

Design thinking vs TRIZ: A panel discussion

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At the innovation leadership workshop I facilitated on July 5-6, we had a panel discussion on two innovation and problem solving methodologies – Design Thinking and TRIZ. For Design Thinking, we had Lakshman Pachineela Seshadri who is the Head of Innovation at SAP Global Delivery, Bangalore and also a visiting faculty at [Hasso Plattner School of Design Thinking](#) at Potsdam. On TRIZ we had Dr. Bala Ramadurai who is the co-founder of [TRIZ Innovation India](#) and an innovation consultant. Here is a summary of the discussion:

1. [What is Design Thinking \(DT\)?](#)
2. [What is TRIZ?](#)
3. [Does TRIZ focus on problem solving or inventions?](#)
4. [Does Design Thinking give a view on how to identify a problem?](#)
5. [Does Design Thinking give any guidelines about what's a good challenge?](#)
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Q: What is Design Thinking (DT)?

Lakshman: DT is about our mindset. It is a culture. It is about exploring users and their behaviours – what they say want, what they do, what they think and what they feel. It involves getting insights about why and how people behave in a particular way. You derive insights from these situations to come with relevant ideas and then solutions.

DT says that don't go by the stated requirements, go beneath them, go and understand why they need it and how they use it. Suppose you look at how kids use a toothbrush, you will realize that it is different from how adults use it. Kids hold the brush with palms instead of just the fingers like adults. Observations like these provide you the insights. These insights then lead to solutions like cushy and firm handles for kids' toothbrush.

Bala: My son does it hands-free 😊 He needs to be told from time to time to hold the brush in hand.

Lakshman: Thanks for the trigger, Bala. Let me tell you an experience we had with 8th to 10th standard students from a school in Sarjapura village. We did a design thinking workshop with a batch of 26 students. An insight from one of the teams was, “Children are lazy and they don’t want to brush their teeth. Colourful brushes and TV ads fail to motivate them. Therefore the Design Challenge was - How can we maintain the dental hygiene of kids despite their laziness? They came up with an idea similar to hands-free, a ‘brown polo mint’ kind of solution containing clove, ginger, honey etc. It was of size similar to polo without the hole. You have to munch it, chew it and then swallow it. They made the prototypes and distributed to the panel members. They tested it with a few children. Of course, it needs to go through several iterations before it can become a product. However, it was interesting to see the school kids coming up with such simple and usable ideas.

DT approach is different from the traditional market research based approach which relies on analysis and number crunching (left brain stuff). DT uses market data to zero on a particular problem area and then we go into the why and how of it.

Q: What is TRIZ?

Bala: TRIZ is a Russian methodology which in English means “Theory of inventive problem solving”. The father of TRIZ, Genrich Altshuller, went through a patent database 60-70 years ago and found out that creative problem solving is not as big a deal as it is thought out to be. Whether it is the apple falling and Newton coming up with the theory of gravitation or Ratan Tata watching a family of four riding a scooter and coming up with the Nano idea, creative process is often romanticized. Altshuller discovered that there are recognizable patterns to problem solving and in TRIZ they are called inventive principles.

My tryst with TRIZ started 5 years ago when I was working as a research scientist at GE. We were working on an ultrasound project. We were using the technology from medicine and applying it to aerospace in predicting part-life. We achieved in a 2 day workshop what could have taken us several months.

We were using a linear plot of intensity. We applied a TRIZ principle which says that what is 1-D becomes 2-D. We asked, “Why can’t we have 2 dimensions to it?” That turned out to be a patentable idea. Sounds so lame, so easy. What does your intuition tell you about our next step? 3-D - bingo! We looked at the hot-spots 3 dimensionally. That was our second patent. It took us just a day rather than 6 to 8 months. There are several such patterns in TRIZ like “1-D to 2-D”.

In another place, a bunch of third year students applied a TRIZ tool called “trimming” and got some amazing results. If you find this room too cold, what does an engineer do? Put a heater. Now, you have two systems – one for cooling and another for heating. And you have to put a third system to monitor these two systems. Then you need IT companies to program and put a User Interface (UI) in front of them to see it visually. That becomes a fourth system. This is how engineers think.

The opposite of that is to remove components hence the term “trimming”. The students who applied trimming were part of social entrepreneurship course at IIT Madras. It is a 4 semester course. First module was creative problem solving.

One team decided to work on water purification problem. I suggested, “Don’t add anything. Take an existing purification system and remove stuff.” Mind you, this wasn’t easy. People are so used to adding stuff especially in engineering. They started with Sarvajal business model where a purification system was at the heart of this business. There were several issues - Electricity was not reliable, water sources are not reliable, it is too expensive etc.

The students started out by putting the whole thing pictographically. Then we said, if electricity is a problem, let’s remove it. It was a big joke initially. But when they went back to the hostel, they got an idea that you could use some of the stuff available locally. The team also discovered that local

entrepreneurs were buying cows and had captive customers who bought milk from them. So they had a ready-made supply chain. All they had to do was to tap into it.

How do we tackle the support? When a complicated RO system breaks in a village, there is nobody there to fix it. So the team decided that the system should be simple enough so that it can be maintained by local entrepreneurs. Then we said, "Let's remove the water sources". Sounds stupid! Then we said, "When customers come for buying milk, they will get unclean water and take clean water back."

Then the question was "How will you market it?" The team figured out that cleanliness is usually associated with hospitals and schools. The team then decided to put purification for free in these two places. People will look at it and say, "Hey, I want one". Team discovered that the ultimate message was "hygiene" – it wasn't "clean water".

The team won Oxford business plan competition, won Dell social innovation contest, was on IBN live, was interviewed with Times of India, Hindu etc.

Q: Does TRIZ focus on problem solving or inventions?

Bala: What is an invention? It is a problem solved well. Problems have what are called contradictions – I want to improve productivity but I don't want to invest a lot of money. TRIZ says that everything is a contradiction. If it is not – if you are trying to compromise – say – I can deal with 60% productivity improvement and may be I will put in a few dollars. Then TRIZ is not your way. It becomes an optimization problem. But if you say, "I want my purification to work but I don't want to use electricity" then TRIZ is useful. But it is, at its core, a problem solving approach.

Q: Does Design Thinking give a view on how to identify a problem?

Lakshman: DT starts with defining a problem. This means you should recognize a problem area – issue and context surrounding the issue. Then you have to come up with a design challenge. For example, you may decide to explore the sanitation issue in Sarjapura area if you hear about the complaints through the locals or NGO, or from newspaper, or TV or other channels. Then you go there and try to understand the context or the ecosystem. Depending upon the complexity (e.g. no of stakeholders such as BBMP, BWSSB, villagers, Panchayat, etc) you may spend a few hours to a few days there. And then you come up with a Design Challenge statement. The more clarity you get about who the stakeholders are and what their issues are, the more relevant the challenge will be.

Q: Does Design Thinking give any guidelines about what's a good challenge?

Lakshman: It does give some guidelines but it is not a formula. It is not the mathematical kind. DT project is done by a team not an individual. The team ideally should be from multidisciplinary background, say, engineers, doctors, sociologists, lawyers etc. depending on the context. Also defining a challenge is an iterative process. You would go back and refine the challenge as you get new insights and prioritize the issues.

A challenge typically starts with a "How Might We or HMW" expression. For example a challenge could be – How might we enable a tech-savvy person like you to move across locations without losing time? HMW phrase has three components – One, the user (tech-savvy person), two, the context – going from location to location, and three, something that needs to be overcome, in this case, "moving without wasting much time".

Q: Does TRIZ give a view on how to identify a problem?

Bala: TRIZ talks about "Ideal final result (IFR)". Let me explain. In my first job, when operating system crashed, I had to use 24 floppy disks to re-load the OS on the computer. It was a painful

process. If something goes wrong during the 23rd floppy installation, you had to re-start the process. In this case, the ideal final result would be “re-starting of computer with zero floppies”. In water purification problem, the ideal final result is that the water is already purified.

Q: How do we ensure that we are getting insights of relevance?

Lakshman: Many times what we say is different from what we do, what we do is different from what we think and what we think is different from what we feel. The closer we go to the “feeling level” the deeper is our insight.

DT suggests using metaphors for expressing the depth of insights. For example, “Lakshman likes strong south Indian coffee” is different from “For Lakshman, strong south Indian coffee is a daily ritual”. The metaphor “daily ritual” packs more meaning into it.

Q: Is skill a pre-condition for Design Thinking?

Lakshman: As I mentioned before DT projects are done in teams. There are coaches to help the teams whenever required. Also DT desires T-shaped people as team members. A T-shaped person has depth in one area (such as engineering or sociology) and also breadth in a few other areas such as music, law, politics etc. Having more T-shaped people helps team members understand and connect each other better and being more productive.