Collaboration in Makerspaces

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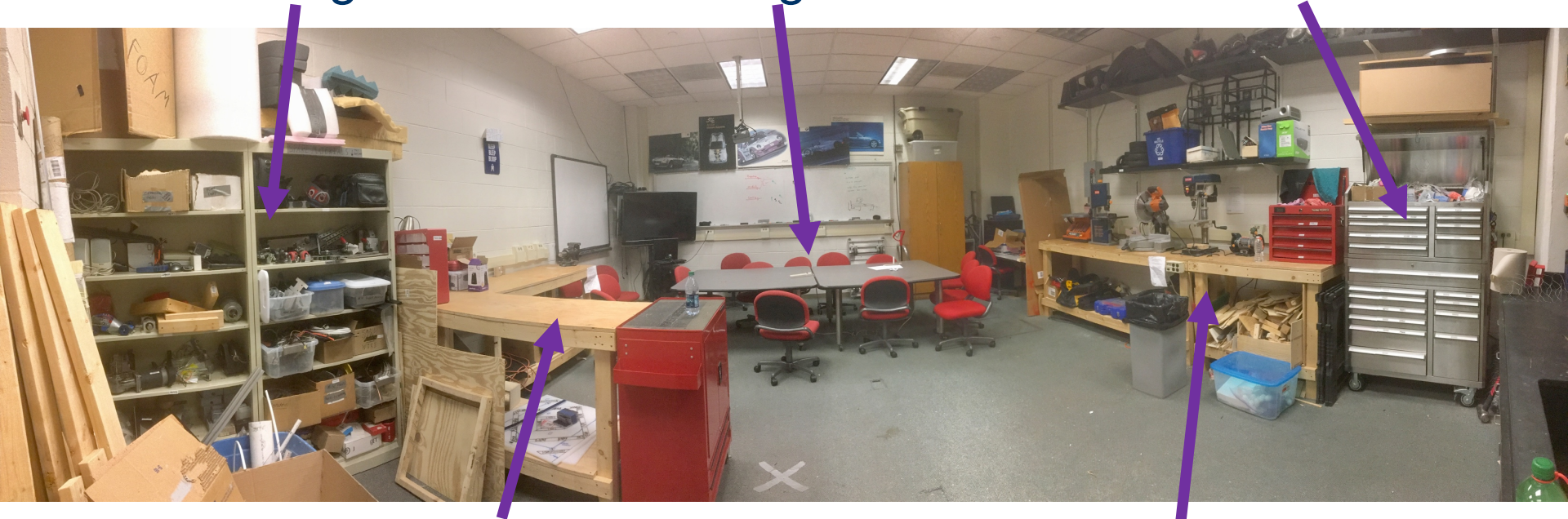
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- A <u>makerspace</u> is a physical location that serves as a meeting space and houses the community's design and manufacturing equipment [1].

- On-campus examples include:

  - EIB 135

  - Watt Center 112, 3D printers

  - Cook Lab machine shop

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Storage

Meeting table

Toolbox

Working table

Machining tools

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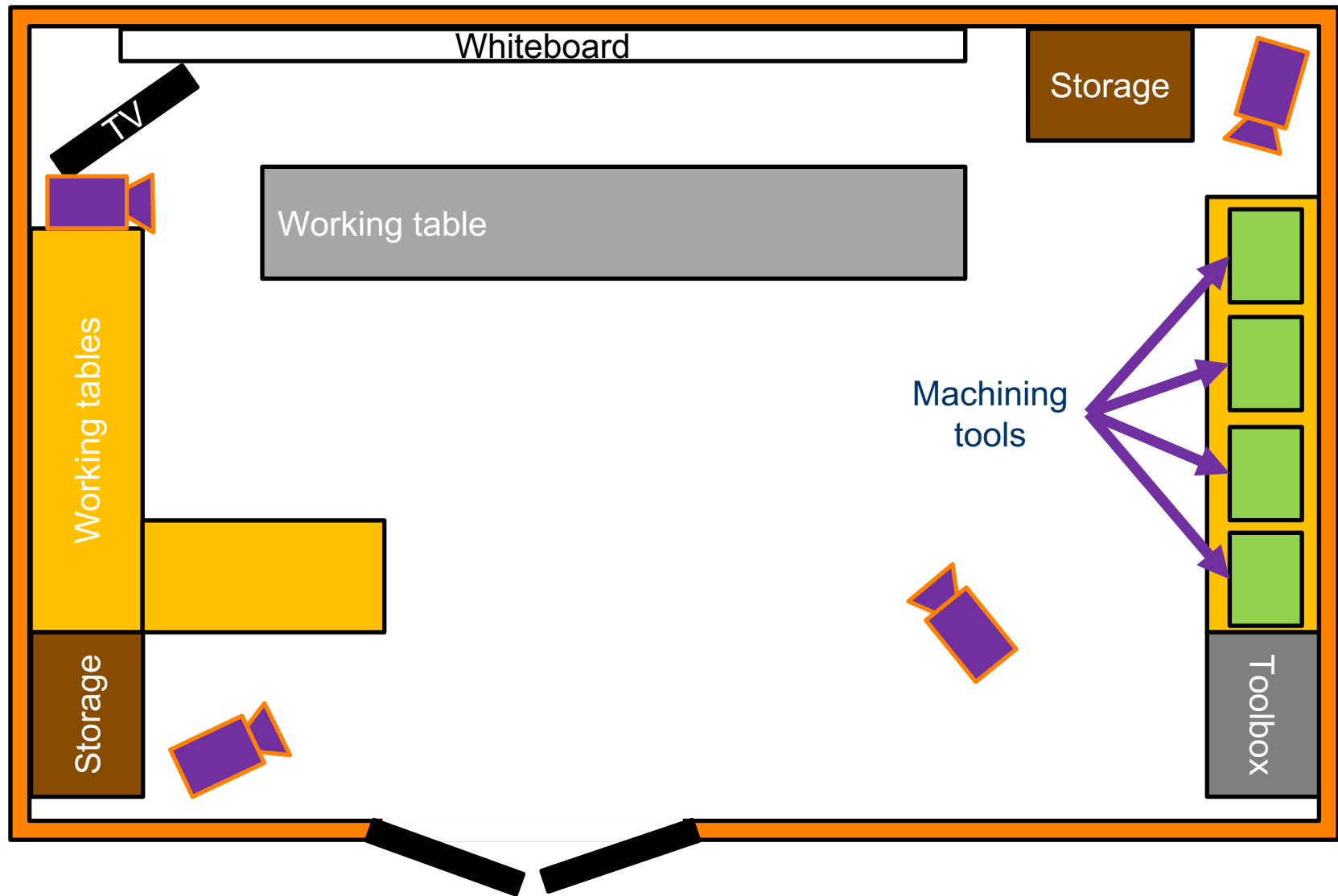
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- Facility has support staff [1]

- Align access to facility with student schedules [1]

- Open environment to promote collaboration [1-4]

  – Promotes awareness of activities, projects, interests [1]

  – Dialogue and idea exchange in a public venue between diverse teams [1,3]

  – Promotes resource sharing [5,6]

- "…a technology and space for engaging curiosity, creativity, and collaboration." [7]

- Maker movement described as "…a cultural norm of sharing designs and collaborating." [8]

Does not answer in what way collaboration occurs.

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Collaboration in Makerspaces

- RQ1: How does a team of users collaborate in a makerspace?

- RQ2: When does a team of users collaborate in a makerspace?

- RQ3: Why does a team of users collaborate in a makerspace?

- Cameras to record student teams use EIB 135
  - Observe "how," "when," and provide insight into "why"

- Integrated camera-monitor network called MakerView [9]

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Collaboration in Makerspaces – EIB 135

Conclusion

- How, when, and why collaboration occurs in makerspaces not well defined

- Case study to observe and answer research questions

Future Work

- Specify and install cameras

- Begin having design teams use the makerspace more often
  - Creative Inquiry
  - ME4010

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Questions?

1. Wilczynski, Vincent; "Academic Maker Spaces and Engineering Design", *ASEE Annual Conference & Exposition*, Paper ID#13724, Seattle, WA.

2. Executive office of the President, "Building a Nation of Makers: Universities and College Pledge to Expand Opportunities to Make", The White House, June 2014.

3. Forest, Craig R., et al., "The Invention Studio: A University Maker Space and Culture", *American Society for Engineering Education*, Advances in Engineering Education, Summer 2014.

4. Fourie, I., Meyer, A., "What to make of makerspaces: Tools and DIY only or is there an interconnected information resources space?", *Library Hi Tech*, Vol. 33 Iss: 4, 2015.

5. Sheridan, Kimberly M., et al., "Learning in the Making: A Comparative Case Study of Three Makerspaces", *Harvard Educational Review*, Vol. 84 No. 4, Winter 2014.

6. Crumpton, Michael A., "Fines, fees and funding: makerspaces standing apart", *The Bottom Line: Managing library finances*, Vol. 28, No. 3, 2015

7. Moorefield-Lang, Heather, "Makers in the library: case studies of 3D printers and maker spaces in library settings", *Library Hi Tech*, Vol 32, No. 4, 2014.

8. Halverson, Erica R., Sheridan, Kimberly M., "The Maker Movement in Education", *Harvard Educational Review*, Vol. 84, No. 4, Winter 2014.

9. Woolf, S., Danahy, E., "MakerView: An integrated camera-monitor network for promoting collaboration in educational Makerspaces", *International Conference Frontiers in Education: CS and CE, FECS'16*, 2016.

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