

Beginning the Master's Thesis Research Process

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Step 1. Identify a Research Theme.

Without being familiar with the state of the art in human-computer interaction (HCI) research, identifying a theme may seem like a daunting task. However, there are a number of helpful approaches to finding a suitable theme.

1.1 Skim through the last several years of the journal Human-Computer Interaction and other journals or conference proceedings on the provided list of journals. The ACM Digital Library is an excellent place to start.

HCI is one of several top-rated journals in the field of HCI and related areas. HCI has a relatively-high 2005 impact factor of 4.7. Visit this site to understand what the "impact factor" of a journal means: <http://scientific.thomson.com/free/essays/journalcitationreports/impactfactor/>

1.2 Skim through the publications of potential research supervisors. Often near the conclusion of a paper there is a section entitled "future work." This section indicates current areas of HCI research.

You may know one of the faculty members who is conducting research in areas you find interesting. Becoming familiar with that person's research will help you find out whether you share common interests. You may consider faculty from IUPUI, IUB, Purdue University, or any other university within the U.S.

Step 2. Identify an Advisor.

One of the members of your master's committee should be able to take an active role in supervising your research from beginning to end. Currently, Drs. Faiola, MacDorman, and Larew are available to do this. The HCI Director, in cooperation with the faculty, will assign you to a research advisor to begin the thesis research process, but this may change over time to better meet your needs. It is important to make sure that you can answer all the following questions in the affirmative, or return to step 1:

2.1 Is your advisor interested in your theme?

The more interested your advisor is in your theme, the more motivated your advisor will be to help you with reviewing the literature, conducting the research, and writing your thesis. It is important that the advisor has a stake in your research and that you and your advisor share common goals, such as co-authored publications that can report your novel research.

2.2 Is your advisor an expert on research in the area of your theme?

Faculty are expected to be specialists, not generalists, who can make a substantial contribution to their particular research areas. Expecting someone to supervise you outside of his or her area of expertise is risky. All members of your committee should be qualified to assess your work, so it

should be related to their research. Further information on how to select your thesis committee is covered in the Thesis Guidelines document.

Sometimes you may even be able to find an advisor who can fund your research with a grant. However, the research theme will need to match the grant.

2.3 Is your advisor currently doing research that you would like to participate in?

At research universities a faculty member may often have funded research projects that graduate students join. This means grants provide support for graduate research assistantships. Nevertheless, non-funded students may still agree to participate in some part of the overall research project of a professor. In either scenario, the professor closely supervises the student's research, so your opportunities for learning through this kind of apprenticeship can be much greater than by working more independently. Of course, each research situation is different and there must be a clear agreement on the conditions of the research partnership before the student agrees to work on the professor's research project.

Step 3. Perform a thorough review of the literature in the area of your theme.

IUPUI provides many online databases for finding journal articles in a specific area (e.g., ISI Web of Science). These complement public databases, such as Citeseer and Google Scholar. It is important that you learn your first semester how to do a proper and thorough literature review. This process will prove to be extremely valuable to collect support for your research direction. Finding many online journals is NOT difficult. If you need help you can go in or call the reference desk and they will assist you.

Step 4. Formulate hypotheses or research questions.

4.1 Do you know the probable answer to the hypothesis or research question before performing any experiment? (You shouldn't.)

Academic research is supposed to be high risk. The most groundbreaking research often turns up results that are counter-intuitive. (For example, Horowitz, T. S. and Wolfe, J. M. (1998). Visual search has no memory, *Nature*, 394, 575–577.) If you can easily guess at the probable result of your experiment, your hypothesis may be boring or trivial.

4.2 Does your result generalize? (They should.)

Applying existing HCI methods to determine whether product A is better than product B in some aspect does not constitute Master's level research because it does not contribute to knowledge in general. Rather, it is the sort of work that an HCI practitioner would perform in a company. However, discovering general principles governing why one product is better than another could be Master's level research because those principles could be applied to various products.

Generating "new knowledge" is the basic criterion for Master's or Ph.D. research in all research-based graduate programs. Developing new methods for evaluating products and demonstrating

that those methods are superior to existing methods can be HCI research. Discovering new knowledge about human perception or interaction with technology can also be HCI research.

4.3 Is your research novel?

However brilliant your idea, there is always the chance that someone has already done it before. This is why talking to experts and performing a thorough literature review are crucial.

Step 5. Run experiments.

After ensuring that your experimental design is correct through discussions with your supervisor and that your experiments are ethical, obtaining approval from the Institutional Research Board (IRB), it is important to perform experiments.

Step 6. Analyze your results.

Step 7. Prepare and submit papers to peer-reviewed conferences or journals.

Peer review by experts validates the quality of your research, and publication disseminates your results to the benefit of the field. If your results have already passed through peer review before your thesis defense, this strengthens your position.

All graduate students will be required to submit a paper for peer review to a conference or journal before graduation. In most cases, conferences are more lenient in evaluating exploratory research, which is often the situation with many graduate research projects. Journals, on the other hand, tend to give more rigorous reviews, while expected more fully elaborated research results.

In either case, students can work with their advisor to prepare the paper for review. The traditional method of preparation includes the student's initial writing of the paper under the direction of the advisor. The advisor makes a final editorial review of the paper to make sure it is in publishable form. The paper is then considered a co-authored paper.

In some cases, students may work with their committee to transform their thesis into a publishable paper after their defense.

Step 8. Present your work at conferences.

This provides another mechanism of obtaining feedback on your research in addition to peer review. It can also help you make contact with people working in your area. If a student's paper is accepted to a conference, the student is encouraged to attend and present the paper with the faculty member.

Step 9. Write up, submit, and defend your Master's thesis

Students who prepare papers for publication gain experience in writing and collecting their thought to better prepare their thesis. The document the Thesis Guidelines will walk you through the proposal stages of writing your thesis and doing your research.