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# Reflections from the Field: Creating an Elementary Living Learning Makerspace

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# Reflections from the Field: Creating an Elementary Living Learning Makerspace

**Abstract**
This article features the creation of a makerspace in the elementary education (ELED) living and learning community (LLC) residence hall. This space was created based on the growing body of literature demonstrating the rise of makerspaces across learning environments as well as the need to expose pre-service teachers (PSTs) to early field experiences that integrate digital technologies and new media across the elementary curriculum. We provide a roadmap for others who aim to create makerspaces in conjunction with teacher preparation programs and living learning communities. We also reflect on ways to improve our process, recommending further research into the effectiveness of makerspaces as field experiences for students preparing for 21st century careers.

**Keywords**
makerspaces, LLC makerspace, Elementary Education, Teacher Preparation Programs, Living Learning Communities, 21st Century Classrooms, First-Year Students, Pre-Service Teachers

## Background

As an assistant professor of Elementary Education, I work with students during their Freshmen year in various roles—including as the Living Learning Community (LLC) faculty advisor and as instructor for Elementary Education (ELED) introductory courses at Ball State University. Some of these first year students indicated a desire to engage with digital technologies and new media. My colleagues and I decided we needed to respond, particularly given widespread agreement in our field about the need for pre-service elementary teachers (PSTs) to be able to integrate digital technologies across the curriculum. We describe how we were catalyzed by student requests and, here, provide a roadmap of the journey we took to co-create a makerspace within our living learning community.

### Makerspaces Defined

The maker movement is often perceived as being grounded in the process of "making" and experiential play. Some credit the origin of makerspaces with the maker movement led by Dale Dougherty's *Make* magazine's *Maker Faires* (Dougherty, 2012; Halverson & Sheridan, 2014). According to Dougherty (n.d.), making is synonymous with tinkering. To make is "to explore and develop things [you] really care about" (Dougherty, 2012, p. 11). While Martin (2015) argues that there is "no set definition of making," he operationalizes it by drawing on Honey and Kanter's (2013) work: "to make is to build or adapt objects by hand, for the simple personal pleasure of figuring out how things work" (p. 31). Play, too, has many definitions. In this context, play means to personally engage in an iterative process of making. Many have theorized learning occurs at the intersection of making and playing—especially when the product is shared with others (Dewey, 1938; Papert & Harel, 1991). We anchor the making process in John Dewey's constructivist theory of experiential learning, a process that includes experience, experimentation, and authentic inquiry (Dewey, 1938; Dougherty, 2012; Westervelt, 2016). We hypothesized that access to makerspaces would influence how our PSTs would design their future learning environments and conceive pedagogical practices so as to emphasize the importance of making/playing in their future classrooms.

### Initial Response to Our Students—Mobile Makerspaces

To address student inquiry regarding digital media and technology integration in the classroom, we decided to create maker workshops within our LLC. Students collaborated with their LLC coordinator, peers, and me to create three workshops. More than 50 PSTs participated in the workshops. During these maker workshops,

students made a range of products, including digital products (eg., like animations and video games), and holiday gifts, using online platforms for ideas. They also engaged in social justice discussions, exploring stereotypes during the process of making paper dolls. At first, the maker workshops were provided for first-year PSTs; then the project expanded so the first-year PSTs were facilitating after-school maker workshops for 30 children in grades K-5. The PSTs and children made video games, board games, and stop motion animations together in an after-school Science, Technology, Engineering, Arts, and Math (STEAM) program.

To plan for the workshops, we utilized various spaces, for instance, my office, library classroom, and elementary classrooms. For each meeting, we brought our technology (e.g., e-tablets) and materials (e.g., books, art supplies, and kits), essentially creating a mobile makerspace. A mobile makerspace is defined differently across literature (Craddock, 2015). Our mobile makerspace was intended to be transported to different venues using carts, bags, and boxes for the purposes of making products with various materials such as clay, blocks, markers, Legos, paper products, e-tablets, cameras, etc. We planned two to three hours once a week prior to implementing the workshops at a local school. The mobility of the space seemed to meet the needs for both first-year students and our partner elementary school. Yet we also encountered challenges in sustaining the mobile makerspace, including the difficulty of transporting materials and technology, securing technologies for planning and the workshops, and securing rooms to meet. After sharing my reflections with faculty and the LLC Residential Halls Director, we decided to design and pilot a physical makerspace for PSTs as part of the ELED-LLC residential program. In the sections that follow, I provide a brief review of the literature, describe the experience of creating the makerspace, and then share reflections and recommendations for others interested in integrating makerspaces into their LCs or LLCs.

## 21st Century Pedagogical Tools and Makerspaces

Pre-service Student Teachers (PSTs) engage in several hundred hours in the field to practice and prepare for the classroom (Greenberg, Pomerance, & Walsh, 2011). Recommendations to improve field experiences include the integration of clinical practice across all facets of teacher preparation programs (National Council for Accreditation of Teacher Education, 2010). Building on this, some argue that 21st century teaching practices must incorporate the use of various technologies as effective pedagogical tools, known as Technology, Pedagogy and Content Knowledge or TPACK (B. Martin, 2015). Additionally, scholars argue this practice can be experienced via making, playing, and learning in makerspaces (Teague, 2016).

Consequently, schools of education are implementing makerspaces to supplement their teacher preparation courses to emphasize creative and interactive

learning experiences (Keune & Whiting, 2015; Webster University, 2016). In addition, makerspaces are on the rise across different types of settings, including higher education and residential halls (Halverson & Sheridan, 2014; Komanski & Black, 2016; Peppler & Bender, 2013). Fleming (2016) suggests makerspaces are becoming more widespread because of the flexibility makerspaces offer, especially when available across fields of study. The ethos of makerspaces is picking up momentum across the nation, as seen in schools (Blake & Yokana, 2015; Craddock, 2015; Rendina, 2015; Scinto, 2014), libraries (Barack, 2015), and university campuses (Barrett et al., 2015; Keune & Whiting, 2015), which suggests an evolution in learning environments across all age levels and fields of study.

Makerspaces are an ideal site for early immersive field experiences, as opposed to traditional field experiences (eg., elementary classrooms), because they do not require high stake results, for instance, children passing a standardized test. This is important for three reasons. First, makerspaces can provide time to explore content related to science, technology, engineering, arts, and mathematics (Barniskis, 2014). Second, PSTs benefit from learning in an informal environment that cultivates troubleshooting, creativity, and innovation through experimenting and creating—especially during an ever-shifting technological era (Komanski & Black, 2016). Finally, makerspaces offer PSTs a site to improve their own competencies in areas where they may need practice, such as digital literacy.

## Makerspaces in Higher Education: Digital Literacy, Community, and Field Experiences

The preparation of PSTs must include early immersive field experiences and the implementation of 21st century skills (Coffey, 2010), including digital literacies across the elementary curricula (Hague & Payton, 2010). Hague and Payton frame digital literacy with eight components as shown in Figure 1. They argue that embedding digital literacy across the curriculum is one method for executing the curriculum in a multifaceted and dynamic manner. Many scholars argue PSTs need to experience how to implement similar components early in their teacher preparation (Greenhill, 2010; Coffey, 2010; Pilgrim, 2015). Alternative spaces to practice, such as makerspaces, may provide an environment for early 21st century field experiences.


Figure 1. Components of Digital Literacy. The eight components include creativity, critical thinking and evaluation, cultural and social understanding, collaboration, find and select information, effective communication, e-safety, and functional skills (Hague & Payton, 2010, p. 19).

Arguably, an LLC makerspace can serve as a place where first-year students meaningfully engage with peers. Through interactions in a makerspace, first-year students may engage in important iterative maker activities while also forming a community that welcomes ideas and expertise across diverse areas of interest (Dougherty, n.d). Similarly, Richardson and Stroud (2014) found LLC residential peers benefited from their living arrangements due to relationships formed and the community activities. With the success of LLCs as sites where students also form community (Richardson & Stroud, 2014), situating a makerspace in an LLC residential hall may connect both the LLC and teacher preparation experience in an innovative way.

LLC makerspaces provide diverse, hands-on learning and creative field experiences (Komanski & Black, 2016). Such field experiences can be beneficial to training across various careers. Teacher preparation programs include schools, libraries, and after-school programs as sites for field experiences, all of which are starting to incorporate makerspaces. Providing first-year students an LLC makerspace environment may provide extra time and opportunity to practice and familiarize students with new technologies, media, and effective pedagogical practices like digital literacy) (Friederichs, 2016; Komanski & Black, 2016). As we recognized the need through a review of the literature, our students' requests, and our own initial foray into mobile makerspaces, our question became this: how might

we create an accessible LLC makerspace that exposes first-year students to digital technologies and new media that relates to their field of study?

## Creating a Living Learning Community Makerspace

I met with several administrators to discuss the pilot LLC makerspace. I learned other LLCs had workspaces similar to makerspaces in their residential halls. For example, the emerging media LLC residential hall offers students filming studios, computer labs, a full-service kitchen, and digital technologies/materials to check out when needed. The nursing LLC residential hall provides library materials, a laboratory, and space to meet to collaborate. Many of the other LLC residential halls included similar spaces; however, the ELED-LLC residential hall was limited with only a multipurpose room for events and activities. This limitation strengthened my argument: PSTs need to have access to similarly enriched living environments. After all, teachers introduce and prepare students for a broad spectrum of career choices.

The campus-wide collaboration that ensued to create the ELED-LLC makerspace included many stakeholders, including faculty from the ELED department and university administrators (See Figure 2). Partial funding was awarded via a university grant. Additionally, the ELED-LLC contributed funding in alignment with the ongoing mission to engage students in meaningful experiences and collaborative activities during their first year. Further discussions about future funding to sustain the makerspace are underway. The sustained collaboration from all levels of administration, faculty members across various departments, and LLC students was essential to create this makerspace.

| | |
|---|---|
| University | Office of the Provost |
| | Student Affairs |
| | Residential Halls Director |
| | Library Education Resources Director |
| | Digital Corps Director |
| College | Teacher's College Dean |
| | Teacher's College Assistant Dean |
| | Elementary Education Department Chair |
| Department | ELED Faculty |
| | LLC Faculty Advisors |
| | ELED Students |

Figure 2. Makerspace Stakeholders. The chart illustrates the university, college, and departmental leaders involved in the design and implementation process for the LLC makerspace.

The LLC makerspace floorplan includes five elements: studio; LLC faculty office; education resources and inventory room; conference rooms; and community space (See Figure 3). The studio provides a SMART board, an Apple desktop computer, cutting boards, a sewing machine, and die-cut machines. It also has consumable materials (e.g., paper and arts supplies) and items such as Legos, blocks, electric textiles, and dry-erase walls. See Appendix A for an extended list of materials. The education resources and inventory room stores items from the university library and technology (e-tablets and cameras). These items are in lockers and accessible with student IDs as a method to track checked out items. Outside of organized events or activities, the space and materials are accessible 24 hours a day, seven days a week.

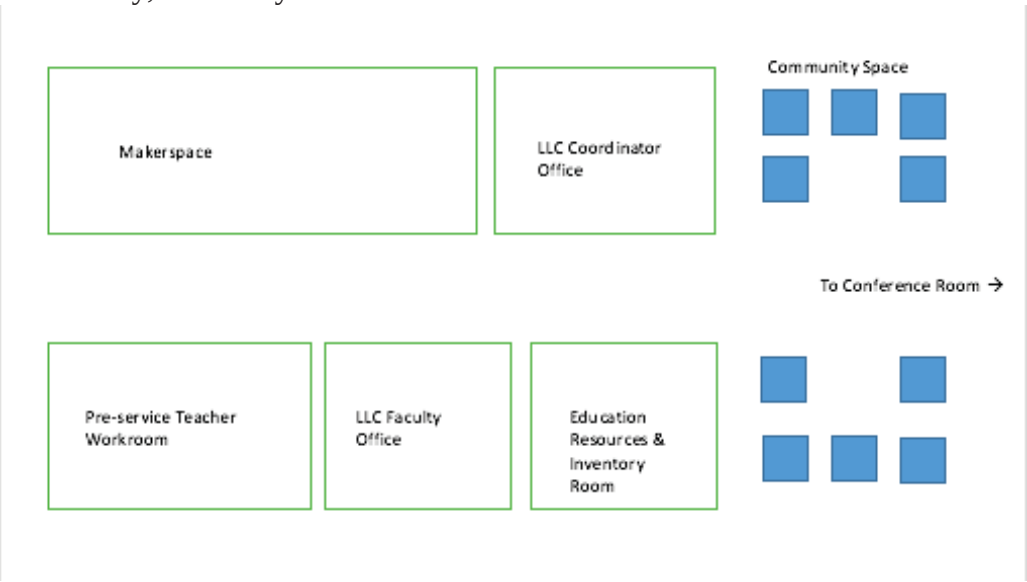


Figure 3. LLC Makerspace Layout. The makerspace is surrounded by additional spaces to promote community and collaboration with LLC faculty, LLC coordinator, and peers. The makerspace is near the LLC coordinator and LLC faculty offices as well as a community space where more chairs and tables are located to meet with peers and other community members.

## Successful Implementation and Effective Practices

The LLC makerspace shows much promise. The LLC students who were most active came from an introductory ELED course. These 60 students were required to participate in 50 hours of service learning, and they were presented the opportunity to volunteer in the makerspace. Nineteen students volunteered consistently over the course of the semester. Of the 19 students, eight students returned the next semester to mentor new ELED-LLC students and to continue volunteering in the LLC makerspace. This return volunteerism seems to indicate

interest, engagement, and promise for the future. One student commented that the makerspace was fundamental to practicing collaboration. Others shared that the makerspace gave them a chance to learn new practices and tools, such as using the SMART board, while others stated they enjoy hanging out in the makerspace with their friends. Many students suggested volunteer office hours as a strategy to help others explore new technologies together.

Of all the successes, one notable realization is the repeated appreciation for the makerspace. The volunteers shared they appreciate the community aspect of the makerspace. One student noted the LLC makerspace introduced her to friends who will also be her life-long colleagues because they are all entering the teaching profession. Another left a note on the dry-erase wall, "Thanks for these amazing opportunities" (See Figure 4). The appreciation and willingness to help without the work being tied to course credit is a strong indication this LLC makerspace and its activities are a welcome extension to first-year student experiences.


Figure 4. Sample Informal Use of Makerspace. Messages from students are often left on the dry-erase walls in the makerspace.

## Reflections

The experience of creating this makerspace leads me to reflect on a couple of effective practices that may transfer to LLC makerspaces on other campuses.

*Regular Meetings with Students*

Students and faculty regularly met and employed effective communication practices. For example, I scheduled my office hours during hours I knew students were available, in this case, once a week in the evenings at the makerspace. The volunteers and I also met as a committee once a month with LLC staff and the residential hall director to share feedback and bring new ideas to develop. These

meetings were documented via a newsletter, which was sent to all stakeholders. Finally, our partners (i.e., the university library, elementary education, and emerging media program) hosted fireside chats once a month for all LLC students. Modeling effective communication and interactive meetings with students is essential to the continued successful management of this space and its activities; it is also important for addressing challenges. Finally, these practices can be applied in their career field, too.

*Acknowledge Challenges and Limitations*

Even though creating this makerspace suggests many opportunities and successes, there were challenges and limitations. First, determining a budget and the source for funding was somewhat difficult. The initial start-up costs were just under $15,000. The makerspace budget is shown in Appendix B. With the rise of makerspaces across various public locations such as high schools and libraries, a recent trend is just emerging for elementary schools to implement them. Thus, obtaining approval took some extra attention and several meetings to discuss the practicability of a makerspace geared towards ELED majors. Another limitation was related to access. Some students were not living in the residential hall, which limits access to a specific timeframe based on security policies. Finally, financially sustaining the makerspace is currently under review, especially considering the two challenges of practicability and permanency. Acknowledging these challenges and limitations with students will help prepare them for their profession. For example, one student mentioned the experience volunteering with the LLC makerspace can inspire her to create a makerspace in her future school someday.

## Recommendations

LLC makerspaces can help students professionally develop and prepare for their careers. Through making and playing, LLC students can build community, explore areas of interest, gain experience, and comfortably experiment with ideas. Future research is needed to better understand the efficacy of the makerspace pedagogy. For example, how might the early experience with a makerspace develop effective practices for first-year students as related to their fields of study? Studying multiple makerspaces across universities, community organizations, and K-12 schools, may inform the larger discussion regarding the development of first-year students across various 21st century fields.

## References

Barack, L. (2015). Where the magic happens: Library maker programs. *SchoolLibrary Journal Online*. Retrieved from http://www.slj.com/2015/05/programs/where-the-magic-happens-the-maker-issue/

Barniskis, S. C. (2014). STEAM: Science and art meet in rural librarymakerspaces. In *iConference 2014 Proce*edings (p. 834 - 837). doi:10.9776/14158

Barrett, T., Pizzico, M., Levy, B., Nagel, R., Linsey, J., Talley, K., Forest, C., & Newstetter, W. (2015). A review of university makerspaces. In 122nd Annual Conference & Exposition of the American Society for Engineering Education, Seattle, WA. Retrieved from https://smartech.gatech.edu/handle/1853/53813

Blake, A., & Yokana, L. (2015). School makerspaces: Building the buzz. *Edutopia*. Retrieved from http://www.edutopia.org/blog/school-makerspaces-building-the-buzz-lisa-yokana

Coffey, H. (2010). "They taught me": The benefits of early community-based field experiences in teacher education. *Teaching and Teacher Education, 26*(2), 335-342.

Craddock, I. (2015). Makers on the move: A mobile makerspace at a comprehensive public high school. *Library Hi Tech*, *33*(4), pp.497 – 504.

Dewey, J. (1938). *Experience and education*. New York, NY: Kappa Delta Pi.

Dougherty, D. (n.d.). The maker mindset. Retrieved from https://llk.media.mit.edu/courses/readings/maker-mindset.pdf

Dougherty, D. (2012). The maker movement. *Innovations, 7*(3), 11-14.

Fleming, L. (2016). A maker culture: Flexible makerspaces teach students to take risks, inspiring a deeper form of learning. *Principal*, 16–19.

Friederichs, E. (2016). Makerspaces expanding across campus, starting in the fall. *Daily Tarheel.* Retrieved from http://www.dailytarheel.com/article/2016/04/makerspaces-expanding-across-campus-starting-in-the-fall

Greenberg, J., Pomerance, L., & Walsh, K. (2011). *Student teaching United States NCTQ report*. National Council on Teacher Quality. Retrieved from http://www.nctq.org/dmsView/Student_Teaching_United_States_NCTQ_Report

Greenhill, V. (2010). *21st century knowledge and skills in educator preparation*. American Association of Colleges of Teacher Education and the Partnership for 21st Century Skills. Retrieved from http://www.p21.org/storage/documents/aacte_p21_whitepaper2010.pdf

Hague, C., & Payton, S. (2010). Digital literacy across the curriculum. *FutureLab.* Retrieved from http://www.nfer.ac.uk/publications/FUTL06/FUTL06.pdf

Halverson, E., & Sheridan, K. (2014). *The maker movement in education.* Harvard Educational Review. Retrieved from https://www.researchgate.net/profile/Erica_Halverson/publication/277928106_The_Maker_Movement_in_Education/links/5689dc6b08ae051f9af7899d.pdf

Honey, M., & Kanter, D. E. (2013). Design, make, play: Growing the next generation of science innovators. In Honey, M., & Kanter, D. E. (Eds.),

*Design. Make. Play. Growing the next generation of STEM innovators* (pp. 1–6). New York, NY: Routledge.

Keune, A., & Whiting, J. (2015). *The MILL: A makerspace for pre-service teachers at Indiana University*. Creativity Labs. Retrieved from http://creativitylabs.blogspot.com/2015/04/the-mill-makerspace-for-pre-service.html

Komanski, C., & Black, H. (2016). A building community: Halls give students a space to show off their creative side. *Talking Stick: The Authoritative Source for Campus Housing*, *33*(5), pp. 24-26, 69.

Martin, B. (2015). Successful implementation of TPACK in teacher preparation programs. Retrieved from http://airccse.org/journal/ijite/papers/4115ijite02.pdf

Martin, L. (2015). The promise of the Maker Movement for education. *Journal of Pre-College Engineering Education Research (J-PEER)*, *5*(1), 4.

National Council for Accreditation of Teacher Education. (2010). *Transforming teacher education through clinical practice: A national strategy to prepare effective teachers*. 1-30. Retrieved from http://www.ncate.org/LinkClick.aspx?fileticket=zzeiB1OoqPk%3D&tabid=7

Papert, S., & Harel, I. (1991). Situating constructionism. *Constructionism, 36*, 1-11.

Peppler, K., & Bender, S. (2013). Maker movement spreads innovation one project at a time. *Kappanmagazine.org*, *95*(3), 22–27. Retrieved from http://www.kyliepeppler.com/Docs/2013_Peppler_Maker_Movement.pdf

Pilgrim, J. (2015). Web literacy and technology integration: Moving beyond TPACK with student-centered instruction. *Journal of Literacy and Technology, 16*(2). Retrieved from http://www.literacyandtechnology.org/uploads/1/3/6/8/136889/jlt_v16_2_pilgrim_martinez.pdf

Rendina, D. (2015). *Defining makerspaces: What the research says*. Renovated Learning. Retrieved from http://renovatedlearning.com/2015/04/02/defining-makerspaces-part-1/

Richardson, T., & Stroud, J. (2014). The Experiences of some early and elementary education living-learning community participants. *American Journal of Educational Research*, *2*(10), pp. 856-861. doi: 10.12691/education-2-10-3

Scinto, R. (2014). *Makerspaces coming to all Farmington elementary schools*. Farmington Patch. Retrieved from http://patch.com/connecticut/farmington/maker-spaces-coming-all-farmington-elementary-schools-0

Teague, H. (2016). The MakeCamp pilot option for professional development: Sociocultural sustainable innovation. In *Proceedings of Society for Information Technology & Teacher Education International Conference 2016* (pp. 2375-2380). Chesapeake, VA: Association for the Advancement of

Computing in Education (AACE). Retrieved from https://www.learntechlib.org/p/172026.

Webster University. (2016). *SOE explores makerspaces*. Webster University Blog. Retrieved from http://blogs.webster.edu/education/2016/03/21/soe-explores-makerspaces/

Westervelt, E. (2016). On the lesson plan: Make stuff. fail. learn while you're at it. *nprED: How Learning Happens.* http://www.npr.org/sections/ed/2016/11/14/499611747/on-the-lesson-plan-make-stuff-fail-learn-while-youre-at-it

## Appendix A

### Sample List of Materials and Resources

| Name | Description | Location |
|---|---|---|
| Activities linking science with math, K-4 Eichinger, John | Activity | University Library |
| Art activity cards | Activity | University Library |
| Gears! Gears! Gears! [toy]: 150-piece super building set Learning Resources (Firm) | Activity | University Library |
| Hands-on learning: more than 1000 activities for young children using everyday objects Kaltman, Gwen Snyder | Activity | University Library |
| STEM, simple machines activity set [kit] | Activity | University Library |
| Stop Motion Animation Application | Animation making application | iTunes Application Store: Free |
| Loose Parts: Inspiring Play in Young Children Book by Lisa Daly and Miriam Beloglovsky | Book | University Library |
| STEM, robot mouse coding activity set [kit] | Coding | University Library |
| Flipagram Application | Documentation application | iTunes Application Store: Free |
| Puppet Edu Application | Documentation application | iTunes Application Store: Free |

| | | |
|---|---|---|
| Drawing Desk Application | Drawing application | iTunes Application Store: Free |
| Sketches II Application | Drawing application | iTunes Application Store: Free |
| 8 stacking cups [toy] tazas apilables Babies "R" Us (Firm) | Games and Activities | University Library |
| Dice activities for mathematical thinking: fluency, understanding, engagement Saltus, Mary | Games and Activities | University Library |
| Spot it! [game] numbers & shapes Blue Orange Games Co | Games and Activity | University Library |
| [Farm and wild animal puppet set] [toy] School Smart (Firm) | Interactive Stories | University Library |
| [Horton the elephant] [toy] Seuss, Dr. Horton hears a Who? | Interactive Stories | University Library |
| Early story starters in a jar [realia] 101 jumpstarts for writing & discussion Free Spirit Publishing | Interactive Stories | University Library |
| DIY.org Application | Making application | iTunes Application Store: Free |
| Baby Bear sorting set [realia] Learning Resources (Firm) | Manipulatives | University Library |
| Geoboard [realia] 11 x 11 pin | Manipulatives | University Library |
| Pattern blocks [realia] | Manipulatives | University Library |
| 10x10 inch Carpet Squares (20) | Materials | Recycle Center: Free |
| 1x1 Glass Tiles (100s) | Materials | Recycle Center: Free |
| 2x2 / 3x3 Corian Tiles (100s) | Materials | Recycle Center: Free |
| Multiple sizes of Fabric swatches (100s) | Materials | Recycle Center: Free |

| | | |
|---|---|---|
| Honey bee life cycle [realia] Carolina Biological Supply Company | Models | University Library |
| iMovie Application | Movie making application | iTunes Application Store: Free |
| Video Star Application | Music video making application | iTunes Application Store: Free |
| Pixel Press | Video game making application | iTunes Application Store: Free |

## Appendix B

### Initial Start-up Costs for Makerspace

| Name | Quantity | Cost per unit | Total Cost |
|---|---|---|---|
| 3D Printer | 1 | $400 | $400 |
| AVerVision U15 Document Camera | 1 | $195 | $195 |
| Bloxels Classroom Kit | 10 | $300 | $300 |
| Circuit Stickers Advance Kit | 10 | $24 | $240 |
| Classroom Marker Set | 1 | $58 | $58 |
| Coin Cell Battery | 10 | $4.15 | $41.50 |
| Cricut E-Cutting Machine | 1 | $339 | $339 |
| Glue | 10 | $2.30 | $23 |
| GoPro Hero Camera | 2 | $579.99 | $1159.98 |
| Green Trifold Posterboard set | 1 set of 5 | $60 | $60 |
| iPad cases/stands | 20 | $10 | $100 |
| iPad Microphones | 6 | $19 | $113.94 |
| iPad mobile charging station | 1 | $925 | $925 |
| iPad Projector (mobile) | 1 | $73 | $73 |
| LED Assortment | 5 | $12.57 | $62.85 |
| Lego Kits | 10 | $30 | $300 |
| Lego WeDo Software v1.2 and Activity pack | 1 | $89.95 | $89.95 |
| Little Bits Super Bundle | 2 | $299 | $598 |
| Makey Makey Starter Kits | 20 | $40 | $800 |
| microphone for recording for flipped classrooms | 4 | $45 | $180 |
| Mini iPads | 20 | $399 | $7980 |
| Modeling Clay | 10 | $12.00 | $120 |

| | | | |
|---|---|---|---|
| Osmo Genius Kit for iPads | 2 | $99 | $198 |
| Paper | 3 reams | $7 | $21 |
| Paper Cutter | 1 | $58.96 | $58.96 |
| Pencils | 144 | $10.39 | $10.39 |
| Rolls of conductive tape with conductive adhesive | 6 | $19 | $112 |
| Roundball chairs | 5 | $20 | $100 |
| Samson Meteor Mic USB Studio Microphone | 1 | $69.95 | $69.95 |
| Sewing Machine | 1 | $215.46 | $215.46 |
| Squishy Circuits Starter Kit | 2 | $25 | $50 |
| Total | | | $14,995 |