Research Project Proposal

About the Project

All deliverables are submitted electronically via Canvas by the beginning of class on the date due, unless otherwise noted/arranged.

All project deliverables must be in **ACM** (https://www.acm.org/publications/proceedings-template) /**IEEE** (https://www.ieee.org/conferences/publishing/templates.html) format. It is highly recommended to use Latex to create the deliverables. If you are new to Latex, I created a simplified template on **Overleaf** (https://www.overleaf.com/read/hnphwhhmqqxc) that you may copy and use. Simply, replace the existing text in the CSCI514_proposal_template.tex file with your own text. Add your references to the CSCI514references.bib file so you can cite them in the tex file. Overleaf can be connected to Zotero by the way, so you can directly import your Zotero library into an Overleaf project.

The research project proposal will give you experience in pursuing a research topic. Rather than one grade at the end of the term, you will turn in pieces of the proposal over time and the final proposal will be submitted at the end of the term.

Deliverable 1: Problem Statement

After you narrow your research interests to one topic, you need to provide a **Problem Statement** (https://wwu.instructure.com/courses/1765416/files/133452338?wrap=1) (https://wwu.instructure.com/courses/1765416/files/133452338/download?download_frd=1) for approval. This problem statement should clearly and concisely describe the issue you are trying to address. Your problem statement should be no more than 2-3 paragraphs in length.

It is expected that you have discussed the topic and problem statement with your advisor and obtained their approval. Your advisor should have also reviewed at least a draft copy of your problem statement and signed the signature sheet (https://wwu.instructure.com/courses/1765416/files/132210498?wrap=1) (https://wwu.instructure.com/courses/1765416/files/132210498/download?download_frd=1) **.** After this is handed back to you, include it in your submission.

Deliverable 2: Literature Review

The **Literature Review** (also called the “Related Work” section in many academic papers) serves to situate your research in the context of existing work. It shows that you understand the academic conversation around your topic, can synthesize prior research, and know where your work fits in. This section is not just a summary of other papers—it’s a critical analysis that helps justify your research project.

Submission should be written in ACM/IEEE format. Include citations in proper and consistent format such as MLA/APA. Your literature review should include the following components:

1. Explain the themes or categories you will use to organize the literature (e.g., if you are studying accessibility in CS education, you might group prior work by accessibility tools, student outcomes, and inclusive pedagogy).

2. Group your sources **by theme or topic**, not by paper. Each subsection should have a **descriptive subheading** (e.g., “AI in Assistive Technology” or “Usability Challenges in Developer Tools”), and within each, you will:

- Discuss 3–5 related papers in each subsection.
- For each paper:
  - Summarize its **main contribution** in 2–4 sentences.
  - Mention key findings, methods used, or technologies developed.
  - Note any **strengths** or important limitations.
- Then, include **1–2 sentences of analysis**:
  - How does this work relate to your proposed research?
  - Does it support, contrast with, or inspire your approach?
  - What gap does your work aim to fill that this paper does not address?

3. At the end of the literature review section (or at the end of each subsection), write a brief synthesis that:

- Summarizes the major trends in the area.
- Highlights what has been done well.
- Points out the **gaps** or **limitations** in the current literature that your work will address.

At a *minimum*, you should plan on including at least **ten full** (approximately 10 page) papers in your review. If you cannot find ten submissions, you are likely not looking hard enough or you have not selected a popular enough area. You are encouraged to add more than ten papers to the related work even if they are a bit older or shorter as long as these papers are of high quality and relevant.

Deliverable 3: Methodology

In this section you will describe **how** you plan to conduct your study. This section should be detailed enough for another researcher to replicate your study or understand your research process.

- Research Design
  - Describe the overall design of your study. Will it be experimental, observational, exploratory, qualitative, quantitative, or mixed-methods?
  - Explain why this design is appropriate for your research question
  - Briefly explain how this design helps address your research objective or hypothesis

- Tools, Data Sources, Participants
  - List any tools, technologies, software, or platforms you will use for conducting your study (e.g., survey software, programming language, IDEs, frameworks, analytics tools)
  - Describe any instruments you will develop (e.g., questionnaires, interview guides, system prototypes)
  - If you are working with human subjects, describe who your participants will be (e.g., students, software developers).
  - If using existing datasets or tools, name them and explain their relevance to your study
  - How many participants or data points you expect to include and how you will recruit or access them. Mention any inclusion/exclusion criteria.
- Data Collection Procedure
  - Provide a step-by-step plan of how you will collect your data
  - If conducting experiments or system evaluations, describe the protocol (e.g., tasks participants will perform, how long the study will take)
- Data Analysis Plan
  - Describe how you will analyze the data you collect

Deliverable 4: Research Project Presentation

At the end of the term each student will present their proposed project in the form of a 10-minute presentation followed by a 5-minute Q&A. The talk should cover the main points in the final proposal such as research questions/objectives, literature review, significance of the research, methodology, and threats to validity. Slides and visuals should be clear, consistent, and appropriate (charts, graphs, images). The slides should include **speaker notes**. Expectations of the talk are: professionalism, clarity of speech, confidence, engagement with the audience, and answering questions appropriately.

When you prepare your talk, you may find the **Research Presentation slides (https://wwu.instructure.com/courses/1765416/files/132210490?wrap=1)** **(https://wwu.instructure.com/courses/1765416/files/132210490/download?download_frd=1)** and these **tips on giving clear talk (http://graphics.stanford.edu/%7Ekayvonf/misc/cleartalktips.pdf)** useful.

Deliverable 5: Final Research Project Proposal

This deliverable, consisting of the most up-to-date version of the proposal, will be graded at the end of the course. While drafts of materials were due earlier in the term, it is expected that you continue work on your proposal until the due date. Your proposal should be in ACM/IEEE format, with proper citations and should be maximim 10 pages, minimum 5 pages, not counting citations.

It is expected that your advisor has reviewed and approved your proposal and signed the signature sheet (https://wwu.instructure.com/courses/1765416/files/132210498?wrap=1) (https://wwu.instructure.com/courses/1765416/files/132210498/download?download_frd=1) .

Initially the CS faculty will be your audience for your research work, but you should write for a general technical audience that is familiar with CS but perhaps not all of the low-level issues that you will be researching. Be detailed, and be sure that the scope of your proposed work is clearly defined. The required sections are:

1. Abstract (~200 words)
    1. Briefly state the context of the research and the overarching purpose of the study. Clearly articulate the problem or issue the research aims to address. Clearly articulate what sets this research apart and why it matters.
    2. Clearly state the research objective or question that the study seeks to answer. This sets the stage for the reader to understand the focus of the research.
    3. Provide a brief overview of the research methodology or approach employed in the study. This may include experimental design, data collection methods, and analysis techniques.
    4. Summarize the main findings or results of the research. Highlight the most significant outcomes and any novel contributions to the field.
    5. Emphasize the significance of the research and its contribution to the existing body of knowledge.
2. Introduction
    1. Research Objective
    2. Research Question(s)/Hypothesis
3. Literature Review. This can be similar to the prior submission, but should not be a copy and paste of this submission. Add more papers from your readings to the literature review. Improve your writing of the literature review, i.e., synthesize information across studies to draw connections and identify patterns. Ensure that your literature review flows logically and is easy for the reader to follow. Use clear transitions between ideas and studies.
4. Methodology
    1. Detailed Plan to conduct research. This may also be thought of as your data collection process.
    2. Detailed Plan to evaluate your research. This may also be thought of as your data analysis process.
    3. Ethical Considerations
        - Describe how you will ensure ethical research practices (e.g., informed consent, data anonymization, confidentiality)
        - Make sure the analysis methods are aligned with your research questions
5. Limitations and threats to your work
6. Significant challenges you will need to overcome