I. CRITICAL THINKING

A. We have seen from the MGCTCT guide that critical thinking is foundational to a good decision making process.

B. In this lecture we will explore the relationship between critical thinking and the development of a good research proposal

II. WHAT IS RESEARCH?¹

A. Why do Research?

1. Without research nothing could be accomplished.

2. Research is how new things are learned, discovery made.

3. The primary goal of research is discovery of truth, which has been around as long as the human race.

B. Research is not:

1. Information gathering

2. Transformation of facts from one location to another

3. Rummaging for information

4. Catchword to get attention.²

5. A compilation of quotations

   a. Quotations are used to document and clarify findings

   b. Simply rewriting other people’s words and ideas into a neat description

6. A defense or apology of my own convictions

7. The presentation of one’s own opinions


²Leedy, 4; cf. Vyhmeister, 5.
8. A sermon or Bible lesson

C. “False Research has often been reenforced by professors who have allowed students to slide by until graduation, or in graduate school, thesis, or dissertation is due, at which time the student finds out he or she is unqualified to do research.

D. Students also reenforce the idea by thinking of classes and papers as “just another hoop to jump through until I get to the thesis or dissertation, at which time I will do ‘real research.’”

1. I have observed much sloppy research produced by students and accepted by professors during my career as a student.

2. One student's dissertation was passed by the committee with minor corrections, though he had forgotten to write an introduction!

3. Another student, who had borrowed a friend's butterfly collection and submitted it, won first place in a science fair, while another student in the same fair, who developed a "house of the future" by creating and studying photoelectric cells and how they might be employed, did not even get mentioned.

E. Research is:

1. “the systematic process of collecting and analyzing information (data) in order to increase our understanding of the phenomenon with which we are concerned or interested.”

2. “a process through which we attempt to achieve systematically and with the support of data the answer to a question, the resolution of a problem or a greater understanding of a phenomenon.”

3. If a position is tenable, research can defend it

4. Can’t allow unsound arguments, even for a good cause

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3Leedy, 3.

4Leedy, 5.
5. The object is to present truth; not to fight others’ positions

6. Good research presents present truth in such a logical and convincing way that there is not need for harsh language

7. Research demands showing facts, data, information

8. The reader must be able to follow the logic and convince the mind

9. Research seeks to inform and convince the mind

10. Good research and writing demonstrates that one has assimilated and synthesized the material and drawn logical conclusions.

11. Research vocabulary is free of superlatives and emotional language.

F. **Characteristics of Research:** The above suggests eight characteristics, the sum total of which is called “research methodology.”

1. RM originates with a question or problem, the solving of which displaces ignorance.

2. RM requires a clear articulation of a goal, that states precisely what the research plans to do.

3. RM follows a specific plan of procedure that promises to deliver relevant data to the particular research problem.

4. RM divides the principle problem into more manageable subproblems because we understand things by “taking them apart and putting them together again.”

5. RM is guided by the specific research problems, questions, or hypotheses:
   a. These are reasonable guesses, conjectures, or suppositions relating to each subproblem.

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5Leedy, 5ff.
b. The data accumulated through the RM process either supports or confirms the various hypotheses.

6. RM accepts certain critical valid assumptions, or self-evident truths, upon which the study rests.

7. RM requires the collection and interpretation of data in attempting to solve the research problem.

8. RM is by nature cyclical, that is, helical (spiral); so “good research begets more research,” meaning that in solving one or more problems, other significant problems that need solving come to light.

9. This RM process Leedy summarizes:

   The core concept underlying all research is its methodology. It is not enough to follow the procedures without an intimate understanding that research methodology directs the whole endeavor—where critical decisions are made and where organizing, planning, and directing the whole project take place. The methodology controls the study, dictates the acquisition of the data, arranges them in logical relationships, sets up a means of refining the raw data, contrives an approach so that the meanings that lie below the surface of those data become manifest, and finally issues a conclusion or series of conclusions that lead to an expansion of knowledge. The entire process is a unified effort as well as an appreciate of its component parts.⁶

G. Each of your courses at Faulkner University should be “a real research course.”

1. Taken early in the student's graduate career, this course should be the experience that helps develop good research papers throughout the rest of the school program.

2. Each paper in each course after this one should improve the student's ability to do research and report it.

⁶Leedy, 9.
3. Each paper should be viewed as an opportunity to research, analyze, learn, and report, with confidence, some facts that make a contribution to knowledge not yet known.

Only when you have experienced the uncertain and often messy process of doing your own research can you intelligently evaluate the research of others. Writing your own paper will help you understand the kind of work that lies behind what experts say and what you find in your textbooks. It lets you experience firsthand how knowledge develops from answers to research questions: how that new knowledge depends on which questions you ask and which you don't; how those questions depend not just on your interests and goals but on those of your readers; how the standard forms for presenting research shape the questions you ask, even determine those that you can ask.  

Those who have learned how to analyze problems dispassionately and who have been disciplined by the scientific method will live with more self-assurance and less panic than those who have shortsightedly dismissed the discipline of research as merely a necessary impediment on the way to a degree.  

4. Thinking of research this way keeps the student from isolationism by impressing on him or her the significance of a particular project and how it advances knowledge. This kind of research is always needed!

III. TOOLS OF RESEARCH

A. Tools are mechanisms for accomplishing tasks.

B. The general tools of research are:
1. The Library and its resources
2. The computer and its software
3. Techniques of measurement
4. Statistics
5. Language abilities

C. We should not confuse the use of these 5 tools with research.

1. One may go to the library, take some kind of measurements, make use of statistics or the computer, and have certain language abilities.

2. Doing so does not mean that person is doing research; it means that person is only using the tools.

3. These tools must be used in a research context for them to be used appropriately.

D. Description of research tools.

1. **Library:**

   a. Libraries and change:

      (1) In the past libraries functioned very well as repositories of books and manuscripts.

      (2) The knowledge explosion of this century forced them to realize they cannot hold all information within their walls.

      (3) Libraries are scrambling to make adjustments electronically, via CD-ROMs, etc.

   b. The electronic library and CD-ROMs are more efficient:

      (1) More accessible information.

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Leedy, 18-24.
2. The Computer as a research tool:\(^{12}\)
   a. It is a great, versatile tool that allows research to be done more quickly.
   b. But being a tool, it cannot do your research for you.

3. Measurement tools:\(^{13}\)
   a. If the old maxim, “If it exists, it is measurable,” is true, then in research the maxim, “If it exists, then it *must* be measurable,” is even more true.
   b. “Measurement” may be defined by breaking the definition into its components.\(^{14}\)

<table>
<thead>
<tr>
<th>Definition</th>
<th>Components</th>
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<td>“Measurement is limiting the data...”</td>
<td>“Measurement” is perceived as setting boundaries beyond which the data cannot go</td>
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\(^{12}\)Leedy, 24.

\(^{13}\)Leedy, 24-36.

\(^{14}\)Leedy 26.
of any phenomenon--substantial or insubstantial--...

so that those data may be examined mathematically..., 

and, ultimately, according to an acceptable qualitative or quantitative standard.”

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<th>Classical Measurements of research:^15</th>
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<td>(1) The nominal level of measurement is measuring by “naming,” or grouping of data according to comparative characteristics.</td>
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<td>(2) The ordinal level of measurement is measuring of data according to a numerical system--greater than/less than--scale</td>
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<tr>
<td>(3) The interval level of measurement is measuring data according to preset, arbitrary intervals.</td>
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<tr>
<td>(4) The ratio level of measurement is measuring data in terms of multiples and fractions of the parts--X is 3:1 times as big as Y.</td>
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d. Validity and Reliability:^16 With any of the above one must ask questions of validity and realizability:

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^15Leedy, 30-32.

^16Leedy, 32-36.
(1) **Validity:** does the measurement instrument measure what it is supposed measure? There are several types of validity.

(a) **Face validity:** does the instrument measure what it is supposed to measure and is the sample representative of the thing being measured?

(b) **Criterion validity:** of two measures of validity, is one an acceptable criterion to compare with the other?

(c) **Content validity:** how accurately does the instrument measure the factors or situations being studied?

(d) **Construct validity:** to what degree is any construct (any concept such as honesty) actually measured?

(e) **Internal validity:** how free from bias are any conclusions drawn in view of the data?

(f) **External validity:** can the conclusions drawn be generalized to other cases?

(2) **Reliability:** how accurate is the measurement instrument?

(a) The researcher should always state "clearly and definitive the specifications of the measuring instrument."  

(b) If these cannot be delineated the research will likely be defective.

4. **Statistics:**

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17Leedy, 35.

18Leedy, 36-38.
a. Statistics, a tool of research, allow a person to view the data from as many different points as possible.

b. Statistical answers are never the end of the research

c. Behind the stats lie the facts

d. Thus a statistical conclusion usually imply a deeper significance

e. The lure of statistics.

   (1) Do not be seduced by statistics--they imply something else.

   (2) "The world of data, not that of statistics, will ultimately yield the evidence that will solve the problem."  

f. Primary function of statistics:

   (1) **Descriptive statistics:** describe the contour of the data, and in the case of two or more groups of data, their relationship.

   (2) **Inferential statistics:** seeks to fit the data to an ideal statistical model

g. Statistics creates that having no counterpart in reality.

   (1) Though statistical answers are never the final answers they all serve to advance the research toward the final answers

   (2) Statistics help to take unconnected data and tie them together meaningfully.

5. **Facility of language as a tool of research:**

   a. The report of all conducted research must be reported.

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19 Leedy, 37.

20 Leedy, 38-39.
(1) This requires of the researcher "the ability to use language in a clear, coherent manner."

(2) It also requires of the researcher "a vocabulary that is adequate for the common exigencies of exposition."

b. Writing as thinking.

(1) Many think “clear thinking precedes clear writing.”

(2) Actually “writing is a good way to discover exactly what one is thinking.”

(3) Therefore, you should begin writing a proposal as soon as possible.

(4) No one writes perfectly, so the earlier one begins the more time one has to improve.

c. Reflections:

(1) Leedy gives some excellent examples of significant research and what they have meant to us.

(2) All research begins with a problem, an observation, a question. Curiosity is the germinal seed. Hypotheses are formulated. Data are gathered. Conclusions are researched. What you are doing in research methodology is the same as what has been one by those who have pushed back the barriers of ignorance and made discoveries that have benefitted humankind.