



# RAIL Fellowship Symposium

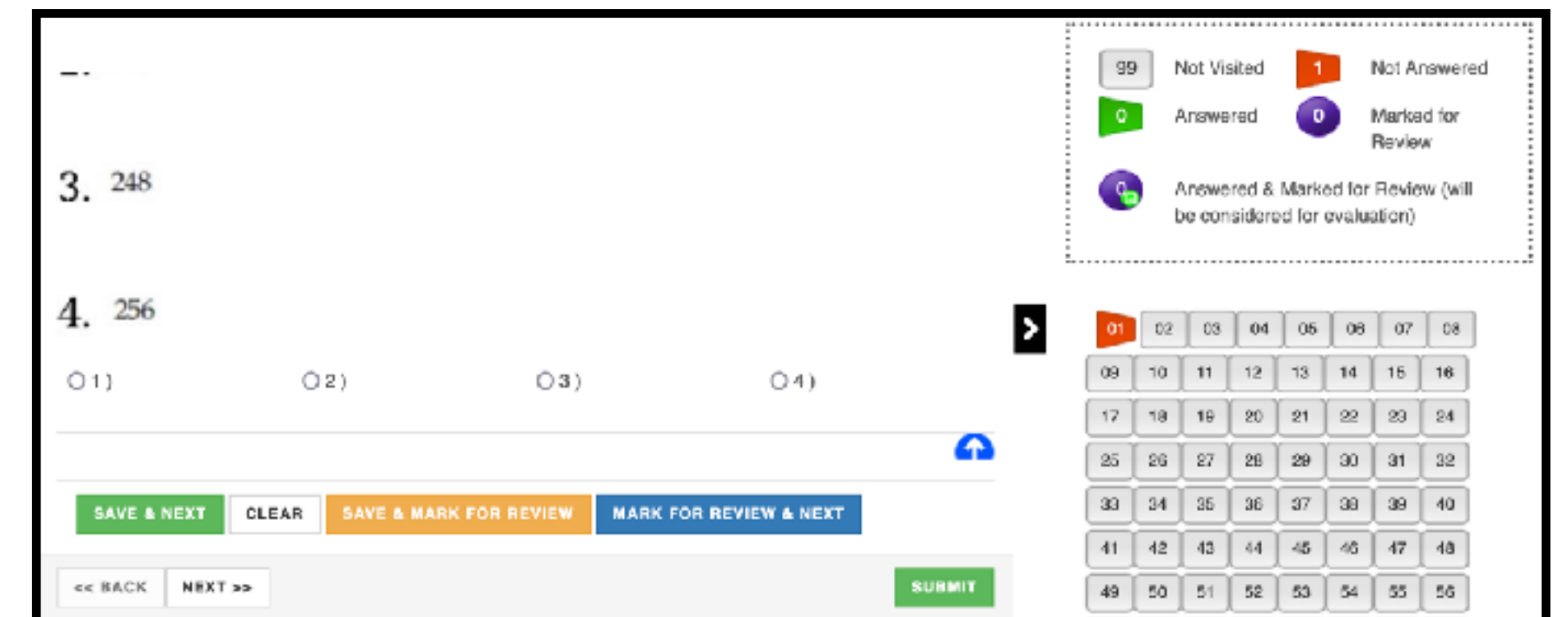
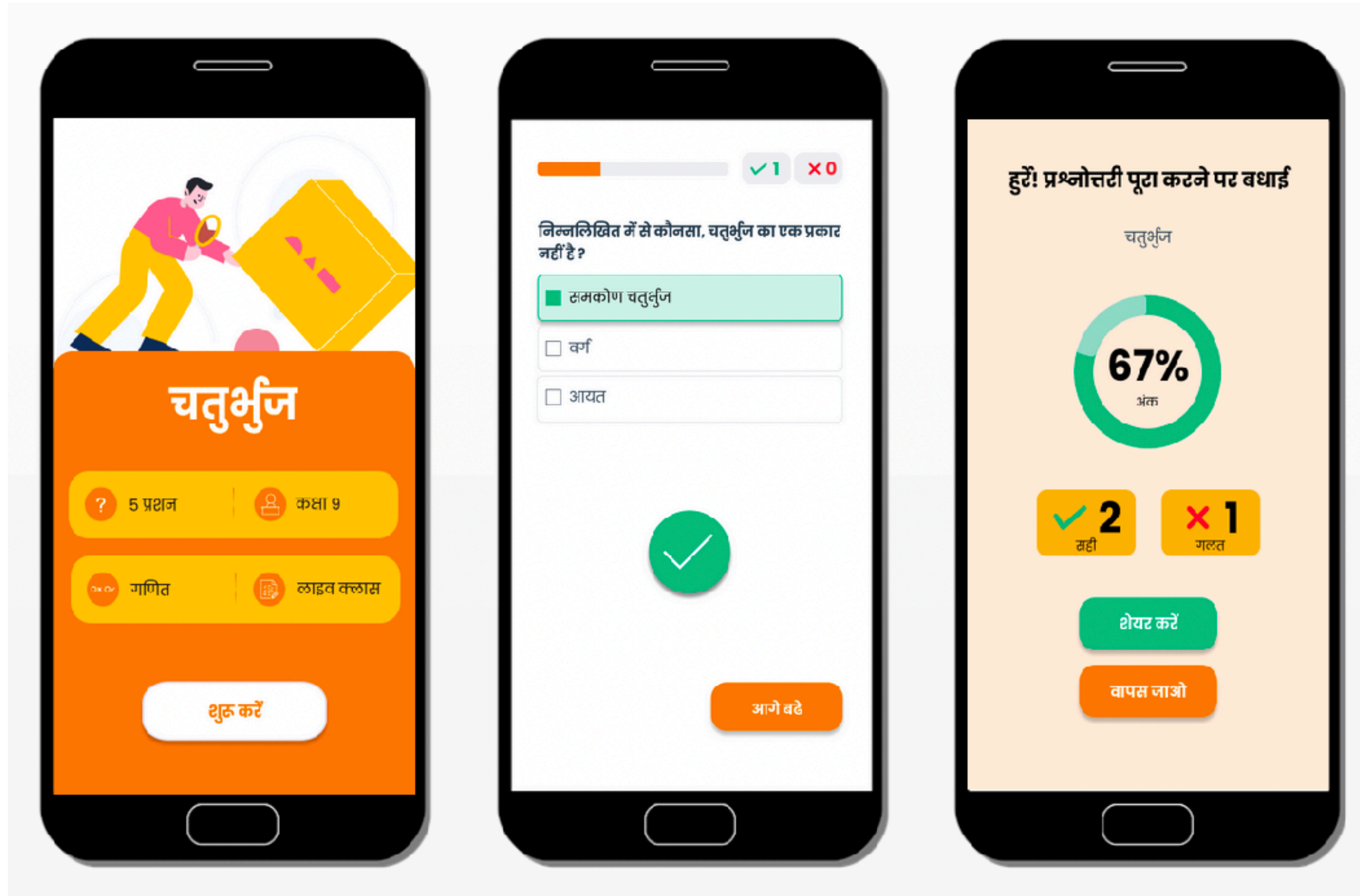
**A Tech Worker's Perspective**

Bengaluru, 28th Nov. 2024  
[suryateja@avantifellows.org](mailto:suryateja@avantifellows.org)

# AF Mission

Help students lift themselves & their families out of poverty in a ***single generation*** by helping them qualify to ***quality professional undergraduate courses*** & develop the skills needed to build successful careers

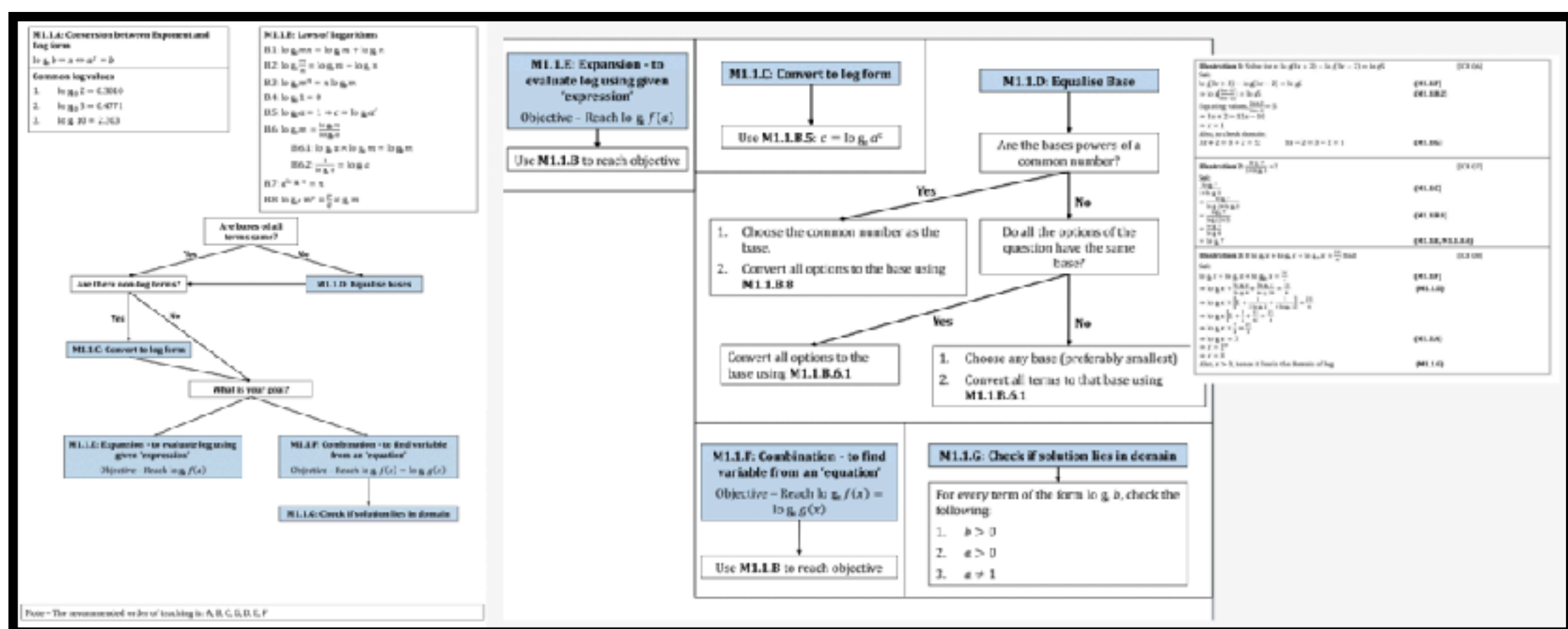
# Quiz Engine



NTA Web Application with ~20 sample papers



# Quiz Engine Flow



Reports  
& Analysis

Question Bank (~1.5 Lakh), Worksheets  
Curriculum & Production Teams  
+ Teachers

Operations Team  
+ Teachers

Tech Team

Ops, Tech  
+ Teachers

# An issue in the QE Flow

Student ID: test\_rahul

0% DELHI Dropper Batch JEE PT-1  
2023-08-13

Click here to review your answers

OVERALL PERFORMANCE

Marks	-6
Unattempted	59
Wrong Answers	14
Correct Answers	2
Partially Correct	0
Percentage	0
Accuracy	12.5

Report Card

See Results

BC8&B09\_PB-MT-PCB Id: test\_admin

Q.4 | Single Choice Physics - Section A

An object of mass  $3\text{ kg}$  is at rest. Now a force of  $\vec{F} = 6t^2\hat{i} + 4t\hat{j}$  is applied on the object then velocity of object at  $t = 3\text{ sec}$  is

☐  $18\hat{i} + 3\hat{j}$

☐  $18\hat{i} + 6\hat{j}$

☐  $3\hat{i} + 18\hat{j}$

☒  $18\hat{i} + 4\hat{j}$

**Solution:**  
Mass,  $m = 3\text{ kg}$ , force,  $\vec{F} = 6t^2\hat{i} + 4t\hat{j}$   
 $\therefore$  acceleration  
 $\vec{a} = \vec{F}/m = \frac{6t^2\hat{i} + 4t\hat{j}}{3} = 2t^2\hat{i} + \frac{4}{3}t\hat{j}$   
Now,  $\vec{v} = \frac{d\vec{r}}{dt} = 2t^3\hat{i} + \frac{4}{3}t^2\hat{j}$

See Results

B08&B09\_PB-MT-PCB Id: test\_admin

Q.3 | Single Choice Physics - Section A

A projectile is thrown from a point in a horizontal plane such that the horizontal and vertical velocities are  $9.8\text{ ms}^{-1}$  and  $19.6\text{ ms}^{-1}$ . It will strike the plane after covering distance of

☐  $39.2\text{ m}$

☒  $19.6\text{ m}$

☐  $9.8\text{ m}$

☐  $4.9\text{ m}$

**Solution:**  
 $R = \frac{2u_x u_y}{g} = \frac{2 \times 9.8 \times 19.6}{9.8} = 39.2\text{ m}.$

See Results

B08&B09\_PB-MT-PCB Id: test\_admin

Q.1 | Single Choice Physics - Section A

What is the dimensions of impedance?

☐  $[ML^2T^{-3}I^{-2}]$

☒  $[M^{-1}L^{-2}T^3I^2]$

☐  $[ML^3T^{-3}I^{-2}]$

☐  $[M^{-1}L^{-3}T^3I^2]$

**Solution:**  
We have  
Impedance = Resistance  $= \frac{V}{I}$   
 $= \frac{W}{q \times I} = \frac{W}{I^2 t} = \frac{ML^2T^{-2}}{I^2 T} = ML^2T^{-3}I^{-2}$

Students rarely revisit quizzes :(



# AI Intervention

HP GRADE 9 FOUN... Id: test\_count\_1

Q.3 | Single Choice Maths

$A$  तीन-चौथाई समय में उससे आधा काम करता है। यदि उन्हें मिलकर काम पूरा करने में 18 दिन लगते हैं, तो  $B$  को इसे पूरा करने में कितना समय लेगा?

$A$  does half as much work as  $B$  in three-fourth of the time. If together they take 18 days to complete the work, how much time shall  $B$  take to do it?

☒ 30 days

☐ 35 days

☐ 40 days

☐ None of these

GPT-4o

Review: HP GRADE ... Id: test\_count\_1

Q.3 | Single Choice Total Questions: 4

If person  $A$  can complete a task in 12 days, how many days will it take for person  $B$  to complete the same task if  $B$  works twice as fast as  $A$ ?

☒ 6 days

☐ 12 days

☐ 24 days

**Solution:**

Since  $B$  works twice as fast as  $A$ ,  $B$  will take half the time  $A$  takes to complete the task. Therefore,  $B$  will take 6 days.

Review: HP GRADE ... Id: test\_count\_1

Q.3 | Single Choice Total Questions: 4

Is it true that if one person does half the work of another in the same amount of time, they will take twice as long to complete the same task alone?

☐ Yes

☒ No

**Solution:**

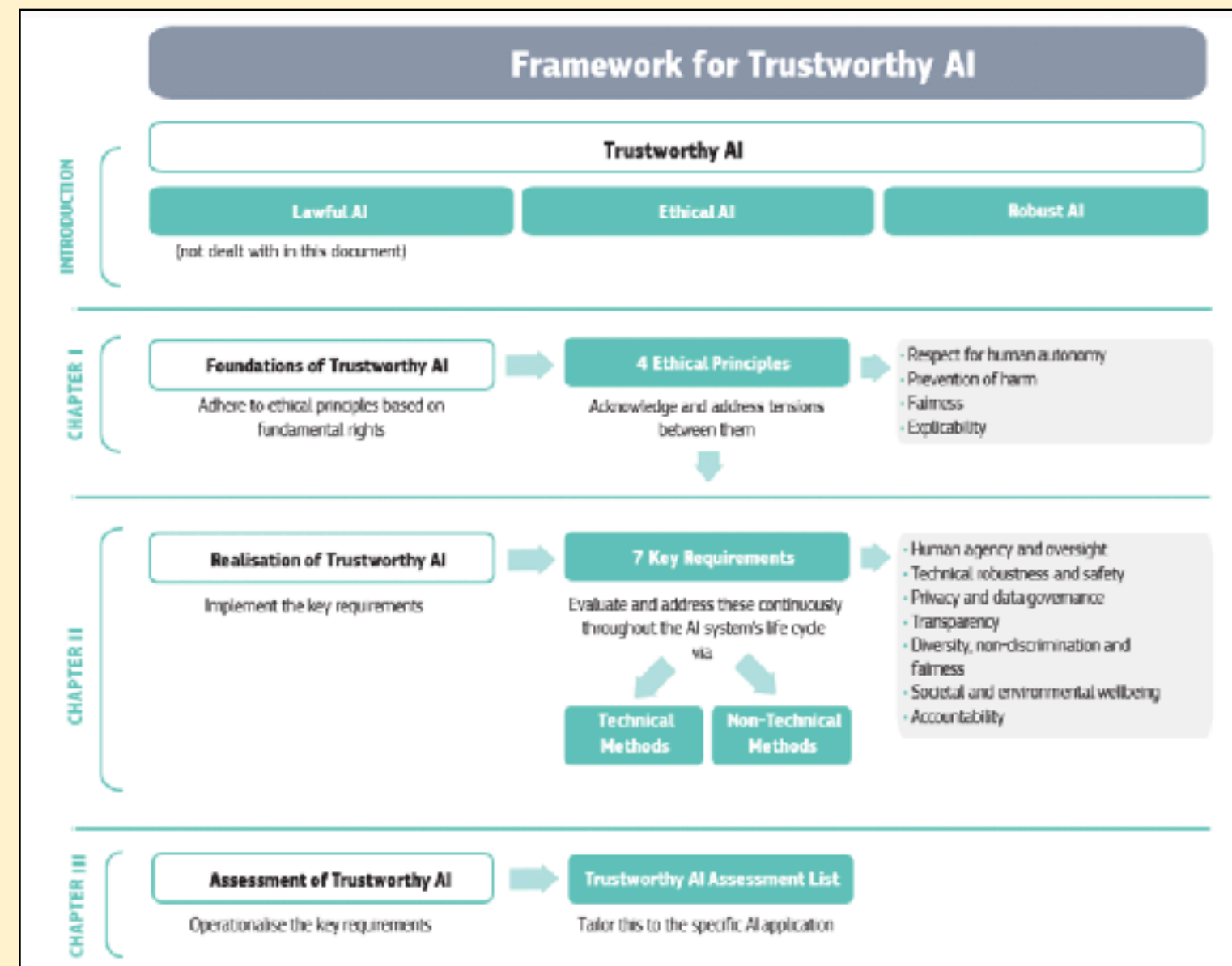
If one person does half the work of another in the same amount of time, they will indeed take twice as long to complete the same task alone. This is because the rate of work is directly proportional to the time taken.

*Smaller*  
*Conceptual*  
*Atomic*  
*Quick*  
*(Mostly) correct*  
*Personalised*

Inactive Learning: Immediately view the correct answer

**Delayed Feedback:** Answer a simpler pedagogical question or a Yes/No question

# Frameworks, Checklists, Rubrics, ...



Generic Frameworks

**III. METHOD**  
Summary: This section discusses the ethical implications of doing AER using a given method. It presents the types of methods and their tradeoffs, as well as, considerations of who is left out, spurious correlations, and the role of context. Special attention is paid to green AI and the fine line between emotion management and manipulation.  
E. Why This Method  
24. Types of Methods and their Tradeoffs  
25. Who is Left Out by this Method  
26. Spurious Correlations  
27. Context is Everything  
28. Individual Emotion Dynamics  
29. Historical Behavior is not always indicative of Future Behavior  
30. Emotion Management, Manipulation  
31. Green AI

**IV. IMPACT AND EVALUATION**  
Summary: This section discusses ethical considerations associated with the impact of AER systems using both traditional metrics as well as through a number of other criteria beyond metrics. Notably, this latter subsection discusses interpretability, visualizations, building safeguards, and contestability, because even when systems work as designed, there will be some negative consequences. Recognizing and planning for such outcomes is part of responsible development.  
G. Metrics  
32. Reliability / Accuracy  
33. Demographic Biases  
34. Sensitive Applications  
35. Testing (on Diverse Datasets, on Diverse Metrics)  
H. Beyond Metrics  
36. Interpretability, Explainability  
37. Visualization  
38. Safeguards and Guard Rails  
39. Harms even when the System Works as Designed  
40. Contestability and Recourse  
41. Be wary of Ethics Washing

Long Checklists  
*45+ points!*

○ Be interpretable, accountable, transparent, nice, good, fair, ethical

(v/s)

○ Moving away from chat-like interface is better as it reduces operational load  
○ Inquire what teachers think of the tools

Bespoke advice; but may not be widely applicable!

"Ethics Guidelines for Trustworthy AI" by the European Commission's High-Level Expert Group on AI (2019)

Mohammad, Saif M. "Ethics sheet for automatic emotion recognition and sentiment analysis." Computational Linguistics 48.2 (2022): 239-278.



# (1) Alternative Perspectives

- Early conversations with Sarah Newman, director of metaLAB at Harvard.
  - Shared deployment experiences at her institute, enabling valuable comparisons with our own context.
  - **Machine Learner Gap.** It's crucial to adapt foreign implementations to local realities.
  - Example: Tutor Copilot's one-on-one digital tutoring model isn't feasible at the scale of our public school systems.
- Prof. Neha Kumar's Lecture and Research:
  - Insights drawn from her analysis of **ASHA healthcare workers** with Azra Ismail
  - Key concerns (potentially for *teachers*): Job security, fears of replacement, and the use of their work to enhance AI interventions.
  - Key takeaway: Consider who is impacted and how they are impacted, ensuring interventions respect existing roles.

Nithya Sambasivan, Erin Arnesen, Ben Hutchinson, Tulsee Doshi, and Vinodkumar Prabhakaran. 2021. "Re-imagining Algorithmic Fairness in India and Beyond." (FAccT '21).

Wang, Rose E., et al. "Tutor copilot: A human-ai approach for scaling real-time expertise." arXiv preprint arXiv:2410.03017 (2024).

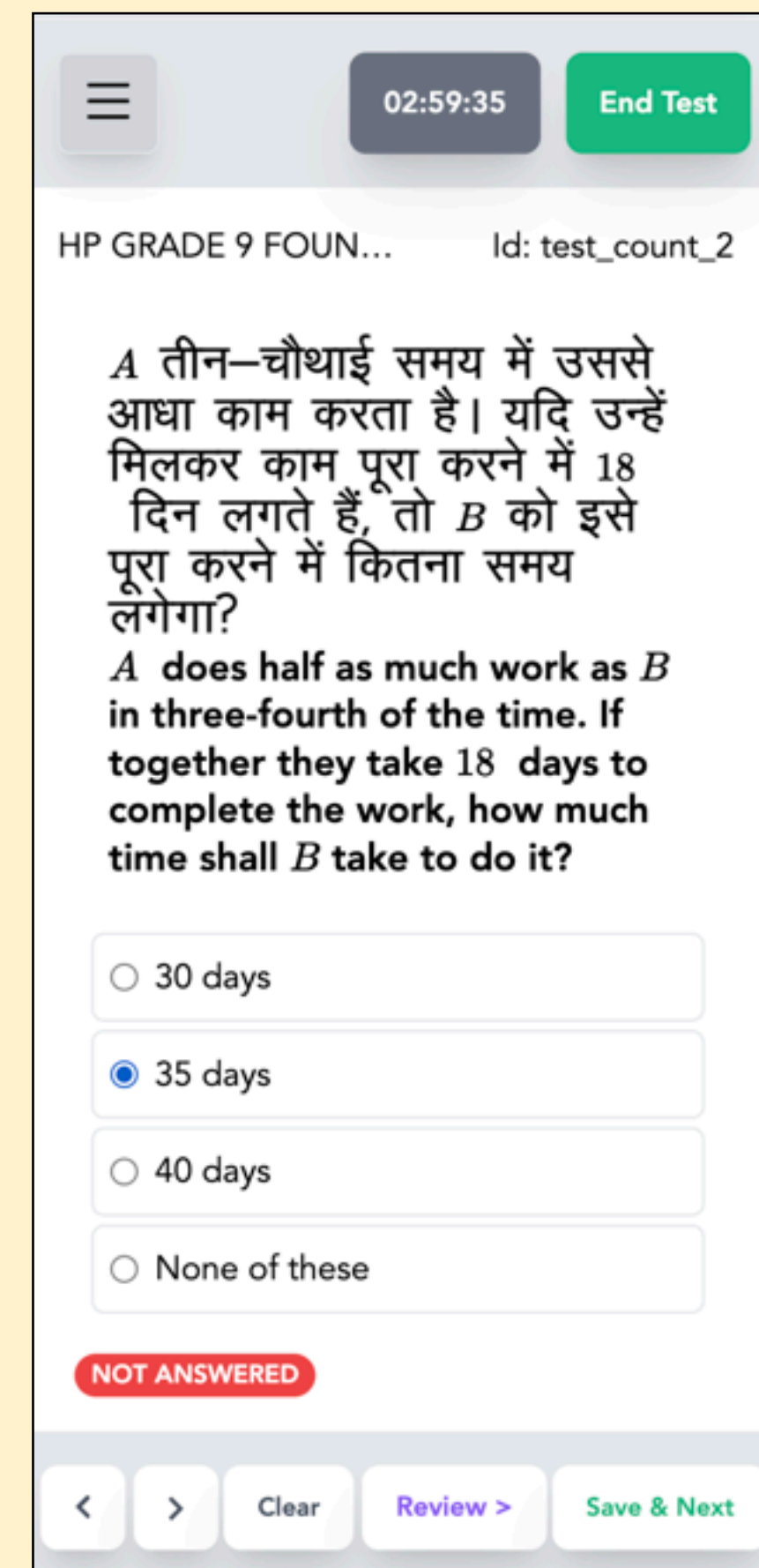
Azra Ismail and Neha Kumar. "AI in Global Health: The View from the Front Lines." CHI (2021).

Dan Meyer, "The Kids That Edtech Writes Off". (2024).



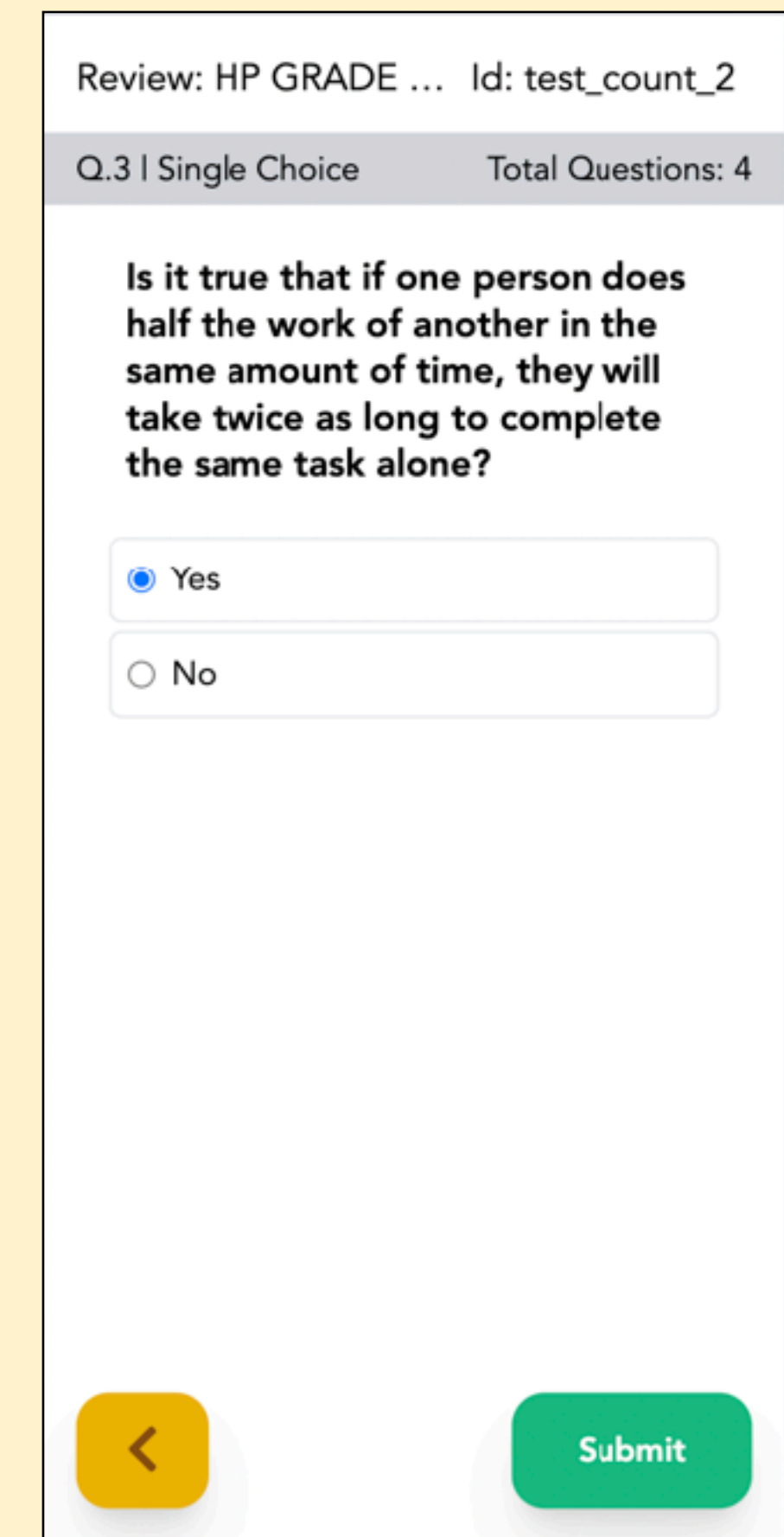
## (2) Interface Design

- Great interaction with Nishita Gill, Founder of Treemouse => Keep the UI simple! Back every design choice with careful experimentation.
- Thin beyond **chat-like interfaces**: Too many interaction points can confuse students.
- Beware of **hidden operational costs**: AI may appear to reduce workload but can quietly take over as a core feature, demanding disproportionate time and effort. Example: Grievance Redressal.



The screenshot shows a mobile app interface for a quiz. At the top, there is a hamburger menu icon, a timer showing 02:59:35, and a green 'End Test' button. Below this, the text 'HP GRADE 9 FOUN...' and 'Id: test\_count\_2' is visible. The main content area contains a question in Hindi and English. The Hindi text asks for the time B will take to complete a task given A's work rate. The English text provides the same information. Below the question are four radio button options: '30 days', '35 days' (which is selected), '40 days', and 'None of these'. At the bottom of the question area, there is a red 'NOT ANSWERED' label. The bottom navigation bar contains five buttons: a back arrow, a forward arrow, a 'Clear' button, a 'Review >' button, and a 'Save & Next' button.

*Quiz Interface*  
Cluttered



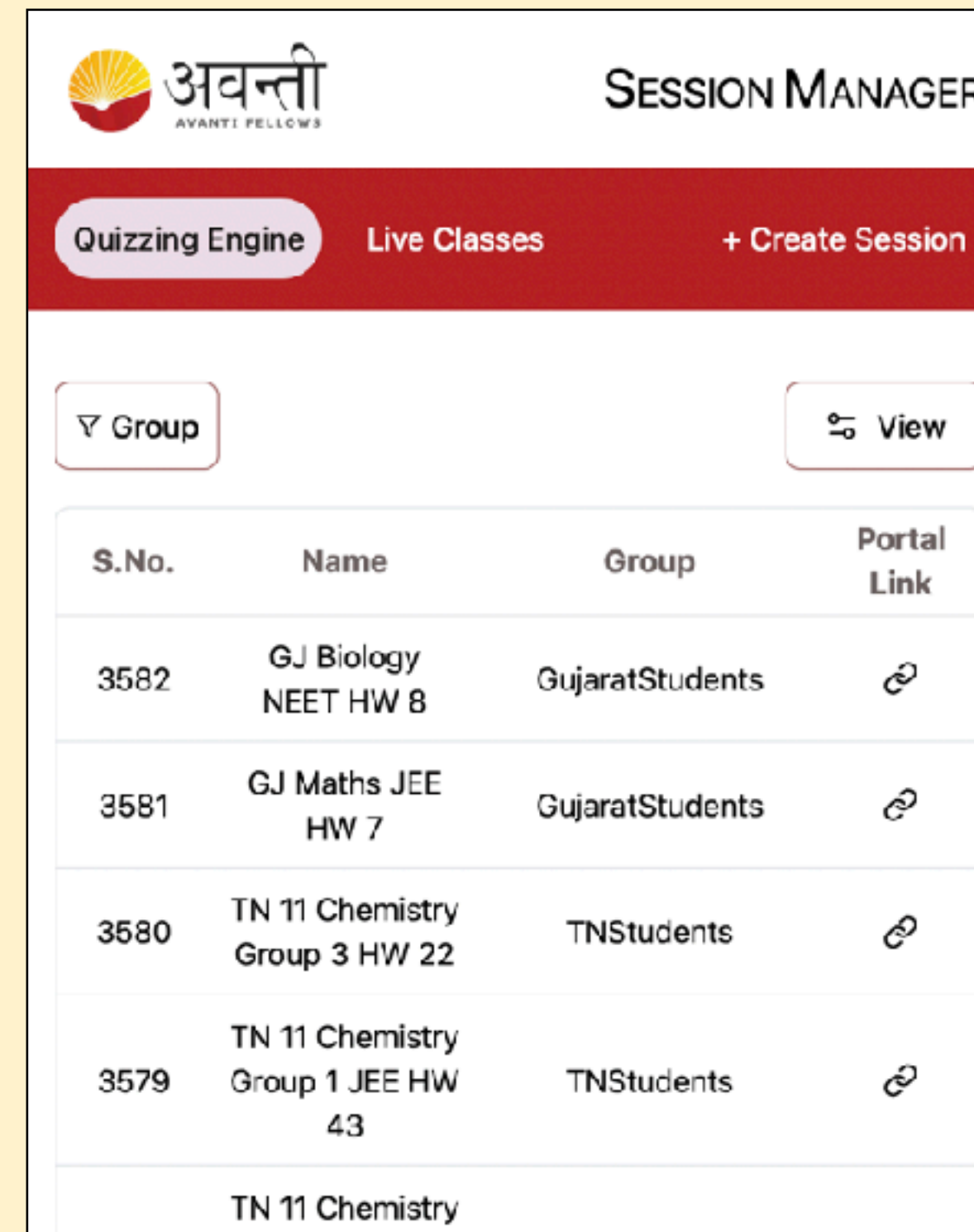
The screenshot shows a mobile app interface for a revision quiz. At the top, it says 'Review: HP GRADE ... Id: test\_count\_2'. Below this, it indicates 'Q.3 | Single Choice' and 'Total Questions: 4'. The main content area contains a question in English: 'Is it true that if one person does half the work of another in the same amount of time, they will take twice as long to complete the same task alone?'. Below the question are two radio button options: 'Yes' (which is selected) and 'No'. At the bottom, there is a yellow back arrow button and a green 'Submit' button.

*Revision Interface*  
Crisp

# (3) Open Source Implementation

- Tarunima Prabhakar's lecture: "*Care* as a necessary ethic".
- Open source pushes us to build carefully, with a sense of accountability.
- Welcoming interns and contributors builds capacity and spreads values, even if copycats emerge.
- **AI Anti-Marketing.** Share negative results to encourage critical thinking and innovation.

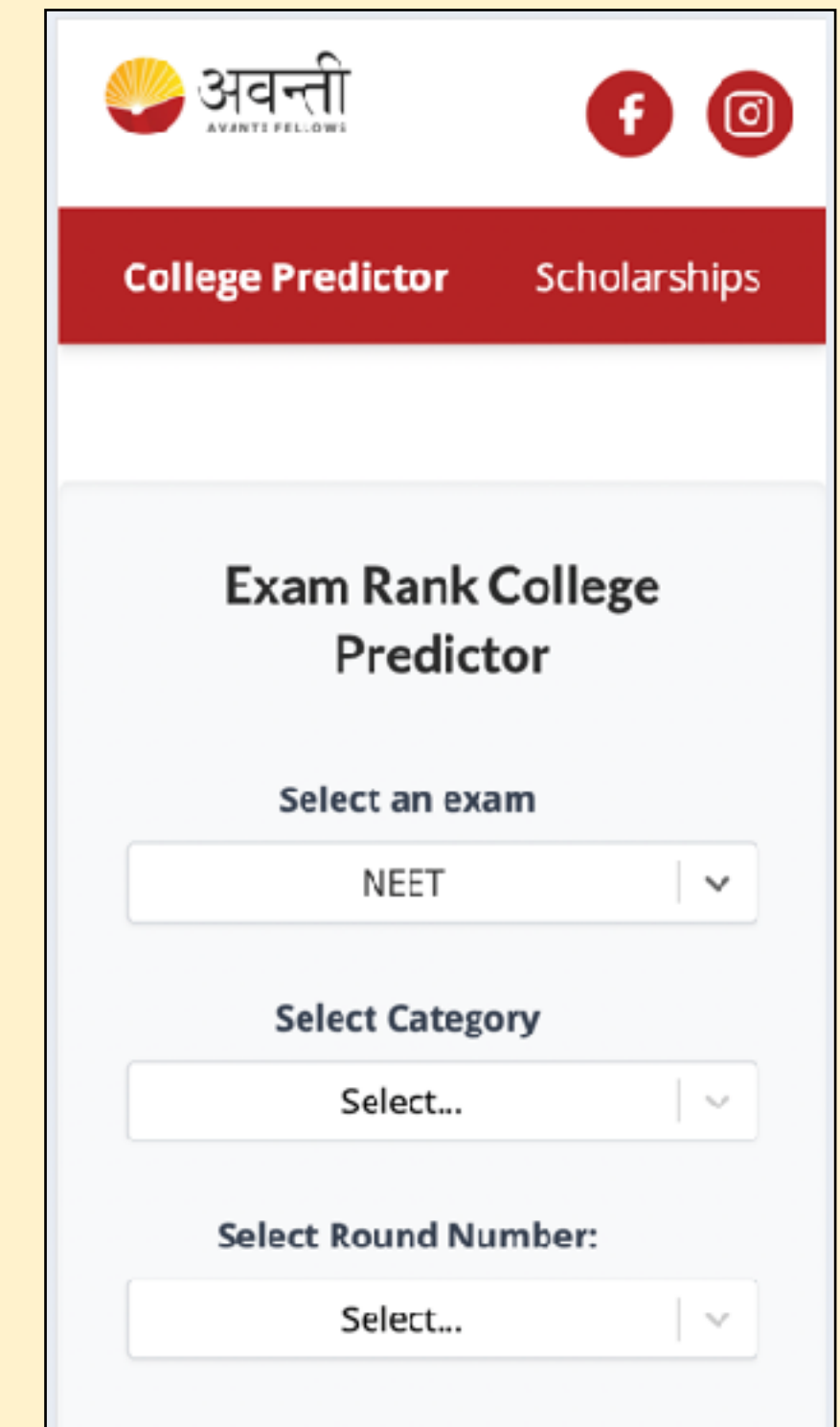
*Session Manager*



The screenshot shows the 'Session Manager' interface for 'अवन्ती AVANTI FELLOWS'. It features a red navigation bar with 'Quizzing Engine', 'Live Classes', and '+ Create Session'. Below this is a table with columns 'S.No.', 'Name', 'Group', and 'Portal Link'. The table lists four sessions, each with a link icon. A 'Group' filter and a 'View' button are also visible.

S.No.	Name	Group	Portal Link
3582	GJ Biology NEET HW 8	GujaratStudents	<a href="#">Link</a>
3581	GJ Maths JEE HW 7	GujaratStudents	<a href="#">Link</a>
3580	TN 11 Chemistry Group 3 HW 22	TNStudents	<a href="#">Link</a>
3579	TN 11 Chemistry Group 1 JEE HW 43	TNStudents	<a href="#">Link</a>
TN 11 Chemistry			

*Futures Tool*

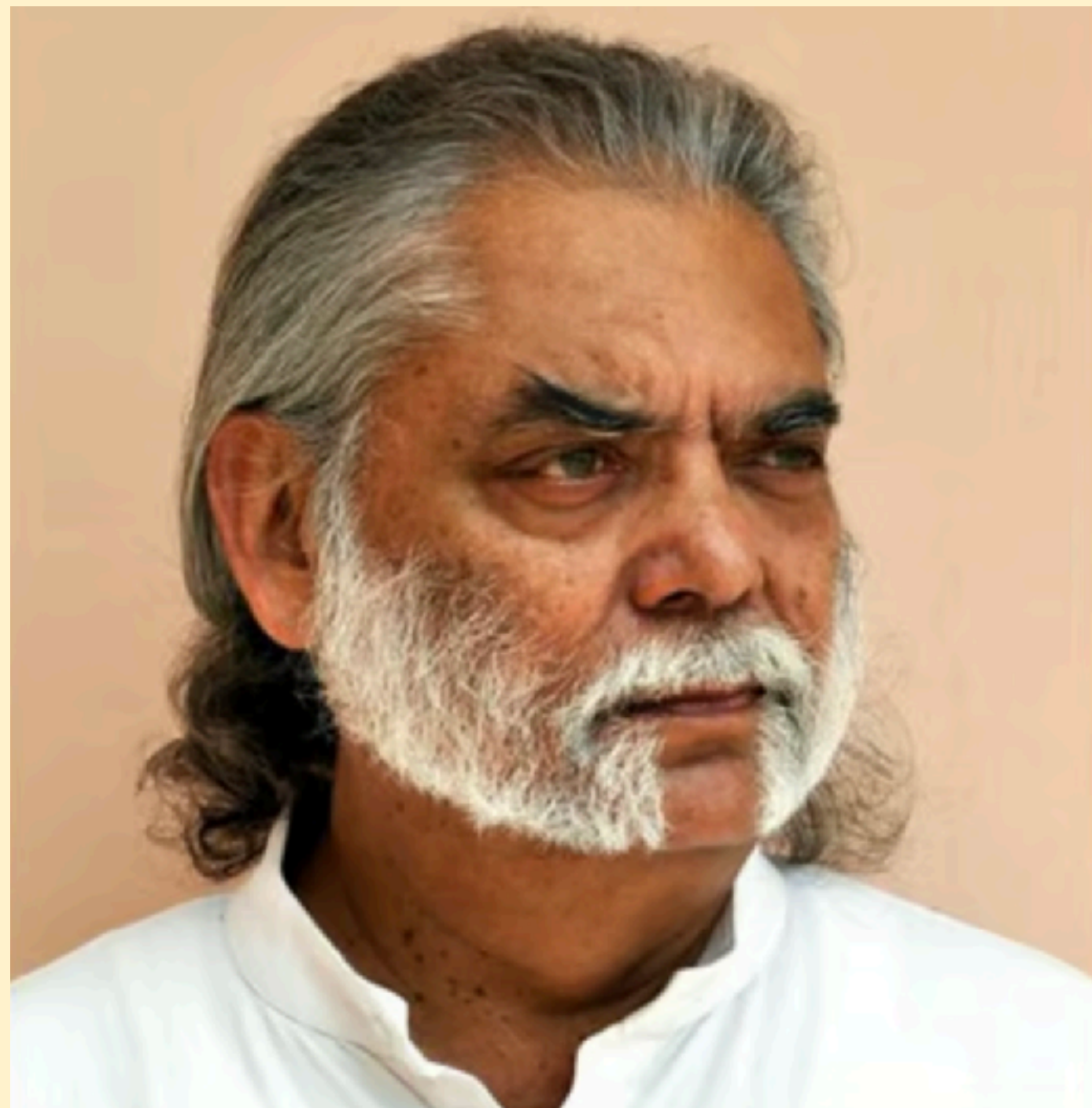


The screenshot shows the 'Futures Tool' interface for 'अवन्ती AVANTI FELLOWS'. It features a red navigation bar with 'College Predictor' and 'Scholarships'. The main section is titled 'Exam Rank College Predictor' and contains three dropdown menus: 'Select an exam' (with 'NEET' selected), 'Select Category' (with 'Select...' selected), and 'Select Round Number:' (with 'Select...' selected).

Contributed by interns we found through the **Code for GovTech (C4GT)** program.



# Is Bold Action Irresponsible?



**Prof. Dinesh Mohan**  
Founder, Transportation  
Research and Injury Prevention  
Programme (TRIPP), IITD



*Rapid Public Transportation*



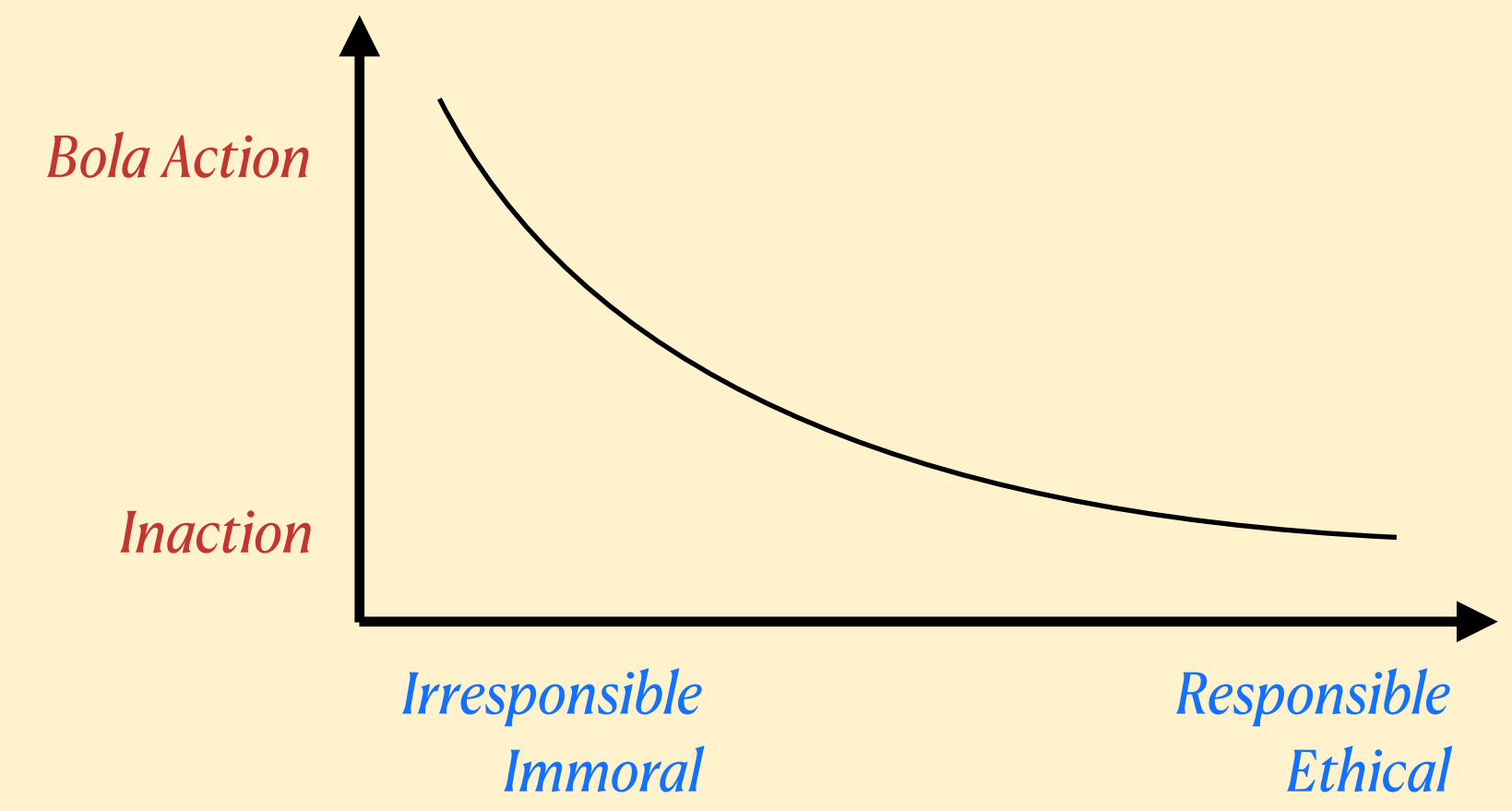
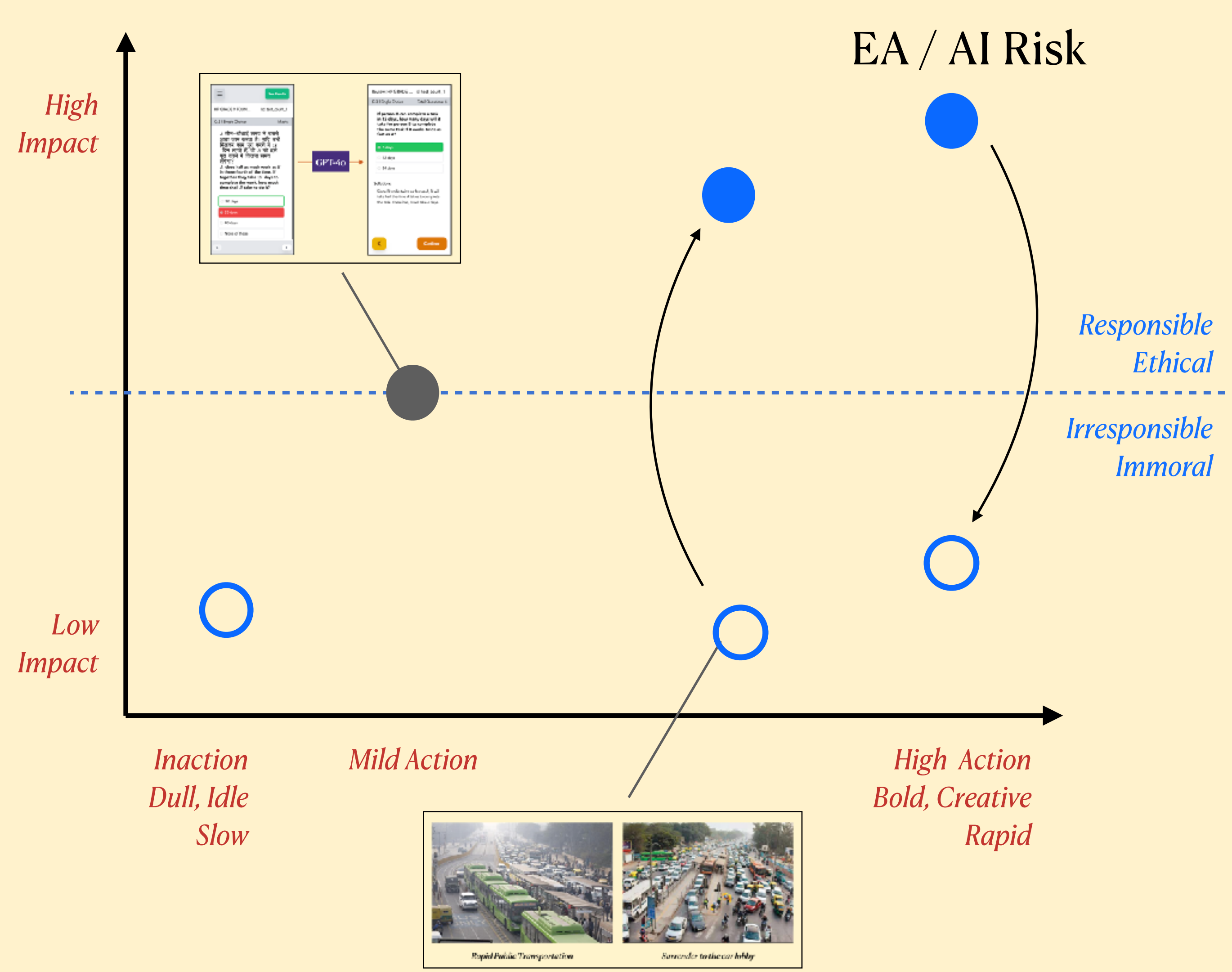
*Surrender to the car lobby*

Prof. Subhasis Banerjee - <https://thewire.in/urban/dinesh-mohan-obituary>

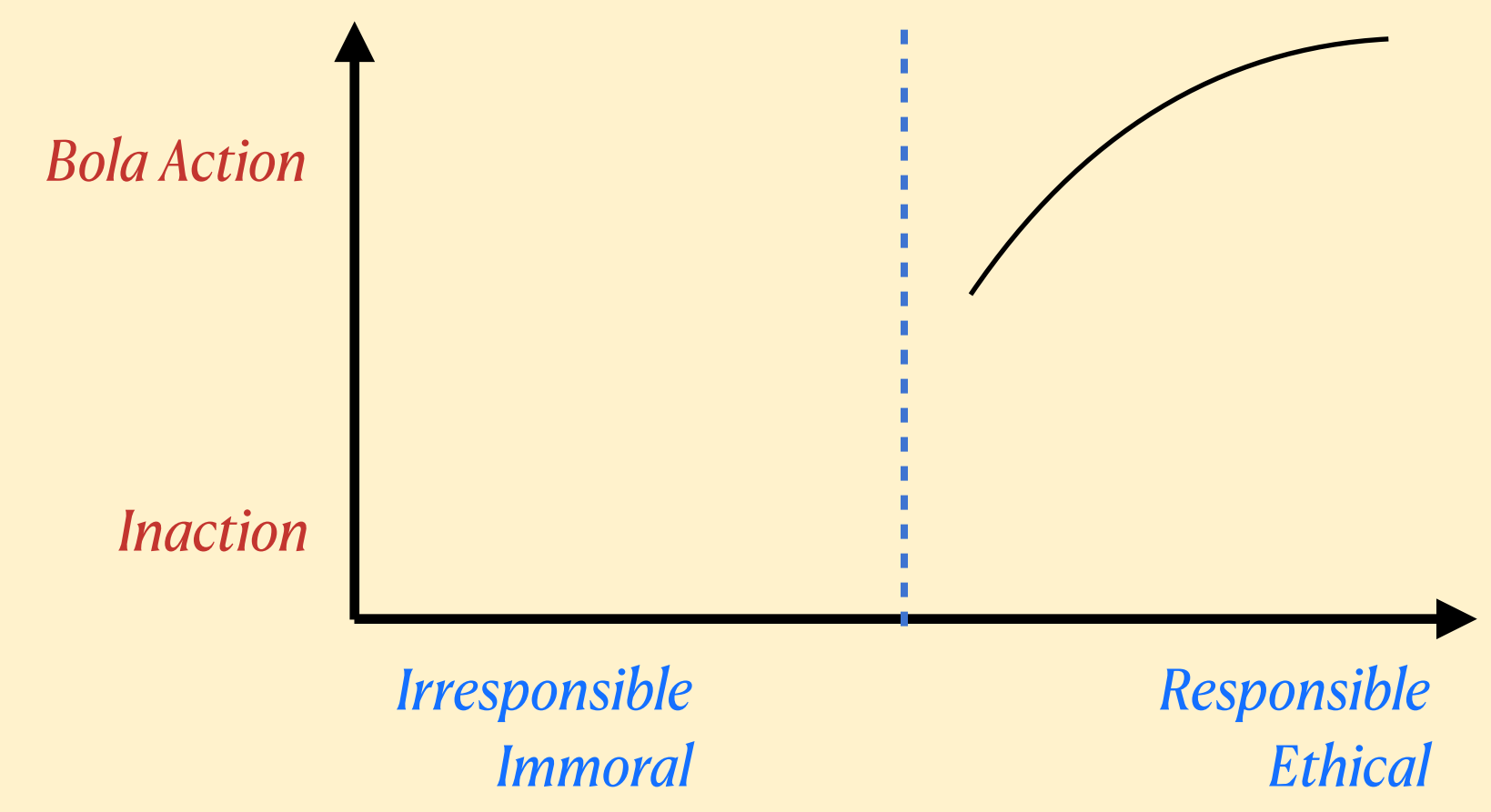
TIWARI, GEETAM. "Metro Rail and the City: Derailing Public Transport." *Economic and Political Weekly*, vol. 48, no. 48, 2013, pp. 65–76. *JSTOR*, <http://www.jstor.org/stable/23528925>. Accessed 26 Nov. 2024.



# Is Bold Action Irresponsible?

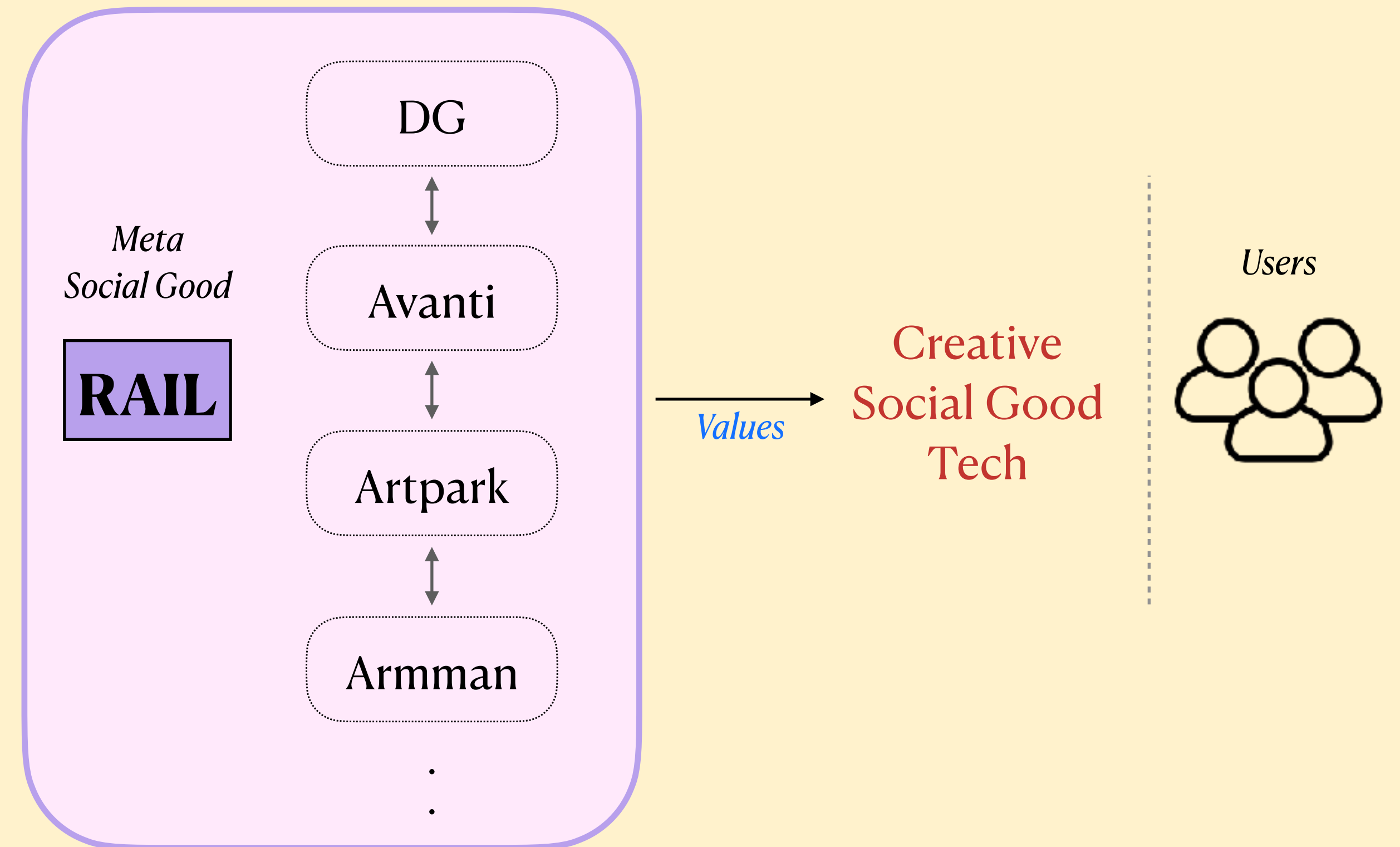


Can we alter this perception?



# Broad Questions

- (1) Does **impact** blur our sense of **responsibility**?
- (2) Are we too **critical**, pausing **action** unnecessarily?
- (3) Or too **hysterical**, rushing into AGI risk debates?
- (4) Is this **moral calculus** too nauseating for tech workers?



Hopefully, initiatives like **RAIL** can simplify this calculus and inspire bold, creative action.



# Thank You!



Slides available  
at [suryabulusu.github.io](https://suryabulusu.github.io)