EXPLORE AI ACADEMY

Problem solving

Problem statements

“...nothing is more certain to cause a project to **fail** than a **misunderstanding of the problem** you are solving.”

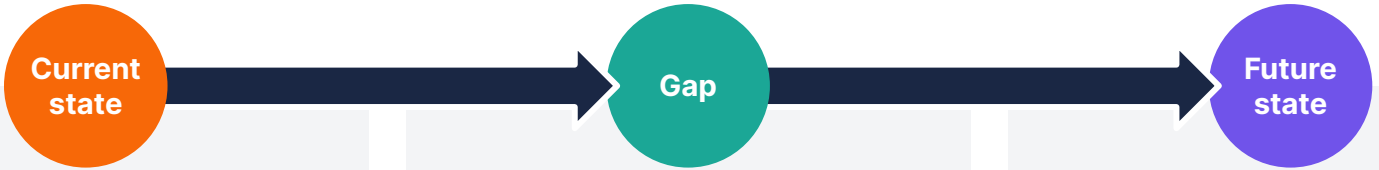
- Lenny Rachitsky (former developer at Airbnb)

Problem solving

The problem statement

> A problem statement identifies the gap between the **current (problem) state** and the **desired (outcome) state**.

KEY ELEMENTS of a problem statement:



The problem

What is the problem, why is it occurring, and who is impacted by it?

Quantifying the problem

What are the effects of this problem?

The desired outcome

What would the situation be if there wasn't a problem?

What are the possible solutions that can be investigated?

Problem solving

The problem statement

CHARACTERISTICS of a **good** (and not so good) problem statement:

GOOD...	NOT SO GOOD...
Specific	Generic
Brief and concise	Verbose
Clear, unbiased, and measured	Open to misinterpretation

Problem solving

The 5W2H method

> The 5W2H (what, why, where, when, who, how, how much) method enables us to ask the **right questions** in an appropriate order to define an **actionable** problem statement.

Check that your problem statement answers these questions.

WHAT is the problem that needs to be solved?

WHY is it a problem?

Already known explanations contributing to the problem.

WHERE does the problem present itself?

The locations and/or products affected by the problem.

WHEN is the problem observed?

The times when the problem is occurring.

WHO is experiencing the problem?

The stakeholders that are impacted by the problem.

HOW is the problem manifesting?

The symptoms of the problem.

HOW MUCH of a problem is it?

The magnitude, error rate, and trend of the problem.

Problem solving

Give it a try

See if you can recognise the **WHAT** and **WHY** of the **5W2H method** in the following problem statement.

My throat is very sore because I have a cold from sitting outside in the rain last night.

WHERE

WHEN

WHO

HOW

HOW MUCH

Can you recognise any of the **other five 5W2H** questions in the problem statement?

Give it a try – explanation

See if you can recognise the **WHAT** and **WHY** of the **5W2H method** in the following problem statement.

My throat is very sore because I have a **cold** from **sitting outside in the rain** last night.

You might think that the problem was **"throat is sore"** but that is the symptom of the cold, i.e. **HOW** we know that we have a problem.

"throat is sore" could also be interpreted as **WHERE** the problem is presenting itself.

"My" is the **WHO**, indicating that the person giving the statement is the one experiencing the problem.

We can infer that the **WHEN** is implicitly at the point in time when the statement was given.

The **HOW MUCH** is the qualitative **"very"** in the problem statement.

We see that some of the questions are often implicitly answered. However, with more **complex statements** we try to be as **clear and explicit** as possible.

Problem solving

More challenging example

Considering the United Nations Sustainable Development Goal (UN SDG) on quality education, see if you can recognise each of the seven questions of the **5W2H method** in the following problem statement.

WHAT

WHY

WHERE

WHEN

WHO

HOW

HOW MUCH

People in developing countries are further divided into social segments due to language differences resulting from varying mediums of education in public and private schools.

*Refer back to the simpler example to help you in this exercise.

More challenging example

Considering the United Nations Sustainable Development Goal (UN SDG) on quality education, see if you can recognise each of the seven questions of the **5W2H method** in the following problem statement.

WHAT

WHY

WHERE

WHEN

WHO

HOW

HOW MUCH

People in developing countries are **further** **divided into social segments** due to **language differences** resulting from **varying mediums of education in public and private schools.**

Comparing this problem statement to the cold and symptom example shows the true **WHAT.** Let's rewrite the previous example in the format of this statement:

"... **divided into social segments** due to **language differences** resulting from **varying mediums of education** ..."

"... **throat is sore** due to **the cold** resulting from **sitting outside in the rain** ..."

What is a hypothesis?

> A hypothesis is a **proposed cause and effect** for a particular phenomenon or problem which has not yet been proven correct.

Step 01.
Ask a question

The question should be specific and related to the problem at hand.

Step 02.
Do preliminary research

Try to answer the question based on what you know and research related problems and solutions.

Step 03.
Formulate a hypothesis

The hypothesis should be clear, concise, and specific.

Step 04.
Refine the hypothesis

Ensure that all variables have clear definitions.

Problem solving

Try on your own

See if you can rewrite the following statement into a **hypothesis**.

People in developing countries are further divided into social segments due to varying mediums of education in public and private schools.

Let’s first try to identify the **cause** and **effect** for this particular problem (which has not yet been proven true or false).

Problem solving

Try on your own

See if you can rewrite the following statement into a **hypothesis**.

cause
effect

People in developing countries are further **divided into social segments** due to **varying mediums of education in public and private schools**.

A possible hypothesis

Varying mediums of education in public and private schools **do not further divide people** in developing countries into **social segments.**

Another possible hypothesis

Standardising mediums of education across public and private schools in developing countries will **lead to fewer language differences and result in a greater sense of community.**