learning how to incorporate the math, or how to think about things spatially in a way that an engineer would, yet differently from the a way a sculptor would and then still being able to circle back around and say from a graphic design standpoint: Is the design solid? Does it look good? Are people going to want to buy these things?

*What exactly is the goal of your project?*

It's kind of broad. The title is a little elusive, but my mentor and I decided to narrow it down and focus on the idea of toy design. The first two weeks, we just brainstormed and thought of different ideas. Now, I've actually developed the toy and done the drawings and made a cardboard model of it. Now that all of that is processed and done, we're working out the bugs and doing some more advanced calculations this week and we will 3-D print it by the end of July.

It's exciting! I should mention too, that another really cool part of the project is that I'm working with a student named Claire Benjamin, who is studying mechanical engineering at Vanderbilt. I was talking earlier about interdisciplinary research within the school, but there are whole different aspects involved with that for a completely different school, too. It was great: we met the other day talking about designs and she mentioned a change in the material that I was using that really pushed my design to the next level. And then, when we talked about something she was designing, I was able to say, "Oh! Well, have you heard about Alexander Calder and his mobiles and the shapes that he uses?" She was excited about that and started looking at him for inspiration.

*What is a typical day like for you?*

It's really up to me, which is what I love about it. A typical day? Well, it's hard to say, because there really isn't a typical day just because there are so many different steps. When I'm researching during the first part, I'm in the library looking through volumes, going through databases, a lot like the work from my HONR 200 rhetoric and research class this past semester. A lot of those skills have transferred over. And then, there's actually drawing, I might be sketching things in my sketchbook or doing more technical drawings on graph paper. And recently, it's been a lot of design work on the computer, so I have been going in with Illustrator or Photoshop and creating things along those lines.

*Do you feel that this research program has challenged you this summer?*

I think it has, because now I know that when I am placed in that sort of situation, when I am given free reign to do what I want with a project, I'll continue to push myself. It's not like in school, when a professor tells you to do something and you get a grade on it, and it influences your GPA. This is really just me. And if it's not a good project, it doesn't make a big difference to anybody else, it doesn't hurt my GPA, but it matters to me. Knowing that I am that kind of person is important because there's so much more that I want to take on, that I know I can take on, because I have the discipline to do it.

*How do you feel that your research this summer could benefit other people who are outside of the realm of the departments with which you work?*

The toy is designed to help teach multiplication, so I've done research on the need for the reinforcement of STEM at a young age. The toy can be used for children who are eight or nine or ten or twelve, but a simpler version could be introduced early on as well, so it doesn't include numbers and so that children are just playing around with it and having fun. Introducing these concepts earlier and earlier and making it enjoyable. I think that will have a great impact.

*Can you describe the dynamics of your mentor-mentee relationship?*

It's just creative brainstorming. You go in, you talk – it's comfortable! You say, "Okay, these are things that I have. These are the problems I'm having. What do you think about this? Does it seem like it's going to work? Will all of the pieces fit? What do you see? What problems do you have?" We were talking today about making the toy modular – what if these parts get left out and you can trade them in for these other types of parts? And I said, "Man! That's an excellent idea! That's perfect, because you just expanded the target audience by 100-fold."

*So you're learning a lot from having those back-and-forth conversations?*

Right. I'm learning a lot, and I would learn a lot from any group because that's what it takes to make things, to engineer, to innovate. I took the Da Vinci Center seminar class last semester, where you go in and talk about what innovation is. So I'm really doing what we were talking about there: coming up with a product, thinking about what the market will be like, the intellectual property rights, the branding, and the design. So it's all applicable. It all sort of folds back into each other.

*What are the benefits of research in general for any undergraduate student?*

What aren't the benefits? There's nothing to lose from it! You learn about working with others. We talked about interdisciplinary research and learning about a different, field. Learning how to communicate across fields is really important, along with learning about yourself.