Culturally Contextualized Design Process: The Trajectory of Engineering Student Learning

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**PURPOSE**

The goal of the study is to better understand the culturally contextualized design learning process of engineering students and develop a multidimensional framework that describes the process in which students learn how to culturally contextually design.

**METHODOLOGY**

**SAMPLE:** UM undergraduate & graduate engineering students

![Gender Distribution]

- Male: 35%
- Female: 65%

![Class Standing Distribution]

- First Year: 10%
- Second Year: 15%
- Third Year: 30%
- Fourth Year: 30%
- Fifth Year: 10%
- Graduate: 5%

![Major Distribution]

- Civil Engineering: 10%
- Electrical Engineering: 20%
- Mechanical Engineering: 25%
- Computer Engineering: 15%
- Other: 30%

**CULTURALLY CONTEXTUALIZED DESIGN PROCESS MODEL**

<table>
<thead>
<tr>
<th>Design Process</th>
<th>Novice</th>
<th>Informed</th>
<th>Engaged</th>
<th>Experts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify Need</td>
<td>Makes assumptions of what stakeholders needs</td>
<td>Learns about stakeholders through second hand resources, without interacting with stakeholder</td>
<td>Respectfully enters the stakeholder’s community and creates relationships in order to collaborate with stakeholders and team members to identify needs</td>
<td></td>
</tr>
<tr>
<td>Research</td>
<td>Does not conduct research on identified problem</td>
<td>Obtains research from literature or online sources</td>
<td>In addition to research, gathers quantitative or qualitative data from stakeholders</td>
<td></td>
</tr>
<tr>
<td>Generate Ideas</td>
<td>Generation of ideas for effectiveness or based on assumptions of stakeholders</td>
<td>Refers to research without consulting with stakeholders when generating ideas</td>
<td>Refers to research and collaborates with stakeholders and team members in the brainstorming. Listens and is open to ideas different than own.</td>
<td></td>
</tr>
<tr>
<td>Test &amp; Evaluate</td>
<td>Does not leave time to assess or is flexible to test and evaluate</td>
<td>Compares and Assesses options based on research</td>
<td>In collaboration with stakeholders and team members, compares and assess options</td>
<td></td>
</tr>
<tr>
<td>Decide on Solution</td>
<td>Decides on solution based on what is assumed to be most effective</td>
<td>Decides on solution on solution based on literature or data collected from experts</td>
<td>Decides on solution in collaboration with stakeholders by directly communicating and interacting with the stakeholder</td>
<td></td>
</tr>
</tbody>
</table>

**FUTURE STEPS**

- Understand the type of experiences that allow students to grow and develop as culturally contextualized designers
- Develop pedagogy that will support the culturally contextualized design development of engineering students
- Construct an assessment instrument to gauge the development of engineering students