

# VITEK Quick-Step Methods Guide

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Welcome to the VITEK assessment quick-step methods guide! By following these few easy steps, you can begin to measure and analyze the dynamic states and trends of traditional environmental knowledge (TEK) in your study neighborhood, and compare the results with other communities in which the same method has been applied. The method elaborated below is completely new, which means that if you choose to put it into practice it then you are a true pioneer in intraplanetary understanding!

1. Give a written summary or an oral explanation of the project description, or both of these, to key members and organizations belonging to the target community.
  - The project description should state clearly the project objectives, methods, estimated duration, and intended use of the results.
  - Ask them for their prior informed consent to participate in the assessment. The consent can be either oral or written, according to prevailing local customs, national laws, institutional regulations, etc.
  - To mollify concerns about intellectual property rights, third party access to valuable or sensitive information, or other touchy issues, you may want to explain that the only information that will be taken away from the local community will be numbers, that is, statistical calculations referring to the vitality (i.e. rate of retention/change over time) of local TEK.
  - We also recommend that you commit to providing the results of the study to the local community before any other target group, as a way of guaranteeing that return of information is carried out as soon as possible.
  - If permission is granted, offer to make members of the community active partners in the project. Ask if any local person(s) might be interested in learning how to do the assessment method so that they can do so in the future on their own. Discuss what possible benefits and advantages the development of this capability might have for them.
2. Once the project consent is secured, ask and arrange for small focus-group meetings with locally recognized experts.
  - The meetings should be held independently for males and females unless it can be established that there should be no significant differences in knowledge by gender. Basically, all steps of the method described below should be performed on a gender-separate basis until the final overall group index calculations are made (see step 13).
  - If it is impossible to assemble more than one person in the same place at the same time, then individual interviews are an acceptable alternative. However, if this option is used then the answers supplied by the individuals must be combined and averaged.

3. In the context of the focus-group meetings (or individual interviews), define the semantic domains that make up the local TEK system.
  - The VITEK protocol specifies a predetermined list of cosmopolitan semantic domains. We call them as such to convey the idea that they are delimited fields of meaning and action that are (potentially) identifiable in a wide number of biocultural situations throughout the world (but not necessarily universal). The general purpose of starting with this list, rather than a blank slate, is to permit meaningful and controlled comparisons from one group to the next. However, it should be emphasized that this list is no more than a starting point, a menu of possibilities, that should be adapted to local categories or frames of significance.
  - First, review the preselected list of cosmopolitan domains (see appendix 1), going down the list one domain at a time. For each domain, ask the participants whether they can recognize it or if it is relevant and important for their lives. Is there a local term, or close equivalent, that labels the domain? Check off and include any domain that is perceived as familiar, salient or important by them. If any domain is considered to be unknown or irrelevant, then eliminate it. Ask if there are any other domains not shown on the list but are important to them. If they reply in the affirmative and are able to tell you what it is, then add it to the list.
  - The trick here is to be able to communicate effectively, moving from the cosmopolitan list to a local one. You may have to rephrase the label of the cosmopolitan domain so that they can understand what you are getting at. A process of creative and flexible dialogue is recommended.
  - The method described here, starting with the complete list appearing in appendix 1, is intended to provide a (more or less) comprehensive assessment of the local TEK corpus. However, let's say that you or the community are only interested in a more focused assessment, a single domain for example, due to specialized research interests or a very tight calendar. In that case, you can limit the process of adapting the predefined domain(s) to its local equivalent or the closest thing to it. In other words, do a partial assessment if you cannot do a full one.
  
4. Once the list of local TEK domains is defined, you need to assign weights to each one.
  - You will notice that the list of cosmopolitan domains is divided into two distinct groupings. The first deals with conceptual knowledge ("know-what") and the second refers to practical skills ("know-how"). Because these types of knowledge constitute fundamentally different epistemological forms, we consider that they are not directly comparable. Therefore the exercise of assigning weights will have to be limited to the constituent domains within each one.
  - Ask the local consultants to rate the relative importance of each domain out of a total of a hundred points (e.g. 15 points for plants, 10 points for animals, etc.). This can be done by direct verbal elicitation for numerate populations or by using the "stone-distribution" scoring technique (i.e. presenting cards on

which each domain is written or depicted, providing 100 small stones, seeds, chips or other objects, and asking them to assign a number of these to each card that reflects the cultural importance of the domain) for non-numerate populations.

- If the consultants are unable to make such numeric judgements, assume that all domains are equally weighted.

5. Compile a free list of categorical items that make up each domain.

- You should ask the consultants to name the "things" or entities that are culturally significant in each domain. For example, what are the kinds of plants that you know and use, the soil classes that you can identify, the types of agricultural labor that you do, the different craft items that you make, etc. Record no more than 100 items per domain (that should be more than enough, in some cases much less). If the consultants cannot name that many, then stop trying when they say they cannot think of any more.
- Once again, the key to this exercise is to be able to communicate effectively about what you want. You may have to provide some examples before they get the basic idea.
- Please note that if individual, rather than focus group, interviews are employed and the total inventories of items add up to more than the maximum amount per domain allowed here, then the ranking procedure described in step 6 that follows can be used to eliminate all items after the top-ranked 100.

6. Arrange the domain-specific list of items into a rank-ordered list according to local criteria.

- Ask the consultants to rank the list according to their own criteria of cultural importance value. If the list is long, ask them to name the 10 most important items. Then ask them to order that group of 10. Then elicit the next 10 most important items and their ranked order, and so on, until an ordered list for the entire domain is completed.
- Divide the list into three groups, reflecting high, middle, and low ranking. Code each item according to the ranked group it belongs to. This coding will be important for selecting which items are included within the test instrument (see step 11 below).

7. Record subsidiary information about each categorical item.

- After the names of categories are recorded by free-listing, record other cultural information such as: use value or other type of significance, identifying characteristics, associated activities (for conceptual domain categories) or associated resource objects (for practical domain categories). Please use the guide provided with the cosmopolitan domain list (appendix 1) to get an idea of what kind of subsidiary information should be collected, given that this will vary according to the domain in question).
- As mentioned above, this list is merely a starting point and can be modified, attenuated or elaborated according to the opinions of the consultants or even according to special research interests.

8. Prepare stimulus materials that may be used in the test instrument as a visual supplement to verbal or text-based questions or cues.
  - These will consist mainly of photos, illustrations and/or specimen samples of the categorical items that are named in step 5.
  - This phase may require excursions around the community's environs or perhaps local people can be employed to collect these materials.
  - The particular stimulus materials prepared will depend on the type of domain and nature of its constituent entities, their accessibility to such recording or collection, and the ability of the medium to provide a reliable and accurate representation of the item in question. For example, photos may be used to depict plant and animal species but may not be feasible for landscape units or weather elements.
  - The perceptual clarity or transparency of photos of plants or soils or other types of objects should be pretested on a small sample of people (5 items tested on 5 people should be enough to do this) in order to determine whether they provide an appropriate stimulus or not. If the answer is no, then specimen collections, when possible, should be considered.
  - Certain animal species or other items may not be easily located but perhaps pictures or drawings obtained from field manuals or even the internet may be available. For bird species, maybe recordings of their songs would be better. The visual representation of culturally significant places may be better done on so-called mental maps that are hand-drawn.
  - The investigator can be creative about this but should always consider carefully whether the representation provides a reliable perceptual cue of the item. If the cue is not a good one, then obviously it should not be used. In any case, this is merely a supplement that is intended to enhance the quality and objectivity of the test instrument. The advantage of using such stimulus materials is that it helps to overcome the limits and biases imposed by merely linguistic-based cues.
  - Hint: a shortcut to this step can be taken by preparing the stimulus materials AFTER the test instruments are made up. In that case, you only have to prepare materials referring to the categorical items that actually appear in the test.
  
9. Make or get a reasonably complete and up-to-date census of the human community where the assessment is being done.
  - The minimum amount of social data that should appear in the census is the person's name, their age and sex.
  - If preexisting census data exists, definitely use it (as long as it is reliable).
  - Divide the population into two groups by gender and assign a number or code to each person (the order is not important).
  
10. Select the sample of persons who will be tested.
  - As alluded to above, the sample will be stratified minimally by age and sex.

- Other social variables could be included in the analysis if the researcher or community groups wish to do so, in which case the sample (and the census) will have to take them into account.
- The population has already been divided into gender groups, as described above, so this division has already been made. We also wish to divide the population into generation groups and, for simplicity purposes, we use the standard interval size of 25 years to make this division. In most groups, this leaves us with four generation groups: 0-24, 25-49, 50-74, and 75-99. At the same time, we wish to limit the assessment to that sector of the population considered to be intellectually mature from a TEK standpoint. (Note: if the research group wishes to include children or immature people in the assessment, then they should feel free to do so, but this cohort should be excluded from the calculations described in step 13 below).
- To determine the age at which "TEK maturity" is hypothetically reached, you should ask your consultants to define what that age should be. Based on their estimate, all individuals below that age should be eliminated from consideration for the sample selection. Thus, for example, if the cutoff age is 15 years old, the generation groups will be defined as: 15-24, 25-49, and 50-74. It may not be feasible to find enough individuals for testing beyond this range or age-dependent decline of physical/mental health may make it difficult to achieve meaningful results through the type of testing contemplated here, so to play it safe we recommend limiting the test to these three groups. This leaves us with at least six age/gender groups for testing.
- Each person in the respective groups should be assigned a number or code and a random selection of at least five persons should be made for each of the test groups.
- If anyone who is selected doesn't want to participate, then just select someone else (and so on) until the roster of all groups is complete.
- In all, you should have selected at least 30 subjects for testing, 5 in each age/gender group.

#### 11. Make up the TEK aptitude test (TEKAT).

- The test consists of two main sections: (a) conceptual knowledge component and (b) practical skills component. The respective sections will include questions drawn from the local domains and the categorical items that were recorded for them in steps 3 and 5 above.
- The relative composition of each section should directly reflect the weights assigned in step 4 above. For example, if the plant domain was assigned 20 out of 100 points, then 20% of all questions in the conceptual knowledge component should be drawn from that domain.
- The selection of categorical items within the domain should be performed using a random selection process, taking care to divide the selection according to the three ranked groupings (see step 6). Thus for plants, one-third would be drawn from the highest-ranked group, one-third from the middle-ranked group, and one-third from the lowest-ranked group. The idea here is to distribute questions among more to less common types of knowledge and

therefore achieve a more comprehensive and representative test of the total TEK corpus.

- In making up the questions, we recommend that the conceptual knowledge be constructed with true/false or multiple choice questions, or a combination of these. For the practical skills component, it will probably be best to use self-reporting questions with some sort of follow-up verification query: e.g. Have you ever built a canoe? If the answer is yes, ask when was the last time you did so or whether you done so in the past year. For certain domains within this component, such as food preparation or ethnomedical practices, true/false and multiple choice formats can be used.
- Stimulus images should be used where appropriate (e.g. showing a picture of an animal and asking the subject to select the correct name from a list of five names or asking them to specify true or false whether it is nocturnal).
- We recommend that each section of the test last no more than one hour. Figuring one minute per question, that puts a limit of 60 questions per section.
- Three alternative versions of the test should be prepared for each section (so that not everyone takes the same exact test). Also remember that separate tests will be compiled for men and for women (although there may be some overlap of content between them). So in all a total of six test versions per section will be prepared.
- Make sure that all of the alternative test versions have the same proportion of multiple choice, true/false, and self-report type questions and that the proportions of these in each domain is also the same.

12. Administer the TEKAT to the sample of subjects selected in step 10.

- The test should be given on a strictly individual basis, preferably in a location secluded from onlookers or others. You may want to provide a snack before beginning each section to keep the blood sugar flowing to the brain!
- We recommend that you have someone from the community help to administer the test and record the answers, especially if the test subject speaks only a local language or is more likely to respond better to someone they are familiar with. Conceivably, the test could be self-administered if the subject is literate. If you're computer-savvy maybe you can even put the test into an interactive program that automatically records the answers in digital form as the person takes the test, saving one step in data-processing.
- The specific test given to each subject should be selected randomly from the three gender-specific versions that were prepared (see step 11).
- The test given to a person should be marked or identified with the code of that person to ensure the confidentiality of the results.
- The scoring of the test should be as simple and straight-forward as possible. The effect of guessing on the test results should be reduced by penalizing wrong answers and by supplying an "I don't know" or "no answer" option for each question. Make sure, however, that you inform the test subjects of this or just ask them to refrain from guessing if they aren't sure about the answer. Thus the raw scores can be computed by counting +1 for every correct answer and 0 for every blank or "I don't know" answer. Incorrect answers are scored

negatively in direct proportion to the number of wrong possibilities they have to guess from. In a multiple choice format with 5 answer choices, every incorrect answer is scored as  $-1/4$ . In a strictly dichotomous true/false format, every incorrect answer is scored as  $-1$ .

- The final raw score should be adjusted so that the minimum score possible is no less than 0.

13. Calculate the key VITEK statistics using the supplied formulas.

- The VITEK consists of three related measures: the intergenerational rate of retention (RG), the cumulative rate of retention (RC), and the annual rate of change (CA).
- RG indicates the rate of retention between any successive pair of age groups and is calculated as the ratio of the generation mean to that of the generation immediately preceding it (see appendix 2 for calculation).
- RC reflects the proportion of the baseline aptitude level retained by each succeeding age group (see appendix 2 for calculation).
- CA expresses the average rate and direction of change per year reflected by the target age group (see appendix 2 for calculation).
- Significance tests can be used to assess whether the trends calculated by the vitality index signal significant differences (i.e., changes) in knowledge between generations.
- The VITEK measures (RG, RC, CA) can be aggregated according to different scales of inclusiveness. The first aggregation that should be performed involves combining the results for both gender groups together. This gives you a single set of measures for the whole community. If you have results from more than one community, district, state or country, you can also put these together to produce a composite measure.
- All of the VITEK measures described here can also be disaggregated according to individual TEK domains in order to assess which types of knowledge are more/less susceptible to erosion or change. This type of more fine-grained analysis can also be used to explore variations in knowledge change between gender groups.

14. Report the results to the target community and offer to discuss their significance.

## Appendix 1. Cosmopolitan Domain List

### I. Conceptual Knowledge

#### 1. Plant domain

- a. taxonomic names and identifications
- b. cultural use or significance
  - i. edible
  - ii. medicinal

- iii. construction
    - iv. technological
    - v. fuel
    - vi. commercial
    - vii. ornamental-artistic
    - viii. spiritual-ritual
    - ix. other
  - c. characteristics (e.g. morphology, behavioral habits, life cycle traits, habitat)
- 2. Animal domain
  - a. taxonomic names and identifications
  - b. cultural use or significance
    - i. edible
    - ii. medicinal
    - iii. labor
    - iv. technological
    - v. fuel
    - vi. commercial
    - vii. ornamental-artistic
    - viii. spiritual-ritual
    - ix. other
  - c. characteristics (e.g. morphology, behavioral habits, life cycle traits, habitat)
- 3. Plant-Animal Relationships
  - a. type of relationship (e.g. food source, shelter, protection, dispersal agent)
  - b. effect of relationship (beneficial/harmful/neutral)
- 4. Biotopes/Landscape units
  - a. names
  - b. characteristics (e.g. elevation, topography, edaphy, architecture, indicator species, disturbance agents, etc.)
  - c. cultural use or significance
- 5. Soil domain
  - a. names
  - b. characteristics (e.g. color, texture, fertility)
  - c. cultural use or significance
  - d. crop suitability
- 6. Climate domain
  - a. elements (e.g. temperature, precipitation, wind)
  - b. seasonal periods and indicators
  - c. seasonal activities
- 7. Ethnogeography

- a. place names
- b. location
- c. cultural use or significance

## II. Practical Skills

1. Primary resource production or procurement
  - a. agriculture
  - b. herding
  - c. hunting
  - d. fishing
  - e. collection
2. Food preparation or processing
3. Ethnomedical preparations or applications
4. Craft and tool making
5. Architecture and construction

## Appendix 2. Calculating the VITEK statistics

### (1) Intergenerational Rate of Retention (*RG*)

The *RG* indicates the rate of retention between any successive pair of age groups and is calculated as the ratio of the generation mean to that of the generation immediately preceding it. This calculation is given by:

$$RG_t = \bar{g}_t / \bar{g}_r$$

where  $\bar{g}_t$  is the mean score of the target age group (i.e. the younger group of the pair) and  $\bar{g}_r$  is the mean score of the reference age group (i.e. the next ascending group).

The  $RG_t$  of the oldest age group is set at 1 based on the logic that no information about the aptitude level of the preceding generation(s) is available and therefore we cannot assume that any differences or changes have occurred in prior time periods.

### (2) Cumulative Rate of Retention (*RC*)

The *RC* reflects the proportion of the baseline aptitude level retained by each succeeding age group. *RC* is calculated by multiplying the reference *RC* by 10 raised to the power of the logarithm of the target *RG*. As with the *RG* calculation, the *RC* of the oldest target age group is set at 1. The formula is defined as:

$$RC_t = RC_r 10^{\log(RGt)}$$

### (3) Annual Rate of Change (CA)

The *CA* expresses the average rate and direction of change per year reflected by the target age group and is given by:

$$CA_t = \frac{RC_t - 1}{yg_t}$$

where  $yg_t$  is the length in years of the target age group interval.