

Pre-Analysis Plan for Impact Evaluation of the Entrepreneurial Mindset Development Program Curriculum in Andhra Pradesh

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The importance of entrepreneurial skills extends beyond individuals who aspire to enter the business world. With the evolving nature of most high-return jobs, there is a growing need for an entrepreneurial mindset of labor that encompasses a range of cognitive and non-cognitive skills. However, there is a lack of data and experimental evidence on whether an entrepreneurial mindset can be instilled (especially in high school students), whether the current at-scale implementation has been effective, their impact on entrepreneurial traits, and whether such skills are effective in closing the existing skill gaps across genders. To address this gap, we leverage a unique opportunity to work with the Government of Andhra Pradesh on the rollout of the Entrepreneurial Mindset Development Program (EMDP). The program consists of a special curriculum, which is delivered to Grade 9 students over 220 working days, to train students on their entrepreneurial mindset. Working closely with the Government of Andhra Pradesh and the implementing NGOs, we aim to assess the program’s impact on the students’ entrepreneurial mindset, cognitive and non-cognitive skills, their ability to prepare and deliver an entrepreneurial idea, their hypothetical choice of labor, choice of major going forward, and their intention to pursue work that is different from traditional labor (i.e. not self-employed).

Keywords: Entrepreneurship skills, adolescents, gender gaps, non-cognitive skills, scalability

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1 Introduction

With the rapidly evolving nature of work and a constant need for innovation, the skills required for employment are quickly changing. Employers are increasingly looking for workers who have a set of skills associated with entrepreneurship in addition to the core technical skills required for the job. The changing landscape requires a large number of workers to have an entrepreneurial mindset that includes a mix of cognitive and non-cognitive skills (such as critical thinking, creativity, communication skills, grit, self-reliance, etc.) However, while there is high demand for workers with an entrepreneurial mindset, the challenge remains on how to educate today's youth in these skills to make them ready for the "jobs of the tomorrow".

We study a program implemented by the Government of Andhra Pradesh (GoAP) – the Entrepreneurial Mindset Development Program (EMDP). EMDP was rolled out in the Government schools of the state from the Academic Year (AY) 2022-23 onwards. The program includes 50 hours of Entrepreneurial Mindset Curriculum (EMC) delivered to grade 9 students across 220 working days during the regular school hours in the AY 2022-23. For the evaluation, some schools are randomly allocated to receive the curriculum extension after the conclusion of the evaluation. The research questions we aim to address are:

1. Does EMDP improve students' entrepreneurial mindset skills, and educational performance in the short-run?
2. Does EMDP alter students' entrepreneurial behavior and broaden their horizons?

The results of this study will generate new evidence for the literature on skills training programs and entrepreneurship. Beyond the scientific contribution, the results will be extremely important for policy and implementation purposes. The results aim to support the government and other funding agencies by demonstrating a proof of concept regarding the effectiveness of entrepreneurial skills training programs.

2 Experimental design

2.1 Implementing Partner

The Global Alliance for Mass Entrepreneurship (GAME) developed the EMDP curriculum in collaboration with NGOs such as the Udhyam Learning Foundation, Aflatoun International, Reap Benefit, and Makerghat. This curriculum focuses on key skills like communication, collaboration, critical thinking, and creativity, which are essential for future workforce integration and are designed to enhance these transferable abilities.

In partnership with the Government of Andhra Pradesh, EMDP was rolled out by the State Council of Educational Research and Training (SCERT-AP) and Udhyam for Grade 9 students during the 2022-23 Academic Year across 4,776 government schools and approximately 300,000 students.

2.2 Intervention

The program features a unique curriculum aimed at equipping Grade 9 students with entrepreneurial skills and mindsets. Delivered throughout the academic year, it engaged students with real-life scenarios to prepare them for various professional environments, including corporations, startups, or family businesses. The curriculum includes daily instructional classes and a substantial practical component, encompassing three smaller projects and one major project. These projects enable students to apply their classroom-learned skills to solve real-world challenges within their communities.

The curriculum includes 18 modules that cover some of the following topics: perseverance, problem identification, solution creativity, growth mindset, communication, critical thinking, and grit. Each module has goals such as promoting curiosity, learning by doing, acceptance of failures, risk assessment, and building a learning community.

Spanning the 2022-23 academic year (August 2022 - March 2023), the intervention included a maximum of 50 hours of EMDP classes, not accounting for the additional time students allocated to project work. EMDP classes, each lasting 90 minutes, took place

during the 7th and 8th periods every Friday for all Grade 9 students. We will measure compliance with the treatment by measuring the extent to which students receive the desired amount of lessons.

Along with regular classes on Friday afternoons, all students were encouraged to develop and submit their main project for the EMDP EXPO organized in March 2023. Students were expected to develop solutions to problems they identified in their community. Projects were subject to a rigorous evaluation process by teachers and district committees. Ultimately, the best projects from each district were displayed at the expo.

EMDP used a cascade training model for program teachers who delivered the intervention. A select group of skilled and experienced teachers received initial training on the EMDP curriculum from each subdistrict¹ ('Master Trainers'). Subsequently, the 'Master Trainers' trained EMDP teachers in their subdistrict. The EMDP teachers were existing school teachers who were nominated by the school principal to teach the EMDP program.

Parental Consent: The evaluation of this program relies on endline surveys conducted among students who were in class 9 during the academic year 2022-2023 and have since progressed to class 10 in the academic year 2023-2024. The academic calendar in Andhra Pradesh spans from April to March. Given the age of the students range from 15 to 18 years, the local IRB requires parental consent. We acquire parental consent before collecting data from students. The survey is conducted on the school premises with the permission of the school principal. The risk to students from participating in the survey is no more than minimal.

Through the consent form, we want to assure parents that their child's privacy and safety throughout the survey are of primary importance. All stakeholders, i.e. parents, school head teachers, and students, are informed that the collected data will be anonymized and kept private. As part of the survey, we do not seek to collect sensitive information about students or their parents, such as national ID cards (Aadhar card numbers), ration

¹A subdistrict is an administrative area which is also referred to as mandal or block in the state of Andhra Pradesh.

cards, etc. Through the parental consent form, we inform the parents that the data generated during the survey will be strictly used for research and academic purposes only. The student's personal information will be kept secure and will not be shared with any third party. In the form, parents are also informed that their child might or might not be selected to participate in the survey, and the student can withdraw their participation. Parents are also provided with contact information in case they intend to reach out with concerns or complaints about research-related problems or injuries.

The parent consent form is translated into Telugu (local language). The language of the consent form is adapted to an appropriate reading level using short sentences while utilizing colloquial language.

According to the survey plan, a team of two enumerators visits each school twice. The first visit is to provide the parental consent form to the school principal and finalize the date for the organization of the survey. The parental consent form is provided to all students in class 10 enrolled in the school. Anticipating the possibility of students misplacing the parental consent form, the delivery of the form, and the survey date are considerably apart, enumerators have been instructed to collaborate with school principals to schedule surveys soon after. Ideally, we have tried to schedule for the next day to ensure prompt completion and minimize the risk of losing the consent form.

During the second visit, the enumerators in advance contact the school principals to verify that they have received the consent forms. The survey is carried out in a school only if more than 80% of the total students in class 10 have returned the signed consent forms. To participate in the survey, only 30 students are randomly picked from the total students. The enumerators are instructed to replace the student if the randomly picked student on the day of the survey does not have a signed parental consent form.

While this procedure applies to most schools, residential schools present a challenge since students live away from home. In such cases, we have planned visits to residential schools to distribute the consent form before a long vacation when the students are most likely to go back home. The survey for these schools will be conducted after the vacation period once the students have returned the signed consent forms. At a later point, we plan

to move to securing verbal consent from the parents. We do not intend to waive off the gathering of the parental consent form in any context. Toward the end of the survey, the enumerator collects the parent consent form, student consent form, and pitch preparation sheet from each student and stores these physical copies in the assigned folder.

2.3 Data & Randomization

The GAME consortium, our implementing partner, along with the research team, has selected 125 subdistricts in the state, which has 1253 government schools that participated in the study. The EMDP was implemented in 75 subdistricts, and the remaining 50 subdistricts did not receive the program.

Randomization: The randomization is done using the Unified District Information System for Education Plus (UDISE and UDISE+) data. Randomization was done prior to the start of the academic year, and therefore the intervention start. UDISE is one of the largest Management Information Systems initiated by the Department of School Education and Literacy, Ministry of Education, Government of India, covering more than 1.5 million schools, 9.5 million teachers, and 265 million children. UDISE+ is an updated version of UDISE that was in use from 2005-2017. The entire system of UDISE+ is online and has been collecting data in real-time since 2018-19.²

Using the UDISE+ 2021-22 data, we randomly sampled 125 subdistricts after dropping those that were part of the pilot study conducted by our implementing partner.³ Further, from the 125 selected subdistricts, we randomly sampled 75 that formed the treatment group, and the remaining 50 formed the control group. All the 748 government schools in the treated subdistricts are part of the treatment group, and none of the 505 government schools in the control subdistricts received the treatment.

²UDISE+ has a mandate of collecting information from all recognized schools imparting formal education from pre-primary to grade 12. Information collected through the digital platform UDISE+ is utilized for planning, optimizing resource allocation, and implementing various education-related programs, and assessing progress. UDISE+ provides a platform to organize and classify all school data across the country and build a credible database of school data. It monitors, measures, and keeps track of vital school performance indicators.

³Our implementing partner, GAME, conducted a pilot study in 49 subdistricts.

2.4 Power Calculations

We performed our power calculations based on data collected during the pilot phase of EMDP. We have baseline and endline data from the pilot for different non-cognitive skills such as self-efficacy. The skills were measured using psychometric tests.

We calculate the average difference between the endline and baseline scores of students to estimate a plausible effect size. For self-efficacy, we have the pilot pre and post data for 1,508 students. We find that the average endline self-efficacy score was approximately 0.5 standard deviations higher than the baseline score. We are clustering our randomization at the subdistrict level and find an intra-cluster correlation (ρ) of 0.42 in the data from the pilot. Our power calculations indicate that to detect an effect of 0.5 standard deviations, we will need at least 16 clusters (subdistricts) per arm assuming we have 50 students per subdistrict for 80% power.

However, previous estimates in related literature have found smaller effects. For instance, a program to improve life skills of adolescent girls in Rajasthan found a 0.1 standard deviation increase in said life skills ([Edmonds et al. \(2023\)](#)). Therefore, we have 75 treatment and 50 control subdistricts.

Endline Data: Our data come from three sources. The first source is the endline survey of students (students' psychometric indices, intent to start a business, business pitch quality, and delivery), the second source is the endline survey of teachers, and the third source is administrative records (students' attendance and test scores). Administrative data will be collected for the entire population of students who were in Grade 9 in AY 2022-23. For the endline student survey data, the total number of students per school is 30, and there are 1250 schools. As a result, our sample at the student level is 37,500 students. For the pitch, we randomly choose around 30% of the students per school.

Student survey data. We collect data using our survey in schools from November to March 2024. Data are collected using Computer-Assisted Personal Interviewing (CAPI) technology. The appendix contains a description of all the key variables of interest.

Teacher survey data. We collect data on the academic background, teaching qualifications, past entrepreneurship and business ownership experience, and the classes taught during the AY 2022-23 from one teacher per school through a dedicated teacher survey. In treatment schools, we also collect about the EMDP curriculum and a few additional questions about teacher’s experience with the EMDP training.

Administrative data. We attempt to collect administrative data for all Grade 10 students in treatment and control schools for academic grades in Telegu, Hindi, English, and Mathematics as well as their overall grades, number of days attended, and whether the student was promoted at the end of the AY. This data will be collected for three AYs - (1) the AY preceding the EMDP (that is, AY 2021-22, while the students were in Grade 9) - to serve as a baseline, the AY during which the EMDP was implemented (that is, AY 2022-23, while the students were in Grade 9) and the AY following the EMDP (that is, AY 2023-24, while the students are in Grade 10). These data are based on promotion lists, which are sent to the Deputy District Education Office by each school, and we will seek the Government’s permission to access these data. The administrative records will be matched to the survey data based on students’ names, date of birth, and sex (for the subset of students included in the survey).

2.5 Outcomes

Primary Outcomes: We are primarily focused on two key outcomes. The first pertains to general behavioral traits and the second outcome examines entrepreneurial behavior. While the first outcome is part of the curriculum, the second is to capture effects on entrepreneurial spirit. To form indices, we will follow [Anderson \(2008\)](#).

1. *General Behavioral traits:* The program’s main aim is to go beyond standard academic education, seeking to trigger various behavioral changes among students. This study focuses primarily on evaluating behavioral traits that are generally associated with success in the labor market: such as aspirations, creativity, collaborative skills,

and internal locus of control. Additionally, we are examining broader traits like the Big Five personality traits (agreeableness, conscientiousness, extraversion, neuroticism, and openness), which have relevance in a wider context beyond entrepreneurship. These behavioral traits are our main outcomes, and their scales are provided in the appendix. These traits include Aspirations (academic); Locus of Control (Internal and External); Collaboration (Relationship and Team work); Agency (relating to education, personal and career); and Goal Setting.

2. *Enterprenuerial Behavior*: General traits as discussed above are equally important for an entrepreneurial mindset but additional traits commonly observed in entrepreneurs are also important. For example, entrepreneurs are often recognized for their risk-taking nature, their self-perceived ability, and aspirations to start a business. Within the entrepreneurial behavioral traits, we encompass a collection of five specific outcomes closely linked to entrepreneurs. These include Business Aspirations; Self-Perceived Business Ability; Business Mathematics Skills; Risk-Taking; and Patience. While the former three are evaluated through survey questions, the latter two are assessed using experimental games. These five traits are pivotal indicators associated with a business-oriented mindset, collectively categorized as our primary outcomes.

Secondary Outcomes. As secondary outcomes, we utilize the rich audio and written material from the action-based task. In a non-traditional “entrepreneurial challenge”, students are asked to prepare and deliver a pitch. Our assessment of this task includes outcomes evaluated by both the audio recordings and written material of these pitches. Through this exercise, our primary focus is to determine if students proactively prepared and accurately recorded the pitch as per instructions. The main outcomes for this task encompass task completion; time allocated for preparation; time utilized for recording; and the duration (in seconds) of silence during the recording when the student is not speaking. Beyond the fundamental metrics of task completion, we also evaluate students’ proficiency in generating ideas within an entrepreneurial context, their confidence levels, presentation skills, and the overall quality of their pitches. External and independent eval-

uators will score students on the quality of pitches. Any pitch recording that is inaudible or cannot be heard clearly will be excluded from our analysis.

Additionally, we gather administrative data encompassing academic performance in class 8, class 9, and 10, alongside school attendance records. This data provides valuable supplementary insights into whether students' achievements and their attendance patterns are not impacted negatively.

Control variables. We include the battery of control variables for demographics, parental background; prior experience with entrepreneurship through family or wider network affiliation. We also include location and geographic variables. For precision, we also include school-level controls such as teacher/pupil ratio and amenities (see Tables 1-3 in the Appendix).

3 Estimation Strategy

3.1 Main Estimation Equation

We use a randomized control trial (RCT) to identify the intervention's causal impact on our outcomes of interest. The main identifying assumption is that had there been no intervention, our outcomes of interest would be, on average, statistically similar between students from the treatment and control groups.

We test for balance in baseline characteristics and find that, on average, there is balance on most characteristics.

To analyze the effects of the intervention, we estimate the intervention's impact by comparing the post-treatment means between treatment and control individuals for our outcomes of interest. We use a linear regression model estimated by Ordinary Least Squares (OLS). Our basic model is given by equation 2 at the student level i :

$$Y_i = \alpha + \delta D_i + \sum_j \beta_j X_{ji} + \epsilon_i^m, \quad (1)$$

where δ represents our coefficient of interest (the Intent-to-Treat (ITT)), and D_i is an indicator function that takes the value 1 if the student has received the intervention and zero otherwise. Y_i represents an outcome from our set of primary, and secondary outcomes defined in Section 2.5. X_{ji} is a vector of j covariates at the individual student level or at the school level (see Section 2.5). Our identification strategy does not require including covariates X_{ji} since we achieve balance using a variety of baseline characteristics. However, we plan to test for coefficient stability as we include covariates, increase our estimates' precision, and further enhance the validity of our empirical strategy (explicitly controlling for potential confounders). We plan to discuss the results' robustness to changes in the set of covariates. Since the randomization was done at the subdistrict level, we cluster them by subdistrict.

3.2 Heterogeneity

We test for heterogeneous treatment effects along a series of dimensions. These include demographics, of which gender is a primary focus. Secondly, we include heterogeneity along parents' characteristics, including parental education levels, and occupation (whether they own businesses). Third, we test for heterogeneity based on school and district characteristics, including the strength of the local labor market. These heterogeneity help inform the mechanisms and causal pathways. For instance, we may expect to find larger effect sizes when a parent owns their business, or if the local labor market is strong.

Our specification with heterogeneity is:

$$Y_i = \lambda + \delta' D_i + \gamma(D_i \times Z_i) + \beta_z Z_i + \sum_j \beta'_j X_{ji} + \epsilon_i^m, \quad (2)$$

where Z_i is the dimension of heterogeneity we test, and γ is the coefficient of interest when we expect heterogeneous treatment effects.

3.3 Multiple Outcomes and Multiple Hypothesis Testing

We employ two different strategies to deal with the rich set of outcome measures. First, we group the related outcome measures into an index as per the definition of each outcome described in Section 2.3. Second, to correct for multiple hypotheses testing, we use a step-down procedure to adjust p-values for the false discovery rate (FDR) among groups of outcomes and report the resulting “q-values” (?). We adjust for multiple hypothesis testing within primary outcomes and within secondary outcome groups, but not across them.

3.4 Addressing potential concerns

3.4.1 Non-compliance

Through direct engagements with the government, school visits, and discussions with GAME we expect that schools’ compliance with treatment assignment to be high. However, to investigate the role of treatment compliance in schools and heterogeneity in implementation quality we envision i) a LATE estimation whereby we instrument treatment compliance, and ii) creating a measure that captures the quality of implementation to test for the role of differences in teacher/school implementation quality.

3.4.2 Procedures to addressing outcomes with limited variation

If some variables present limited variation, we will conduct the following steps. First, we will assess if such limited variation implies that 95 percent of observations have the same value within the treatment group. If so, we will omit this variable from the analysis - including all index measures. If these decisions result in excluding all variables that form an index, we will exclude the index from the evaluation.

3.4.3 Evaluating the quality of pitches

The study takes place in all areas of the state and the quality of school infrastructure varies considerably. At the same time, due to the restrictive timeline, conducting several pilots on the novel measure of pitches was challenging. As a result, to be conservative, before estimating the effect of the intervention on these secondary outcomes we will verify the quality of the data. Observations - i.e. student pitches- that cannot be used due to noise, poor recording conditions, or wide variation in interruptions to the pitch completion we will be removed. To do so, we will remove outliers by removing the top/bottom 5 percent of observations that deviate from what is considered high quality data.

3.4.4 Addressing differences in the timing of survey completion

Due to the large scale of the project there is considerable difference between the timing of survey completion and proximity to the end of the academic year. We will account for this by controlling for the month of survey completion in the analysis.

References

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Main Tables

Table 1: Balance Test

	Building Blocks	Classrooms	Toilet	No. of Func. Toilets (Boys)	No. of Func. Toilets (Girls)	Handwash	Drinking Water	Func. Hand Pump
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat	0.114 (0.44)	0.215 (0.22)	0.00292 (0.35)	0.0667 (0.13)	0.476 (0.69)	-0.0439 (-1.49)	0.00719 (0.36)	0.0527 (0.85)
N	1253	1253	1253	1134	1196	1253	1253	1205

Notes: Robust standard errors clustered at subdistrict level in parenthesis. Significance: *p < 0.10, **p < 0.05, ***p < 0.01.

Table 2: Balance Test (Contd.)

	Func. Tap	Water Purifier	Electricity	Library	Playground	Medical Checkup Conducted	Computer Room	Digital Board	Internet Facility
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treat	0.0101 (0.23)	0.00832 (0.16)	-0.0106 (-1.08)	0.00248 (0.07)	0.0428 (1.43)	-0.00910 (-0.57)	-0.0530 (-1.23)	0.00432 (0.19)	-0.0522 (-0.83)
N	1205	1241	1253	1253	1253	1253	1250	1253	1253

Notes: Robust standard errors clustered at subdistrict level in parenthesis. Significance: *p < 0.10, **p < 0.05, ***p < 0.01.

Table 3: Balance Test (Contd.)

	Missing Student Scores	Prop. Student Scores ≥ 60	Prop. of OBC Students	Prop. of SC Students	Prop. of ST Students	Prop. of Female Teachers
	(1)	(2)	(3)	(4)	(5)	(6)
Treat	0.106 (1.54)	0.0478 (1.33)	-0.0150 (-0.43)	-0.00974 (-0.42)	-0.0115 (-0.33)	0.0128 (0.51)
N	1167	740	1126	1126	1126	1148

Notes: Robust standard errors clustered at subdistrict level in parenthesis. Significance: *p < 0.10, **p < 0.05, ***p < 0.01.

Online Appendix

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Survey: Key Variables

A. Aspirations: We use two measures: *Academic Aspiration* and *Future Business Aspirations*

Academic Aspiration:

- What is the highest level of schooling you plan to complete?
 1. Class 10
 2. Class 12
 3. Vocational/Technical Training
 4. Polytechnic College
 5. Bachelors Degree
 6. Post graduate Degree

Future Business Aspiration:

- Thinking about yourself in the future immediately after completing your studies, for your first employment do you plan to
 1. Work for pay for the Government
 2. Work for pay in someone else's company
 3. Work for pay in an NGO
 4. Work on my own business for profit
 5. Work on my family business for profit
 6. Not work
 7. -99 Not sure / Don't know
- Thinking about yourself in the future immediately after completing your studies, do you plan to start a part-time business
 1. Yes

2. No

- Thinking about yourself in the future, after gaining a few years of work experience in your first job, do you plan to . . .

1. Work for pay for the Government
2. Work for pay in someone else's company
3. Work for pay in an NGO
4. Work on my own business for profit
5. Work on my family business for profit
6. Not work
7. -99 Not sure / Don't know

- Thinking about yourself in the future after gaining a few years of work experience in your first job, do you plan to start a part-time business

1. Yes
2. No

B. Locus of Control :

We ask whether students strongly disagree, disagree, neither agree nor disagree, agree or strongly agree with the following statements:

1. When I make plans, I am almost certain that I can make them work.
2. Getting people to do the right thing depends upon ability; luck has nothing to do with it.
3. What happens to me is my own doing.
4. Many of the unhappy things in people's lives are partly due to bad luck.
5. Getting a good job depends mainly on being in the right place at the right time.
6. Many times I feel that I have little influence over the things that happen to me.

C. Collaboration :

We ask whether students strongly disagree, disagree, neither agree nor disagree, agree or strongly agree with the following statements referring to how much they value relationships and teamwork:

Valuing Relationships

1. I am a good listener.
2. I enjoy seeing my classmates be successful.
3. I take into account what others are interested in.
4. I enjoy considering different perspectives.

Valuing Teamwork

1. I prefer working as part of a team to working alone.
2. I find that teams make better decisions than individuals.
3. I find that teamwork raises my own efficiency.
4. I enjoy co-operating with peers.

D. Agency :

We ask whether students strongly disagree, disagree, are neutral, agree or strongly agree with the following statements referring to their education, career and personal goals.,

Regarding your education:

On a scale of 1 to 5, how strongly do you agree or disagree that you have the ability to make decisions about your education?

Regarding your career:

On a scale of 1 to 5, how strongly do you agree or disagree that you have the ability to make decisions about your career choices?

Regarding your personal goals:

On a scale of 1 to 5, how strongly do you agree or disagree that you have the ability to set and pursue your personal goals?

E. Goal Setting:

We ask whether students consider the following statements to be not like them at all, not much like them, somewhat like them, mostly like them or very much like them:

1. I often set a goal but later choose to pursue a different one.
2. I have been obsessed with a certain idea or project for a short time but later lost interest.
3. I have difficulty maintaining my focus on projects that take more than a few months to complete.
4. New ideas and projects sometimes distract me from previous ones.
5. I finish whatever I begin.
6. Setbacks don't discourage me.
7. I am diligent.
8. I am a hard worker.

F. Big 5:

To measure the Big 5 Personality Traits, i.e., Agreeableness, Conscientiousness, Extraversion, Neuroticism, and Openness, we ask whether students strongly disagree, disagree, neither agree nor disagree, agree or strongly agree with the following statements.

Agreeableness:

1. You see yourself as someone who tends to find fault with others.
2. You see yourself as someone who has a forgiving nature.
3. You see yourself as someone who is generally trusting.
4. You see yourself as someone who is sometimes rude to others.

Conscientiousness:

1. You see yourself as someone who does things carefully and completely.
2. You see yourself as someone who can be somewhat careless.
3. You see yourself as someone who tends to be disorganized.

4. You see yourself as someone who tends to be lazy.
5. You see yourself as someone who does things efficiently (quickly and correctly).
6. You see yourself as someone who makes plans and sticks to them.

Extraversion:

1. You see yourself as someone who is reserved; and keeps thoughts and feelings to self.
2. You see yourself as someone who generates a lot of enthusiasm.
3. You see yourself as someone who tends to be quiet.
4. You see yourself as someone who is outgoing, sociable.

Neuroticism:

1. You see yourself as someone who is depressed, or gets blue.
2. You see yourself as someone who has an active imagination.
3. You see yourself as someone who likes work that is the same every time (routine).
4. You see yourself as someone who likes to think and play with ideas.
5. You see yourself as someone who doesn't like artistic things (plays, music).

G. Entrepreneurial Behavior: Business Math, Risk, Patience, Business ability

Business Math:

We use the following four questions to evaluate students' grasp of basic business math, e.g., simple interest, compound interest, profit and rate of return.

- Suppose you take a loan of 10000 INR and the interest rate is 5 percent per year. You have to pay back the principal and interest after 1 year. After one year, how much would you have to pay back?

1. 10,000 INR
2. 10,500 INR
3. 15,000 INR

- Suppose you had 10000 INR in a savings account and the interest rate was 2 percent per year compounded annually. After five years, how much do you think you would have in the account if you left the money to grow?

1. More than 11,000 INR
2. Exactly 11,000 INR
3. Less than 11,000 INR

- Suppose there is a business that sells agar batis. The cost of material and labor to make agar batis is 900 INR. It sells these for 1300 INR at the end of the year. How much profit would this business earn in 1 year?

1. 100 INR
2. 300 INR
3. 400 INR

- Suppose you invest 1000 INR of your own savings in the agar batti business described in the last question. What is the rate of return on this investment?

1. 10 percent
2. 30 percent
3. 40 percent

Risk:

We use a simple experimental game to measure attitudes towards risk. Students are presented with the following scenario and asked which game they would pick:

Suppose you're asked to play a game where a coin is flipped. You get a certain amount of money if it lands heads, and a certain amount of money if it lands tails. There are 5 versions of the game below.

- 1st game: Heads = 2500 INR, Tails = 2500 INR
- 2nd game: Heads = 2000 INR, Tails = 4000 INR

- 3rd game: Heads = 1500 INR, Tails = 5500 INR
- 4th game: Heads = 1000 INR, Tails = 7000 INR
- 5th game: Heads = 0 INR, Tails = 10000 INR

Patience/time preferences:

Another experimental game is used to measure time preferences. Students are presented with the following scenario and asked which game they would pick. The game continues as long as the respondent picks option (1):

People often make decisions that involve trading off something soon for something else later. For example, people sometimes have to choose between having some money soon, or having more money later. The next set of questions asks how you make such decisions. There are no right or wrong answers. For each pair of options please indicate which you prefer between option (1) and option (2). Would you prefer:

- (1) 1000 INR now, or (2) 900 INR in one month?
- (1) 1000 INR now, or (2) 1100 INR in one month?
- (1) 1000 INR now, or (2) 1300 INR in one month?
- (1) 1000 INR now, or (2) 1500 INR in one month?
- (1) 1000 INR now, or (2) 2000 INR in one month?
- (1) 1000 INR now, or (2) 2500 INR in one month?

H. Pitch :

First, students are presented with a business pitch of an individual thinking of starting a business. The content of the pitch (provided below) covers the following dimensions: (1) Introduction (2) Problem Statement (3) Solution (4) Customers/Market Opportunity, and (5) Ask and Conclude.

Pitch:

Introduction: Ladies and gentlemen, I'm [Your Name], and I'm here to introduce an innovative solution to a critical problem in farming. This venture tackles over-irrigation, water waste, and rising costs for farmers. Problem Statement: In our area, farmers often

use too much water for their crops, leading to water wastage. This happens because they sometimes forget to turn off the water pump or think that more water is always better for their crops.

Solution: We're creating a smart irrigation system that takes the guesswork out of watering crops. It uses sensors and technology to check the soil and weather, then waters the crops just the right amount automatically.

Customers/Market Opportunity: This solution is in high demand due to water shortages. We'll target farmers of all sizes and groups. Our system is eco-friendly and affordable, giving us a strong market position.

Ask and Conclude: Your financial support will make a significant impact. Join us to save water, boost crop yield, support sustainable farming and get high monetary returns. Let's revolutionize irrigation together!

Second, students are asked to answer the following question about the pitch:

What problem does the proposed business venture aim to address?

1. Over-fertilization of crops
2. Crop diseases and pests
3. Over-irrigation and water wastage

Third, students are asked to create a coherent business pitch for another business problem (see problem statement below). Students are informed that independent evaluators will vote on the pitches based on the content as well as style of pitching, and that the top three winners will receive prizes of 10,000 INR for the first place, 5,000 INR for the second place, and 2,000 INR for the third place. Students are reminded that the content of the pitch should broadly include: (1) Introduction, (2) Problem Statement, (3) Solution, (4) Customers/Market Opportunity, and (5) Ask and Conclude. The time allocated for this task is 5-minutes for preparation, during which students are provided with a sheet with the five content dimensions and their assigned ID to take notes. The sheets are collected at the end of the survey.

Problem statement: In your region, farmers face significant challenges with tomato crop wastage due to unpredictable bumper production. This leads to financial losses for the farmers and unnecessary waste of valuable resources.

In a fourth and final step, students are asked to record a pitch that is no longer than 2 minutes using the tablets' recording function.