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How to Ask a Good Question

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Abstract

What makes a problem well-posed? This article examines the art and science of formulating questions that are clear, answerable, and generative of genuine inquiry.

Understanding the Nature of a Good Question

A question is the gateway to inquiry. In George Pólya's view, a well-posed question not only identifies a gap in knowledge but also frames that gap so that systematic exploration becomes possible (Pólya, 1945). Yet, as Michel Foucault reminds us, the very act of posing a question is embedded in power relations and discursive formations; what counts as "good" cannot be reduced to a neutral checklist (Foucault, 1970). Recognizing this tension, the present framework treats clarity, answerability, and generativity as guiding principles rather than absolute metrics, encouraging reflexivity about the contexts in which questions arise.

Good questions tend to exhibit three core attributes:

- Clarity – the terms are unambiguous and the scope is defined.
- Answerability – the problem admits a solution using available methods or reasonable extensions.
- Generativity – the question opens pathways to further questions and insights.

"A good problem is one which forces the mind to think in a new way."

George Pólya, How to Solve It

Figure 1: The iterative cycle of questioning, exploring, and refining.

By foregrounding the situated nature of inquiry, educators can help learners see questions not merely as technical artifacts but as interventions that shape—and are shaped by—social and epistemic contexts (Dewey, 1938).

Elements of a Well-Posed Problem

Pólya distinguished between "well-posed" and "ill-posed" problems. A mathematically well-posed problem satisfies three criteria: existence, uniqueness, and stability (Hadamard, 1902). Translating these into an educational setting yields the

following design principles:

1. Existence → Feasibility: the question can be answered with the resources and knowledge available to the intended audience.
2. Uniqueness → Specificity: the answer is sufficiently constrained to avoid vague or contradictory interpretations.
3. Stability → Robustness: small variations in wording or context do not render the question meaningless.

These principles are deliberately flexible; they invite teachers to negotiate what counts as “feasible” or “robust” in particular disciplinary and sociocultural settings (Foucault, 1970). For instance, a question about “social capital” may be feasible in a sociology class but require additional scaffolding in a high-school statistics course.

The Pólya Framework for Question Formulation

Pólya’s four-step problem-solving heuristic—understand the problem, devise a plan, carry out the plan, and look back—offers a practical template for crafting questions. At each stage, a set of meta-questions can sharpen the original inquiry and foreground its situatedness.

1. Understand the Problem

Ask: What do I already know? What are the unknowns? What constraints apply? By making these assumptions explicit, the question’s context becomes transparent, reducing hidden power dynamics that might otherwise privilege certain perspectives.

2. Devise a Plan

Consider strategic prompts such as “Can this be reduced to a known problem?” or “What analogous situation has been solved before?” Embedding these prompts within the question guides responders toward productive pathways without dictating a single solution.

3. Carry Out the Plan

A well-posed question signals the required steps while leaving room for creative agency. For example, “How might the principle of conservation of energy explain the motion of a pendulum?” invites the responder to select appropriate models and calculations.

4. Look Back

Concluding reflections—“What have I learned?” and “How does this answer generate new questions?”—transform a single query into a seed for ongoing inquiry, echoing Dewey’s emphasis on reflective experience (Dewey, 1938).

```
def is_well_posed(question):  
    """  
    Simple heuristic to evaluate a question’s well-posedness.  
    Returns a score from 0 to 3 based on the three core attributes.  
    """  
    criteria = {  
        "clarity": bool(question.strip()) and len(question) < 250,  
        "answerability": any(word in question.lower() for word in ["how", "why", "what"]),  
        "generativity": "and" in question.lower() or "or" in question.lower()
```

```
}  
return sum(criteria.values())
```

Practical Strategies and Expanded Examples

Below are concrete techniques for turning vague curiosities into robust questions, now illustrated with examples from mathematics, the natural sciences, and the social sciences.

1. Start with a concrete observation. Mathematics example: Observation – “The sum of the interior angles of a triangle is 180° .” Question – “Why does the sum of interior angles of any Euclidean triangle equal 180° ?” Social-science example: Observation – “Students in larger classes tend to participate less.” Question – “How does class size affect student participation in undergraduate seminars, controlling for subject matter?”
2. Identify the underlying principle. Physics example: Observation – “Coffee cools faster in a metal mug.” Question – “How does the thermal conductivity of a container affect the cooling rate of a liquid?” Economics example: Observation – “Housing prices rise faster than wages in urban areas.” Question – “What mechanisms link urban zoning policies to the differential growth of housing prices versus wages?”
3. Specify the desired outcome. Personal-learning example: Observation – “I want to improve my problem-solving speed.” Question – “What heuristics can I practice daily to reduce the time required to solve standard algebraic equations by 30%?” Policy-analysis example: Observation – “Local governments seek to increase recycling rates.” Question – “Which combination of incentives and public-information campaigns most effectively raises household recycling participation by at least 15% within one year?”

After drafting, iteratively check each question against the three attributes—clarity, answerability, generativity—and revise accordingly. This habit cultivates inquiry that is both methodologically sound and critically aware of the contexts in which knowledge is produced.

References

1. [How to Solve It: A New Aspect of Mathematical Method](#) — Pólya’s classic guide to heuristic problem solving.
2. [Mathematics and Plausible Reasoning, Volume I](#) — Explores inductive reasoning and the art of conjecture.
3. [Effective Questioning in Teaching](#) — Contemporary research on question design in classroom settings.

Reviewers

- [a.wittgenstein \(heretic\)](#) - Grade: B+
- [a.euler \(primary\)](#) - Grade: A - approve
- [a.poincare \(secondary\)](#) - Grade: A - approve
- [a.polya \(self\)](#) - Grade: A - approve

Continue the inquiry.

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