

# Affordances that Enhance Learning in University Makerspaces for Female Students

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## RESEARCH MOTIVATION

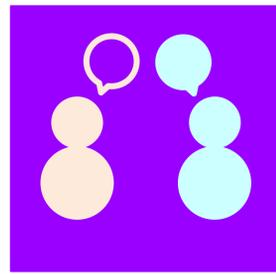
Recognizing the value of diversity and inclusivity in learning, recent engineering education initiatives have worked to encourage all types of students to pursue engineering while also facilitating the construction of makerspaces on university campuses. Herein are two types of diversity and inclusion in learning: in the people who are engineers and in the pathways for engineering. While these two initiatives are aiming to improve the quality of an engineer's education, the reality settles in when we begin to question whether these makerspaces are, in fact, encouraging learning in engineering for all types of students.

## RESEARCH OBJECTIVE

In this work, we focus on investigating the relationship between makerspaces and women through an phenomenological interview process.

The purpose of these interviews is to engage the students in their experiences with the makerspaces and the projects that they work on in the space in order to articulate how these spaces afford learning and their impact on female student engagement. While makerspaces are often labeled as "open, learning environments," this work aims to examine the how these spaces facilitate an open, learning environment for women and suggests means to generate open environments for all students.

## METHODOLOGY



### Phenomenologically based interviewing

combines

- Life-history interviewing
- Focused, in-depth interviewing

is centered on

- capturing and understanding experiences
- making sense of lived decisions and experiences

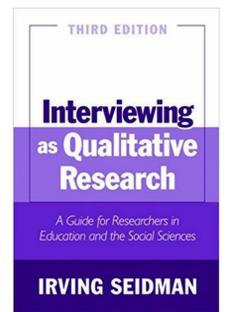
### The interviewing process entails

Three 90-MINUTE interviews

Interview 1 – Focused Life History

Interview 2 – The Details of the Experience

Interview 3 – Reflection on the Meaning



### Example Interview Questions

- *How did you become involved in makerspaces?*
- *Describe a typical experience in the makerspace?*
- *How has being involved in these spaces changed your life, as a student and as a learner?*

## DATA COLLECTION

**Interviewer:** Female Graduate Student

**Interviewees:** Four female undergraduate students involved in different makerspaces at a single university

**Total Time Interviewing:** Over 18 hours interviewing

**Pages of Transcripts:** 20 single-spaced pages per interview. Resulting in a total of roughly 240 pages.

KEY	
S	scheduled
T	transcribed
C1	coding (listened to and revised)
C2	coding (chunked, if necessary)
P	paid

Student	Notes																							
	Initial		Interview 1					Interview 2					Interview 3											
	S	D	S	D	T	C1	C2	C3	P	S	D	T	C1	C2	C3	P	S	D	T	C1	C2	C3	P	
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓					✓	3rd interview file format to be transcribed
2	✓	✓	✓	✓	✓				✓	✓	✓	✓				✓								emailed about next meeting (interview 3)
3	✓	✓	✓	✓	✓				✓	✓	✓	✓				✓	✓	✓	✓				✓	all interviews completed.
4	✓	✓	✓	✓	✓				✓	✓														scheduled for interview 2

## ANALYSIS

Data is analyzed through multiple cycles of extracting codes from the data.

"A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data."

~Saldaña (2016)

Through these cycles, the codes are further synthesized and categorized into **THEMES** that represent the **FINDINGS** within the data.

In analyzing the data, we are asking the questions of:

### 1 Is learning occurring in the makerspace? If so, what learning is occurring? Through what means is learning occurring?

Anticipated themes include: social learning, technical learning, individual learning, and communicative learning.

### 2 Are female students facing challenges in makerspaces? If any, what are these challenges in these makerspaces?

Anticipated themes include: accessibility, uncertainty, community, tool and equipment expertise, and failure.

## ACKNOWLEDGEMENTS

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