

PSYCH 494

Human Factors and Ergonomics

Term Paper

Learning Outcomes

In completing the term paper, you will:

1. Learn about **research** done in an area of human factors and ergonomics (HF/E) that interests you.
2. Potentially apply Moray's (1994) **systems approach** (depending on your topic), which can help you learn and remember this foundational knowledge in the course.
3. Exercise your **scientific research and writing skills**, which are [important abilities](#) that are highly valued by employers and post-graduate schools.

Important Dates

- you must email your paper topic for approval by the end of the day (11:59pm) on **Tuesday, March 5**
- your term paper must be submitted by the end of the day (11:59pm) on **Thursday, April 4**

Format

The body of your paper (i.e., not including title page, references, figures, tables, appendixes, or quotations) must be at least **12 full pages** (about 3,800 words) but no more than **25 full pages**. If your paper is too short, you are not covering your topic in enough depth. You do not have to write an abstract. Doing an original research project (i.e., conducting your own empirical research) is likely beyond the scope of this course.

Your term paper **must** be written in **APA style**. If your term paper does not conform to APA style, you will lose marks. APA style guidelines apply to the format of your paper (e.g., size of the margins), but also the style of writing, and quoting source material (**avoid** direct quotes; paraphrase--write it in your own words--instead). Even more importantly, the use of APA style ensures that you support all claims or opinions with proper citation of evidence; failure to do so will cost you marks. The APA has [sample papers](#) available on their website for free; these are in Microsoft Word format and can be used as templates for your term paper. Further requirements will be presented in the lecture on APA Style and Research.

Type of Paper

Literature Review: This format of paper describes, summarizes, compares, and evaluates the findings of **primary research** in a topic in human factors and ergonomics. Your paper should **not** be a review of opinion papers; although you may include some descriptive research (e.g., surveys), you should focus on primary empirical research to evaluate particular theories. Any important theoretical or practical issues should be described and critically analyzed, in the context of what you have learned in the course. Avoid using secondary sources, which are a summary of other research. If you write a paper based only on secondary sources, you are writing a summary of a summary. This is not a good way to familiarize yourself with the research literature. A better approach is to try and find peer-reviewed studies on your chosen topic, using the online PsycINFO database, for example (online databases of research articles can be found at [University of Alberta Library A-Z Databases](#)). Do **not** use PSYCH 494 lecture notes as a reference (they are a secondary source!). Do not write a [comprehensive review](#) or [systematic review](#), which are secondary sources that critically analyzes *all* research papers on a given topic; however, your review should be representative of the literature. Be sure to include important or influential studies. Your review should include at least 24 sources.

Case Study: Human factors and ergonomics has a strong applied component. Often, HF/E professionals must solve real-world problems. You may review a particular problem in a certain field, and then interview someone (a subject matter expert) who works in that field. Then, evaluate their approach in the light of known research and theories—do not simply submit a transcript of your interview. Examples of potential subject matter experts include designers, architects, physicians, or ergonomists. Your paper must still include a literature review and an assessment of how the subject matter expert applies best practices. Another type of case study is a disaster analysis, in which you perform an in-depth analysis of a catastrophic systems failure or disaster. The main trade-off in writing a disaster analysis is that, for a given disaster, there will be relatively few sources (e.g., official investigation reports of an aviation disaster), they will be extensive (e.g., 200+ pages). Your term paper should structure the contributing causal factors according to the levels of the systems approach (see Moray, 1994, in the coursepack).

Research Proposal: If you have an interest in a particular topic, but you cannot find enough published research for a 12-page review paper, you may write a research proposal. The first part of your paper consists of an introduction, in which the available literature is reviewed. In the second part, you describe the design of an experiment (or experiments) to try and test a particular theory, fill a significant gap in what is known about your topic, or apply the principles of the systems approach. Don't worry—you are not expected to actually carry out the research! Details on the content and organization of this kind of manuscript are given in the APA manual. Be sure to include **all** important sections of a research paper, including participants, procedure, design, etc.

Submitting Your Term Paper

To avoid late penalties, your paper must be submitted by the due date & time. Submit your term paper via [eClass](#) in Microsoft Word (.docx) format or Adobe Acrobat/Portable Document Format (.pdf).

Late Policy

Late documents may be submitted via eClass. Late submissions will lose 10% per 24-hour period, starting immediately after the deadline. That is, if you submit your document 1 minute after the deadline, you will lose 10%. If you submit it 23 hours and 59 minutes after the deadline, you will still lose only 10%. But if you submit it 24 hours and 1 minute after the deadline, you will lose 20%, etc.

Resources

In addition to the recommended resources listed in the syllabus, the following websites also give helpful information on writing a critical research literature review and APA style:

- [The Literature Review: A Few Tips On Conducting It](#)
- [Writing a Literature Review in Psychology](#)
- [UAlberta Library Foundational Research Tutorials](#)
- [UAlberta Library APA Citation Style Guide](#)
- [Purdue Online Writing Lab \(OWL\): APA Style](#)
- APA Style Checklists: [formatting](#), [citations](#), [references](#); [revision guide](#) (highly recommended)
- [Official APA Style website](#) (has [Handouts and Guides](#) including a [Student Paper Setup Guide](#))

It is unpleasant to read a paper in which there are many structural and grammatical errors. In the worst case, if what you have written is incomprehensible, you will lose marks. If you are not fluent in English or have difficulty writing, you are *strongly* recommended to consult Writing Services (formerly the Centre for Writers), who can help you improve your writing skills. They offer free tutoring and workshops to all students. See the [Writing Services website](#) for more information, and hours of operation.

Topic Ideas

The following topics are merely suggestions and examples; you may choose your own topic. (However, you may **not** choose a topic that is course content, such as Air Transat flight 236, Three Mile Island, Chernobyl, the space shuttle Challenger, Therac-25, etc.) Your paper topic must be approved by the instructor.

- **physical ergonomics** -- Are products (e.g., chairs, desks) designed with the capacities of the human body in mind? Does prolonged computer keyboard use cause RSIs/CTS?
- **rehabilitation medicine** -- Are some tasks prone to causing injury to the low back, and is the weight of the lifted object the only contributing factor?
- **health care/medicine** -- What factors contribute to strains of bacteria that are resistant to antibiotics? Or, what is the biopsychosocial model of whiplash, and what evidence supports it?
- **COVID-19** -- Viewed through the lens of the systems approach, what factors contribute to SARS-CoV2 transmission, and how can these be harnessed to address the pandemic?
- **technostress** -- What is technostress, who is prone to experiencing it, and why?
- **"Facebook depression"** -- What factors may cause people to experience depression with social media use?
- **cybersecurity/information security** -- How can individuals, organizations, and nations maintain computer security and privacy?
- **disaster case study** -- Review published scientific literature and official investigation reports on a large-scale disaster (e.g., the Bhopal tragedy, the *Titanic*, the *Exxon Valdez*). What happened? What were the causes, as analyzed by the systems approach? What has been learned? What changes resulted?
- **sick building syndrome** -- What are the causes of SBS, as analyzed by the systems approach? Why do modern buildings suffer SBS more than older ones?
- **auto safety** -- Are airbags a more of a hazard than a safety device? (Why are women more at risk of injury compared to men?) Or, what factors affect driver safety and driving performance?
- **traffic psychology** -- What considerations must be made of people when they are driving a vehicle? How does this relate to safety?
- **aviation** -- What are mode errors, how common are they, and why do they happen?
- **aging** -- How do driving abilities change as people age? Or, how can devices like automated teller machines be better designed for usability by an aging population?
- **food safety** -- How does HACCP work, and what is the evidence of its pros and cons? How does the systems approach help in understanding a breakdown in food safety?
- **signs and symbols** -- What factors contribute to the effectiveness of traffic signs? Or, are symbols in common usage effective? What makes some symbols more effective?
- **handedness** -- Are left-handed people more likely to die sooner, due to accidents caused by using tools designed by a right-handed world? Is this just a statistical misinterpretation?
- **architecture, urban design, and environmental design**: How is productivity and wellbeing affected by open-plan office design vs. traditional closed office layout? Or, how does the built environment of workspaces, rooms, and buildings affect performance?
- **fatigue** -- How does sleep-related fatigue affect performance on real-world tasks and jobs? Or, what factors affect fatigue--either exacerbating it or mediating its effects?

Still having a hard time? Another approach is to browse through HF/E publications to look for a topic that interests you. An excellent place to start is the HFES magazine [Ergonomics in Design](#). Or you can look through journals like [Human Factors](#), [Ergonomics](#), [Applied Ergonomics](#), [Journal of Usability Studies](#), [Journal of Cognitive Engineering and Decision Making](#), [Journal of Experimental Psychology: Applied](#), [Human Factors in Healthcare](#), [Accident Analysis & Prevention](#), [Aviation Psychology and Applied Human Factors](#), [IISE Transactions on Occupational Ergonomics and Human Factors](#) and [JMIR Human Factors](#) to get some more ideas.

More Information

Additional important information about the term paper requirements, some details on APA style, and how to find research will be presented in the lecture on APA Style and Research.

It can be difficult to keep track of all of the sources you use when writing your term paper; [reference management software](#) can help with this. This software organizes and formats all of the sources you use in your term paper. I recommend the free, open-source [Zotero](#) (available for macOS, Windows, Linux, and iOS, with connector plugins for Chrome, Safari, Firefox, and Edge browsers). It integrates with Microsoft Word, Google Docs, and LibreOffice, formatting citations and the reference list for you automatically. Zotero can even access and organize articles that are behind paywalls by working with the UAlberta Library [EZProxy server](#). For more information:

- UAlberta Library: [getting started, documentation, and support](#) for Zotero
- [How To Use Zotero \(A Complete Beginner's Guide\)](#) on YouTube

The Fine Print

The University of Alberta is committed to the highest standards of [academic integrity](#). Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the [Code of Student Behaviour](#) and avoid any behaviour which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence.

Academic dishonesty is a serious offence and can result in suspension or expulsion from the University. These resources from Student Conduct and Accountability, and the University of Alberta Library can help:

- [Academic Integrity: Introduction to Academic Culture](#) - videos on citing, quoting, summarizing, and paraphrasing
- [How to Avoid Plagiarism](#) - plagiarism definition, and tips for avoiding plagiarism
- [Foundational Research Tutorial: Plagiarism](#) - interactive tutorials on citing, plagiarism, and paraphrasing, with examples
- [Citing, Quoting, Paraphrasing & Summarizing](#) - how-to document that compares and contrasts them
- [Don't Do It \(Cheating & Plagiarism\)](#) - Faculty of Science document on academic misconduct and resulting penalties