**EDUR 7130**
Presentation 2a

1. Educational Research and the Scientific Method

Below is a model of three factors, or variables, that might affect one's workplace satisfaction. How might this model be tested? Typically, researchers would employ the scientific method (SM) as a systematic, and repeatable, approach to empirically assess whether this model is valid.

The SM is also useful to teachers and other school personnel for assessing the viability and utility of school and classroom practices and instruction.

Figure 1: One possible model for Workplace Satisfaction.
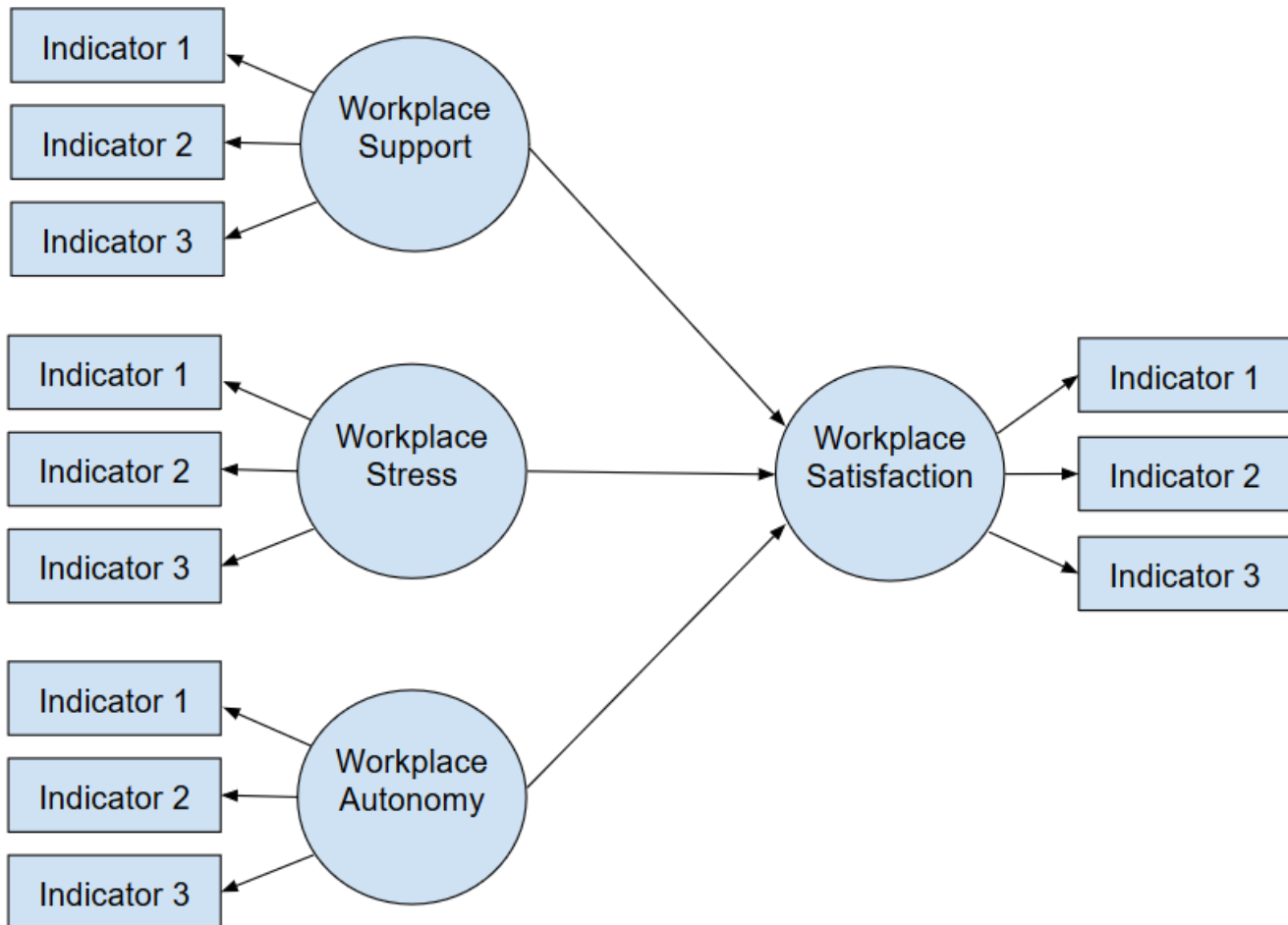
Steps of the SM:

(1) identify problem/issue for study
(2) expectations: form research questions or hypotheses to help direct study
(3) develop study plan in detail (allow others to replicate), collect data
(4) analyze data, report results
(5) draw conclusions

Big Picture of this Course – what will we learn?

- learn how educational researchers execute various steps of the SM,
- collect data in a way to produce trustworthy, or valid, information,
- and how those steps are reported in research reports.

To help with understanding research reports, we will briefly review components of a research report.

2. Format of Research Reports Follow the SM

Research reports typically follow the format of SM:

Scientific Method		Sections of Research Report
Identify problem/issue	=	Purpose statement/introductory section of report; literature review
Set expectations of findings	=	Hypotheses or Research Questions
Study plan, collect data	=	Method section
Analyze data	=	Results section
Draw conclusions	=	Conclusions/discussion

Details of research reports presentation forms can be found here:

http://www.bwgriffin.com/gsu/courses/edur7130/content/format_of_a_research_paper.htm

Below is an outline of research reports.

1. Title
2. Abstract
3. Introduction
4. Literature Review
5. Research Questions or Hypotheses
6. Method, which consists of:
    - Participants
    - Instrumentation/Materials/Apparatus
    - Procedure (and design for experiments)
7. Results
8. Discussion/Conclusion
9. References

For the remainder of this presentation, we'll review two components of the SM:

(1) identify problem/issue for study
(2) develop expectations: form research questions or hypotheses to help direct study

3. Problem and Purpose Statements

3a. Problem Statement

Formal presentation of a problem statement is not common, except in dissertations. Usually authors of research reports describe the problem of concern in the introductory material of the report, but rarely do they label it as a problem statement,

It identifies for readers the problem the researcher wishes to address through the purpose of the study. For example:

"High school dropout rates are high, and there is speculation that use of minimum competency tests may be contributing the high rate of school dropout."

A more common approach to identifying problems that will be addressed in a study is to problem a brief introduction to the problem. For each example, the introductory material is several sentences or a paragraph (or two) describing the problem in some detail and why it is important to study. Once the problem is identified and explained, one typically presents the study purpose and this is often followed by study research questions or hypotheses.

3b. Purpose Statement

What role do these statements play in the report?

Purpose statements:

- sometimes can be several statements or a paragraph,
- function as the theme of the report --- they provide the reader with a brief introduction explaining the intent/purpose of the study which follows,
- and may often highlight the theoretical or practical importance of study.
- Details of the study will be revealed later in the report (e.g., methods used to execute the experiment will be provided in the Method section; findings from the study will be reported in the Results section).

Examples of Purpose Statements within Opening Sections of a Research Report

In the following examples, the PS is underlined.

Example 1
    Speculation among educators and educational researchers holds that increases in academic standards may have detrimental effects on students, especially academically at-risk students (Johnson, 1994; Jones, 1993). With state mandates requiring increased standards, such as the adoption of minimum competency tests, educational researchers have argued that high school dropout rates will increase substantially once students begin experiencing difficulty passing competency tests (Adam, 1983). <u>The purpose of this study is to investigate whether increased standards, in the form of minimum competency tests, influence students' decisions to leave school before graduation.</u> If increased academic standards do, in fact, influence students' decisions to drop out of school, then policy makers need to reconsider both the goals for, and implementation of, such standards.
(Note. The IV in this PS is increased standards [use of minimum competency tests] and the DV is withdrawing from school.)

Example 2
    Anorexia nervosa and bulimia are two eating disorders that affect females in the United States and Europe every year, and both are recognized as major medical and psychiatric problems. Anorexia is a disorder that most commonly affects females in their teenage and young adult years. Leichner and Gertler (1988) estimate that as much as 20% of women on college campuses demonstrate anorectic behaviors. Despite improved therapeutic approaches, the mortality rate of this disorder is between 5% and 20% (Zerbe, 1993). Bulimia, the other eating disorder, also affects adolescent females, and the prognosis for individuals with bulimia is often worse than those with anorexia. Because of the prevalence and severity of eating disorders, psychological researchers desire to learn of the symptoms that precede such eating disorders, how those symptoms develop, and the additional problems that accompany such symptoms.
    Clinicians, in an attempt to document symptoms that precede eating disorders, are often confounded by the fact that females are usually secretive in regard to their eating disorders. Adding further to the problem is the fact that many teenagers diet, and eating disorders can sometimes be confused with dieting. Thus, as noted by Zerbe (1993), early signs of eating disorders, such as weight loss, frequently go unnoticed by family members and are ignored by

physicians. Since physical and other observable warning signs are often disregarded, and since eating disorders are related to, and perhaps caused by, underlying personality characteristics, emotions, and conflicts, it seems that a method of assessment that would project these underlying tendencies would be helpful in the early diagnosis of eating disorders.

Usually eating disorders are connected to emotional conflicts, personality characteristics, and other psychological problems. Researchers have long used human figure drawings (HFD) for the assessment similar psychological problems in children and adults (Dileo, 1983; Koppitz, 1968), and, according to Klepsch and Logie (1982), such drawings can capture symbolically on paper some of an individual's thoughts, feelings, and present state of mind or attitude. Note that such states or attitudes may be governed by developmental and social-emotional conditions at any given moment (Mortensen, 1984).

Since HFDs may capture various social-emotional conditions on paper, perhaps HFDs may be used as a diagnostic tool in an attempt to differentiate among individuals with and without eating disorders. Therefore, the purpose of this investigation will be to determine whether HFDs, viewed as a diagnostic tool, can adequately identify individuals with eating disorders.
(Note. The IV is HFDs and the DV is identification of eating disorders.)

4. Why literature reviews, who benefits how?

Two perspectives: researcher and reader.

4a. Benefit to researcher

(a) Generation of research ideas by seeing gaps or weaknesses in field
The more familiar one becomes with this literature, the better one will be at locating potential research topics because weaknesses in some studies or gaps in our understanding of certain behaviors become more apparent.

(b) Historical overview of field
Lit. review helps a researcher better understand what was done in previous studies. The review presents a history/story of past endeavors by other researchers in this area.

(c) Prior methods – learn how difficult studies executed
This can be very helpful because it shows how others solved difficult design issues and study problems.

For example:
- Academic and recreational reading interest among young readers
- How would you measure academic and recreational reading interest among kindergarten or 1st grade students who are weak readers?

Possible solution:

Could I simply give these students statements such as the following?

"I enjoy reading recreationally from books found in the library"

1 = strongly disagree
2 = disagree
3 = somewhat agree
4 = agree
5 = strongly agree

Can children of this age handle complex statements and rating scales?

Literature review could help us find a measure of reading interest for young readers.

Use Google or Google Scholar:

https://www.google.com/

http://scholar.google.com/

Use Google Scholar - What search terms would you use?

academic and recreational reading interest inventory scale kindergarten students alpha

Note some search words included:

- **Inventory and Scale** - limits search to studies with scales
- **alpha** - limit search to Cronbach's alpha, a measure of reliability, so we see studies in which reliability is reported
- **kindergarten** - limits to studies of young children
- **students** - limits studies to kids in school

> Side note:
> Nice features about Google Scholar:
>
> 1. Cited by
> 2. Related articles
> 3. Versions
> 4. PDF link
> 5. Time search ranges
> 6. Very thorough, includes many publications, large database
> 7. Author pages (with scholarship, citation counts)
> 8. Authors can add work if missing

In summary, a good literature review can help one uncover solutions to problems that may be faced by the researcher, provides a historical overview, and also helps one see potential studies and weaknesses in the field under investigation.

4b. Does the reader of your research report benefit from the literature review in any way?

- literature review is the story behind your research -- it explains the logical development of your study and places your study in the context of other studies on the same topic. After reading the review, the reader should then be able to understand why you are conducting the current study (the reader should understand the theory/logic driving your study, should see the "need" for your study);
- at the end of the literature review, readers should understand your research questions and hypotheses and see the logic, based upon the review, of why you formed the particular research questions and hypotheses you present.

4c. Boolean Logic and Search Symbols

Many search engines use AND, OR, and NOT to define searches:

Source: https://sites.google.com/a/onalaskaschools.com/tech/boolean-search-tools
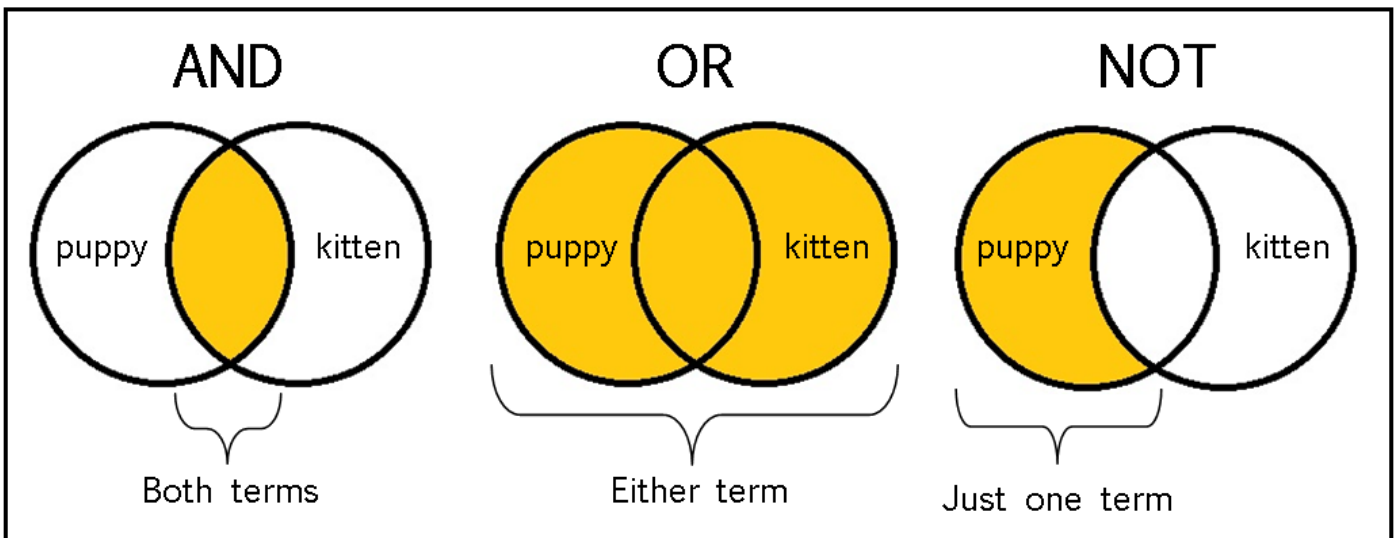
Google Scholar and Google work a bit differently

- **AND** = not needed, Google assumes if multiple words, AND is implied
- **NOT** = does not work in Google, instead, use
- **-** = same as NOT, excludes word, **kitten -puppy**
- **OR** = functions as expected, but must use capitalize OR, **kitten OR puppy**
- **" "** = exact match, **"Bryan W Griffin"**
- ***** = wildcard, **"Bryan * Griffin"**
- **Site:** = search sites, **site:.edu "Bryan W Griffin"**

Google, but not Google Scholar

- **@** = include in front of word to search social media (e.g., twitter); currently not part of Google Scholar, **@kitten**
- **$** = in front of number to search for price, **$50 kitten**
- **#** = hastag search, **#kitten**

Experiment: how many hits?

(a) Dropouts OR "minimum competency testing"
(b) Dropouts "minimum competency testing"
(c) Dropouts "minimum competency testing" -college

How many pages hits for each?

In summary,

- use of AND (or not including AND in Google) in the search means a filter is set in the search and finds only those articles that contain mention of "dropouts" and "minimum competency testing" (both phrases must be present),
- whereas use of OR produces a search that seeks for "dropouts" or "minimum competency testing" --- it is not necessary in this search for both terms to be present in the same article.

For research purposes, if I am interested in reading literature that reports the possible relationship between high school dropouts and results from minimum competency testing --- that is, does one's performance on a competency test influence one's decision to drop out of school --- which is the better to use, AND vs. OR, and why?

Use of AND (in most search engines, no need for AND with Google) will provide better results because those hits obtained will be more focused on the specific search conducted, the possible link between competency testing and dropping out of school. Otherwise use of OR will result in many studies completely unrelated to that you wish to conduct.

4d. Characteristics of Written Reviews

Most of this is self-explanatory so you can read this on your own. Will focus on a few characteristics.

4d1. Primary vs. secondary references – how different?

Primary references show that you have found the source firsthand. Secondary references mean that you found it in someone else's work but you didn't actually find the source yourself. Also, a primary source is one in which the author is the one who collected or observed the data (if the report is of empirical research), while a secondary is one in which the author did not collect data, but instead relied upon other's work. In a secondary source, the author is removed from the observations -- the author did not perform the experiment, study, etc., but simply summarizes what was found by others.

If I cite a study from the author who collected and analyzed data, that is a primary source. If I cite someone who summarized others' research, that is a secondary source.

 An autobiography should be primary source, and biography secondary.

The journal "Review of Educational Research" specializes in summary literature reviews---would this be a source for primary or secondary work?

4d2. Empirical studies – these are usually preferred in reviews, what is meant by empirical?

An empirical study is simply one in which data are collected to address questions or hypotheses. If no data were collected to address an issue or question, then that is not an empirical piece of work.

If I say "I believe this will work" or "Logic suggests this will work" or "Theory suggests this will work" I am making non-empirical statements. If I say, "Evidence from data suggests this will work" then I am making a statement based upon empirical support -- data driven.

How can one identify whether an article or report is empirically based --- that is, the authors collected data to address a question?

Usually identify an empirical work by the inclusion of a "Method" section; publications without some description of "Method" are usually not empirical. The "Method" section explains how data were collected (usually includes sampling or participants, measurement, and procedures).

What are data?

For the most part data are recorded bits of information. Data can range from numbers (such as ITBS scores) to words (such as transcribed conversations). Contrary to some beliefs, data do not have to be limited solely to numbers (quantitative information), data can also be words, pictures, etc. (qualitative information). This chat session, once posted on the Internet for all to view, will be a source for data.

4d3. Organization - here are several options for organization of the review. Below are two common approaches.

Big v

      With this approach the review should flow from general to specific. This means that the writer presents information that is only generally related to the topic of the paper first, and as the literature review progresses one should build a case for the specific research questions or hypotheses in the study, so the literature review becomes more focused on the specific questions or hypotheses of the study. Writing the review in the form of general to specific focuses on the topic of the study and helps direct the reader's attention to the importance of the questions or hypotheses addressed in the study. For example, one may be interested whether cyberbullying among college students results in negative psychological or academic effects. One could present the focus of this study in one research question: Do those who experience cyberbullying demonstrate lower psychological well-being or academic outcomes? With this review, one would first (a) introduce the concept of bullying (this represents the most general component of the review); then move to (b) comparison of cyberbullying and traditional bullying (this is the first step toward making review more specifically focused on the topic of this study). Research on cyberbullying usually focuses on K-12 students, so next the review would (c) compare and contrast research on cyberbullying for college and K-12 environments (this further focuses review on topic of study). The last component of the review introduces the specific focus of the study, a (d) discussion of the possible effects of cyberbullying on psychological well-being (e.g., life happiness, stress, anxiety) and academic outcomes (e.g., motivation, grades, academic self-efficacy). So the flow goes from most general (what is bullying) to most specific (cyberbullying relation to psychological and academic outcomes).

Variable Focused

      In studies that examine relations among variables, the review may focus specifically on those variables and how they relate. For example, in a study of student ratings of teaching in college courses, the outcome or dependent variable would be student ratings. One may hypothesize that student ratings of teaching are predicted by several factors such as (a) instructor organization, (b) student interest in the subject of the course, and (c) grade discrepancy (student believes a grade will be assigned that is lower than deserved). The review for this study would first introduce student ratings as a concept, then move to current research on how student ratings relate to instructor organization. Next, the review would present research on the relation between student ratings and student interest in course, and then finish with discussion of the relation between student ratings and grade discrepancy research.