Welcome to Psyc941

Psyc941 prepares you for your dissertation, which is also required!

The purpose of this class is teach you the “common sense” of scientific empirical research, which has 4 parts...

1. Public nature of psychological study & knowledge
   • any properly trained & equipped psychologist can replicate the findings of another

2. Empirical nature of psychological study & knowledge
   • evidence is derived from experiment or observation

3. Statistical nature of psychological study & knowledge
   • empirical evidence is quantitatively represented & evaluated

4. Hypothesis Testing nature of psychological study & knowledge
   • Specific provisional ideas are evaluated based on public, empirical, statistical evidence

If I had to identify the very core of what empirical research is all about – what do we do that produces useful knowledge ...

Representation
• Can’t get “every behavior, from everybody, everywhere, every time” that we want to learn about
• Will have to sample

Inference
• Will draw conclusions from the sample
• Will then infer that the conclusions drawn from our sample tell us about more than our sample

The better our sampling, and so, the better our representation, the better our inference & the more useful knowledge we’ll learn
What are the ways that we need to be able to apply rep & inf?

Evaluate the “quality” of completed research
• Understand the choices the researcher made
• Evaluate the consequences of those choices for the usefulness of the knowledge gained

Evaluate the “quality” of proposed research
• Understand the choices the researcher has proposed
• Evaluate the consequences of those choices for the usefulness of the knowledge to be gained
• Generate alternatives to those choices
• Evaluate the advantages & disadvantages of the alternatives

Perform creative & contributive (“high quality”) research
• Make the right choices
• Defend those choices as the best alternative
• Carry out those choices to produce useful knowledge

So, what are the kinds of things we need to know how to do to get all this done???

Measurement
• If we can’t collect data about behaviors & characteristics we can’t be empiricists
• Most important thing – last thing you’ll study seriously, if at all

Research methods
• Have to be able to make the who, what, what, where & when decisions based on “best practices” research & experience

Data Treatment & Analysis
• Have to be able to turn measures into data and data into results from which we can draw conclusions to make inferences

Content Knowledge
• “best practices” of measurement, research methods and data analysis differ across content areas
• “Have to be a researcher first and a methodologist second!”

About Statistics, Data Analysis & Arithmetic
Statistics is a mathematical discipline
• statisticians work mostly with the Calculus to develop theories and formulas about how to manipulate, organize & represent data
• they use axioms, theorems, & proofs to generate these formulas

Data analysis is a tool used by Psychological researchers and practitioners to represent and test hypotheses about data
• arithmetic formulas and/or statistical analysis software are used

In Psyc941 we will study data analysis…
This course is more like “drivers education” and not like “mechanical engineering”
The statisticians “build” the statistics, but we have to know how to “drive” them properly
It is important to learn to "stop & check other people's math" !!!

A classic from the web… "A king size waterbed holds enough water to fill a 2000 sq. ft. house 2 inches deep."

Let’s do the math …

2000 sq. ft of water 2 inches deep
• 2 inches is 1/6 foot, so
• 2000 square feet * 1/6 foot = 333.33 cubic feet of water

How big would a water bed mattress have to be to hold 333.33 cubic feet of water?
• a water bed mattress is usually about a foot deep
• if it were 1 foot deep and 7 feet top-bottom, it would have to be 47.618 feet wide (333.33 / 7) !!!
The math is simple, but you have to remember to stop & check !!!

Of course – you have to be able to do the math correctly

… and it is not just numbers, math & statistics either…

From a Subaru advertisement shown for 3 years …
"Subaru Forrester! Better gas mileage than any midsized SUV"

I think what set off my "lie detector" was that I expected to hear the phrase "any other midsized SUV"

Curious, I compiled the following from the web. Notice anything ??

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<th>Explorer</th>
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<td>239</td>
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Technically they didn’t lie! But they made a "misleading comparison" – an important thing to learn to watch for !!!!!

“looking for…” versus “looking at…”

One of the reasons for learning the jargon, organizing it into a particular cognitive structure and then learning how to apply that structure via specific action scripts is that, as cognitive and perceptual psychologists tell us, we are much better at "looking for…” specific things than "looking at…” something and noticing the details!

Example #1

Ever text message? Notice that there are certain letters on the different numbered buttons (duh??). Only about 10% of people who text message every day can write down exactly which letters/symbols are on which number keys. When given 60 seconds to study the keypad, 90% of folks get it right – we’re better at looking for things than looking at them.

Example #2  click here  Oh… the things we miss!!!
Pedagogical Structure of the Course

Jargon
You gotta know the lingo

Cognitive Structure
How the words relate & integrate

Action Scripts
How to apply what you know to produce & evaluate knowledge

This pedagogical approach can be used to make the learning of very complicated things much more reasonable!

The secret is to study how “experts” perform – what jargon they actually use, how those elements are meaningfully integrated & how they are orchestrated into actual expert performance !!!

Here’s an example of applying this approach to “make sense” out of a very complicated activity — sleight-of-hand magic.

Pedagogical Structure to learn Sleight-of-hand Magic

Jargon
Seven Basic Principles of Magic:
Palm, Ditch, Steal, Load, Simulate, Misdirect, Switch

Cognitive Structure
How the principles relate & integrate:
Palm-then-Ditch, Load=Steal+Palm, Switch=Ditch+Steal, Simulate-to-Misdirect

Action Scripts
Combining elements & props into a “routine”
Pedagogical Structure of the Course – How it works it Psyc350

Jargon
You gotta know the lingo → Terms EDU Exercises

Cognitive Structure
How the words relate & integrate → “All-the-Words Page”

Action Scripts
How to apply what you know to produce & evaluate knowledge → “Validity Net” & “Researcher Choices” pages

Instructional “Philosophy”

S  Sell – knowing this stuff is very important

I  Inspire – “Learn statistics and someone will feed you for the rest of your life.”

S  Structure – curricular design & integrative instructional flow

S  Support – web-based exercises & exam preparations, integrated laboratory experience & me

I  Insist – I really want you to learn this stuff and will fuss, nag, cajole, lure, bribe, etc. to get you to do so