TEACH THE CHILD AND NOT THE SUBJECT ALONE

BUILDING ENTREPRENEURIAL COMPETENCIES IN

TEACHERS TO MEET THE CHALLENGES OF
THE 4TH INDUSTRIAL REVOLUTION

by

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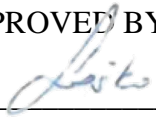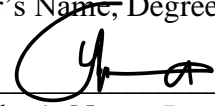
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ABSTRACT

TEACH THE CHILD AND NOT THE SUBJECT ALONE

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Sarojini Rao
2023

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The purpose of education is to prepare students for a life which is getting increasingly uncertain and ambiguous. They will also have to co-exist in a highly technology driven environment. Information is getting outdated every day and AI has taken over most cognitive skills. The readiness for this starts with the teacher. The whole concept of teach the child and not the subject alone emanates from here.

The mantra is Human Intelligence + Artificial Intelligence = Innovative Intelligence. It is a collaborative effort.

My Research question based on the literature review is :

How do we improve the entrepreneurial competencies of teachers to teach the child and not the subject alone in order to face the challenges of the 4th Industrial Revolution (IR)?

Vision can be realized only if teachers are ready for the following:

- Ability to collaborate not just with humans but with machines. To that extent we introduced the Collaborative Learning Model (CLM) in all our schools. Robots as teacher assistants is the highlight .They take on the routine tasks of a teacher. Needless to say, the teacher's role now is to design immersive learning experiences & build lifelong competencies. They have to **move from instructional to learning designers.**

    - All stakeholders need greater clarity on the purpose of education. A curriculum for entrepreneurial competencies has been designed and implemented for all students and a beginning has been made in getting teachers ready for the same through self-development.

        Data has been generated for all actions. For e.g., data from entrepreneurial competencies will give us insights into Innovation, collaboration and critical thinking. Likewise, academic data will be an indicator of personalization and Collaborative Learning Model (CLM).

    The data source has been from Indus International Schools which are part of Indus Trust. I am the Principal of one of the schools. The method of data collection will be mainly primary.

Secondary sources has been used to study global trends. The results of the research are encouraging. There is a positive correlation between collaborative learning model (CLM) and student & teacher performance. There is also a direct correlation with students' innovative scores. With regard to creativity and having a higher purpose, students have been more open to unlearning than teachers. All most all of them have a purpose to pursue, where as teachers are still struggling with crafting their jobs. We are dealing with mindsets and therefore the difficulty level is higher with them. Teachers seem to agree on the requirements of the 21st century. However, when it comes to implementation, there seems to be a subtle stubborn resistance on their part.

I will conclude by highlighting that my research will help teachers reskill & reinvent themselves and be more relevant & human in the age of machines, technology and AI.

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LIST OF ABBREVIATIONS

ITARI   Indus Training And Research Institute

ISL   Indus School Of Leadership

SUY   Startupyou

ERL   Eagle Robot Lab

SDL   Self-Directed Learning

EOL   End Of Lesson Feedback

DTP   Design Thinking Process

CLM   Collaborative Learning Model

TPIN   Teacher Progressive Index

SPIN   Student Progressive Index

ATL   Approaches To Learning

TOK   Theory Of Knowledge

PD   Professional Development

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CHAPTER I:

INTRODUCTION

1.1 Introduction

Every social institution has been reinvented, except for schools. Google images of what a classroom looked like in 1900, 1950, 2005 and today is an evidence of that. One can see features that are common over the past 121 years.

Figure 1.1 Classrooms over the past 200 years

Theatre-style seating with no collaboration

One teacher in broadcast role

Assembly line

No differentiation

Students are unhappy and passive learners

Emphasis on examinations

Education so far has focused on preparing students for tests and examinations. With the advent of the fourth Industrial revolution, the uncertainty of a future which has already arrived and the rise of exponential technologies, schools will have to unlearn their beliefs and shift their mindset on education.

What is the purpose of education? Is it to equip students academically to score high marks in examination or is it to prepare them for life? Undoubtedly, it is to prepare them for a life which is getting increasingly uncertain and ambiguous. They will also have to co-exist in a highly technology driven environment. Information is getting outdated every day and AI has taken over most cognitive skills. **The readiness for this starts with the teacher**. The whole concept of teach the child and not the subject alone emanates from here.

With the advent of the 4th Industrial Revolution, education and learning will have to change.

What is Driving Disruption in Education in the 4th IR?

- **Algorithms & internet** will take on a great deal of teacher's load. They will teach content much better than the teacher.

- Future schools will be software companies which means **high levels of digitization.**

- **Education is becoming border-less.** Being borderless means many things – the absence of brick-and-mortar schools, online education, blended learning, and

digital campuses. Schools will go to the students and not vice versa. Education will be accessible from anywhere & anytime.

- **Medium is the message**. The medium of technology and its engagement with the stakeholders will decide the pace of learning.

- **The days of qualifications are over.** Skills and competencies - not degrees – will shape the future of work. Future employability will not be about college degrees and certifications; it will be about competencies and mindsets (Harari, 2018). To be **'qualified'** means to be **'employable'**. The world is not interested in what qualifications you have. They want to know what have you done, and what can you do, with your qualifications? (Ray, 2018)

- **There is an inverse relationship between GPA and innovation** (Sandel, 2020). As a country obsessed with grades and 100 % college cut-offs, there is bad news. Research by **Google** and **New York University**, and now **China,** concludes: **(1)** the more students and countries focus on test scores, the less creative they are, and therefore, the less employability they have. Further, **(2)** the higher the grade point average, the lower is the student's interest in innovation. This is why Google doesn't ask for transcripts and test scores because they don't predict anything. In fact, they have come up with a certification course for high school students

- Rise of **Generation Alpha** - children born in 2010 (and growing till 2025).
By 2025 their global population will be around 2 billion strong, nearly one-fourth of the world population. They do not see technology as a tool, but as an extension of their nervous system (McCrindle and Wolfinger, 2009)(Dimock, 2019).

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- **Transition from M to U to E learning**. The learner has moved from learning at the right time to learning in the right way. They have moved to a sense of permanency and accessibility where every kind of learner has an opportunity.

Technology can clearly deliver the content much better than the teacher. However, what it cannot do for now at least, are the matters of heart and mind such as empowering students to be lifelong learners. **It is moving from knowledge about to knowledge to do and knowledge to be. In other words, building competencies, one's identity, purpose and potential.**

With the advent of AI & ML, teachers become more relevant than before and have to reskill and re-role themselves to meet the new challenges of pedagogy. Technology gives them the autonomy and time to do so. This is the only route to academic excellence in a future that has already arrived.

The mantra is Human Intelligence + Artificial Intelligence = Innovative Intelligence. It is a collaborative effort (Ray 2018)

However, it is not as easy as that. The issue goes beyond technology into mindset.

1.2 Research Problem

Therefore at each level, the questions are:

(**1**) reimagine and **redefine the purpose of education** in the 4th Industrial Age;

(**2**) **reinventing the student** to be an independent learner, and the game-changer;

(**3**) how **exponential technologies** will enable

(a) <u>**personalisation of learning,**</u>

(b) the development of <u>**social and emotional competencies**</u> and above all,

(c) be <u>**lifelong learners**</u> – to be able to **learn, to unlearn and to relearn** continuously.

(4) how to **re-role the teacher** to make her relevant.

<u>**The questions above are each inter-connected and I would like to research on the question of re-roling the teacher to teach the child and not the subject alone.**</u> **In my study over the last few years, this aspect has been identified, spoken about, but not addressed in practical terms at K12 level.**
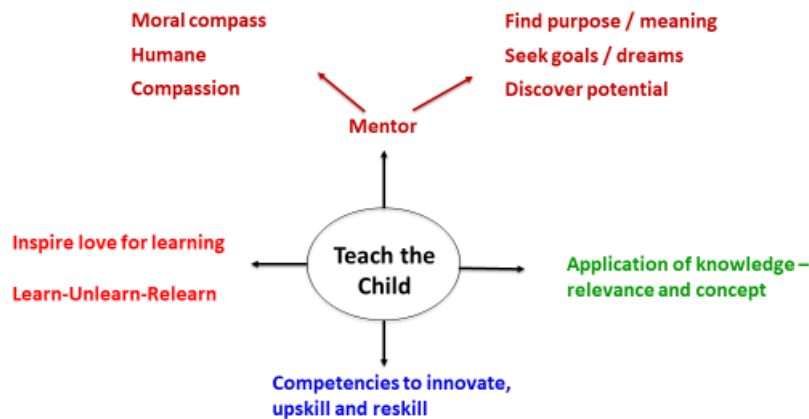
Figure 1.2 Teach the Child (Ray, 2018)

From Figure 1.2, it is clear that the teachers have to rise above the mechanics of teaching a subject to teaching competencies using the subject as a medium. They have to reskill and re-role themselves to meet the new challenges of pedagogy.

In other words, transformation of teachers, a shift from teaching their subject to teaching the child. It involves greater clarity on the purpose of education. **It**

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is about building competencies of collaboration, critical thinking, problem finding, innovation, design thinking, risk taking, resilience and above all pursuing a higher purpose to give meaning to life and make the world a better place.

Research Question:

How do we re-role the teacher to teach the child and not the subject alone, in order to prepare children for a future we do not know

1.3 Purpose of Research / Aim

Re-role the teachers by building **entrepreneurial competencies** (*Critical thinking, Innovation, Collaboration, Communication, Goal setting and Compassion*) and above all enable a clear understanding of the **Purpose of Education** and their role in a future that has already arrived. **This will be preceded by 'de-culturalization' of the teacher.**

Objectives:

Before amplifying on the objectives, these competencies have been identified and benchmarked keeping in mind the UNESCO report on education, and UNICEF framework on life skills for 21st century.

The first objective is to **identify** the **key challenges** in re-roling the teachers. This would involve direct interviews, surveys and secondary resources. Unfortunately, teachers do not understand their role. They visualize their role as merely agents of syllabus transaction. Their accountability is confined to the final academic scores/ standardized tests. Even if they do understand, there is reluctance to move out of their comfort zone. They are happy transacting information.

This has been further higlighted by thought leaders. Arjun Ray, the CEO & MD of the Indus Trust, who was a **keynote speaker** at the **Indus International Ideation Colloquium, highlighted the state of K12 education globally**. "We are not educating children to possess 21st century competencies to be a Moral Man, an Economic Man, and an Innovation Man".

Ray brought out an interesting aspect on educational reforms. With few exceptions, most of the great reforms in education in the 20th century were not introduced by "teacher-teachers". They were education reformers like Horace Mann, John Dewey, Rudolph Steiner, Benjamin Bloom, Maria Montessori, Jean Piaget, Paulo Freire, and several others.

Teachers must reflect and introspect on **why teachers who are classroom-practitioners, have not transformed education? What reforms in teacher selection, education and training are, therefore, overdue?** Amongst stakeholders, the teacher is the key player. Most transformational initiatives have failed because of the teacher. Until s/he buys into the reforms and collaborates, transformation is not possible (Ray, 2021).

The challenge is a vicious circle.
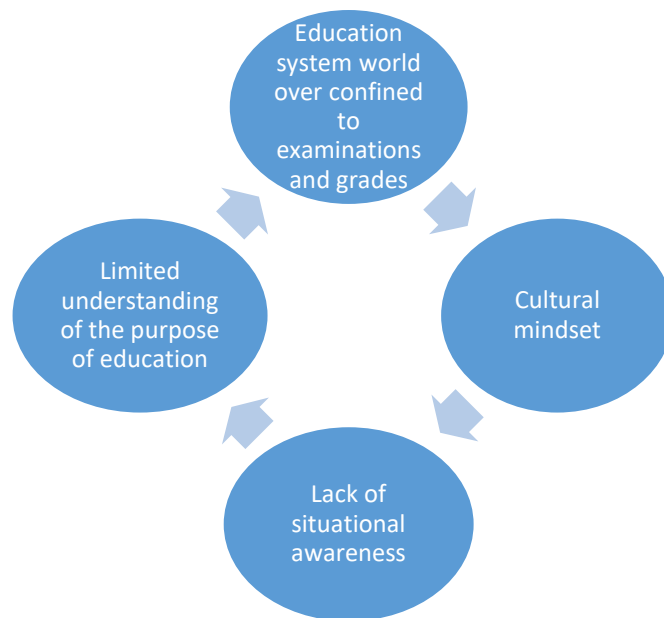
Figure 1.3 Challenges as a vicious circle (Ray, 2022)

The second objective is to move from knowledge about to knowledge to be. This is about application of knowledge to be creative and innovative in finding solutions to real time problems. It is the ability to build critical thinking, empathy and problem solving. Application of knowledge is effective pedagogy. Needless to say, it begins with the teachers.

The third objective is to support teachers, in having clarity on the purpose of education, which is to prepare students for life and not examinations. This involves exposure, talks on the characteristics of the 4th Industrial age, retreats, training in big data and digital literacy. **A teacher's understanding of the purpose of education/life should translate into identifying her/his personal vision and plans to practice it.**

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The **purpose of education** cannot be to prepare students for college – scoring high marks in examination, followed by placements in reputed colleges to pursue a career. This is a regressive step and an affront to human intelligence. Rather, the purpose of education should be to become a **life entrepreneur** – to be future-ready, to be life-ready, to be startup-ready; and to be able to learn, unlearn and relearn. To be able to apply business competencies in one's personal life.

Figure 1.4 Purpose of Education (Ray, 2022)

Teachers have to be made **situationally aware** and **unlearn** through talks, retreats, discussions, colloquiums & symposiums, and exposure to an ecosystem. Deep reading is an important tool for situational awareness. Deep reading, is mindful reading, to identify concepts, and then experiment with them, or apply them in one's life and/or

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work. Deep readers are also deep thinkers. Therefore, this involves understanding the reading-brain, building the habit of reading in teachers, exposing them to different genres & mediums. This will help build a bi-literate brain (Wolf, 2018), their belief system, critical thinking, the art of questioning and observation, and most importantly, increase their empathy levels.

Scenario planning will be part of their training as well. This involves future thinking and introspection into their emerging role. Foresight development through scenario planning will help teachers realign their roles and be better prepared for a VUCA world.

We believe that these actions will help build domain/knowledge mastery and understand the purpose of education
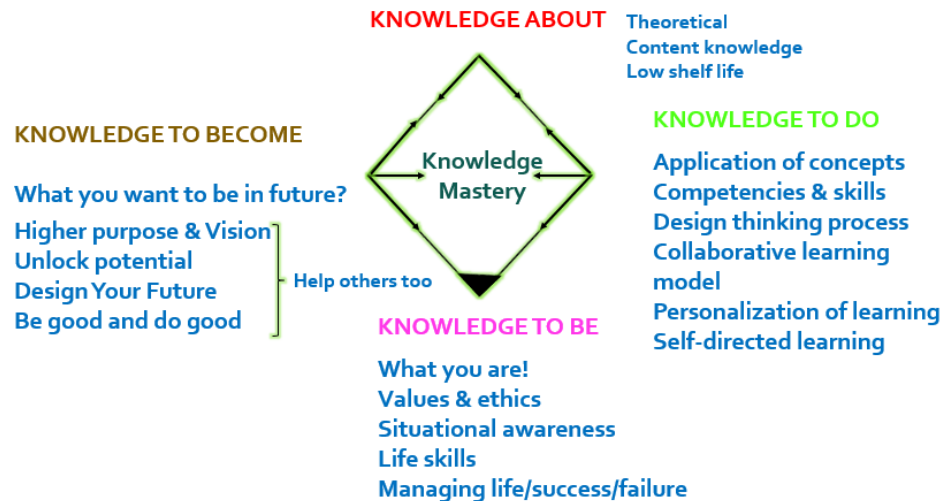
Figure 1.5 Knowledge Mastery (Ray, 2022)

1.4 Research Purpose and Questions

How do we re role the teacher to teach the child and not the subject alone in order to face the challenges of the 4th Industrial Revolution (IR)

Aim:

Re role the teachers by building entrepreneurial competencies (**Critical thinking, Innovation, Collaboration, Communication, Goal setting and Compassion**) **and** above all enable a clear understanding of the **Purpose of Education** and their role in a future that has already arrived.

Objectives & Methodology:

Before amplifying on the objectives, I would like to mention that these competencies have been identified and benchmarked keeping the UNESCO report on education and UNICEF framework on life skills for 21st century as a broad framework.

The data source will be from Indus International Schools which are part of Indus Trust. I am the Principal of one of the schools and I am driving these actions. Therefore, the method of data collection will be mainly primary and qualitative with emphasis on observation, 360 degrees feedback, and impact measurement.

Secondary sources will be used to study global trends.

The objectives based on the literature review are based on the premise that we must *prepare and not plan*. Planning to be successful, and preparing to be successful, are two different things. Therefore, while the will to succeed is important, the will to prepare is

more important. *"failing to prepare is preparing to fail." (John Wooden).* **The objectives are:**

1. **Are we prepared for an unknowable future?** *What are the key challenges in re-roling teachers?* **This would involve direct interviews, surveys and secondary sources.**

2. *How to move from knowledge about to knowledge to be?* The knowledge/domain mastery circle (Fig 1.5) amplifies this. This also brings out another aspect of planning and preparation. Do you plan for academic rigor or do you prepare for academic rigor? The preparation will involve the-

   a. ability to communicate, collaborate and think critically not just with humans but with machines.

   b. Teachers should be trained to teach for creativity, thinking and imagination.

   c. The pedagogy should focus on learning how to learn.

3. **Are schools prepared for an unknowable future. Therefore, the third objective is** *Do teachers have clarity on the purpose of education*, which is to prepare students for life and not examinations. This would involve exposure, talks, retreats, training in big data and digital literacy. A teacher's understanding of the purpose of education/life should translate into identifying one's personal vision and plans to practice it. They should also enable every student to have a personal vision to pursue.

OBJECTIVES	METHODOLOGY	DATA REQUIRED	IMPACT MEASUREMENT
1. Identify the key challenges in re-roling teachers	Surveys & interviews	Data of teachers and their views	Analysis and clarity on the challenges
2. Support teachers in moving from knowledge about to knowledge to be	Preparation before planning: • CLM • Learning how to learn • Teaching with creativity	• Performance of students in CLM earlier and now • Comparison with non CLM subjects • Data on continuous assessments • Data on Self-Directed Learning (SDL) assessments • Data on feedback at the end of every class • Data on performance of students in DTP & entrepreneurial competencies • Scores of students in Theory of knowledge • Admissions in to ITARI	• Continuous improvement in academic performance of students which includes SDL scores and learning competencies • Outcomes of the innovation curriculum are achieved (Please refer **Appendix I**) A sample report card can be found in **Appendix U**. • Increase in recruitment of teachers from ITARI across all our schools
3. Support teachers in understanding the purpose of education	• Self-development of teachers for deriving their personal vision • Help students derive their personal vision • Innovation council • Outward bound curriculum	• Data on teacher assignments for 'design your future' training • Innovation scores of students • Data on student performance in	• Teachers have clarity & 'design their own future' • Students have identified their Personal Vision (Tikkun Olams) and set goals to

		outward bound activities • Data on targets achieved by the Innovation Council in terms of **extent** of student participation, people impacted, networking in the larger community for funds & awareness and finally the target itself	pursue them. The goals have to be at challenging levels of acceptance which has been defined (Please refer **Appendix J**) • Targets achieved by the innovation council • Performance of the students in the outward bound competencies

Table 1.1 Innovation Curriculum Objectives and Impact Measurement

I will address various aspects of preparation to teach the child and not the subject alone. This will culminate into an **Innovation Index** to ascertain the impact of the various initiatives.

Chapter II:

REVIEW OF LITERATURE

2.1 Theoretical Framework

To design this, we hosted colloquiums at the local, national and international

levels and participated in few edtech conferences. We had eminent thought leaders from

all over the globe, who gave their views on the future of education and the role of the

teacher in the light of emerging and exponential technologies. This will form part of my

literature review.

Literature Review

Arjun Ray, the CEO & MD of the Indus Trust, **was a keynote speaker at the**

Indus International Ideation Colloquium. He highlighted the state of K12 education

globally. We are not educating children to possess 21st century competencies to be a

Moral Man, an Economic Man, and an Innovation Man.

He emphasized that despite all the technologies at our command, there have been

no meaningful reforms to take school education out of the Industrial Age, especially for

the teeming millions of less-privileged children. For example, we are still unable to

provide affordable exponential technologies to develop creative and entrepreneurial

competencies; and the achievement gap in academics and innovative competencies

continue to persist.

He brought out an interesting aspect on educational reforms. With few exceptions, most of the great reforms in education in the 20th century were not introduced by teacher-teachers. They were education reformers like Horace Mann, John Dewey, Rudolph Steiner, Benjamin Bloom, Maria Montessori, Jean Piaget, Paulo Freire, and several others.

Teachers must reflect and introspect on **why teachers who are classroom-practitioners, have not transformed education? What reforms in teacher selection, education and training are, therefore, overdue?** Amongst stakeholders, the teacher is the key player. Most transformational initiatives have failed because of the teacher. Until s/he buys into the reforms and collaborates, transformation is not possible (Ray, 2021).

Prof. Michael L. Mathews who was a panelist at the international colloquium commented, when you think of the metaverse, it's a digital overlay of our real world and they sort of mesh together. But the first metaverse that makes a difference is in our mind. Prof. Mathews is the VP for Innovation and Technology at Oral Roberts University, Tulsa, USA and has over 24 years of experience as a senior level IT executive.

Prof. Mathews brought out an interesting analogy with the auto industry. The auto industry went through four iterations of transformation. Some would say disruption. He calls it transformation. We can no longer go to a car dealer and buy a new car and ask them to disclose the antiskid brakes or the autonomous features or A.I. within the engine. It all comes integrated. That's the challenge for education. We have not been through iterations of transformation. The pandemic is iteration number one. Hopefully it doesn't

take another pandemic to get to iteration two, three and four. According to him, when we finally understand that the human being and technology can be fully integrated like the auto industry, we will see the change that we've been waiting for. **It goes back to the role of the teacher**.

According to Ray and Reich, technology by itself has failed to disrupt and transform education mainly because it was not part of an Ecosystem. The ecosystem must include other schools, industry, Edu Tech companies, universities, thought leaders, and even the community. Presently they are non-existent. Schools and technology should **focus on winning the innovation race**, and not on reinforcing standardized testing.

Mainly for these reasons, In the past two decades, four great predictions by four great educational reformers have failed to achieve their extraordinary, stated objectives (Reich, 2020)(Ray, 2021).

First, after his great success in the "*hole in the wall experiment*", Sugata Mitra prophesized, "*We don't need schools and education institutions anymore. Give kids laptops and broadband connection.*" (Mitra, 2015) There has been little progress on this idea in the world.

Second, Clayton Christensen, the rock-star Harvard professor. In 2008, he predicted that by 2019, half of all middle and high school courses will be blended or online, and the cost will be one-third of today's costs (Christensen et al., 2013).

Third, in 2011, Salman Khan gave a clarion call in his famous TED talk, "*Let's use Video to Reinvent Education.*" He spoke about a future where students will learn all foundational content on their own, thereby enabling teachers to provide remediation and group projects (Khan, 2015). Wired, Time and Forbes captured the concept and sensationalized it in typical media headline: "*One Man, One Computer, 10 million Students. How Khan Academy is Reinventing Education.*" Later in 2019, Salman Khan established a brick-and-mortar school in the Silicon Valley and made a complete turnaround. He admitted that blended learning was the way ahead.

Fourth, in 2012, Sebastian Thrum, the Godfather of Online and founder of Udacity, made an audacious claim on how MOOCs will reform the future of universities. He predicted that ultimately, in the next 50 years, there will be only 10 mega universities in the world delivering higher education. The reality is different. Instead of transforming higher education, MOOCs have been absorbed by universities to supplement the existing professional masters' courses / degrees and executive education programmes.
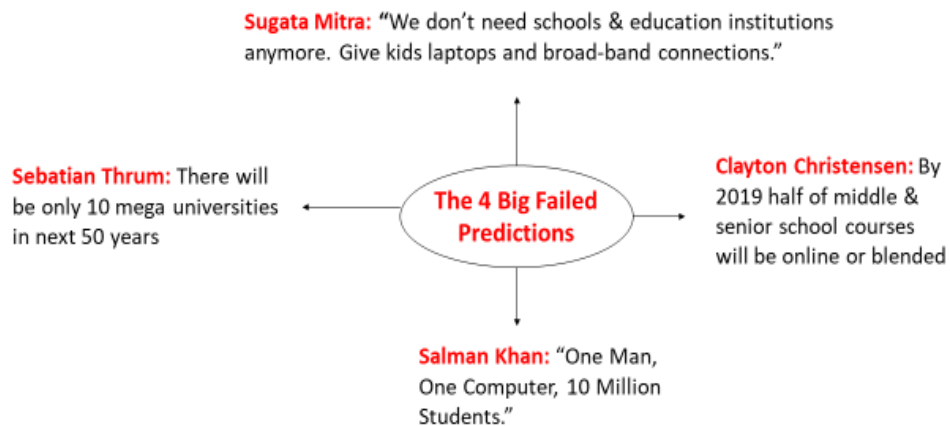
Figure 2.1 The 4 Big Failed Predictions (Ray, 2021)

This brings us to the question of what should we be learning in schools regardless of the syllabus, technology and the boards? What is the role of the teacher?

Alex Beard in his keynote address emphasized on two critical questions - what should we be learning in the 21st century to succeed in era of automation, AI, and climate change? What role might our teachers and technologies play?

He wrote and presented the Learning Revolution, a three part series on the future of education for BBC Radio in 2020, and the author of Natural Born Learners A User's Guide to Transforming Learning in the 21st Century(Beard, 2018).

In one of the many schools in Silicon Valley that Beard had visited, he had the opportunity to see AI technology inside an adaptive learning environment. What was happening was that the intelligence software, was adapting the experience for each individual student, learning their individual strengths and weaknesses and then giving them just the activities they needed to build on their strengths or tackle their weaknesses. So, each student was having a completely unique experience that was being given to them by the A.I. Now, the students would spend about one hour every day using this technology. The most interesting thing about it was there were no teachers in this room. A couple of assistants were supervising the students. And the other thing that's exciting about this approach is that these students were learning more English and more math than other students of similar backgrounds in Silicon Valley.

So, it's working. And partly, that's the technology, but partly it's also **freeing up teacher time to work in small groups with students, to bring parents into schools and work with them as well.** The teacher in Beard's opinion has the time now to personalize learning than merely teach content. AI is particularly good at doing these kind of routine tasks (Beard, 2021)

In his experience, we shouldn't be thinking about what our technologies can do for us, but what new can we learn to do with our technologies (Beard, 2018). The purpose of new learning and teachers must be to guard our children and even adults against doctrine, manipulation, post-truth and alternative facts (Ray, 2018).

The Oxford Martin report that came out five years ago or so, elaborates further on this. it was a famous report that was done on the future of work, and it gives us some clues about what children should be learning today. The message in this report is that in order to stay ahead in the future of automation, we need to invest in our most human capabilities, in particular our creativity (Frey and Osborne, 2013)

It also raises a really important question for educators. How do you grow creativity for innovation? Therefore, what is the role of the teacher?

According to Ray, man and a woman have to be driven by a higher purpose, only then does creativity happen (Ray, 2019).

It just does not happen on its own. There has to be a trigger and that trigger is a higher calling, a higher purpose. Creativity itself is not enough. Innovation has to happen.

And there are two different things. Creativity is only the start point, which is the ignition. You have to be a **critical thinker**. You have to be a **risk taker**. You have to be a **team player** because innovation, is a team sport there. And you have to be able to **take on failures** as a steppingstone for success(Ray, 2021). **The teacher's role is to create the cognitive dissonance to build these competencies**

Prof. Sandel in his book on 'Tyranny of Merit' has brought out that countries with high grade point average are low in innovations. China, which has just got eight Nobel Prizes. Japan 20, Korea one, India 12 are examples. An academic environment which is based on standardized testing, rote memorization discourages creativity and entrepreneurial spirit. Students with great grades are often overfocused and therefore voluntarily they shut off all their passions and experiences that ignite innovation(Sandel, 2020).

How to learn and how to think is something which schools just do not teach, and according to Sandel, it is more important than anything else. Schools should help students deal with adversity. This must be artificially inseminated in situations by teachers.

The colloquium also tried to address the most important aspect of action**. What should we be doing?**

Ami Dror was one of the speakers. Ami Dror is the Co-founder and CEO of LeapLearner, the world's leading provider of K-12 Computer Science education software for schools and learning centers. Apart from being a serial entrepreneur who founded

BriBooks, the world's leading children creative writing platform, and Ponka, a social impact enterprise in Sierra Leone, Ami is the author of the best-selling book *Raising Future Innovators*. According to Ami Dror, there is no right way. There is no one path that that we like. For example, he is from Israel, and visitors to Israeli schools are shocked. There is chaos. Disorganization. The schools are very wild. And even if you look at the PISA scores of Israel, they're actually quite low. But at the same time, there's so much innovation coming from this country.

According to Dror, something that is extremely popular in Israel and it's probably the essence, is that they do not have traditional teachers. A lot of the activities that kids in Israel undergo are activities where kids teach kids. For example, in the Israeli youth movements, the young teachers are normally one or two years older than the trainees. By allowing children to teach, schools are allowing them to be good students(Dror, 2021). It's something very unique to Israel. Amy Dror's recommendation is to change the pyramid instead of having a teacher teaching many kids.

We had the eminent Prof. Yong Zhao address us on the second day. Prof. Yong Zhao is a distinguished professor in the School of Education at the University of Kansas, USA and a professor in Educational Leadership at the Melbourne Graduate School of Education in Australia. He has published over 100 articles and 30 books which includes *An Education Crisis Is a Terrible Thing to Waste: How Radical Changes Can Spark Student Excitement and Success* (2019).

He reiterated that COVID 19 has given us the opportunity to create learning for a different type of education. We have to imagine education without thinking about schooling. Whenever we talk about reimagining education, we imagine our schooling, we think about a curriculum. We have to have classrooms. We have to have buildings. We don't need that. In his radical view, education can operate without schools. Of course, schools cannot operate without education. Can we imagine education without schooling (Zhao and Ray, 2021) **Therefore what will be the role of the teachers?**

Michael Mathews also emphasized on this aspect. Forecast is that Brick and mortar schools will be replaced by digital campuses. The campuses will be part of a global economic system, an ecosystem that is where learning will happen, not in the classroom, but outside the classroom. Blended learning is already the future of education. Learning will be learner centric, with avatars, virtual and immersive technologies taking care of experiential learning. VR, blockchain, gamification are the vanguard of the metaverse, which has already arrived. **Competencies and life skills will be experienced by teachers.** Schools will have to give priority to education research. Today, there is no education research happening at a school level anywhere in the world. Even at the college level it is limited(Mathews et al., 2021).

According to Prof. Zhao, he feels that **teachers** are very diverse. we need to be very careful not to over characterize them. So, his recommendation to organizations is to create opportunities for the ones who are willing to change. He emphasizes that we cannot only rely on teachers. We need to create new opportunities to make students part of this. If

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they're learning partners, their output will be higher. Education has failed since World War

Two. We are still at war with each other. People are still trying to follow a few dictators.

Chapter III:

METHODOLOGY

3.1 Data and Methodology:

Data will be generated for all objectives. **The data source will be from Indus International Schools which are part of Indus Trust**. Lt Gen Arjun Ray (R) is the CEO and MD of the Indus group. I am the Principal of one of the schools. The method of data collection will be mainly primary and qualitative, with emphasis on observation, 360 degrees feedback, and impact measurement.

Secondary sources will be used to study global trends.

I will be mainly working on primary data. The participants for data collection are the teachers across the school and the students of middle and senior school.

The data will be of two types, **surveys & assessment for learning** . Surveys will be used for gathering data on **feedback & perception**. The assessments will vary and generate data on **learning, unlearning and relearning** as a result of teacher development. For eg. data from pursuit of a higher purpose/vision will help us discern, teachers' comprehension of purpose of education, compassion, risk & resilience. Likewise, **The assessment data from CLM will give us insights into improvement in learning & critical thinking**. Going further, data from assessment of DTP projects will inform us about progress in Innovation besides collaboration, and critical thinking. We have **created a data pipeline in partnership with a data company**. This will help analyze data for intervention, remediation, feedback and impact measurement.

3.2 Resources:

I will be working with a small team of educators who will comprise of the Heads of schools, the curriculum coordinator and the Head of the collaborative learning Model. In all it will be a team of 7 to 8 people. I have the relevant approvals from the Trust for access to data and the services of a data company for analytics which has been identified. The approval also extends to proceedings of colloquiums, meetings, video recordings and conferences. Besides research, I am also leading these initiatives as the head of the institution. There is no risk of any kind to any stakeholder in implementing the initiatives. I will adhere to all ethical guidelines which will include relevant approvals, anonymity in surveys and individual assessments.

3.3 Timeline:

Indus Schools have been experimenting with these concepts for over a year and relevant data in most areas is already available. Our academic session is from Aug'22 to Jun'23. Due to the pandemic, data for the last 2 years is mainly online and may not be a fair comparison with this year's data. I plan to consider data till 15th Mar'23 for analysis and data before pandemic for few aspects. I hope to complete my research by 15th May'23 with analytics.

Chapter IV:

RESULTS AND ANALYSIS

4.1. Objective 1

Challenges with the Reimagined Role of Teacher

In **2013 Red Bull** set up the largest meta-analysis research in creativity. The project reviewed 30,000 research papers on the subject, and interviewed hundreds of subject matter experts. By **2016**, the project arrived at **three** major conclusions:

1. Creativity is the **master competency** of the 21st century and successful CEOs.
2. Creativity is essential for solving **complex** and **wicked problems**.
3. There has been little progress in training people to be creative. The reason for this failure is: **we are trying to train a skill, but creativity is not a skill; what we really need to be training is a mindset**.

The answer will lie in developing the following model for developing a **creative mindset.**

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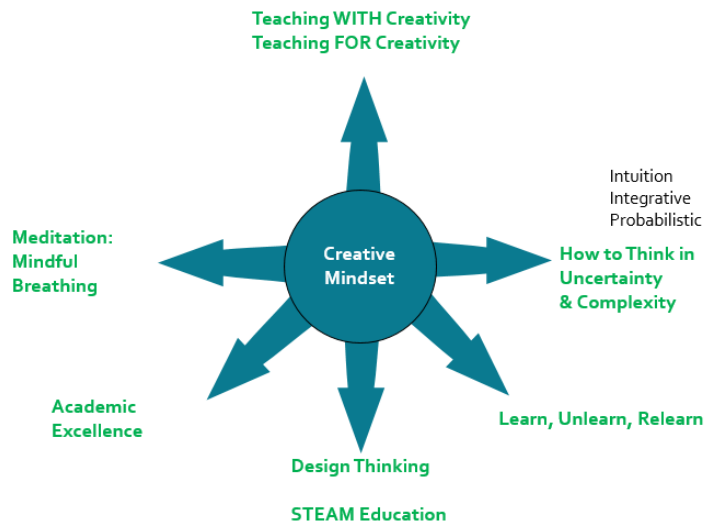
Figure 4.1 Creative Mindset (Ray, 2021)

Thus far there has been no serious attempt to reskill teachers and designers to teach **WITH** creativity, and teach **FOR** creativity, respectively. This demands a lot of upskilling and reskilling by teachers and designers. This should be the one of the 20 % of every school leader and 20% of school scheduling.
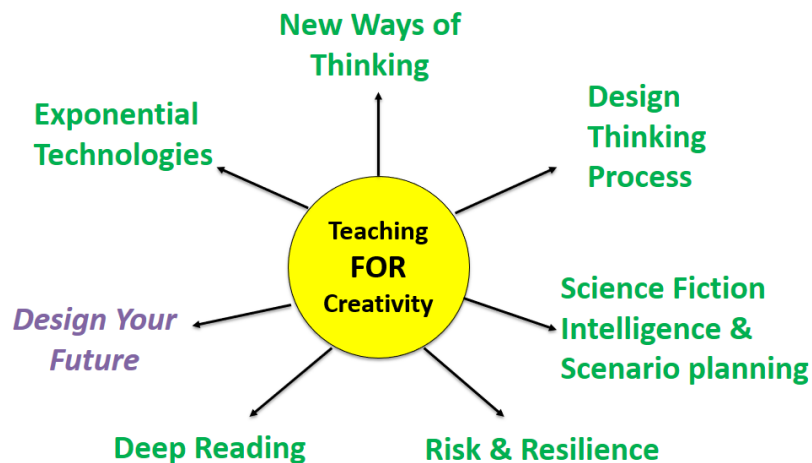
Figure 4.2 Teaching for Creativity at Indus (Ray, 2022)

With a pronounced shift from content knowledge to competencies and mindsets, schools should re-role teachers to **teach the child and not the subject alone.** Content knowledge is important, but its **application** to solve problems creatively, and to improve the quality of life, is more important.

The challenge is not technology; it is culture. Present methods of teaching focus on **rote-memorisation** of **content** knowledge, for students to score high marks in examination. This practice does not nurture entrepreneurial competencies in the child to be life-ready. The reasons are mainly the challenges the teachers face. In several interactions, both formally and informally, the challenges that teachers face are as follows.
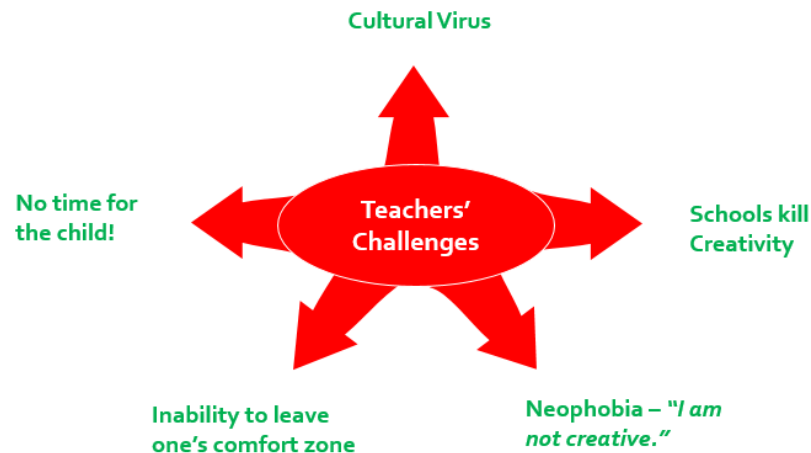
Figure 4.3 Teacher's Challenges

1. **First,** teaching for content is a legacy that has become a **cultural virus** in the minds of generations of teachers, ever since the Gutenberg printing press/process was invented. As mentioned earlier, it is not a technology

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problem; it is cultural. Teachers do not want to breakout of their comfort zone, their bubble, their Matrix.

2. **Second,** it is well known that **schools kill creativity**. Teachers are uncomfortable with creative children. It is not uncommon to hear of biases against creative students, as teachers fear that their **(1)** <u>authority may be challenged</u>; or they may be **(2)** <u>embarrassed before the classroom</u>; and the **(3)** <u>classroom is likely to become disruptive</u>.

3. **Third,** a vast number of children and teachers believe they are not creative, that creativity is a gifted talent. As a result, they suffer from   what we call **Neophobia** – fear of new ideas, even unwillingness to experiment with ideas, and the fear of creativity.

4. **Fourth,** to be able to nurture creativity in children, teachers must **teach with creativity**. In order to do that, they must be creative in the first place. That means that the teacher has to breakout of her **comfort zone** of teaching content.

5. **Fifth,** in all fairness, teachers have **insufficient time to spend with their students**, to be able to develop their in-born life-skills and competencies. An average teacher spends nearly 90 % of her time **(1)** preparing and delivering content that is already available on Google; **(2)** homework assignments that require assessment for learning and not assessment of learning; **(3)** formative

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and summative assessments; **(4)** managing systems and processes for academic rigour; and **(5)** campus duties and responsibilities. This leaves her no time to spend with the child, personalize learning, and find time for her own upskilling, reskilling, leisure, and work-life balance.

4.1.1 Analysis and the Way Ahead

The survey results **Appendix A.1** and **Appendix A.2** showed that the teachers in principle believe and understand the need to reskill themselves and be prepared for the future. They are not sure how to go about it. It clearly endorses the above challenges that we had identified. Expectations as expressed in the objectives have been met in terms of understanding the challenges. However what stood out was the dichotomy in the challenges. The survey results clearly showed that the teachers realize the need to re role. However, the seriousness and urgency is missing. There is no sincere attempt by them to re role themselves to face these challenges. Therefore what is clearly emerging is the mindset which is not there. This is the most difficult aspect to change. Skills and competencies can be acquired but not a mindset. It cannot be taught. It is more deeper, and gets transferred from generation to generation as memes. As shown in figure 4.1, teach the child will definitely involve a shift in the creative mindset of teachers which so far has been confined to teaching content and passing examinations.

With these aspects in mind, our foremost action was sensitizing teachers to the purpose & future of education to keep them relevant and meaningful. This was done through small group meetings, exposure to talks such as colloquiums at various levels & retreats. This

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was hugely supported with capacity building at a professional and personal level such as designing their own future, collaboration with machines and various entrepreneurial competencies.

Our preparation for 2030 focused on create not compete with preparation in teacher effectiveness. This included aspects of changing role of teachers, teachers as coaches and not tutors, personalization of learning, algorithmic leadership with data driven leadership, the role of designers in building a culture of innovation and self-growth of teachers with focus on domain mastery. These challenges are addressed in the subsequent objectives. Please refer to **Appendix B** for some of the professional development sessions that we incorporated for teachers.

We hope that we can create cognitive dissonance in them. They are situationally unaware of the future of education and therefore their role. Homeopathic approach may not help now. The world is moving at an alarming speed and therefore a change of mindset also needs to happen fast. **Culture and mindsets are the most difficult to change**.

The various strategies being deployed to assist teachers in re rolling themselves can be elaborated and summarized in terms of preparation and planning. As mentioned earlier, to plan is short term whereas to prepare is more encompassing. Preparation will help us deal with any adversity and change in plans. Planning to be successful and preparing to be successful are two different things. Preparation for an unknowable future will involve working out probabilities as probable scenarios, building key capabilities for most probabilities and detect vulnerabilities. Based on this, our preparation has been in the following aspects to reskill and upskill the teachers to teach the child and not the subject alone.

4.2.1 Collaborative Learning Model - The preparation is in terms of helping teachers collaborate with machines and technology. In other words, they must understand the Collaborative Learning Model (CLM). They must realize that the only way to stay ahead of technology is to collaborate with it. Therefore one of our most important aspects of preparation has been to train teachers to understand and practice this aspect:

TEACHER
- Key concepts and relevance
- Personalization of learning with focus on competencies
- Provide socio-emotional support
- Ethics & character building
- Engage students in innovation

AI - ASSISTANT
- Multilingual delivery of content
- Automated assessment with analytics
- Two-way interaction to clarify doubts
- Immersive experiences

STUDENT
- SDL with focus on prior / background knowledge
- Self and peer assessment
- Research
- Engage in Innovation

Figure 4.4 Collaborative Learning Model (Ray, 2019)

Robots have been introduced in all schools as Teaching Assistants to facilitate **collaborative learning** between teachers, students and the AI-Assistant. Seriousness in **educating teachers and students** on the concept of collaborative learning; and effective use of data analytics is evident in the school's initiative in hiring **learning designers** for every subject. Their role is to move from a culture of instruction to learning. They are expected to create, curate and plan learning experiences for teachers instead of the regular lesson plans which focus on instructional strategies. These will include immersive experiences such as VR, game based learning, gamification, automated assessments and feedback, Drones in education & AI mentor for adaptive learning. 3D printing for prototyping & Block chain for credentialing student work and lifelong learning is also being initiated.
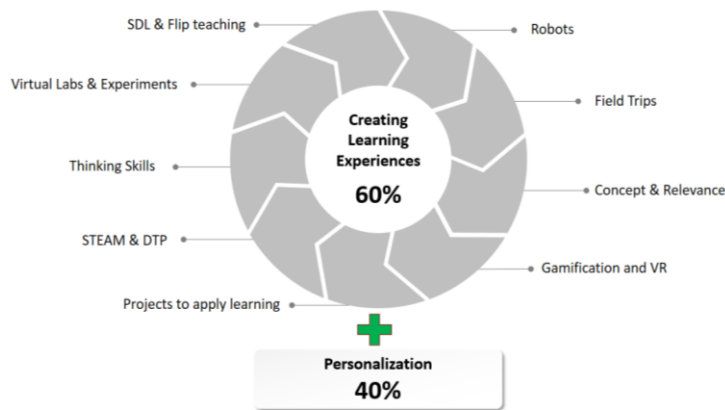
Figure 4.5 Learning Design

To amplify on a few technologies, Virtual Reality is one of the emerging technologies whose applications show great promise in the future of education. Through immersive, life-like experiences it is one of the best ways to enhance student learning and engagement. As children are primary visual learners, conceptual clarity can be easily achieved when they experience, first-hand what they are learning about. Over time, the technology will become more immersive and refined, as the line between virtual and reality blurs.

Students become part of the experience instead of being passive learners. The Robots are the highlight of the collaborative learning model. They take on the routine and mundane tasks of teachers, thereby giving them the time to upskill themselves to connect with students. The robots teach content and assist in assessment for learning. They are being continuously upgraded and are now capable of two way interaction, sentiment analysis and facial recognition. These will be used within ethical parameters. Conversational AI is a key feature of the robots.

Conversational AI will emulate conversations as they occur in real life. The application of this in the classroom will ensure that the student will effectively be able to converse with AI devices to learn subject content and clarify doubts. This will allow the teacher more time to focus on the child and not the subject alone - personalize learning.

The data from assessments, conversations and other tech interface is helping teachers plan for personalization of learning. At Indus the definition of the collaborative learning model is:

A data driven pedagogical model which makes use of human intelligence and artificial intelligence to provide the best learning experiences and environment.

Human intelligence + Artificial intelligence = Innovative intelligence

TEACHER Effectiveness
• Teacher Agency
• Reskilling & Upskilling
• Growth in Career options
• Work-Life Balance
• Mentoring

SCHOOL Effectiveness
• Teacher Effectiveness
• Ecosystem for Innovation
• Readiness for 21st Century
• Brand Building

STUDENT Effectiveness
• Increase in Academic Performance
• Student Agency
• Develop Life Competencies
• Readiness for future of work (Reskill & Reinvent)
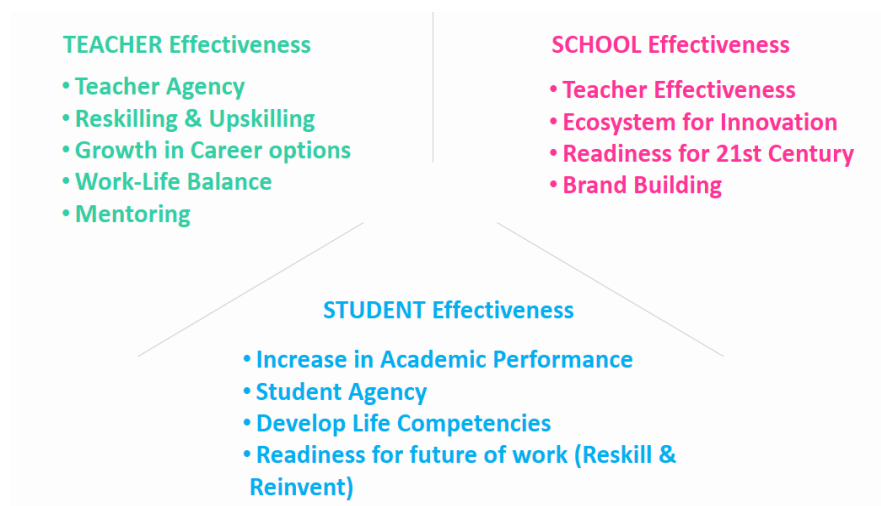
Figure 4.6 Measurable benefits of Collaborative Learning Model (Ray, 2022)

We have hired a data company which is working closely with us for analytics. Please refer to **Appendix C.1.**

The data from our trials before Covid is also very encouraging **Appendix V**. The data post covid is evolving.

In our experience of the collaborative model we realized the problem is not technology but training and sensitizing teachers and most importantly giving them the time to teach the child.

4.2.1.1 Personalization of Learning

Personalized learning is the **future of education,** a future that has already arrived. Personalized learning is the game-changer for the future of teaching. The collaborative learning model is a no-go unless teachers are trained to personalize student learning. The very act of personalization is time consuming for an average teacher, Therefore, the **bottom-line is:** reduce the workload of teachers. Or else CLM will remain a pipe dream.

Personalization of learning is overdue, and in my experience most teachers are either not trained in this domain, or they lack the will and motivation to practice it. The idea of **"one size fits all"** approach to learning is the greatest disservice any teacher can do to students. It is not uncommon to see that many are unable to understand the difference between **'personalized learning'** and **'differentiated instruction'.** The latter could follow any one of the following methods:

DI is an instructional method that encompasses the following:

- **Adapting content** to suit the student's interests, age and academic readiness.
- The process is usually followed in student **clusters**.
- The **learning outcomes** could be in **different mediums** – videos, writing, oral presentation and projects.
- **Student feedback**.

Personalization, however, is an educational approach that aims at **customizing learning** for each individual student, while keeping in mind her / his <u>strengths and weaknesses</u>, <u>specific needs</u>, <u>skills</u> and <u>interests</u>. It is based on the concept that all students learn differently, and are always at a different point in their learning journey. The focus is on enabling them to be **independent learners** and not so much on adapting content to each individual need.

The other differences with DI are:

- Not an instructional method but an educational approach.

- Students have individual learning goals. The emphasis is more on **data analytics** to evaluate one's learning on a continuous learning basis. This is why formative assessments can be algorithmic. They have greater value in personalization of learning than summative assessment. Individuals can take their own exams any number of times if they wish to.

- Individual learning goals are co-created by the teacher and the student.

- Students take responsibility for their learning, especially the self-learning process. That is what agency is all about

Personalisation of learning is **(1)** not limited to content knowledge (for that is the relatively easy part); but (**2**) conceptual understanding of the topic being taught; and **(3)** building entrepreneurial competencies in the student. This leads to **agency** (taking responsibility for their learning), higher **student motivation** and therefore **engagement,** and **creativity. The purpose of education directs learning in personalization.**

Tutoring	Personalisation
Techniques to pass tests / exams	Deliberate practice and feedback
Content driven. Focus on Deep learning is limited.	Present oriented. Goal- based approach.
Examination and marks driven	Focus on learning how to learn
Short focus	Competency building
Drill and practice	Unlocking potential.

Table 4.1 Comparison between Tutoring and Personalization

4.2.1.2. Analysis and the Way Ahead

The academic data of CLM post covid has not been very positive since world over there were learning losses and gaps. However, the dip was higher in the case of non-CLM subjects. This is evident from Appendices C.1 and V. However, there was very high positive co-relation with the innovation curriculum of the school with the CLM subjects. This is an indication of improvement in their critical thinking and creativity scores. It is also indicative of an improvement in the self directed learning which was analysed separately. It improved academic discipline, creativity and critical thinking in students.

The collaborative learning model (CLM) which was initiated in 2018 showed a steep rise in academic performance of students by almost 17%. While this was heartening, we had to discontinue because of the pandemic. Post pamdemic we revived it in a staggered manner and the results are positive. We introduced CLM in 7 subjects out of 10 in middle school and 4 out of 7 in senior school. What is evident is that the CLM

subjects are helping students perform better in their academics compared to non-CLM subjects. Our observation based on walkthroughs and performance is that the teacher is better prepared in terms of time and capability to personalize learning which is directly proportional to academic performance. The overall class average has gone up with a standard deviation of less than 1.

The CLM has delivered better results by the end of the session which is May-June 2023 (can be viewed in Appendix C.2). It ranges from 5 to 10 % across the school (Appendix X). It is marginal but most of the initiatives were either modified, enhanced or introduced in the latter half of the first term in the last session. This is keeping in perspective the introduction of learning designers, personalization of learning and higher version of the Robot itself. This will be further complimented with the AI tutor which has been introduced as a pilot in few grades and the results so far are encouraging. We hope to achieve a 20% improvement in the overall mean scores of the students from the first term with a standard deviation of less than 1 and higher correlation between CLM and Innovation Curriculum in the coming session.

Coming more specifically to teachers, the analysis showed that the Teacher Performance Index (TPIN) improved considerably between non CLM and CLM subjects. The average scores was 33.44 in case of CLM and 27.2 in non CLM teachers. This is very encouraging since the whole concept was revived, redesigned and upgraded post pandemic. The teachers had to be trained in understanding the concept and eventually delivering it. The teacher performance index (TPIN) of teachers is calculated as per the

aspects mentioned in Appendix M:. The TPIN scores comprise of the improvement index of students along with the achievements grades. This has shown an increase for teachers who teach CLM subjects compared to those who teach non CLM subjects. This is again an indication of better planning and design of pedagogy. The innovative index of these teachers is also high compared to others.They are motivating and more empathetic towards students since they have the opportunity, training and luxury of time to connect with them in the classrooms.

Having said that, this could have been better. The surveys done earlier and supplemented with classroom observations, showed that the teachers are not very receptive to change and the new role that is expected of them. They are hesistant to move out of their comfort zone. We noticed that many teachers went back to teaching the conventional way regardless of what the robot/technology was doing. There seems to be a sense of insecurity coupled with the inconvenience of change. Few did not understand the relevance of this. They felt the same results could be achieved through the regular route. Time came up as a challenge. Teachers felt that they did not have the time to curate lessons for CLM and personalization of learning. It seemed more like an alibi to resist change.

Further in CLM & in personalization of learning, few more challenges emerged:
- Training teachers in personalized learning is the most challenging task. To start with, the teacher has to be a (**1**) self-learner. Encourage the (**2**) habit of reflection in teachers. Enable them to be (**3**) algorithmic leaders. She must know

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(4) how to think in different ways; and **(5)** how to learn, unlearn and relearn. **(6)** habit of being goal-minded. **(7)** Conceptually minded.

- Absence of data. Without real-time personalized data, personalization is not possible.

- Achieving a balance between knowledge-about and knowledge to-do.

- Focus on concepts and not on content. This is difficult because most teachers do not read.

- Providing creative learning experiences.

The overall innovation scores of students has also improved because of CLM in a broad range of subjects. Our inference is that the students have been encouraged to think better critically and creatively and are on the path to becoming independent learners as a result of the learning strategies and personalization.

Another aspect that was evident was that the teachers were initially uncomfortable moving out of their regular pedagogy. Some of them continued to teach the way they were doing in the past. They were not open to change and believed that their experience and knowledge was more important than collaborating with AI or even personalization. Mentoring, Walkthroughs (WTs) and continuous guidance in small groups has helped us achieve moderate improvement. I am hopeful that this will consolidate in the upcoming session. We are dealing with mindsets and not merely skills. Therefore the journey goes beyond training and orientation.

4.2.1.3 <u>Actions based on the analysis</u>

We made a beginning by giving them the time in every unit. Forty percent time is given to the teacher for personalization for a unit which spans over four weeks. This is possible only if the curriculum is redesigned and modified for synchronous and asynchronous learning. As mentioned earlier, we appointed learning designers, whose primary responsibility is to create learning experiences and design broad personalization plans for teachers to customize.

The essential aspect in personalizing learning is that the teacher must be conscientious of what she is doing with the students. As mentioned earlier, at Indus, with the help of one data, she helps every student in setting a short term goal based on the individual's strengths and weaknesses in that particular unit. The subject knowledge of the teacher is not what is important here. It is her/his ability to help students achieve their goals by guiding, motivating and making them independent learners. This is different to tutoring and mentoring. **Please refer Appendix D for a lesson plan by Learning Designers.**

The performance of students in the assessments is a clear indication of their learning as a result of the learning designers and personalization of learning. The variation of theseresults from January to June with an interim analysis in March can be viewed in Appendix E.

This brings me to the concept of learning.

4.2.2 Learning How to Learn

Learning how to learn is the second component of preparation and competency of the 21st century. It is imperative to learn how to learn to survive in a volatile and uncertain world. Students of every school should be taught this in a formal manner.

The Doctrine of Learnability:

- Reflection & introspection

- Learning, unlearning and relearning

- Self-directed and voluntary

- Acquiring competencies for application of knowledge

- Non-formal education

- On-the-go learning

The above doctrine should help us in decision making, mid-stream correction and most importantly learning and unlearning about ourselves.
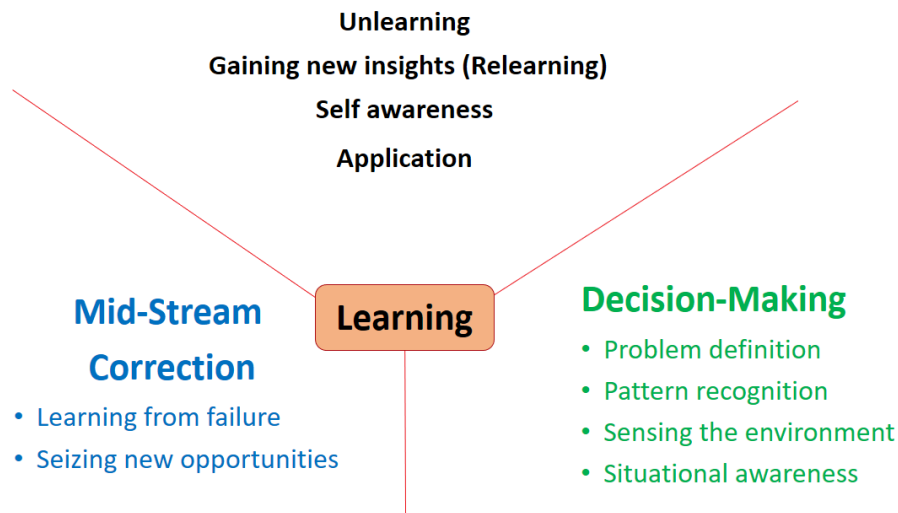
Figure 4.7 Learning (Ray, 2022)

We need to make a big shift from a training culture to a learning culture, wherein teachers and students take on the prime responsibility for their learning instead of being spoon-fed. This will happen the day teachers accept personal responsibility for lifelong learning by reflecting and learning on-the-job, and mastering the science of how to learn.

How are we doing this at Indus?

4.2.2.1 Self-Directed Learning:

A major aspect of how to learn is to make students self-directed. This begins by designing the entire unit of 4-5 lessons into micro and nano capsules, as part of the learning design which was mentioned under the Collaborative Learning Model (CLM). Micro teaching is synchronous with the help of the teacher where she brings out the concept and relevance in 10 to 15 minutes. Nano teaching and learning is asynchronous and is self-directed. These could be 3 to 5 minute videos created by students or teachers for learning.

It is a tool to test learning as well. The rationale is clear. It helps in focus, reduces learning fatigue, it fits well with declining attention span of students, provides teachers time to personalize learning and most importantly it gives them the opportunity to be independent learners. As part of our assessment policy it is mandatory to administer minimum of 12 tasks every term (session comprises of 2 terms) for Self-Directed Learning (SDL).

This can be complemented with other strategies such as flip teaching, peer learning and students creating content , Harkness method, mind mapping and case studies to amplify a concept. **The capacity building of teachers to facilitate learning how to learn, which we have implemented are**:

4.2.2.2 Concept teaching:

The teachers should understand how to deliver lessons conceptually and bring out the relevance of what is to be taught. They should build the skills of self-directed learning in students. They must help students translate learning into application, move from knowledge about to knowledge to do. In the process the students will embark on being critical thinkers, empathetic, innovative, collaborative, risk takers and lifelong learners. In other words, teaching to their heart and mind along with head. These in turn require high levels of emotional intelligence on the part of the teachers.

In rote learning and content memorization, no critical thinking and concept-learning is involved. Consequently, innovation is the first casualty.

Concept in simple terms is the overarching theme, idea or principle. It is similar to a pattern that emerges when we link pieces of data or information.

Ideally, concept learning happens best when it is preceded by self directed learning (SDL). Students are asked to do some guided learning after or before a concept is introduced. This is followed by collaborative work on real time application of the concepts learned.

The concept is explained by the teacher in the class using the 'Feynman technique' that is teaching a concept in a manner that an eight-year old child can understand. In case the teacher is unable to do so, It is best for the teacher to revisit the concept for her own clarity.

After obtaining clarity on the concept, the teacher proceeds to the second step – helping the students to build content around the concept to enhance their understanding. For example, before explaining the concept of ecosystems, the teacher may give resources in the form of a case study, film or excerpts as part of self- directed learning(SDL). Thereafter, she revisits the SDL component through quick recap and then brings out the concept of ecosystem. She may use an example to show the relationship between living and non-living things and ask students to research on other ecosystems, and synthesize what these ecosystems have in common, and how are they different to artificial ecosystems. This would be followed by critical thinking questions and the design thinking process (DTP) or project, where issues connected with ecosystems are translated into specific problems, each of which could be addressed by various groups in the grade.

It is important to provide opportunities for application of knowledge which is essentially about educating the heart thereby building empathy levels. It could be problem or project based where case studies and simple problems are given to students to

apply their conceptual understanding. For example, principles of Math's and Science could be used to optimize parking or working space in the school or neighborhood. In Humanities, they could discuss the cold wars and its relevance to the present world. They could design a curriculum framework for a sustainable world or International mindedness.

By focusing on conceptual clarity and self-directed learning, enables the teacher to blend several lessons into one and allows her the time for more meaningful activities such as feedback, personalization of learning, application and engagement. A sample of the SDL assignment can be found in Appendix F. Please refer Appendix G for performance of students in their SDL**.**

4.2.2.3 Deep reading:

Deep reading is perhaps the most ignored and important requirement of the teacher community. Deep reading builds on the cognitive processes such as critical thinking and introspection. It enables teachers to draw analogies and inferences. It is unfortunate that the teachers are completely oblivious to this survival need. This is due to their lack of deep knowledge and interdisciplinary thinking for their cognitive processes to be active. In my experience, I have noticed that teachers mostly confine themselves to their subjects and the grades they are teaching. The scope for multi-disciplinary learning and teaching becomes limited.

Professional development therefore has focused on building the habit of reading in teachers. A beginning was made by reading books in small groups and the key

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concepts were shared in a discussion. Teachers have been encouraged to maintain a journal where their intent to apply the concepts in life is highlighted. Many of them have graduated to reading books individually and the more serious ones have been encouraged to experiment with the concept of a biliterate brain where they read the same book in print and screen and draw their inferences from each medium independently. Marianne Wolf, distinguished professor at UCLA has brought out the idea of developing a biliterate brain in her book titled 'Reader Come Home'. According to her the medium is as important as the content in processing information. Therefore, the inferences from each of the mediums for the same book could be different. Teachers have been advised to use both print and digital interchangeably.

The choice of books which they read should titillate their thinking, enable them to identify concepts and in some cases create dissonance. Books such as Alchemist by Paulo Coelho and Homodeus by Yuval Harari have been highly recommended.

4.2.2.4 Deliberate Practice and Feedback:

Feedback is another area which has been undermined and teachers need to be aware of the relevance of seeking and giving feedback. Teachers generalize and are vague in their comments. 'great work', 'can do better', 'elaborate' are some common remarks made by the teaching community. These mean nothing to the students unless what is good about the piece of work or what needs to improve is specifically brought out.

Our training has been on sensitizing them to the whole philosophy of deliberate practice as brought out Anders Erickson. Feedback is the most important aspect of deliberate practice and is essential for self and continuous improvement. Pursuit of

excellence is possible only with feedback (receiving & giving) and practice. Timely objective feedback should be given by the teacher to improve the student's performance. There should be a learning context for feedback. It should be on a task or a process of learning. It should also be goal oriented such that the feedback clearly lets the learners know where they stand and therefore where they need to go.

To train teachers they were given samples of good and non-specific feedback to study and analyze. This was followed by several pieces of good and mediocre work of students which the teachers could assess and clearly comment as part of practice. A simple template which is criteria specific has been worked out and the teachers can give their comments as per the criteria. This template has been based on the work done by Susan Brookhart, an independent education consultant. The teachers are expected to be clear about the focus area that is the learning goal(s) and criteria to be assessed. They should give guidance on the work without giving away the answers. Many times I have found teachers writing copious answers on the assignments. That does not help. The tone of feedback has to be constructive with simple vocabulary.

The teachers have been made aware of the various dimensions to feedback. it should not be highly supportive and less challenging and vice versa. Likewise, low support and low challenging feedback is being dismissive. Therefore what is required is high support and high challenge which is focused, attentive and actionable. The general format that we follow here is simple and easy to implement . Please refer to Appendix H for the general format of the feedback and samples of EoL feedback analysis from Cognitensor.

Teachers should seek feedback from students. This should be sought after every class. Technology aided feedback or a quiz which is well planned on the key concepts

work. It is imperative that the teacher focuses on the concepts rather than factual knowledge. For feedback to be effective students should be clear about the objectives of the lesson and the teacher's expectations. Every class should end with minimum three and desirably five objective questions. Two thirds of these questions should be concept driven and the rest on content. This will also help build data for student understanding and give teachers a clear idea of how the teaching and learning process is progressing. With regard to this teachers should also be trained in setting objective and multiple choice questions. **This is what is being practiced at Indus.** Feedback is sought and analyzed by the data company at the end of every lesson for every teacher and subject. Teachers have been trained in setting multiple choice questions.

Academic rigor is about building the competencies of learning how to learn in students in order to make them lifelong learners. This would involve making them curious, fearless, independent, risk takers, critical thinkers, problem solvers, team players and above all humane. The strategies mentioned above could help them move in that direction.

Professional development must move from techniques of pedagogy to equipping teachers to be agents of transformation. They should build lifelong competencies in students such as optimism, being innovative, big picture, critical and independent thinking. This requires high levels of emotional intelligence on the teachers' part. The PD recommended above will help them move in that direction only if it is complemented with self-development.

4.2.2.5 Analysis and the Way Ahead

The results of the above was mixed. Students majorly did not understand the deeper purpose of self directed learning. There was certain amount of subtle resistence by parents on this concept. Therefore along with sensitization, we had to enforce it. At times the customers may not know what they want or what is best for them. In their own interest it was made mandatory. The concept of being independent learners is still very nascent in our education system. We also observed that the teachers themselves were not clear and creative about self directed tasks. Had they been convinced and clear, students would have been self motivated. The results that are shown in Appendix G could have been much better.

In the case of concept based teaching, we noticed that at least 40% of teachers struggled in moving from facts to topic to concepts and principles. Most of these teachers also struggled to make connections and apply knowledge. Application of knowledge to solve real life problems is not understood.

Deep reading continues to be a challenge. We realized that almost all teachers did not understand the meaning of deep reading. It is about understanding concepts and applying it in your life. For eg.. Jonanthan livingston seagull by Richard bach is about Excellence. Merely reading the book is irrelevant. Application of the concept of excellence in one's life is important. This still continues to be a difficult area for us.. Only 10% of teachers maintained a reading journal.

We observed that teachers need more training on giving constructive feedback and understanding data. The use of a format as shown in Appendix H has helped. However, effective feedback comes with different types of assessments and assignments which is

lacking in teachers currently. Timely feedback seems to be another concern. The concept of continuous improvement is not understood clearly by the teachers. We had to mandate feedback within 48 hours of work submission because of which timely feedback has improved. However, quality of feedback continues to be a challenge.

4.2.3 Teaching for Creativity

The third aspect of preparation is teaching for creativity. At Indus we are committed to whole-education but not at the cost of academic excellence and innovation. Design thinking process, exponential mindsets, immersive technologies, and the Students' Innovation Councils. We are the only schools in the world to have **designers** as part of our faculty, to help us in teaching **FOR** creativity.

How are we doing this at Indus?

There are many aspects to teaching for creativity. However here I will stress upon our curriculum for innovation and entrepreneurship. We had a broad curriculum on innovation for the whole school focused on design thinking process and personal vision. As mentioned, one of the methods which has been scientifically proven is the design thinking process (DTP).

Design Thinking is a solution-based approach that is used to find innovative solutions to problems. It was based on the work that was developed in Stanford Design School. The design thinking process (DTP) in simple terms is a collaborative way to identify problems, and thereafter come up with creative solutions. There are five stages in DTP: empathy, problem definition, ideation, prototyping and testing.

By practicing DTP, teachers and students are driven into meaningful experiences for students. They are motivated to research, collaborate, brain storm, observe, empathize, ideate, reflect, and build on life competencies. Design thinking is a life skill at a macro level and an instructional strategy at a micro level. It helps in learning how to learn which is the essence of academic rigour.

Students facilitated by teachers, engage in projects through DTP. At least three projects till the prototype phase and one to the testing level in an academic session.

For a selected few which is optional, we introduced an advanced programme which we called as the Start up You curriculum (SUY), which was targeted at building entrepreneurial skills which included idea hackathons for moonshot ideas and in some cases, it has culminated into a shark tank pitch. **Please refer to** Appendix T **for some Shark tank ideas.**

 Our endeavour has been to have at least 25 percent students as potential entrepreneurs. We have helped them with mentoring. We have also supported a small number with incubation. We have made a good beginning.

Various levels of the StartupYou programme:

As a result of SUY's success, we realized that this programme must be extended to all students and not selectively and therefore going ahead all students will be part of this programme from next session. Our curriculum for the whole school has been enhanced to include the following:

<u>Seeker Level (Beginner) :</u>At this level, the faculty which include designers from well known design schools sensitize students to accept uncertainty as part of life by:

- Getting the students to come out of their comfort zone by empathizing with different sectors of the community.

- Engaging them in divergent critical thinking where they come up with a whacky idea, good idea, and bad idea surrounding a central theme.

- Reinforcing discipline in managing time, energy, and emotions.

This level also nudges students to work on a community initiative or design a product or technology in a conditional future. The aim of this activity is to encourage them to visualize themselves in alternate scenarios and use imagination to make their world a better place.

<u>Explorer Level (Intermediate):</u> At this level, the faculty deliberately introduce scenarios to test their comfort levels under uncertainty by having students

- Resuscitate dooming businesses by resolving their challenges

- Use imaginative design in a simulated environment (often filled with unfavorable or extraneous situations)

- Understanding customer persona and alternative points of view.

This level culminates in an 'idea hackathon' where students are presented with 3 alternative scenarios and asked to come up with a business venture that would succeed in any one of them. Students are assigned to random teams with whom they collaborate and structure their idea.

Adventurer Level (Advanced): In the Adventurer program, the learners navigate different aspects of entrepreneurship and business where they understand how to

- Cultivate resilience to changing circumstances and bounce back from setbacks through life lessons from mentors and review of other businesses

- Collaborate with and seek help from others in their time of need

- Foster a positive outlook in the face of chaos and uncertainty

This level exposes students to the real-life incidents of various entrepreneurs, the adversities, and challenges they have faced, and how they overcame them. The students also participate in a 'mini 'Shark Tank' where they pitch their ideas to expert mentors and industry stalwarts who subject them to testing by questioning various elements of their project under different scenarios, thereby testing the robustness of their thinking.

For clear outcomes we have competency measurement guidelines for teachers. Few of these outcomes and competencies that we assess can be found in Appendix J and I.

4.2.3.1 How to think:

Closely connected with this is **how to think**. Here the focus is on two main aspects of thinking - integrative thinking and probabilistic thinking. These are important to build thinking skills in students. What are these and how are we doing it at Indus? Integrative thinking as brought out by Roger Martin is " the ability to face constructively the tension of opposing ideas and, instead of choosing one at the expense of the other,

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generate a creative resolution of the tension in the form of a new idea that contains elements of the opposing ideas but is superior to each."

The most important outcome in integrative thinking is it helps us to look at the problem holistically and consider all points of view. This enables us to see and identify potential solutions which may not be so obvious and resolve tension between different ideas.

The way it can be applied in schools and we have made a humble attempt is by increasing metacognition in students through deep reading, reflection, introspection, design thinking process, building thinking tools into the curriculum such as the Harkness method and art of questioning.

The Harkness Discussion method is an active, discussion-based learning style that allows students to lead the discussion. It is student centered. The concept is introduced and moderated by the teacher and the students are empowered to discuss, question, give a point of view, research, inquire and listen as part of the process. It certainly is an excellent tool to build skills of learning independently and collaboratively.

Coming back to thinking, students and teachers must be encouraged to think in an integrative manner in every academic unit and non-academic unit. Fortunately the International Baccalaureate (IB) curriculum facilitates this to an extent through their Theory of Knowledge and Personal Project as part of the curriculum. This will include aspects such as approaches to learning as given by the IBO:

ATL Skill Categories	MYP ATL Skill Clusters
Communication	Communication skills

Social	Collaboration skills
Self-Management	Organisation skills
	Affective skills
	Reflection skills
Research	Information Literacy skills
	Media literacy skills
Thinking	Critical thinking skills
	Creative Thinking skills
	Transfer skills

Table 4.2 ATL (Approaches To Learning) Skills (Cole et al., 2014)

TOK is a metacognition paper which students have to attempt in high school. The IBO says, "The inclusion of TOK in curriculum challenges students and their teachers to reflect critically on diverse ways of knowing and areas of knowledge and to consider the role knowledge plays in a global society. It encourages students to become aware of themselves as thinkers who understand the complexity of knowledge and to recognize the need to act responsibly in an increasingly interconnected world. It is designed to develop a coherent approach to learning which transcends and unifies the academic areas and encourages appreciation of other cultural perspectives''.

Nurturing probabilistic thinking is imperative in schools. It helps us in staying relevant, making decisions and above all in designing our life and future. We have been encouraging probabilistic thinking in our schools through first principles of thinking and second order thinking. This includes aspects such as science fiction intelligence, Socratic way of questioning and five why technique. In second order thinking the focus has been on

understanding the difference between planning and preparation, scenario planning, chess, setting challenging goals and data driven decisions.

We conducted workshops on science fiction intelligence for our students, talks and a leadership retreat for all our school leadership teams on aspects of preparation for 2030 and how it is different to planning. The best leaders were not more risk taking, more visionary, and more creative; they were more disciplined, more empirical, and more paranoid (Collins and Hansen, 2011)

The students of our school also presented their vision of 2030 for schools, by applying their recent learnings from their Sci-Fi Intelligence Workshop. Their impressive vision of schools as centres of learning (not teaching) was fuelled by their enhanced understanding of the immersive technologies and a nuanced view of the role of the teachers.

Today, the world is moving at an alarming rate. The future is becoming the present before we even know it. The pace of change when it comes to new technologies is increasing by the day. Technology has evolved at a faster rate in the last twenty years than it has over the last century.

Analysis and trends have made it easy to gauge with reasonable accuracy the emerging technologies and practices of the future. However, how they will actually be used in everyday life is still speculation. This is where Design Fiction and Science Fiction Design Intelligence can help. Talking about a product or a trend in the future in isolation may not draw much insight. For example, saying that Virtual Reality or teacherless classrooms are the future of education does not give a very clear picture of

how it would look like. But, writing a story about a boy using virtual reality in a teacherless classroom in the year 2050 will!

We can then speculate on how such futures can be can be dealt with. This is the first step for innovation. Science fiction is an effective way to perceive such realities.

Many of today's innovations have been inspired by iconic films. Tablets, touchscreen technology, video conferencing, holograms and the use of drone are only some of the innovations that have been extensively covered in Sci-Fi movies like 2001: A Space Odyssey, Star Wars, Back to the Future and Bladerunner, decades before they were invented.

Based on the workshops and discussions, students were asked to *"Create your vision of what classrooms will look like in 2035, through a graphic novel, short story or short film."* Their presentations were truly futuristic. Please refer to Appendix K **for a sample of the Science Fiction Graphic novella from our students.**

Likewise, Students in the TOK Exhibition are expected to select three objects and connect them to one of the following 35 IA prompts designed by IB. At Indus, we conduct a Mock Exhibition, that prepares them to identify one object, further examine and explore one of the knowledge questions and understand how TOK manifest's around them. **Please refer to Appendix L for some of theToK topics.**

4.2.3.2 Analysis and the Way Ahead

The results show that the innovation curriculum as part of our startup you initiative which was selectively done for few students should be extended to all. The results were very encouraging with students who chose to do the programme. There was

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very high positive correlation between the innovation scores and the academic scores of these students. For rest of the students, so far we had a modified curriculum focused on design thinking and personal vision. They were assessed accordingly which was reflected in their SPIN scores. That will now be enhanced into a complete entrepreneurship curriculum from next session starting August 2023.. Creativity cannot be done for selected few is our final understanding.

To enable this, teacher training was initiated and the focus was on building entrepreneurial competencies in teachers (**Appendix B**). We had over 100 teachers trained in delivering the innovation curriculum from March '23. This is to boost their curiosity and creative confidence. This will also encourage inter-disciplinary thinking. They were trained in generating ideas and taking them to a shark tank stage. As a result of the training, they came up with over 25 shark tank pitches. The real test of this besides improved innovation scores of students will be at least one start up by a group of teachers.We have over 25 designers across all our schools from well known design schools such as NID and NIFT. They have been coordinating with the school leadership team to deliver the outcomes and train the teachers. We hope to achieve our outcomes by the end of next session as mentioned in Appendix I.

The students who made the graphic novella (Please refer Appendix K) on schools of the future had something interesting to show. They visualized virtually no role for the teacher. Their imaginative schools were without teachers where education was self and technology driven. This should have come as an eye opener for teachers. Unless they do not re role themselves there is a danger of becoming redundant. Technology and digital natives will outsmart them.

It was observed that students are more open and receptive to thinking and creativity compared to teachers. Teachers in general have found it difficult to teach thinking skills such as integrative thinking and probabilistic thinking to students. Therefore this was delivered by professionals from non teaching background. This goes back to the cultural baggage which teachers carry. It will take sustained training and sensitization to get them out of this. Another aspect which is emerging seriously is the whole teacher training itself. Our teacher training institutes must focus heavily on thinking skills as part of pedagogy.

It is very important to create an **ECOSYSTEM** to help teachers teach the child and not the subject alone. An ecosystem will help change culture and mindsets. The Indus training and research institute (ITARI) along with a leadership school(ISL), learning designers, immersive and AI driven technology and an institute to build entrepreurial competencies(SUY) are some of the initiatives we have taken to build the ecosystem. Transformation cannot happen in isolation.

4.2.4 Indus Training And Research Institute(ITARI):

The Indus Training and Research Institute (ITARI) (https://itari.in/) was set in 2009 as part of an ecosystem to nurture teacher competencies. It was envisioned by **Lt. Gen. Arjun Ray,** CEO and MD, Indus Trust.

The rapid rate of knowledge & jobs obsolescence necessitates school education to focus on placing the human in the centre. The objective was to create teachers who are prepared for 21st century challenges in schools.

The vision of ITARI is "Build an innovative learning community that will cope with challenges in future learning, by application of exponential technologies and personalising learning."

We offer both pre-service and in-service training. The institute provides professional development workshops across IB, IGCSE, CBSE and ICSE schools. It is India's first institute to offer Level 7 teacher education programmes in collaboration with well-known universities like Birmingham City University, University of Bath and Cambridge Assessment and International Education, UK. Over 1000 teachers have graduated and more 2000 teachers have been trained as part of inservice training. Research is an important component of a course at ITARI.

Therefore, an ITARIan learns- the Role of the Teacher & Purpose of Education, holistic education, lifelong learning, 21st century competencies and importance for innovation for self and the world. The core curriculum at ITARI revolves around concept-based thinking, learning design, innovation mindedness, international mindedness, personalised learning, human-machine partnership in education and ethical mindedness. These collectivelty also address the requirements & guidelines of NEP 2020

The ecosystem that exists between ITARI and Indus International Schools has many advantages which includes continuous research in a leading IB World School, being able to experiment innovative ideas in education, internship opportunities, strong mentoring support from experienced IB educators, and also the opportunity to learn from IB students from over 32 nationalities.

ITARI also offers core Teacher Executive programmes which will equip one with new ways of thinking and learning(How to learn, unlearn and relearn), skills required to create learning designs, competencies to build an entrepreneurial mindset and strategies to buid a creative mindset.

After completing a course at ITARI, various career pathways open up for the students which are research-oriented and hones their creativity. Many of them have got into IB Education, EdTech Industry, Research, educational leadership, learning design and educational start-ups.

It has over 1000 ITARI graduates teaching across the world as of 2023. Please refer to Appendix W for the student demographics found at ITARI.

4.2.4.1 Analysis and the Way Ahead

ITARI has to move from their traditional role of standardized qualifications to training students in research. Research which is ongoing and applicable. With so much happening in education and technology space, that has to be focus of teacher training institutes world over and ITARI is no exception. Research with emphasis on accelerated learning, learning how to learn, teacher agency, exponential technologies and impact on education and re roling of the teacher are some areas where ITARI could focus.

They also have to build on the inservice programmes. Although we have conducted many inservice programmes, most of them are traditional based on the customer's requirements. The time has to enlighten the schools and educators in the country on pedgogy which has gone beyond the classrooms and traditional teaching. More emphasis on thinking practices such as systems thinking,s integrated thinking, probalblistic thinking and scenario planning. ITARI should also conduct programmes on deep reading which is very different to reading. Without deep reading, situational awareness and research will be severly impacted. It is the foundation for deep work.

The concept of deep work is another areas which ITARI should focus in the training. What constitutes deep work and how do we work out our 20% based on the pareto's principle. Many times teachers fail to identify their focus areas and therefore the level of engagement. This will also help them collaborate with technology as assistants to be better educators.

ITARI shoul also become a platform to create dissonance. Currently it is not in that role. 70% of the graduates from ITARI are from non teaching background and this is the right time and group to be sensitized to the new role of a teacher. The focus I believe seems to be more on getting a teaching degree with exposure to good pedgogy. We should go beyond that into reflection and introspection.

4.3   Objective 3:

Finding a Purpose

Purpose in life and at work is our rationale for living, for work, for happiness. In turn, purpose gives us meaning in whatever we do. Purpose is transcendental, in that it is higher and beyond one's responsibility to oneself, one's family and even one's close circle. Since designing a purpose for one's life appears esoteric, a good beginning is to affirm the purpose of education.

Stakeholders may lack complete understanding about the purpose of education, and the vision of the school. Despite the writings on the wall, teachers may still believe that their role is to teach the subject, and prepare students to pass examinations. They

have to co-exist in a highly technology driven environment, where AI will soon take over most cognitive skills.

Parents too largely believe that the purpose of schooling is to help students graduate, and get the best possible placements in prestigious colleges and universities. The greater challenge is to acknowledge and honor one's purpose which is derived from deep reflection and introspection.

How do we do it at Indus?

4.3.1 Personal Vision (Tikkun Olam):

The journey begins with the right vision (What) to realize the purpose of life. Designing the vision statement which encapsulates the purpose is imperative. If the vision is right, then the mission (How) becomes easy to achieve. The core values have to be part of the vision statement. This has to be amplified clearly to all the stakeholders as defined by the organization and not the dictionary.

For students, core values have to be experiential. At Indus, the core values as understood by the school has been translated to age specific actions. For example, Love to an eight-year-old would imply caring, and to an eighteen-year-old it could be sacrifice. Therefore, opportunities have been created for students to experience values. These have been amplified at all levels.

Service, which is the epitome of servant leadership, is a huge canvas to inculcate values regardless of what the vision is. The basic premise is that, true leaders serve first; and in the process, they transform others. Servant leadership (in addition to deep reading) is the most powerful tool to develop emotional and spiritual competencies in our context. It therefore forms the core element of our school's curriculum.

Community service will make an impact only if students and teacher reflect and introspect on their experience of service. Reflection and introspection is a skill which can be developed by building the habit of deep reading. Book reading is not a synonym for deep reading; there is a huge difference. The former is for leisure, for information; and there is no reflection or follow up. Deep reading, on the contrary, is mindful reading, to identify concepts, and then experiment with them, or apply them in one's life and/or work. Deep readers are also deep thinkers. This involves understanding the reading-brain, building their habit of reading in students and teachers, exposing them to different genres which will help build their belief system, critical thinking, the art of questioning and observation, and most importantly, increasing their empathy levels.

Marianne Wolfe, a distinguished professor at UCLA, has brought out in her research that, it is important to build a bi-literate brain, where students are exposed progressively to both print and digital media. Projects which involve reading concepts in print followed by research in digital is a good way to go about it. She gives the example of the refugee crisis, where the issue itself can be studied in print, followed by details, photographs, videos, views, etc. on the digital media.

As part of their leadership training, students were helped to derive a personal vision for themselves. We emphasized that every student, should follow a personal vision which we call as their Tikkun Olam. It is a Jewish word which means heal the world. We wanted each student in the school starting from our 3 year to our 18 year olds to have one vision for themselves which is connected with healing the world. This should go beyond self and be sustainable. It could be about womens' empowerment, children & human rights, animal welfare, environment, garbage, water, to anything and everything that

impacts the humans, society & community. This we expect will give meaning to their life and go beyond the realm of self into larger good for the world.

This has been translated into specific goals, along with building their skills of feedback, risk taking, grit, and dealing with setbacks.. To go about their Tikkun olam or anything in life, students need to understand the skills of goal setting which will involve understanding and doing their SWOT, the relevance of Specific, measurable, achievable, relevant and Timely (SMART) goals. The goals may change but the vision will remain the same as the students' progress into their higher education.

An important aspect of having a vision is to visualize the kind of world they are looking at and the steps that they would be taking at each level. Students must be trained to visualize their vision as often as possible.

The power of positivity needs to be emphasized here in order to make them introspective. Please find attached a few Tikkun Olams from our students in Appendix N. Please refer to Appendix O for the SPIN scores of students.

4.3.2 Innovation Council

The volatility and uncertainty that the whole world experienced through events like the COVID-19 pandemic highlights the glaring gaps in our society which in turn points to the avenues that the education sector has been falling short in bridging. At Indus, we consider these events as indicators which call for an overhaul in our education system and the transformation of the traditional Student council to the Innovation Council as an attempt to bridge this gap.

The Innovation Council:

In our endeavour to help our students unlock their potential and cultivate a culture of Innovation, Indus has introduced its very own **Innovation Curriculum**. The curriculum encourages its students to go beyond the requirements of academics to see the bigger picture and realise where our education really fits in the scheme of things.

Our students are encouraged to look for issues in their society like problems related to empowerment of the **underprivileged / marginalized communities** and **climate change**. As an organic culmination to these initiatives, we have designed the **Innovation Council** which will comprise of students from Grades 4 to 12. The distinguishing feature of the Innovation Council is that the opportunity to be part of the council is not determined by the grade or age but by the impact created due to their involvement and contribution to building a culture of innovation.

The distinguishing feature of this council is that the students have been selected based on their innovation score. The idea of the Innovation Council is that the members should use their position to inspire change and transform the community around them. They were guided to drive these initiatives by converting them into age-appropriate projects from primary years to Diploma programmes. Some of these initiatives that our students are involved in are:

Community Kitchen: Having identified hunger and lack of access to nutritious food as an impediment to social progress, students and teachers of Indus set up the Community kitchen which provides 1000 nutritious meals (Breakfast and Lunch) for 500

malnourished children from Indus International Community School

(https://www.induscommunityschool.com).

Students are involved in the complete process which includes fund-raising, planning and preparation and distribution of the meals. Time is allocated during their school day where they visit the kitchen to get involved in activities like cutting the vegetables, cooking or serving under the supervision of senior students and teachers. Students have also been involved in growing and harvesting some of the vegetables required for these meals.

Womens' empowerment projects:

Empowering underprivileged women by liberating them from the socio-economic restraints of reliance is a pre-requisite for the development of a society and nation as a whole. Having identified this need, our students have been sensitized to come up with avenues for empowering these women through vocational and soft skills training. Our students plan and execute **vocational training courses** including beautician course, culinary course, and tailoring courses. The people identified for these courses include women from the local communities and support staff from the school, based on interviews that they conducted.

Our students have also been conducting computer literacy, financial literacy and entrepreneurial training classes for our school's Ammas. Designing these courses has a multitude of benefits for the students which adds to their own learning, apart from empowering these women with the skills and knowledge needed to succeed in today's digital age.

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Bio-degradable sanitary napkin project: Creating low-cost sanitary napkins is a project that we began back in 2014, as part of our student community service initiatives. Inspired by the initiative conceived by by Mr Arunachalam Muruganantham, a social entrepreneur from rural Coimbatore, we began the project of making low- cost sanitary napkins on our school premises involving our students in the process. This has now transformed into an small – scale entrepreneurial avenue that our housekeeping staff and women in the local community is being introduced to, where they will make low cost bio- degradable sanitary napkins from plant sap.

Culinary Start-up: The culinary Start-up is another manifestation of the innovative entrepreneurial opportunities that our stduents have explored. This project monetises the culinary and entrepreneurial skills of the underprivileged women. The start-up sells healthy snack items prepared and packaged in 100% sustainable packaging was initially set up by our students and they have now trained the housekeeping staff to run it. This project aims to embed the start-up culture in the community so that they can enter the commercial market.

Apart from setting up the path for them to transform into self-sufficient entrepreneurs, these collaborations also help to sensitise our students to the needs of the lesser privileged to come up with innovative solutions.

Mobile health clinic: The school helped the students with this project by procuring a bus which has been converted into a mobile health clinic. We have tied up with a hospital in the neighborhood to set up health camps and provide general healthcare to the neighboring villages. For the villagers who have illnesses which require further care, the doctors provide reference for specialized follow-up care and we help with resources.

Action against Climate change:

Our students have been encouraged to take up and lead challenging projects to help reverse the impact of manmade issues like pollution , which has resulted in climate change. **Reducing our carbon footprint** and finding innovative ways to **reduce/ reuse plastic** has been some of the areas we have been focusing on.

Bio Gas Digester : Towards this we set up a Bio Gas Digester to produce cooking gas for the community kitchen. This will produce 200kgs of Bio Gas every 15 days which will sustain the kitchen for 1 month and 18 days, saving Rs. 25000 every month for the project. It will also reduce the CO_2 emissions by 155 Kgs every month. The digester will also produce 175kgs of manure which will be used in the farming of vegetables for the community kitchen. This is currently being done with a bigger motive which is to introduce this method for the main school kitchen and reduce CO_2 emissions by 10 times.

Plas-tuck Café: The Plas-Tuck Café is a café which uses plastic waste as the currency in exchange for essential supplies. This café endeavours to be a prototype to raise awareness of plastic pollution, which is an issue that the world is riddled with. This idea has been further extended to include IICS as a part of the student's house vision. To expand the outreach, a mobile tuck shop to collect plastic waste from across town has also been set up to collect a total of 474kgs in plastic waste and 211kgs in E-waste. This has helped to reduce 1.5 tons of CO_2 emissions and aim to reduce 4 tons by 2024.

Our students have also come up with a prototype of an innovative **plastic filament machine** which can use molten plastic to create the filament for 3D printers. This will be used to produce recycled products. In the process they have eliminated 1.5 T

of CO_2 from not just Indus, but from neighboring schools and villages too. A few photos of our initiatives can be found in Appendix P.

4.3.3 Outbound curriculum: This curriclum has been mainly conducted through our Indus School of Leadership (ISL)(https://www.indusschoolofleadership.com/) which is located at Kanakpura , 70 km from Bangalore , on 10 acres campus close to hills and forest area. The outdoor environment provides the right platform to nurture young leaders in a challenging but non-threatened environment. The activities designed are based on obstacle courses, navigational exercises, rock craft, high rope courses, trekking, paintball and many others. Leadership Programmes are designed for various age groups, eight year olds to adults. The ISL is equipped with a high ropes discovery course the first-of-its-kind in India, and the second in Asia. The safety standards for the material and the accessories / equipment are certified by ACCT (Association for Challenge Course Technology), USA. By navigating the rope course, we expect our students to develop courage, risk taking, problem solving and have a better understanding of themselves. Besides this the ISL also organizes mountaineering expeditions. Some notable ones have been to Mt. Everest base camp, Mt. Kilimanjaro in Tanzania, Mt. Yunam in Ladakh, Mt. Kinabalu in Malaysia, Mt. Fuji in Japan, and Mt. Elbrus in Russia. At the leadership school too, the emphasis is on critical thinking, creativity, collaboration and communication. Some of the learning goals associated with these are listening, feedback, trust building, reflection, flexibility, cooperation, responsibility and initiative. For Critical thinking and creativity, the leadership school has focused on aspects such as idea generation, expression, regulation, openness to courage and explore, interpretation and analysis, problem solving and solution finding along with constructing arguments. Rubrics have been worked out for all of this **Appendix Q**.

4.3.4 Self-Development of Teachers through the concept of Design Your Future

Professional development will be meaningful only if it is preceded by Self- development of the teachers. For all aspects mentioned in the professional development section such as Design Thinking, Assessment for Learning, Feedback, Personalization, Special educational needs and Counseling require high levels of emotional intelligence on the part of the teachers. It involves educating the heart and not just the head. The role of the teacher changes with the advent of the AI revolution. Technology can clearly deliver the content much better than the teacher. However, what it cannot do are the matters of heart and mind such as teaching values, empathizing, creativity, innovation, introspection, reflection, having a purpose, pursuing a vision and in the process unlocking potential of self and the students. The teachers become more relevant than before and have to reskill and re-role themselves to meet the new challenges of pedagogy. Therefore, self-development is imperative if professional development and teaching the students has to succeed.

The teachers have to rise above the mechanics of teaching a subject to teaching a child using the subject as a medium. This may involve sacrifice, moving out of their comfort zone and also dealing with setbacks in the process.

Self development has to focus on creating that dissonance in them about their changing role, enabling a personal vision or a belief, setting challenging goals to teach the child, introspection and in the process they have to learn to deal with failure. Therefore, building positivity and growth mindset will be important components of the self development process.

Teachers do not understand their role. They visualize their role as merely agents of syllabus transaction. Their accountability is confined to the final academic scores.

Even if they do understand, there is reluctance to move out of their comfort zone. They are happy transacting information.

How are we doing it here?

Actions lead to insight far more than insight leads to action. Learning who we are and what we want and what we are capable of is a lifelong process. Therefore, it is important that we stretch for insight since self-awareness comes slowly. The personal development aspect of growth is being led by our MD and CEO, Lt.Gen. Arjun Ray.

How do we stretch for insight? You can stretch for insight by giving meaning to your work and life. For people who are highly evolved, insight comes to them naturally as a result of certain experiences. With that they embark on a journey of transformation of self and the world at large. There are many examples of such great people. Mother Teresa and Mahatma Gandhi are universal examples. Closer home we have our very own Noble laureate, Kailash Satyarthi and M Arunachalam who innovated low cost sanitary napkins for economically poor women.

These great men and women were highly value driven and self-aware because of which an experience triggered their inner self and gave them the purpose of their life. All of us may not be able to embark on this journey. What do we do then?

According to Gen.Ray, let us understand the various paths to having a purpose in life which is the ultimate route to happiness. The first one is through a deep insight like the examples that I have just mentioned. One has to be highly evolved to understand the journey and seek a higher purpose. The other routes are much simpler. At a basic level, we can stretch for a strong belief if not a higher purpose. This can be done by introspecting on certain values that we believe and practice. Converting your value to a strong belief and practicing it is a simpler way of giving meaning to your life. For

example, let us assume that a teacher's strong belief is to treat others the way she wants to be treated or 'Do unto others as you would have them do unto you'. With that belief which we assume is strong she can give meaning to her life by taking up a challenging task such as creating a bullying free environment in her school in a year's time where every child feels safe. For a teacher to take up a whole school task such as this is indeed challenging.

For those who find it difficult to align to a strong belief can go with the purpose of their profession or vision of the organization A teacher for example can give meaning to her life by designing or job crafting a challenging goal out of the purpose of education which is to prepare students for life. The challenging goal could be holistic development of students using subject as a medium or creating learning experiences or accelerating teaching .

Gen.Ray's workshop on *Design your future* emphaisized on the difference between 'job' and 'work'.

Reflect on what 'job' and 'work' mean to you? Job takes up most of our time and energy in a day. **Job** is an occupation with titles and positions you are paid for, a means for earning a livelihood, an economic security. It demands that you stick to the **'job description'** given to you - the employer's expectations.

Work, on the other hand, goes beyond 'job' and 'career'. There is more to work than earning a livelihood. Work is what gives meaning to life, which in turn gives you happiness. Work is passion-in-motion. Work is what transforms your profession and expertise, that impacts the occupation, community, or even the world?
It is less about training and more about the intent to build on self. They have to move out of their comfort zone.

Design your future As described by Gen.Ray,

"We are 22 years into the **4th Industrial Revolution**, and its characteristics are severely impacting the future of **work**, the future of **education**, the future of our **personal and social lives,** and the future of the **planet". This means that we need to reinvent ourselves along with problems and products.**

Innovation is not limited to products, people and problems. In the 4th Industrial Age, **Innovation Is More About Designing And Re-Designing Ourselves.** If we can do that, the rest will fall into place.

To reinvent is not to be a better version of me, but a **different version** of me. We can achieve this goal, provided we overcome the **'experiential crisis'** we face, and cope with the challenges of the **4th Industrial Revolution**.

That is the aim and scope of designing your future as conducted by Lt. Gen.Arjun Ray. According to him, we can design our future provided we practise the **Three Commandments of Life.**

1. Life has a **higher purpose**. *"The mystery of human existence lies not in just staying alive, but in finding something to live for."* (**Dostoyevsky**). Those who survived in the concentration camps of Dachau and Auschwitz, were not the young and the strong, but those who had something to live for.

2. If I am the most important person on this planet, then **designing my life is the most important project**. It is the **ONE THING** in my life. Only when I change, will the world around me change.

3. The future cannot be predicted; I must, therefore, **invent it, create it,** to live a fulfilled life.
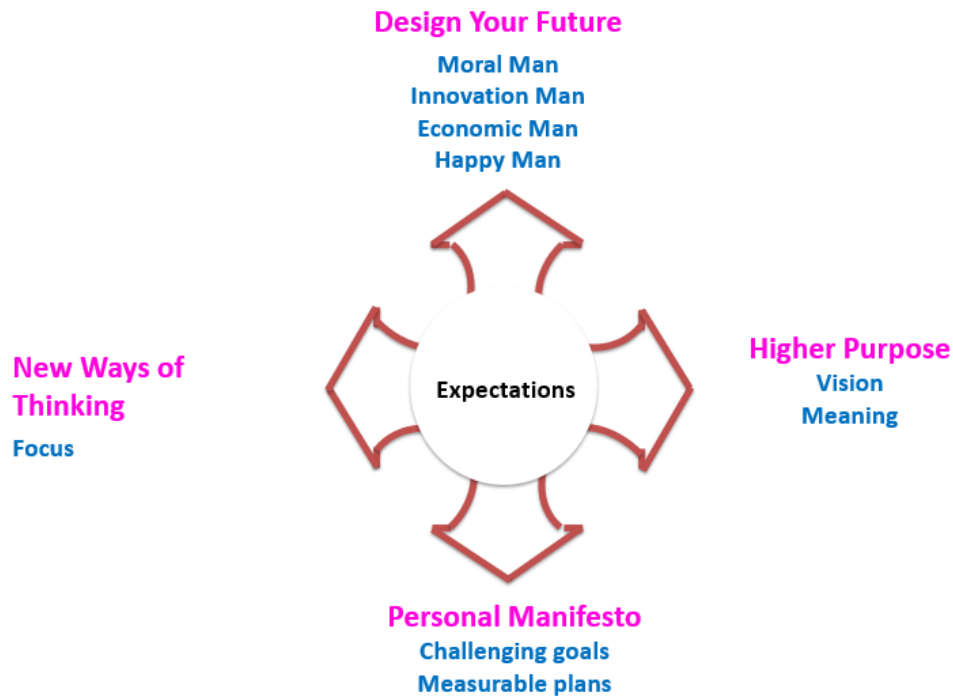
Design Your Future
Moral Man
Innovation Man
Economic Man
Happy Man

New Ways of Thinking
Focus

Expectations

Higher Purpose
Vision
Meaning

Personal Manifesto
Challenging goals
Measurable plans

Figure 4.8 Design Your Future (Ray, 2022)

<p style="text-align:center">1 – Start Where You Are</p>

The **1st** step in designing your future is **start where you are**; not where you think you are, or you wish you were. And not where you think you ought to be. In life, we face what are called **gravity problems** about our job, the boss, the money, and our future prospects. The gravity problem could be: a situation, a circumstance, or a fact of life. Like gravity, they are problems that cannot be solved. They are unchangeable, irreversible, and you can't do much about them. You can fight gravity but you can't change gravity.

The only response to gravity problems is acceptance.

The **2nd** step is to conduct a **life design assessment** to know where you are. Break this down into four main areas of your life, and gauge them from empty (zero) to full

(100): one's higher **purpose; meaning at work; emotional health;** and **love** (relationships, with family, and what precious sacrifice you are ready to make). This will help you to identify what key areas of your life need immediate attention.

This was conducted for selected teachers and few teaches from other schools to understand their perspectives as well. Please refer to Appendix R.

We believe that all this should eventually lead to domain mastery as mentioned in my introduction of the objectives.

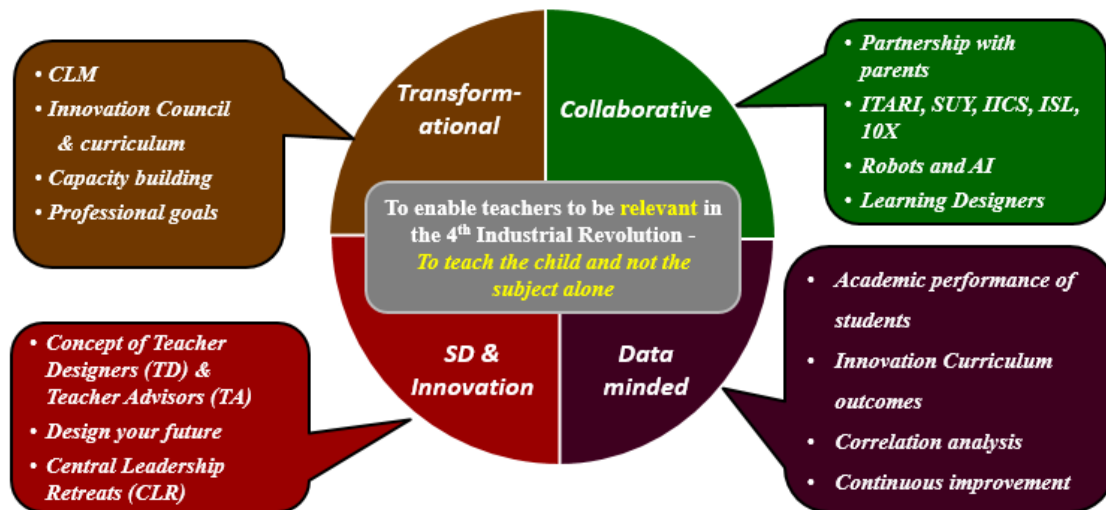Figure 4.9 Teacher Profile

Please refer to Appendix S for scores of the 4 Cs of teachers for this exercise and for training them for designing their future.

<div align="center">**4.3.5 Analysis and the Way Ahead**</div>

1. Regarding personal vision, students have been more open to making their personal vision than the teachers. Unlearning has been easier at their level. They have a better understanding of the relevance of a higher purpose and meaning to life. Teachers still think at a tactical and classroom level when it comes to personal vision. Purpose for a teachers unfortunately still continues to be the examination scores and family needs. Majority of the teachers who took the design your future programme found it difficult to visualize their way ahead. They were largely thinking in terms of their current profession and promotions within. Thinking creatively of new professions was very difficult. Needless to say, this transformation cannot happen with few workshops. It is possible through sustained self development. We have been focusing on their self-development and will continue to do so. This must precede Professional development.

2. Another important market trend that has come up in the international school scenario is the shortage of teachers. Therefore since the market is in their favour, many teachers fail to see the relevance of this transformation.

3. The creativity scores of both students and teachers are generally low and we hope as a result of our programme it should improve and result in helping them design their future and life. For students it should help in building their entrepreneurial competencies. The students who come to our schools are from affluent families and therefore are in a bubble. The risk and resilience is generally low as is evident in their scores as well. Therfore, it is imperative that we build this in teachers. Our training

and curiculum for entrepreneurial competencies we hope will bring about a change. The results of that will be clear once we implement it in it full form from Aug'23

4. We also expect the Innovation Council to reach another level. The objective of innovation curriculum is to sensitize students to innovation and transformation. We had started this journey few years back and we have revived it post pandemic. I am confident that the students will achieve their targets but most importantly leave a legacy of innovation and transfornmation in the process. Education must make them more human. This is possible if the motivation and inspiration comes from the teachers. Therefore they have to understand that empathy and creativity are two faces of the same coin. Academics, empathy and creativity are interlinked and the teachers have to see this synergy to teach the child. Right now it is largely driven by few in the leadership team and our endeavour will be to ensure most teachers are part of this journey. We have made a beginning with the renewed innovation curriculum where one third teachers have been trained as teacher designers (TD).

5. The outward bound activities is to help them connect their inner and outer self. The performance out there is an affirmation of what they are trying to achieve in school with academics and innovation curriculum. Teachers should accompany students in this journey and role model values that are expected in outward bound set up. Right now, we noticed that about 40% teachers are open to this. The rest do it because it is mandatory. The purpose of this should emerge from the teachers which is slightly a challenge now. Sensitizing them to the fact that they have a better understanding of

their students which in turn will help in unlocking their inner potential will be one of our priorities.

CHAPTER V:

Summary

The journey has started, however it is long drawn since we are dealing with mindsets and not just skills and competencies. The teachers have no choice but to rerole. As is evident, the world and the education scenario is changing at an alarming rate and it is surprising that the teachers are situationally unaware in order to remain relevant.

They seem to have a short sighted view of the emerging world where the market seems to be in their favour with international education making inroads in to Asian countries in the last two decades. This short sighted view will make them redundant in future and will directly impact students. They will be unprepared for the future. Therefore what is imperative in schools is to **change the culture and mindset of the teachers**. This starts with cognitive dissonance in them through exposure, talks, colloquims, training and retreats. Focus to be more on self development of teachers than professional development. PD is meaningless unless teachers are self and situationally aware of the purpose of education and life.

We have to give opportunities to rerole such as collaborating with technology and teaching for and with creativity. They should also understand that the onus of **learning is on oneself** and organizations can only provide opportunities . Therefore the relevance of lifelong learning and learning how to learn. This would involve unlearning to a large extent which is the most difficult part of learning. This goes back to my point

on igniting disturbance and dissonance in teachers to move them out of their comfort zone.

Schools will have to give priority to **education research**. Today, there is no education research happening at a school level anywhere in the world. Even at the college level it is limited. Organizations have to create an environment for change. This happens by building an **ecosystem** of training like we have done - The Indus Training and Research Institute (ITARI), leadership (Indus School of Leadership), technology (Eagle Robot Lab), entrepreneurial competencies (SUY). All this is driven and supported by leadership with **vison and foresight**.

All the recommendations that I have made in terms of the CLM, teaching with creativity and having a higher purpose is all about self development of teachers to enable them to **teach themselves first before they teach the child.** This is a route to academic excellence in a future that has already arrived. They have now got an opportunity to regain their lost glory.

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impact on future education. Presented at the Indus International Ideation
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Appendix A.1: Survey results pertaining to first Objective: Identify the key challenges in re-roling teachers

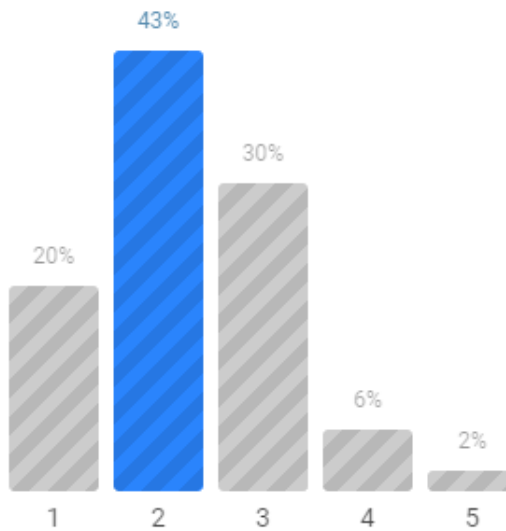### 1. How would you approach an unknowable future?

Plan
🔘 0%

Prepare
━━━━━━━━━━━━━━━━━━━━━━━━━━━ 100%

2. How prepared are schools for an unknowable future?
1 - Not prepared at all 5 - Extremely Prepared

Score: ⭐ 2.3

43% (2)
30% (3)
20% (1)
6% (4)
2% (5)

3. Do you plan or prepare for academic rigor?

Plan
4%

Prepare
96%

---

4. Why must we re-invent our lives continuously?
Open text poll   35 responses

S Sreedevi Gopalakrishna
That's what it means to be a lifelong learner

N Neelu Saini
To stay relevant

H Hema Thiagarajan
So that we stay current in the ever changing world

R Ram Manohar
Because of knowledge doubling in short time

P Pulama Devi
For personal growth and happiness

S Shikha Anand
To remain relevant in VUCA world

How are you feeling at this moment?

Wordcloud Poll ☑ 62 responses

Happy woman
Restlessly thoughtful
State of flow
Health
Grateful
energetic
Hopeful
Provoked by thoughts
Introspective
happy
Mindful
motiv
Scared
Reflective
Great
Curious
Love
Thoughtful
Energised
Responsible
Overwhelemed
Motivated
Restlessne
Inspired
Contemplative
Queries
Pensive
Focus
To prepare
Grasping
determined
I am feeling important
Sensory Attention

5. Why is critical thinking important?

Wordcloud Poll ☑ 50 responses

approachlife as a concept
Connection with Analysis
To empathize and decide
Innovate
Information to knowledge
To encounter biases
it helps us analyze
Perspective
reinvent
Usable knowledge
To make right choice
for objective analysis
minds
To take right decision
decisions
improves decision making
Imp for self love
and problem solving
Logical thinking
For analysed decision
Plan better
To understand developing

What are your thoughts about the scores?

Multiple Choice Poll ☑ 39 votes   ⤴ Share ⌄

Agree - 25 votes

████████████████████████████░░░░░░░░ 64%

Disagree - 14 votes

████████████░░░░░░░░░░░░░░░░░░░░░░░░ 36%

If you have agreed or disagreed with the score shared this morning, please state your reasons.

Open text poll   ☑ 31 responses

☐ Share ⌄

B   Bindu reddy
Disagreed because the test would have been more practical and interview kind where the answers are more honest and spontaneous

U   Uma RAVITHARAN
Critical thinking is indeed a Critical skill and to develop that, one has to read diversely, voraciously and we have not created a rigid routine to do this.

A   Anjali Negi
The data was shared to reflect on where we stand as a team or institution and the way forward.

N   Nandakumar Mukundan
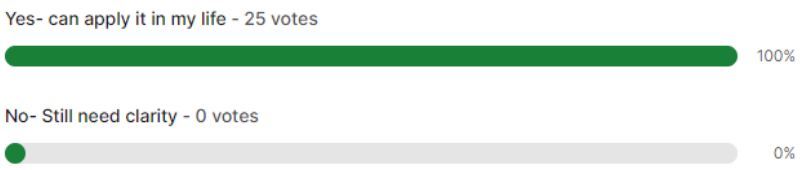I am agree with the scores shared in the morning. Teachers lack critical thinking skills.

Have you understood the difference between purpose and higher purpose?

Multiple Choice Poll   ☑ 25 votes

☐ Share ⌄

Yes- can apply it in my life - 25 votes

100%

No- Still need clarity - 0 votes

0%

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8. How do you give meaning to your work?

Wordcloud Poll   ☑ 27 responses

By treating it as my purp   By going beyond the JD

Walking extra mile   Connection

Discipline   by being committed   Purpose, self decipline

Prescious   choose a role beyond jd   Help other people

Loving my work   **Its continuous effort**   Love

Satisfactory   knowledge and activity   Extend

Full commitment   Working beyond my JD

Serve purpose and higher   By adding the value

Go beyond my work mandate

89

What are your thoughts/emotions at this moment?
Wordcloud Poll   12 responses

Share ⌄

How are you feeling at this moment?
Wordcloud Poll   29 responses

Motivated for my work
Motivating
Redesigning to work craft   Focused
Thought provoking.
Motivated   Reflective   Contemplative
Narrative matters to add
Introspective

Conflicted
Annoyed   Motivatee
Introspective   Disgusted
Reflective   Alienated   Positive   Amazing
Awake   Insightful
Incensed   Enlightened   Infuriated
Bullied
Good   Informed   Okay
Saturated
Pensive about jobcrafting   Curious
Introspective mood

How confident are you designing your future?
Rating Poll   38 votes

Share ⌄

Score: **3.9**

			37%	
		32%		29%
3%	0%			
1	2	3	4	5

Not very confident   Extremely Confident

One word you would associate with Personalization of learning?
Wordcloud Poll   38 responses

Share ⌄

Getting closer to the child
Innovation   Need of the hour   Deliberate practice
LearningNeeds   Potential
Coaching
Focus   Selfdiscipline   Vision   Informal
Empathy   rigorous   Insightful
Personalization
Self directed learning   Optimal
Progressive
CLM   Individualised   Student Agency
Student Centered   Agency   Purpose
Customisation
Independence   Self discipline   Ownership
Freedom   Informative   Concept Mindedness

90

Do you consider yourself to be a coach or a mentor?

Multiple Choice Poll   ☑ 39 votes   ⬆ Share ⌄

Coach - 30 votes

77%

Mentor - 8 votes

21%

Neither - 1 vote

3%

What is the difference between technology mindedness and being tech savvy?

Open text poll   ☑ 36 responses   ⬆ Share ⌄

M   Madhavi B
mindset vs skill

D   Disha Aggarwal
Technology mindedness is using technology to make human more human and tech savy is a person who uses a lot of softwares or enjoys working in the area of IT.

D   Dr. Vijetha Palnaty
First one is to know when, what and how to use technology and other one is to be aware of latest developments in technology. This is my understanding.

A   Achint Jain
Technological mindedness is a mindset where one seeks technological intervention and disruptions to achieve one's target as opposed to being tech savvy which means to immerse in existing technologies.

Should learning design involve a separate team of content creators or should it be the class teacher's responsibility?

Multiple Choice Poll   ☑ 39 votes   ⬆ Share ⌄

Content Creators - 26 votes

67%

Class teacher - 13 votes

33%

What new unlearning took place today after Mrs. Rao's Presentation?

Open text poll   38 responses   ⬆ Share ⌄

M   Madhavi B
fundamental difference between coaching and mentoring

D   Disha Aggarwal
Difference between a coach and a mentor

D   Dr. Vijetha Palnaty
More clarity in using the learning design to achieve the purpose of Education To make
children apply knowledge, to be independent learning aiming to build agency which
are important for 21st century skills

A   Achint Jain
Role of coach / mentor / teacher

D   Dhananjay Singh Bisht
Had a dofferent understanding about coaching.

What would you do in order to be an effective teacher coach?

Open text poll   38 responses   ⬆ Share ⌄

M   Madhavi B
create space for structured discussions that enable them to formulate the right
questions (very imp) and then think critically on possible answers.. rather than looking
for one perfect answer.

D   Disha Aggarwal
Developing mastery in my subject by deep reading. By encouraging curiosity and
imaginative thinking in kids. By helping students see the unseen.

D   Dr. Vijetha Palnaty
I will prepare my self first as a coach by deep reading

A   Achint Jain
Domain mastery and personalised learning

Dhananjay Singh Bisht

Is personalisation of learning posssible for teachers?
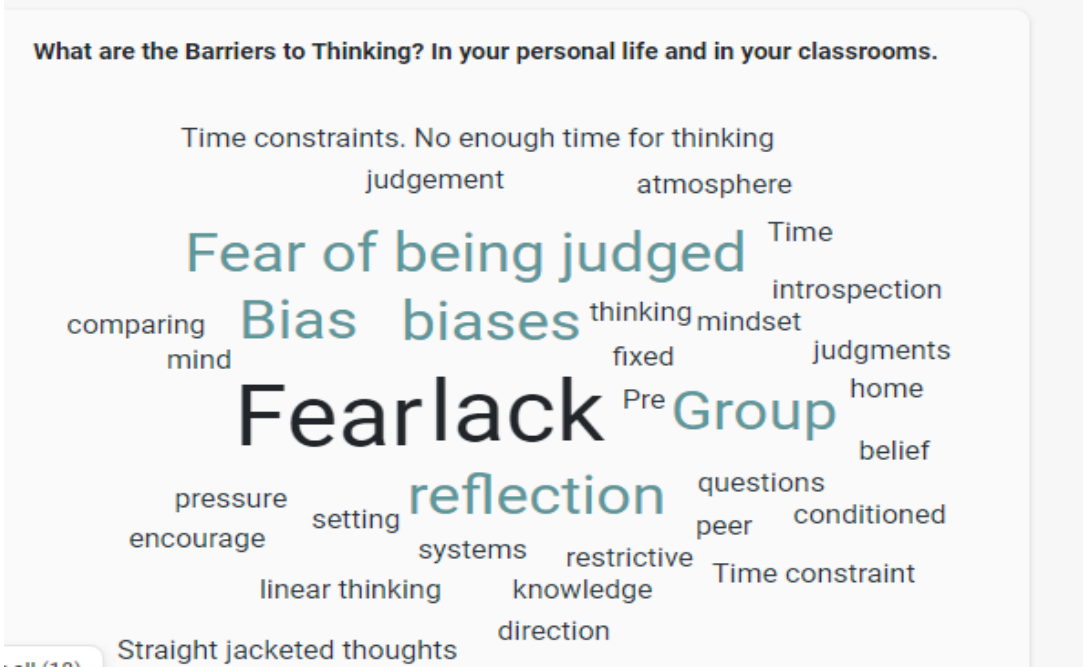
Yes- it is something a teacher can plan and prepare

████████████████████████████ 65%

No-this is not doable with the current expectations(workload)

███ 5%

Yes- we can do it with additional training

███████████████ 30%

What are the Barriers to Thinking? In your personal life and in your classrooms.

Time constraints. No enough time for thinking

judgement   atmosphere

Time

Fear of being judged

introspection

comparing **Bias biases** thinking mindset

mind   fixed   judgments

home

Fearlack Pre Group

belief

pressure   questions

setting reflection peer conditioned

encourage

systems   restrictive Time constraint

linear thinking   knowledge

direction

Straight jacketed thoughts

Appendix A.2: SUY PD Survey

Day 1 Analytics:

Survey Question 1:

Objective: To understand the Teacher Designer's opinion about the role of teachers

		Top % of poll votes
Question	Who can best nurture a child's creativity?	Teachers (60%) & Society (25%)
	Who can best help the child build life skills?	Teachers (62%), Society (18%)& Parents (15%)
	Who can best nurture ambition and drive for a child?	Teachers (53%), Parents (35%)
	Who would be the most engaging role model/mentor for the child?	Teachers (65%), Parents (24%)

Inference
The Teacher Designers are clear on the role of a teacher in grooming a child's life entrepreneurship skills	Teacher Designers believe that Parents/Guardians play an important role

Options given : Teachers/school, Parents, Society, Friends/siblings

Activity

STARTUPYOU

Activity

Madlibs – Randomly chosen nouns and adjectives plugged into a pre-written text, resulting in a fun and interesting script.

Question

What did the TDs think was the purpose of the activity?

Observation

85% of the teachers believed the purpose of the activity was to open the mind to ridiculous/whacky possibilities
10% believed the purpose was to foster collaboration

Inference

The TDs are open to whacky ideas emerging from stimulating activities and believe that collaboration and collective work can help boost creativity. They were very keen to take it back to their classrooms.

Survey Question 2:

Objective -To understand the teacher designers' mindset regarding ideas and how they dealt with them thus far. This question was asked before introducing the Zine activity of creative journaling.

Question

How did they log ideas usually?

Observation

44% of them maintain a journal

47% just commit them to memory and make no notes

3% don't care for radical ideas

6% believe they don't have time for creative ideas

Inference

50% of the teachers believe creativity is for everyone and keep ideating. The rest (47%) don't take their ideas seriously and/or don't believe in its purpose (9%).

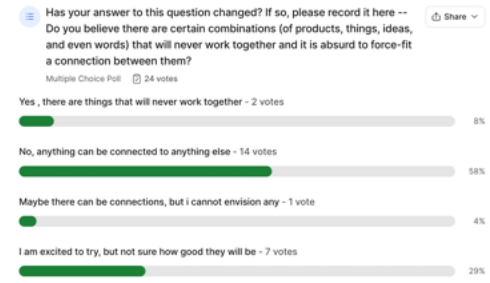**Activity** — Objective: Wacky Idea - building an imaginative & creative environment

Teachers were encouraged to think creatively through an exercise. They were asked to connect two random objects – pizza and sunglasses and asked to come up with an idea/product combining both.

Do you believe there are certain combinations (of products, things, ideas, and even words) that will never work together and it is absurd to force-fit a connection between them?
Multiple Choice Poll · 32 votes

- Yes , there are things that will never work together - 2 votes — 6%
- No, anything can be connected to anything else - 10 votes — 31%
- Maybe there are ideas that can be connected, but I don't think I can envision that - 5 votes — 16%
- I am excited to try, but not sure how good they will be - 15 votes — 47%

Before the activity

Has your answer to this question changed? If so, please record it here --
Do you believe there are certain combinations (of products, things, ideas, and even words) that will never work together and it is absurd to force-fit a connection between them?
Multiple Choice Poll · 24 votes

- Yes , there are things that will never work together - 2 votes — 8%
- No, anything can be connected to anything else - 14 votes — 58%
- Maybe there can be connections, but i cannot envision any - 1 vote — 4%
- I am excited to try, but not sure how good they will be - 7 votes — 29%

After the activity

Inference : The Teachers found the activity interesting and the engagement level was high. Wacky ideas and going beyond the normal was observed.

The activity helped change the mindset of teachers that everyone can be creative and they embraced randomness again.

The activity helped increase the creative confidence of teachers. They were very keen to take it back to their classrooms.

Activity & discussion on Thinking Different

Objective: Design Thinking Case Studies, Imagination station, Setting the stage for Idea Hackathon. Embracing divergent thinking, opinions and perspectives

Activity

The teachers were taken through a whole variety of design driven innovation in real life.

Question

The teachers were asked which of these examples they would take back to their classroom

Observation

Around 55% wanted to take back activites that showed how innovation saved lives or helped livelihoods

38% of teachers chose technological advancements as an example

Over 60% wanted take back a combination of social enterprise and tech innovation to their classrooms as exemplars to inspire

Inference

Teachers are of the opinion that the purpose of DTP and design is to help a noble cause

Tech advancements are seen as a "nice to have" and take the next priority.

Survey — Objective -To understand teachers' opinions on how curiosity can be nurtured

Observation

80% believe exposing children to innovations happening around the world will help motivate children

17% believe that children must not be given any direction and should start on a blank slate

Inference

After the Think Different to inspire to solve Problems discussion, the TDs are affirmative towards showing examples to increase awareness, and nurture curiosity.

Day 2 Analytics:

Survey: Knowing you better

Objective: To understand the teachers mindset and understanding with respect to higher purpose, reinventing oneself, competencies for the VUCA world and creativity.

The following questions were asked:
- What stops you from expressing your creativity?
- What stops a child from expressing their creativity?
- What does reinventing oneself mean to you?
- What competencies are required for a student to thrive in the uncertain future?
- Do you align with the concept of having a higher purpose?
- What does Higher purpose mean to you?

What stops you from expressing your creativity?

Total: 30 participants

Reasons cited:

- Time (10 responses)
- Judgement (8 responses)
- Hierarchy / Structure (4 responses)
- Environment (4 responses)
- Fear of failure (2 responses)

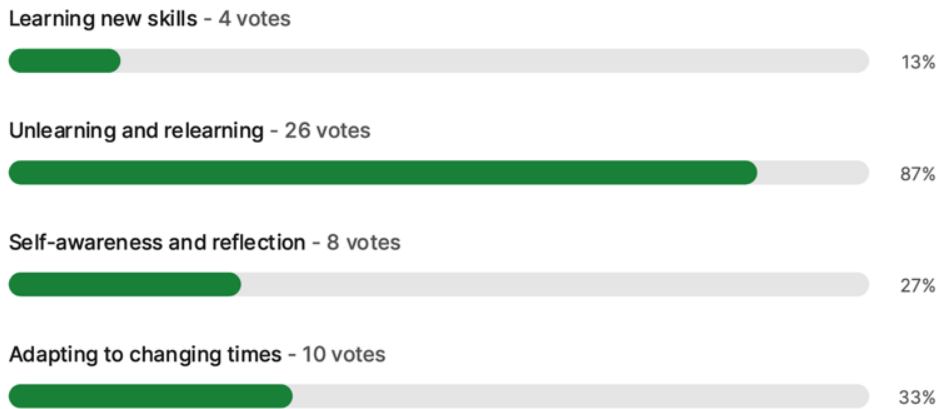## What stops a child from expressing their creativity?

Total: 30 participants

Reasons cited:

- Judgement (8 responses)
- Expected structure (7 responses)
- Workload (6 responses)
- Grading (5 responses)
- Harsh feedback (3 responses)
- Other responses: fear of failure, lack of self-awareness, mentors.

What does reinventing oneself mean to you?

Multiple Choice Poll · 30 votes

Learning new skills - 4 votes

13%

Unlearning and relearning - 26 votes

87%

Self-awareness and reflection - 8 votes

27%

Adapting to changing times - 10 votes

33%

Which of these competencies are required for students to thrive in an uncertain future? (select upto 3 most applicable options)

Multiple Choice Poll · 30 votes

Critical thinking - 22 votes

73%

Creativity - 23 votes

77%

Empathy - 13 votes

43%
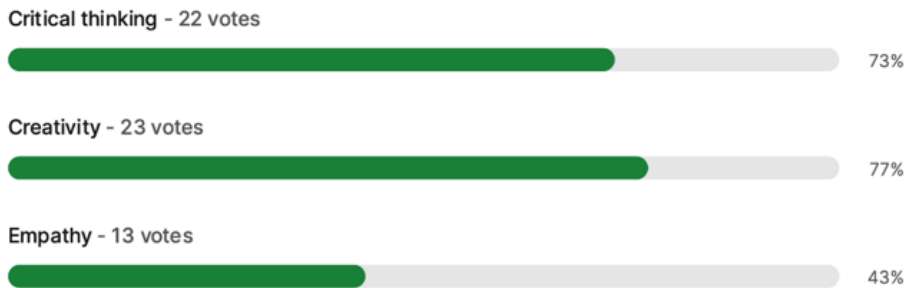
Other options given to respondents include: risk taking, resilience, data driven, tech awareness, emotional intelligence, goal driven, reflection and introspection, collaboration

97

Do you align with the concept of having a higher purpose?

Out of the 31 respondents,

30 participants expressed through words on their alignment to the concept. Majority of the respondents have mentioned that they still haven't figured out what their higher purpose is.

1 expressed in not completely aligning to having a higher purpose but believed in everyday simple goals such as being humane, humility, being a good human being.

What does higher purpose mean to you?
Wordcloud Poll ☑ 30 responses

Passion beyond me & mine   Discipline and commitmen
Self satisfaction   Finding your disatisfact
Service to self ater good
Long term dedication   Pivtol of life
That benefits society
Human Engineering   **Understanding self**   Meaningful life
Having a vision,   moving from lham to.Param   Life purpose
Selfdiscovery   Spirituality   Happiness
Reason for my existence
Is one really required?

What challenges have you faced while engaging students in problem identification/definition?
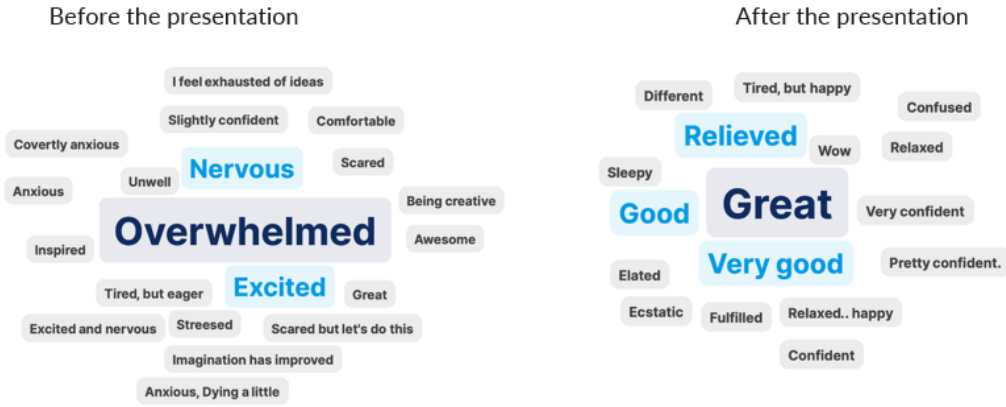
Questions of pre-survey - refer document : Microsoft Word Document

- The objective of the pre-survey question was to know their challenges.
- The discussion, hands on activity was conducted on Day 2 and 3 which aimed to strengthened their confidence to identify the problems. However, many teachers have requested for another couple of sessions to strengthen their confidence and in guiding students in problem identification. This will be included during check in sessions in March and April.
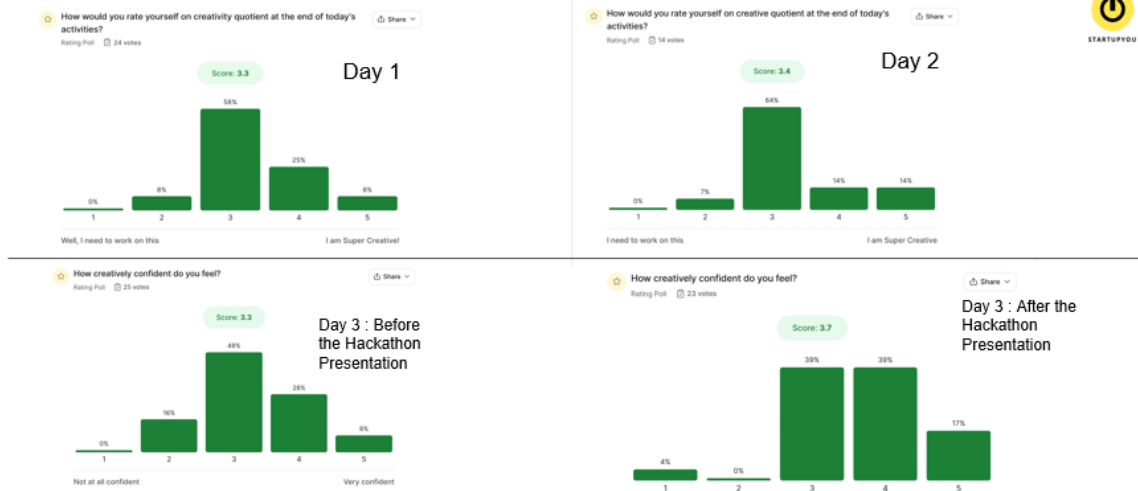
Day 3 Analytics:

Feelings word cloud: To gauge their emotions before and after the Idea Hackathon presentation General Ray and Mrs Rao

Before the presentation

I feel exhausted of ideas
Slightly confident   Comfortable
Covertly anxious
Nervous   Scared
Unwell
Anxious
Being creative
Overwhelmed   Awesome
Inspired
Tired, but eager   **Excited**   Great
Excited and nervous   Streesed   Scared but let's do this
Imagination has improved
Anxious, Dying a little

After the presentation

Different   Tired, but happy   Confused
Relieved   Wow   Relaxed
Sleepy
Good   **Great**   Very confident
Elated   **Very good**   Pretty confident.
Ecstatic   Fulfilled   Relaxed.. happy
Confident

Overall Feedback Analysis:

Day 1 — How would you rate yourself on creativity quotient at the end of today's activities? Rating Poll, 34 votes, Score: 3.3

Day 2 — How would you rate yourself on creative quotient at the end of today's activities? Rating Poll, 14 votes, Score: 3.4

Day 3 : Before the Hackathon Presentation — How creatively confident do you feel? Rating Poll, 25 votes, Score: 3.3

Day 3 : After the Hackathon Presentation — How creatively confident do you feel? Rating Poll, 23 votes, Score: 3.7

Inference on Creative Confidence of the Teachers:

This was a self-assessment of the teachers (and not the same sample – this is the cohort's average scores). The creative confidence level from day 1 to day 3 has increased from 33% to 56% (4,5) which could also have been the series of activities, unlearning and trying the sci-fi idea hackathon including collaboration, research and AI tools.

What's your biggest takeaway from the 3 days?

- Difference between good idea and great idea
- How to define a problem statement
- Value of being free from judgement
- Creative surrounding can foster creativity
- Creativity has no limit
- Time is so important in order to truly express one's creativity!
- Vital to create safe environment for children to become bold thinkers
- Divergent thinking

What's your biggest unlearning?

- Everyone is capable of being creative
- Any idea original or not can be encouraged to become a great idea
- I've unlearnt the notion that creativity implied drawing and painting.
- That there is no "wrong" form of creativity. It's our mental block and barriers that make it seem like we may not be creative enough.
- I was under the impression that through the DTP process we were looking for very practical ideas. This disheartened me a little, as I felt that focusing primarily on that was not conducive to encouraging creativity. When I heard General say today that he wants us to ignite our children's imagination, it was such a joyous moment for me. I feel like I can now unlearn the mindset that I've had to cultivate here, and I am so looking forward to relearning how to celebrate imagination and creative expression!

Appendix B: Professional Development Plan for Teachers
ENRICHMENT TRAINING PROGRAMME OBJECTIVE & MEASUREMENT

By the end of the Training Programme, teacher designers will be able to effectively deliver the SUY curriculum in their classrooms. They will be like Barefoot Designers.

Month 1	*Boosting curiosity and creative confidence and encouraging inter-disciplinary thinking*	*Outcome: Idea Hackathon*
Month 2	*Taking moonshot ideas from the phase 1 and transform them into workable ideas / new workable ideas*	*Outcome: Design Sprint*
Month 3	*Taking the workable ideas to viable ideas in phase 3 and testing them. With a focus on building Business competencies and developing an entrepreneurial mindset*	*Outcome: Shark Tank*

How will we measure?

- **Pre & post workshop online assessments: Competency assessment a) as a baseline in Month 1 and b) end of Moth 3 in Creativity, Critical Thinking & Empathy**
- **Teacher Designers should have lesson Plans ready for the first half of the upcoming academic session**
- **The 3 outcomes : Idea Hackathon (Month 1), Design Sprint (Month 2) & Shark Tank (Month 3)**

Pre & Post workshop competency assessments

Competency assessment in the following will be taken by the Teacher Designers:
 (a) as a baseline in March and (b) end of May
1. *As a baseline Assessment before the training (March '23)*
2. *At the end of the 3rd month of training (June'23)*
    a. *Critical Thinking test*
    a. *Creativity Test*
    b. *Empathy Test*
    c. *Collective Intelligence during collaboration*

Critical Thinking: https://www.assessmentday.co.uk/watson-glaser-critical-thinking.htm
Empathy: https://www.idrlabs.com/multidimensional-empathy/test.php
Creativity: http://www.testmycreativity.com/
Collective Intelligence: to be observed during collaboration

Appendix C.1: Collaborative Learning Model (CLM) Benefits Post Covid Analysis:

CLM subjects RCB 21 vs RCB 22

Only the following subject/grade combinations showed an improvement.

Grade	Subject	RCB 21	RCB 22	Change	Change%
7	Biology	57%	61%	+4	7%
8	Chemistry	51%	54%	+3	5.8%
8	Biology	57%	61%	+4	7%
9	Biology	55.4%	58%	+2.6	4.6%
11	Chemistry	56.46%	66.8%	+10.4	18.42%
11	Biology	54.54%	59.71%	+5.2	9.5%
11	Business	58.52%	66.24%	+3.7	6.3%

Non - CLM subjects RCB 21 vs RCB 22

Only the following subject/grade combinations showed an improvement.

Grade	Subject	RCB 21	RCB 22	Change	Change%
6	English	60%	65%	+5	8.33%
8	English	62%	63%	+1	1.6%
11	English	57.18%	62.8%	+5.7	9.9%
11	Modern Languages	63.56%	63.62%	+0.6	0.95%

Supporting graphs

G6 to 8 - RCB21 vs RCB 22 - CLM subjects
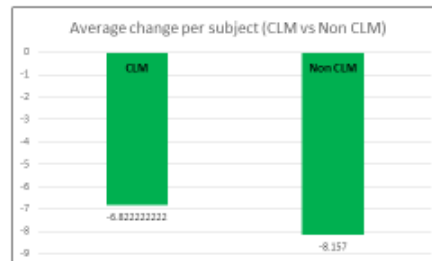

Gr6-8 RCB21 vs RCB 22 non CLM subjects
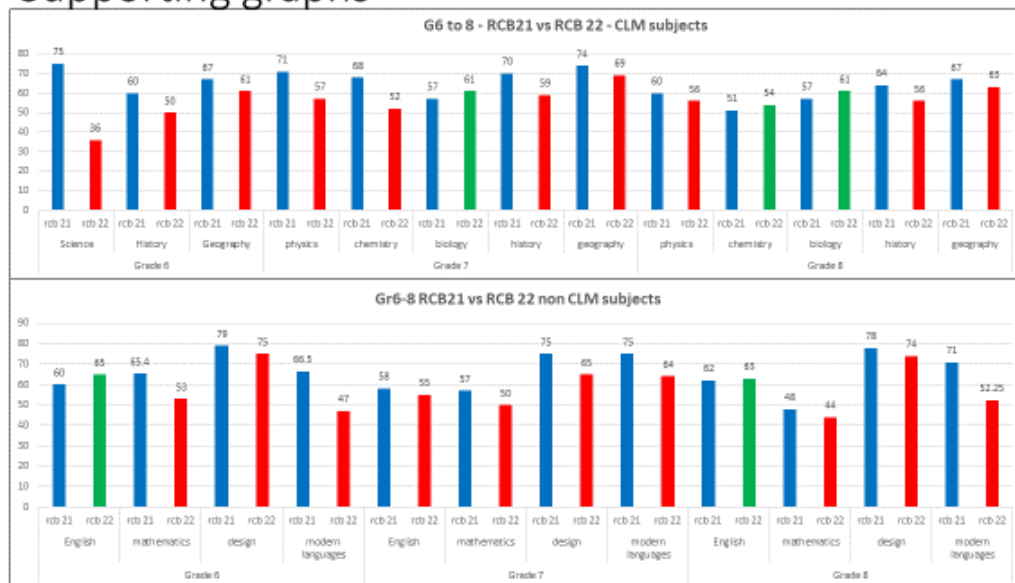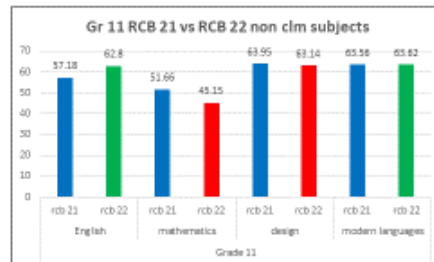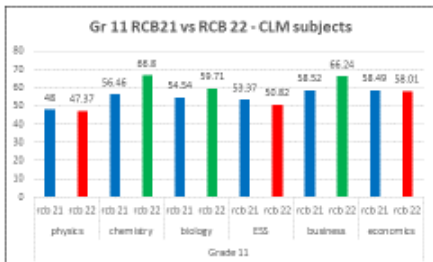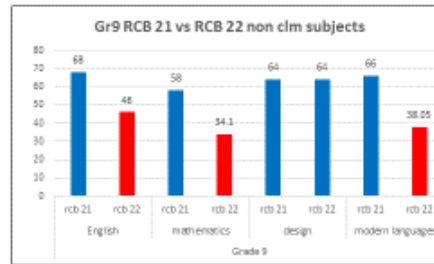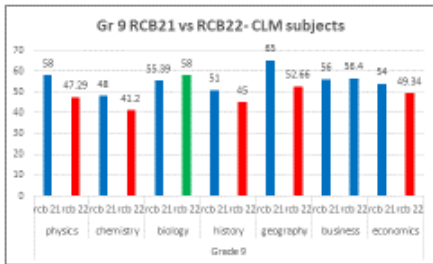
RCB21 vs RCB22 subject wise data
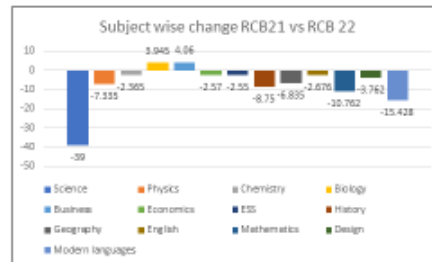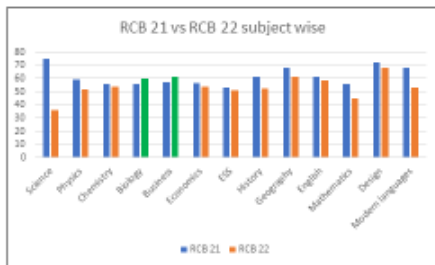
1. Overall, student performance has fallen across all subjects but the decrease is greater in the non CLM subjects.
2. Biology and Business studies are the only 2 subjects showing an overall increase. Both these subjects are taught the CLM way.

What is the co- relation between CLM and non CLM scores based on academic scores ?
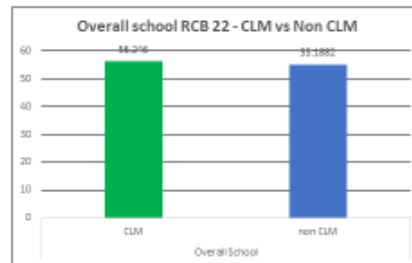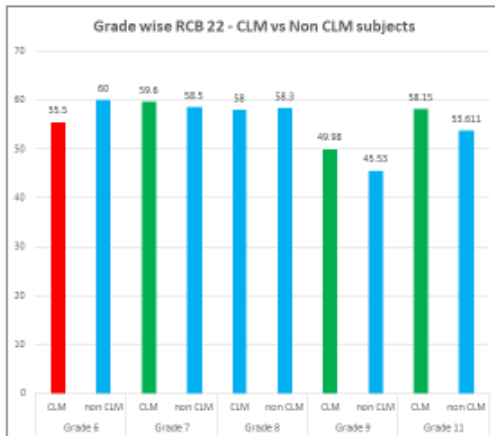
RCB22 CLM vs Non CLM

Grade wise RCB 22 - CLM vs Non CLM subjects

Overall school RCB 22 - CLM vs Non CLM
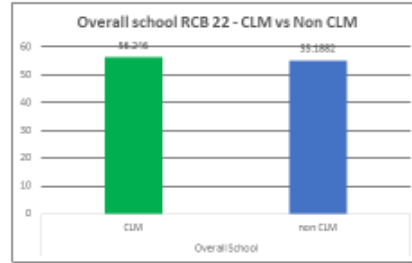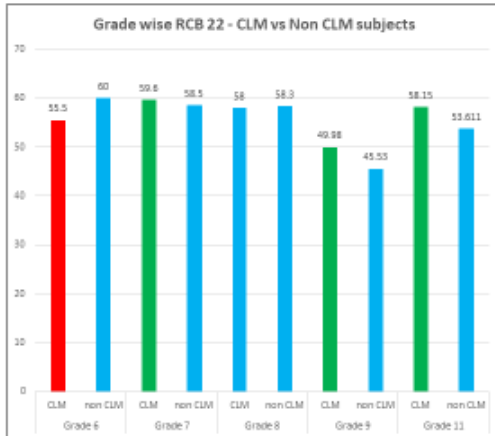
The CLM subjects performed better in Grade 7, 9 and 11

	non CLM	CLM	Difference	difference%
Grade 7	58.5	59.6	+1.1	1.8%
Grade 9	45.53	49.98	+4.45	9.7%
Grade 11	53.611	58.15	+4.6	8.5%

What is the co-relation between CLM scores and Innovation curriculum scores?

	CLM subjects %	IC scores %
Grade 6	55.5	55.59
Grade 7	59.6	52.29
Grade 8	58	58.03
Grade 9	49.98	40.89
Grade 11	58.15	61.45

Correlation - .805

	non CLM subjects %	IC scores %
Grade 6	60	55.59
Grade 7	58.5	52.29
Grade 8	58.3	58.03
Grade 9	45.53	40.89
Grade 11	53.611	61.45

Correlation - .69

There is a very strong positive correlation between the CLM subject scores and the IC scores across all grades.
This shows that the use of CLM impacts the development of competencies in students.

Has the use of CLM improved teacher effectiveness? (overall TPIN scores)

	CLM Teachers average TPIN	Total Scores	Ave %	Non CLM Teachers average TPIN	Total scores	Ave %
RCD 21 - 22	137.8	250	54.80%	138	250	55.20%
RCB 22 - 23	50.21	150	33.44%	40.82	150	27.21%

The TPIN scores have been positively impacted for teachers who have been delivering subjects using the CLM format.

Observations

Comparing RCB21 vs RCB22 may not be the best form of comparison for the following 2 reasons

1. RCB21 was held online whereas RCB22 was held in person
2. The benchmarks were significantly raised in the academic session 22-23

Although the academic data itself is not very positive the impact has been on the IC scores of the students and the TPIN scores of the teacher.

: **<u>Comparison of results of Half-Yearly exams vs</u>**

<u>Final exams of 2022-23 in CLM subjects</u>
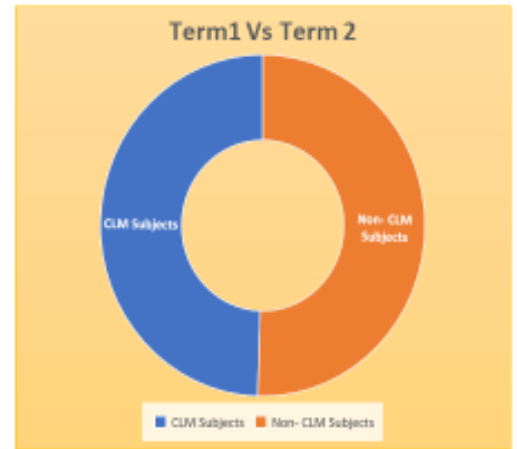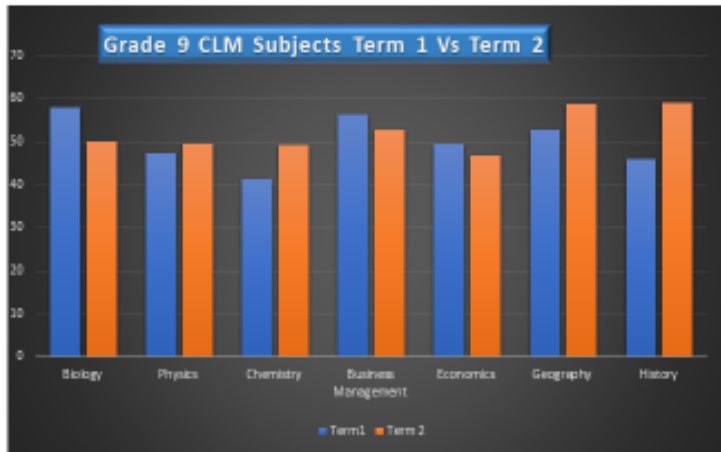
➢ Average increase of 4 % in Term 2 vs Term 1 across all subjects.

➢ Minimum increase of 4% in each subject and maximum increase is 18%. Except Biology, BM and Economics.

➢ In CLM Subjects – Physics, Chemistry, Geography, History Performed better than Biology, Economics and BM

➢ Overall difference between CLM and Non- CLM subjects is 8%

Appendix D: Lesson plan – Learning Designers

<u>Lesson Plan 1:</u>

Subject: General Science   **Grade:** 6

Topic: Interdependence and Food Chains, Food Webs and Energy Pyramid

Duration: 40 minutes

The teacher brings in the relevance of the **Key Concept** of **interdependence** and

differentiates it from collaboration in an age-appropriate manner through examples from

daily life scenarios. Examples of situations which depict the ripple effect of the absence of any one component in an ecosystem is used to bring out the relevance. This provides a hook for the students to immerse in the Robot lesson that follows.

Lesson	Robot
1	Food Chains and Food Webs G6 bio unit Ecology_ L1_Food chain and fo Assessment food chain test.docx

The teacher concludes the robot lesson by re-iterating the concept of Interdependence by relating it to the ancient African concept of **Ubantu** which highlights the importance of humanity to others. It is often described as 'I am what I am because of who we all are'. It is important to note that the teacher is not confining the discussion to just a Science topic, but relates it to connections in life and there by making it inter-disciplinary.

The **assessment** at the end of the robot lesson helps the teacher identify the learning gaps. She analyses the results and uses this information to create personalised lesson plans at different levels for the students.

The personalised plan which she implements is given below:

Lesson	Personalisation		
2	**Level 1**	**Level 2**	**Level 3**
	Students will attempt the following tasks as a group: • Create a mindmap of their	Students will have a discussion on the following guiding questions as a group and	Students will have a discussion on the following guiding question as a group and make notes in their notebook.

		understanding of a Food web in an environmental region of their choice. Eg: Tundra, Rainforest, Desert, etc.	make notes in their notebook.	They are asked to share their answers with the teacher once
			They are asked to share their answers with the teacher once ready. After that they use their laptops for further research and validate their answers.	ready. After that they use their laptops for further research and validate their answers.
		• Reflect and write down in their notebooks on why the energy flow in an ecosystem is represented as a tapering pyramid and not as a rectangle.	Guiding questions: • Why does only 10 percent of energy get transferred to the next trophic level? • How do decomposers play a role in energy transfer? • How should we, human beings modify our actions to conserve the balance in the ecosystem?	Guiding question: • Tourism helps to improve the economy of a region. But, it is increasingly being located in natural areas and areas with fragile ecosystems like the Western Ghats. Discuss the ethical dilemma that people face in these areas and suggest solutions to conserve the biodiversity.

Lesson Plan 2:

Subject: Economics   **Grade:** 9
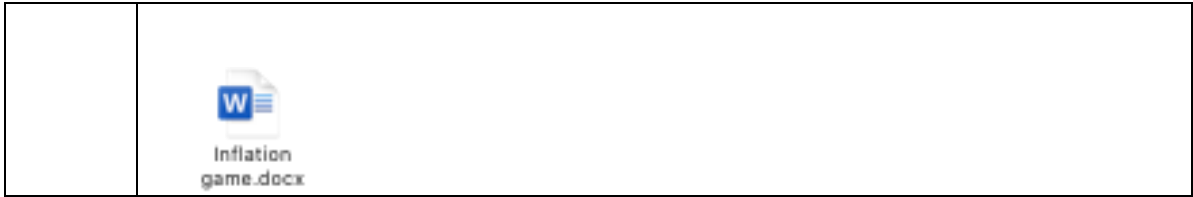
Topic: Circular Flow of Income

Duration: 40 minutes

Lesson	Robot
1	Circular Flow of Income

	Circular flow of income-
	Assessment
	Circular flow of income

Lesson	Gamification
1	Through this game, students will understand what is inflation.
	Students will be given money, they will bid on certain goods and services. The highest bidder gets the good. There will be four rounds of bidding. Each round will depict one particular world situations. For instance,
	Round 1 – Stable Economy
	Round 2 – Food Shortage
	Round 3 – Demonetisation
	Round 4 - Pandemic
	At the end of the each round, the teacher will gather the key findings and ideas from the students.
	After this, students will analyse the impact of inflation on circular flow of income.
	Game-
	handout_1_funny_money.docx

Lesson	Personalization		
	Level 1	**Level 2**	**Level 3**
1	The teacher will guide the students on the instruction of the **following game**. https://wordwall.net/resource/54455497 The game will enable students to understand the basic concepts and applications of government intervention such as taxes and	Students will play the <mark>**Tragedy of Commons game**</mark>. In this game, students represent farmers who use a common grazing area to feed their cows. However, the grazing area is limited, and overuse leads to environmental degradation. Students must create a dialogue script in collaboration with each other regarding how many cows they will bring to graze and the 10% tax they pay for each cow. They will also include in the script - 1. Discussion between farmers on the effect of the tax 2. Discussion with the government authority regarding how the tax revenue will be used 3. Discussion regarding alternatives the farmers are suggesting to the government instead of raising the tax. 4. Conclusion regarding number of cows to bring to graze The script will be presented in the form of a skit/dialogue delivery OR	This group of students will be assigned with the <mark>**Harkness Method**</mark> of discussion. The topic/central idea of the discussion is – Students will be asked to conduct an in-depth research about the various forms of intervention implemented by Governments around the world to curb the consumption of cigarettes. The countries they choose must be different types of

subsidies, in an **immersive learning experience**. The game will be supervised by the teacher continuously and provide support and assistance throughout and close the learning gaps.	Students will be given the following attached **case study.** After reading the case study, the students will use the **Ishikawa diagram technique also known as fish bone diagram,** which is a problem-solving tool used to identify cause and effects of various phenomena. Using this technique, they will **identify the main problem/cause** that led to the need for government intervention and they will **brainstorm and troubleshoot possible alternative solutions** to the problem. Fishbone Diagram Template.docx Case Study.docx	economic systems – ranging from capitalist, socialist and mixed economy. The outcome of this would be to enable the students to understand not only the need for interventions but also to understand the differences in extent of intervention based on the economic and political priorities of the country's chosen.

Appendix E: Formative Assessment scores of Students

Grade 9 Geography:

Student Names	Formative Assessment (January)	Formative Assessment (March)	Formative Assessment (May)
	Score (20 pts)	Score (20 pts)	Score (20 pts)
Aarnav Agrawal	15	18	20
Aarush Somani	16	15	19
Abhinandan	12.5	15	16
Auriane Audrey	12.5	15	17
Gyaan Gaurav	11	8	9
Kalika Vaidya	15	17	19
Lakshya Mittal	9	8	9
Mandavi Goyal	10	13	14
Nerio Prie	13	18	19
Prayash Gowda	14	14	15
Kalika Vaidya	15	17	18
Lakshya Mittal	9	7	18
Mandavi Goyal	10	13	16
Nerio Prie	13	17	18
Prayash Gowda	14	17	19
Aarnav Agrawal	15	18	20
Aarush Somani	16	15	19
Abhinandan Gopalakrishnan	12.5	15	16
Auriane Audrey	12.5	15	17
Gyaan Gaurav	11	8	9

Grade 9 Chemistry:

Student Names	Formative Assessment (January)	Formative Assessment (March)	Formative Assessment (May)
	Score (16 pts)	Score (16 pts)	Score (16 pts)
	8	12	16
	4	10	14
	11	12	13
	6	8	8
	4	8	10
	5	16	16
	2	3	9
	4	16	14
	2	9	16
	3	10	14
	8	11	13
	4	9	12
	11	12	13
	6	7	9
	4	8	9
	8	10	13
	5	10	11
	12	12	13
	6	8	9
	4	8	9

Appendix F: Sample of SDL Assessment

Case Study on Self-Directed Learning

Grade: 9   **Subject: Economics**

Topic: Absolute and Comparative Advantage Theory

Executive Summary: This report provides an overview of a case study on self-directed learning (SDL) of Absolute and Comparative Advantage Theory in a Grade 9 Economics class. The study focuses on integrating teacher-led strategies with online resources and group discussions to enhance students' understanding and performance.

Introduction: This case study delves into the self-directed learning journey of 40 Grade 9 students studying Economics. The topic of focus is the Absolute and Comparative Advantage Theory. The case study showcases a teacher-led strategy combined with SDL to enhance students' understanding of these economic concepts.

Objectives: The main objectives of this SDL lesson are as follows:
1. To comprehend the concepts of Absolute and Comparative Advantage Theory.

2. To understand the significance of specialization and its relation to international trade.

Strategy:

Before the SDL was sent out, the teacher facilitated a comprehensive discussion on the advantages and disadvantages of international trade, including an analysis of the pros and cons of free international trade. After this session, in the personalization class, level 1 students received a case study on trade protection and were required to answer questions based on the given scenario. Level 2 students were provided with a newspaper article titled "Trade Protection" for analysis. On the other hand, level 3 students were tasked with a more advanced assignment where they had to select two countries of their choice and conduct research on the level of trade restrictions imposed by their respective governments, ultimately comparing their trade protection policies.

To support SDL, the teacher provided the students with two online resources: a video lecture and an article focused on the absolute advantage theory. These resources allowed the students to augment their understanding beyond the confines of classroom discussions, promoting independent exploration.

Subsequently, during the following class session, the teacher posed critical thinking questions based on the SDL content. This approach encouraged students to actively engage in a class discussion, wherein they shared their insights, raised questions, and sought clarification to reinforce their knowledge and solidify their understanding of the absolute advantage theory.

Outcome: Through a blend of teacher-led discussions and SDL using online resources, students achieve conceptual clarity, can relate economic principles to practical scenarios,

and can think critically about economic principles and analyze their implications on a global scale.

Assessment: Out of the 40 students studying Economics, 25 students participated in the SDL assessment. Figure 1 illustrates the performance of the 25 students who participated in the SDL assessment. The assessment was conducted on a scale of marks out of 10, and the figure presents the individual scores of each student. The class average score on the assessment was 7.72 out of 10, indicating a better understanding of the content learned through the combined teacher-led and SDL approach.
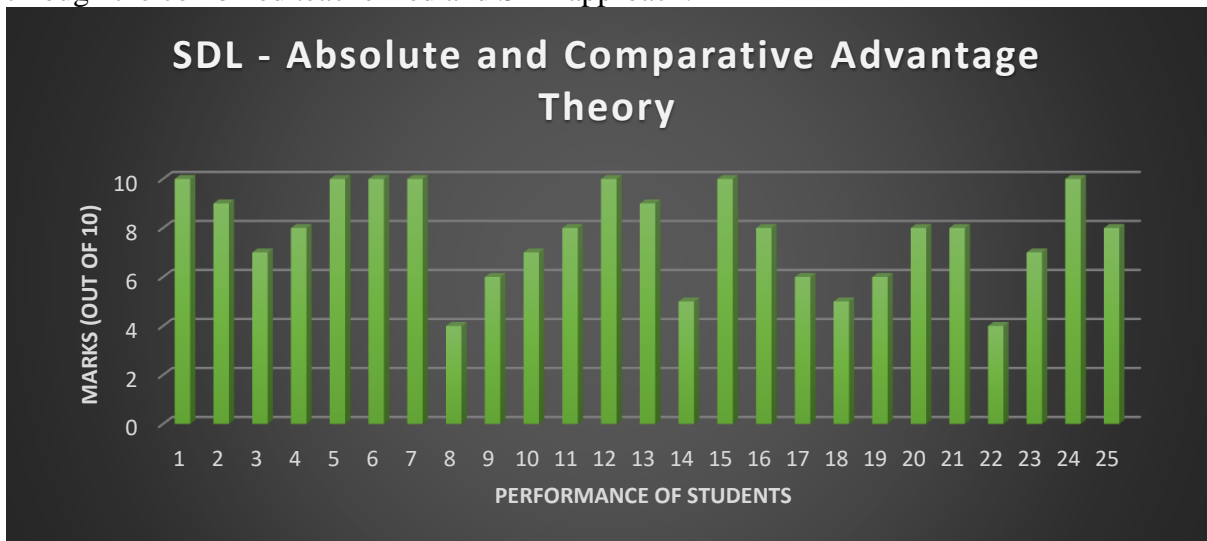
Performance of students who participated in the SDL assessment that was conducted on a scale of marks out of 10.
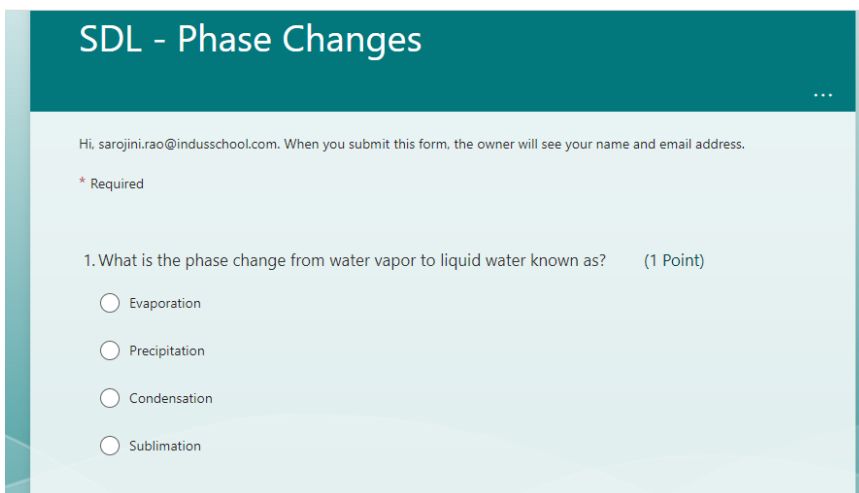
Conclusion: This case study demonstrates the effectiveness of the teacher-led strategy combined with SDL in enhancing students' understanding of Absolute and Comparative Advantage Theory in economics. The active participation, real-world examples, and utilization of online resources have enriched students' knowledge, promoting critical thinking and real-world application of economic concepts.

To improve participation from all the students, and keep them motivated and on track, a dedicated SDL period is recommended within the curriculum. During this designated time,

students must come prepared for group discussions after working on the SDL content. This will play a vital role in monitoring their progress, addressing any queries they may have, and overcoming challenges they encounter.

Grade 6 Science:

Students capability to learn certain concepts on their own, building on their prior knowledge was assessed in this task. Prior to setting this task, the teacher induced the student's thinking through a simple experiment related to a real-life scenario, about what would they classify as a phase change. Following this, they were asked to go through the simulation to observe the change in particle behavior during a phase change (Link to simulation: https://simbucket.com/meltingandboiling/) and make notes. After this, they had to answer a few multiple-choice questions provided in the form below. These questions helped to monitor their progress, address any queries and overcome challenges they encounter.

SDL - Phase Changes

···

Hi, sarojini.rao@indusschool.com. When you submit this form, the owner will see your name and email address.

* Required

1. What is the phase change from water vapor to liquid water known as?   (1 Point)

   ◯ Evaporation

   ◯ Precipitation

   ◯ Condensation

   ◯ Sublimation

2. What is the change of state from a liquid to a solid called as? * 🔖 (1 Point)

○ Melting

○ Freezing

○ Evaporation

○ Sublimation

3. Which phase change refers to solid directly changing into vapor? *   (1 Point)

○ Evaporation

○ Sublimation

○ Condensation

○ Precipitation

4. What is the phase change when your watermelon popsicle turns into watermelon juice due to heat from the sun? *   (1 Point)

○ Melting

○ Condensation

○ Precipitation

○ None of the above

5. Why do you see water droplets on the bottom of the lid when you cover your hot milk with the lid? *   (1 Point)

○ Evaporation

○ Precipitation

○ Condensation

Appendix G: **Student Performance in SDL(Self-Directed Learning) component**

Grade 9 Chemistry

Student Names	SDL (January) Score (10 pts)	SDL (March) Score (10 pts)	SDL (May) Score (10 pts)
darsh Biju Sophia	5	6	7
handrakanth M	4	6	7
hirag Ravikumar	3	6	7
hakshith L	6	4	4
iya Anand	4	7	8
hubh Gupta	5	6	7
iyona Khurana	3	5	6
uti Sandip Shah	4	4	4
wapn Kumar Singh	5	6	7
anush Vikas Reddy	3	2	5
hubh Gupta	4	6	7
yona Khurana	3	5	6
uti Sandip Shah	3	4	4.5
wapn Kumar Singh	5	6	7
anush Vikas Reddy	1	2	6
hubh Gupta	5	6	8
yona Khurana	3	5	6
uti Sandip Shah	4	4	7
wapn Kumar Singh	5	6	7
anush Vikas Reddy	3	2	5
hubh Gupta	5	6	7
iyona Khurana	3	5	6
uti Sandip Shah	4	3	4
wapn Kumar Singh	5	6	7
anush Vikas Reddy	3	4.5	5

Grade 9 Geography:

Students	SDL (January)	SDL (March)	SDL (May)
	Score (10 pts)	Score (10 pts)	Score (10 pts)
Aarnav Agrawal	7	7	8
Aarush Somani	7	8	0
Abhinandan	6	8	5
Reeti Singh	5	6	7
Sathvik Shastry	8	8	10
Shruthi Swaminathan	9	8	9
Shubh Gupta	5	7	6
Siddharth Manojkumar	7	6	7
Soha Baig	1	5	9
Woosung Weon	8	8	9
Reeti Singh	3	6	7
Sathvik Shastry	8	5	8
Shruthi Swaminathan	9	8	10
Shubh Gupta	5	7	9
Siddharth Manojkumar	7	6	7
Soha Baig	1	9	10
Woosung Weon	8	8	9
Reeti Singh	3	6	7
Sathvik Shastry	8	5	8
Shruthi Swaminathan	9	8	10
Shubh Gupta	5	7	9
Siddharth Manojkumar	7	6	7
Soha Baig	1	9	10
Woosung Weon	8	8	9

Appendix H: Format of feedback and EoL(End of Lesson) Feedback Analysis

Format of Feedback:

| Aspects	Nature	Teacher comments
Focus	Learning goal(s)	
Comparison	Rubrics/Criteria	
Specificity	Guidance that is specific without giving away the answers	
Tone	Constructive	
Clarity	Simple vocabulary	

Example of a good feedback:

Q. Analyze an economic issue that involves exchange rates, trade patterns and /or trade theories

Answer:

Dumping is where a producer sells a product in a country at an unfair price, less than what is charged in other markets. It is an economic problem causing damage by diverting resources and income away from the local producers and towards the cheaper import manufacturer who is rewarded by covering at least some of their cost of production. The WTO advocates for free global trade without tariffs, quotas or subsidies. An exception is allowed for dumped goods, allowing countries to place a specific anti dumping duty on imports to remove the price advantage of dumped product

| Aspects	Nature	Teacher comments
Focus	Learning concept	Accurately identifies an issue
Comparison	Rubrics/Criteria	Analyzes the issue - Criterion B
Specificity	Guidance that is specific without giving away the answers	Could support it with an example from the world
Tone	Constructive	Positive
Clarity	Simple vocabulary	Easy to understand

EoL Feedback Analysis from Grade 7 History:
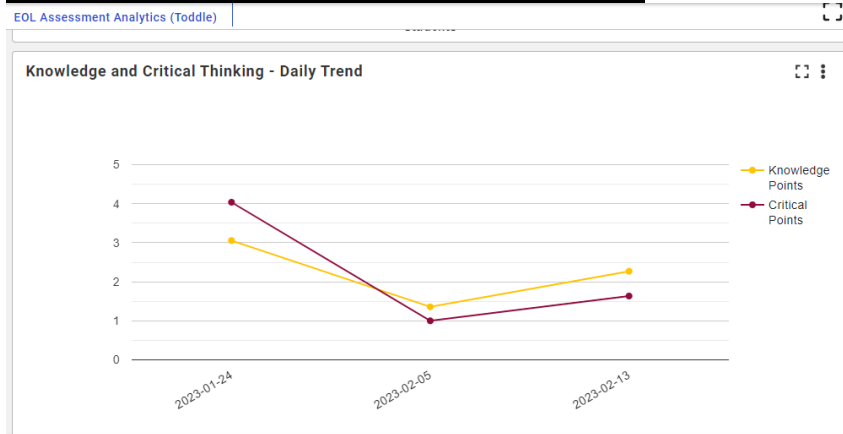
EoL Feedback Analysis from Grade 8 Biology:

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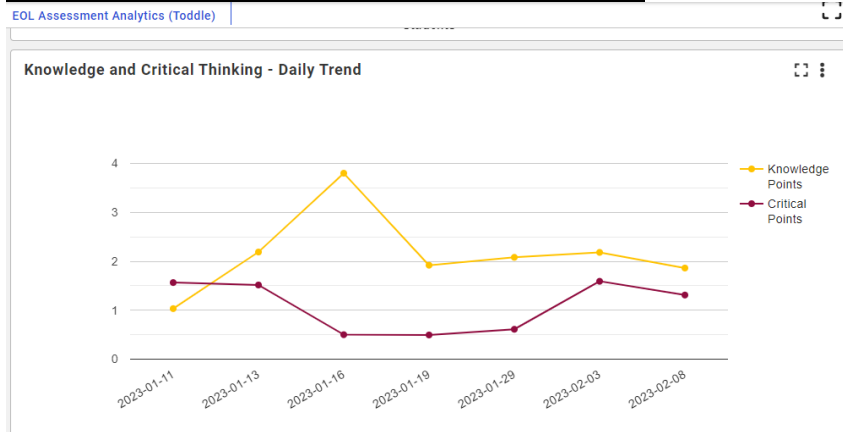
EoL Feedback Analysis from Grade 9 Economics:
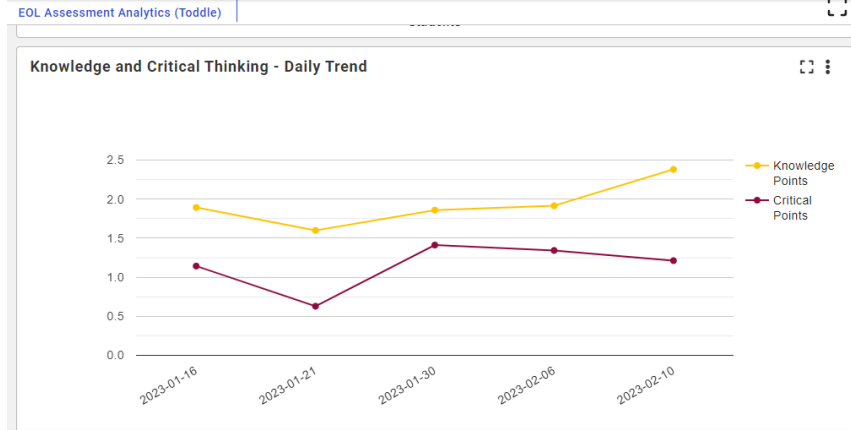
Appendix I: SUY Outcomes

TO MEASURE	OUTCOMES	YEAR 1	YEAR 2	YEAR 3
To measure Creativity Index	Moonshot ideas (Idea Hackathons & Sci-Fi DI)	100%	100%	100%
	Moon shot ideas to near Viable ideas	40%	50%	60%
Effectiveness of Pre-DTP & Problem Definition	Design Thinking: Problem Definition in different areas (PPP)	100%	100%	100%
Near Viable ideas, Ideation through various techniques, Readiness for Prototyping	Quality & number of near Viable ideas / prototypes	50-75%	50-75%	50-75%
	Social entrepreneurship	50%	50%	50%
	Product Innovation – Apps, Game, Products	50%	50%	50%

Readiness for Market Viable ideas | Business Viability | Elevator pitching in Shark tank | Readiness for Incubation | Student Entrepreneurs	Number of groups in Testing and Business Viability planning	50 – 75%	50 – 75%	50 – 75%
	Shark Tank pitches	50 – 75%	50 – 75%	50 – 75%
	No. of potential Student Entrepreneurs	25 – 50%	25 – 75%	25 – 75%
	Application for Incubation & Funding support	25%	25 -50%	25- 50%
Design Your Future (Grade 9 & above)	Future Readiness	100%	100%	100%

Appendix J: SUY Competencies Goals and Rubrics

Attributes (H1)	Descriptions/Outcomes	Sub Competencies & How to Measure	Descriptions	Beginning	Developing	Accomplished	Exemplary	Course Outcomes
Skills & Techniques	How well a student has grasped or imbibed the various Techniques shown to them and the Skills that they have honed, consequently. For example, how comfortable a student has gotten with the act of visual notetaking or journaling over time – are they using these Techniques organically and making them a part of their toolset? If so, to what extent?	Based on how skillfully an assignment was completed. Attention to detail and display of technical know-how can be assessed through submissions. Additionally, usage of skills and techniques shared during live sessions (Viz. Notetaking, Grids, etc.)		*(A basic understanding of what to do and how to do it - initial steps)*	*(Building familiarity with the subject matter, gradually exploring and doing generally well)*	*(Engages actively, thorough understanding of the assignment)*	*(Flawless execution, above and beyond expectations and defined criteria)*	*(Has the student been able to achieve the desired outcome at the end of 12 weeks?)*
		Goal Setting (S)	Ability to set and take steps towards achieving their goals	Is struggling to set and accomplish goals/take steps towards the same - e.g. does not submit roadmap, or map is v. basic	Has defined goals and can provide an idea of how they intend to achieve them - e.g. simple roadmap submission, no supplementary writeup/evidence	Can comfortably set and describe steps taken to achieve goals - e.g. descriptive roadmap + supplementary evidence/writeup	Has extensively detailed their goals and the means by which they will be achieved - e.g. comprehensive roadmap + detailed supplementary evidence/writeup	Is the student capable of setting challenging goals and taking active steps to achieve them - have they identified where they'd like to be at the end of the course and articulate how they're going to get there?
		Collaboration	Working with each other effectively to get things done, communicating appropriately	Prefers to work alone, does not engage well with others unless required to	Attempts to work with other, but is still uncomfortable with sharing and expressing themselves	Actively tries to work in a group and share information while contributing	Is able to effectively work with others, share thoughts and ideas and help others while developing ideas together	Has displayed proficiency in working with others and as a team

Attributes (H1)	Descriptions/Outcomes	Sub Competencies & How to Measure	Descriptions	Beginning	Developing	Accomplished	Exemplary	Course Outcomes
Personal Growth and Development	Using the tools and techniques they're learning about, how are students growing over time? What new dimensions to their thinking can be observed? Actually applying the knowledge they are imbibing will always yield positive and enlightening result and aid in charting their own journeys.	Cultivating Empathy and Self-Awareness	Building and inculcating empathy for the world and people around you - understanding empathy and the need for it, the needs of others, how to put yourself in someone else's shoes	Is struggling with empathy and its need, does not see applicationss for the same or its value and importance	Is taking steps towards understanding what empathy is and how it can be applied around them, as well as why it is necessary	Is gradually learning to see the world around them in a different manner and can articulate the same	Is developing a strong sense of empathy and belonging with the world around them - can see themselves as part of a larger whole and are directing their efforts towards this as well as reflect on their experiences	Nurtures a strong sense of empathy for the spaces and communities around them, is motivated by these learnings to apply themselves in their efforts

Attributes (H1)	Descriptions/ Outcomes	Sub Competencies & How to Measure	Descriptions	Beginning	Developing	Accomplished	Exemplary	Course Outcomes
Entrepreneurship & Leadership	In today's fast paced, ever-changing world, entrepreneurs are not just people with strong business skills, but individuals with a mindset that helps them grow, develop and succeed while overcoming challenges – whether in the fields of business or personal interests and passions. Also, giving back to the communities they are part of and sharing their passions with others is essential.	Risk Taking	Non-aversion to taking bold steps, making ambitious plans, without complete safety systems	Does not enjoy taking any risks, perceives them as unnecessary, prefers safety and familiarity in their work and approach to ideas	Is opening up to the idea of less than secure plan of action, is still uncomfortable with pushing themselves	Is becoming familiar with the differences between risk-taking and recklessness and can take bold steps within their work	Takes risks calculated to the best of their abilities and knowledge, does not shy away from potential challenges or obstacles	Is willing to try and step out of their comfort zone inorder to bring their ideas to life
		Focus on impact and Vision	Ability to work on tasks having the bigger picture in mind	Gets focused and absorbed on theactivity and often loses sight of the bigger picture	Understands the activities as part of the whole, but has difficulty staying aligned all the time	Is able to align each predefined task in the context of the bigger picture	Can see and align each task in the context of the bigger picture, as well as being able to adapt to changes as is necessary	Student can see the complete picture and the individual tasks as a path to achieving the vision, making necessary changes as and when necessary

| Attributes (H1)	Descriptions/Outcomes	Sub Competencies & How to Measure	Descriptions	Beginning	Developing	Accomplished	Exemplary	Course Outcomes
Critical Thinking & Problem Solving	Looking at the world around us in an observant manner and thinking on our feet to tackle challenges, explore opportunities and solve problems dynamically. Applying these principles to our ideas and daily lives to help us grow and succeed is the central motive.	Analytical Mindset	Ability to analyze information, identify problems and trends and solve complex problems	Student is not very observant and fails to perceives the problem correctly	Student is very observant and perceives a problem, but fails to drill down	Student is able to drill down to the root cause of the problem	Student is able to infer, draw parallels and analyse a problem and come up with a solution	Student is able to observe a situation, draw inferences and reason out the root cause for a situation/decision or problem
		Observation and Extrapolation	The art of seeing the world around you, and making meaning through this - picking up on non-verbal cues, paying attention to minute details and using this effectively in their work	Is trying to see things differently, needs time and guidance to make their own observations on their learnings	Has begun to make independent observations and draw conclusions from the same	Is becoming comfortable with seeing the world around them as a source of valuable learning and applying that to their work	Is able to make detailed observations of the world around them and use them as a foundation upon which they can build their ideas	Views the world around them through a specific lens that allows for idea creation, inspiration and opportunity capitalization - can build on these to manifest personal interests

| Attributes (H1)	Descriptions/ Outcomes	Sub Competencies & How to Measure	Descriptions	Beginning	Developing	Accomplished	Exemplary	Course Outcomes
Innovation	The Spirit of Innovation is a fleeting, elusive thing, yet its presence and influence on the world around us is undeniable. Students are uniquely placed to understand and imbibe the qualities of an innovative and analytical thinker, which allows them to make a lasting mark and leave behind lasting legacies.	Building Creative Confidence	Developing a comfortable sense of self and nurturing one's imagination throught their explorations	Can comprehend basic concepts of creativity being used in form, self expression, problem solving, etc.	Warming up to the idea of expressing themselves creatively and inculcating certain aspects in work	On the verge of seeing it as a day to day practice, trying to use creativity as a tool to solve problems	Able to effectively articulate themselves creatively, overcome challenges and build understanding of the world around them	Is comfortable with the idea of expressing themselves and sharing with the world around them, can access their imagination to inform their actions and practice

Attributes (H1)	Descriptions/ Outcomes	Sub Competencies & How to Measure	Descriptions	Beginning	Developing	Accomplished	Exemplary	Course Outcomes
Adaptability	Complexity and evolving ambiguities are staples of our modern world – within this crucible of plans and ideas, change truly is the only constant. For students to bounce back from unexpected adversity, recognize and adapt to the unknown and develop a strong spirit of perseverance and resilience to the challenges that they will undoubtedly face is the need of the hour.	Coping with Failure and Positive Outlook	Ability to bounce back after a setback while learning from the experience	Gets discouraged upon a failed attempt and does not venture again	Builds a negative approach towards the domain/industry/ service and actively seeks to avoid those areas	Bounces back after failure, but likley to repeat the same errors without learning a lesson	Understands failure as an opportunity to learn and attempts to venture again, equipped better	Student understands that failure is just step in the journey, learns to accept it, learn from it and re-try

Attributes (H1)	Descriptions/ Outcomes	Sub Competencies & How to Measure	Descriptions	Beginning	Developing	Accomplished	Exemplary	Course Outcomes
Learning and Exploration	Lifelong Learners are more in tune with a mindset that allows them to imbibe new knowledge and information. This allows for explorations of the same to broaden their horizons. Stretching and growing through new experiences will enable students to achieve this.	Independent Thinking	The ability to form and express thoughts outside of the purview of others - taking resources provided to the next level, independent exploration of materials shared	Has difficulites with thinking for themselves, prefers group consensus, can be swayed by different opinions	Is gradually developing their own throught process and formulating their own ideas	Is able to articulate their own point of view and their reasoning	Is proficient at applying their own methods and ways of seeing, are comfortable with expressing their own versions of their work	Is comfortable with independently developing their ideas and opinions while also applying and interpreting learnings and feedback received in a personal way
		Introspection & Reflection	The examination of one's own conscious thoughts and feelings. Personal practice, looking back on events, defining causality, imbibing learnings from the same	Struggles with understanding themselves and what motivates them, Has difficulty with reflecting upon themselves and their work, cannot use this to inform future practices	Is trying to gain a deeper understanding of themselves and is curious, taking steps to understand themselves and how they can gain insight into their motivations	Is becoming familiar with themselves and can articulate their obsevations, with self-reflection and documenting their journey	Is becoming comfortable by themselves and is using thier knowledge to inform their work while making accurate assessments on their capabilities, Can effectively look back on their journey and use their experiences to inform their practice	Understanding the needs of the self by looking within and incorporating these learnings, also used to undestand one's strengths and weaknesses, Learns from what has come before to inform what will be in the future - is able to look inward and gain an understanding of the self and its motives

Appendix K: Science Fiction Graphic Novella on 'School of 2035':
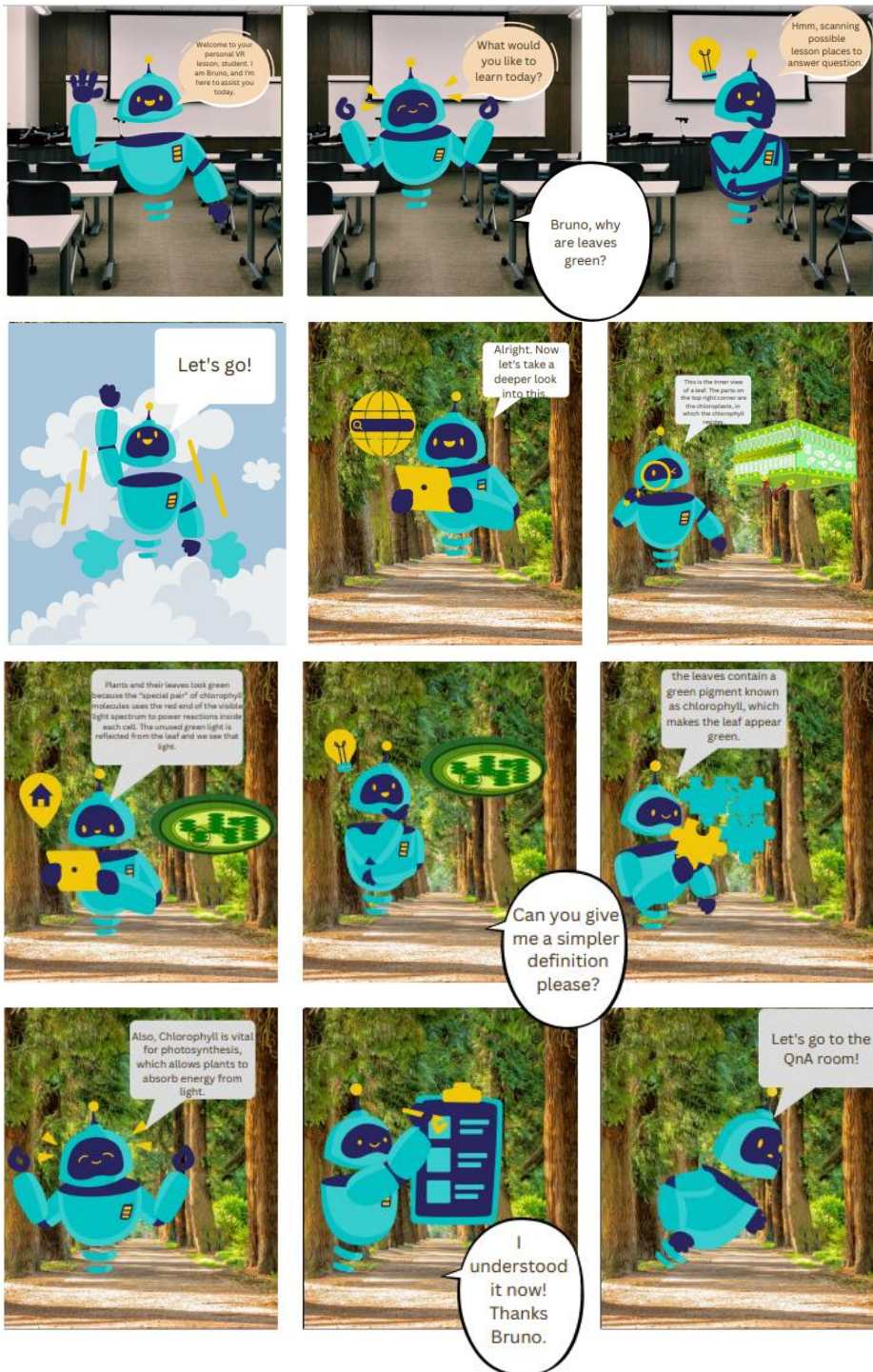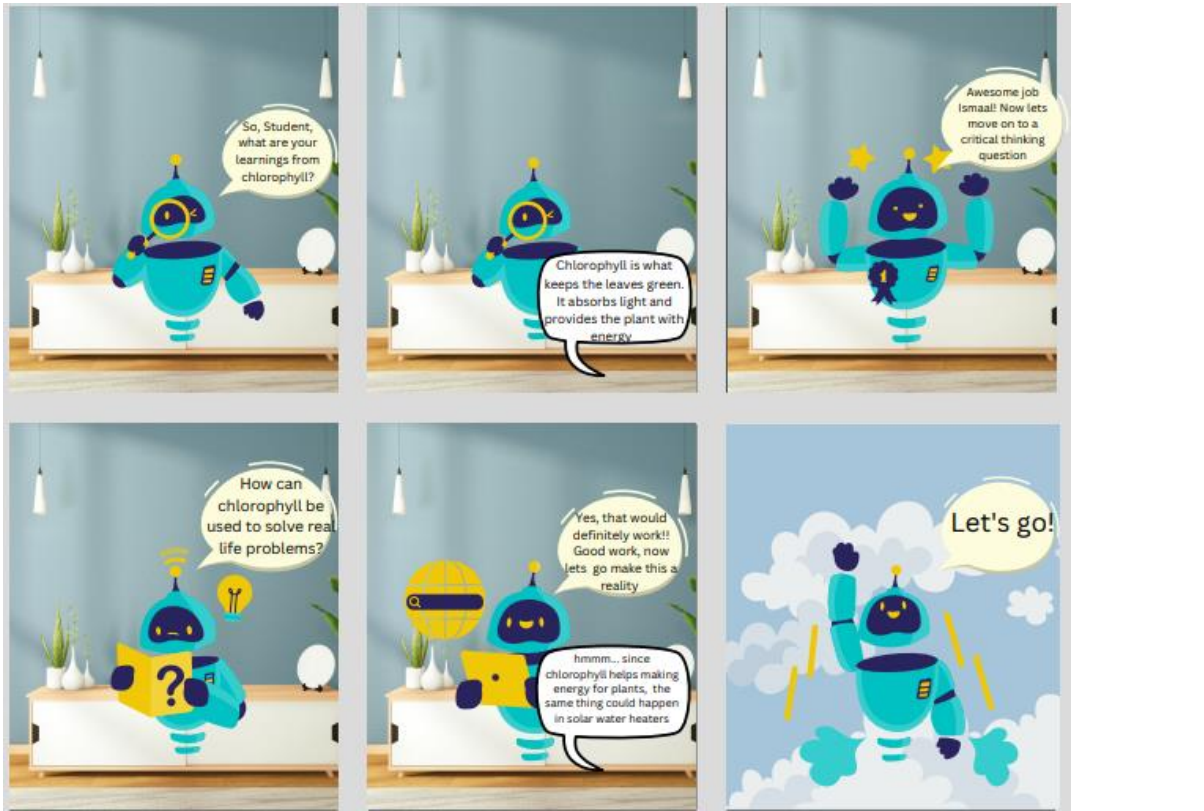
Appendix L: ToK topics of Students

1. What counts as knowledge?

2. Are some types of knowledge more useful than others?

3. What features of knowledge have an impact on its reliability?

4. On what grounds might we doubt a claim?

5. What counts as good evidence for a claim?

6. How does the way that we organize or classify knowledge affect what we know?

7. What are the implications of having, or not having, knowledge?

8. To what extent is certainty attainable?

9. Are some types of knowledge less open to interpretation than others?

10. What challenges are raised by the dissemination and/or communication of
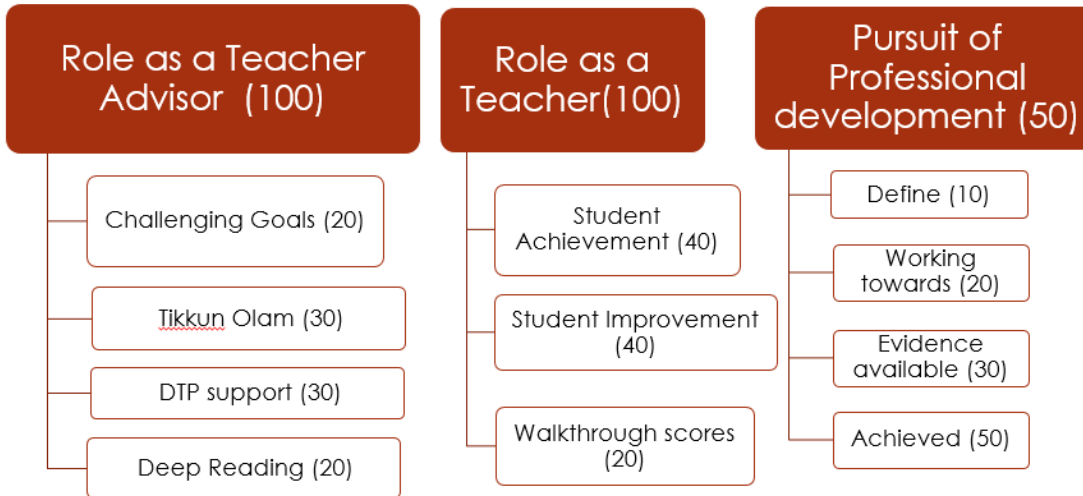
knowledge?

11. Can new knowledge change established values or beliefs?

12. Is bias inevitable in the production of knowledge?

13. How can we know that current knowledge is an improvement upon past knowledge?

14. Does some knowledge belong only to particular communities of knowers? 15. What constraints are there on the pursuit of knowledge?

16. Should some knowledge not be sought on ethical grounds?

17. Why do we seek knowledge?

18. Are some things unknowable?

19. What counts as a good justification for a claim?

20. What is the relationship between personal experience and knowledge?

21. What is the relationship between knowledge and culture?

22. What role do experts play in influencing our consumption or acquisition of knowledge?

23. How important are material tools in the production or acquisition of knowledge?

24. How might the context in which knowledge is presented influence whether it is accepted or rejected?

25. How can we distinguish between knowledge, belief and opinion?

26. Does our knowledge depend on our interactions with other knowers?

27. Does all knowledge impose ethical obligations on those who know it?

28. To what extent is objectivity possible in the production or acquisition of knowledge?

29. Who owns knowledge?

30. What role does imagination play in producing knowledge about the world?

31. How can we judge when evidence is adequate?

32. What makes a good explanation?

33. How is current knowledge shaped by its historical development?

34. In what ways do our values affect our acquisition of knowledge?

35. In what ways do values affect the production of knowledge?

Appendix M: TPIN Calculation

Role as a Teacher Advisor (100)	Role as a Teacher(100)	Pursuit of Professional development (50)
Challenging Goals (20)	Student Achievement (40)	Define (10)
Tikkun Olam (30)	Student Improvement (40)	Working towards (20)
DTP support (30)	Walkthrough scores (20)	Evidence available (30)
Deep Reading (20)		Achieved (50)

Teacher Name	2021-22 (out of 250)	2022-23 (out of 250)
	181	199
	179	197
	176	194
	170	187
	167	184
	166	183
	165	182
	165	182
	162	178
	161	177
	160	176
	157	173
	156	172
	156	172
	156	172
	155	171
	155	171
	155	171
	153	168
	152	167
	151	166
	150	165
	149	164

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Appendix N: Tikkun Olams of Students

TA's Name	Student	Grade	Tikkun Olam
Ms. Shweta	Avantika K	7C	My Tikkun Olam goal is to enhance the quality of life of senior citizens in old age homes and in my community.
Ms. Lalitha	Pramukh	7C	I will ensure a plastic-free boarding room, home, and community and also ensure that 20 families in my hometown do so by July 2023.
Ms. Lalitha	Shravanth	7C	I will rehabilitate at least 10 abandoned animals like cows, rabbits, dogs, and cats in my farmland by providing them food, shelter and medications by July 2023.
Mr. Vivek	Aashna	7D	I will teach basic Math and English to 20 kids from the orphanage YuvaSparks in age groups 7-10 years by August 2023
Mr. Vivek	Ahaana	9D	My Tikkun Olam is to make my locality plastic free by August 2023.
Mr. Vivek	Aarav	9D	I will reduce my CF by 16 to 20 tonnes and that of my community members to 50% by Aug 2023
Ms. Geetanali	MIZUKI YAMATO	9D	My Tikkun Olam is to enhance the opportunities of children (girls) who are 8 to 9-year-old by teaching them basic English & Math by September 2023.

No	Student Name	Grade	TA	Tikkun Olam
1	Sameen Rahman (evidence collected)	11	Anupama	Bear A Hand, a non-profit organization envisions the upliftment of differently abled individuals by providing an equal standing professional platform (A CSR initiative). It has assisted 20 candidates so far
2	Dia Doshi (evidence collected)	11	Ipshita	'Inner Conversations' aims to build life and entrepreneurial skills (such as self-awareness, interpersonal skills), in families of menial labourers
3	Dia Dora (evidence collected)	11	Ipshita	To train and empower children from Immadihalli Government school through communication workshops, thereby helping them translate their ideas into powerful verbal and written communication
4	Ayush Thaker (evidence collected)	11	Ipshita	To help students of IICS to improve upon their concentration, spatial visualization, motor skills and mathematics through origami workshops.
5	Anaya Jethanandani (evidence collected)	11	Biji	To empower marginalise women by making them financially literate through her NGO 'FINWIN'
6	Anagha Gopikrishna (evidence collected)	11	Biji	To create a thrift store for the under privileged through cloth recycling. Created a startup where clothes that cannot be used will be converted to toys and rugs for pets. Proceeds to go to dog shelters
7	Anahita Mishra (evidence collected)	11	Biji	To deduct colour blindness at an early stage in children through a game created for this specific purpose
8	Antara Ganapathy (Working)	11	Biji	To build an app for students of middle-income group to help with university scholarships, expenses and budgeting.
9	Anketh (evidence collected)	11	Biji	To create mental agility in adolescents through the game of cricket
10	Anvi Kurade (working)	11	Biji	Prototyping a device for assissting Alzheimer's patient

Appendix O: Student Performance Index (SPIN scores)

Break-up of SPIN Score

50% Academic score + 50% Innovation Curriculum score = SPIN score

Innovation Curriculum score = Tikkun Olam(Personal Vision) + Progress in Design Thinking project

Grade 7 SPIN Score

Student Name	Academics (Weightage: 50%)		Innovation Curriculum (Weightage: 50%)		SPIN (Out of 100) (2021-22)	SPIN (Out of 100) (2022-23)
	2021-22	2022-23	2021-22	2022-23		
	79	91	62	71.3	71	81
	77	89	60	69	69	74
	77	88	68	78.2	72	78
	77	88	58	66.7	67	73
	75	86	62	71.3	69	74
	73	84	42	48.3	58	63
	72	83	76	87.4	74	79
	72	82	66	75.9	69	74
	71	81	54	62.1	62	68
	70	80	90	103.5	80	85
	79	91	62	71.3	71	77
	77	89	60	69	69	74
	77	88	68	78.2	72	78
	77	88	58	66.7	67	73
	75	86	62	71.3	69	74
	73	84	42	48.3	58	63
	72	83	76	87.4	74	79
	72	82	66	75.9	69	74
	71	81	54	62.1	62	68
	70	80	90	103.5	80	85

Grade 9 SPIN Score

Student Name	Academics (Weightage: 50%)		Innovation Curriculum (Weightage: 50%)		SPIN (Out of 100) (2021-22)	SPIN (Out of 100) (2022-23)
	2021-22	2022-23	2021-22	2022-23		
	53	60.82	60	69	56	65
	55	63.25	57	65.55	56	64
	48	54.69	60	69	54	62
	55	62.96	65	74.75	60	69
	24	27.60	30	34.5	27	31
	56	64.40	40	46	48	55
	52	60.31	55	63.25	54	62
	31	35.94	56	64.4	44	50
	46	53.15	54	62.1	50	58
	51	58.52	52	59.8	51	59
	54	62.10	60	69	57	66
	55	63.25	60	69	58	66
	46	52.90	43	49.45	45	51
	55	62.96	40	46	47	54
	25	28.75	22	25.3	24	27
	56	64.40	40	46	48	55
	52	60.31	34	39.1	43	50
	35	40.25	34	39.1	35	40
	46	53.15	54	62.1	50	58
	51	58.52	36	41.4	43	50

Grade 11 SPIN score

Student Name	Academics (Weightage:		Innovation Curriculum		SPIN (Out of 100)	SPIN (Out of 100)
	2021-22	2022-23	2021-22	2022-23	(2021-22)	(2022-23)
Aatit Chadha	70	76.48	56	61.04	63	69
Aansh Binner	53	57.59	52	56.68	52	57
Ramav Agarwal	59	64.58	72	78.48	66	72
Aarcha Nair	67	73.03	70	76.3	69	75
Aashrit Ashok Salani	39	42.51	64	69.76	52	56
Aayushi Viswanath	51	55.77	66	71.94	59	64
Abhinav Aditya Shankar	48	52.32	56	61.04	52	57
Abhinav Dutta	60	65.40	58	63.22	59	64
Aditya Harsh Joshi	56	61.40	58	63.22	57	62
Aditya Sharma	79	86.29	54	58.86	67	73
Aatit Chadha	70	76.48	56	61.04	63	69
Aansh Binner	54	58.86	52	56.68	53	58
Ramav Agarwal	60	65.40	72	78.48	66	72
Aarcha Nair	67	73.03	70	76.3	69	75
Aashrit Ashok Salani	35	38.15	63	68.67	49	53
Aayushi Viswanath	51	55.77	66	71.94	59	64
Abhinav Aditya Shankar	46	50.14	55	59.95	51	55
Abhinav Dutta	60	65.40	58	63.22	59	64
Aditya Harsh Joshi	56	61.40	59	64.31	58	63
Aditya Sharma	79	86.29	54	58.86	67	73

Report Card Sample:

Progress summary

Progress summary for subjects

	Achievement level by criteria				Final Grade	Score
	A	**B**	**C**	**D**		
English	6	6	7	7	6	62

Rishabh is a gifted person and has infinite motivation and positivity. His HYE performance reveals he can competently analyse the effects of the creator's choices on an audience. He sufficiently justifies opinions and ideas with examples and explanations. He uses varied vocabulary and formal register to communicate his ideas effectively. Keep up with the good work.

Language Acquisition	7	7	7	7	7	64

Rishabh is extremely motivated and always puts best effort into assignments. He pays attention and remains focused in the class. He identifies most stated information (facts, opinions, messages and supporting details) in simple authentic texts. He interprets conventions in simple authentic texts and interprets connections in simple authentic texts.

Economics	-	-	-	-	-	80

Rishabh produces high-quality work. He communicates a secure understanding of concepts and contexts. He uses knowledge and skills in the familiar classroom and real-world situations and demonstrates critical and creative thinking, frequently with sophistication. He actively participates in all class discussions and shows a keen interest in the subject. He also takes full responsibility to submit assignments on time. His performance has been excellent and amongst the top scorers of class. Keep it up.

History	7	8	7	6	7	62

Rishabh is a phenomenal student. He is deeply dedicated and attentive in class. His work demonstrates a near mastery of the concepts and content. His answers contain genuine insights, which reveal his unique perspective. He should share his thoughts and opinions more readily, they will likely benefit the whole class.

Physics	6	6	6	7	6	68

Rishabh is very cheerful and obedient child. His concept clarity is good. Rishabh completes his work regularly and on time. He displays good understanding of the concepts. He should practice application based questions to improve overall grade. Worksheet provided and text can be used for practice. Practicing regularly will help him score higher grades in next set of examination.

Chemistry	4	6	6	6	5	64

Appendix P:Photographs of Innovation Council Initiatives

Appendix Q: Outbound Curriculum (ISL) Rubrics

Student Leadership Report

Student Name			Date	8/15/2022 to 8/19/2022
Grade	9		Group	2
School	IISB		Trainer	Mr Mitesh Singh

S. No.	Competency	1 - 2 – 3 - 4 (Novice – Emerging - Proficient - Exemplary)
	Critical Thinking	
1	Information and Discovery	3
2	Interpretation and Analysis	3
3	Reasoning	3
4	Problem-solving/ Solution finding	3
5	Self-reflection	3
	Creativity	
6	Idea Generation and Expression	3
7	Openness and Courage to explore	3
8	Creative Production and Innovation	3
9	Self-Reflection/Agency	3
	Collaboration	
10	Responsibility and Initiative	3
11	Cooperation, Flexibility and Responsiveness	2
12	Common goal or shared purpose	3
13	Self-Reflection/ Agency	3
	Communication	
14	Being Clear, Complete, Concise & Confident	3
15	Listening & Feedback	3
16	Trust building	3
17	Self-reflection	3

Trainer's Assessment and Recommendations

Assessment of Leadership

Reflects well during the sessions, shares ideas, her understanding and logical thinking in decision making. Creates a good learning environment among the team members. Collaborate well with the team mates for getting better results.

Assessment for Leadership

Active listening, taking initiatives and managing her emotions in adverse situations will be helpful to manage her team and results effectively.

Student Leadership Report

Student Name			Date	10/17/2022 to 10/21/2022
Grade	11		Group	1
School	IISB		Trainer	Capt Mohit Tomar

S. No.	Competency	1 - 2 – 3- 4 (Novice – Emerging - Proficient - Exemplary)
	Critical Thinking	
1	Information and Discovery	3
2	Interpretation and Analysis	3
3	Reasoning	3
4	Problem-solving/ Solution finding	3
5	Self-reflection	3
	Creativity	
6	Idea Generation and Expression	4
7	Openness and Courage to explore	4
8	Creative Production and Innovation	3
9	Self-Reflection/Agency	3
	Collaboration	
10	Responsibility and Initiative	3
11	Cooperation, Flexibility and Responsiveness	3
12	Common goal or shared purpose	3
13	Self-Reflection/ Agency	3
	Communication	
14	Being Clear, Complete, Concise & Confident	3
15	Listening & Feedback	3
16	Trust building	3
17	Self-reflection	3

Trainer's Assessment and Recommendations

Assessment of Leadership
Appreciates and analyzes a situation well. Asks relevant and reflective questions. Generate ideas and takes decisions. Displays empathy and respect towards team members.

Assessment for Leadership
Must read books on a variety of subjects. Engagement in debates and discussions will help to develop reasoning and logic. Must solve real -life problems and issues.

Appendix R: Design Your Future Master class
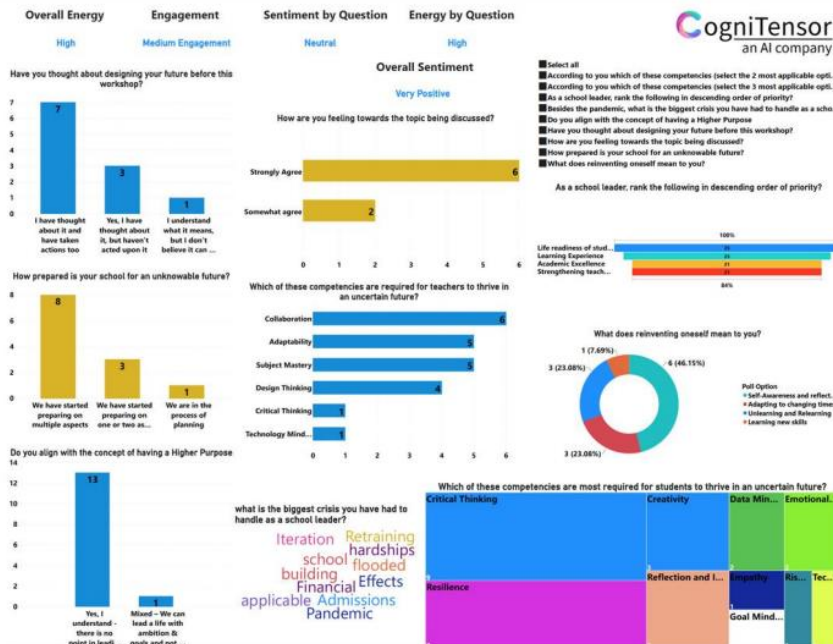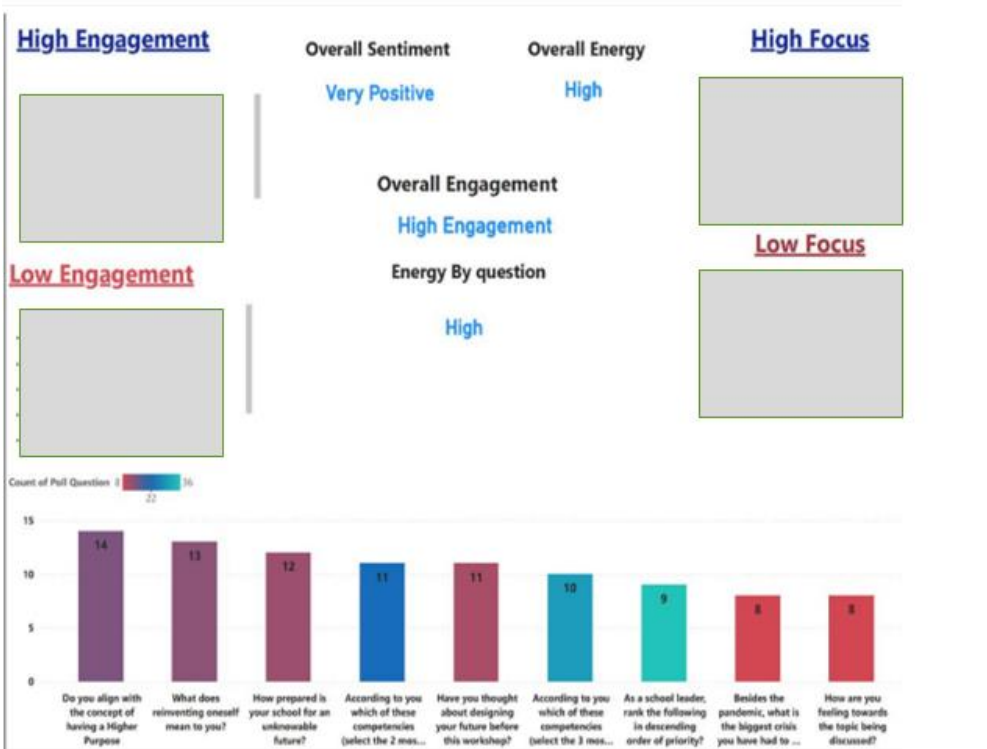
Have you thought about designing your future before this workshop?

Action Points:

- We can help those who have 'thought about it but haven't acted' with our offering. They qualify as high potential clients.

- We can target the proactive schools which have already acted on it with mentorship sessions. Being proactive, they have high possibility of being potential converts, as a second priority.
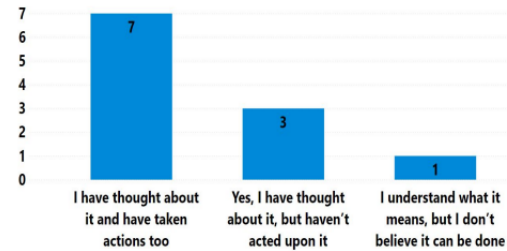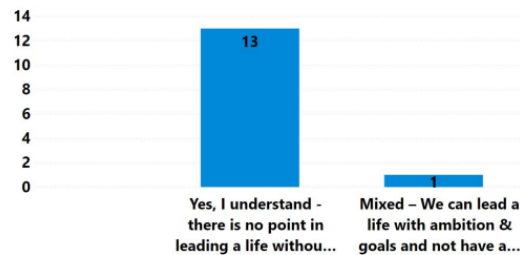

15

Do you align with the concept of having a higher purpose?

Action points:

- We can leverage our receptive and aligned audience to prepare a strategy to achieve higher purpose

- Talk to stakeholders and advise them to bring their respective teams on-board

19

140

How are you feeling towards
the topic being discussed?

Note: This question was asked during day 1 in the Design Your Future Masterclass - Session 1 and 2

Findings:

1. This question has a **medium engagement of 72%** (8 out of 11)

2. **75% (6 out of 8)** of the attendees have a very positive approach towards the topics being discussed.

3. **25% of the attendees** who have polled have some positive inclination when it comes to topics discussed and need a bit more effective approach.
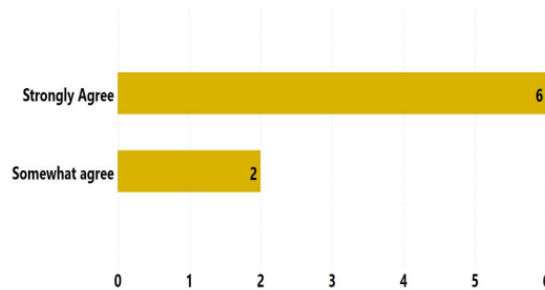
20

As a school leader, rank the following in the descending order of priority?

Findings:

We got the following ranking

1. Life readiness of students
2. Learning Experience
3. Academic Excellence
4. Strengthening teacher effectiveness

Implication:

1. All the guest have utmost priority for life readiness of students.

2. We can convey the win-win case of collaborating on SUY programme to achieve the common goal of students overall development.
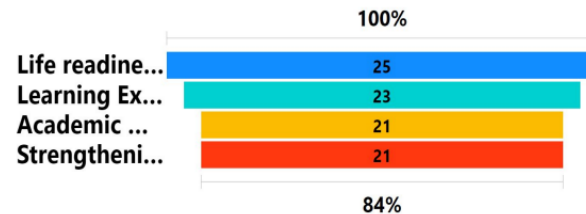
22

Which of these competencies are required for teachers to thrive in an uncertain future

Findings:

1. 6 of the attendees shared the opinion that collaboration is most required for the teachers to thrive in an uncertain future, while 5 of the attendees had the opinion that either Adaptability or subject mastery is the most required competency.

2. Only one attendee had the opinion either of the critical thinking or technology mindedness is the most required competency.
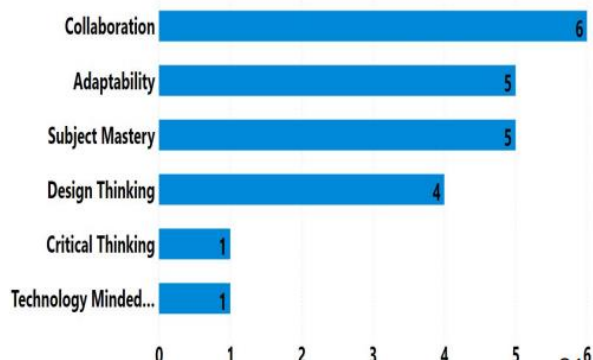
Which of these competencies are most required for the students to thrive in an uncertain future?

Findings:

1. Larger number of the attendees shared the opinion that critical thinking is the most essential skill for the students to thrive in an uncertain future.

2. The competencies that were least voted by the attendees were Empathy, Risk Taking, Technology minded and goal mindedness.

26

142

What does reinventing oneself mean to you?

Findings:

1. Almost half of the attendees shared the view that reinventing oneself implies self awareness & reflection whereas 3 people voted equally for learning new skills and unlearning and learning as the meaning to reinventing oneself.

2. While there was an extended discussion on lifelong learning, unlearning, and relearning, the dominating concern when it came to reinventing oneself was Self-Awareness.

What does reinventing oneself mean to you?

1 (7.69%)
3 (23.08%)
6 (46.15%)
3 (23.08%)

Poll Option
- Self-Awareness and reflect...
- Adapting to changing times
- Unlearning and Relearning
- Learning new skills
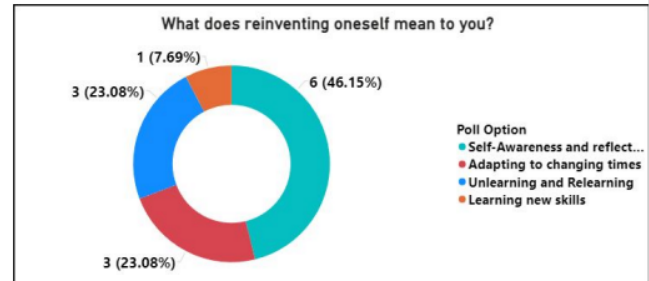
28

What is the biggest crisis you have had to handle as a school leader?

Findings:

1. The attendees were of the opinion that admissions, pandemic and financial constraints were the biggest crisis a person has to handle as a school leader.
2. Surprisingly, regular problems like staff management and routine administrative difficulties do not feature heavily.

Iteration Retraining hardships school flooded building Financial Effects applicable Admissions Pandemic

30
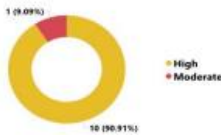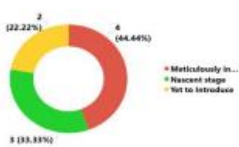
How likely are you to apply the philosophy of job crafting in your school

Findings:

- **85.7%** of attendees are very likely to apply the philosophy of job crafting in their school.

Implication:

- People have agreed with the talk and are well inclined towards including **Job crafting** in their schools.

- Few examples of successful mindset changes from the Indus schools and how the teachers are going beyond there JD to help students to make them life ready can be shown as example.

- Any projects done by teachers themselves can also be shown as example of job crafting.

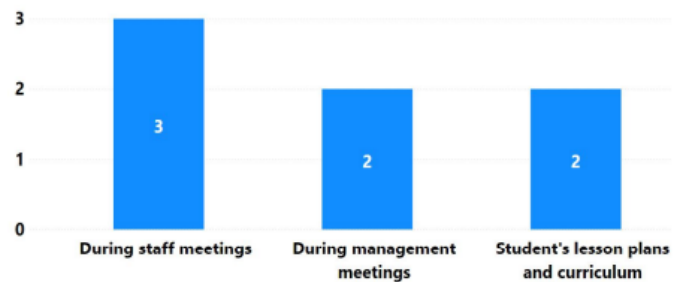• Very likely

12 (100%)
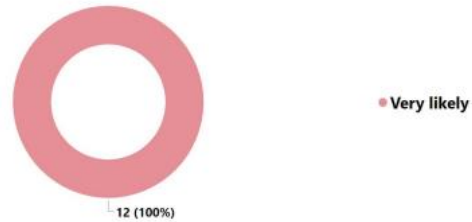
42

Where will you apply either probabilistic, integrative thinking or both in your schools

Findings:

- 3 of the attendees opinionated that they will apply the new methods of thinking in their staff meetings whereas 2 attendees each shared the opinion that these methods would be implemented either during management meetings or during the formulation of student's lesson plans.

Implications/Action Points:

- It would have been better if the guest have chosen their first priority as student's lesson plans and curriculum.
- Most of the guest haven't got to the what extend probabilistic thinking and integrative thinking can change the Classroom experience and how teaching these methods to students will change the perspective and decision making of the students

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Appendix S: <u>The tests taken by the Teacher Designers: (4C's)</u>

Critical Thinking: https://www.assessmentday.co.uk/free/watson-glaser/freetest1/FullTest/index.php

Empathy: https://www.idrlabs.com/multidimensional-empathy/test.php

Creativity: http://www.testmycreativity.com/

Teacher Name	Percentile. (Critical Thinking)	Total Empathy %	Creativity (%)
	15 P	56%	57
	16 P	57%	72
	61 P	54%	67
	61 P	60%	68
	20 P	70%	61
	40 P	60%	52
	20 P	63%	62
	22 P	70%	66
	29 P	55%	63

Appendix T: **Shark Tank poster and Ideas**

Name	Grade, School	Venture/ Project Name	Brief
	10X , Grade 9	EyeSight	A prototype pair of glasses that seeks to ease the lives of visually impaired using technology Features an integrated camera and speaker system that takes a picture of the text placed in front (paper, currency etc.) and speaks out in the attached speakers.
	IISB , Grade 11	Budgetary	A task and money management app for university students Features include to-do lists, expense logs and currency conversions, all in one app.
	IISB , Grade 9	Buskverse	A Digital stage (metaverse) meant for independent music artists to come together and create exemplary music.
	IISB, Grade 9	Careolina	A technology-driven solution to provide care and assistance to Alzheimer's patients that struggle to navigate their daily life. An AI-powered app that can help patients recognize faces and places.
	IISP , Grade 11	Peaches	A sexual wellness app for underprivileged teens in rural India through education. Features include advise from teachers and medical professionals on safe sex practices.
	IISB , Grade 11	Health Intentions	A healthcare website that will be focusing on different health care problems and conditions that aren't talked about much, in the beginning focusing on cancer. It will be an awareness and sharing platform. Features include articles/posts from professionals (doctors), patients, and students in the medical field, where they can share their experiences and new things in the medical field, as well as give detailed information on diseases
	IISH , Grade 11 IISH , Grade 11 IISH , Grade 11 IISH , Grade 11	Y2C (Yes You Can)	Enable children from childcare institutions realize their hidden potential through education and become self-sufficient. Features include a completely developed curriculum to be delivered to students from Grade 7 onwards that focuses on English, mathematics and sciences that seamlessly integrated with the government board exams.
	IISB , Grade 11	Inner Conversations	Build awareness around mental health of teenagers through workshops on mindfulness and exam anxiety and also provide a platform for constructive dialogue with medical professionals Features include a website with articles and stories with the guidance of mental health professionals
	IISB , Grade 11	Incuba-Nari	A non-profit committed to empowering Indian women through financial independence by incubating MSME ventures and amplifying India's real stories of Women entrepreneurship.

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Appendix U: Sample Report card

Congratulations on completing your five weeks Seeker Journey with StartupYou

You have demonstrated the traits of a deep thinker; you are able to analyse issues critically and express ideas and thoughts clearly. Your quests are meticulously accomplished. Your observations and insightful responses to the quest "Mapping Empathy for a Fictional Character" are commendable.

We recommend you to set short-term goals using the SMART-C framework while keeping your long-term goal in mind. When you are addressing multiple tasks at once to make the most use of your time and energy, the prioritisation matrix may be helpful. Maintain your curiosity and desire to take on new challenges!

Awaiting your arrival on the Explorer's Voyage!

You are now ready to be an Explorer!
In this 12 weeks Explorer Level Program, you will dive deep into hands-on design projects, business challenges and get a sneak peek into the start-up ecosystem. Please reach out to our Program Manager at info@startupyou.in to receive more information.

Quests
(attempted quests are marked with ✹)

✹ **Hunting for Effective Design** : *The things we use and interact with, natural or man-made, are usually designed to do specific things. By understanding the thought behind such objects and systems, we can better learn about the world we inhabit.* **This quest encouraged you to look around and evaluate what constitutes user-centric design, and if they can be improved.**

Imagination Station : *In an ever-changing world, the ability to empathise with yourself or others has its advantages. When you are aware of your needs and wants it helps to chart a course to get to where you want to be.* **This quest encouraged you to push your imagination and design for a life in a turbulent world.**

✹ **Mapping Empathy** : *When you trust and acknowledge other people's feelings and experiences, you will be able to understand their needs and can be in a unique position to support them.* **This quest encouraged you to be empathetic to a character in a short film and understand their motivations and further introspect about yourself.**

✹ **SWOT Analysis, Goal Setting** : *A goal-oriented mind encourages you to learn from failure, form productive habits and build resilience.* **This quest encouraged you to think about what you wish to achieve in a short-term and long-term capacity and provided a tool to frame your goals in a more organised manner.**

✹ **Applying Time Management Techniques** : *As someone who is trying to achieve many things at once, prioritising your tasks based on urgency and importance can be immensely useful in organising yourself.* **This quest encouraged you to put your tasks on a list, identify your priorities using Pareto's Principle, and frame them with the help of the Eisenhower matrix.**

✹ **Write a Letter to your future self** : *To set meaningful goals, it is important to introspect. A letter can act as an effective time capsule connecting your past, present and future.* **This quest encouraged you to empathise with yourself, set expectations and make a general plan for your future!**

✹ **Making Idea Banks** : *No idea is a bad idea. Having a wall of ideas co-created with your peers opens up avenues that you probably would not have thought of by yourself! What may seem like a bad idea, in the right context, can turn out to be a marvel. But what good are ideas if they are lost when you need them the most?* **This quest encouraged you to look at the world, build your observation and imagination, and document the ideas you come up with.**

Sushma		
Faculty, StartupYou	Faculty, StartupYou	Director, StartupYou

Appendix V: Pre Covid CLM Data

Overall scope of the use of Eagle in the classroom December 2018 to February 2020					
Trials	**Time Period**	**Grade**	**Subjects**	**Number of classes**	**Number of Students**
IISB – MYP (prototype trials)	Jan to June 2019	7, 8 and 9	Biology , Physics	30	250
IISB - MYP	Aug 2019 to Mar 2020	7, 8 and 9	History, geography, biology, chemistry, physics	153	300
IISB - PYP	December 2019 to Feb 2020	3, 4 and 5	English, math and UOI	16	225
IISH MYP	Aug 2019 to March 2020	7,8 and 9	History, geography, biology, chemistry, physics	12	
IICS	September 2019 to Mar 2020	8 and 9	Science and social studies	26	50
Govt Schools	Sep 2019 to Mar 2020	7 and 8	Science and social studies	19	250+

Experiment 1

Aim – To determine the effectiveness of the collaborative learning model(CLM) in the IB MYP.

Outcome #1 - Student academic performance increased by **15%** (MYP IB).

Outcome #2 - The students undergoing the CLM did better than those who were taught the same topic traditionally(MYP IB) Statistical analysis of the two sets of data showed an **effect size of 0.63**. An effect size greater than 0.5 is considered as positive.

Outcome #3 - Maximum impact of CLM was found in **History and Biology**

Experiment 2

Aim – To determine the wider impact of the CLM on student performance beyond a robot lesson

Outcome #4 - Students in the collaborative learning model were **more likely to submit assignments** thereby exhibiting greater discipline and self directed learning

Outcome #5 - The students exposed to the Collaborative Learning Model **performed better in critical thinking and investigation** based questions.

Outcome #6 – Teachers who took part in the CLM trials moved up an average of **3 percentile points**.

Experiment 3

Aim – To determine the effectiveness of the collaborative learning model(CLM) in Government schools.

Outcome #1 - Student academic performance increased by **17%**

Outcome #2 - The appreciation for social studies content was higher than for science content

Overall Conclusion

The Collaborative Learning Model is **more effective** as a pedagogical strategy than traditional teaching in improving student performance in any curriculum.

The Collaborative Learning Model is **capable of developing competencies** such as discipline, self directed learning and critical thinking in students.

Experiment 1

Aim

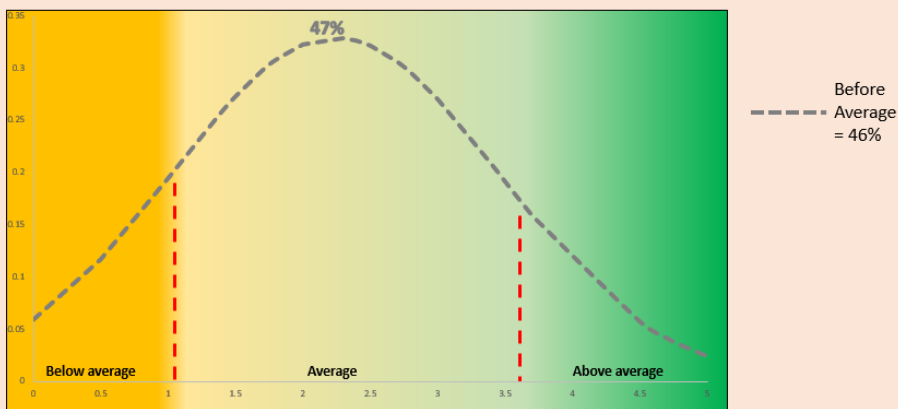To determine the effectiveness of Collaborative Learning Model in the IB MYP

Method

In collaboration with an external researcher random topics in different subjects were selected.
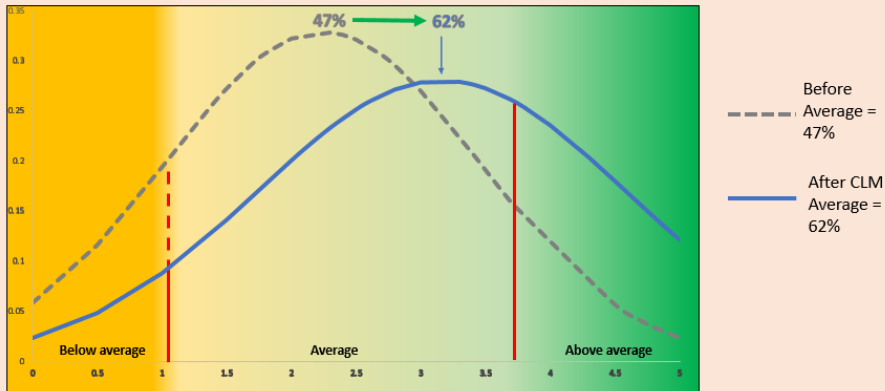
#Students were divided into control and test groups.

#Both groups answered a pre test and a post test.

This experiment results showed a 0.63 effect size when the data was meta-analyzed.

Student academic performance increased by 15%(MYP IB)

47%

Before
Average
= 46%

Below average   Average   Above average

Student academic performance increased by 15%(MYP IB)

Before Average = 47%

After CLM Average = 62%

Outcome #2 – The students undergoing the CLM did better than those who were taught the same topic traditionally

Traditionally – Blue(average -2.25/5)   CLM – Green(average – 3.1/5)
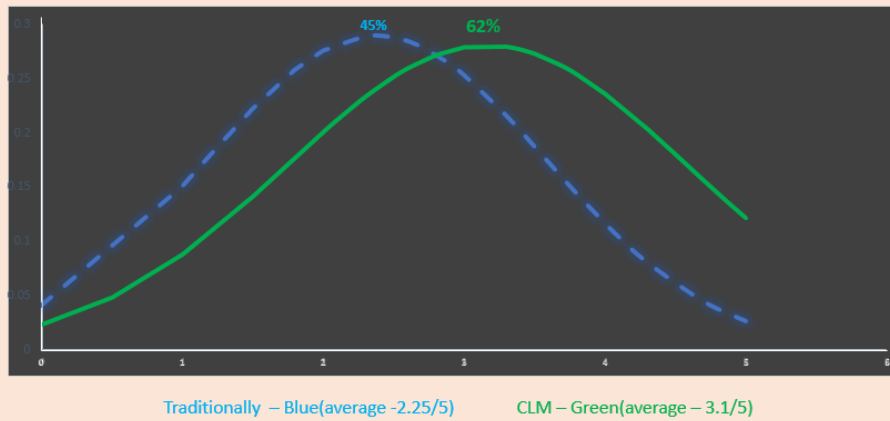
Maximum impact of CLM was found in History and Biology

	Grade	Control Group	CLM Group
Biology Average scores	8 & 9	53%	70%
History Average scores	7	42%	56.40%
Geography Average scores	9	73%	76.20%
Physics Average scores	8	53%	53.40%

We believe that the opportunity to visualize historical events and biological systems through graphics, along with simple yet effective explanations by the robot helped.
Understanding historical concepts beyond just the dates of events and understanding biological systems deeper than just structure and function could also be another reason.

Experiment 2

Aim

To determine the wider impact of the CLM on student performance beyond a robot lesson.

Method

Complete data from 1 term was collected for the control group and the CLM group

Data from robot assessments and school assessments was analyzed for both groups

Data from Term 1(2019 – 2020) in the following subjects was collated and analyzed

  Grade 9 – Biology and Geography
  Grade 8 – Biology and Physics

Students in the collaborative learning model were more likely to submit their assignments thereby exhibiting greater discipline and self directed learning.

	Number of graded assignments in Term 1	Submission of assignments throughout Term 1	
Case study		Control group	CLM Group
Grade 9 Geography	6(graded)	65.97%	96.5%
Grade 8 Physics	3(graded)	97.7%	100%
Grade 8 Biology	2(graded)	80%	90%
Grade 9 Biology	3(graded)	96%	98%

The Collaborative Learning Model is highly structured in terms of time management and compaction. This provides the teacher extra time to personalize and inspire students to complete assignments.
The Collaborative Learning Model expects students to come prepared to class. This allows for greater understanding and lesser resistance to assignments as they are motivated to demonstrate taking responsibility for their own learning.

The students exposed to the Collaborative Learning Model performed better in critical thinking and investigation based questions (MYP IB).

Data from Term 1(2019 – 2020) in the following subjects was collated and analyzed based on criteria as per IB MYP.
Grade 9 – Biology and Geography
Grade 8 – Biology and Physics

The Collaborative Learning Model allows the teacher to focus on competency development of the students. Her efforts are directed towards teaching the child.

	Control Group	CLM group	Difference
Criteria A (Knowledge & Understanding)	54.75%	60.26%	5.51%
Criteria B (Investigating/Inquiring and Designing)	30.87%	51%	20.12%
Criteria C (Communicating/ Processing and Evaluating)	44.5%	67.56%	23.06%
Criteria D (Critical thinking/reflecting on impact of science)	37.95%	56.26%	18.31%

Teacher performance increased by an average of 3 percentile places

BEFORE CLM

Teacher performance increased by an average of 3 percentile places

AFTER CLM

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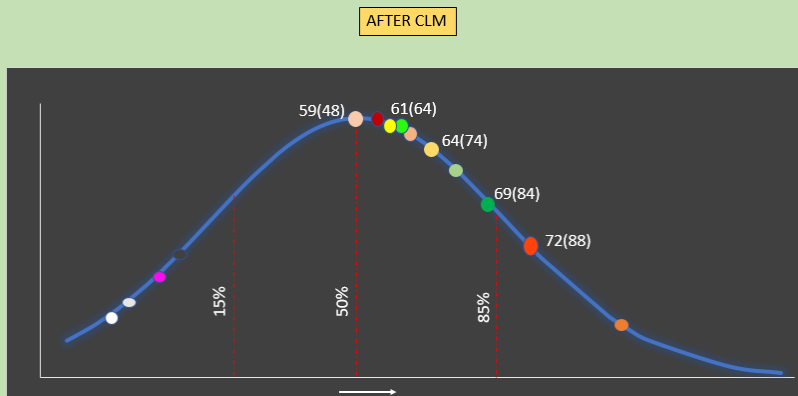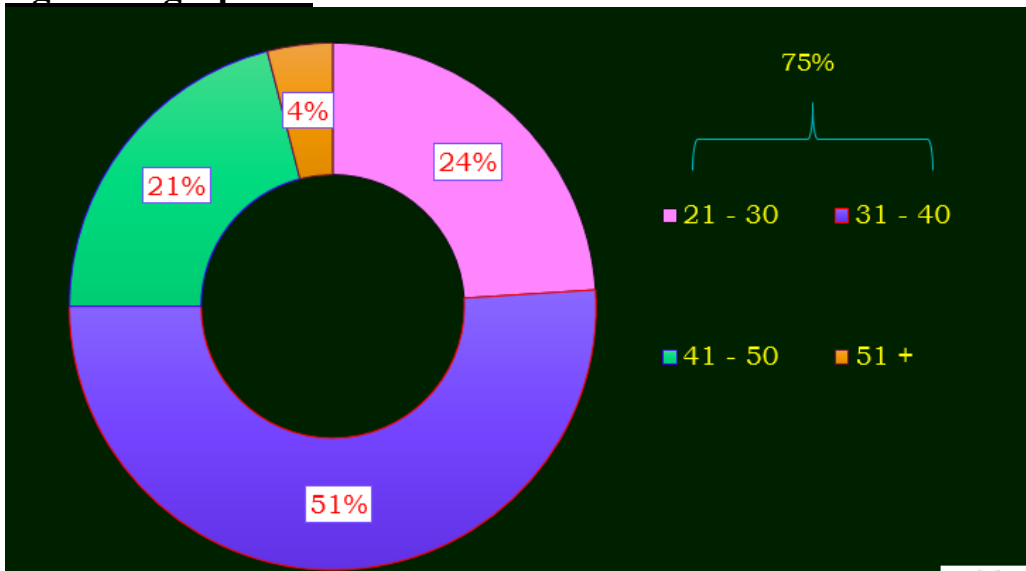
Government Schools - Students in the CLM performed 17% better than the students taught the same topic traditionally.
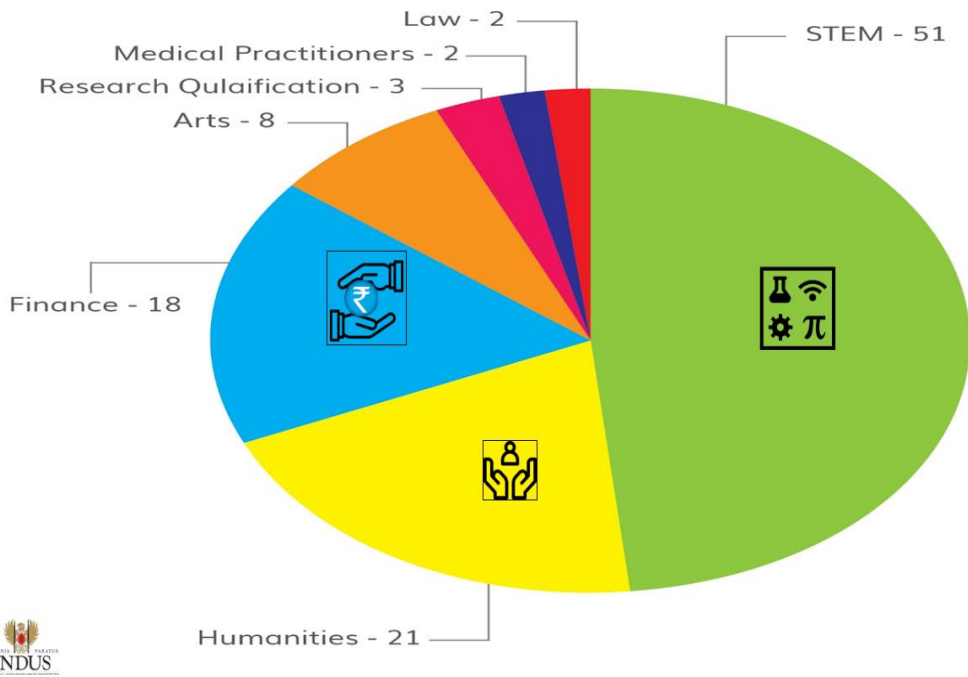
33% → 50.5%

Control Group performance

CLM Group performance
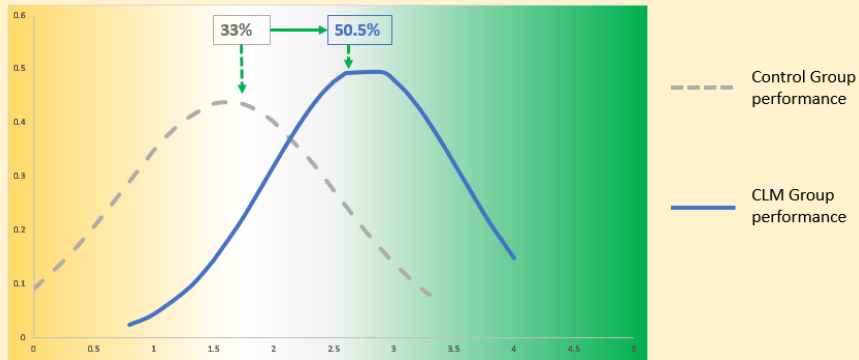
Appendix W: Student demographics of ITARI

Age demographics:

75%

4%

24%

21%

■ 21 - 30   ■ 31 - 40

■ 41 - 50   ■ 51 +

51%

Background Contexts of the Students:

Pie chart showing distribution:
- STEM - 51
- Law - 2
- Medical Practitioners - 2
- Research Qulaification - 3
- Arts - 8
- Finance - 18
- Humanities - 21

INDUS

Appendix X : Comparison of Final Exam results of 2021-22 vs 2022-23

G6 - RCD 2022 vs RCD 2023 - CLM subjects (Grade 6)

Subject	RCD 2022	RCD 2023
Science	72	70
History	60	69
Geography	63	67

Grade 7 - RCD 2022 vs RCD 2023 - CLM subjects (Grade 7)

Subject	RCD 2022	RCD 2023
Physics	63	59
Chemistry	58	62
Biology	69	65
History	66	67
Geography	70	69

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Grade 8 - RCD 2022 vs RCD 2023 - CLM subjects

Subject	RCD 2022	RCD 2023
Physics	57	62
Chemistry	42	68
Biology	67	64
History	64	71
Geography	71	71

Grade 9 - RCD 2022 vs RCD 2023 - CLM subjects

Subject	RCD 2022	RCD 2023
Physics	58	55
chemistry	48	41
Biology	55	58
History	51	45
Geography	65	60
B & M	56	56
Economics	54	49

Grade 11 - RCD 2022 vs RCD 2023 - CLM subjects

Subject	RCD 2022	RCD 2023
Physics	48	56
chemistry	56	60
Biology	54	61
ESS	53	58
B & M	58	57
Economics	58	64

Analysis:

RCD	Overall average
RCD 2022	59.08
RCD 2023	62.6

Increase in overall average by 6%

RCD 2022 vs RCD 2023
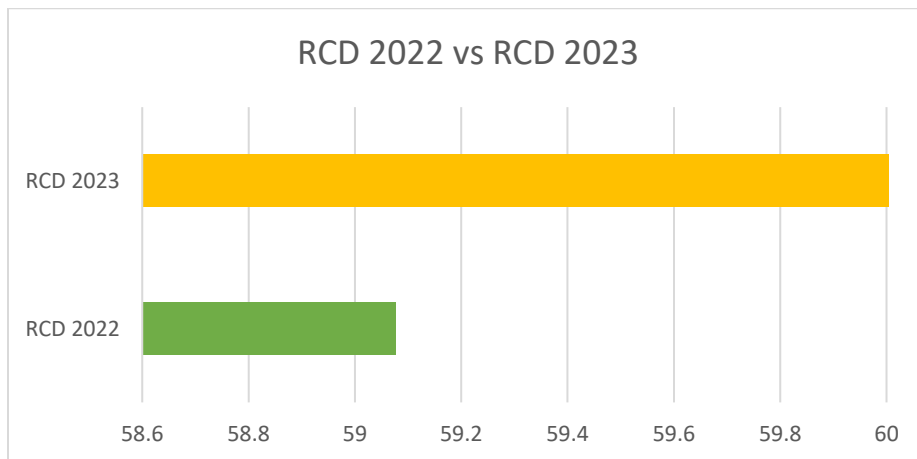
Permission Letter for use of Data:

7th September 2022

Subject: Permission for usage of Data

Dear Gen.Ray,

I am writing this mail to seek your approval to analyze & use data for my Doctorate in Business Administration, with Swiss School of Business Management.

My research topic is **Teach The Child And Not The Subject Alone: Building Entrepreneurial Competencies In Teachers To Meet The Challenges Of The 4th Industrial Revolution.**

Towards this, I need your approval for data on the following:

- Collaborative Learning Model (CLM)
- Professional goals and Teacher performance Index (TPIN)
- Projects based on the Design thinking process
- Innovation curriculum and Innovation council
- Teacher feedback on aspects connected with my topic

I will follow all ethical guidelines and the data will be used for research purposes only. I look forward to your approval.

Warm regards,

Sarojini Rao
Principal
Indus International School, Bangalore

Approved.

Ayim Ray

7th Sep 2022

Billapura Cross, Sarjapur, Bangalore - 562 125. Ph: 91-80-2289 5900 / 3089 5900. Fax: 91-80-2289 5990. www.indusschool.com

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