

Globalization



Engineers must design for vastly different cultures

Clinical Immersion



The immersion experience was created to introduce engineers to designing products for different cultures using ethnographic techniques: observation, interviewing, & focus groups discussion

Ethnography



Bridges gap between cultures and allows products to truly meet stakeholder needs

Goals of Clinical Immersion

Comprehensive Design Process

Experiential Learning

Clinical Immersion Experience & Intercultural Training

Human-Centric Design

Research Question:

How does the content and depth of student interactions with stakeholders affect the decisions made during the design process?

Study Participants & Data Collection

- Semi-structured in-depth interviews
- Three senior capstone design teams were interviewed during the course of their project
- Two interviews: at mid-point and end-point of project

	Design Teams		
	Team A	Team B	Team C
Participated in immersion experience?	Yes	Yes	No
Design project	Surgery tool	Diagnostic tool	Surgery tool
Design team participants	Three ME	Two ME, Two BME	Four ME

Example Questions:

- How did your team develop this use requirement?
- What information did you use to arrive at this decision?
- Where did you gather the information used while making this decision?
- Which information proved most useful during the design process?

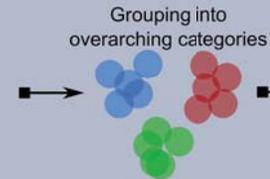
Data Analysis



Transcripts



References to stakeholder interaction



Themes developed through comparing and contrasting within categories

Iteration until changes stop being made

Characterizing students' interactions with stakeholders during the design process

Ibrahim Mohedas, Shanna Daly, Kathleen H. Sienko

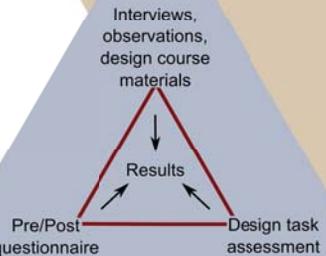


+In-depth interviews to determine the "why" behind the results of this study

- Essential for development of effective pedagogical tools

+Develop a design task which can assess a student's ability to interact with stakeholders

- Understand the specific strategies students use to extract information from stakeholders



Motivation

Objectives

Methodology

Results

Conclusions

Future Work

Students interacted with stakeholders throughout the design process in order to make decisions

Success was hampered by:

Challenges:
Originating from both the difficulties associated with extracting information from stakeholders and interpreting highly variable information that was obtained

Missed Opportunities:
Failing to recognize opportunities where interaction with stakeholders would be beneficial led to students struggling with some design decisions

Realized Benefits

Theme I: Interviews with stakeholders were consistently cited as the most relevant and useful source of information during the design process.

Theme II: Students reported that experts were able to explain highly technical information quickly and accurately.

Student: "We also talked to other medical personnel, such as...set-up people and nurses...they weren't straight up interviews...more like quick talks...they helped explain to us what is going on because one of the challenges was we're all mechanical engineers, we're in an operating room, and we don't know what they're doing"

Missed Opportunities

Theme: Students did not always take full advantage of stakeholder knowledge.

Theme: Students struggled with problems attempting to find answers via online or literature research, but did not consult with stakeholders.

Interviewer: "Did you ask any of the surgeons what they felt was important as far as patient safety is concerned"
Student I: "I don't think we specifically asked. They just said it was the first, the most important"
Student II: "They said that it was really, really important"

Challenges

Theme: Students obtained inconsistent or incorrect information from stakeholders.

Theme: Students had difficulties asking the appropriate questions to the appropriate stakeholders or finding the appropriate stakeholder to interview.

Theme: Students had difficulty conducting effective interviews.

Interviewer: "How did you go about obtaining all the [user requirements]"
Student I: "I found that if you put things in front of them when interviewing, it would stump the creativity of the interview...they would do it more of like a task than critical thinking"

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