Incorporating active learning in a quantitative research course at Xavier University: a course development plan

Michelle L. Johnson

Follow this and additional works at: http://utdr.utoledo.edu/graduate-projects
Incorporating Active Learning in a Quantitative Research Course at Xavier University:

A Course Development Plan

Michelle L. Johnson

Faculty Mentor: Beth Ann Hatkevich, Ph.D., OTR/L

Site Mentor: Joan Tunningley, MS, OTR/L, BCP

Site Mentor: Joanne Estes, MS, OTR/L

Department of Occupational Therapy

Occupational Therapy Doctorate Program

The University of Toledo Health Science Campus

May 2010

Note: This document describes a Capstone Dissemination project reflecting an individually planned experience conducted under faculty and site mentorship. The goal of the Capstone experience is to provide the occupational therapy doctoral student with a unique experience whereby he/she can demonstrate leadership and autonomous decision-making in preparation for enhanced future practice as an occupational therapist. As such, the Capstone Dissemination is not formal research.
Introduction

Consistent with its Jesuit tradition, Xavier University offers a rich, collaborative learning environment that challenges a diverse and capable student body intellectually, morally, and spiritually (Xavier University, 2010). The University’s rigorous undergraduate, graduate, and professional studies empower students to integrate theoretical and applied knowledge with questions of human values and ethical behavior. Its curriculum is intended to stimulate critical thinking and interdisciplinary learning that inspire cooperative, innovative, approaches to problem solving and engagement with society. Xavier’s intellectual vitality, coupled with genuine care for the personal and professional lives of the university’s students and alumni, promotes life-long learning and service to others.

In fulfilling the mission of Xavier University and the department of Occupational Therapy and with the spirit of the philosophy underpinning the educational process, faculty have defined the goal of the Master in Occupational Therapy program as producing a graduate who is:

“A competent and caring entry-level practitioner who promotes best practice in occupational therapy; skillfully interfaces roles of clinician, educator, researcher and manager; confidently provides service in both traditional and emerging practice areas; and advocates for social and occupational justice at individual, group and community levels (Xavier University, Department of Occupational Therapy, 2009).”

Faculty further believe it important that graduates are able to effectively articulate and advocate the unique role of occupation in influencing life satisfaction and impacting health and well-being; promote strong intra- and inter-disciplinary team working relationships; demonstrate sensitivity and responsiveness to diversity factors in human interactions; value a life of service provision; demonstrate exemplary professional behavior and adherence to high ethical and moral
standards; and demonstrate practices consistent with dedication to a life of self-reflection and lifelong learning (Xavier University, Department of Occupational Therapy, 2009).

Xavier University promotes students’ personal and professional growth and development of mind, body, and spirit to produce occupational therapists who are creative, critical thinkers. This prepares graduates to become change agents and advocates via direct service, consultation, policy development, and systematic critical inquiry.

Core values of Xavier University that will be addressed through this capstone experience include the demonstration of care through personal attention; ensuring broad, challenging educational experiences; fostering faith, values, morals and spiritual growth; engaging the city and its businesses, culture and communities; embracing diversity and the inclusion of all people and perspectives; and preparing students for successful lives and careers (Xavier University, 2009).

Creative and Systematic Inquiry II is an existing course instructed by Joanne Estes at Xavier University in the department of occupational therapy. The purpose of revising the existing course was to add active learning opportunities. The revised course is second course in the research curriculum at Xavier, its’ description is outlined below. This course includes (1) “Methodology and evidence-based decision making related to quantitative research, (2) culminates in the writing of a proposal for graduate research related to occupation-based practice, occupational justice, or occupational science, (3) contains grant-writing, the scientific reasoning process, and professional writing for dissemination, and (4) it further includes reflective components such as the lifelong responsibility for maintaining expertise in evidence-based practice and for self-assessment and addresses roles of researcher, practitioner and manager.”
The revised course is the second of four research related courses in the Department of Occupational Therapy. The first course, entitled Creative and Systematic Inquiry I is completed in the Fall prior to the revised course and focuses on qualitative-type research designs. In this course, students are assigned a research group of 3-4 students and a research topic.

The revised course, entitled Creative and Systematic inquiry II, is the second research course in the curriculum. Included in this course are the drafting of a research prospectus which is a brief overview of the proposed research with a literature review and tentative plans for the methods and procedures, drafting of the research proposal, and attainment of IRB approval.

The two courses that follow the revised course (entitled Graduate Research Project 1 & 2) include data collection, data analysis, and the completion of the final research paper for dissemination of results.

The faculty at Xavier University believes that the developmental process of learning builds on basic knowledge. They scaffold learning using a spiraling approach to add depth to concepts as they reoccur during progressively advanced courses and experiential learning opportunities.

Faculty create a scholarly environment where student learning is experiential, self-directed, and ultimately self-perpetuating. Social and Transformative learning theories guide key learning occupations such as discussion, critical reflection, service learning, experiential learning, and fieldwork. In this statement of educational philosophy, it is important to note the emphasis on experiential learning.

This course is related to Xavier’s curriculum design through its emphasis on evidence-based practice and critical review of the literature. These concepts are related to the importance of lifelong learning and self assessment.
The research process is applied and initiated as students write grant applications and complete a research proposal. Rooted in the course are professional writing skills as well as ethical reasoning as it relates to research. The occupational therapy process is emphasized through content associated with gathering data and measuring outcomes.

This course is related to the Xavier University’s institutional mission and philosophy through the production of Creative, scholarly work that adds to a body of knowledge; the pursuit of knowledge, and the discussion of issues confronting society; emphasis on producing a student dedicated to lifelong learning, continuous acquisition of knowledge, and the development of new skills; through encouraging critical thinking and problem solving; and by providing a rigorous, analytical, and reflective learning environment respectful of the culture, dignity, and the needs of others.
The following values and beliefs guide the faculty’s dedication in fulfilling the Missions of the University (Xavier University, 2009d) and Department of Occupational Therapy.

### Beliefs About Human Beings

This curriculum is built around a key belief that humans are biopsychosocial and spiritual beings [World Health Organization (WHO), 2001] who travel a developmental trajectory (Fisher, 1998) throughout their lifespan, constantly interacting with the environment. We recognize individuals are members of a greater community with social consciousness and social responsibility to self, to others, and to the environment. Each person is an agent, “capable, free, self-directed, integrated, and purposeful” (Yerxa, 1992, p. 81). Quality of life is dependent upon one’s ability to participate in life situations (WHO, 2001). Health-related quality of life “reflects a personal sense of physical and mental health and the ability to react to factors in physical and social environments” (United States Department of Health and Human Services, 2001, p. 10). Humans are occupational beings with strong intrinsic drives to participate in self-selected, meaningful occupations. Doing so is transformative and directly connected to one’s perceptions of health, well-being, and life satisfaction [American Occupational Therapy Association (AOTA), 2002; Law et al, 1998; Wilcock, 1998; Wilcock, 2001; Yerxa, 1998].

### Beliefs About How Human Beings Learn

Our student-centered focus on learning (Royeen, 2001) transforms individuals and enables them to effectively and creatively contribute to the betterment of society. We believe that the developmental process of learning builds on basic knowledge. We scaffold learning using a
spiraling approach to add depth to concepts as they reoccur during progressively advanced courses and experiential learning opportunities. In addition, we believe that partnering with the community serves as a rich learning environment, while engaging students in issues of ethics, values and justice.

Faculty create a scholarly environment where student learning is experiential, self-directed (Fulton et al, 1997; Knowles et al 1998; Kolb, 1984; Merriam, 1996) and ultimately self-perpetuating. Students are “active participants in the construction of their own knowledge” (Fulton et al, 1997, p. 20) while learning is advanced, focused and contextual (LaPidsus, 1989). Social Learning Theory (Hamel et al, 2001; Vygotsky, 1978) and Transformative Learning Theory (Mezirow, 1991) guide key learning activities such as discussion (Brookfield & Preskill, 1999; Rabow et al, 2000), critical reflection (Fulton et al, 1997; Schön, 1987), service learning (Clark, 1999), experiential learning and fieldwork. Furthermore, intra- and interdisciplinary cooperation and collaboration are important components of this authentic education (Leinhardt, 1992) that best prepares students to meet needs of society (Clark, 1999; Royeen, 2001). Finally, the spirit of confluent education engages hands and connects hearts (Peloquin, 2002) to produce competent and caring members of community (Peloquin, 1990).

View of Occupation

Occupations are complex (Yerxa, 1998) and may be defined as “…everything people do to occupy themselves, including looking after themselves…enjoying life…and contributing to the social and economic fabrics of their communities…” (Law et al, 1997, p. 34). Occupations have qualities related to productivity, restoration, and/or pleasure (Pierce, 2003). These occupations shape humans by facilitating change, growth and adaptation as a dynamic synthesis
Johnson Capstone Dissemination 8

of “doing, being, and becoming” (Wilcock, 1998, p. 248). Occupations provide individuals with a bridge to health as related to survival, diversion, mastery, habit, support, identity, and spiritual connection (McColl, 2002). Inability to participate in self-selected occupations may arise from factors related to biological, psychological, spiritual, or other contextual influences thereby impacting health and wellbeing. All human beings have the right to seek health and well-being through occupational participation.

**View of Occupational Therapy**

The ultimate aim of occupational therapy intervention is to promote participation in life to support function and health for individuals, groups, and society (AOTA, 2002). The richness of our professional roots (Mohr & Naylor, 1998) fosters humanistic and nurturing values as well as a holistic, integrated, and optimistic view of mankind (Yerxa, 1998). Occupational science, “an academic discipline, the purpose of which is to generate knowledge about the form, the function, and the meaning of human occupation” (Zemke & Clark, 1996, p. viii), provides a valuable scientific foundation which informs the practice of occupational therapy. Lastly, in order to thrive in the 21st century, our rapidly expanding global and advancing technological society makes critical the need for our profession to embrace human diversity and maintain expertise in use of technology.

Occupational therapists form a dynamic and collaborative partnership with service recipients in order to help them realize their occupational potential. A process model of evaluation, intervention, and outcomes is applied whereby each phase centers on the client’s human occupational performance (AOTA, 2002). Doing so requires occupational therapists to be competent practitioners, educators, researchers, and managers. We believe best practice
incorporates a commitment to caring (Peloquin, 2002), to self-reflection (Schon, 1983), and to intervention that is occupation-based, client-centered, evidenced-based, and grounded in sound ethical principles. Finally, occupational therapists have an ethical responsibility to monitor and maintain competency in these areas throughout their career.

The uniqueness of occupational therapy lies in our recognition and appreciation of the therapeutic power of occupation. We believe it is the role of occupational therapy practitioners and students to serve as advocates and to promote occupational justice (Wilcock, 1998). An occupationally just society provides opportunity for all people to develop their occupational potential (Wilcock, 1998) so they can “participate as valued members of society despite diverse or limited occupational potential” (Townsend, 1993, p. 176).

Adopted by Faculty, 10-22-07
References


LaPidus, J. B. (1989). Graduate education the next twenty five years. Paper presented at the 25th Anniversary Event, Faculty of Graduate Studies, University of Guelph, Ontario, CA.

Cited in Thomas, J., Predergast, N & Mitcham, M (2000). Professional education at the
Post-baccalaureate level: Options and strategies. Paper presented at annual meeting of the American Occupational Therapy Association, Seattle, WA.


Education for OT in Health Care, 15(12), 209-213.


Yerxa, E. (1992). Some implications of OTs history for its epistemology, values, and relation to
Johnson Capstone Dissemination 13


Philosophy of Education

John Dewey, best known as the “father of modern education,” promoted educational ideals that respected democracy and veered away from former authoritarian approaches as he advocated for educational reform that offered more experiential approaches to education for students. This position is reiterated educational philosopher, Ralph Tyler, who stated “it is what the student does that he learns, not what the teacher does” (Tyler, 1949). My beliefs parallel those of John Dewey and Ralph Tyler and are further analogous to those beliefs outlined in the American Occupational Therapy Association’s Philosophy of Occupational Therapy Education (AOTA, 2007). I believe that occupational therapy educators must facilitate learning experiences that engage the learner and encourage mastery of material through the enhancement of meaning and purpose, constructs inherent to active and hands-on types of learning experiences.

The educational process requires a considerable commitment by the teacher and the learner. Learning is an active process which can be encouraged and guided. Teaching is not talking and learning is not listening. Active participation is an important feature of learning. The learner must be involved in the educational process that builds upon prior knowledge and integrates experiential learning, academic knowledge, and clinical reasoning in order to be successful. I believe that it is the teacher’s role to set up a learning environment and guide/manipulate the situation to stimulate a desired reaction. An active learning environment involves the exchange of knowledge through discussions, group interactions and peer learning opportunities. Learning experiences should be designed to synthesize information. It is the student’s role to be objective, take in information, and critically analyze it to form opinions and allow for learning.
I believe that the ideal curriculum and course serves as a foundational base for further learning and critical inquiry. Course and curriculum objectives should be clearly stated and result from the needs and interests of the learner, philosophy of the educational program, and designed with psychological development in mind. I believe that courses should be continually re-organized and re-evaluated for continued efficacy augmentation. I encourage students to provide formative and summative feedback and evaluation of course effectiveness and instructor.

Throughout this course material will be presented through multiple types of media including: lecture presentations, group work, simulations, written assignments, readings, and hands on occupations in order to suit a variety of learning styles. It is important that students set up an appointment to meet with the instructor if additional assistance is needed or as concerns arise.

GOALS OF THE OCCUPATIONAL THERAPY EDUCATION PROGRAM

According to Presseler (1984) the ultimate measure of a program’s success is the performance of its graduates, that is, “the proof of education is practice” (p. 31). In fulfilling the Missions of the University and the Department of Occupational Therapy, and with the spirit of the Philosophy underpinning the educational process, the goal of the Master’s in Occupational Therapy program is to produce a graduate who is:

A competent and caring entry-level practitioner who promotes best practice in occupational therapy; skillfully interfaces roles of clinician, educator, researcher, and manager; confidently provides service in both traditional and emerging practice areas; and advocates for occupational justice at individual, group, and community levels.

In realizing this goal, the graduate will demonstrate the following competencies:

1. Articulates and advocates for the unique role of occupation related to influencing life satisfaction and impacting health and well being.

2. Implements *Occupational Therapy Practice Framework* using available evidence, sound clinical reasoning skills, and current technology.

3. Promotes intra- and inter-disciplinary team working relationships.

4. Displays sensitivity and responsiveness to diversity and spiritual factors in human interactions, health, and well-being.

5. Synthesizes and applies information using creative problem solving and strong critical thinking skills including effectively managing ambiguity and anticipating change.

6. Values a life of service provision and participation in community.
7. Demonstrates exemplary professional behavior and adheres to high ethical and moral standards.


COURSE DESCRIPTION

Methodology and evidence-based decision making related to quantitative research. Culminates in the writing of a proposal for graduate research project related to occupation-based practice, occupational justice, or occupational science. Includes grant-writing, scientific reasoning process (use of evidence to support decision making), and professional writing for dissemination. Includes reflective components re: lifelong responsibility for maintaining expertise in evidence-based practice and for self-assessment and addresses roles of researcher, practitioner and manager.

RELATIONSHIP TO INSTITUTIONAL MISSION AND PHILOSOPHY

♦ Explore inter-disciplinary collaboration
♦ Creative, scholarly work adds to body of knowledge
♦ Pursuit of knowledge, discussion of issues confronting society, open and free inquiry
♦ Dedicated to lifelong learning, continuous acquisition of knowledge, develop new skills
♦ Critical thinking and problem solving
♦ Provide a rigorous, analytical, and reflective learning environment which is respectful of the culture, dignity, and needs of others
**RELATIONSHIP TO CURRICULUM DESIGN**

- Emphasis of course is on evidence-based practice; critical review of literature to seek evidence in decision-making is an integral part of the course.
- Application of research process initiated as students write grant applications and complete proposal for research project to be implemented in the next semester.
- Professional writing skills embedded in course.
- Scientific reasoning emphasized with ethical reasoning (related to research) included.
- OT process: content relates to data gathering and measuring outcomes; relationship between theories that underlie practice emphasized.
- Role of researcher primary with secondary applications to roles of practitioner and manager.
- Concepts related to importance of lifelong learning and self assessment re: continuing education needs also included.

**PRIMARY COURSE OBJECTIVES**

<table>
<thead>
<tr>
<th>ACOTE Standards (2005)</th>
<th>Objectives</th>
<th>Evaluation Method</th>
<th>ACOTE Assessment Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.1.1, B.1.2, B.1.10, B.8.2- B.8.7</td>
<td>1. Demonstrate ability to produce a sound prospectus and proposal for quantitative or qualitative research study.</td>
<td>#1, #3, #6</td>
<td>1, 5</td>
</tr>
<tr>
<td>B.9.1, B.9.7</td>
<td>2. Adhere to ethical standards in research process.</td>
<td>#3, #4, #6</td>
<td>5</td>
</tr>
<tr>
<td>B.1.2, B.8.2</td>
<td>3. Apply scientific reasoning process to decision-making.</td>
<td>#2, #3, #5, #6</td>
<td>5, 6</td>
</tr>
<tr>
<td>B.1.2, B.8.1, B.8.2, B.9.7</td>
<td>4. Advocate importance of evidence-based decision-making as an OT professional.</td>
<td>#2, #3, #5</td>
<td>4, 5</td>
</tr>
<tr>
<td>B.1.2, B.8.1, B.9.7</td>
<td>5. Advocate need for continued scientific evidence to promote and develop profession of OT.</td>
<td>#2, #3, #5</td>
<td>5</td>
</tr>
<tr>
<td>B.1.2, B.1.3, B.1.9, B.1.10, B.8.3, B.8.4, B.8.5</td>
<td>6. Seek and critically review professional literature to form basis of research prospectus and proposal.</td>
<td>#1, #3, #4, #5</td>
<td>1, 5</td>
</tr>
<tr>
<td>B.1.2, B.8.9, B.9.7</td>
<td>7. Demonstrate a basic understanding of the grant-writing application process.</td>
<td>#6</td>
<td>3</td>
</tr>
<tr>
<td>B.1.3, B.6.6, B.8.3</td>
<td>8. Seek and use national and international sources for evidence-based decision-making.</td>
<td>#3, #5, #6</td>
<td>5</td>
</tr>
<tr>
<td>B.8.2, B.8.3, B.8.5</td>
<td>9. Explain and apply steps in implementing evidence-based practice as a foundation for clinical decision-making.</td>
<td>#6</td>
<td>3</td>
</tr>
<tr>
<td>B.8.5, B.8.6</td>
<td>10. Explain steps to quantitative research investigation including design, data collection, analysis, and interpretation.</td>
<td>#3, #5, #6</td>
<td>3, 5</td>
</tr>
<tr>
<td>B.8.2, B.8.4, B.8.5</td>
<td>11. Critique the rigor of quantitative methodology, analysis, and outcomes.</td>
<td>#1, #2, #3, #5, #6</td>
<td>1, 3, 5</td>
</tr>
<tr>
<td>B.8.5</td>
<td>12. Describe the range of quantitative-type research designs including critique of internal and external reliability and validity for each.</td>
<td>#2, #5, #6</td>
<td>1, 3, 5</td>
</tr>
<tr>
<td>B.8.8</td>
<td>13. Demonstrate understanding of basic descriptive, correlational, and inferential quantitative statistics</td>
<td>#5, #6</td>
<td>3, 6</td>
</tr>
<tr>
<td>B.8.7, B.9.1</td>
<td>14. Submit research proposal to XU IRB (and any relevant external IRB) for review and gain approval.</td>
<td>#4</td>
<td>1</td>
</tr>
</tbody>
</table>

REQUIRED TEXTS


*Research Manual* (Spring 2009): Xavier University Department of Occupational Therapy. [RM]

REQUIRED READING ON ELECTRONIC RESERVE


NOTE: additional articles may be placed on electronic reserve throughout the semester.

SELECTED BIBLIOGRAPHY


**Students are required to complete all assigned readings prior to the class session/lecture.**

**SCHEDULE**

The initial course schedule, with topics, assignments and due dates will be provided on the first day of class. The schedule is considered tentative, changes and adjustments are inevitable during the semester. The schedule and subsequent revisions will be posted on Blackboard. It is the students’ responsibility to check for schedule revisions each class meeting day. The instructor intends to e-mail or verbally inform students in class when any schedule revision is posted. If you have a question about the schedule, please contact the instructor.

**E-MAIL COMMUNICATION**

All students are required to use the Xavier e-mail account and to keep it clean to accept new messages. It is the responsibility of the student to check this e-mail on a daily basis for course and department communications.

**ACCOMMODATIONS FOR SPECIAL NEEDS**

According to ADA (1990) regulations, a student who has a qualified disability that requires special accommodations in a classroom setting must register with the Learning Assistance Center (LAC) before accommodations will be implemented. The first step of this process is self-identification of a disability or need for accommodations by the student. Contact the director of the LAC for further information (745-3280).

**ATTENDANCE POLICY**

Attendance to all classes is expected and will be noted and documented for inclusion in final grade calculation. Promptness for class is also expected, as late arrivals cause disruption to the instructor and other students. Three unexcused late arrivals will be treated as one unexcused absence. Five points will be deducted from the final grade for the second and any additional unexcused absence(s) incurred. Completion of a Student Absences from Class form is required in all instances of absence from class sessions; documentation (e.g. doctor’s note, obituary) must be attached in order for an absence to be excused. This form needs to be completed within a week following the absence or an otherwise excused absence will be converted to an unexcused absence. If students miss an exam or quiz, a doctor’s note or other documentation of emergency must be submitted to the instructor before the exam or assignment will be rescheduled. Students missing a scheduled class session are responsible to obtain any handout material or information presented from their peers.
TIMELY SUBMISSION OF ASSIGNMENTS

Assignments are due no later than the start of class on the due date specified in the syllabus. Unexcused late turn-ins will result in an initial 3 point reduction in grade with an additional 2 point reduction for each calendar day prior to the assignment being turned in. Students absent on the due date of an assignment will require a doctor’s note or other documentation of an emergency in order to receive an excused late turn in.

ELECTRONIC MEDIA USE

As a professional courtesy, all electronic devices should be turned off and left out of sight during class. Electronic distractions and text messaging are NOT permitted during class. Exceptions maybe approved on a case-by-case basis with prior notification. (For example, due to a family emergency it may be necessary to have your cell phone turned on vibrate during a specific class.) Use of laptops during lecture/lab is permitted for class related purposes ONLY. Classroom activities may be recorded by a student for personal use by that student or for all students presently enrolled in the class with written permission, but may NOT be further copied, distributed, published or used for any purpose.

ACADEMIC HONESTY

As integrity, honesty, and truthfulness are expected standards of ethical conduct, cheating, plagiarism and collusion will not be tolerated. At minimum, instances of plagiarism will result in a score of “0” on the assignment. As noted in the University catalogue, students found to be in violation of the Academic Honesty Policy may receive an “F” for the course and may be considered for expulsion from the University. Definitions of cheating, plagiarism, and collusion are as follows (*see policy in XU OT Student Handbook Academic Year 2010-2011).

GRAMMAR/SPELLING/PUNCTUATION

This is a professional level course. Correct grammar, spelling and punctuation are required for all assignments. Errors will result in point deductions from the assignment grade.

GRADING SCALE

The Department of Occupational Therapy uses the following grading scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100</td>
</tr>
<tr>
<td>B</td>
<td>92-85</td>
</tr>
<tr>
<td>C</td>
<td>84-77</td>
</tr>
<tr>
<td>F</td>
<td>76 and below</td>
</tr>
</tbody>
</table>

GRADE DISCREPANCY POLICY

A student who feels a grade received from the class instructor is in error may request that the grade be reconsidered. To do so, a written statement of the area of discrepancy needs to be
submitted to the course instructor. Such a statement needs to include sound justification and supportive evidence. Verbal requests for change of grade will not be considered. Requests for grade consideration must be made within one week of receiving the grade in question; reconsideration for a grade will not be provided after one week. Also, requests must be presented to the instructor no later than the last day of the semester (i.e. before final exam week).

EVALUATION METHODS/ASSIGNMENTS

<table>
<thead>
<tr>
<th>#</th>
<th>Percentage</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>10%</td>
<td>Prospectus</td>
</tr>
<tr>
<td>#2</td>
<td>20%</td>
<td>Midterm exam</td>
</tr>
<tr>
<td>#3</td>
<td>20%</td>
<td>Proposal</td>
</tr>
<tr>
<td>#4</td>
<td>20%</td>
<td>XU IRB Protocol</td>
</tr>
<tr>
<td>#5</td>
<td>15%</td>
<td>Present critique of research article</td>
</tr>
<tr>
<td>#6</td>
<td>15%</td>
<td>Final Exam</td>
</tr>
</tbody>
</table>

GRADE, ROUNDING UP POLICY

Grades for assignments and exams will be calculated out three decimal points and trimmed to two (e.g. 88.676 will become 88.67). Upon calculation of the final score, all grade percentages will be weighted as indicated and added together. At that time, and only at that time, grades will be rounded up to the nearest whole number (e.g. 92.56% will be rounded to 93%; 84.51% will be rounded to 85%). A grade lower than 0.5% of a percentage point will not be rounded up e.g. 92.49% will not be rounded up. In such a case the final percentage grade will be 92%.
## MOCT 501 COURSE SCHEDULE: (Schedule is subject to change per instructor discretion)

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Assigned Reading</th>
<th>Due</th>
</tr>
</thead>
</table>
| Jan 10  | *Review Syllabus  
              *Research Prospectus  
              *Quantitative Continuum                  | RM p. 11-14; Appendix A                   |                               |
| Jan 17  | MLK Holiday                                                |                                           |                               |
| Jan 24  | *Review of Research Process  
              *Research Proposal                              | *K Ch 4  
              *RM p. 15-20; Appendix B & C  
              *Hartman                                     | *Prospectus due                   |
| Jan 31  | *Single Subject & Case Study Designs  
              *Experimental & Quasi-experimental Design                                   | *K p. 25-28  
              *K Ch 7  
              *K p. 545  
              *K Ch 11                                      | *Graded Prospectus returned         |
| Feb 7   | *Survey Research  
              *Sampling                                           | *K Ch 8  
              *K Ch 31                                       |                               |
| Feb 14  | *Reliability & Validity of Measurement  
              *Experimental Control                              | *K Ch 12,  
              *ER P & W Ch 9                                    | *Proposal due                    |
| Feb 21  | *Document of Informed Consent  
              *Institutional Review Boards                       | *RM p. 21; Appendix D, E, F                  | *Graded Proposal returned       |
| Feb 28  | Midterm Exam  
              *Writing a research report                           | APA: Parts of a manuscript                               | *Proposal re-write due          |
| Mar 7   | Spring Break                                               |                                           |                               |
| Mar 14  | *Descriptive statistics  
              *Inferential statistics  
              *t-test & ANOVA  
              *Non-parametric statistics                   | *K Ch 15, 16  
              *K p. 243-264                                    | *Proposal re-write returned       |
| Mar 21  | *Critiquing quantitative research  
              *Meta-Analysis                                     | *K Ch 18  
              *ER McClure                                       | *XU IRB Protocol due             |
| Mar 28  | *Grant funding                                            | *K Ch 30                                      | *XU IRB Protocol returned       |
| Apr 4   | *Evidence-Based Practice                                  | *K Ch 41, 42, 43;  
              *ER Abreu; Sackett                                |                               |
| **TUES  | Apr 5**                                                   |                                           |                               |
| Apr 11  | *EBP (continued)  
              *Presentations 1-6                                    |                                           |                               |
| Apr 18  | *Presentations 7-14  
              *Course Evaluation  
              *Post-test                                          |                                           |                               |
| **FRI  ** Apr 22 | Attend Class of 2011 Research Symposium, 8:00-10:30 a.m. |                                           |                               |
| Apr 25  | Easter Break                                              |                                           |                               |
| **FRI  ** Apr 29 |                                                  |                                           | *XU IRB APPROVAL DEADLINE       |
| **FRI  ** May 2 | FINAL EXAM  
              8:30-10:20                                               |                                           |                               |
ASSIGNMENTS

NOTE: Assignments graded by Faculty Tutor (i.e. Prospectus, Proposal, & IRB Protocol; and all re-writes) are to be handed in to your faculty tutor by 9:30 a.m. on respective due dates.

Prospectus
See Research Manual (2011) for explanation of assignment and grading criteria form. The Prospectus will be graded by the faculty tutor. Groups are to turn in a binder in which the following are included:

• A copy of the Prospectus and a copy of each article referenced in the Prospectus. Articles are to be placed in alphabetical order (according to the first author’s surname) with each article tabbed according to authors’ surname(s).
• For each reference citation in the Prospectus, highlight or mark the original source material in the article (i.e. highlight, underline, etc., the content in the article and also document page and paragraph number where the material appears in the Prospectus).
• For each in-text reference citation in the Prospectus, write lightly in pencil the page number of the article from which the material is sourced.

Turn in Prospectus grading criteria form (Appendix A of Research Manual) with binder.

Proposal
See Research Manual (2011) for explanation of assignment and grading criteria forms. The Proposal will be graded by the faculty tutor. The last step before turning in the Proposal is to complete the Proposal Check-List and ensure that all items are met (see Appendix B of Research Manual). The Check-List must be turned in with each submission of the Proposal in order to avoid deduction of late points. Students are also to turn in Proposal grading criteria form (Appendix C of Research Manual).

Students will re-write the Proposal (incorporating faculty tutor feedback). The Proposal grade will be calculated based on 60%-weight for the first-write and 40%-weight for the re-write. Note: when grading the re-write, faculty tutor will likely deduct points for lack of incorporation of feedback provided in the original grading.

IRB Approval
See Research Manual (2011) for explanation of assignment and grading criteria forms. Student groups must attain and present documentation of approval by all relevant IRBs in order to avoid deductions of points for lateness. If an external IRB is involved with the project (e.g. Tri-Health; Cincinnati Children’s Hospital Medical Center), external IRB approval is attained prior to submitting a protocol to XU’s IRB; XU’s IRB requires documentation of external approval prior to consideration of a protocol. One point will be deducted from assignment grade for each calendar day after April 30 until XU IRB approval is attained. Students are responsible for attaining approval from external IRBs (note – with external IRB protocol written in collaboration with clinical tutor) and from XU’s IRB.

NOTE: Attaining external IRB approval is likely to be a lengthy process so students need to take this into consideration when planning their timeline (it is recommended that 4 weeks be
allowed for the external review and approval process); also, remember that the XU protocol is submitted after external approval and this, too, must be taken into consideration in the planning process. Students should inquire as to external IRB requirements early in the semester and plan accordingly to ensure that approval by both IRBs is attained by the April 29 deadline.

All research groups (i.e. including those submitting protocols to external IRBs) will develop an XU IRB protocol for their projects and submit it to faculty tutor for grading. In the event that external IRB approval has not been attained by the date the XU IRB protocol is due to the faculty tutor, the research group should simulate the provision that their project has been approved by external IRB for the purpose of this assignment (i.e. note external IRB approval in cover letter and include page representing external IRB approval letter in appendixes). Faculty tutor will either approve the protocol or note changes that need to be made. Students will revise and re-submit to the faculty tutor until all portions of the protocol are approved as acceptable for submission. Faculty tutor will establish due dates for revisions subsequent to the initial revision noted on syllabus schedule.

Upon faculty tutor approval, students will submit their protocol to JPE who will either approve it for submission or require additional editing. Again, if additional changes are required, students will revise and resubmit (with resubmission due dates established by JPE on group-by-group basis) until it is deemed acceptable for submission to the IRB. Students must have approval from JPE before making multiple copies of the protocol for submission or before submitting it electronically. NOTE: submitting the protocol in its entirety electronically will likely expedite XU’s approval process. See Research Manual Appendix F for grading criteria form.

Evidence Table and Presentation
Students will form pairs (i.e. partners from research group) and sign up to present a 15 minute critique (i.e. based on the completion of an Evidence Table form) of a quantitative-based research article related to their research project (sheet will be posted on office door for students to sign up for date, time, and article so that each pair of students presents a different article). Evidence Tables are to be typed with the Table and the article color coded according to instructions. Grade will be determined by 70% weighting of Evidence Table and 30% weighting of the presentation. For all students, a copy of the article and the completed Evidence Table are due April 5 for grading. Students will then incorporate feedback from grading so that information presented to the class is accurate. Assignment grades will be posted on Blackboard after the final presentation has been given and graded. See Evidence Table and grading criteria forms.
PROSPECTUS GRADING GUIDELINES

Student’s name: ______________________________________
Title of study: ________________________________________
Marked by: __________________________________________
Date: _______________________________________________

Listed below are five major areas of a prospectus. Each area has equal weighting of 20 points, giving a possible total of 100 points. The Rating Scale for determining how many points to assign is meant to serve only as a guide. If, for example, the area covering research design and procedures is explained better than “fair” (12 points) but not equal to a rating of “good” (16 points) any score between 12 and 16 points can be assigned (e.g. 13 or 14.5).

There is also a category titled “additional features.” All research studies are not the same; therefore, if the areas listed do not adequately cover some of the content of the prospectus, additional points may be awarded under this category. This category may also be used to subtract points if features specific to a particular prospectus are not adequately addressed.

0 pts = unacceptable or feature not even addressed in prospectus
4 pts = student at least identifies the need to further develop this area
8 pts = addresses it and is just passing in acceptability
12 pts = fair
16 pts = good
20 pts = excellent

Points

______ I. Statement of the Problem/Purpose- this would address the justification for the research. What is the problem? What is the purpose? Why is it a significant problem to study? What are the potential benefits (to clients or to agencies)? What is the goal of the study? What is to be accomplished? (20 pts. possible)

______ II. The Research Question, Query, and/or Hypothesis- operationalized, not vague, with terms identified. This can be the research/alternative hypothesis or the null hypothesis. For a descriptive study, a hypothesis may not be necessary. Also, a
hypothesis is not appropriate for a qualitative or naturalistic research design, rather a stated question or query is used. (20 pts. possible)

_____ III. Evidence that the study has begun to get in to the literature review process. Five sources are cited, none of which are duplicate of a partner(s). Relationship of the sources included to the literature review section is explained. (20 pts. possible)

_____ IV. (Some idea) of the research design and the methods and procedures or tentative plans the student has in mind for carrying out the research. (20 pts. possible)

_____ V. Required resources needed from within and outside the facility are indicated, including copying needs, assessments, room for testing, a statistician, computer analysis, etc. Additional resources requested can be included (those that would help but are not mandatory). (20 pts. possible)

Additional Features:

Note: Subtract points for turning prospectus in late. Three points will be deducted if not turned in by due date and time and an additional two points for each calendar day after the due date will also be deducted.

_______ = _______ %
100 pts. possible

Comments:
Outlined below are five major areas of a proposal and their respective weightings for purposes of grading. The weightings serve only as guidelines and may be adjusted to suit the individual proposal being graded. Partial points may be awarded.

<table>
<thead>
<tr>
<th>Revised</th>
<th>Original</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I. The Problem (25%)</td>
</tr>
<tr>
<td></td>
<td>- did the author provide some background to the problem? (5)</td>
</tr>
<tr>
<td></td>
<td>- is the problem and purpose of the study clearly and concisely stated? (5)</td>
</tr>
<tr>
<td></td>
<td>- is the hypothesis, question, query, or objective of the study clearly stated? (5)</td>
</tr>
<tr>
<td></td>
<td>- is the significance of the problem to occupational therapy discussed? (5)</td>
</tr>
<tr>
<td></td>
<td>- has the study been adequately delimited (operational definitions, target population, assumptions, limitations &amp; sample identified)? (5)</td>
</tr>
<tr>
<td></td>
<td>II. Review of Related Literature (25%)</td>
</tr>
<tr>
<td></td>
<td>- is the review comprehensive (i.e. have all important works been included) and appropriately related to the research area? (5)</td>
</tr>
<tr>
<td></td>
<td>- is there and Introduction, Body of review, and Summary? (5)</td>
</tr>
<tr>
<td></td>
<td>- are the relationships between previous studies and the present investigation identified? (5)</td>
</tr>
<tr>
<td></td>
<td>- is the review paraphrased and synthesized adequately vs. a list of findings from other studies with little flow or development of ideas? (5)</td>
</tr>
<tr>
<td></td>
<td>- does the author critically compare, evaluate and integrate the findings of key studies? (5)</td>
</tr>
<tr>
<td></td>
<td>III. Methods and procedures (25%)</td>
</tr>
<tr>
<td></td>
<td>- is the specific sample and method of sampling clearly outlined? (5)</td>
</tr>
<tr>
<td></td>
<td>- is the design of the study adequately described? (4)</td>
</tr>
<tr>
<td></td>
<td>- has the researcher clearly indicated what instruments will be used to collect the data and given reasons for using the instruments and procedures outlined? (4)</td>
</tr>
<tr>
<td></td>
<td>- is there sufficient detail to permit replication by another researcher? (4)</td>
</tr>
</tbody>
</table>
- do the methods and procedures show logical, thorough planning from beginning to end? (4)
- has the author outlined plans for data analysis and/or any statistical tests to be used? (4)

IV. References and Appendices (15%)
- was the material properly referenced in the text and in the reference list using APA format? (4)
- were any references cited in the text left out of the reference list? (3)
- were consent forms included in the appendix? (4)
- were data collection forms included in the appendix? (4)

V. Format and Overall Organization (10%)
- was the proposal as a whole neatly typed and well laid out? (2)
- were the major sections and subsections ordered such that there was a smooth flow to the whole proposal? (2)
- was there evidence of proofreading, no typing, spelling, or grammatical errors? (2)
- was the material presented in an organized, coherent and scholarly fashion? (2)
- was text formatted using APA format? (2)

Additional Features:

* If a clinical tutor is involved in the study, there must be evidence that he or she reviewed the Proposal (e.g., signature and date OR e-mail to faculty tutor) prior to students turning it in to faculty tutor to grade. Lack of evidence will result in a 5-point reduction from the above grade.

(2) x .60 = __________
(1) x .40 = __________

= __________ Proposal Grade

Comments:
Xavier University IRB Protocol Grading Criteria Form

_____/10 All relevant forms are included and correctly filled out (e.g., Submission Form; Human Subjects’ training certificate; Letter of Permission; HIPAA Waiver; etc.).

_____/10 Cover letter is professional in wording and appearance and includes sufficient background information to introduce the study and researchers.

_____/20 Protocol Part I (Research, Purpose, Significance) meets IRB standards.

_____/20 Protocol Part II (Methodology, Procedures) meets IRB standards.

_____/20 Protocol Part III (Informed consent procedures) meets IRB standards.

_____/15 Informed consent form(s) and assent form (if applicable) meet IRB standards.

_____/05 Appendixes: all are included and quality meets IRB standards (e.g., tests or measurements for data collection; interview guide; recruitment posters; scripts for introduction or debriefing project).

_____/100

Faculty Tutor approval (of all portions of protocol) for submission to IRB contingent upon Research Coordinator review and approval

OR:

_____ Changes that must be made before protocol is submitted to IRB:
2011 501 Evidence Table GC
DEPARTMENT OF OCCUPATIONAL THERAPY
MOCT 501
Spring 2011

Grading Criteria

Evidence Table

Each pair of students will generate one evidence table for one of the peer-reviewed literature sources (i.e. quantitative design research study) incorporated into the Proposal. Each Evidence Table must be typed with all sections completed thoroughly, accurately, and succinctly. Additionally, each section of the table must be color-coded along with the accompanying article portions (table text in specified color; article highlighted or underlined in corresponding color). In the event a portion is not specified in the article, use of the same color coding on the expected article page with a note to indicate the same will serve as a substitute. Submit accompanying article. See grading criteria.

Students:________________________________________________ Date:_________________

Evidence Table:
Note: For items #1-#3 below, the eight sections of the Evidence Tables are point-weighted as follows: I – 1; II – 1; III – 2; IV – 3; V – 5; VI – 2; VII – 2; VIII- 4.

_____/20 1. Each table section is thorough

   I ___/1; II___/1; III___/2; IV___/3; V___/5; VI___/2; VII___/2; VIII___/4

_____/20 2. Each table section is accurate

   I ___/1; II___/1; III___/2; IV___/3; V___/5; VI___/2; VII___/2; VIII___/4

_____/20 3. Each table section is succinct

   I ___/1; II___/1; III___/2; IV___/3; V___/5; VI___/2; VII___/2; VIII___/4

_____/10 4. Article text is color-coded correctly

Presentation:

_____/10 5. Information presented is thorough, accurate, and succinct; corrections made from original turn-in based on instructor feedback.

_____/15 6. Critique of study and article is clearly articulated and justified by Evidence Table.

_____/05 7. Knowledgeably responds to classmates’ questions or facilitates discussion lacking the same

_____/100 Total
### Evidence Table

**Quantitative Design**

<table>
<thead>
<tr>
<th>I. Author(s) /Year</th>
<th>II. Title (light/bright green)</th>
<th>III. Level of Evidence/ Rationale (black)</th>
<th>IV. Study Design; Sample Size &amp; Characteristics (teal/aqua/blue)</th>
<th>V. Internal Validity (See Portney &amp; Watkins, 2000) (pink)</th>
<th>VI. External Validity (See Portney &amp; Watkins, 2000) (red)</th>
<th>VII. Outcome (dark green)</th>
<th>VIII. Practice Implications (grey/pencil)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Students:

Project:
**Session # 1**  
**Date: 1/10/2011**

**Learning Outcomes:**
- a. Demonstrate ability to produce a sound prospectus and proposal for quantitative or qualitative research study.
- b. Seek and critically review professional literature to form basis of research prospectus and proposal.

**Required Reading(s):**
- a. Review of Syllabus and XUOT Research manual (pp. 11-14 & Appendix A)

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Content</th>
<th>Learning Activities</th>
<th>Instructional Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30</td>
<td>Welcome to 501</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:10</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:20</td>
<td>Initial evaluation</td>
<td>“Perceived competence in research activities” survey and pre-test</td>
<td>Handouts of survey and pre-test</td>
</tr>
<tr>
<td>11:00</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 11:10    | Research Prospectus  
- Brief summary  
- Purpose  
- Format  
- Contents  
- Grading Criteria | Listen, take notes, clarify with questions | Welcome to MOCT 501/Research Prospectus PowerPoint |
| 11:40    | Overview of quantitative research  
- Ways of knowing  
- Types of research | Listen, take notes, clarify with questions | Quantitative continuum PowerPoint |

**References:**


Perceived Competence in Research Occupations

Please answer the following questions about your level of confidence in your skill at carrying out various parts of the research process. In order to keep your response anonymous I would like you to choose an animal AND a number between 1 and 200. Please write down in another location the animal and the number used. In the post-test I will ask you to identify yourself by using the same two identifiers so that I can compare your perceptions at the beginning of the course to your perceptions at the end without knowing who you are.

I CHOOSE ANIMAL__________________          I CHOOSE NUMBER__________________

Please rank each of the following statements to describe your confidence in your skills as this point in the course. Mark how your feel TODAY about each of these statements.

**Instructions:** Circle a number between 1 and 7 where 1= least confident and 7= most confident.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I can use library resources to locate journal articles on a particular topic.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I can identify peer-reviewed journals.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I can read and understand information in review articles.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I can read and understand information from research reports.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I can critically evaluate the information contained in review articles.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I can read and understand information from case studies.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I can critically evaluate the methods and findings of case studies.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I can critically evaluate the methods and findings of research reports.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. I can identify the parts of a research protocol.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I can interpret a print-out of statistical results.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. I consciously use writing skills to avoid plagiarism.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. I can paraphrase work to reduce my need for direct quotations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I can combine 6-10 sources to write a literature review.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. I can follow APA guidelines for writing in-text citations and references.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. I can locate quality references using the internet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. I can critically evaluate information from an internet source.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. I can critically evaluate work which I have previously written.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. I can critically evaluate written work of other students.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**** Thank you for completing this survey form.
Pre-Post Test

Age: _____  Undergraduate Degree: ____________________

PLEASE NOTE: These questions are designed to assess current understanding of concepts to be covered in this course. I do not expect that you will know the answer to every question. Keep in mind that this questionnaire will not be graded. Results of this questionnaire will be utilized in further lessons.

MULTIPLE CHOICE: For each of the following questions or statements, select the response that BEST answers or completes it; record the answer’s corresponding letter on the scantron form.

1. A study which the researcher carefully designs all aspects of the study before actually collecting any data is:
   a. Qualitative
   b. Quantitative

2. The following question “How do teachers in occupational therapy classes react to distance learning?” fits in to which category:
   a. Qualitative
   b. Quantitative

3. In a __________ study design, the investigator is the data gathering instrument:
   a. Qualitative
   b. Quantitative

4. In a __________ type of study, the design emerges as the study unfolds:
   a. Qualitative
   b. Quantitative

5. A researcher is interested in knowing if achievement level in high-school mathematics is related to motivation to excel. This statement demonstrates which of the following steps in the research process?
   a. A problem statement or research question
   b. Population and sampling
   c. Data collection
   d. Implication
6. The researcher wishes to project the findings to all high-school students enrolled in public schools in her district during the 2010-2011 academic years. This statement demonstrates which of the following steps in the research process?
   a. Data collection
   b. Population and sampling
   c. Data Analysis
   d. Recommendation

7. From the above target projection group (question 6), the researcher randomly draws 50 boys and 50 girls to participate in her study: this statement demonstrates which of the following steps in the research process?
   a. Population and sampling
   b. Data collection
   c. Instrumentation/source of information
   d. Implication

8. The researcher assumes that the relationship between achievement in mathematics and motivation to excel will hold true for all of the high-school public school students in her district from which these 100 study subjects were drawn.
   a. Data analysis
   b. Implications
   c. Discussion/conclusions
   d. Recommendations

9. If this questionnaire adequately tests for all parts of the content covered in class, one can say the exam has strong:
   a. Predictive validity
   b. Concurrent validity
   c. Content validity
   d. Face validity

10. Two therapists administered a test approximately 1 week apart that assessed fine motor prehension skills. The test results showed no change in the individual status between the first and last testing session. This would indicate that the test instrument has:
    a. Internal validity
    b. External validity
    c. High reliability
    d. Low reliability

11. Which of the following is a descriptive statistic:
    a. t test
    b. ANOVA
    c. correlation
    d. cumulative percentage
12. An OT working in the school system is choosing an evaluation tool to use with a fourth-grade student who is having difficulty with handwriting. The OT would like to be able to compare the student’s performance on this assessment to the performance of other students who have taken the same assessment. The OT would MOST likely choose a:
   a. Standardized assessment
   b. Criterion-referenced assessment
   c. Norm-referenced assessment
   d. Observation-based assessment

13. The OT practitioner is reviewing the literature to determine the best treatment technique to use with a patient. When evaluating evidence-based research, the level of evidence that is considered to be the strongest is attributed to:
   a. Case studies
   b. Cross-sectional surveys
   c. Cohort studies
   d. Randomized control trials

14. To become an evidence-based practitioner, typically five steps need to be followed as evidence from the literature is used to inform practice. Identify step number four:
   a. Apply the findings to a practice setting
   b. Go to a database and locate the evidence in the literature
   c. Appraise the evidence found
   d. Evaluate how the study was applied to practice
   e. Develop the research question

15. One difference between case study research and single-subjects design research is that case study research is ________ and single subject design research is __________.
   a. descriptive; experimental
   b. rigorous; controlled
   c. a withdrawal design; analyzed using inferential statistics
   d. level III evidence; level II evidence

16. In inferential statistics, if p < 0.05:
   a. H₀ is accepted due to a Type III error
   b. there is a 5% chance of rejecting H₀ when it is true
   c. H₁ is accepted
   d. all of the above

17. Which of the following is a form of nonprobability sampling:
   a. Cluster sampling
   b. Stratified random sample
   c. Convenience sample
   d. Systematic sampling
WELCOME TO 501

January 2011

Agenda

1. Review Research Manual & Syllabus
2. Initial Evaluation
3. Research Prospectus
4. Overview of Quantitative Designs

Prospectus

- Brief summary
- Outlines plans

Purpose of Prospectus

- Tentative plans for methods and procedures
- Well into literature review

Format

- Title Page (see Research Manual, p. 14)
- Body
  - Maximum of 2 typed pages
  - Paragraph
- References
  - Minimum of four citations per student in groups of 3 – 4 students; groups of 1 – 2 students check with FT
### Title of Project
- Carefully worded
- Laser-in on your topic
- Capture interest of audience
- Statement format, not question
- Will evolve over course of project
- **≤ 12 words** [APA (6th ed.), p. 23]

### Contents of the Prospectus

#### I. Statement of Problem /Purpose
- What is the *problem* you are addressing?
- Justification
- Potential benefits
- Include literature (i.e. citations*)

*References cited in this Section count toward minimum required number of citations

#### II. Question/Query/Hypothesis*
- Clearly worded
- 2-3 major terms *operationally defined**

*may be information cited from literature

#### III. Review of Literature
- Connect your study to those published in literature
- Condense HOCS 403 Review of Literature paper; must be cohesive body of writing

#### IV. Research Design/Methods/Procedures
- Research design
- Sample
- IV & DV (if applicable)
- Tentative data collection and analysis plans

#### V. Required Resources
- What is needed to complete the study
- Additional resources to be requested
Contents of the Prospectus

VI. References

- A minimum of four per student....
Learning Outcomes:
   a. Describe and differentiate between qualitative and quantitative research paradigms
   b. Explain steps to quantitative research investigation including design, data collection, analysis, and interpretation.
   c. Adhere to ethical standards in research process.

Required Reading(s):
   b. Kielhofner chapter 4: Characteristics of sound inquiry and the research process
   c. Review of XUOT Research Manual (pp. p. 15-20; Appendix B & C)

Timeline

<table>
<thead>
<tr>
<th>Time</th>
<th>Content</th>
<th>Learning Occupations</th>
<th>Instructional Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30</td>
<td>Occupation</td>
<td>“Making God’s Eye” craft</td>
<td>Requires a second facilitator for ‘hands-on’ group</td>
</tr>
<tr>
<td>10:00</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:10</td>
<td>Research proposal</td>
<td>Listen, take notes, clarify with questions</td>
<td>Research proposal PowerPoint</td>
</tr>
</tbody>
</table>

References:


“Making God’s Eye” Craft

Divide students into two groups. Distribute materials to group A (“hands-on”). A student volunteer will teach group A the steps to “making a God’s eye” through active completion of the steps. Concurrently, group B (demonstration) will be instructed verbally about the steps to “making a God’s eye” by the course instructor. [Note: it is important that directions are given to both groups in the same order]

Materials:

- String or yarn in several colors
- 2 Popsicle or craft sticks
- Glue
- Scissors

Directions:

1. Glue the two sticks together to form an "X."
2. Tie a slip knot in the first yarn and tighten it around the intersection of the sticks
3. Wind the yarn in a figure eight around the intersection of the sticks six times
4. Work counter-clockwise, moving the yarn behind the top stick, back over the top stick, behind the left stick, over the left stick, behind the bottom stick, over the bottom stick, and behind and over the right stick to complete the first round
5. Repeat step #4 ten times
6. Knot a second color to the first
7. Repeat step #4 fifteen times
8. Tie off the yarn
Review of the Research Process

Complete discussion about the steps to the research process. Facilitate the students in completion of the steps to the research process using the “God’s eye” occupation through:

1. Review of literature: discuss the pre-reading meta-analysis. Analyze results of prior studies, conclusions, and recommendations. [*Note: there is an on-going meta-analysis of hands-on vs. demonstration being conducted at UT currently (2010). This may serve as a better “review of the literature” in the future.]

2. Identify the research question: facilitate students to consider the selection of a theoretical perspective and brainstorm hypotheses based on the review of literature
   Example: The purpose of this study is to determine whether students engaged in hands-on learning would be able to recall more of the steps and more of the correct order of the steps of an occupation than students engaged in a demonstration teaching method

3. Decide a methodology: based on the identified research question, discuss an appropriate experimental design for collecting and analyzing data for comparison of Group A to Group B. Include discussion of grouping and inclusion and exclusion criteria for the ‘study’.
   a. Pretest: ask students to write out steps to making a God’s eye craft

4. Obtaining ethical review: describe purpose and record as students identify information for IRB review (risks to participation, etc.).

5. Implement procedures and collect data (post-test): prompt students from both groups to write down steps to completion of God’s eye craft (discuss data saturation, sufficient numbers, and no missed data).

6. Manage and analyze data: tally data from each group (e.g., #of steps in correct order written during data collection) [include that quantitative data generally entered in spreadsheet/statistical analysis and concept of safe storage for confidentiality and period of time].
7. Interpret and generate findings: Based on data analysis from step 6, accept or reject the hypothesis. Examine results and ask students to brainstorm possible alternative explanations and limitations.

8. Dissemination: Discuss importance of dissemination of findings including the contribution to a body of knowledge, accountability, and nonscientific stakeholders.
Research Process

1. Review Literature

- How is question related to literature?
- Selecting a theoretical perspective
  - Defines assumptions
  - Makes question "transparent"
- Question drives method!

2. Identify Research Question

- Design => Approach
- Sample => Sampling
  - Inclusion Criteria
  - Exclusion Criteria
- Data Collection => Dependability
- Analysis => Statistics vs. Qualitative

3. Deciding Methodology

- Need
- Rationale
- Plan
- Methods

4. Writing a Prospectus/Proposal
5. Obtaining Ethical Review

- **Purposes**
  1. "Protect subjects from any harm,
  2. Ensure that subjects' effort and any risk involved is warranted by the study's importance, and
  3. Ensure subject freely give informed consent to participate." (Kielhofner, 2004, p. 42)

- Cannot begin data collection until IRB approves study protocol!
- Cannot deviate from approved procedures without prior IRB approval

6. Implement Procedures & Collect Data

- **Quantitative =>** highly structured
- **Recruit Subjects =>** presentations; fliers; brochures; e-mail
- **Sufficient data =>** Saturation; Sufficient numbers; No missed data

7. Manage and Analyze Data

- **Quantitative data entered in data base or spreadsheet for descriptive or statistical analysis**

- **Safe storage**
  - Confidentiality
  - Don’t lose it!

8. Interpret and Generate Findings

- **Hypothesis testing =>** Accept or Reject
- **Examine for alternative explanations =>** Make sure no missing or incomplete data
- **Degree of confidence in findings =>** Consider limitations

9. Dissemination

- "No study is complete until it has been formally shared with other members of the scientific community and other interested constituencies.” (Kielhofner, p. 45)

- **Contribute to body of knowledge**
- **Accountability**
- **Nonscientific stakeholders**
The Research Proposal

Purpose of Research Proposals

- “...synthesis of critical thinking and scientific literature...” (p. 759)
- Grant application
- IRB proposal
- Communication with consultants
- Guide for carrying out research

Characteristics of a Proposal (DuBois & Gill, 2013)

1. Clarity
2. Precision
3. Parsimony
4. Attention to structure

Contents of Proposal

- Title Page (Research Manual, p. 20)
- Table of Contents
- Body
  1. The Problem
  2. Review of Literature
  3. Methods and Procedures
- Reference List
- Appendixes

I. The Problem

NOTE: the following 9 sub-sections may be combined in various formats to promote flow of ideas

1. Introduction
2. Statement of the Problem
3. Purpose of the Study
4. Hypothesis/Question/Query*
5. Rationale

*Select the most appropriate identifier vs. including all 3

I. The Problem (cont)

6. Scope of the Study
7. Assumptions
8. Limitations
9. Definition of Terms
II: Review of the Literature

NOTE: Add five reference citations per student in groups of 3-4 students; groups of 1-2 students check with FT
- Introduction
- Body – with sub-headings
- Summary

III. Methods & Procedures
- Sample
- Research Design
- Instrumentation
- Procedures
- Data Analysis

At the end....
- Reference List
- Appendixes – examples include, but are not limited to...
  - Cover letter
  - Questionnaire/Survey
  - Interview Guide
  - Copies of Assessments (within copyright restrictions)
  - Consent forms

Review, Revise, Edit, Revise, Review
(Francis & Watkins, 2008)

- Reviewers:
  - Knowledgeable about topic
  - Knowledgeable about design and methodology
  - Unfamiliar with topic (readability)
Session #: 3  Date: 1/31/2011

**Learning Outcomes:**
- Critique the rigor of quantitative methodology, analysis, and outcomes.
- Describe the range of quantitative-type research designs including critique of internal and external reliability and validity for each.

**Required Reading(s):**
- Kielhofner chapter 7: Group comparison studies: Quantitative research designs
- Kielhofner pp. 25-28, 545
- Kielhofner chapter 11: Single-subject research

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Content</th>
<th>Learning Activities</th>
<th>Instructional Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30</td>
<td>Single Subject Design</td>
<td>• Listen, take notes, clarify with questions</td>
<td>Single Subject PowerPoint, video</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• “TUG video”</td>
<td></td>
</tr>
<tr>
<td>10:20</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:30</td>
<td>Case Study Design</td>
<td>• Listen, take notes, clarify with questions</td>
<td>Case Study PowerPoint, dry-erase board</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• “CS and SSD comparison”</td>
<td></td>
</tr>
<tr>
<td>11:10</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:20</td>
<td>Experimental &amp; Quasi-experimental designs</td>
<td>• Listen, take notes, clarify with questions</td>
<td>Experimental &amp; Quasi-experimental designs PowerPoint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• “An experiment in course evaluation”</td>
<td></td>
</tr>
<tr>
<td>12:10</td>
<td>Review</td>
<td>“Research Design Notes”</td>
<td>Handout “Ongoing research design notes”</td>
</tr>
</tbody>
</table>

**References:**


TUG Video

Use the following video to demonstrate single subject experimental designs. The first portion of the video shows a woman with MS walking without FES. The second portion of the video shows the same woman walking without an assistive device with the use of FES stimulation dorsiflexion. Conduct and experiment using stop watches to time the woman (as in the “Timed Get Up and Go” (TUG) test and/or discuss how after removal of the FES, the woman would return to “baseline.”

http://www.youtube.com/watch?v=xDBEZiAAEpA
CS and SSD Comparison

Instructions: Using the white board, facilitate students in identifying the similarities and differences between CS and SSD. See example below:

- **Descriptive**
  - Systematic reporting
  - No baseline
  - Lacks rigor
  - Difficult to replicate
  - No statistical analysis
  - Weak internal validity

- **Experimental**
  - Cause-Effect
  - Baseline measurements
  - DV & IV
  - Repeated measures

- Different from single-subject design
  - SSD is experimental/quasi-experimental
  - Cause/effect research
  - Baseline data
    - DV (outcome) repeatedly measured to determine change because of the intervention (IV)
    - Repeated measures of variable of interest is hallmark of SSD

- Case Study: systematically reporting a single case
  - No baseline data
  - Lacks rigor (uncontrolled variation in study)
• Difficult to replicate b/c there’s no design, limited generalization
• No statistical analysis
• Subjects as own control (improvement compared to baseline)

An Experiment in Course Evaluation

Hypothesis: Type of snack provided to students will influence course evaluation results

Sample: drawn from the class population

Conditions of the IV: Hershey’s kisses vs. no snack

DV on which all participants are measured:

<table>
<thead>
<tr>
<th></th>
<th>SD</th>
<th>D</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
</table>
1.      |     |    |    |    |
2.      |     |    |    |    |
3.      |     |    |    |    |
4.      |     |    |    |    |
5.      |     |    |    |    |

Demonstrate: repeated measures, carryover, etc.
# Ongoing Research Design Notes

<table>
<thead>
<tr>
<th>Research Design</th>
<th>Surveys</th>
<th>Single-Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Reliability:</td>
<td>Notes:</td>
<td>Design Reliability:</td>
</tr>
<tr>
<td>Design Validity:</td>
<td></td>
<td>Design Validity:</td>
</tr>
<tr>
<td>Pros:</td>
<td></td>
<td>Pros:</td>
</tr>
<tr>
<td>Cons:</td>
<td></td>
<td>Cons:</td>
</tr>
</tbody>
</table>

---

**Surveys**

- Design Reliability:
- Design Validity:
- Pros:
- Cons:

**Single-Subject**

- Design Reliability:
- Design Validity:
- Pros:
- Cons:
<table>
<thead>
<tr>
<th>Case Study</th>
<th>Design Reliability:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Design Validity:</td>
</tr>
<tr>
<td></td>
<td>Pros:</td>
</tr>
<tr>
<td></td>
<td>Cons:</td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>Design Reliability:</td>
</tr>
<tr>
<td></td>
<td>Design Validity:</td>
</tr>
<tr>
<td></td>
<td>Pros:</td>
</tr>
<tr>
<td></td>
<td>Cons:</td>
</tr>
<tr>
<td>Notes:</td>
<td></td>
</tr>
<tr>
<td>Quasi-Experimental</td>
<td>Design Reliability:</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td></td>
<td>Design Validity:</td>
</tr>
<tr>
<td></td>
<td>Pros:</td>
</tr>
<tr>
<td></td>
<td>Cons:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meta-Analysis</th>
<th>Design Reliability:</th>
<th>Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Design Validity:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pros:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cons:</td>
<td></td>
</tr>
</tbody>
</table>
**Single-Subject Design**

**Case Study Design**

---

**Limitations of Experimental Designs**

- Control groups & large numbers of subjects
- Generalization doesn’t appreciate individual differences
- Can’t differentiate those who responded favorably from those who didn’t improve
- Group designs only measure pre- and post

---

**Single-Subject Designs**

- **Purpose** → “…allow us to draw conclusions about the effects of treatment based on the responses of a single patient under controlled conditions.” (Portney & Watkins, p. 236)

---

**Single-Subject Designs**

- **Purpose** → Used to study...
  - Comparisons between
    - Several treatments
    - Components of treatments
    - Treatment and no-treatment
    - Sequential activities

---

**Single-Subject Designs**

- **Purpose** → Observe change under on-going treatment
  - **IV** → intervention
  - **DV** → target behavior
    - Observable, quantifiable, valid indicator
SSD Structure

- Repeated Measurement
  - Of a behavioral response over time
  - Observe trends and patterns
  - “…evaluate variability of behavioral response over time.” (P & W, p. 236)
  - Advantage ➔ modify design to obtain meaningful outcomes

- Design Phases
  - Baseline phase ➔ A
  - Intervention phase ➔ B
  - A-B design

Structure

Ethical issues: collection of baseline data
1) Not unethical to withhold treatment for short period when unsure about effectiveness of current treatment

2) Not denying all treatment to patient

Baseline Characteristics

- Stability: consistency of response over time
- Trend: slope showing rate of change

SSD Structure

- “Collection of baseline data is the single feature of a single-subject design that particularly distinguishes it from clinical practice, case studies and traditional experimental designs…” (p. 237)
**Length of Phases**
- It depends…
  - Type of patient
  - Type of treatment
  - Expected rate of change
  - Equal phases
  - Extend until have stability
  - Minimum of 3-4 data points in each phase

**Target Behavior**
- Choice of target behavior is important first step
  - Impairments
  - Functional limitations
  - Measures of disability
  - Individualized measurements

**Measuring Target Behavior**
- Frequency
  - Frequency count
  - Operational definitions
  - Not always useful
  - Percentage
  - Rates

**Measuring Target Behavior**
- Duration
  - Cumulative total vs. individual occurrence
  - Operational definitions
  - Percentages

**Measuring Target Behavior**
- Magnitude
  - Quantitative scores
  - Outcomes: impairments, functional limitations, disability measures

**Interval Recording for Observational Measures**
- Observational measures
  - Frequency & duration
  - Occurrence and non-occurrence
  - Interval recording => time sampling
Choosing a Target Behavior

- Consider stability
- Intervention to address target behavior
- Behavior is valid indicator of intervention effectiveness
- Treatment will cause change in behavior
- Instrumentation
- Clinical goals
- Performance vs. functional outcomes

Limitations of the A-B Design

- Lack of control
- Replication of effects
  - Repeat phases
  - Alternating two or more interventions
  - Replicate effects
    - Across more than one subject
    - Within one subject across multiple conditions

Withdrawal Designs

- Experimental control
- Within-series designs

A-B-A Design

- Baseline following intervention
- Behavioral change only evident during intervention
- Internal validity controlled
- Disadvantages
  - Behavior must be reversible
  - Ethical ramifications

A-B-A-B Design

- Two opportunities to evaluate effects of intervention
- Limitation: behaviors must be reversible to see treatment effects
- If target behavior stays level during 2\textsuperscript{nd} baseline, still possible to show change if further improvement during 2\textsuperscript{nd} intervention
Multiple Treatment Designs

- Compare the effects of two treatments
- A-B-C-B Design
  - Effects of reinforcement procedures
  - See differences across four phases of study
  - Replicating B phase provides control to document differences between two treatments

Data Analysis

- Visual Analysis
- Statistical Analysis

Visual Analysis

- Stability
- Trend
- Phase comparisons
  - Level
  - Trend
  - Slope

Celeration Line

- Estimates trend within data series
- Demonstrates trend in data

Generalization of Findings

- Continued success of intervention under changed conditions
- Follow-up or maintenance phase

External Validity

- Contribution of single-subject research: individual treatment and circumstances can be established
- Clinically significant vs. statistically significant results
- Replicate studies
Direct Replication
- Same procedures with different subjects or repeat study on same subject
- Results accumulate across subjects
- One experiment & three successful replications (Barlow & Hersen as cited in Portney & Watkins, p. 269)
- Flexibility

Systematic Replication
- Findings can be observed under different conditions
- After generalization across subjects established
- Search for exceptions

Clinical Replication
- Applicability
- Advanced replication
- “…combine and recombine successful treatments for coexisting problems…” (p. 270)
- Establish conditions where positive results can be expected

Social Validation
- “…importance of treatment effects within a social context…” (p. 271)
- Setting treatment goals
- Acceptability of treatment procedures
- Magnitude of treatment effects

Limitations of SSD (Domholdt, 2005)
1. Ethical issues
2. Weaker designs don’t control for threats to internal validity
3. Generalizability may be low
4. Statistical analysis in infancy

Advantages of SSD
- Clinical utility
- Outcomes research
- Individual differences
- Source of empirical hypotheses
Objective

“...investigate the effects of therapy balls as seating on in-seat behavior and legible word productivity of students with attention deficit hyperactivity disorder. Additionally, social validity was assessed to evaluate teacher and student opinions regarding the intervention” (Schilling et al., 2003, p. 534)

Variables (Schilling et al., 2003, p. 535-536)

- IV: Therapy ball
- DV1: In-seat behavior
- DV2: Legible work productivity

A-B-A-B Interrupted time series

- A seated in chair
- B seated on therapy ball
- A seated in chair
- B seated on therapy ball

Each phase was 3 weeks long

Social Validity (Schilling et al., 2003, p. 536)

- Questionnaires to teacher and students
  - Three choices: ball, chair, nd
  - “Students had better attention to task when sitting on ________”
  - “I finish my work better sitting on ________”
Results: Social Validity/Students
- All 3 students with ADHD preferred balls to chairs for comfort, writing, and productivity
- Of the 21 other students, 21 preferred balls, 2 preferred chairs, and 2 had no preference

Results: Social Validity/Teacher
- “Although students are bouncing, they are more focused on what I am saying”
- “The noise level immediately decreases”

Case Study Design

Descriptive Research
- Existing phenomena
- Describes how variables change over time
- Foundation for
  - classifying individuals
  - identifying relevant variables
  - asking new research questions
(p. 201)

Retrospective Research
- Ex post facto
- Can’t control operational definitions or reliability of data collection
- Clinical data bases
Prospective Research
- "...direct recording in the present..." (p. 278)
- More reliable
- Time-consuming and expensive

Case Studies
- In-depth description
- Group, institution, social unit
- Unusual patient or innovative treatment

Case Studies
- History
- Demographics
- Treatment plan
  - Literature
  - Interventions, responses, follow up

Case Studies
- Data
  - Qualitative or quantitative
  - Subjective or objective

Case Studies
- Generates inductive hypotheses
- Discover relationships

Case Studies
- Direct applicability to patient care
- Least rigorous
  - Weak internal validity
  - Limited external validity
Case Studies

- Enhance validity
  - Objectify treatment effects
  - Demonstrate treatment effects under different conditions
  - Multiple DVs
  - Outcome measures with large and immediate changes
  - Long-range success
  - Literature

Case Studies

- Advantages
  - Depth
  - Unique circumstances missed in group design

CASE STUDY DESIGN


Objective

- “We examined the efficacy of a remotely based arm rehabilitation regimen. A 62-year-old man participated in occupation-based, task-specific practice of activities of daily living (ADLs) >3 years after stroke. The entire regimen was administered over the Internet using personal computer-based cameras and free network meeting software.” (p. 73)

Method

- Pretest-Posttest Case Study design
- Assessments
  - Fugl-Meyer
  - Action Research Arm Test
  - COPM
- 4 week intervention

Results: FM & ARA

<table>
<thead>
<tr>
<th>Test</th>
<th>Pre</th>
<th>Post</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>25</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>ARA</td>
<td>75</td>
<td>65</td>
<td>10</td>
</tr>
</tbody>
</table>

http://www.rehabhospital.org/Manager/BionessH200.pdf
**Results: COPM**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Performance Change</th>
<th>Cognitive Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting</td>
<td>3.2</td>
<td>3.8</td>
</tr>
<tr>
<td>Eating</td>
<td>3.2</td>
<td>3.8</td>
</tr>
<tr>
<td>Taking a pill</td>
<td>3.2</td>
<td>3.8</td>
</tr>
<tr>
<td>Balancing</td>
<td>3.2</td>
<td>3.8</td>
</tr>
</tbody>
</table>

**Conclusions** (p. 78)

- “Affected UE impairment and functional limitation each decreased…
- Ability and satisfaction while performing ADLs with affected UE each increased.”
**EXPERIMENTAL AND QUASI-EXPERIMENTAL DESIGNS**

**HYPOTHESIS:**
**TYPE OF SNACK PROVIDED TO STUDENTS WILL INFLUENCE COURSE EVALUATION RESULTS**

**DEFINITION OF AN EXPERIMENT: 7 KEY FEATURES**

1. One representative sample drawn from a population

   ![Diverse sample](image)

2. One categorical IV

   ![Snack options](image)

3. Study participants are randomly assigned to as many groups as there are conditions to the IV

   ![Random assignment](image)

4. The IV is administered as planned.

   ![IV administered](image)
5. Potentially confounding variables are minimized, and otherwise uncontrollable events are equally likely across the groups.

6. There is one DV on which all subjects are measured or categorized.


TRUE EXPERIMENTAL DESIGNS

- Single-Factor Designs for Independent Groups: Pretest-Posttest control group

TRUE EXPERIMENTAL DESIGNS

- Matched-Pairs
### REPEATED MEASURES

<table>
<thead>
<tr>
<th>R</th>
<th>X</th>
<th>O</th>
<th>X</th>
<th>O</th>
<th>X</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Y</td>
<td>O</td>
<td>Y</td>
<td>O</td>
<td>Y</td>
<td>O</td>
</tr>
</tbody>
</table>

- **R** = Randomization
- **X** = IV or intervention
- **Y** = Different intervention or placebo
- **O** = Observation (measurement for DV)

### RANDOMIZED FACTORIAL DESIGN

#### 2 X 2

- **RO XY**
- **RO X**
- **RO Y**
- **RO O**

- **R** = Randomization
- **X** = M & Ms (1st IV)
- **Y** = Kisses (2nd IV)
- **O** = Course Eval
- **= Observation (DV)**

#### 2 X 3

<table>
<thead>
<tr>
<th>R</th>
<th>O</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>O</td>
<td>X</td>
<td>Y</td>
<td>Z</td>
</tr>
<tr>
<td>R</td>
<td>O</td>
<td>X</td>
<td>Z</td>
<td>Y</td>
</tr>
<tr>
<td>R</td>
<td>O</td>
<td>Y</td>
<td>X</td>
<td>Z</td>
</tr>
<tr>
<td>R</td>
<td>O</td>
<td>Y</td>
<td>Z</td>
<td>X</td>
</tr>
<tr>
<td>R</td>
<td>O</td>
<td>Z</td>
<td>X</td>
<td>Y</td>
</tr>
<tr>
<td>R</td>
<td>O</td>
<td>Z</td>
<td>Y</td>
<td>X</td>
</tr>
</tbody>
</table>

- **R** = Randomization
- **X** = IV or intervention
- **Y** = IV = M&Ms (plain)
- **Z** = IV = M&Ms (peanut)
- **O** = DV (Course Eval)

### RANDOMIZED CONTROL TRIALS

- **DV** = health outcome
- **IV** = clinical intervention
- **Control group**
- **Random assignment to groups**

- **"Gold Standard"**
RCT

- Issues
  - Dropouts threaten validity
  - Bias
  - Categorical measurements

Cluster RCT (“Nested”)

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>O</td>
<td>X</td>
<td>O</td>
</tr>
<tr>
<td>R2</td>
<td>O</td>
<td>X</td>
<td>O</td>
</tr>
<tr>
<td>R3</td>
<td>O</td>
<td>X</td>
<td>O</td>
</tr>
<tr>
<td>R4</td>
<td>O</td>
<td>X</td>
<td>O</td>
</tr>
<tr>
<td>R5</td>
<td>O</td>
<td>Y</td>
<td>O</td>
</tr>
<tr>
<td>R6</td>
<td>O</td>
<td>Y</td>
<td>O</td>
</tr>
<tr>
<td>R7</td>
<td>O</td>
<td>Y</td>
<td>O</td>
</tr>
<tr>
<td>R8</td>
<td>O</td>
<td>Y</td>
<td>O</td>
</tr>
</tbody>
</table>

- R = Randomization at site
- X = IV (Broccoli)
- Y = IV (Wine)
- S1 = Xavier U.
- S2 = Ohio State U.
- S3 = Eastern Kentucky U.
- S4 = U Southern California
- S5 = St. Louis U.
- S6 = Creighton U.
- S7 = Cleveland State U.
- S8 = U of Toledo
- O = DV (i.e. Course Eval)

Crossover or Counterbalance Designs

Latin Square

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>X</td>
<td>O</td>
<td>Y</td>
</tr>
<tr>
<td>R</td>
<td>Y</td>
<td>O</td>
<td>Z</td>
</tr>
<tr>
<td>R</td>
<td>Z</td>
<td>O</td>
<td>X</td>
</tr>
</tbody>
</table>

- R = Randomization
- X = Intervention 1
- Y = Intervention 2
- Z = Intervention 3
- O = DV (Outcome; Course Eval)

Experimental Designs: True vs. Quasi

- True experimental design
  - Randomized subject assignment
  - ≥ 2 comparison groups
  - Controls most internal validity threats

- Quasi-experimental design
  - No random assignment for comparison
  - Internal validity threats not controlled
  - Unequal groups
  - Real world, natural settings

Quasi-experimental Designs

One-Group Designs

- One-group pretest-posttest design
  - No comparison group
  - Defended by previous research
  - Ethical grounds for lack of control group
  - Useful
    - Experimental situation isolated
    - Temporal effects minimized

Simple design

\[ \theta_1 \quad X \quad \theta_2 \]
QUASI-EXPERIMENTAL DESIGN MULTIGROUP DESIGNS

- Pretest-Posttest Control Group Design
- Nonequivalent Pretest-Posttest Control Group Design

R 0 X 0
0 0 0

0 X 0
0 0 0

QUASI-EXPERIMENTAL DESIGN MULTIGROUP DESIGNS

- Posttest-only Design
- Nonequivalent Posttest-Only Control Group Design

R X 0
0 0

X 0
0 0

QUASI-EXPERIMENTAL DESIGN MULTIGROUP DESIGNS

Non-randomized Comparison Group

M X 0
M Y 0

TYPE I ERROR

- "...reporting a relationship when there really is no relationship..." (Rosenthal & Rosnow as cited in Kielhofner, 2006, p. 70)

TYPE II ERROR

- "...the failure to find and report a relationship when the relationship actually exists.”
  (Kielhofner, 2006, p. 72)
Learning Outcomes:

a. Critique the rigor of quantitative methodology, analysis, and outcomes.
b. Describe the range of quantitative-type research designs including critique of internal and external reliability and validity for each.

Required Reading(s):

a. Kielhofner Chapter 8: Survey Research Design
b. Kielhofner Chapter 31: Securing samples for effective research across research designs

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Content</th>
<th>Learning Activities</th>
<th>Instructional Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30</td>
<td>Survey</td>
<td>Listen, take notes, clarify with questions “Survey Research Critique”</td>
<td>Survey PowerPoint, Revised Perceived Competence Survey handout</td>
</tr>
<tr>
<td>10:30</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:40</td>
<td>Survey Research Simulation</td>
<td>“Survey Research Construction Simulation”</td>
<td>Simulation Handout</td>
</tr>
<tr>
<td>11:20</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:30</td>
<td>Sampling</td>
<td>Listen, take notes, clarify with questions “Sampling Review Questions” “Processing Activities 1 &amp; 2”</td>
<td>Sampling PowerPoint, review questions handout, dry erase board, sampling procedures visual handout</td>
</tr>
<tr>
<td>12:10</td>
<td>Review</td>
<td>“Ongoing research critique notes”</td>
<td>Handout</td>
</tr>
</tbody>
</table>

References:


Survey research critique of revised perceived competence survey:

1. Identify research question/hypothesis
2. Is demographic information assessed? Is it sufficient to use for generalization?
3. Are the questions presented in a logical sequence?
4. What are some of the pros and cons of the design of the survey?
5. Is it evident that there was a review of preliminary drafts?
6. Are you able to determine the method of sampling participants? Is it appropriate? If no, sampling methods would you recommend? Justify your answer.
7. Is the survey introduced with a cover letter? If no, what topics/items should be included?
8. Does the survey include a document of informed consent? If no, and if you were writing a document of informed consent, what topics should this document include?
9. Is there a plan for follow-up? If no, identify a logical plan for follow-up with participants.
10. What types of questions are included in the survey? Is there a good mix of types of questions? Do questions address the time frame appropriately? Based on your answers, what recommendations would you make to the authors of the survey?
11. Practice converting questions between styles (open ended, likert, VAS, branching, continuum, grid/checklist, rank order, etc.).
Revised Perceived Competence in Research Occupations

**Background Information:**

Age: ______  Sex: ______

Undergraduate School: _______________________________________________________

Undergraduate Degree: ______________________________________________________

Race (circle one): Caucasian    African American    Native American
Pacific Islander    Asian    I prefer not to respond

Ethnicity (circle one):   Hispanic    Non-Hispanic    I prefer not to respond

Residence (circle one):     In State   Out of State

**Perceived Competence:** Please rank each of the following statements to describe your confidence in your skills as this point in the course. Mark how you feel TODAY about each of these statements.

**Instructions:** Circle a number between 1 and 7 where 1= least confident and 7= most confident.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I can use library resources to identify journal articles on a particular topic.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>I can identify peer-reviewed journals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>I can read and understand information in review articles.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>I can read and understand information from research reports.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>I can critically evaluate the information contained in review articles.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>I can read and understand information from case studies.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7.</td>
<td>I can critically evaluate the methods and findings of case studies.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8.</td>
<td>I can critically evaluate the methods and findings of research reports.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9.</td>
<td>I can identify the parts of a research protocol.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10.</td>
<td>I can read a print-out of statistical results.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11.</td>
<td>I consciously use writing skills to avoid plagiarism.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12.</td>
<td>I can paraphrase work to reduce my need for direct quotations.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13.</td>
<td>I can combine 6-10 sources to write a research paper.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14.</td>
<td>I can follow APA guidelines for writing in-text citations and references.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15.</td>
<td>I can find information using the internet.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16.</td>
<td>I can critically evaluate information from an internet source.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17.</td>
<td>I can critically evaluate work which I have previously written.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18.</td>
<td>I can critically evaluate written work of other students.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Please rate the quality of your background in the following areas (place an X in the corresponding box):

<table>
<thead>
<tr>
<th>Area</th>
<th>Very poor</th>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Very Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of journal articles on a particular topic using library resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critical evaluation of information in quantitative research articles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification of the parts of a quantitative research protocol</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research writing skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using APA guidelines for writing in-text citations and references</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critical evaluation of information from an internet source</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please rank the following sources for finding articles from most commonly used (1) to least commonly used (8):

- _____ XU Journal Center
- _____ AOTA.org
- _____ American Journal of Occupational Therapy
- _____ OT International
- _____ OT Journal of Research
- _____ OT Practice
- _____ Google or similar search engine
- _____ XU online catalog

Which source are you most likely to use to determine the correct format for a reference citation? (circle one):

APA Manual

Online website: (which one) _____________________________________________

Do you use the “Ask the librarian” feature on the McDonald Library website? _____ Yes _____ No

If yes, please give an example:

____________________________________________________________________________________
Have you attended a library research seminar?  _____Yes  _____No

If yes, what topics were discussed?:
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

Have you ever requested a consultation with a librarian when working on a research project?  
_____Yes  _____No

If yes, was this consultation helpful?:
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

Have you ever requested a consultation with a statistician when working on a research project?  
_____Yes  _____No

If yes, was this consultation helpful?:
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

Thank you for completing this survey form.

Survey Research Construction Simulation:

You are the owner of a private practice occupational therapy practice and you have several OTs and COTAs working for you. You are interested in finding out about how satisfied your clients (parents of the children treated in your practice) are with the therapy they have received by your therapists. Construct a ten-item Patient Satisfaction Survey based on common principles of survey construction. You must take into consideration the strengths and weaknesses of scale format, open-ended vs. closed ended questions, question order, and question wording. Additionally, provide brief answers to the following questions:

1. Discuss the strengths and weaknesses of survey research in general.
2. Outline the important considerations in constructing survey questions/items. Be specific. Address each of the broad categories of considerations listed above.
3. Compare the strengths and weakness of three different modes of survey administration: self administered by mail, interview, and telephone. Consider survey length, time, and costs involved.
4. For the survey you have constructed, choose a mode of administration that you feel is most appropriate and discuss why. Hint: there is no “right” answer as long as you can justify your methods.

Sampling Procedures

Non-Probabilistic sampling procedures (not everyone had a known chance of "making it" into your sample)
- Convenience
- Purposive
- Quota
- Snowball

Probabilistic Sampling Procedures (every member of the population had a known chance of "making it" into your sample--although not necessarily equal chance)
- Simple Random
- Systematic
- Stratified
- Cluster
Sampling Processing Activity (1):
Using all OT majors at Xavier University as the population, formulate a research question. How would you sample from this population using the various techniques described in lecture?

Sampling Processing Activity (2):

Brainstorm scenarios with your group in which you would choose a non-probabilistic sample over a random sample. Choose at least two of the scenarios to share with the rest of the class. Be sure to describe why the non-probabilistic sample was the best choice.

Sampling Review Questions

Using the following list, identify the type of sampling procedure used in each scenario below:

a. Convenience Sample
b. Purposive/Judgment Sample
c. Quota/proportional Sample
d. Stratified Random Sample
e. Cluster Sample
f. Snowball Sample

1. ______E______ sampling was used in order for the total sample to have “equal numbers of boys (n=20) and girls (n = 20), 6- and 7-year olds (n = 20 each), and to allow for equal numbers of right-handed (n = 32) and left-handed (n=8) children in each group” (Smith-Zuzovsky & Exner, 2004).

2. ______B______ “Participants were identified by their occupational therapist, school psychologist, or special education teacher according to predetermined criteria including having a learning disability as defined by the State of Washington”(Handley-More, Deitz, Billingsley, & Coggins, 2003).

3. _____G______ Use of posters and brochures were used to recruit subjects. “Word of mouth and personal contacts were also used” (Clemson, Manor, & Fitzgerald, 2003).

4. _____A_____ The sample was 140 participants who were selected from four groups with different levels of neurological impairment and community participation. There was a limitation in that the levels of education were not equal among the four groups. Education was used and controlled for as a covariate in the statistical analysis to compensate (Goverover & Josman, 2004).
5. A school superintendent wishes to identify the attitudes of fourth-grade teachers in her district towards a new method of teaching science. She will be administering a survey to selected teachers to identify the survey recipients; she uses a three-phase procedure:

a. First, she divides her district into rural and urban areas. Next, she lists the schools in both the rural and urban areas and, using the table of random numbers, draws an equal number of rural and urban schools. Finally, she distributes the surveys to ALL of the fourth-grade teachers in the schools selected in step 2. The superintendent is using ___F______ sampling method.

b. Suppose instead of using the three-step process (in case a), the superintendent pre-targeted ONLY those fourth-grade teachers who had at least a Master’s degree and five years of experience teaching fourth grade. Then, _____B______ sampling method is used.

c. _____E____ sampling method is used if IN ADDITION to the facts in scenario b, the superintendent also non-randomly tries to maintain the approximate male-to-female teacher ratio balance that exists generally in her district.

d. ____A_____ sampling method is used if the superintendent tries to “keep it simple” by only surveying those fourth-grade teachers in the school that happens to be located closest to the district office.

e. ___G____ sampling method is used if the superintendent starts with one fourth-grade teacher who is most accessible and asks that teacher to circulate a flyer announcing the study in the teacher’s lounge.
**Survey Research**

**Questionnaires**
- Advantages
- Disadvantages

**Self-Report**
- Bias or inaccuracy
- Recall bias
- Perceptions, fears, motivations, attitudes

**Design of Surveys**
1. The Research Question
   - Guiding Questions
   - Hypotheses (relationships)
2. Questionnaire Outline
   - Detailed!
2. Review of existing instruments

3. Designing the Instrument
- Knowledge, skills, attitudes from guiding questions
- Categories
- General to specific
- Demographics
- Sensitive information

The beauty is in the details!
- Clarity; GSP; Visual Appeal

4. Preliminary Drafts
- Reviewed by others
- Revise
- Reviewed again
- Content validity

5. Pilot Testing and Revisions
- Wording; clarity; time to complete
- Test-retest reliability
- Length of survey

6. Selecting a Sample
- Probability
  - Stratified
  - Cluster
7. Contacting Respondents
- Introduction
- Follow up

When sending out a survey, does one include a *document of informed consent*?

What information should be included in a cover letter?

What are some disadvantages of closed-ended questions?

What are some disadvantages of closed-ended questions?

Open-Ended Questions
- Feelings & opinions
- Pilot questions
- Difficult to code and analyze
- Generally avoided in questionnaires

Closed-Ended Questions
- Forced-choice
- Easily coded
- Characteristics
  - Exhaustive
  - Mutually exclusive
- Logical order

Format of Closed-Ended Questions
- Dichotomous
- Brackets vs. Circle the letter: A B C D
- Continuum
- Grid or checklist
- Rank-order
- Branching
CONSTRUCTING THE SURVEY QUESTIONS

1. It is important to include a research course in a graduate level occupational therapy curriculum.
   A. Strongly Disagree
   B. Disagree
   C. Neutral
   D. Agree
   E. Strongly Agree
   F. Unsure

2. It is important to include a qualitative methods course in a graduate-level occupational therapy curriculum.
   A. Strongly Disagree
   B. Disagree
   C. Neutral
   D. Agree
   E. Strongly Agree
   F. Unsure

3. It is important to include a quantitative methods course in a graduate-level occupational therapy curriculum.
   A. Strongly Disagree
   B. Disagree
   C. Neutral
   D. Agree
   E. Strongly Agree
   F. Unsure

4. A capstone project in the form of a completed research study must be included in a graduate level occupational therapy curriculum.
   A. Strongly Disagree
   B. Disagree
   C. Neutral
   D. Agree
   E. Strongly Agree
   F. Unsure

PLEASE RATE YOUR LEVEL OF AGREEMENT WITH THE FOLLOWING STATEMENTS:
IT IS IMPORTANT TO INCLUDE A __________ IN A GRADUATE-LEVEL OCCUPATIONAL THERAPY CURRICULUM.

<table>
<thead>
<tr>
<th>Number</th>
<th>Statement</th>
<th>SD</th>
<th>D</th>
<th>Neutral</th>
<th>A</th>
<th>SA</th>
<th>Unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>research course</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>quantitative methods course</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>qualitative methods course</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>capstone project in the form of a completed research project</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
“BRANCHING”

Please answer the following questions truthfully; return of survey implies consent to participate.

1. Is Dan using your basketball tickets tonight?
   YES { } NO { }

   If “YES”, you are done with this survey.
   Thank you for participating.

   If “NO”, please go to #2

2. Will you be on campus at 8:00 p.m.?
   YES { } NO { }

   If “NO”, you are done with this survey. Thank you for participating.

   If “YES”, please go to #3

3. Would you be willing to run over to Cintas, obtain your two faculty tickets, and leave them at “Will Call” for Ben Estes?
   YES { } NO { }

   If “YES”, Bless Your Heart! You just saved me a trip to campus this evening!

   If “NO”, that’s ok; Thanks for taking the time to complete this survey.

   The End.

“BRANCHING”

Sensitive questions
Let respondent know that it is “OK” to be in an otherwise embarrassing or unacceptable category.

“…distinguish among people who demonstrate different intensities of the characteristic that is being measured.” (p. 338)

“BRANCHING”

WORDING

☺Clear & simple
☺Double-barreled questions
☺Frequency & time measures

Scales

☺Purpose
“…distinguish among people who demonstrate different intensities of the characteristic that is being measured.” (p. 338)
**Types of Scales**

- **Summative**
- **Assesses values or attitudes**
- **Ranking to reflect level of agreement**
- **Neutral**

**Likert Scales**

For each statement given below, please indicate whether you strongly agree (SA), agree (A), are neutral (N), disagree (D), or strongly disagree (SD):

- Knowledge of appropriate principles is important for the practice of occupational therapy.
- Research and statistics should be taught in entry-level professional programs.
- Participation in a research project should be a requirement.

**Point Value**

- **Consistency is key!**
  - “Higher” point value = more positive opinion (or, vice-versa is ok, too)
    - SD = 1
    - D  = 2
    - A  = 3
    - SA = 4
  - So, need to assign numerical values to scores accordingly

**“Positively” phrased items:**

- Graduate level occupational therapy curricula should include a strong research component.
  - SA = 4
  - A  = 3
  - D  = 2
  - SD = 1
  - HIGHER score indicates that research should be included in graduate OT curricula

**“Negatively” phrased items:**

- Research should not be a strong component of graduate level occupational therapy curricula.
  - SA = 1
  - A  = 2
  - D  = 3
  - SD = 4
  - HIGHER score indicates that research should be included in graduate OT curricula
**SCALES**

- **Visual Analogue Scale (VAS)**
  - Intensity of subjective experience
  - 100 mm line with words describing extremes at each end
  - Measure distance from left-anchor
  - Mean score

| No Pain | Pain as bad as it can be |

**VAS**

- **Guttman Scale**
  - Cumulative
  - Hierarchy

**DELPHI SURVEY**

- A panel of experts are asked to complete a series of questionnaires to identify their opinions
- Uses several rounds of questionnaires
- Goal is consensus


**DATA ANALYSIS**

1. Determine usable responses
   - Track % of non-usable responses
2. Code* & enter data into spreadsheet program
   - Excel vs. SPSS

* Numeric labels for responses

**DATA ANALYSIS**

- **Descriptive statistics**
  - Frequency of responses
  - 30% (N=72) of respondents agreed or strongly agreed...
DATA ANALYSIS

- Cross-tabulations
  - Chi-square test
  - Significant relationship between variables

E-SURVEY

- **Access** (Moss & Hendry, 2002)
  - Body of e-mail
  - Web-based
    - Embedded in body of e-mail
    - Hotlink

- **Benefits** (Amar, 2008)
  - Cost savings
  - Decreased time
    - Coding, entering, verifying data
    - Errors
    - Responses immediately available
  - Creativity in design
  - Larger sample
  - Anonymity & privacy => sensitive issues

- **Challenges** (Amar, 2008)
  - Requires computer & internet
    - Sample bias
      - Most likely: school-aged child & annual income >$100,000
      - Least likely: age 65 >; minorities; less than HS degree (Day & Davis as cited in Amar)
    - Use combination of hard-copy & e-mail
  - Decreased time
  - Anonymity & privacy => sensitive issues

- **Strategies to increase response rate**
  - Invitation or pre-survey notification (e-mail or hard copy)
  - Sent from ‘known’ entity
  - One reminder sent 2 days after initial e-mail doubled response rate (Crowford, Cooper, & Lamai as cited in Amar)
  - Incentives (e.g. raffles, especially with smaller prizes & > chances of winning; Davidsen, DeRuyter, Martin, & Oostendorp, as cited in Amar)
E-SURVEY

Challenges (Amar)
- Multiple submissions or sabotage
- Protect access via password

Challenges
- Protect Privacy & Confidentiality
  - Participants can designate conditions of release, use, retention, and disposal of personal data
  - ‘Secure Sockets Layer (SSL) encryption (i.e. https)’ (p. 139)
  - ‘in the creation of the survey link, an anonymous collector can be created that ensure that responses are anonymous and internet protocol (IP) addresses are not saved’. (p. 139)

CRITERIA FOR QUALITY OF E-SURVEY DESIGN (Andrews, Nomnik, & Preiss, 2003; p. 187)
- “Supports multiple platforms and browsers/e-mail clients” (Yun & Trumbo, as cited in...)
- “Detects multiple submissions automatically” (Yun & Trumbo, as cited in...)
- “Allows saving responses before completion time” (Smith, as cited in...)
- Collects open-ended & quantitative data
  - Bachmann & Elfrink, ... as cited in...

CRITERIA FOR QUALITY OF E-SURVEY DESIGN (Andrews, Nomnik, & Preiss, 2003; p. 187)
- “Uses paper questionnaire design principles” (Dillman, ... as cited in...)
- “Provides automatic feedback with completion” (Smith, ... as cited in...)
- “Provides automatic transfer of responses to a database” (Kehoe & Pitkow, ... as cited in...)
- “Provides for links to definitions, menus, button and check box options, animation, sound, graphics options, ...” (Preiss et al., ... as cited in...)

CRITERIA FOR QUALITY OF E-SURVEY DESIGN (Andrews, Nomnik, & Preiss, 2003; p. 187)
- “Does not require familiarity with survey presentation software” (Sheehan & Hoye, as cited in...)
- “Displays appear quickly to participant” (Couper, Tranaglott, & Lamin, as cited in...)
- “Tracks response source of response failure” (Pasco, et al., ... as cited in...)

Copyright © 2023. All rights reserved.
Recognized credibility of researchers
Survey transparency
Distribution procedures that do not offend or intrude

**Table 3.** Number of Possible Participants, Number of Responses, Quality of Responses, and Average Days to Respond Based on Day Contacted

<table>
<thead>
<tr>
<th>Day of Week E-mailed/Contacted</th>
<th>Number of Possible Participants E-mailed</th>
<th>Number of Responses</th>
<th>Mean Days to Respond</th>
<th>Quality of Responses (Mean/Number of Nominal)</th>
<th>Total Nominations/Day (Number of Responses X “Quality of Response”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>39</td>
<td>8</td>
<td>3.25</td>
<td>7.25</td>
<td>58</td>
</tr>
<tr>
<td>Tuesday</td>
<td>40</td>
<td>15</td>
<td>3.33</td>
<td>3.21</td>
<td>48</td>
</tr>
<tr>
<td>Wednesday</td>
<td>39</td>
<td>17</td>
<td>5.24</td>
<td>3.41</td>
<td>50</td>
</tr>
<tr>
<td>Thursday</td>
<td>39</td>
<td>10</td>
<td>5.00</td>
<td>6.70</td>
<td>67</td>
</tr>
<tr>
<td>Friday</td>
<td>35</td>
<td>10</td>
<td>5.99</td>
<td>5.20</td>
<td>53</td>
</tr>
<tr>
<td>Total/Minus</td>
<td>192</td>
<td>60</td>
<td>4.57</td>
<td>4.76</td>
<td>281</td>
</tr>
</tbody>
</table>

**REFERENCES**


Sampling

Target Population

Issues re Sampling
- What factors drive sample selection?
  - Research question
  - Study design
  - Logistics ($, time, space)

Population and Sample
- Population
- Sample

Participant Selection

Gender & Race/Ethnicity Issues
- Traditionally...
- “...Latinos and African-Americans with disabilities in the U. S. are more likely to receive fewer comprehensive services...compared to white families.” (Kielhufner, 2006, p. 56)
Representative Sample

Why is it importance to have a representative sample in quantitative or experimental research?

Steps in Sampling

1. Define population
2. Unit of analysis
3. Sampling plan
4. Implement

Sampling Bias

- Samples must be representative
- Bias
  - Conscious
  - Unconscious
  - Impartial selection

Inclusion and Exclusion Criteria

- Inclusion Criteria
- Exclusion Criteria

Sampling Error

- Random error
- Systematic error

Sampling Techniques

Nonprobability Samples

- Nonrandom Selection
- Generalization limited
Sampling Techniques

**Probability Samples**

Random Selection

---

**Probability Sampling**

- **Simple Random Selection**
  - Unbiased
  - Table of random numbers

---

**Probability Sampling**

- **Systematic Sampling**
  - Sampling interval
  - Less time-consuming
  - Equivalent to random sampling

---

**Probability Sampling**

- **Stratified Random Sampling**
  - Strata
  - Proportional stratified sample
  - Can be more representative than random sampling

---

**Probability Sampling**

- **Cluster Sampling**
  - Stages
  - Advantage
  - Disadvantage

---

**Nonprobability Sampling**

- **Convenience**
  - Consecutive Sampling
  - Volunteers and self-selection bias
Nonprobability Sampling

- Quota Sampling
  - "...proportionally representing each segment of the population in the sample." (Portney & Watkins, 2009, p. 151)

Nonprobability Sampling

- Purposive Sampling
  - 'Hand-pick' subjects
  - Specific choices
  - Can represent population
  - Common in qualitative

Nonprobability Sampling

- Snowball Sampling
  - Good for 'hard to locate' subjects
  - Stages

Sample Size (Gall, Borg, & Gall as cited in Kielhofner, 2006)

- Correlation: n = 30
- Survey: n = 100
- Experimental: n = 15/group

Statistical Power

- "...the likelihood of finding a significant difference between groups or association between variables when one exists.”
  (Albert & Borkow as cited in Kielhofner, 2006, p. 522)

- Determine N necessary to have sufficient statistical power

Recruitment

- Depends on question
- Advertisements
- Mailings
- Membership lists
- Attrition
- Contingency plan
Learning Outcomes:

a. Seek and critically review professional literature to form basis of research prospectus and proposal.
b. Critique the rigor of quantitative methodology, analysis, and outcomes.
c. Describe the range of quantitative-type research designs including critique of internal and external reliability and validity for each.

Required Reading(s):

a. Kielhofner chapter 12: Developing and evaluating quantitative data collection instruments
b. Portney & Watkins chapter 9 (ER): Validity in experimental design

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Content</th>
<th>Learning Activities</th>
<th>Instructional Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30</td>
<td>Reliability &amp; Validity in Measurement</td>
<td>Listen, take notes, clarify with questions</td>
<td>Reliability &amp; Validity in Measurement Powerpoint</td>
</tr>
<tr>
<td>10:00</td>
<td>Reliability and Validity in measurement</td>
<td>“Types of Reliability and Validity in Measurement”</td>
<td>Handout, Kielhofner text</td>
</tr>
<tr>
<td>10:30</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:40</td>
<td>Reliability and validity</td>
<td>“Reliability and Validity in Measurement Occupation”</td>
<td>Handout</td>
</tr>
<tr>
<td>11:20</td>
<td>Reliability and Validity in Design</td>
<td>Listen, take notes, clarify with questions</td>
<td>Experimental Control PowerPoint</td>
</tr>
</tbody>
</table>

References:


Types of Reliability & Validity in Measurement:

Materials: Kielhofner textbook and handout provided below

Instructions: Divide the students into groups. Assign each group a type of reliability or validity to review using their Kielhofner text. Instruct the students to use the boxes below to record a brief definition of each concept related to reliability and validity of measurement. Allow time for each group to explain their assigned concept to the other groups of students.

<table>
<thead>
<tr>
<th>Measure of Validity</th>
<th>Measure of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Construct Validity</em></td>
<td><em>Test-Retest</em></td>
</tr>
<tr>
<td><em>Criterion Related: Concurrent</em></td>
<td><em>Inter-Rater</em></td>
</tr>
<tr>
<td><em>Criterion Related: Predictive</em></td>
<td><em>Split-half</em></td>
</tr>
<tr>
<td><em>Face</em></td>
<td><em>Alternate forms</em></td>
</tr>
<tr>
<td><em>Content</em></td>
<td><em>Internal Consistency</em></td>
</tr>
</tbody>
</table>
Reliability and Validity in Measurement Occupation

Equipment (Each group 5 students will need):

- One 12” ruler
- One 3’ piece of string
- A 1’ piece of elastic
- One tape measure
- Hand out of the “head measurement data sheet”

Directions: Divide the students into groups of 5. Instruct the students to measure the other four heads in the groups using the materials provided. Instruct the students to record their measurements in the table provided below:

<table>
<thead>
<tr>
<th></th>
<th>Person 1:</th>
<th>Person 2:</th>
<th>Person 3:</th>
<th>Person 4:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape measure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruler</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>String</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elastic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Processing: When all measurements are completed, facilitate discussion about the validity of each method used to obtain a head circumference. Encourage discussion about reliability by having students compare their measurements to those of the other group members (inter-rater). Instruct each of them to take an additional measurement using one of the tools and compare those results to their first (test-retest).

Reliability

Measurement Error
- Difference between true and observed values
- Reliability

Kappa Coefficient
- 0.00 => no reliability
- 1.00 => perfect reliability
- Poor reliability: < .40
- Moderate reliability: .40 - .75
- Good reliability: > .75

Measurement Error
- Sources
  1. Rater
  2. Instrument
  3. Characteristic measured
- Strategies to Reduce
  1. Inform, train, & ensure accuracy of raters
  2. Standardization of instrument
  3. Taking repeated measures

Instrument Reliability
- Test-Retest Reliability
- Split–Half Reliability
- Alternate Forms
- Internal Consistency
Rater Effects on Reliability

- Hawthorne effect
- Rater bias
- Inter-rater Reliability

Pilot Testing

- Establish reliability prior to data gathering
- Trials of data collection should have reliability assessed (Mitchell as cited in Portney & Watkins)
- Error rate of measurement within actual data

What is Validity?

- Does an instrument measure what it is intended to measure?

Types of Validity

- Face Validity
- Content Validity
- Criterion-Related Validity
  - Concurrent
  - Predictive
- Construct Validity

What is the “True” Score?

- Expect deviation in every measure
  - Initial vs. final score
  - “Best” score
  - Average score
Experimental Control

True Experiment
1. IVs must be manipulated
2. Random assignment of subjects
3. Control group

1. Manipulation of IVs
- Imposing conditions on one group of subjects
- Two types of IVs
  - Active
  - Attribute

Ex Post Facto Research
- Study attribute variables
- No control
- No cause and effect

2. Random Assignment
- Assure no bias exists within a group that might affect DV
- Use design variation when randomization doesn't balance distributions

Assigning Subjects
Table of Random Numbers
3. Control Groups
- Rule out extraneous effects
- Initially equivalent
- If change occurs in treatment group, it is due to intervention
- Ethical issues

Research Protocol
- Consistency
- Potential limitations
- Control vs. relevance to practice

Incomplete or Lost Data
- Reasons for Lost Data

Analysis Types
- On-Protocol
- Treatment-received analysis
- Intention to treat

Blinding
- Double-Blind Study
- Single-Blind Study
### Design Strategies

1. **Homogenous Subjects**
   - Control for extraneous effects of attribute variables
   - Similar characteristics
   - Extraneous variables eliminated as variables
   - Disadvantage

2. **Blocking**
   - Build extraneous variable into experimental design as IV
   - Block
   - Blocking variable
   - Randomized block design

3. **Matching**
   - Matched pairs design
   - Limitations
     - Difficult process
     - Limits interpretation of findings

4. **Use Subjects as Own Control**
   - Independent factor
   - Repeated measure
   - Repeated measures design

4. **ANCOVA**
   - Analysis of co-variance
Threats to Validity

- Four types of design validity
  - Statistical conclusion validity
  - Internal validity
  - Construct validity of causes and effects
  - External validity

Statistical Conclusion Validity

- Is there a relationship between the IV and DV?
  - Inappropriate use of statistics
  - Invalid conclusions

Internal Validity

- Given a statistical relationship between the IV and DV, is there evidence that one causes the other?
- Extraneous variables are threats

Threats to Internal Validity

- History
  - Events that occur after introduction of IV

- Maturation
  - Effects occurring as a result of passage of time
  - Relevant when intervals between measurements is long

- Attrition
  - Experimental mortality
  - Random vs. biased reasons
Threats to Internal Validity

**Testing**
- Familiarity improves performance
- Reactive measurements

**Instrumentation**
- Reliability of measurement
- Calibration
- Test-retest and rater reliability

**Statistical Regression**
- Regression toward the mean

**Selection**
- Selection-Maturation
- Selection-History
- Selection-Instrumentation
- Selection-Regression
- Selection-Attrition
- Selection-Testing

**Interactions with Selection**
- Diffusion or Imitation of Treatments
- Compensatory Equalization of Treatments
- Compensatory Rivalry
- Resentful Demoralization of Respondents Receiving Less Desirable Treatments
**Threats to Internal Validity**

- **Ruling Out Threats to Internal Validity**
  - How can some of these extraneous factors threaten the internal validity of your research project?
  - How can you control for some of these factors to strengthen the internal validity of your data?

**Construct Validity of Causes and Effects**

- Operational definitions of IV & DV
- Time frame within operational definitions
- Multiple treatment interactions
- Experimental bias

**Construct Validity of Causes and Effects**

- **Experimental Bias**
  - Hawthorne Effect
  - Experimenter Effects
    - Active
    - Passive

**External Validity**

*Can the results be generalized to persons, settings, and times that are different from those employed in the experimental situation?*

- Interaction of Treatment and Selection: *People*
- Interaction of Treatment and Setting: *Place*
- Interaction of Treatment and History: *Time*

**Reality Check**
Learning Outcomes:

a. Adhere to ethical standards in research process.
b. Describe the purpose of institutional review boards and the process of informed consent
c. Discuss ethical dilemmas and investigator responsibilities associated with research using human subjects
d. Submit research proposal to XU IRB (and any relevant external IRB) for review and gain approval.

Required Reading(s):

a. XU OT Research Manual (pp. 21); Appendix D, E, F

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Content</th>
<th>Learning Activities</th>
<th>Instructional Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30</td>
<td>Institutional Review Board</td>
<td>Listen, take notes, clarify with questions</td>
<td>IRB PowerPoint</td>
</tr>
<tr>
<td>10:30</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:40</td>
<td>Document of Informed Consent</td>
<td>Listen, take notes, clarify with questions</td>
<td>Document of Informed Consent PowerPoint</td>
</tr>
<tr>
<td>11:10</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:20</td>
<td>Document of Informed Consent</td>
<td>“Production of document of informed consent”</td>
<td>Research Group Lab</td>
</tr>
</tbody>
</table>

References:


Production of Informed Consent Document:

Instructions: Within your research group, produce a document of informed consent for your study using the IRB template. Type the document in size 14 font. Email document to estej@xavier.edu.
Our life is what our thoughts make it. — Marcus Aurelius

INSTITUTIONAL REVIEW BOARD (IRB)

XU IRB (2009-2010)

- Dr. Kathleen Hart (Interim Chair)
- Dr. Charles Grossman (Vice-Chair)
- Dr. Roshan D. Ahuja
- *Mr. Stewart Bonem
- *Dr. Michael J. Colligan
- Dr. Linda Moore
- Dr. Brent Richardson
- Diane Miszak (Administrative Assistant)

XU IRB

Any research project involving human subjects which is conducted by Xavier University faculty, staff, or students, or that takes place on the Xavier University campus...

XU IRB

Responsibilities
- Review and approve human subjects’ research
- Protect participants in study
- Assist in the pursuit of knowledge while upholding ethical standards

Principles
- "...direct or potential benefits to subject, and/or importance of knowledge gained, must outweigh risks...
- Voluntary participation & IC
- Right to withdraw or refuse to participate without consequences
- Safeguarding information is primary obligation of investigator
- No distinction between funded/non-funded projects...
**Satisfy Requirements:**

- Risks are minimized
- Risks reasonable in relation to benefits
- Subjects selected equitably
- Voluntary informed consent obtained and documented
- Report harmful event to IRB

**Types of Review**

**EXEMPT:**

- Educational research
- Education tests
- Survey or interview procedures, except
  - Subject can be identified
  - Responses could place subject at risk
  - Deals with sensitive topics

**Types of Review**

**EXEMPT**

- Observation, except
  - Subject can be identified
  - Subject could be at risk
  - Sensitive topics
- Collection of existing data, documents, records, pathological specimens

**Types of Review**

**EXPEDITED**

- Research on behavior; no manipulation of behavior and doesn’t involve stress
- Existing data, documents, records
- Moderate exercise by healthy individuals
- Voice recordings for research purposes

**Types of Review**

**EXPEDITED**

- “Recording data from subjects 18 years of age or older using non-invasive procedures routinely employed in clinical practice…”
- Blood samples by fingerstick or venipuncture; <450 ml w/in 2 months

**Types of Review**

**FULL REVIEW**

- “Any research involving the use of human subjects which does not fall into the Exempt from Review or Expedited Review categories must be submitted to the IRB for Full Board Review.”
IRB Review Process

1. Submit complete application packet
2. Initial evaluation and recommendations by IRB Reviewer
3. **Exempt**: IRB Administrator verifies
4. **Expedited Review**: Expedited Review Subcommittee reviews and recommends
5. **Full Review**: Reviewed by all IRB members; in-depth by two
1. **Modification Request** form
2. **Progress Report** form
   - Expedited and Full Review
3. **Final Progress Report**

---

**Subject Injury Report**
Site Review

- All research – random basis
- Highly vulnerable populations or high risk: site visit upon IRB recommendation
- Adverse event reports
- Reports of non-compliance
- Complaints by subjects

Certification of Courses Involving Human Subjects’ research

Instructors assume responsibility for ensuring projects will be conducted within IRB guidelines
Required before students can implement research

Special Considerations

- Certification of Courses Involving Human Subjects’ research
  - Instructors assume responsibility for ensuring projects will be conducted within IRB guidelines
  - Required before students can implement research

Special Considerations

- Classroom Projects based on Survey Research: Requires IRB approval –
  - Subjects under age 18
  - Sensitive Topic Areas

Sensitive Topic Areas

- Sexual behavior
- Sexual orientation
- AIDS or HIV
- Incest
- Rape or date rape
- Sexual molestation
- Substance use and/or abuse

Sensitive Topic Areas

- Eating disorders or behaviors
- Contraception, pregnancy, abortion
- Aspects of subject’s mental health
- Religious orientation and/or views
- Veteran and/or wartime experiences
- Vulnerable populations
- Any research on subjects under age 18

IRB Approval Not Required

- Not specific to above behaviors
- Research participants are not identifiable by name or description
- Subjects do not reveal personal experiences, behaviors, or identity
“All research projects involving human subjects completed to satisfy Master’s or Doctoral thesis requirements are subject to the IRB review guidelines.”

**IRB Approval Is Required**

**IRB Protocol:**

1. Cover Letter
2. Completed Submission Form
4. Consent & Assent forms
5. Letters of Permission
6. HIPAA form
7. NIH Training Certificate

**Who is doing the research**
- Introduce selves, clinical tutor, faculty tutor (identifying roles)

**What is the research project**?
- Level of review and rationale

**Where** will it be conducted (i.e. external site => letter of permission)

**External IRB?** => Explain; Append approval letter

**Cover Letter**
• “Statement of research, purpose, and significance of the study;
• Research methodology and procedures...
• Informed consent procedures…”

• Maximum length is three single-space pages
DOCUMENT OF
INFORMED CONSENT

 Shoot for the moon.
 Even if you miss it
 you will land among the stars.

Les Brown

"Every potential subject who is a
physically and mentally able adult must
provide consent to participate in research
prior to the conduct of any activities that
constitute the research" (XU IRB Policies and Procedures)

Why do subjects need protection?

- Past abuse
- Research is not for immediate benefit of subjects

OHRP

- U.S. Department of Health and Human Services
- Informed Consent process....
Four Elements of Informed Consent

• Disclosure

Four Elements of Informed Consent

• Comprehension

Four Elements of Informed Consent

• Voluntariness

Four Elements of Informed Consent

• Competence

Process of Obtaining Informed Consent

• Procedures approved by IRB
• Avoid coercion
  ▫ Active vs. Situational

Characteristics of IC Form

• Simple, straight-forward, understandable
• Lay-language
• No exculpatory language
• 6th grade level
6th Grade Level

- SMOG Readability Formula
- “Count off ten consecutive sentences near beginning, in middle, and near end of text.”
- “Count number of words containing 3 or more syllables (polysyllabic) including repetitions of same word.”
- Total polysyllabic word count for 6th grade level = 7-12
- www.cdc.gov/od/ads/s mog.htm

Elements of an Informed Consent Document (DePoy & Gitlin, 2005)

- Purpose
- Procedures
- Risks and Benefits
- Confidentiality
- HIPAA disclosures
- Voluntariness and right of refusal/withdrawal
- Signature lines
- Contact information

“Sticky” Issues

- Naturalistic Design
  - Specify details for IRB
  - Level of detail to participants

- RC form creates level of formality

“Sticky” Issues

- Vulnerable populations

- Research subjects are also patients under care of you/your institution
Waiver To Written Consent

- Surveys

Waiver To Written Consent

- “The only record linking subject to research would be IC form and principle risk would be potential harm resulting from breach of confidentiality” (XU IRB Policy & Procedures)

Waiver to Written Consent

- Withholding information from subject

Waiver to Written Consent

- “In no case should an investigator seek to withhold information about the research or the subject’s role in it solely to decrease the chances of refusal to participate by potential subjects” (XU IRB Policies and Procedures)

Waiver to Written Consent

- Procedures

Special Circumstances

- Children
Storage of Forms

- Keep for 3 years

Activity

- Within your research group, produce a document of informed consent for your study using the IRB template
- Type the document in size 14 font
- E-mail to estej@xavier.edu
# Learning Outcomes:

a. Demonstrate ability to produce a sound prospectus and proposal for quantitative or qualitative research study.
b. Adhere to ethical standards in research process.
c. Explain steps to quantitative research investigation including design, data collection, analysis, and interpretation.
d. Critique the rigor of quantitative methodology, analysis, and outcomes.
e. Describe the range of quantitative-type research designs including critique of internal and external reliability and validity for each.

## Required Reading(s):

a. APA Manual: Parts of a manuscript

## Timeline

<table>
<thead>
<tr>
<th>Time</th>
<th>Content</th>
<th>Learning Activities</th>
<th>Instructional Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30</td>
<td>Midterm Exam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:15</td>
<td>Writing a research report</td>
<td>Listen, take notes, clarify with questions</td>
<td>Writing a research report PowerPoint</td>
</tr>
<tr>
<td>12:00</td>
<td>Formative evaluation of course and instructor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## References:


Formative Evaluation:

On a scale of 1-10 (10 being high), please rate the course and/or instructor on the following [Note: please feel free to make additional comments in the space provided below each statement]:

1. Instructor shows adequate knowledge of the material/subject matter. ______

2. Instructor utilizes presentation techniques that facilitate learning. ______

3. Occupations/presentations/lectures reflect advance preparation for the class. ______

4. Instructor attempts to make course matter interesting to students. ______

5. Instructor provides students with adequate attention for questions or comments either during class or outside class. ______

6. Instructor contributed to my intellectual, moral, and spiritual growth through contributions to the course. ______

List things you liked about the course & lectures.

What recommendations do you have for improvement?

Are there areas of interest that you want to make sure we cover prior to the end of this semester?
MIDTERM EXAM

NAME: _________________________________

MULTIPLE CHOICE: For each of the following questions or statements, select the response that BEST answers or completes it; record the answer’s corresponding letter on the scantron form (credit will be given only for correct answers recorded on scantron form). Each correct answer is worth 2 points (total of 80 points).

1. Which of the following types of research is in the Full Review category of IRB review:
   a. survey research re current ethical issues faced by occupational therapists
   b. “Flow and the experience of hand knitting” (interview data)
   c. “Supports and barriers to occupation base practice” (interview data)
   d. Autistic childrens’ response to a new OT treatment intervention

2. One threat to a study’s external validity is “interaction of treatment and selection”. This could occur when subjects:
   a. Do not adhere to the research protocol
   b. Drop out of a study
   c. Mature at different rates
   d. Talk to each other and influence the results

3. The threat to internal validity known as “testing effects” refers to the possibility that:
   a. subjects may drop out
   b. the testing instrument may not be properly calibrated
   c. research groups matured at different rates
   d. familiarity with testing may improve performance.

4. The essence of random sampling is that sampling differences between the treatment group and control group are due to:
   a. conscious human bias
   b. chance
   c. unconscious human bias
   d. extraneous variables

5. One threat to internal validity - maturation - is of particular concern when the research study involves:
   a. elderly subjects
   b. unreliable measurement instruments
   c. children as subjects
   d. brief time periods between pretesting and intervention
6. You develop a new assessment tool to measure fine motor coordination and would like to produce validity data for this tool. In doing this, you administer your assessment to a group of patients. Then you give this same group of patients the 9-Hole Peg Test (the “gold standard” of fine motor coordination tests) again. When you compare the scores of your test to the 9-Hole Peg Test scores, you find the two sets of scores to be comparable. From this, you can conclude that the new assessment tool you developed has strong:
   a. Test-retest reliability
   b. Content validity
   c. Intra-rater reliability
   d. Criterion-related validity

7. In “consecutive sampling” one recruits (and accepts into the study) the first 100 people who meet inclusion criteria. The major limitation to this sampling method is:
   a. Self-selection bias of volunteers
   b. Researcher conscious bias
   c. Researcher unconscious bias
   d. The threat of attrition

8. __________ validity indicates that a test or instrument appears to measure what it intends to measure and it is the weakest type of validity.
   a. Content
   b. Concurrent
   c. Predictive
   d. Face

9. Which of the following threats to internal validity refers to unexpected events that occurred after the introduction of treatment that may influence the outcomes:
   a. Instrumentation
   b. History
   c. Selection
   d. Statistical regression

10. In Single-Subject research, social validity refers to:
    a. The acceptability of intervention by the target populations
    b. External validity
    c. Internal validity
    d. The method of data analysis

11. Single-Subject research designs are characterized by:
    a. Lack of a dependent variable
    b. Lack of an independent variable
    c. Collection of baseline data
    d. Collecting only pretest and posttest data
12. Two therapists measure active range of motion of the elbow on the same patient and then compare their measurements. They find that the two measurements are nearly identical and conclude that they have established strong ________ reliability.
   a. Intra-rater
   b. Inter-rater
   c. Split-half
   d. Test-retest

13. Which of the following is TRUE regarding a “True Experimental Design”:
   a. Independent variables are manipulated
   b. Must have random assignment into groups being compared
   c. A control group is used as a comparison with a treatment group
   d. All of the above

14. When true experimental conditions cannot be achieved, which of the following designs allow for comparisons between experimental and control groups:
   a. Qualitative
   b. Descriptive
   c. Quasi-experimental
   d. Historical

15. Which of the following is a source of measurement error:
   a. Rater
   b. Instrument
   c. Characteristic measured
   d. All of the above

16. Which of the following research designs is considered the “gold standard” or most rigorous:
   a. Randomized control trial
   b. Qualitative
   c. Single-subjects
   d. Quasi-experimental

17. If children are participants in a research study, which of the following is true:
   a. informed consent is not necessary
   b. parents must sign an informed consent form
   c. IRBs will not approve the study
   d. only verbal consent is required

18. One purpose of case study research is to:
   a. demonstrate cause and effect relationships
   b. demonstrate effectiveness of an intervention under controlled conditions
   c. study effectiveness of an intervention with several patients randomly assigned to groups
   d. share clinical experiences
19. Which of the following threats to internal validity can **NOT** be controlled by using randomization and control groups:
   a. testing
   b. instrumentation
   c. attrition
   d. maturation

20. Which of the following designs provides the strongest evidence for cause and effect relationships:
   a. RCT
   b. Single subject
   c. Quasi-experimental
   d. Case study

21. Which of the following distinguishes a Single-Subject design from Case Studies or group designs:
   a. Control group
   b. Repeated measurement
   c. Randomization
   d. Lack of IV

22. Which of the following types of research is in the **Exempt** category of IRB review:
   a. research involving children
   b. educational research
   c. surveys regarding sexual activity
   d. observation of teen illegal drug use

23. An “ordinal” scale of measurement:
   a. is dichotomous
   b. represents relative position within a group
   c. has arithmetic properties
   d. has equal intervals between categories

24. Which of the following is an example of a “dichotomous” variable:
   a. gender
   b. age
   c. income
   d. quality of life

25. One advantage of case study research is that it provides a
   a. depth of information
   b. wide scope of information
   c. control group
   d. all of the above

26. If someone’s score on a standardized test is in the 80th percentile, this means that
   a. the person got 80% of test correct
   b. the score was higher than 80% of those taking the test
   c. the score was lower than 80% of those taking the test
   d. none of the above
27. Which of the following is one of the “four elements of informed consent”:
   a. voluntariness
   b. competence
   c. disclosure
   d. all of the above

28. Which of the following types of research is in the **Expedited Review** category for IRB review:
   a. survey research
   b. observational research
   c. research on behavior with no manipulation of behavior
   d. educational tests

29. Written informed consent is **“waived”** for research studies involving:
   a. anonymous surveys
   b. children
   c. prisoners
   d. interviews that are not tape recorded
30. The following diagram represents what type of research design: \[ \begin{array}{ccc} \text{R} & \text{X} & \text{O} \\ \text{R} & \text{O} \end{array} \]
   a. Pretest-posttest control group
   b. Posttest only control group
   c. Single-subject
   d. Correlation

31. Pilot-testing a survey before distributing it to potential respondents:
   a. can be used to estimate time demands of completing the survey
   b. is not necessary
   c. should be done electronically
   d. can be used to determine criterion-related validity of the survey

32. A Visual Analogue Scale (VAS) is most useful for attaining which of the following type of data:
   a. values and attitudes
   b. opinions about sensitive topics
   c. intensity of subjective experience
   d. qualitative

33. _________________ is a social threat to internal validity that occurs when subjects in the treatment group communicate with subjects in the control group.
   a. attrition
   b. selection-maturation interaction
   c. diffusion of treatments
   d. statistical regression toward the mean

34. A quasi-experimental design is used:
   a. to determine intervention efficacy
   b. when experimental and control groups are unequal
   c. to control for threats to internal validity
   d. to maximize external validity

35. When designing a survey, which of the following types of questions best assess respondents’ values or attitudes:
   a. dichotomous
   b. Likert scale
   c. Guttman scale
   d. Visual Analogue Scale

36. “Case Study” studies are categorized as which type of research:
   a. Descriptive
   b. Experimental
   c. Quasi-experimental
   d. Exploratory

37. Which of the following represents a challenge to electronic survey research:
   a. sample bias
   b. multiple submissions
   c. response rate
   d. all of the above
TRUE-FALSE: Determine whether each of the following statements is TRUE or FALSE. For TRUE, mark “a” on scantron form; for FALSE, mark “b” on scantron form (credit will be given only for correct answers recorded on scantron form). Each correct answer is worth 1 point (total of 10 points).

38. One advantage of Single-Subject research designs is that individual subject changes are more easily detected.

39. The purpose of pretesting in a “Pretest-Posttest” experimental research design study is to demonstrate that the treatment group and control group are equal prior to introducing the independent variable to the treatment group.

40. Internal validity refers to the potential for confounding factors to interfere with the relationship between the independent and dependent variables.

41. An informed consent form must be signed by survey respondents in a research study.

42. Single-subject research studies are categorized as Experimental designs.

43. To determine test-retest reliability of an instrument, subjects are administered the instrument on two different occasions with a distinct time period in between the two administrations.

44. You have designed a research study in which you will recruit subjects by selecting every 6th name on the OOTA membership roster, a sampling method known as simple random selection.

45. Attaining informed consent from participants in a research study is only required if the participants are able to understand, speak, and read English.
SHORT ANSWER/FILL-IN-THE-BLANK

46. When conducting research with participants who are 14 years old, these participants must sign what type of form prior to participating in the study? _________________________________ (1 point)

47. In A-B-A Single Subject research, the “B” phase represents ____________________________(1 point)

48. When implementing the technique _____________________________________________________________, neither the researcher nor the participants know which research group is receiving the treatment and which is receiving no treatment. (1 point)

49. Define efficacy as related to research outcomes: ____________________________________________________________ (2 points)

50. Define intra-rater reliability: ________________________________________________________________ (2 points)

51. Define mean: _____________________________________________ (1 point)

52. Name two nonparametric statistical tests: _______________________________________________________________ and _______________________________________________________________ (2 points)
WRITING UP RESEARCH REPORTS

Abstract
- Content
- Brief (120-150 words)
- Concise, specific, accurate
- Self-contained

Introduction
- Presents the Problem
- Why is the problem important?
- Purpose
- Relevance of the research

Review of the Literature
- Background
- Past research
- Gaps in literature

Methods*
- Identify sub-sections
- Design
- IRB approval/Ethics procedures
- Participants or subjects
- Instrument(s) (psychometric properties)
- Procedures (e.g. Sampling; Steps; Data Analysis; etc.)

*What you did and how you did it

Results: Quantitative
- Summarizes data collected & statistical results
- All relevant results
- No raw data (except for Single-Subject Designs)
- Tables & Figures complement but do not repeat text
Discussion

- Evaluate & interpret Results
- Open with statement of support (or, non-) of hypothesis
- Consider meaning & significance of results/findings in relation to:
  - The study question(s) and purpose
  - Previous literature (agreement & disagreement)

Discussion (APA, 2005)

- Address alternative explanations of results
- Threats to internal validity
- External validity
- Do not repeat anything you’ve written previously
- Limitations

Conclusions

- Synthesis of Results & Discussion
- Importance of Results
- Clinical or practical implications
- Problems that remain unsolved
- Implications for future research

References

Appendixes
**Session #: 8  Date: 3/14/2011**

**Learning Outcomes:**

1. Demonstrate understanding of basic descriptive, correlational, and inferential quantitative statistics.
2. Seek and critically review professional literature to form basis of research prospectus and proposal.

**Required Reading(s):**

1. Kielhofner chapter 15: Making meaning from numbers: Measurements and descriptive statistics
2. Kielhofner chapter 16: Concepts of inferential statistics: From sample to population
3. Kielhofner chapter 17: Methods of analysis: From univariate to multivariate statistics (pp. 243-264)

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Content</th>
<th>Learning Activities</th>
<th>Instructional Media</th>
</tr>
</thead>
</table>
| 9:30     | Descriptive statistics  
- Measurement scales  
- Central tendency  
- Measures of variability | Listen, take notes, clarify with questions | Descriptive statistics  
PowerPoint |
| 9:50     | Inferential Statistics  
- Probability  
- Sampling Error  
- Confidence Intervals  
- Hypothesis & Null  
- Type 1 & 2 error | Listen, take notes, clarify with questions | Inferential statistics  
PowerPoint |
| 10:30    | Hypothesis testing review | “Hypothesis exercise” occupation | Hypothesis exercise handout |
| 10:40    | Break | | |
| 10:30    | Non-parametric statistics  
- Chi-square  
- Correlation | Listen, take notes, clarify with questions | Non-parametric statistics  
PowerPoint |
| 11:00    | Non-parametric review | “Analysis of non-parametric statistics” | Analysis handout |
| 11:20    | T-Test & ANOVA | Listen, take notes, clarify with questions | T-test & ANOVA PowerPoint |
| 12:10    | Stats Review | “The muddiest point”  
“Statistics crossword” | Pencil and paper, handouts |

**References:**


Hypothesis Exercise

Choose one of the following situations. Compose a succinct research question and then construct a null hypothesis relative to that question.

**Situation A:** At my previous place of employment, most adolescents with severe depression were treated in occupation and work awareness groups. In my new place of employment, I am expected to work entirely one to one, and progress seems slower.

**Situation B:** The clinic has three different screening tests to access developmental delay for three to six-year-old children. All three of these screening tests are norm-referenced and take less than thirty minutes to administer. I need to decide on a test to use as a “child-find” pre-kindergarten screening for the entire school district.

**Situation C:** In hospitals, some physicians routinely order OT evaluation and treatment on the first day of admission for persons who have had a CVA. Other physicians routinely order OT on the second day, while others order it when the person shows signs of being medically stable.

**Situation:** ______

1. Research question:

2. Null hypothesis:

Analysis of Non-Parametric Statistics

Brainstorm scenarios (in groups and/or as a class) in which one would choose a non-probabilistic sample over a random sample. Generate a list of scenarios among the class. Be sure to describe why the non-probabilistic sample was the best choice.
Statistics Crossword

The following crossword puzzle is designed for you to use as a review of statistical concepts discussed in class. It is **NOT** a required assignment.
Across

1. Rank order categories; Distance between categories not necessarily equal
5. Variables that take on an infinite number of values
7. Level of “certainty” that the findings for the sample will hold true for the entire population (Hint: 2 words)
11. Parametric statistic used to ascertain the extent to which significant group differences can be inferred to the population
12. The difference between the highest and lowest observed value in a collection of data
15. A true ‘zero’ point indicates the lack of characteristic; equal distance between values
16. Value that occurs most frequently in the data set
17. The amount of spread among test scores
18. Average score
19. An indicator of the average deviation of scores around the mean (hint: 2 words)

Down

2. Variables with a finite number of distinct values
3. Point in a distribution at which 50% of the cases fall above and below
4. Number assigned to category; No numerical value; mutually exclusive
6. Parametric test to ascertain the extent to which any significant differences existing between two sample group means can be inferred to the population
7. Nonparametric statistic used with nominal data to test group differences
8. Method of determining relationships among variables
9. Distance between units of measurement are equal; No meaningful zero point
10. The difference between the values obtained from the sample and that actually exist in those in the population (Hint: 2 words)
13. Type of statistics that estimate characteristics of a population from a sample
14. Type of statistics that summarize and describe data
Statistics Crossword Answer Key

1. ORDINAL
2. INTERVAL
3. MISENTIRE
4. MENTION
5. CONTINUOUS
6. DISCONTINUOUS
7. CONFIDENCE
8. INTERVAL
9. HIGH
10. SINGULAR
11. ANOVA
12. RANGE
13. TEMPERATURE
14. IDINEN
15. RATIO
16. MODE
17. VARIANCE
18. MEAN
19. STANDARD DEVIATION
List of concepts to be discussed and/or calculated in SPSS lecture: (use data sets from pre-test and perceived competence survey — compare 2 halves of the class or results from prior classes)

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>t-test</td>
</tr>
<tr>
<td>Median</td>
<td>Chi-Square</td>
</tr>
<tr>
<td>Mode</td>
<td>ANOVA</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>Pearson Correlation</td>
</tr>
<tr>
<td>Variance</td>
<td>Spearman Correlation</td>
</tr>
</tbody>
</table>

### Statistics for Correlational Design

<table>
<thead>
<tr>
<th>Variables</th>
<th>Correlation</th>
<th>Value Range</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both variables</td>
<td>Pearson Correlation</td>
<td>-1 to +1</td>
<td>-1 is perfectly negative correlation</td>
</tr>
<tr>
<td>interval (not skewed)</td>
<td></td>
<td></td>
<td>0 is no correlation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>+1 is perfectly positive correlation</td>
</tr>
<tr>
<td>Both continuous, but at least one is ordinal</td>
<td>Spearman Correlation</td>
<td>-1 to +1</td>
<td>-1 is perfectly negative correlation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0 is no correlation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>+1 is perfectly positive correlation</td>
</tr>
<tr>
<td>Both Categorical</td>
<td>Chi-Square</td>
<td>$\chi^2$</td>
<td>0 to infinity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The larger, the more likely to be statistically significant</td>
</tr>
</tbody>
</table>

### Stats for designs involving comparisons between groups with no repeated measures:

<table>
<thead>
<tr>
<th>Ind. Var.: 2 conditions</th>
<th>t-test</th>
<th>Value Range</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dep. Var: Interval</td>
<td></td>
<td>- to +infinity</td>
<td>The larger absolute value, the more likely to be statistically significant</td>
</tr>
<tr>
<td>IV: 2 conditions</td>
<td>Mann-whitney</td>
<td>$U$</td>
<td>0 to infinity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The smaller, the more likely to be statistically significant</td>
</tr>
<tr>
<td>DV: Ordinal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV: 3 conditions</td>
<td>1-way ANOVA</td>
<td>$F$</td>
<td>0 to infinity</td>
</tr>
<tr>
<td></td>
<td>(+ multiple comparisons)</td>
<td></td>
<td>The larger, the more likely to be statistically significant</td>
</tr>
<tr>
<td>DV: Interval</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV: 3 or more conditions</td>
<td>Non-parametric ANOVA</td>
<td>$F$</td>
<td>0 to infinity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The larger, the more likely to be statistically significant</td>
</tr>
<tr>
<td>DV: Ordinal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV: 2 or more conditions</td>
<td>Chi-Square</td>
<td>$\chi^2$</td>
<td>0 to infinity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The larger, the more likely to be statistically significant</td>
</tr>
<tr>
<td>DV: Categorical</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Name: __________________________________________________________

Given a pre-existing data set, students will individually perform the following operations, print a hard copy of the output reports, and give the output report to faculty tutor for grading. Faculty tutor will place a check mark by each operation performed correctly. Students will repeat each incorrect operation until it is performed correctly.

1. Input data
2. Edit data
3. Produce descriptive statistics and present in table format [according to APA (6th ed.) format]
4. Produce a bar graph
5. Produce a pie chart
6. Produce a histogram
7. Perform correlation analysis
8. Interpret result of #7 (i.e. read printout and determine significance)
9. Report results of #7 in text sentence according to APA (6th ed.) format
The Muddiest Point

1. Did you get what you came for today?
   a. If yes, what did you understand?
   b. If no, what was missing?
   c. If not sure, please explain.

2. What was the muddiest point remaining at the end of today’s class?

3. What percent of ‘mud’ was due to:
   a. Unclear presentation by instructor?
   b. Lack of opportunity to ask questions?
   c. A personal lack of preparation?
   d. A personal lack of participation in class discussion?
   e. Other?

4. In one quick sentence, please explain your answers to question #3.

***Please return your feedback by email to JPE by ______time & ______date.
Descriptive Statistics

Statistics?
- Probability theory
- Estimate population characteristics based on sample data

How are statistics used?
- Describe characteristics of sample
- Infer information about population based on data from sample
- “...identify associations, relations, and differences among sets of observations…” (Kielhofner, 2006, p. 214)

Measurement Scales

Categorical
1. Nominal
2. Ordinal

Nominal Scale
- Number assigned to a category
- No numerical value
- Mutually exclusive
- Examples:
  - 1 = female; 2 = male
  - 1 = RA; 2 = OA; 3 = PA
**Ordinal Scale**
- Rank-order categories
- “...numbers represent relative position of the category along the continuum...” (Kielhofner, p. 216)
- Distances between ranks are not necessarily equal
- Example: 1=no pain; 2=mild; 3=moderate; 4=severe

**Interval Scale**
- Distance between units of measurements (or ‘intervals’) is equal
- “...no meaningful zero point...” (p. 217)
- i.e., zero does not mean ‘nonexistence’ or absence
- Example: temperature

**Ratio Scale**
- True ‘zero’ point; i.e. indicates lack of characteristic
- Equal distance between values
- Examples: height; weight; age; ROM

**Descriptive Statistics**
- Summarize sample characteristics
- Frequency tables and graphs for __________________
- Measures of central tendency & variability for __________________

**Frequency Distribution**
- Discrete Variables

**Frequency Distribution**
- Discrete Variables

---

AOTA Membership
- Faculty
- Students
- Alumni
Frequency Distribution

- Continuous Variables

Measures of Central Tendency

- Mean
- Median
- Mode

Measures of Variability

- Range
- Percentile
- Variance
- Standard Deviation
  - Report with the mean

http://www.gseis.ucla.edu/courses/ed230a2/frequency.html
Inferential Statistics

**Definition:**

- Estimating characteristics of a population from a sample

...(whereas descriptive statistics summarize and describe data)

Two Important Concepts of Statistical Reasoning

- **Probability**
- **Sampling Error**

Probability

- System of rules for analyzing a complete set of possible outcomes
- Likelihood that any event will occur given all possible outcomes
- Reflects what should happen, not necessarily what will happen
- Use probability to determine if treatment differences are representative of population differences or if differences could have occurred by chance

Sampling Error

- Tendency for sample to be different from population
- **Sampling distribution of means** = distribution of sample means; normal curve
- **Standard Error of the Mean**
  - Estimate of population standard deviation
  - As sample size increases, sample is more like population; sample mean is more likely to be closer to population mean; sampling error is smaller
  - As “n” (sample size) increases, standard error of mean decreases

Confidence Intervals

- **Point estimate** = single value obtained by direct calculation from sample data
- **Interval estimate** = interval within which population parameter will lie
Confidence Intervals

- CI = range of scores with specific boundaries or confidence limits that should contain population mean
  - Wider interval, more confident that true mean falls within it
  - 95% confident that population mean will fall within interval
  - 5% chance that population mean not included in obtained interval

Confidence Intervals

- Confidence Intervals with small samples:
  - Smaller samples’ distributions are more spread out; standard normal curve not appropriate for samples < 30
  - t-distribution: different curve – wider – shape changes with different sample sizes
    - Different proportions under the curve
  - Degrees of freedom (df): used to identify various t-distributions; n-1

Hypothesis Testing

- Decide if observed effect reflects chance or if difference is due to “real” effects
- Two possible explanations:
  - Difference is due to treatment
  - Difference is due to chance as a result of sampling error

Hypothesis Testing

- Null hypothesis: \( H_0: M_1 = M_2 \)
- Any observed difference between means are due to chance
- Goal is ALWAYS to test \( H_0 \) with intention of rejecting it
- Assume no relationship exists between variables until evidence tells us otherwise
- Purpose is to disprove or discredit \( H_0 \)
- Reject \( H_0 \): unlikely that chance is producing difference; significant effect is probably not due to chance
- Fail to reject \( H_0 \): observed difference may be due to chance and is not significant (ns); evidence is too weak to support

Hypothesis Testing

- Alternative Hypothesis: \( H_1 \) (or \( H_a \))
- Observed difference is not due to chance
- Treatment (IV) made the difference
- Non-directional (two-tailed) simply states that difference exists; does not indicate whether difference is larger or smaller
  - \( H_1: M_1 \neq M_2 \)
- Directional (one-tailed) indicates direction of difference
  - \( H_1: M_1 > M_2 \)
  - \( H_1: M_1 < M_2 \)
  - NOTE: \( H_1 \) will either be “<” OR “>”; but not both

Errors in Hypothesis Testing

<table>
<thead>
<tr>
<th>( H_0 ) true</th>
<th>( H_0 ) false</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reject ( H_0 )</td>
<td>Type 1 error</td>
</tr>
<tr>
<td>Accept ( H_0 )</td>
<td>correct</td>
</tr>
</tbody>
</table>
Errors in Hypothesis Testing

**Type 1 error**
- Reject \( H_0 \) when it is true
- Conclude that real difference exists when in fact difference is due to chance
- Could decide to use ineffective treatment

**Type 2 Error: Statistical Power**
- Type 2 error is failure to reject \( H_0 \) when it is false; found no significant difference when one does exist
- Power: probability that test will lead to rejection of \( H_0 \)
- Power is function of factors:
  - Variance: Power increases as variance decreases
    - Increased variability \( \Rightarrow \) difference between 2 groups less obvious
    - Variance decreased and power increased by increasing sample size

**Concepts of Statistical Testing**
- Directional vs. Non-directional tests
  - Critical region estimate in both directions = two-tailed test = non-directional

---

Type 1 Error: Level of Significance

- Probability \( p \) that observed difference did occur by chance; determined by statistical test
- \( p = .18 \Rightarrow 18\% \) probability that difference between two means occurred by chance
- If reject \( H_0 \) and conclude that two groups are different, 18\% chance of being wrong and committing type 1 error
- Preset the level of significance (alpha) according to the maximum acceptable risk you are willing to take of making a type 1 error if you reject \( H_0 \)
  - Typically pre-set at .05
  - If \( p < .05 \), we reject \( H_0 \) and accept \( H_1 \)
  - Willing to accept a 5\% chance of incorrectly rejecting \( H_0 \)

---

Type 2 Error: Level of Significance

- **Sample Size**: larger sample, greater power
  - Small sample: less likely to be good representation of population therefore true difference less likely to be recognized
- **Effect Size (ES)**: Size of effect of experimental variable
  - Greater effect size, \( \Rightarrow \) difference between 2 groups
- **Power analysis**: Estimate sample size needed to obtain desired level of power before data collection
Concepts of Statistical Testing

- One-tailed or two-tailed?
  - One-tailed (directional) is more powerful (less likely to commit type 2 error)

Parametric vs. Nonparametric Statistics

- Parametric – statistics used to estimate population parameters; assumptions:
  - Samples randomly drawn from population with normal distribution
  - Variances are equal; test for homogeneity of variance
  - Data is interval or ratio

- Nonparametric – conditions don’t meet above assumptions
  - Used with small samples
  - Used when normality and homogeneity haven’t been established
  - Data is nominal and ordinal

Statistical vs. Clinical Significance

- Importance: Significance does not equal important, conclusive, distinctive, or marked
  - Use the term ‘significant’ only to refer to results of statistical tests

- Effect size: When test doesn’t result in statistical significance but effect size is large enough, be aware of possibility of type 2 error; don’t automatically assume treatment is ineffective

- Consider validity of statistical procedure
Nonparametric Statistical Analysis

Chi Square

Correlation

Nonparametric Tests

Chi-Square ($X^2$)

- Analysis of frequencies
- Categorical variables (nominal or ordinal)
- Determines how nominal variables are distributed

Assumptions

1. Frequencies represent individual counts
2. Categories are exhaustive and mutually exclusive

Parametric vs. Nonparametric Tests:

1. Random sampling of population
2. Assume population normality and homogeneity of variance.
3. Data measured on interval or ratio scales

1. Small or convenience sampling
2. Can’t assume population normality and homogeneity of variance
3. Data is nominal or ordinal

Nonparametric Tests

Chi-Square ($X^2$)

- Types of frequency comparisons
  - Test of independence: whether 2 variables are independent of each other
  - Test of goodness of fit: whether observed frequency differs significantly from expected frequency

Nonparametric Tests

Chi-Square ($X^2$)

- Test of independence
  - Most common application of chi-square in clinical research
  - Examine the association between two categorical variables
  - Association based on the proportion of individuals who fall into each category
Example

Purpose:
Determine whether therapists were responding to environmental demands in planning interventions.

Example

- **Participants**
  - 22 Special Education teachers
  - 5 Occupational Therapists
- **Instrument:**
  - Survey of tasks required for role of student
  - 36 tasks (3 categories) identified

Example

- **Procedures**
  - Teachers marked which of the 36 items students in their classrooms were required to perform regularly
  - Therapists completed one survey for each child receiving direct services in targeted classrooms
  - Marked which of the 36 items were included in the goals of the child's OT intervention

Example

- **So, what scale of measurement did the data represent?**

Example

- **Data Analysis**
  - *Teacher data:* "...frequency with which each item was designated as an early childhood classroom requirement was tabulated and converted into a percentage of the total response rate...items selected by 75% or more of the respondents were operationally defined as representing the student role demands of the target environment.” (p. 66)

Example

- **Data Analysis**
  - *Therapist data:* "...frequency with which each item was designated as being addressed by occupational therapy direct services was also tabulated." (p. 66)
**Example**

- Result of Chi Square analysis:
  \[ X^2_{(1)} = 58.8, \ p < .001 \]
- Based on the above, what can you conclude?

**Correlation**

- Relationship between 2 variables
- The value of one variable (X) is associated with the value of another variable (Y)

**Correlation**

- Correlation coefficients....
  "...quantitatively describe the strength and direction of a relationship between two variables." (Portney & Watkins, 2009, p. S3)
  - Values between 0 ± 1.00
  - 1.00 = perfect positive relationship
  - X increases as Y increases
  - X decreases as Y decreases
  - -1.00 = perfect negative relationship
  - X increases as Y decreases and vice versa

**Correlation**

- 0.00 to .25: little or no relationship
- .25 to .50: fair degree of relationship
- .50 to .75: moderate to good
- > .75: good to excellent

**Correlation**

- Statistical significance
  - Indicates observed value is unlikely to be result of chance

**Scatter plots of statistical relationship**

- Various scatter plots illustrating different levels of correlation.
Correlation

- Pearson Product–Moment Correlation Coefficient
- Covariance
- Most common measure of correlation

Example


Example

- 19 preschool children
- The Test of Playfulness
- Coping Inventory

Example

- So, what can you conclude?

Correlation

- Spearman Rank Correlation Coefficient
  - $r_s$
  - Nonparametric
  - Ordinal data
  - Ranked observations (1 is lowest score – rank from smallest value)

$r = .51, p = .02$

Figure 1: Scatterplot of relationship between playfulness and coping.
Correlation

- Presence of correlation **does not** indicate causation
- **Can’t automatically** say that X causes Y or Y causes X
- Causality must be supported by
  - Biological credibility of association
  - Logical time sequence (cause precedes outcome)
  - Larger causal factor, larger outcome
  - Consistency of findings across several studies
**t-Test and ANOVA**

**t-Test = Parametric Test**
- Two independent groups
- Difference between means

**Assumptions**
- Normal distribution
- Random assignment
- Independent samples
- Groups equivalent at start

**Conceptual Basis**
- Based on mean (between groups)
- and variance (within groups)

**Error Variance**
- Unexplained error
- Personal characteristics
- Inconsistencies in measurement
- Behavioral and environmental factors
- Greater error variance \(\Rightarrow\) less likely that treatment produces difference between groups (likely it was chance)

**Test of statistical significance**
- Decide whether or not to reject the null hypothesis on basis of its probability of being true
Statistical Hypotheses

- $H_0: M_1 = M_2$
- $H_a: M_1 \neq M_2$
- $H_a: M_1 > M_2$
- $H_a: M_1 < M_2$

When to use the $t$-test

- Difference between groups
- Participants tested once
- Only 2 groups
- DV = interval or ratio scale

$DV =$ interval or ratio scale


$IV =$ Classroom furniture

Example


$IV:$ Classroom furniture

- Standard, too-large furniture; not support optimal seating position
- Optimally positioned, individually fitted furniture

DV: In-hand Manipulation Test

Degrees of Freedom (df)

- $(n_1 + n_2 - 2)$
- Also can be written as $df = N - 2$
**Result of t-test**

\[ t_{(38)} = -2.77; p < .01 \]

“...children who were optimally positioned performed significantly better than children who were tested in the too-large standard classroom furniture.” (p. 380)

**Paired Sample t-Tests**

- Dependent samples
- Analyze difference scores for each pair

**Example**


IV: Wrist condition
- Free wrist (i.e. no splint)
- Wearing a static wrist orthosis

DV: Shoulder ROM (flexion; abduction; internal rotation)

**Example (con’t)**

- 20 participants (with no UE dysfunction) performed a controlled feeding activity under two separate wrist conditions

**Results of paired t-tests**

- **Shoulder flexion:**
  \[ t_{(19)} = -3.778, p = 0.001 \]

- **Shoulder abduction:**
  \[ t_{(19)} = 3.374, p = 0.003 \]

- **Shoulder internal rotation:**
  \[ t_{(19)} = 0.728, p = 0.475 \]

**Inappropriate Use of t-Tests**

- Can only use when comparing two means
ANOVA
- Parametric
- Compares means of three or more groups
- F statistic
- Do instead of multiple t-tests
  - Multiple t-tests > chance Type I error

One-Way ANOVA
- Compare three or more independent group means
- One IV with three or more levels

Example

Example (con’t)
IV: Aromas (3 levels)
- Rosemary
- Lavender
- No scent
DV: Cognition and Mood
Results of One-Way ANOVA

Quality of Memory
\( F(2, 141) = 4.80, p = .010 \)
Tukey post-hoc: rosemary (mean = 363.91) produced significantly higher scores than lavender (mean = 326.61); \( p < .05 \)
No other significant differences were found

Results of One-Way ANOVA

Accuracy of Attention
\( F(2, 141) = 1.20, p = .305 \)

Results of One-Way ANOVA

Alertness
\( F(2, 141) = 5.43, p = .005 \)
Tukey post-hoc: rosemary produced increase in alertness (mean change = 5.51) compared to decreases for both the control group (mean change = -3.06), \( p < .05 \), and lavender (mean change = -7.49); \( p < .05 \)

Results of One-Way ANOVA

Contentedness
\( F(2, 141) = 9.72, p = .0001 \)
Tukey post-hoc:
- Rosemary produced significant increase in contentedness scores (mean change = 2.39) compared to controls (mean change = -9.58); \( p < .01 \)
- Lavender produced a decrease in contentedness (mean change = -2.79) that was significantly less than that for controls (mean change = -9.58); \( p < .05 \)

Two-Way ANOVA

- Involves 2 IVs (not repeated)
- Extension of a one-way analysis
- Example:
  - IVs = (a) type of splint
    (b) type of medication
  - DV = pain

Two-Way ANOVA

- Main effects
  - Effect of splint, independent of effect of pain meds
  - Effect of pain meds, independent of effect of splint
- Interaction effect
  - Effect of interaction of splint and pain meds
**Example**


**Example (con’t)**

IVs
- Cultural group (Jewish & Druze)
- Gender

DV
- Score on Children's Assessment of Participation and Enjoyment (CAPE)

---

### CAPE

- **8 sub-scales**
  - Total participation
  - Formal
  - Informal
  - Recreational
  - Active physical
  - Social
  - Skill based
  - Self-improvement

### Types of scores

- Diversity score
- Participation intensity
- Personal intensity
- Enjoyment

---

### Results

#### Main Effect of Culture

<table>
<thead>
<tr>
<th>Type of activity</th>
<th>Participation intensity</th>
<th>Personal intensity</th>
<th>Enjoyment</th>
<th>Amounts of Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Participation</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Formal</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Informal</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Recreational</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Active physical</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Social</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Skill based</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Self-improvement</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
</tbody>
</table>

*Note: 1. The Druze children scored significantly higher on these scales than the Jewish children. 2. Jewish children scored significantly higher on these scales than the Druze children.*

---

#### Main Effect of Gender=NS

---

#### Interaction Culture x Gender
### Table 1: Gender Group by Gender Interaction on Each Child’s Assessment of Participation and Environment Scale

<table>
<thead>
<tr>
<th>Scale</th>
<th>Gender Group 1</th>
<th>Gender Group 2</th>
<th>Gender Group 3</th>
<th>Gender Group 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Participation &amp; Environment Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Score</td>
<td>Score</td>
<td>Score</td>
<td>Score</td>
</tr>
<tr>
<td></td>
<td>1.23</td>
<td>1.24</td>
<td>1.25</td>
<td>1.26</td>
</tr>
<tr>
<td></td>
<td>1.27</td>
<td>1.28</td>
<td>1.29</td>
<td>1.30</td>
</tr>
<tr>
<td></td>
<td>1.31</td>
<td>1.32</td>
<td>1.33</td>
<td>1.34</td>
</tr>
<tr>
<td></td>
<td>1.35</td>
<td>1.36</td>
<td>1.37</td>
<td>1.38</td>
</tr>
</tbody>
</table>

### Table 2: Gender Group by Gender Interaction on Each Scale of the Children’s Assessment of Participation and Environment Scale

<table>
<thead>
<tr>
<th>Scale</th>
<th>Gender Group 1</th>
<th>Gender Group 2</th>
<th>Gender Group 3</th>
<th>Gender Group 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Participation &amp; Environment Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Score</td>
<td>Score</td>
<td>Score</td>
<td>Score</td>
</tr>
<tr>
<td></td>
<td>1.23</td>
<td>1.24</td>
<td>1.25</td>
<td>1.26</td>
</tr>
<tr>
<td></td>
<td>1.27</td>
<td>1.28</td>
<td>1.29</td>
<td>1.30</td>
</tr>
<tr>
<td></td>
<td>1.31</td>
<td>1.32</td>
<td>1.33</td>
<td>1.34</td>
</tr>
<tr>
<td></td>
<td>1.35</td>
<td>1.36</td>
<td>1.37</td>
<td>1.38</td>
</tr>
</tbody>
</table>

- The present children scored significantly higher on these scales than the back children.

The American Journal of Occupational Therapy 427
Learning Outcomes:
   a. Apply scientific reasoning process to decision-making.
   b. Critique the rigor of quantitative methodology, analysis, and outcomes.
   c. Describe the range of quantitative-type research designs including critique of internal and external reliability and validity for each.

Required Reading(s):
   a. Kielhofner chapter 18: Meta-Analysis

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Content</th>
<th>Learning Activities</th>
<th>Instructional Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30</td>
<td>Meta Analysis</td>
<td>Listen, take notes, clarify with questions</td>
<td>Meta-Analysis PowerPoint</td>
</tr>
<tr>
<td>10:30</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:00</td>
<td>Review Evidence Table Assignment</td>
<td>Listen, take notes, clarify with questions</td>
<td>Evidence Table assignment handout &amp; grading criteria</td>
</tr>
</tbody>
</table>

References:
## Meta-Analysis Activity: Single Study Quality Score

| Rater Name: ____________________ Date: ____________ |
| Study Author and Year: ______________________________ |
| Study Title: ________________________________________ |
| Recommendation for analysis (check one): _____ Yes _____ No _____ Unclear |

**IVS (√ one): ____ 3 _____ 2 _____ 1**

### A. Descriptions

<table>
<thead>
<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th><strong>Unclear</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Was the study population well described (time, place, &amp; person)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Was the intervention well described (what, how, who, where)?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| + _______ | - _______ | 0 _______ |
| 2 | 2 | 2 |

Comments:

### B. Sampling

<table>
<thead>
<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th><strong>Unclear</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Did the authors specify the sampling frame or universe of selection for the study population?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Did the authors specify the screening criteria for study eligibility?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Was the population that served as the unit of analysis the entire eligible population?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Are there other selection issues not otherwise addressed (high refusal, inappropriate control, restricted sampling)?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| + _______ | - _______ | 0 _______ |
| 4 | 4 | 4 |

Comments:

### C. Measurement

<table>
<thead>
<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th><strong>Unclear</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Did the authors attempt to measure exposure to the intervention?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Was the exposure variable:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Valid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Reliable (consistent, reproducible, interrater, ICC, Kappa)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Were the outcome and other independent (or predictor) variables:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Valid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Reliable (consistent &amp; reproducible)?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| + _______ | - _______ | 0 _______ |
| 5 | 5 | 5 |

Comments:

---

**Grade of Evidence**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**Level of Evidence**

<table>
<thead>
<tr>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
</table>

---

≥ points (≥95%) = Very High
19-21 points (81-92%) = High
16-18 points (70-81%) = Medium
≤ 15 points (≤ 69%) = Low

___A ___B ___C ___D ___E

---
### D. Data Analysis

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Unclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did the authors conduct appropriate statistical testing by:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Conducting statistical testing (when appropriate)?</td>
<td>12.</td>
<td>13.</td>
<td>14.</td>
</tr>
<tr>
<td>* Reporting which statistical tests were used?</td>
<td>15.</td>
<td>16.</td>
<td>17.</td>
</tr>
<tr>
<td>* Controlling for repeated measures in populations that were followed over time?</td>
<td>14.</td>
<td>15.</td>
<td>16.</td>
</tr>
<tr>
<td>* Controlling for differential exposure to the intervention?</td>
<td>17.</td>
<td>18.</td>
<td>18.</td>
</tr>
<tr>
<td>* Using a model designed to handle multi-level data when the included group-level and individual co-variates in the model?</td>
<td>18.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Are there other problems with the data analysis? Describe:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total: + 7 - 7 0 7

Comments:

### E. Interpretation of Results

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Unclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did at least 80% of enrolled participants complete the study?</td>
<td>19.</td>
<td>19.</td>
<td>19.</td>
</tr>
<tr>
<td>Did the authors assess the confounding variables?</td>
<td>20.</td>
<td>20.</td>
<td>20.</td>
</tr>
<tr>
<td>Whether the units of analyses were comparable to prior exposure to the intervention (report p values and ICC for demographic age &amp; gender)?</td>
<td>21.</td>
<td>21.</td>
<td>21.</td>
</tr>
<tr>
<td>Correct for controllable variables or institute study procedures to limit bias appropriately (e.g., randomization, restriction, matching, stratification, or statistical adjustment)?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total: + 3 - 3 0 3

Comments:

### F. Reporting of Biases or Confounders

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Unclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check ‘yes’ if authors reported all or most potential biases or unmeasured/contextual confounders.</td>
<td>22.</td>
<td>22.</td>
<td>22.</td>
</tr>
</tbody>
</table>

Total: + 1 - 1 0 1

Comments:
22A. Grade for Internal Validity

<table>
<thead>
<tr>
<th>Definition (from Portney &amp; Watkins, 2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal Validity</strong></td>
</tr>
<tr>
<td>Represents the degree of confidence that the results of a study can be attributed to the intervention rather than to flaws in the research design (confidence in the relationship between the independent and dependent variables). 10 areas that can be lower the confidence are: selection, history, maturation, repeated testing, instrumentation, regression to the mean, experimental mortality, selection—maturation interaction, and experimenter bias. A variable is an observed and measurable characteristic or concept: the independent variable is the causal intervention or manipulation and the dependent variable is the outcome measure.</td>
</tr>
<tr>
<td><strong>3</strong></td>
</tr>
<tr>
<td><strong>2</strong></td>
</tr>
<tr>
<td><strong>1</strong></td>
</tr>
</tbody>
</table>

Internal Validity Score (IVS): _______

22B. Grade for External Validity

<table>
<thead>
<tr>
<th>Definition (from Portney &amp; Watkins, 2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External Validity</strong></td>
</tr>
<tr>
<td>Refers to the degree to which the findings of the study are useful and generalized outside the experimental participants, setting and times. It is the heterogeneity of the sample that allows you to generalize well (i.e., age range, one gender, a specific diagnosis, one level of function).</td>
</tr>
<tr>
<td><strong>(a) 3</strong></td>
</tr>
<tr>
<td><strong>(b) 2</strong></td>
</tr>
<tr>
<td><strong>(c) 1</strong></td>
</tr>
</tbody>
</table>

External Validity Score (EVS): _______

Confounder for Internal Validity

(From the 1st Measure to the 2nd Measure

1. **History**: The potential effect that participation in specific events that may be responsible for change in the outcome (dependent variable) (i.e., participation in other therapies, or global event state law mandating specific behaviors).

2. **Maturation**: The potential effect that passage of time affecting subjects or measures that may be responsible for change in the outcome (dependent variable) (i.e., growing older, stronger, healthier, more experience, weaker, tired, or bored).

3. **Attrition**: The potential effect that (also called experimental mortality) the loss of study subjects by dropout or death may be responsible for changing the randomness (i.e., group with unequal variances).

4. **Testing**: The potential effect that the pretest or repeated measure may be responsible for change in the outcome (dependent variable) (i.e., coordination tests may be reactive measures).

5. **Instrumentation**: The potential effect of a (non-reliable testing) that the calibration, observer, or tester, experience and skill may be responsible for changes in the outcome (dependent variable).

6. **Statistical Regression**: The potential effect of a (non-reliable) test to tent to extreme scores on pretest to regress toward
the mean of the post-test and be responsible for the change in the outcome.

7. Selection

The potential effect that the difference between the groups (control vs. treatment) cannot be balanced out.

8. Interaction:

The potential effect that the interaction between any combination of selection maturation, history and/or instrumentation may be responsible for the change in the outcomes.

9. Treatment:

The potential effect that ambiguity of cause-effect, diffusion of treatment, imitation of treatment, compensatory equalization of treatments, compensatory rivalry and resentful demoralization of participants receiving less desirable treatment causes the differences in outcomes.

10. Experimental Bias:

The potential effect that the experimenter or subject’s expectation or best presentation: is not representative of natural behavior.

<table>
<thead>
<tr>
<th>Grade of Recommendation</th>
<th>Level of Evidence</th>
<th>Therapy/Prevention, Aetiology/Harm</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1a</td>
<td>SR (with homogeneity) of RCTs</td>
</tr>
<tr>
<td></td>
<td>1b</td>
<td>Individual RCT (with narrow CI)</td>
</tr>
<tr>
<td></td>
<td>1c</td>
<td>All or none</td>
</tr>
<tr>
<td>B</td>
<td>2a</td>
<td>SR (with homogeneity) of cohort studies</td>
</tr>
<tr>
<td></td>
<td>2b</td>
<td>Individual cohort study (including low quality RCT; e.g., &lt;80% follow-up)</td>
</tr>
<tr>
<td></td>
<td>2c</td>
<td>Outcomes research</td>
</tr>
<tr>
<td>C</td>
<td>3a</td>
<td>SR (with homogeneity) of case-control studies</td>
</tr>
<tr>
<td></td>
<td>3b</td>
<td>Individual case-control study</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
<td>Case-series (and poor quality cohort and case-control studies)</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>Expert opinion without explicit critical appraisal, or based on physiology bench research or first principles</td>
</tr>
</tbody>
</table>


***(Heyn, Abreu, & Ottenbacher, as cited in Kielhofner, 2006)***
Meta-Analysis

EBP
- Multiple studies to validate effectiveness
- Translate research findings into clinically useful information
  “Combine” Literature

Narrative Literature Review

Systematic Review

“...a rigorous process of searching, appraising, and summarizing existing information on a selected topic...most commonly focused on intervention...”
(Portney & Watkins, 2009, p. 357)

“...statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating the findings.”
(Glass as cited in Portney & Watkins, 2009)

M-A is Research Design

What are the “steps” in conducting ‘research’?
1. **Problem formulation**
   - Topic
   - Question
   - IV = Treatment
   - DV = Outcomes
   - Operational definitions

2. **Data Collection**
   - Inclusion criteria
   - Search strategy
   - Report procedures

4. **Data evaluation and coding**
   - Meets pre-determined criteria?
     - RCT; Peer-reviewed
     - All studies
   - Systematic “Coding”

4. **Analysis & Interpretation**
   - Effect size (IV)
     - “...degree to which the null hypothesis is false.” (Cohen as cited in Kielhofner, 2005, p. 290)
   - Sample size weighting system
   - Homogeneity: “…is variability of effect size greater than what would be expected by chance?” (p. 292)
5. Reporting Results

- Introduction
- Methods
- Results
- Discussion

**Steps in M-A**

- Statistical power
- Magnitude of experimental effects
- Insight into relationships among variables
- Objectively explore contradictions

**Advantages**

(Kielhofner, 2005, p. 294)

---

- Researcher judgment
- Assumptions need to be explicit
- Role of inferential stats controversial

**Limitations**

(Kielhofner, 2005, p. 295)
### Session #: 10  Date: _____________

**Learning Outcomes:**

- a. Demonstrate a basic understanding of the grant-writing application process.

**Required Reading(s):**

- a. Kielhofner chapter 30: Obtaining funding for research

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Content</th>
<th>Learning Activities</th>
<th>Instructional Media</th>
</tr>
</thead>
</table>
| 9:30     | Grant Writing  
• Funding sources  
• Barriers  
• Process & Proposal | Listen, take notes, clarify with questions | Grant Writing PowerPoint |
| 10:30    | Break | | |
| 10:40    | Overview of grant funding agencies | “Grant funding agencies” | Computer lab /internet access |
| 11:00    | Grant writing occupation/lab | “Grant writing lab” | Computer lab/internet access, electronic version of handout |
| 12:00    | Grant writing discussion | Class processing of “Grant writing lab” | Grant writing handouts |

**References:**


Grant Funding Agencies

I. Answer questions for specific funding agency:

1. American Occupational Therapy Foundation
2. Robert Woods Johnson Foundation
3. Therapeutic Riding grants application (posted on AOTA web site)
   http://www.horsesandhumans.org/Research.html
4. National Institute of Neurological Disorders and Stroke (posted on AOTA web site)
   http://www.ninds.nih.gov/
5. Grant opportunity for research in mental health: “Functioning of People with Mental Disorders”
   http://www.aota.org/Educate/Researcher/Funding/MHResearch.aspx
   (posted on AOTA web site)
6. Agency for Healthcare Research and Quality (posted on AOTA web site)
   http://www.ahrq.gov/fund/grantix.htm
7. Organization for Autism Research
   http://www.researchautism.org/professionals/grants/index.asp
8. Fundsnet Services – Homeless population
9. Dorthea Haus Ross Foundation

II. Identify a funding source and potential purpose (i.e. for which to seek funding) from:

   http://www.fundsnetservices.com/
Please answer the following questions:

1. Name of funding agency

2. Mission of funding agency

3. Fields of interests/areas of funding

4. Types of projects agency is likely to support

5. Types of projects that will not be funded

6. Contact information

7. Amount of money awarded annually

8. Historically, what types of projects have been funded?

9. What are the criteria for eligibility?

10. Describe the review process

11. Title of project YOU propose to submit for funding AND type of grant
Grant Writing

Why?

- ACOTE Standard:
  8.9 Demonstrate a basic understanding of the grant-writing application process.

Purpose of Grants
- Obtain resources to support
  - Research
  - Training
  - Program Development
  - Special projects
  - Construction

Sources of Funding
1. Federal Agencies
2. Private Foundations
3. Professional Organizations
4. Grant Databases
5. Local organizations

Funding Sources
- Federal
  - Department of Health and Human Services
  - National Institutes of Health (NIH)
    - National Center for Medical Rehabilitation Research (NCMRR)
  - US Department of Education (DOE)
    - Office of Special Education and Rehabilitative Services (OSERS)
  - National Institute on Disability and Rehabilitation Research (NIDRR)
Funding Sources

- **Private Foundations**
  - Pew Foundation
  - Robert Woods Johnson Foundation
  - Spinal Cord Research Foundation
  - United Cerebral Palsy Foundation
  - Arthritis Foundation
  - Hazel K. Goddess Fund for Stroke Research in Women

- **Grant Databases**
  - The Foundation Center [www.fdncenter.org](http://www.fdncenter.org)
  - Grants.Net [www.grantsnet.org](http://www.grantsnet.org)
  - Grants.gov [www.grants.gov](http://www.grants.gov)

- **Community Organizations** (Reynolds & Lane, 2010)
  - PTO
  - American Association of University Women (AAUW) community action grants
  - Messer Construction Co.

Know What is HOT!

- **HOT**
  - Community and home based service models
  - New health care models (cost–effective patient outcomes)
  - Underserved populations
  - Innovative use of technology
  - Chronic disease self-management
  - Informal care giving
  - Interdisciplinary team approaches
  - Health promotion, disease prevention

*It Starts With an Idea* (Gill & Lyons, 1998)

- Innovative: Bold!
- Significant!
- Compelling!
- Completely thought out!
- Catches reviewers attention!
Know What Is HOT!

- NOT
  - Hospital-based systems
  - Single discipline research
  - Narrow focus on minorities
  - Exclusion of women
  - Research w/ little clinical applicability
  - Programs needing continued support

Initial "Hurdles" (Raymond & Livne, 2010)

- Find potential source
- Your goals = funding source goals?
- Funding acceptable?
- Do you & facility meet requirements?
- Can you meet application deadline?
- Is funding period adequate for your project?
- Review proposals already funded, match?

Before you write...
(Raymond & Livne, 2010, p. 9-10)

1. "Have the right supports in place"
2. "Conduct a needs assessment"
3. "Identify theoretical foundation"
4. "Search the literature"
5. "Self-reflect"

Acquire Guidelines

Four of the Most Important Steps In Grant Writing

- Read the correct instructions.
- Read all of the instructions.
- Read the current instructions.
- Highlight the instructions.

Writing the Proposal

- Structure
- Attention to specifications
- Concise, persuasive writing
- Reasonable budget

(www.cpb.org/grants/grantwriting.html)
Writing the Proposal

• Title
  - Should generate enthusiasm!!!!

Writing the Proposal

• Abstract
  - Problem or need
  - Goals & objectives
  - Project
  - Evaluation method(s)

Writing the Proposal

• Introduction
  - Facts or statistics that best support the project

Writing the Proposal

• Goals and Objectives

Writing the Proposal

• Literature Review

Writing the Proposal

• Methodology
  - Background
  - Staffing
  - Design
  - Recruitment
  - Implementation
  - Evaluation
Dissemination Plan

- Plan to achieve objectives, be on time, be within budget
- Responsibilities clearly defined – organizational chart
- Realistic timelines

Team & Institutional Qualifications

- Personnel
- Nonpersonnel
  - Equipment
  - Supplies
  - Travel
  - Indirect
  - Justification or Narrative

References & Appendices

- Separate reference page
- Appendices
- Letters of Support
- CV
- Sample assessments

Significance:

- Does this study address an important problem?
- Is scientific or clinical knowledge being advanced?
- Is the project affecting the concepts or methods that drive this field?
Grant Review: Key Factors

- **Approach:**
  - Are the design, methods, and analyses adequately developed and appropriate to the aims of the project?

Grant Review: Key Factors

- **Innovation:**
  - Are the aims original and innovative?
  - Does the project develop or employ novel concepts and tools for this area?
  - Does the project challenge existing paradigms or develop new methodologies or technologies?

Grant Review: Key Factors

- **Investigators:**
  - Are the Principle Investigators (PIs) and other key personnel appropriately trained and well suited to carry out this work?
  - Is the work proposed appropriate to the experience level of the PIs and other researchers?

Grant Review: Key Factors

- **Environment:**
  - Does the environment in which the work will be done contribute to the probability of success?
  - Do the proposed studies benefit from unique features of the environment, or subject populations, or employ useful collaborative arrangements?
  - Is there evidence of institutional support?

Grant Review Process

- **Study Section**
  - Grant content analyzed for completeness
  - 2–3 peers are assigned to provide written review of your grant
  - Decides which grants are in the lower half of scientific merit → ‘streamlined’

Grant Review Process

- **Study Section Meeting**
  - Evaluation of your grant presented by assigned reviewers
  - General discussion of grant applications
  - Study section members mark their priority scores for each grant
  - Priority scores are tabulated
Grant Review Process

Study Section
1) Indicate level of enthusiasm for grant application
   ✓ How the application compared with others evaluated
   ✓ Discuss applications
   ✓ Recapitulate key arguments
2) Study section members vote

Possible Outcomes

General Reasons for Failure
- Lack of a good, original idea
- Unimportant problem
- Lack of acceptable rationale
- Insufficient demonstration of knowledge base

General Reasons for Failure
- Lack of essential experience/expertise/resources
- One or more aims cannot be undertaken unless an earlier aim has a specific outcome
- Unrealistic amount of work proposed
- Uncertain outcomes and future directions

SORRY!
- Revise & Resubmit

Diffuse, superficial, or unfocused approach

If you don’t know where you’re going, any path will get you there!
Keys to Success

- Passion
- Attitude
- Time
- Luck

You've been funded, now what?!  

- Develop & adhere to timeline
- Meet reporting requirements
- Follow outlined procedures
Learning Outcomes:

a. Apply scientific reasoning process to decision-making.
b. Advocate importance of evidence-based decision-making as an OT professional.
c. Seek and use national and international sources for evidence-based decision-making.
d. Explain and apply steps in implementing evidence-based practice as a foundation for clinical decision-making.
e. Critique the rigor of quantitative methodology, analysis, and outcomes.

Required Reading(s):

b. Kielhofner chapter 41: Evidence-based practice in occupational therapy
c. Kielhofner chapter 42: Analyzing evidence for practice
d. Kielhofner chapter 43: Managing change and barriers to evidence-based practice
e. Sackett et al. (1996)

Timeline

<table>
<thead>
<tr>
<th>Time</th>
<th>Content</th>
<th>Learning Activities</th>
<th>Instructional Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30</td>
<td>Evidence Based Practice</td>
<td>Listen, take notes, clarify with questions</td>
<td>EBP PowerPoint</td>
</tr>
<tr>
<td></td>
<td>• Historical Perspective</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Barriers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Levels of evidence</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ethical Considerations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:30</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:40</td>
<td>EBP Occupation Preparation</td>
<td>EBP Occupation Preparation</td>
<td>Handout of guidelines, class notes, computer lab</td>
</tr>
</tbody>
</table>

References:


EBP Occupation

- Divide into groups of 4
- For your assigned topic, define a clinical topic for which you will seek evidence
- Access one item from each of the eight types of information available from AOTA
- Synthesize all of the information to produce an intervention recommendation related to your clinical topic
Evidence Based Practice
(JPE & CRS)

Knowing is not enough, we must apply.
Willing is not enough, we must do.
Goethe, 1833

Introduction

"We envision that OT is a powerful, widely recognized, science-driven, and evidence-based profession with a globally connected and diverse workforce meeting society’s occupational needs”
~AOTA Centennial Vision~
(www.aota.org)

Integrating
1. Clinical expertise
2. Patient values
3. Conscientious, explicit, and judicious use of current best evidence

In making decisions about care of individual patients

What is EBP?
(Sackett, Straus, Richardson, Rosenberg, Haynes, 2000)

EBP in Occupational Therapy

• EBM
• Cost containment
• Accountability
EBP congruent with “...philosophical beliefs and highly contextualized and dynamic nature of occupational therapy”? (p. 657)

EBP in Occupational Therapy

Appropriateness of hierarchy of Levels of Evidence?

EBP in Occupational Therapy

Top Ten Reasons for Becoming an Evidence-Based Practitioner (Holm, 2003)

10. Sounds impressive to cite research studies.
9. Team will be impressed with your knowledge.
8. Patients will be impressed.

7. Everyone else is doing it.
6. You want to know what your students are talking about.
5. You want to be reimbursed for services.

Top Ten Reasons for Becoming an Evidence-Based Practitioner (Holm, 2003)

4. You want to be a competent practitioner.
3. You want to be a scientific practitioner.
2. You want to be an ethical practitioner.

Top Ten Reasons for Becoming an Evidence-Based Practitioner (Holm, 2003)

1. You want the best outcomes for your patient!
**Historical Perspective**

**THEN**
- Therapist’s beliefs and values
- Patient preference
- Opinions of experts
- Research evidence => handed down from practitioner to practitioner

**NOW**
- EBP
  - Accessibility of information
  - Rapid growth made possible
  - Tracking & appraising evidence
  - Systematic reviews
  - EB journals
  - Information age

**Barriers to EBP**
- Lack of administrative support
- Access to evidence
- Skill in finding evidence
- Interpreting evidence
- Time
- Evidence!
- Attitude (Dubouloz, Egan, Vallerand, von Zwerk, 1999)

**Motivation for Overcoming Barriers**
- Regulations
- Prospective payers
- Capitation
- New patient populations
- New practice environments

**Strategies to Overcome Barriers**
- Managers provide time and support
- Create atmosphere of support
  - emphasizes in OT education programs
- Researchers create more ‘clinically-friendly’ research

**Barriers related to evidence**
- Conflicting results
- Methodological problems
- Poor generalize ability
- Unclear implications for practice
- Lack of clinical relevance
Myths about EBP

- “One size fits all”
- Impossible to do
- Tool for cost cutting
- Rejection of non-RCT
- Conflicts with client-centered practice

Current Challenges

- Too much evidence?
- Quantity doesn’t equal quality
- Hierarchy of evidence
  - Top ranking
    - Least vulnerable
    - More generalizeable
    - More confident outcome due to intervention

Best use of research resources (Hayes as cited in Kielhofner, 2005)

Levels of Evidence

Level I
- Strong evidence from at least one systematic review of multiple RCT

Level II
- Strong evidence from at least one RCT of appropriate size.

Level III
- Evidence from well-designed trials without randomization: Quasi-experimental; pre-post; cohort; & case control studies

Levels of Evidence

(Moore, McQuay, & Gray, 1995 as cited in Holm, 2000)
Levels of Evidence

Level IV
- Evidence from well-designed, non-experimental studies from more than one center or research group.
- “Correlational studies of multiple sites” (Kielhofner, 2005, p. 670)

Levels of Evidence

Level V
- Opinions of respected authorities based on clinical evidence, descriptive studies or reports of expert opinions
- Correlational studies; qualitative studies; expert opinion (Kielhofner, 2005, p. 670)

Steps in EBP

1. Formulate a question
2. Find evidence
3. Appraise the evidence
4. Apply the evidence
5. Evaluate

PICO format (Richardson et al., 1995)
- Problem
- Intervention preferred
- Comparison intervention
- Outcome

1. Formulate a question

Search data bases
Read literature

For patients with newly diagnosed rheumatoid arthritis in acute flare up, will soft resting hand splints be more effective than hard resting hand splints in leading to an outcome of decreased pain and stiffness and increased functional use of the hands?

1. Formulate a Question
Different types of research provide ‘best’ answers for different types of questions:

- **Treatment**: Systematic Reviews, Randomized Controlled Trials, in some cases single-case experimental studies
- **Patient experiences/concerns**: Qualitative


- Likely course of disease/disability: Cohort/ follow-up studies
- Cost-effectiveness: Economic studies comparing all outcomes against costs

3. Appraise the Evidence

(Williams, 2005)

- What are the study findings?
- Is this study of sufficient quality?
- How can the results help me care for my client?

**Appraisal by others**
- AOTA Evidence Briefs [www.aota.org](http://www.aota.org)
- OTCATS [www.otcats.com](http://www.otcats.com)
- OT Seeker [www.otseeker.com](http://www.otseeker.com)
- Cochrane’s TRIP [www.tripdatabase.com](http://www.tripdatabase.com)
- Cochrane’s Reviews [www.cochrane.org](http://www.cochrane.org)

3. Appraise the Evidence

AOTA Evidence Briefs [www.aota.org](http://www.aota.org)
3. Appraise the Evidence

- OTCATS  www.otcats.com
- OTSeeker  www.otseeker.org
- CochraneTRIP  www.tripdatabase.com
- Cochrane’s Reviews  www.cochrane.org

• How can I share the results with my client?
  - Explain options & results of findings
  - Apply judiciously
  - Measure religiously

4. Apply Evidence in Practice
  (Kellegrew, 2005)
4. Apply Evidence to Practice

- Alignment with population & context
  - Dx, setting, intervention, measures of change, outcomes
- The more aligned, the more useful
- The higher/rigorous evidence most generalizable
- Lower evidence can “guide”

5. Evaluate the Results

- Questions to ask
  - Did it work? Why? Why not?
  - What was same/different?
- Outcomes (cost, efficiency, ease)
- Social validity (satisfaction, use)

Need to Tackle as a Team

- Time & commitment
- EBP or journal club
- Person/committee
- Conferences
- Listserves
- Partner with institutions
- Evaluate after use - #5

Ethical Considerations in EBP
(Christiansen & Lou, 2001)

- Status of evidence may not be as high quality evidence as you would like
- Consumer autonomy (people with disabilities should have “say” in research agendas)
- Evaluating the evidence (base decisions on best available evidence for particular pt.)

Ethical Considerations (con’t)

- Conflict of interest (avoid real or perceived situations)
- Informed consent (fully informed to participate in research)
- Bias in research (Western medicine emphasis on length of life vs. quality of life)

AOTA’s EBP Resources

- TOPICS
  - Children & Youth
  - Health & Wellness
  - Mental Health
  - Productive Aging
  - Rehabilitation, Disability, Participation
  - Work & Industry
1. AJOT articles*
2. OT Practice articles
3. SIS Quarterly articles
4. CATs & CAPs
5. Evidence Brief Series
6. Evidence Perks
7. Evidence Bytes
8. EBP Resource Directory

AOTA’s EBP Resources

EBP Occupation

• Divide into groups of 4
• For your assigned topic, define a clinical topic for which you will seek evidence
• Access one item from each of the eight types of information available from AOTA
• Synthesize all of the information to produce an intervention recommendation related to your clinical topic

The End
Learning Outcomes:

- a. Apply scientific reasoning process to decision-making.
- b. Advocate importance of evidence-based decision-making as an OT professional.
- c. Seek and use national and international sources for evidence-based decision-making.
- d. Explain and apply steps in implementing evidence-based practice as a foundation for clinical decision-making.
- e. Critique the rigor of quantitative methodology, analysis, and outcomes.

Required Reading(s):

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Content</th>
<th>Learning Activities</th>
<th>Instructional Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30</td>
<td>EBP Occupation Preparation</td>
<td>EBP Occupation Preparation</td>
<td>Handout of guidelines, class notes, computer lab</td>
</tr>
<tr>
<td>10:30</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:40</td>
<td>Evidence table presentations 1-7</td>
<td>Student Presentations</td>
<td>PowerPoint</td>
</tr>
</tbody>
</table>

References:


Learning Outcomes:

a. Apply scientific reasoning process to decision-making.
b. Advocate importance of evidence-based decision-making as an OT professional.
c. Seek and use national and international sources for evidence-based decision-making.
d. Explain and apply steps in implementing evidence-based practice as a foundation for clinical decision-making.
e. Critique the rigor of quantitative methodology, analysis, and outcomes.

Required Reading(s):

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Content</th>
<th>Learning Activities</th>
<th>Instructional Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30</td>
<td>Presentations 7-14</td>
<td>Student presentations</td>
<td>PowerPoint</td>
</tr>
<tr>
<td>11:00</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:15</td>
<td>Post-test</td>
<td>“Perceived competence in research occupations” “Pre-post test”</td>
<td>Handouts</td>
</tr>
<tr>
<td>12:00</td>
<td>Summative Course Evaluation</td>
<td>“Summative evaluation”</td>
<td>Handout</td>
</tr>
</tbody>
</table>

References:


**Perceived Competence in Research Occupations**

Please answer the following questions about your level of confidence in your skill at carrying out various parts of the research process. In order to keep your response anonymous I would like you to choose an animal AND a number between 1 and 200. Please write down in another location the animal and the number used. In the post-test I will ask you to identify yourself by using the same two identifiers so that I can compare your perceptions at the beginning of the course to your perceptions at the end without knowing who you are.

I CHOOSE ANIMAL__________________          I CHOOSE NUMBER__________________

Please rank each of the following statements to describe your confidence in your skills as this point in the course. Mark how your feel TODAY about each of these statements.

**Instructions:** Circle a number between 1 and 7 where 1= least confident and 7= most confident.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I can use library resources to locate journal articles on a particular topic.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. I can identify peer-reviewed journals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. I can read and understand information in review articles.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. I can read and understand information from research reports.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. I can critically evaluate the information contained in review articles.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. I can read and understand information from case studies.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. I can critically evaluate the methods and findings of case studies.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. I can critically evaluate the methods and findings of research reports.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. I can identify the parts of a research protocol.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. I can interpret a print-out of statistical results.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. I consciously use writing skills to avoid plagiarism.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. I can paraphrase work to reduce my need for direct quotations.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. I can combine 6-10 sources to write a literature review.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. I can follow APA guidelines for writing in-text citations and references.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. I can locate quality references using the internet.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. I can critically evaluate information from an internet source.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17. I can critically evaluate work which I have previously written.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18. I can critically evaluate written work of other students.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

*** Thank you for completing this survey form.
Pre-Post Test

Age: _____ Undergraduate Degree: __________________________

PLEASE NOTE: These questions are designed to assess current understanding of concepts to be covered in this course. I do not expect that you will know the answer to every question. Keep in mind that this questionnaire will not be graded. Results of this questionnaire will be utilized in further lessons.

MULTIPLE CHOICE: For each of the following questions or statements, select the response that BEST answers or completes it; record the answer’s corresponding letter on the scantron form.

1. A study which the researcher carefully designs all aspects of the study before actually collecting any data is:
   a. Qualitative
   b. Quantitative

2. The following question “How do teachers in occupational therapy classes react to distance learning?” fits in to which category:
   a. Qualitative
   b. Quantitative

3. In a __________ study design, the investigator is the data gathering instrument:
   a. Qualitative
   b. Quantitative

4. In a __________ type of study, the design emerges as the study unfolds:
   a. Qualitative
   b. Quantitative

5. A researcher is interested in knowing if achievement level in high-school mathematics is related to motivation to excel. This statement demonstrates which of the following steps in the research process?
   a. A problem statement or research question
   b. Population and sampling
   c. Data collection
   d. Implication
6. The researcher wishes to project the findings to all high-school students enrolled in public schools in her district during the 2010-2011 academic years. This statement demonstrates which of the following steps in the research process?
   a. Data collection  
   b. Population and sampling  
   c. Data Analysis  
   d. Recommendation

7. From the above target projection group (question 6), the researcher randomly draws 50 boys and 50 girls to participate in her study: this statement demonstrates which of the following steps in the research process?
   a. Population and sampling  
   b. Data collection  
   c. Instrumentation/source of information  
   d. Implication

8. The researcher assumes that the relationship between achievement in mathematics and motivation to excel will hold true for all of the high-school public school students in her district from which these 100 study subjects were drawn.
   a. Data analysis  
   b. Implications  
   c. Discussion/conclusions  
   d. Recommendations

9. If this questionnaire adequately tests for all parts of the content covered in class, one can say the exam has strong:
   a. Predictive validity  
   b. Concurrent validity  
   c. Content validity  
   d. Face validity

10. Two therapists administered a test approximately 1 week apart that assessed fine motor prehension skills. The test results showed no change in the individual status between the first and last testing session. This would indicate that the test instrument has:
    a. Internal validity  
    b. External validity  
    c. High reliability  
    d. Low reliability

11. Which of the following is a descriptive statistic:
    a. t test  
    b. ANOVA  
    c. correlation  
    d. cumulative percentage
12. An OT working in the school system is choosing an evaluation tool to use with a fourth-grade student who is having difficulty with handwriting. The OT would like to be able to compare the student’s performance on this assessment to the performance of other students who have taken the same assessment. The OT would MOST likely choose a:
   a. Standardized assessment
   b. Criterion-referenced assessment
   c. **Norm-referenced assessment**
   d. Observation-based assessment

13. The OT practitioner is reviewing the literature to determine the best treatment technique to use with a patient. When evaluating evidence-based research, the level of evidence that is considered to be the strongest is attributed to:
   a. Case studies
   b. Cross-sectional surveys
   c. Cohort studies
   d. **Randomized control trials**

14. To become an evidence-based practitioner, typically five steps need to be followed as evidence from the literature is used to inform practice. Identify step number four:
   a. Apply the findings to a practice setting
   b. Go to a database and locate the evidence in the literature
   c. Appraise the evidence found
   d. **Evaluate how the study was applied to practice**
   e. Develop the research question

15. One difference between case study research and single-subjects design research is that case study research is __________ and single subject design research is __________.
   a. descriptive; experimental
   b. rigorous; controlled
   c. a withdrawal design; analyzed using inferential statistics
   d. level III evidence; level II evidence

16. In inferential statistics, if p < 0.05:
   a. \( H_0 \) is accepted due to a Type III error
   b. **there is a 5% chance of rejecting \( H_0 \) when it is true**
   c. \( H_1 \) is accepted
   d. all of the above

17. Which of the following is a form of *nonprobability* sampling:
   a. Cluster sampling
   b. Stratified random sample
   c. **Convenience sample**
   d. Systematic sampling
Learning Outcomes:

a. Demonstrate a basic understanding of the grant-writing application process
b. Explain and apply steps in implementing evidence-based practice as a foundation for clinical decision-making.
c. Critique the rigor of quantitative methodology, analysis, and outcomes.
d. Describe the range of quantitative-type research designs including critique of internal and external reliability and validity for each.
e. Demonstrate understanding of basic descriptive, correlational, and inferential quantitative statistics

Required Reading(s):

References:


Summative Evaluation:

On a scale of 1-10 (10 being high), please rate the course and/or instructor on the following [Note: please feel free to make additional comments in the space provided below each statement]:

1. Instructor shows adequate knowledge of the material/subject matter. ______

2. Instructor utilizes presentation techniques that facilitate learning. ______

3. Occupations/presentations/lectures reflect advance preparation for the class. ______

4. Instructor attempts to make course matter interesting to students. ______

5. Instructor provides students with adequate attention for questions or comments either during class or outside class. ______

6. Instructor contributed to my intellectual, moral, and spiritual growth through contributions to the course. ______

7. The text and readings were useful and appropriate. ______

8. The amount of required work was proportional to credit awarded. ______

List things you liked about the course & lectures.

What recommendations do you have for improvement?

Are there topics that you would like to see discussed further?
NAME: _________________________________

MULTIPLE CHOICE: For each of the following questions or statements, select the response that BEST answers or completes it; record the answer’s corresponding letter on the scantron form (credit will be given only for correct answers recorded on scantron form). Each correct answer is worth 2 points (total of 80 points).

1. Which of the following is a descriptive statistic:
   a. t test
   b. ANOVA
   c. correlation
   d. cumulative percentage

2. One difference between case study research and single-subjects design research is that case study research is __________ and single subject design research is __________.
   a. descriptive; experimental
   b. rigorous; controlled
   c. a withdrawal design; analyzed using inferential statistics
   d. level III evidence; level II evidence

3. For which step of evidence based practice would one access www.otcats.com:
   a. evaluate
   b. appraise the evidence
   c. apply the evidence
   d. form a question

4. The score that occurs most frequently is known as the:
   a. mean
   b. median
   c. mode

5. One purpose of case study research is to:
   a. demonstrate cause and effect relationship
   b. demonstrate effectiveness of an intervention under controlled conditions
   c. study effectiveness of an intervention with several patients randomly assigned to groups
   d. produce level I research

6. One advantage of case study research is that it provides a
   a. depth of information
   b. wide scope of information
   c. control group
   d. all of the above
7. According to the class lecture, which of the following is the **first** of the five steps in evidence-based practice:
   a. asking the patient what is important to him or her
   b. finding evidence about the patient’s diagnosis
   c. formulating a question
   d. reading an article about a new treatment relevant to the patient’s diagnosis

8. Which of the following is the LEAST rigorous type of research design:
   a. single-subject
   b. case study
   c. RCT
   d. quasi-experimental

9. The “average” score is known as the
   a. mean
   b. median
   c. mode

10. Which of the following is a “myth” about evidence-based practice: it
    a. helps with reimbursement
    b. conflicts with client-centered practice
    c. is based on evidence-based medicine
    d. includes consideration of patient’s values

11. Which of the following is a potential source of grant funding:
    a. hospitals
    b. professional organizations
    c. universities
    d. all of the above

12. When critiquing quantitative research studies, which of the following should you expect to find in the “methods” section:
    a. study limitations
    b. clinical significance of findings
    c. detailed description of intervention
    d. relationship of findings to previous literature

13. If you are following the steps of the evidence-based practice process and your PICO question is related to patient experiences, which of the following types of research would you seek:
    a. RCT
    b. single subject design
    c. cohort study
    d. qualitative design

14. Which of the following is key is securing grant funding:
    a. good luck
    b. positive attitude
    c. passion for one’s topic of study
    d. all of the above
15. Which of the following should appear in the “data analysis” section of a ‘good’ quantitative research study:
   a. alpha level of significance
   b. operational definitions of variables
   c. results of statistical analysis
   d. limitations of analysis

16. A correlation coefficient of -.60 indicates which of the following:
   a. little relationship
   b. fair relationship
   c. moderate relationship
   d. good relationship

17. If you would like to determine if there are statistically significant differences between 3 groups, which test would you perform:
   a. t test
   b. ANOVA
   c. chi-square
   d. correlation

18. You are reading the methods section of a peer-reviewed journal article and notice that the data was statistically analyzed using an ANOVA. Surviving the Xavier OT research curriculum, you know that:
   a. nonparametric statistics were used to compare the means of three or more groups.
   b. Chi-square analysis was used.
   c. median data is used in the ANOVA procedure.
   d. parametric statistics were used to compare the means of three or more groups.

19. Which of the following is a component of evidence based practice:
   a. research published in peer review journals
   b. clinical experience
   c. patient values
   d. only a & b
   e. a, b, and c

20. H_: M1= M2 is known as
   a. alternative hypothesis
   b. null hypothesis
   c. two-tailed hypothesis
   d. one-tailed hypothesis

21. “Strong evidence from at least one systematic review of multiple RCTs” is Level ____ evidence.
   a. I
   b. II
   c. III
   d. IV
22. In critiquing a quantitative research study, which of the following should you find in the **Discussion** section:
   - a. justification of research design
   - b. description of subjects
   - c. rationale for study
   - d. clinical application of findings

23. If you conduct a t-test and the results show that $p = 0.18$, you can conclude that
   - a. the null hypothesis should be rejected
   - b. there is an 18% chance that differences between the two means occurred by chance
   - c. the results are clinically significant
   - d. all of the above

24. In inferential statistics, if $p < 0.05$ then the null hypothesis
   - a. is rejected
   - b. cannot be rejected

25. “The value in which there are as many scores above as there are below” is known as the:
   - a. mean
   - b. median
   - c. mode

26. Which of the following happens when a Type 2 error occurs:
   - a. reject $H_0$ (null hypothesis) when it is true
   - b. decide to use an ineffective treatment
   - c. ignore an effective treatment
   - d. conclude that a difference between 2 groups exists when difference is actually due to chance

27. If you want to determine if there is a significant difference between the means of two groups, which statistical test would you select:
   - a. ANOVA
   - b. chi-square
   - c. correlation
   - d. t-test

28. If one wants to apply for a grant to fund his or her dissertation research project that addresses innovative occupational therapy interventions, to which of the following would he or she apply:
   - a. AOTF
   - b. AOTA
   - c. Robert Woods Johnson Foundation
   - d. National Institute of Health

29. The simplest measure of variability, the range, is the:
   - a. difference between the highest and lowest values in a distribution of scores
   - b. average score of a distribution
   - c. set of numbers between the highest and lowest scores in a distribution
   - d. all of the above
30. When critiquing a quantitative research study, which of the following questions should be asked about the “methods” section:
   a. Is the design appropriate to answer the research question?
   b. Is there any type of bias present in the sampling procedures?
   c. Are ethical procedures described?
   d. All of the above

31. Which of the following is a type of graph for a frequency distribution:
   a. histogram
   b. stem-and-leaf plot
   c. frequency polygon
   d. all of the above

32. Case study research is
   a. systematic reporting
   b. difficult to replicate
   c. descriptive in nature
   d. all of the above

33. “Type 1 error” occurs when one:
   a. fails to reject $H_0$ (null hypothesis) when it is false
   b. says differences are due to chance when there are real differences between samples
   c. reject $H_0$ (null hypothesis) when it is true

34. Which of the following is an ethical consideration of evidence-based practice:
   a. Western medicine’s bias toward extending life vs. quality of life
   b. people with disabilities determine research problems to be studied
   c. Level I evidence is the only type that should be considered
   d. all of the above

35. Which of the following is included in a grant proposal:
   a. letters of recommendation
   b. findings of PI’s past research studies
   c. narrative explanation of budget
   d. limitation of study

36. If someone’s score on a standardized test is in the 80\(^{th}\) percentile, this means that
   a. the person got 80% of test correct
   b. the score was higher than 80% of those taking the test
   c. the score was lower than 80% of those taking the test
   d. none of the above

37. Which of the following is a general reason for failure to get a grant proposal funded:
   a. lack of acceptable rationale
   b. unimportant problem
   c. PI lacks publications
   d. all of the above
38. A correlation co-efficient of .25 means that there is:
   a. a 25% probability that the difference between two means is due to chance
   b. a good relationship between 2 variables
   c. little or no relationship between 2 variables
   d. a chance that a Type 1 error occurred

39. When doing case study research, which of the following is a way to enhance validity:
   a. add qualitative data
   b. incorporate inferential statistical analysis
   c. include multiple DVs
   d. incorporate descriptive statistical analysis

40. According to class presentation, which of the following is a barrier to evidence-based practice: lack of
   a. time
   b. patient understanding of the literature
   c. AOTA membership
   d. peer support

39. If you read an article about a study that had statistically significant results, you can conclude that the
   a. difference observed between the 2 groups is most likely due to the intervention and not due to chance
   b. correct statistical test was conducted
   c. results are clinically significant
   d. results are important

40. The following diagram represents a
   a. uniform curve
   b. right-skewed curve
   c. normal curve
   d. left-skewed curve

http://www.tushar-mehta.com/excel/charts/...
TRUE-FALSE: Determine whether each of the following statements is TRUE or FALSE. For TRUE, mark “a” on scantron form; for FALSE, mark “b” on scantron form (credit will be given only for correct answers recorded on scantron form). Each correct answer is worth 2 points (total of 20 points).

41. The difference between parameters and statistics is that parameters represent sample data and statistics represent population characteristics.

42. Case study research designs have strong internal validity.

43. In inferential statistics, if $p < 0.05$ then one can be 95% certain that the difference between 2 means is due to the treatment of intervention and not due to chance.

44. When using the PICO format to develop a clinical question for evidence-based practice, the “p” refers to the “population” about which you would like information.

45. The mean, median, and mode values are all equal in a normal curve.

46. When writing a grant proposal, little attention should be paid to developing a title because it is not important.

47. In critiquing the “Results” section of quantitative research studies, it is important to determine if all subjects have been accounted for.

48. A non-parametric statistical test is conducted when sample size is small.

49. One advantage of case study research is that it can uncover unique circumstances missed in group design research.

50. The first step in the evidence-based practice process is formulating a question.
Course Evaluation

This course will be evaluated through analysis of the results of the perceived competence in research occupations pre- and post survey, a pre-post test, and student midterm and final evaluations.

Evaluation will be completed through review of student assignments including the research prospectus and proposal documents, the critique of a quantitative research article and presentation, and the institutional review board documents.

Evaluations will completed formally and informally. Informally, active learning occupations are designed to elicit feedback about the clarity and content of lecture material and occupations assignments. Further, students are encouraged to meet with the instructor as problems and questions arise.

Formally, students will complete evaluations of the course on the days of the midterm and final exams.

Per protocol and following the completion of each course at Xavier, the instructor completes a comprehensive evaluation that details student feedback, examines the extent to which the course meets objectives, and makes recommendations for future implementation of the course.