

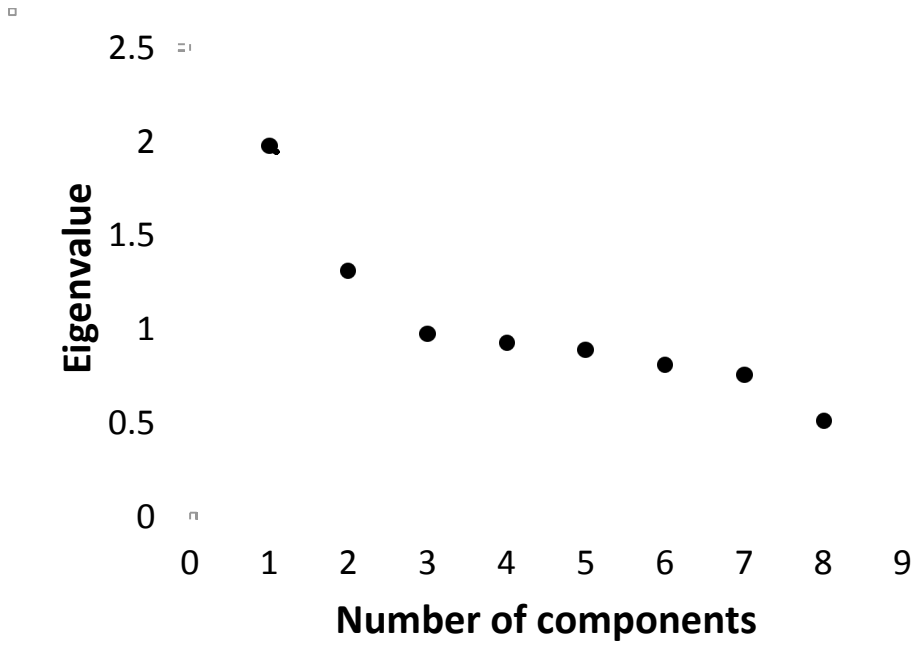
Supplemental Material

CBE—Life Sciences Education

Jeffery *et al.*

Supplemental Material

Figure S1. Scree plot used in factor analysis.



Supplemental Material

Table S1. Development of survey items. Bolded text indicates text that was added and/or altered in revising the item; grayed-out text indicates text that was removed in subsequent versions of the item.

Source survey (Citation)	Item	Original item	Early version (used in 3 student interviews)	Final version (used in 8 student interviews)
SUSSI (Liang et al., 2008)	Q1	Scientific theories based on accurate experimentation will not be changed/modified. (-)	Biology knowledge gained through accurate experimentation will NOT be changed. (-)	Biology knowledge gained through accurate experimentation will NOT be changed. (-)
	Q5	Scientists may make different interpretations based on the same observations. (+)	Biologists may make different interpretations based on the same observations. (+)	Biologists may make different interpretations based on the same observations. (+)
	Q6	Scientific research is not influenced by society and culture because scientists are trained to conduct pure , unbiased studies. (-)	Biology research is NOT influenced by society and culture because biologists are trained to conduct pure, unbiased studies. (-)	Biology research is influenced by the researcher's culture and social background . (+)
	Q3	Scientists do not use their imagination and creativity because they can interfere with objectivity. (-)	Biologists do NOT use their creative imagination because it can interfere with scientific reasoning . (-)	Biologists do NOT use their imagination because it can interfere with scientific reasoning. (-)
	Q8	Scientists follow the same step-by-step scientific method. (-)	Biologists all follow the same step-by-step approach when designing experiments . (-)	Biologists all follow the same step-by-step scientific method . (-)
(Liang et al., 2006)	Q14	The purpose of scientific research is to uncover truth or facts. (-)	The primary purpose of doing a biology experiment is to establish facts. (-)	The primary purpose of doing a biology experiment is to establish facts. (-)

CLASS-Bio (Semsar et al., 2011)	Q13	Learning biology that is not directly relevant to or applicable to human health is not worth my time. (-)	The study of biology is only useful when it directly benefits humans. (-)	The study of biology is only useful when it directly benefits human health or wellbeing. (-)
	Q12	I think about the biology I experience in everyday life. (+)	I think about the biology I experience in everyday life. (+)	I think about the biology I experience in everyday life. (+)
Created by authors	Q2	Biologists should know when the answer to a biology problem is correct. (-)	Biologists should know when the answer to a biology problem is correct. (-)	Biologists can NEVER be certain that the answer to a biology research question is correct. (+)
	Q4	If the same biology experiment is done more than once, the data that are collected should always be the same. (-)	If the same biology experiment is done more than once, the data that are collected should always be the same. (-)	If the same biology experiment is done more than once, the data that are collected should always be the same. (-)
	Q7	The more hypotheses an experiment attempts to test, the better. (-)	The more hypotheses an experiment attempts to test, the better. (-)	The more hypotheses an experiment attempts to test, the better. (-)
	Q11	If I had the necessary materials, I could conduct a successful biology experiment. (+)	If I had the necessary materials, I could conduct a successful biology experiment. (+)	If I had the necessary materials, I could conduct a successful biology experiment. (+)
	Q10	I am confident that I can design a valid biology experiment. (+)	I am confident that I can design a valid biology experiment. (+)	I am confident that I can design a valid biology experiment. (+)
	Q9	Experiments that are done under lab conditions can provide information that applies to the real world. (+)	Experiments that are done under lab conditions can provide information that applies to the real world. (+)	Experiments that are done under lab conditions can provide information that applies to the real world. (+)

Table S2. Final set of eight survey items. Groupings are based on exploratory factor analysis of students' post-test responses.

Attitudinal Survey Item (expert-like response: agree + or disagree -)

Confidence & interest in scientific inquiry:

If I had the necessary materials, I could conduct a successful biology experiment. (+)

I am confident that I can design a valid biology experiment. (+)

I think about the biology I experience in everyday life. (+)

Understanding & acceptance of scientific inquiry:

The study of biology is only useful when it directly benefits human health or wellbeing. (-)

Biologists may make different interpretations based on the same observations. (+)

Biologists do NOT use their imagination because it can interfere with scientific reasoning. (-)

Experiments that are done under lab conditions can provide information that applies to the real world. (+)

The more hypotheses an experiment attempts to test, the better. (-)
