Research Instrument Question Matrix

One issue that faculty frequently notice is that the questions students create for their research instruments sometimes seem disconnected from the primary research questions. In other words, the questions students write don't "get at" the information they seek. This can be because:

- *the questions are poorly worded.*
- *the implications of the questions and their possible answers have not been thought through. (Each question has what designers call "affordances"—in this case, the possible kinds of data it will generate.)*
- *students have not decided what they want out of the questions.*
- *student have not thought about how the questions relate to their constructs or theoretical frameworks.*

One way to scaffold the process of writing precise, functional questions for research instruments is to have students create a chart or document similar to this in which the student poses a question, identifies the goal or purpose of the question, anticipates types of answers as well as the potential content of the answers, and connects the question to the larger theoretical framework of their project.

Sample

Research Instrument Question Matrix

Interview Question	What I want out of this question	Potential Answers	Theoretical connections
How do different institutions generate knowledge claims about the definition, performance, and value of green infrastructure and its built and natural components? How are these contested? What new knowledge practices are created?			
How does your institution (department/bureau/etc) define green infrastructure?	Provides information on knowledge claims about definition, Provides potential to reveal sources of definitions (from grey or peer-reviewed lit, consultants, etc)	1) any sustainable infrastructure probably includes non-living infrastructure like those that use renewable energy 2) infra that mimics nature probably includes non-living infrastructure like permeable pavement 3) infrastructure that includes nature only infrastructure with living stuff in it 4)_?? something unexpected	Ontological classification of natural and man-made components of infrastructure; expected differences between epistemic communities
What services do green infrastructure facilities provide? (Both mandated and additional services)	Describes what problems the institution is using green infra to fix; provides information on knowledge claims about performance	1) stormwater management 2) increased water quality 3) urban cooling – mitigate heat island 4) beautification	Epistemological conceptions of performance and measurement; expected differences between epistemic communities
Why use green facilities rather than grey to provide those services?	Provides information regarding the justification for switching to green infrastructure, which reflects value of GI to institution	1) green cheaper than grey 2) added benefits service provided by green over grey 3) public pressure to build green 4) green infra champion	Credibility contest/OPPs

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Who is responsible for facility design in your institution?	Provides information about who is considered a credible knowledge producer; potential contestations may be uncovered here;	1) engineering department 2) ?? something unexpected	Credibility contest/OPPs
Where did your current design standards come from?	Provides information about who is considered a credible knowledge producer; potential contestations may be uncovered here;	1) EPA 2) local consultant 3) another city's plans	Credibility contest/OPPs
How are green infrastructure projects funded in your institution? How does this compare with grey infrastructure?	Provides information regarding valuation metrics in use;	1) fee-based program 2) general fund 3) bonds	Credibility contest/OPPs; Epistemological conceptions of performance and measurement; expected differences between epistemic communities
In general, how would you describe your institution's approach to green infrastructure management? Do you think it has evolved over time?	Explicit approach to green infrastructure	Unknown	Ontological and/or epistemological orientation of the institution
How are green infrastructure knowledge systems challenges changing institutions and ecosystems on-the-ground?			
Describe a recent green	Job description of	I expect to hear about exceptions to	Knowledge Systems:

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infrastructure implementation project you were involved in… How did it differ from a grey infrastructure project? (Follow-up questions to move the story along): ● What was your role in the project? ● What kind of facility type was built? ● Who generally was involved in the decision-making around this facility? ● Who designed the facility? What facility specifications did you use? ● What is the facility maintenance plan? Who is responsible for carrying out the maintenance plan? ● How is this facility	interviewee Provides information regarding institutional structure/organization through example decision-making process; Provides information regarding the institutions' approach to green infrastructure vs. grey infrastructure; Provides information on what different institutional structures exist to support green vs grey infrastructure	the rules when the interviewees describes a specific project; for example: "we usually build bioswales like X, but because of Y we had to do Z instead on this project."	existing and emerging knowledge practices; knowledge utilization and circulation; Ontological classification of natural and man-made components of infrastructure; Epistemological conceptions of performance and measurement; Expected differences between epistemic communities

included in your Bureau's asset management? What facility valuation methods did your Bureau use to value this facility for asset management? ● What metrics are used to evaluate the performance of this facility through time? Who is responsible for monitoring performance?			
How does your institution interface with other city institutions, or regional and county agencies, regarding green infrastructure projects? To what degree do these interactions impede or enhance your ability to	Provides information regarding collaborations – shared resources, shared designs, lower cost because working with others, etc. – around GI Provides information regarding combative relationships – higher cost	1) do not manage infra jointly 2) competition for funding of green infra 3) build facility on other institution's property or vice versa 4) ?? unknown	Credibility contests/OPPs

manage green infrastructure?	because of overlapping infrastructure, disincentives, etc. – around GI		
Wrap-up			
What do you see as the greatest challenges or opportunities for your institution if green infrastructure continues to expand?	Open-ended – what did I miss?	Unknown	Potentially all connections;