Replication (and Replicability) versus Reproduction (and Reproducibility)

Some scientists use the term *replication* (and *replicability)* as synonyms of *reproduction* (and *reproducibility)*.

For example, Shuttleworth (2009) writes that "**Reproducibility** is regarded as one of the foundations of the entire scientific method, a benchmark upon which the reliability of an experiment can be tested. The basic principle is that, for any research program, an independent researcher should be able to **replicate** the experiment, under the same conditions, and achieve the same results."

However, some scientists distinguish between *replication* (and *replicability)* versus *reproduction* (and *reproducibility).*

For example, Peng (2011) defines "*replication* as [a group of independent] researchers going out and collecting new data" in an attempt to replicate a study previously conducted by another group of researchers. In contrast, Peng defines "*reproducibility* as [a group of independent] researchers analyzing the [previously collected] data" of a study previously conducted by another group of researchers.

So, according to Peng (2011), with *replication*, an independent group of researchers conduct a replication of a previously conducted study, including collecting and analyzing their own data, to see if they get the same results; with *reproduction*, an independent group of researchers analyze the data from a previously conducted study to see if they get the same results.

In addition, Shuttleworth (2009) distinguishes between *reproducibility* and *repeatability*, which is when "the (same) researchers repeat their (own) experiment to test and verify their results."

For this course you may use the terms interchangeably; however, be aware that some scientists do make a distinction among the terms.