



Construct – What's that?

What the heck is a **construct**? This term gets used prolifically in engineering education research, and education research in general, but it is rarely explained. So let's give this a try...

Are you familiar with the story of the blind men and the elephant? It is found in Buddhist, Hindu, and Jain texts¹ and describes a group of blind men who are interested in discovering what is an elephant. Each put their hands on a different part of the animal. The man who touches the ears thinks that an elephant is like a fan, the man who touches the tail thinks that an elephant is like a rope, the man who touches the leg thinks that an elephant is like a tree trunk.... You get the idea. Each of these experiences informs an aspect of what “elephant” means to us – and each of us has a different understanding and meaning we attach to “elephant”. “Elephant” is a construct and each of these parts are aspects of the construct. Obviously, fully understanding elephants requires putting together all of this learning, and a lot more: where do elephants live, what do they eat, what are their social characteristics, etc. The construct we call “elephant” is a human constructed definition; indeed, the whole concept of a “species” is made up by us. It has aspects that we consider objectively true -- absolute truths that are true of elephants regardless of context or observer. And it has aspects that are unique to the observer – our attitudes about elephants, the value we place on them.

So a construct is a concept, and the associated aspects of the concept. More specifically it is the concept as we each uniquely comprehend it. Merriam-Webster² says a construct is something constructed by the mind: a theoretical entity, a working concept, or a product of ideology, history or social circumstances.

Elephants are relatively well defined, tangible things, but let's use a different example that is less tangible: grief. Suppose you are interested in exploring the relationship between the grieving process that occurs when a student fails a course and academic advising. You might start by exploring the construct of grief and the grieving process. You would want to read up in the literature on different types of grief, the stages of grief, and other aspects of this construct. Perhaps you have personally experienced grief, and this would also inform your understanding – keeping in mind that your grief is unique to you and not necessarily generalizable. You will find that there are not as many “absolute truths” in this construct compared to elephants. However, there are probably some agreed upon aspects of the construct. For example, you would find that there is general agreement that there are stages in grief.

How does this help shape your research? Constructs are often explored through surveys, observations, experiments, (i.e., research) and captured in theoretical frameworks. A theoretical framework is a model or structure that captures, and perhaps characterizes or labels, some aspects of a construct (idea, thing, process, system). For example, it might describe the construct of “motivation”, or “competence”. It often reflects the perspective, or area of interest, of the researcher, and it makes it easier for people to have shared conversations about complex ideas. For elephants, a conceptual framework might look like an anatomical diagram, or a habitat and food map, or a social network diagram. All of these capture some important aspects of elephants, but no diagram or description will capture all aspects.

¹ According to Wikipedia. I honestly didn't do more research than that.

² <https://www.merriam-webster.com/dictionary/construct>

For grief, you may find existing frameworks for the stages of grief such as the framework developed by Kubler-Ross (denial, bargaining, anger, depression, acceptance).³ This doesn't capture every aspect of grief, or perfectly describe the construct and all of its complexity, but it provides some of the major aspects that give you a starting point for your research. How could you use this particular construct and associated conceptual framework?

Examples:

- You might start by explaining how you decided to use this pre-existing term coined in another context to describe an engineering education experience--what would you miss and what would you see with greater clarity?
- You could observe student advising sessions and code your observations using this 5 stage theoretical framework as a starting point for your coding.
- You might devise approaches to academic advising that align with each of these stages and test whether a stage-specific approach works better than a generic approach to advising.
- Etc.

Constructs are frequently the focus of surveys and construct validity is an aspect of survey design. Construct validity is increasingly viewed as critical to a well-designed survey, and reviewers will look for this in your research write-up. Construct validity means that either you are using an existing survey that is built around a theoretical or conceptual framework, using pre-defined items on a scale that has been validated to assess grief, or you are building your own survey around a conceptual or theoretical framework. The survey should also cover the major aspects of the construct.

Some surveys may explore more than one construct, but it should be clear that the items "load" onto the constructs of interest – that is, the items all measure aspects of the same construct. Typically, you want a set of items that cover different aspects of the construct without too much overlap (redundancy), but includes some triangulation (i.e. criterion validity). This "loading" should be described in your write-up so the logic in your survey design is explained, and it can also be tested statistically once you have results.

Together, constructs and theoretical frameworks are foundational to educational research. Constructs and theoretical or conceptual frameworks reflect the way a researcher knows, values, and experiences the world. They say something about what aspect of the phenomenon the researcher has chosen (foregrounded) for their work, which also speaks to the researcher's values. They help us put the pieces of the elephant together so we can discuss a concept as a cohesive thing and come to some shared understanding and language or identified areas of disagreement.

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³ E. Kubler-Ross, "On Death and Dying", originally published in 1969.