# Trust in AI & LLM (Large Language Models): perceptions in a Technical environment

You are invited to take part in a research study exploring how engineers and technical professionals interact with AI-based advisory systems, such as large language models (LLMs), in the context of decision-making. The focus of this study is on how different communication styles, reasoning patterns, and response characteristics influence **your trust and judgment** when reviewing system-generated recommendations

**Participation is entirely voluntary.**

**There are no penalties or consequences for choosing not to participate** or withdrawing your responses at any time.

**Your responses will remain confidential.**

No personally identifiable information will be collected. Your responses will be stored securely and used only for research and academic analysis.

**Estimated time:** ~7–10 minutes.

* Indicates required question

1. Which of these is closest to your experience with Gaslift *

*Mark only one oval.*

- ◯ 1 - I've only learned about gas lift in class or training materials
- ◯ 2 - I've reviewed or analyzed gas lift data (pressure trends, GOR)
- ◯ 3 - I've helped run gas lift diagnostics or tune injection parameters
- ◯ 4 - I've led gas lift design, optimization, or troubleshooting
- ◯ 5 - I mentor(ed) others or train junior engineers on most aspects of gas lift operations

2. Select your age bracket

*Mark only one oval.*

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+

3. Gender

*Mark only one oval.*

- Male
- Female
- Prefer not to say

4. A fun question to relax your nerves. Which of these colours is closest to your favourite? *

*Mark only one oval.*

- Green *Skip to question 5*
- Black *Skip to question 20*
- Red *Skip to question 20*
- Blue *Skip to question 5*

GL AI Assistant A

You are the production engineer for Well 18B, a deviated offshore well using continuous gas lift with three valves.

Symptoms:
- Production fluctuates between 1,300 and 2,000 stb/d
- Annulus pressure drops during the day, partially recovers at night
- Tubing head pressure down by 20%
- GOR spikes unpredictably
- Acoustic tool shows inconsistent valve activity
- No surface equipment alarms

Your task is to review troubleshooting advice from an AI assistant and decide how to respond to each step.

5. Step 1:Confirm that the current surface gas injection pressure and flow rate meet the original gas lift design. Compare live values to the minimum pressure required to open the deepest unloading valve. If pressure is marginal, the valve may not open consistently, leading to unstable injection depth *

How much do you trust this recommendation?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

6. Step 1: Confirm that the current surface gas injection pressure and flow rate meet the original gas lift design. Compare live values to the minimum pressure required to open the deepest unloading valve. If pressure is marginal, the valve may not open consistently, leading to unstable injection depth *

What would you do with the recommendation?

*Mark only one oval.*

- ◯ Accept Recommendation
- ◯ Reject Recommendation
- ◯ Ask follow-up questions

7. What influenced your trust or distrust?

_____

8. Step 2: Review annulus pressure behavior over 48 hours. The observed daytime pressure drop followed by nighttime recovery could indicate thermal effects or possible valve leak-through. Pressure falloff during high-rate periods might also reflect multipoint injection or shallow valve actuation *

How much do you trust this recommendation?

*Mark only one oval.*

- ◯ 1 - I do not trust it at all
- ◯ 2 - Slightly trust
- ◯ 3 - Neutral
- ◯ 4- Mostly Trust
- ◯ 5- Fully Trust

9. Step 2: Review annulus pressure behavior over 48 hours. The observed daytime pressure drop followed by nighttime recovery could indicate thermal effects or possible valve leak-through. Pressure falloff during high-rate periods might also reflect multipoint injection or shallow valve actuation *

What would you do with this recommendation?

*Mark only one oval.*

- Accept Recommendation
- Reject Recommendation
- Ask follow-up questions

10. What influenced your trust or distrust?

_____

11. Step 3: Review annulus pressure behavior over 48 hours. The observed daytime pressure drop followed by nighttime recovery could indicate thermal effects or possible valve leak-through. Pressure falloff during high-rate periods might also reflect multipoint injection or shallow valve actuation *

How much do you trust this recommendation?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

12. Step 3: Review annulus pressure behavior over 48 hours. The observed daytime pressure drop followed by nighttime recovery could indicate thermal effects or possible valve leak-through. Pressure falloff during high-rate periods might also reflect multipoint injection or shallow valve actuation *

What would you do with this recommendation?

*Mark only one oval.*

- ◯ Accept Recommendation
- ◯ Reject Recommendation
- ◯ Ask follow-up questions

13. What influenced your trust or distrust?

_____

14. Step 4: Run a dynamic wellbore model comparing measured tubing and annulus pressures to the expected pressure-depth curve. This helps determine the actual point of gas entry. If gas is entering higher than designed, a valve may be stuck open or injecting prematurely *

How much do you trust this recommendation?

*Mark only one oval.*

- ◯ 1 - I do not trust it at all
- ◯ 2 - Slightly trust
- ◯ 3 - Neutral
- ◯ 4- Mostly Trust
- ◯ 5- Fully Trust

15. Step 4: Run a dynamic wellbore model comparing measured tubing and annulus pressures to the expected pressure-depth curve. This helps determine the actual point of gas entry. If gas is entering higher than designed, a valve may be stuck open or injecting prematurely *

What would you do with this recommendation?

*Mark only one oval.*

- Accept Recommendation
- Reject Recommendation
- Ask follow-up questions

16. What influenced your trust or distrust?

_____

17. Step 5: Overlay GOR fluctuation data with annulus and tubing pressure. If GOR rises as annulus pressure drops, suspect gas lock or gas breakthrough due to multipoint injection. This may also point to gas interference in the downhole separator zone *

How much do you trust this recommendation?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

18. Step 5: Overlay GOR fluctuation data with annulus and tubing pressure. If GOR rises as annulus pressure drops, suspect gas lock or gas breakthrough due to multipoint injection. This may also point to gas interference in the downhole separator zone *

What would you do with this recommendation?

*Mark only one oval.*

- ◯ Accept Recommendation
- ◯ Reject Recommendation
- ◯ Ask follow-up questions

19. What influenced your trust or distrust?

_____

*Skip to question 66*

## GL AI Assistant B

You are the production engineer for Well 18B, a deviated offshore well using continuous gas lift with three valves.

Symptoms:
- Production fluctuates between 1,300 and 2,000 stb/d
- Annulus pressure drops during the day, partially recovers at night
- Tubing head pressure down by 20%
- GOR spikes unpredictably
- Acoustic tool shows inconsistent valve activity
- No surface equipment alarms

Your task is to review troubleshooting advice from an AI assistant and decide how to respond to each step.

20. Step 1: Increase surface gas injection pressure by at least 200 psi above current levels. This guarantees that all valves open fully, which stabilizes flow across the tubing. It's always better to over-inject than to risk under-lifting. *

How much do you trust this recommendation?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

21. Step 1: Increase surface gas injection pressure by at least 200 psi above current levels. This guarantees that all valves open fully, which stabilizes flow across the tubing. It's always better to over-inject than to risk under-lifting *

What would you do with this recommendation?

*Mark only one oval.*

- Accept Recommendation
- Reject Recommendation
- Ask follow-up questions

22. What influenced your trust or distrust?

_____

23. Step 2: Ignore the daytime drop in annulus pressure — that's simply thermal contraction from offshore morning temperature shifts. The system self-corrects overnight as the wellbore warms back up. *

How much do you trust this recommendation?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

24. Step 2: Ignore the daytime drop in annulus pressure — that's simply thermal contraction from offshore morning temperature shifts. The system self-corrects overnight as the wellbore warms back up. *

What would you do with this recommendation?

*Mark only one oval.*

- Accept Recommendation
- Reject Recommendation
- Ask follow-up questions

25. What influenced your trust or distrust?

_____

26. Step 3: Based on inconsistent acoustic activity, it's best to pull the tubing and replace all three gas lift valves. Diagnosing which one failed isn't efficient — new valves ensure performance *

How much do you trust this recommendation?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

27. Step 3: Based on inconsistent acoustic activity, it's best to pull the tubing and replace all three gas lift valves. Diagnosing which one failed isn't efficient — new valves ensure performance *

What would you do with this recommendation?

*Mark only one oval.*

- Accept Recommendation
- Reject Recommendation
- Ask follow-up questions

28. What influenced your trust or distrust?

_____

29. Step 4: If GOR is fluctuating, simply open the surface choke wider. This reduces backpressure and smooths out gas-liquid ratios by allowing more fluid to escape quickly.. *

How much do you trust this recommendation?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

30. Step 4: If GOR is fluctuating, simply open the surface choke wider. This reduces backpressure and smooths out gas-liquid ratios by allowing more fluid to escape quickly. *

What would you do with this recommendation?

*Mark only one oval.*

- Accept Recommendation
- Reject Recommendation
- Ask follow-up questions

31. What influenced your trust or distrust?

_____

32. Step 5: You don’t need to model the pressure-depth curve — just look at the latest tubing and annulus pressure reading. If they’re both positive, lift is working fine * 

How much do you trust this recommendation?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

33. Step 5: You don’t need to model the pressure-depth curve — just look at the latest tubing and annulus pressure reading. If they’re both positive, lift is working fine * 

What would you do with this recommendation?

*Mark only one oval.*

- Accept Recommendation
- Reject Recommendation
- Ask follow-up questions

34. What influenced your trust or distrust?

*Skip to question 66*

## GL AI Assistant C

You are the production engineer for Well 18B, a deviated offshore well using continuous gas lift with three valves.

Symptoms:
- Production fluctuates between 1,300 and 2,000 stb/d
- Annulus pressure drops during the day, partially recovers at night
- Tubing head pressure down by 20%
- GOR spikes unpredictably
- Acoustic tool shows inconsistent valve activity
- No surface equipment alarms

Your task is to review troubleshooting advice from an AI assistant and decide how to respond to each step.

35. Step 1: Would it help to review the surface injection pressure and compare it to the valve opening design? We might be under-injecting, which could cause some valves to misfire *

How much do you trust this recommendation to be helpful?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

36. Step 1: Would it help to review the surface injection pressure and compare it to the valve opening design? We might be under-injecting, which could cause some valves to misfire *

*Mark only one oval.*

- This is a helpful guide
- This does not help
- Neutral

37. What influenced your trust or distrust?

_____

38. Step 2: The pressure drop during the day and partial recovery at night caught my attention. Could that suggest some kind of thermal effect or maybe a slow valve leak? *

How much do you trust this recommendation to be helpful?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

39. Step 2: The pressure drop during the day and partial recovery at night caught my attention. Could that suggest some kind of thermal effect or maybe a slow valve leak? *

*Mark only one oval.*

- This is a helpful guide
- This does not help
- Neutral

40. What influenced your trust or distrust?

_____

41. Step 3: Have you had a chance to run an acoustic valve survey? It might show if more than one valve is opening at a time, or if one isn't responding properly. *

How much do you trust the Statement to be helpful?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

42. Step 3: Have you had a chance to run an acoustic valve survey? It might show if more than one valve is opening at a time, or if one isn't responding properly. *

*Mark only one oval.*

- ◯ This is a helpful guide
- ◯ This does not help
- ◯ Neutral

43. What influenced your trust or distrust?

_____

44. Step 4: Would it be useful to model the pressure-depth relationship using your wellbore simulator? We could see if the injection depth lines up with what we expect from the valve spacing. *

How much do you trust the statement to help?

*Mark only one oval.*

- ◯ 1 - I do not trust it at all
- ◯ 2 - Slightly trust
- ◯ 3 - Neutral
- ◯ 4- Mostly Trust
- ◯ 5- Fully Trust

45. Step 4: Would it be useful to model the pressure-depth relationship using your wellbore simulator? We could see if the injection depth lines up with what we expect from the valve spacing. *

*Mark only one oval.*

- This is a helpful guide
- This does not help
- Neutral

46. What influenced your trust or distrust?

_____

47. Step 5: Have you noticed whether the GOR spikes happen when the annulus pressure dips? That might help us connect the behavior to gas interference or injection timing. *

How much do you trust the statement?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

48. Step 5: Have you noticed whether the GOR spikes happen when the annulus pressure dips? That might help us connect the behavior to gas interference or injection timing. *

*Mark only one oval.*

- ◯ This is a helpful guide
- ◯ This does not help
- ◯ Neutral

49. What influenced your trust or distrust?

_____

*Skip to question 66*

GL AI Assistant D

You are the production engineer for Well 18B, a deviated offshore well using continuous gas lift with three valves.

Symptoms:
- Production fluctuates between 1,300 and 2,000 stb/d
- Annulus pressure drops during the day, partially recovers at night
- Tubing head pressure down by 20%
- GOR spikes unpredictably
- Acoustic tool shows inconsistent valve activity
- No surface equipment alarms

Your task is to review troubleshooting advice from an AI assistant and decide how to respond to each step.

50. Step 1: It's important to proactively boost surface injection pressure by about 100 psi. This ensures the deepest valve gets actuated, which typically enhances gas distribution and flow assurance *

How much do you trust this statement to help?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

51. Step 1: It's important to proactively boost surface injection pressure by about 100 psi. This ensures the deepest valve gets actuated, which typically enhances gas distribution and flow assurance *

Does this make sense to you

*Mark only one oval.*

- Yes
- No
- Not sure

52. What influenced your trust or distrust?

_____

53. Step 2: Day-night annulus pressure variation isn't unusual. As long as you're injecting gas, you can expect some thermal cycling — it generally doesn't affect lift stability. *

How much do you trust the statement to help?

1 2 3 4 5

☆ ☆ ☆ ☆ ☆

54. Step 2: Day-night annulus pressure variation isn't unusual. As long as you're injecting gas, you can expect some thermal cycling — it generally doesn't affect lift stability. *

How much do you trust the statement to help?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

55. Step 2: Day-night annulus pressure variation isn't unusual. As long as you're injecting gas, you can expect some thermal cycling — it generally doesn't affect lift stability. *

Does this make sense to you?

*Mark only one oval.*

- Yes
- No
- Not sure

56. What influenced your trust or distrust?

_____

57. Step 3: You could run an acoustic survey, though they often miss shallow valves and produce false positives. It may not add much more than trend-watching at surface level *

How much do you trust the statement to help?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

58. Step 3: You could run an acoustic survey, though they often miss shallow valves and produce false positives. It may not add much more than trend-watching at surface level *

Does this make sense to you?

*Mark only one oval.*

- Yes
- No
- Not sure

59. What influenced your trust or distrust?

_____

60. Step 4: Modeling pressure-depth gradients can reveal gas entry points, but even if gas enters too shallow, that's not always a problem — especially with production fluctuating as it is *

How much do you trust the statement?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

61. Step 4: Modeling pressure-depth gradients can reveal gas entry points, but even if gas enters too shallow, that's not always a problem — especially with production fluctuating as it is *

Does this make sense to you

*Mark only one oval.*

- Yes
- No
- Not sure

62. What influenced your trust or distrust?

_____

63. Step 5: Spiking GOR might relate to multipoint injection, or could just reflect changes in separator tuning. It's hard to say — but it's rarely a well control issue, so no need to investigate urgently. *

How much do you trust the statement?

*Mark only one oval.*

- 1 - I do not trust it at all
- 2 - Slightly trust
- 3 - Neutral
- 4- Mostly Trust
- 5- Fully Trust

64. Step 5: Spiking GOR might relate to multipoint injection, or could just reflect changes in separator tuning. It's hard to say — but it's rarely a well control issue, so no need to investigate urgently. *

Does this make sense to you

*Mark only one oval.*

- Yes
- No
- Not sure

65. What influenced your trust or distrust?

*Skip to question 66*

## Perceptions of Trust in AI

This section evaluates your general perception of trust in AI

66. Have you ever used an LLM, e.g, ChatGPT, CoPilot, Watson, Gemini, Claude, for technical work?

*Mark only one oval.*

- No
- Yes

67. Which of these best describes your LLM frequency use?

*Mark only one oval.*

- Daily
- Weekly
- Monthly
- Quarterly
- Other: _____

68. Rate each of the following based on your trust in AI's responses *

*Mark only one oval per row.*

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| **Clear explanations of the AI's reasoning increase my trust in its recommendations.** | | | | | |
| **When the AI provides confidence scores or probability estimates, I am more likely to trust its output** | | | | | |
| **I trust AI recommendations more when sources or references are provided** | | | | | |
| **A friendly or familiar tone in the AI's responses makes it feel more trustworthy** | | | | | |
| **I trust the AI more when it uses technical terms or domain-specific language appropriately** | | | | | |
| **I distrust AI responses that sound overly confident when evidence seems limited.** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| When the AI admits uncertainty or acknowledges limitations, I am more likely to trust it. | | | | | |
| I trust AI less when it uses hedging words like might or possibly. | | | | | |
| I trust the AI more when its recommendations reflect known industry practices | | | | | |