ARIZONA STATE UNIVERSITY

GENERAL STUDIES COURSE PROPOSAL COVER FORM

Course information:

*Copy and paste **current** course information from Class Search/Course Catalog.*

Academic Unit: **Human Systems Engineering** Department: **The Polytechnic School**

Subject: **EGR** Number: **390** Title: Qualitative Research Methods (to be HSE 390 when new prefix is approved) Units: 3

Is this a cross-listed course? (Choose one)
If yes, please identify course(s): **No**

Is this a shared course? (choose one) If so, list all academic units offering this course: No

Course description:

Requested designation: (Choose One)

*Note- a **separate** proposal is required for each designation requested*

Eligibility:

Permanent numbered courses must have completed the university's review and approval process.
For the rules governing approval of omnibus courses, contact Phyllis.Lucie@asu.edu or Lauren.Leo@asu.edu.

Submission deadlines dates are as follow:

For Fall 2015 Effective Date: October 9, 2014

For Spring 2016 Effective Date: March 19, 2015

Area(s) proposed course will serve:

A single course may be proposed for more than one core or awareness area. A course may satisfy a core area requirement and more than one awareness area requirements concurrently, but may not satisfy requirements in two core areas simultaneously, even if approved for those areas. With departmental consent, an approved General Studies course may be counted toward both the General Studies requirement and the major program of study.

Checklists for general studies designations:

Complete and attach the appropriate checklist

- Literacy and Critical Inquiry core courses (L)
- Mathematics core courses (MA)
- Computer/statistics/quantitative applications core courses (CS)
- Humanities, Arts and Design core courses (HU)
- Social-Behavioral Sciences core courses (SB)
- Natural Sciences core courses (SQ/SG)
- Cultural Diversity in the United States courses (C)
- Global Awareness courses (G)
- Historical Awareness courses (H)

A complete proposal should include:

- ☐ Signed General Studies Program Course Proposal Cover Form
- ☐ Criteria Checklist for the area
- ☐ Course Catalog description
- ☐ Course Syllabus
- ☐ Copy of Table of Contents from the textbook and list of required readings/books

Respectfully request that proposals are submitted electronically with all files compiled into one PDF. If necessary, a hard copy of the proposal will be accepted.

Contact information:

Name: Nancy J. Cooke Phone: 480-727-5158

Mail code: 2880 E-mail: ncooke@asu.edu

Department Chair/Director approval: *(Required)*

Chair/Director name (Typed): Ann McKenna Date: 12/30/14

Chair/Director (Signature): Ann McKenna

Rev. 1/94, 4/95, 7/98, 4/00, 1/02, 10/08, 11/11/ 12/11, 7/12, 5/14

Arizona State University Criteria Checklist for

LITERACY AND CRITICAL INQUIRY - [L]

Rationale and Objectives

Literacy is here defined broadly as communicative competence—that is, competence in written and oral discourse. **Critical inquiry** involves the gathering, interpretation, and evaluation of evidence. Any field of university study may require unique critical skills that have little to do with language in the usual sense (words), but the analysis of written and spoken evidence pervades university study and everyday life. Thus, the General Studies requirements assume that all undergraduates should develop the ability to reason critically and communicate using the medium of language.

The requirement in Literacy and Critical Inquiry presumes, first, that training in literacy and critical inquiry must be sustained beyond traditional First Year English in order to create a habitual skill in every student; and, second, that the skill levels become more advanced, as well as more secure, as the student learns challenging subject matter. Thus, two courses beyond First Year English are required in order for students to meet the Literacy and Critical Inquiry requirement.

Most lower-level [L] courses are devoted primarily to the further development of critical skills in reading, writing, listening, speaking, or analysis of discourse. Upper-division [L] courses generally are courses in a particular discipline into which writing and critical thinking have been fully integrated as means of learning the content and, in most cases, demonstrating that it has been learned.
Notes:

1. ENG 101, 107 or ENG 105 must be prerequisites
2. Honors theses, XXX 493 meet [L] requirements
3. The list of criteria that must be satisfied for designation as a Literacy and Critical Inquiry [L] course is presented on the following page. This list will help you determine whether the current version of your course meets all of these requirements. If you decide to apply, please attach a current syllabus, or handouts, or other documentation that will provide sufficient information for the General Studies Council to make an informed decision regarding the status of your proposal.

Revised April 2014

Proposer: Please complete the following section and attach appropriate documentation.

ASU - [L] CRITERIA

TO QUALIFY FOR **[L]** DESIGNATION,THE COURSE DESIGN MUST PLACE A MAJOR EMPHASIS ON COMPLETING CRITICAL DISCOURSE--**AS EVIDENCED BY THE FOLLOWING CRITERIA:**

YES	NO		Identify Documentation Submitted
☒	☐	**CRITERION 1:** At least 50 percent of the grade in the course should depend upon writing assignments (see Criterion 3). Group projects are acceptable only if each student gathers, interprets, and evaluates evidence, and prepares a summary report. *In-class essay exams may not be used for [L] designation.*	See Syllabus: "Research Proposal" project description

1. Please describe the assignments that are considered in the computation of course grades--and indicate the proportion of the final grade that is determined by each assignment.

2. **Also:**

Please **circle, underline, or otherwise mark** the information presented in the most recent course syllabus (or other material you have submitted) that verifies **this description** of the grading process--and label this information **"C-1".**

C-1

YES	NO		Identify Documentation Submitted
☒	☐	**CRITERION 2:** The writing assignments should involve gathering, interpreting, and evaluating evidence. They should reflect critical inquiry, extending beyond opinion and/or reflection.	See Syllabus: "Research Proposal" project description. See also attached Reading Guide for Clark (2007)

1. Please describe the way(s) in which this criterion is addressed in the course design.

2. **Also:**

Please **circle, underline,** or **otherwise mark** the information presented in the most recent course syllabus (or other material you have submitted) that verifies **this description** of the grading process--and label this information **"C-2".**

C-2

YES	NO		Identify Documentation Submitted
☒	☐	**CRITERION 3:** The syllabus should include a minimum of two writing and/or speaking assignments that are substantial in depth, quality, and quantity. Substantial writing assignments entail sustained in-depth engagement with the material. Examples include research papers, reports, articles, essays, or speeches that reflect critical inquiry and evaluation. Assignments such as brief reaction papers, opinion pieces, reflections, discussion posts, and impromptu presentations are not considered substantial writing/speaking assignments.	See Syllabus: "Research Proposal" project description and Research Presentation description

1. Please provide relatively detailed descriptions of two or more substantial writing or speaking tasks that are included in the course requirements

2. **Also:**

Please **circle, underline,** or **otherwise mark** the information presented in the most recent course syllabus (or other material you have submitted) that verifies **this description** of the grading process--and label this information **"C-3".**

C-3

ASU - [L] CRITERIA

YES	NO		Identify Documentation Submitted
☒	☐	**CRITERION 4:** These substantial writing or speaking assignments should be arranged so that the students will get timely feedback from the instructor on each assignment in time to help them do better on subsequent assignments. *Intervention at earlier stages in the writing process is especially welcomed.*	

1. Please describe the sequence of course assignments--and the nature of the feedback the current (or most recent) course instructor provides to help students do better on subsequent assignments

2. **Also:**

Please **circle, underline,** or **otherwise mark** the information presented in the most recent course syllabus (or other material you have submitted) that verifies **this description** of the grading process--and label this information **"C-4".**

C-4

Course Prefix	Number	Title	General Studies Designation
HSE (EGR)	390	Qualitative Reseach Methods	L

Explain in detail which student activities correspond to the specific designation criteria.
Please use the following organizer to explain how the criteria are being met.

Criteria (from checksheet)	How course meets spirit (contextualize specific examples in next column)	Please provide detailed evidence of how course meets criteria (i.e., where in syllabus)
C-1	Entire course is focused upon writing a substantive research proposal involving qualitative research methods	Descriptions of writing assignments are discussed in the Research Proposal section of the Syllabus (p. 3) along with a detailed sample outline of a research proposal paper (pp. 6-7)
C-2	To develop an effective research proposal, students must conduct meaningful search, analysis, and summary of the relevant background literature	Descriptions of writing assignments are discussed in the Research Proposal section of the Syllabus (p. 3) along with a detailed sample outline of a research proposal paper (pp. 6-7) Students will specifically be asked to critically synthesize prior research on two iterative assignments ("Research Questions" and "Literature Review") prior to submitting a complete propsal To facilitate reading and understanding of the literature, the course will include specific lessons on literature reviews and academic writing (see Schedule, p. 2) and Reading Guides that help students think critically about what has been read (p. 3)
C-3	Students develop a research proposal throughout the course, and must present a coherent and concise overview of this work to their peers	The final Research Proposal assignment represents a substantial amount of work and writing, which will emerge from a series of writing assignments and analyses throughout the course. (See Syllabus p. 3 and sample outline pp. 6-7) In addition, students will present their proposal in a conference-style presentation in class (p. 3)
C-4	The writing assignments in class are broken down into meaningful pieces that allow studenst to practice and receive feedback throughout the semester. At the end of the course, students refine and integrate these pieces (with additional feedback) prior to submitting a complete proposal	See course schedule (p. 2) and proposal outline (pp. 6-7)

Course Catalog Description

Introduction to fundamental methods of qualitative research, including observation, survey, and interview techniques. Discusses issues of validity and reliability. Emphasizes applications in Human Systems Engineering, such as cognitive task analysis and usability testing.

Required Textbooks and Readings

Textbook

Stanton et al., (2013). *Human Factors Methods*: *A Practical Guide for Engineering and Design*. Ashgate Publishing Limited. (2nd edition or later).

Example Readings from Research Literature

Chi, M. T. H. (1997). Quantifying qualitative analyses of verbal data: A practical guide. *The Journal of the Learning Sciences*, *6*(3), 271-315.

Clark, R. E., Feldon, D., Van Merrienboer, J., Yates, K., & Early, S. (2008). Cognitive task analysis. *Handbook of research on educational communications and technology*, *3*, 577-593.

Cooke, N. J., Gorman, J. C., Myers, C. W., & Duran, J. L. (2013). Interactive team cognition. *Cognitive Science*, *37*(2), 255-285.

Holzinger, A. (2005). Usability engineering methods for software developers. *Communications of the ACM*, *48*(1), 71-74.

Reading Guide for Clark et al. (2007)

Instructions:

As you read the chapter written by Clark and colleagues, consider the following questions and take notes to answer the questions.

You will turn in these notes via Blackboard as a typed Word document.

This assignment is worth **10 points**. **1 point** for each question answered and the **remaining points** if **all** questions are answered.

Questions to Consider:

1. What are the five common steps in most cognitive task analysis methodologies?

2. What are three common techniques for collecting preliminary knowledge? Briefly describe each technique.

3. What are two semi-structured or structured knowledge elicitation methods? Briefly describe the two methods.

4. What is declarative knowledge? How does it support skill acquisition? (Hint: you may want to consult other resources or textbooks to define some of the other terms mentioned)

5. What is procedural knowledge? How does it support skill acquisition? (Hint: you may want to consult other resources or textbooks to define some of the other terms mentioned)

6. Under what conditions are observations and interviews most appropriate for CTA?

7. Under what conditions are process tracing methods most appropriate for CTA?

Syllabus (sample)

Qualitative Research Methods (HSE 390)

Session C: 8/20/2015 to 12/4/2015 Monday/Wednesday: 10:30 to 11:45am SANCA 151

Instructor: Rod Roscoe, Assistant Professor, Human Systems Engineering
Office: SANCA 150D (Polytechnic Campus)
Contact: rod.roscoe@asu.edu or (480) 727-2760
Office Hours: Tuesdays (by appointment)

Prerequisites: HSE 290, EGR 290, or PSY 290

Required Textbook: Stanton et al., (2013). *Human Factors Methods*: *A Practical Guide for Engineering and Design*. Ashgate Publishing Limited. (2nd edition or later).

Course Description and Objectives

Qualitative research methods allow researchers and practitioners to explore and understand human behaviors, experiences, and performance in nuanced contexts. Traditionally, *quantitative* methods emphasize numerical data (e.g., reaction times), statistical inference (i.e., estimating population parameters from sample characteristics), and hypothesis testing. In contrast, *qualitative* methods tend to generate open-ended data (e.g., observations and interviews) that require well-reasoned interpretation or transformation into meaningful units (i.e., coding). A common misconception is that quantitative and qualitative methods are opposites—this is not true! Both approaches depend upon careful and rigorous research design, valid and reliable measures, and objective analysis. Importantly, many studies use *mixed-method* approaches that include *both* types of research.

This course will introduce students to fundamental qualitative research methods with a focus on *human systems engineering* applications (e.g., human factors, human-centered design, and human-computer interaction). Students will review core concepts of validity and reliability, which will be discussed in relation to the design and conduct of observations, surveys, and interviews. Specific techniques and methods will include protocol analysis, cognitive task analysis, and usability testing. Upon completion of the course, students should be able to:

- identify and describe issues involved in the conceptualization, design, execution, analysis, and reporting of qualitative research
- explain concepts of validity and reliability in relation to data collection and analysis
- demonstrate knowledge and ability to implement three core qualitative methods
- author (and perhaps implement) a research proposal that incorporates qualitative methods

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Course Schedule (Tentative, some aspects are *TBA*)

We will attempt to adhere to the calendar outlined below, but adjustments may be made based on the needs of the class and topics. All materials will be available on Blackboard.

Week and Topics		Date	Readings	Projects (Point Value)
1	Introduction			
	Research Article Anatomy			
2	Literature Reviews			**Topic Selection (10)**
	Research Questions			
3	Reliability		Ch. 1	
	Validity			
4	Observation		Ch. 2	**Pilot Observation Data (25)**
			TBA	
5	Surveys		Ch. 2	**Pilot Survey Data (25)**
			Pintrich (1995)	
6	Interviews		Ch. 2	**Pilot Interview Data (25)**
			TBA	
7	Protocol Analysis		Ch. 3	**Research Questions (15)**
	Coding Reliability		Chi (1997)	
8	Cognitive Task Analysis		Ch.4	
			Clark (2008)	
9	Usability Testing		Usability.gov	**Proposal Outline (50)**
			Holzinger (2005)	
10	Interface Analysis		Ch.10	
			TBA	
11	Design Methods		Ch.13	**Literature Review (50)**
			TBA	
12	Team Assessments		Ch.9	
			Cooke (2012)	
13	Writing about Research			**Methods Overview (50)**
	Writing about Research			

Comment [RR1]: Criterion 4 (C-4)

The entire course cumulatively develops a research proposal. Students are explicitly taught about the structure and purpose of "research articles" and how to develop questions/hypotheses via a literature review. These topics are grounded within discussions of validity and reliability. (weeks 1-3)

In the second phase of the course, students have the opportunity to gain first-hand experience in collecting data of different types and reflecting on these experiences. Students have the opportunity to write about these data and receive feedback. (weeks 4-7)

In the third phase of the course, students are exposed to sets of techniques that combine core methods to address particular research goals, such as assessing usability and team functioning (weeks 7-12).

During this same period, students will begin developing the components of the research proposal in clearly defined stages, with a period of 1-2 weeks between each stage to enable feedback, reflection, and (as needed) meetings with the instructor (weeks 9-14)

The final phase of the course returns explicitly to the task of writing, including discussions about writing in research and opportunities for peer feedback. Discussions amongst peers during week 14 allow students to practice articulating their ideas aloud to another person (also reduces subsequent presentation anxiety)

14	Peer Writing Workshop			
	Peer Writing Workshop			
15	Class Presentations			**Research Proposal (100)**
	Class Presentations			

Assignments and Grading

Specific details about each assignment and grading will be provided on separate handouts.

Course Readings and Reading Guides (approximately **200 points**, cumulative across readings)

Weekly reading assignments will be drawn from the required course textbook (Stanton et al., 2012) and published research articles (available via Blackboard). Students are required to take notes on each reading and address the questions in weekly **Reading Guides** (turned in via Blackboard). Guides are each worth **10 points**. You will earn **1 point** for each question addressed and the remaining points if **all questions** are answered. These questions will blend both "recall" and "analysis" types of responses (see example).

Come prepared to discuss each reading **on the date listed in the calendar**.

Research Proposal (approximately **400 points,** cumulative across project components)

Students will be guided through the development of a **Research Proposal** (**250 points**) that incorporates qualitative methods. Students will choose a topic early in the course—the topic can be refined later—that will guide students' literature review, research questions, and choice of methods. By the end of the course, students will write and submit a complete proposal that describes key background research, a rationale for the research, methods (e.g., participants, materials, and procedures), and expected analyses (see the example outline on the final page). Stages of this process will include a Proposal Outline (**50 points**), Literature Review (**50 points**), Methods Overview (**50 points**), and a complete final Research Proposal (**100 points**).

As part of this process, students will complete a **Pilot Data Project** (**100 points**) in which they conduct "pilot" observation, survey, and interview data collection related to their project topics. Collecting and writing about these pilot data will help students understand and explore the strengths and limitations of different methods via first-hand experience. In addition, these activities will provide concrete examples for discussion in class. Finally, students will be able to use these pilot activities to explore and refine their research questions. This project encompasses Topic Selection (**10 points**), Pilot Observation (**25 points**), Pilot Survey (**25 points**), Pilot Interviews (**25 points**), and Research Questions (**15 points**) components.

Finally, students will participate in **Writing Workshops** that will focus specifically on how to write about research and proposals. A guest speaker from the Writing Center will be invited to present on these topics. As part of these workshop activities, students will engage in **Peer Review** (**50 points**) to assist each other with writing a strong proposal.

Research Presentation (approximately **50 points**)

Students will present their research proposals to the class via a 15 minute presentation (i.e., academic conference style presentation) that concisely and clearly communicates their project topic(s), rationale, key background literature, methodology, and expected results.

Attendance and Participation (approximately **75 points,** 5 points per week)

Class meetings involve lecture and discussion. To maintain a healthy classroom atmosphere, students must **attend** class and **participate** in the discussions. Students are expected to

Comment [RR2]: Criterion 2 (C-2)

Reading Guides and assignments contribute to students' understanding of how to read and critique scholarly articles with regard to key variables, methods, and findings.

Comment [RR3]: Criterion 1 (C-1) and Criterion 3 (C-3)

Approximately 60% of the course grade will be determined by the cumulative and iterative development of qualitative research proposal.

Students writing will include summarization and integration of research literature, as well as description and justification of research methods and procedures.

Comment [RR4]: Criterion 2 (C-2)

The entire research proposal process involves reading relevant research articles, interpreting prior findings and methods, and evaluating the research. An effective literature review goes beyond listing or summarizing past work and makes critical judgments about the quality, relevance, and potential limitations of that work.

Comment [RR5]: Criterion 3 (C-3)

contribute ideas about key concepts, *ask and answer questions*, and *discuss* readings. Lecture notes may also include discussion activities that will be the focus of certain classes.

Course Policies

Attendance Policy

You are required and strongly encouraged to attend every class. The instructor must be notified **24 hours in advance** for any absence to be excused. Absences may be excused if related to religious observances (http://www.asu.edu/aad/manuals/acd/acd304-04.html), university-sanctioned activities (http://www.asu.edu/aad/manuals/acd/acd304-02.html), or medical concerns. It is the responsibility of all students to **make plans in advance** to complete or turn in any assignments whose due dates occur during an excused absence.

Students are also granted **one unexcused absence** (e.g., not showing up to class or failing to give 24 hours of notice) with no penalty. Students will receive a friendly reminder and warning. Continued unexcused absences will result in a reduced course participation grade.

Use of cell phones is never permitted during class. Students who wish to use tablet or laptop computers must prove that they are using these devices solely for instructional purposes (e.g., by emailing their notes taken during the class to the instructor). Disrupting class will impact your participation grade.

Late Assignments

Assignments will be accepted **one day** after they are due. However, late assignments can earn no more than **90 percent** of their original maximum points. No assignment will be accepted after one day (i.e., it will receive zero points). Any extra credit assignments cannot be turned in late.

Academic Integrity

Students will be held to the statutes of academic integrity put forth in the *Student Code of Conduct* that can be found in the *Student Handbook* (https://students.asu.edu/srr/code) and the *Student Academic Integrity Policy* (https://provost.asu.edu/index.php?q=academicintegrity). In addition, students are expected to maintain respectful and constructive interactions with each other and the instructor (http://www.asu.edu/aad/manuals/ssm/ssm104-02.html). Insulting, threatening, or derogatory remarks will not be tolerated. The offending student will be asked to leave the classroom and will receive a reduced course participation grade.

Cheating and plagiarism will not be tolerated under any circumstances. Students are expected to familiarize themselves with all university policies regarding cheating and plagiarism. Please clarify any questions or confusion with the instructor **before** turning in any assignment (https://provost.asu.edu/index.php?q=academicintegrity).

Students with Disabilities

Students registered with Student Disabilities Services are strongly encouraged to talk to the instructor about any assistance that might be needed for this class. Please contact the instructor earlier rather than later in the course when it may be too late to make accommodations. Students requesting accommodations must be registered with the university Disability Resource Center.

Teaching Philosophy

My goal as a teacher is to facilitate students' understanding and problem-solving relevant to the field, and to prepare them to be independent and effective learners and researchers in the future. My teaching and mentoring philosophy is informed by my research and experience in cognitive science and the learning sciences, and can be summarized through three central principles:

- Learning is an effortful and **constructive** process.
- Independent and effective learning requires **self-regulation**.
- Teachers and mentors provide **opportunities** for positive cognitive, metacognitive, and motivational development.

Teachers and mentors *cannot* force their students to learn, to care, or to strive for mastery. Instead, the power of teachers and mentors resides in their ability to *offer and enable opportunities for learning*. As the instructor, I will endeavor to identify and share useful information relevant to the course. I will also provide assignments that I believe are educational while also allowing me to assess your progress.

However, *learning is your responsibility as a student*. You will only learn (and earn better grades) if you are willing to put forth the effort to participate in the process—do the readings, do the assignments, ask questions, and consult additional resources when needed.

I am confident that you can succeed in this course and beyond!

Example Structure of a Research Proposal

Introduction

The Introduction section describes the issue that will be addressed by the research and explains why this issue is significant. The Introduction draws upon past research in order to *argue why the current research is necessary, interesting, and valuable*. The Introduction has at least two sections: Literature Review and Research Questions.

1. The **Literature Review** summarizes previous work on the chosen topic:

    a. Describe what is already known and provide clear citations related to this previous research (a minimum of five articles; use APA style citations)
    b. Summarize the most important studies that have been conducted, including their main findings and limitations
    c. Explain why past research is insufficient to answer current questions. What are the unsolved problems or unanswered questions?

2. The **Research Questions** clearly states the questions that will be addressed by the proposed research:

    a. List the questions to be explored and answered (do not propose to answer an unrealistic number of questions)
    b. Explain how the research questions are important and relate to broader issues raised in the Literature Review
    c. Describe specific claims, hypotheses, or models that will be explored
    d. Predict the most likely answers to be obtained from the research

Method

The Method section explains and justifies how the research will be conducted. The reader should be able to understand exactly what will occur during the research, and the reader should understand the rationale for these methodological choices. The Method section should explain who will be in the study, all materials and measures to used, any manipulations or interventions, and expected analyses.

1. **Participants**:

    a. Who will be recruited or examined in the study?
    b. Why are these individuals being studied?
    c. Include information about the age, gender, socioeconomic status, and other demographic background variables relevant to the research
    d. Are they any types of participants that will be excluded? Why?

2. **Materials and Measures**:

    a. Describe all measures (e.g., surveys, questions, and devices) that will be used to collect data

Comment [RR6]: Criterion 1 (C-1) and Criterion 3 (C-3)

Students will have to both write about a coherent proposal for research and present this proposal to an audience of their peers

Comment [RR7]: Criterion 2 (C-2)

An effective literature review goes beyond listing or summarizing past work and makes critical judgments about the quality, relevance, and potential limitations of that work.

b. Explain why each measure is necessary to the research
c. Explain how each measure is valid and reliable
d. Explain how each measured will be coded and/or scored

3. **Design**:

a. Describe the overall research design, including different treatments, interventions, or conditions that will vary across participants
b. What variables will be studied or manipulated?
c. Explain how these variables and manipulations will specifically address the research questions
d. How does this design answer the research questions/hypotheses?
e. What factors will be controlled for in this study?

4. **Procedure**:

a. Describe exactly what procedures participants will engage in, and in what order these tasks will occur. What will participants do?
b. Exactly how and when will observations be made, surveys be delivered, interviews conducted, etc.?
c. As necessary, describe how procedural steps will help to minimize potential problems, such as bias or contamination of data

(Potential) Results

Comment [RR8]: Criterion 2 (C-2)

In order to develop plausible and convincing "Expected Results," "Alternative Results," and interpretations, students will need to critically review and synthesize prior literature and research findings.

The Results section describes how the data will be analyzed to specifically answer each research questions. This section should explain what findings are expected, but should also discuss likely alternative outcomes and their interpretation.

1. **Expected Results**:

a. Describe the results that are expected based on past research and authors' theories and hypotheses
b. What patterns of data would *support* the hypotheses?

2. **Alternative Results**:

a. In addition to discussing what is expected, also consider the broader range of findings that are possible or plausible
b. What patterns of data would lead to a *rejection* of the hypothesis?
c. Consider different patterns of data and how each could be interpreted in terms of the research questions

References and Appendix

The **References** provide a *complete* list of all research papers and measures used to inform or conduct the research. References should be in APA style. The **Appendix** provides examples and excerpts of research materials (e.g., surveys) used in the study.

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SECOND EDITION

ASHGATE

HUMAN FACTORS METHODS

A Practical Guide for Engineering and Design

Neville A. Stanton
Paul M. Salmon
Laura A. Rafferty
Guy H. Walker
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Daniel P. Jenkins

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