THE MAKERSPACE REVOLUTION
STEM Learning, Engineering, and Building a Makerspace

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PowerPoint at: blogs.uakron.edu/waynec3
• What is a Makerspace?
• Funding
• Room Design
• Operations and Staffing
• Communication

• Curriculum Integration
• Community Outreach
• Feedback
• Q & A
WHAT IS A MAKERSPACE?
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DEFINITION

• DIY spaces where people gather to create, invent, and learn
• Contain 3D printers, laser engravers, CNC routers, electronics, software, craft, supplies, and tools
• Suitable for many disciplines, but especially engineering, computer technology, science, and art
• Patrons meet, socialize, and collaborate
FUNDING

GRANT SOURCES

• Local foundations & trusts, utility companies, large & small companies/agencies
• National competitive grants
  • American Honda Foundation, National Science Foundation, NEA Foundation, U.S. Dept. of Defense
• Non-published grants
  • Bill & Melinda Gates Foundation
• Work with internal offices & departments
• Contact local businesses for consumables
  • Plastic filament, wood, acrylic, supplies
• Start an endowment
• Use a mailing list
  • Word gets around!
• Acknowledge gifts with dedication plaques
• Invite donors back to realize progress
ROOM DESIGN

PLANNING

• Makerspace Playbook (http://goo.gl/to3BGd)
• Visit area makerspaces
• Dedicated room or library

ATMOSPHERE

• “Techie” look
• Hang-out area for homework, socializing, projects
• Meeting place for clubs
ROOM DESIGN

CONTENTS

• Computers for workshops/lessons/classes
• Webcams to broadcast activity
• Display cases & windows (glass door, too)
• Empty tables for projects
• Whiteboards
• “Idea Box” for unfinished or donated objects
OPERATIONS & STAFFING
OPERATIONS
• Maintenance schedules
• Service plans
• Policies and procedures
  • Who can use the space and for which activities?
  • What can cause revocation?
• Equipment use queues
OPERATIONS & STAFFING

STAFF
- Staff for all hours of operation
- Likes challenges / learning new things
- Knows CAD design, teach lessons, tutor
- Equipment use/maintenance
- Student staff relatable to other students

DIRECTOR
- Community contact, grants, purchasing, staffing, documentation, project management
SAFETY

• “Hold harmless” waiver
• Label/summarize all equipment
• Usage guides, tutorial videos, warning posters
• Written and demonstrative tests
• Ability badges
• Posted MSDS for harmful chemicals
• Safety plans
COMMUNICATION
COMMUNICATION

WEEKLY BLOG
blogs.uakron.edu/waynec3
• Build mailing list for everyone expressing interest
• Continually take pictures; write about them

WEBSITE
engineering.case.edu/thinkbox
• List makerspace mission, equipment, tutorials, donor recognition, community involvement, marketing materials, projects

INVOLVE LOCAL NEWSPAPERS
• Include reporters in mailing list blog
MARKETING DEPARTMENT

• Gets the word out through campus publications (electronic & printed), e-mail blasts, etc.
• Promotional posters
• “On the road” presentations
  • Portable 3D printer
  • Tablecloth with logo
  • Stand-up banner
  • Custom-made handouts (3D printed, engraved, include logo)
CURRICULUM INTEGRATION
INTENDED CURRICULM (ENGINEERING)

• Model rockets (Statics and Dynamics), Robotics & Structural Studies (Tools for Engineering)

CROSS-CURRICULAR

• Multiple disciplines and pedagogies
  • Contact department heads and individual teachers
  • Integrate into subject content
• Students helping students
  • Engineering students helping business majors
CURRICULUM INTEGRATION

CROSS-INSTITUTION

• Shared projects with other schools
  • Model rocket high schools with college engineers
  • 3D printed parts for Rube Goldberg machines

INTERNSHIPS

• Invite companies to makerspace, offer lessons/services to employees
• Creates business relationships with students
COMMUNITY OUTREACH
COMMUNITY OUTREACH

OPEN ACCESS

• Students, staff, community use at no/low cost
• Educational/personal/business projects

FREE SERVICES

• Fix things around college, personal requests, ADA requests, business/community requests
• Lab staff and students gain experience
COMMUNITY OUTREACH

SHOW ON THE ROAD

• Portable printer for offsite demonstrations
  • Schools, Kiwanis, Lion’s Club, business/trade mixers, Chamber of Commerce meetings

FREE LESSONS

• Cerco and Northwestern CAD training
• Community kids CAD & 3D lessons, summer camp
• Invite 4-H, Boys/Girls clubs, YMCA, libraries
• Host a Maker Faire
FEEDBACK
FEEDBACK

TRACKING
  • Patron sign-in
    • Number of weekly/monthly visitors helps funding

PATRON SURVEY
  • Feedback marker boards on walls
    • What was the most/least fun or most frustrating?
    • What would you change/add to the makerspace?

COMMUNITY FEEDBACK
  • Cold-call business & schools to discover needs
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