Appendix C

Heuristics for Possibility Thinking

The following is a quick summary of the thinking backward strategies and tactics for flipping assumptions presented in Chapter 3. You can use the following summary as an advanced organizer for key strategies discussed in the chapter or as a quick refresher to help support your and others' possibility thinking.

Strategies for Reasoning Backward

- Notice the uncommon and small features of a situation or problem.
    - How might you view an atypical situation or ill-defined problem differently by concentrating on the most surprising, uncommon, or disturbing aspects of the problem? What easily overlooked clues or small details of a situation might point to new possibilities for addressing the problem?

- Continuously search for root causes and potential explanations.
    - What if you let go of old ideas and standard expectations in an effort to continuously search for underlying patterns, unexpected connections, and potential root causes of the problem that might otherwise be overshadowed by your assumptions or expectations? What if you tried to work backward from the problem so that you can identify potentially new and more viable explanations for moving forward?

- Look for new connections by combining opposites.
    - What if you tried combining seemingly opposite elements of the problem or situation to help you reformulate the problem, discover otherwise hidden connections, and thereby see the problem (and potential solutions) in a new light?

Source: Adapted from Paavola, 2012, pp. 207–211; Rothenberg, 2014.

Tactics for Flipping Assumptions

- Causation flip: Challenge assumptions about cause and effect.
  - What if the cause of a problem (e.g., a student being a "troublemaker") is actually the effect (e.g., a student acts like a troublemaker to avoid getting bullied by other students) or the effect of problem is actually the cause?
- Coexistence flip: Challenge assumptions about compatibility and incompatibility.
  - What if features of a problem that seem compatible are incompatible (e.g., teachers who are friends are unable to work well together in planning a curriculum) or features of the problem that seem incompatible are actually compatible?
- Composition flip: Challenge assumptions about multiple and singular.
  - What if a problem that seems to be made up many different elements is actually made up of a singular element (e.g., teacher frustration about a new and complex curricular mandate has its basis in a singular frustration about the impact the mandate has had on scheduling) or a problem that seems to be made up of one element is made up of many different elements?
- Context flip: Challenge assumptions about what is unique and common.
  - What if something that seems to be unique to a particular context actually applies across many contexts (e.g., a practice used by a small private school to develop a sense of school-wide community among students and teachers can, with minor modification, be adopted to address the problem of student isolation faced by students in a large public school) OR something that seems to be common across contexts only applying in certain contexts?
- Evaluation flip: Challenge assumptions about good and bad.
  - What if some seemingly positive feature of a problem is actually negative (e.g., providing rewards and incentives for increasing test scores undermines teachers' intrinsic motivation and creativity) and or some seemingly negative feature is actually positive?
- Focus flip: Challenge assumptions about individual and social/contextual.
  - What if a seemingly individual problem (e.g., unmotivated students) is actually a social/contextual problem (e.g., influence of peers) or a seemingly social/contextual problem is actually an individual problem?
- Function flip: Challenge assumptions about what is effective and ineffective.
  - What if some seemingly effective aspect of situation is actually functioning ineffectively (e.g., a new instructional approach results in gains in reading scores, but students no longer enjoy reading) or some seemingly ineffective aspect of a problem is actually functioning effectively?

- Movement flip: Challenge assumptions about tandem and inverse.
    - What if things that seem to move or change together (e.g., increasing homework increases understanding) actually have an inverse relationship (e.g., increasing homework decreases understanding) or things that seem to move in opposite directions actually move in the same direction?

- Opposition flip: Challenge assumptions about similar and different.
    - What if things that appear similar are actually different (e.g., your approach to dealing with what seems to be a seemingly run-of-the-mill disagreement between two students actually makes the problem worse because this situation is very different from what you have dealt with in the past) or things that appear different are actually similar?

- Organization flip: Challenge assumptions about structured and chaotic.
    - What if things that appear organized are really disorganized (e.g., a seemingly highly structured set of curricular standards lacks the conceptual organization necessary to be effectively implemented) or something that seems disorganized and chaotic is actually organized and structured?

- Relationship flip: Challenge assumptions about related and unrelated.
    - What if something that seems related is actually unrelated (e.g., teachers grouped by subject area and grade level for professional development training are unable to work together due to stark differences in their approach to teaching) or things that seem interdependent are actually independent?

- Stability flip: Challenge assumptions about fixed and flexible.
    - What if things that seem stable and fixed can actually change (e.g., a seemingly rigid and inflexible district policy for hiring temporary teachers has more flexibility than initially appears to be the case) or something that seems dynamic and changing is actually stable and fixed?

Source: Adapted from Davis, 1971; Weick, 1979.