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REALIZATION AS A DRIVER FOR DESIGN

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ABSTRACT:

This paper focuses on the topic of 'realization' and its importance in the world of design. Design is a vast term and it has many facades, but in every segment, truly understanding the purposes and requirements is absolutely necessary. This true understanding is called realization. When we truly realize, we tend to do things in a way that leads to optimal and fruitful results. And these results or outcomes are long-lasting. They do not harm or cause discomfort to their surroundings. Realization happens at different levels. One can realize the change by looking into the various steps of their endeavor. This will help them is exactly pinpointing the area of alteration/ change. The moment we realize the layer in which the change has occurred, we immediately realize the cause of it. This enables us to act immediately and effectively. If that change is desirable then we move along, or else we try to do the necessary modifications that will rectify it and lead to the improvement of the overall result. Then there are various types of realization, broadly

these are categorized based on the way realization is implied. The categories are namely self-realization, collective realization and ideation to realization. The idea of how the manmade world and the natural world are different in terms of problem-solving is also addressed in this paper, where I found that the manmade world is solely driven by the idea of fulfilling the demand without careful and logical thought about the practical consequences, it is only now that we have realized that how consequences are shaping a future that we will find difficult to live in. On the other hand, the natural world or mother earth/ the provider has designed everything that is interconnected and optimal by nature. This has resulted in the creation of a pure, self-sustaining and self-fulfilling world that is also self-healing and self-providing. As designers, we must abide by these wonderful ideals when we design because it will lead to the creation of outcomes that will be the best and most favourable.

Key Words: ***Realiztion, Design driver, Nature, Human Creativity, Future.***

INTRODUCTION

Realization can indeed be a powerful driver for design. In the context of design, realization refers to gaining a deep understanding or insight into a problem or a need, which then informs the design process and the resulting solutions.

When designers have a strong realization of the problem they are trying to solve, it fuels their creativity and motivates them to develop innovative and user-centred solutions. Realization helps designers move beyond surface-level observations and uncover the

underlying challenges and opportunities inherent in a design problem.

Realization also helps designers identify constraints and limitations that may impact the design process. By understanding the practical aspects and contextual factors surrounding a design challenge, designers can develop more feasible and viable solutions. Realization can lead to practical design decisions that consider factors such as budget, resources, technology, and user preferences.

Furthermore, realization enables designers to envision the desired outcomes of their designs. It allows them to imagine how their solutions will positively impact the users, the environment, or the overall experience. Realization helps designers create a clear vision of what they aim to achieve, which provides direction and focus throughout the design process.

To harness the power of realization in design, designers can employ various research methods, such as user interviews, observations, surveys, and data analysis. These methods help designers gain insights into user behaviours, preferences, and pain points, allowing them to form a comprehensive understanding of the design problem.

In conclusion, realization plays a vital role in the design process by providing designers with a deep understanding of the problem at hand. It fuels creativity, guides decision-making, and enables designers to develop innovative, user-centred, and impactful solutions. By embracing realization, designers can create designs that truly address user needs and deliver meaningful experiences. The topic of this paper is 'realization as a means for design'. Now

there are three major words in this sentence, a. realization, b. means and c. design.

Realization – ***the word REALIZE means to convert a concept or an idea into something real, a proposal into something tangible. REALIZE also means to become conscious/ aware, to have the knowledge or understanding, of and about.***

Means – ***the word means MEANS stand for a tool(s). without a proper tool, a task cannot be accomplished. This on the other hand is a precursor to realization. It encircles the experiences, ways, or steps that lead to realizing.***

Design – ***this is the biggest word. The word 'design or designing' here has a much deeper meaning, purpose and perspective than it sounds. It is the entire journey of creation, an entire timeline, a process.***

So, together these three words form the basis for the most powerful requirement of any design process, which is understanding the need and purpose and building the solution accordingly.

In design, if the need/ goal/ purpose is not realized then it can steer the direction of the entire idea, which in turn might lead to catastrophic results. Because not being mindful or not being conscious about the idea or the next step can lead to nowhere causing complete failure.

Again, on the other hand, if an idea or an abstract is not realized then it will not see the light of day, there will not be anything tangible to interact with. So, it is very important to realize the

vitality of a product/ concept to take it through to a fruitful outcome.

A very critical example in the field of mobility is 'the study of the target group and creating a suitable persona'. As designers, if we fail to interpret and realize what the customer desires then the design will not be accepted and the entire project will end up as an experiment. So, it's better to realize the needs and demands of the customer at a very early stage when there is time to correct any mistake and react accordingly.

METHOD:

This is not a typical paper in the sense that this does not focus on any outcome based on some technical research. This is more about understanding the concept of realization. What does it mean to realize? What does it take to realize? And most importantly, where does it lead when we realize? these were the three questions that I wanted to explore through this study.

So, there is no typical method that I have followed. Instead, this is a collection of secondary and partly primary research that I have done. In the section on self-realization, I asked my colleagues to close their eyes for 30 seconds and think of nothing. This is a very tricky statement that I made on purpose. Because it suggests two things, 1. think of nothing – when there is absolutely nothing in the mind (truly empty mind), and 2. think of nothing – when the participant is thinking about the statement 'think of nothing. In the first case, the mind is truly blank whereas in the second case it is not. This was a very exciting experiment because it made us

understand the psychological efforts that we need to realize the very basic difference between these two types.

Apart from this no strict method of research was employed and used, except for secondary research.

RESULT:

Just like the method, there was no result in the typical sense, meaning, that there was no technical conclusion based on which a derivation can be done. The result is majorly learning and understanding the importance of realization, its types and its characteristics. It was also about how realization works in the automotive world. I learned about the various aspects of realization and how they function. The various factors that affect realization, and their consequences.

This was more of an exploratory study than a purely technical experiment.

DISCUSSION

Type of realization:

1. Self-realization

It is a great tool for achieving goals and performing any task as it gives the confidence to not only plan in a proper way but to execute flawlessly. In the world of design, this tool can be exploited in a creative way.

Design evolves with time, which means that there is an opportunity for new design direction at every moment, the only catch is that it

has to be viewed through different lenses which shows a different perspective.

Viewing/ addressing a problem is done by designers (people), who can have various characteristics and can employ them as and when needed.

a. *Touch of success – These people know how to turn lead into gold.*

b. Flow – These people follow the plans of the universe (flexibility and lack of attachment to results)

c. Enterprising – Go-getters. They are fluent in their actions. They are either disciplined or are taught life lessons.

d. Cooperating – These people are good at teamwork, as they know what to pull from each team member.

e. Intuitive – They rely on their sixth sense and can easily and quickly access it.

f. Waiting – They are patient, which is their greatest weapon.

2. Collective realization

Collective realization refers to the shared understanding or insight that emerges within a group or community of individuals. It is the result of collective thinking, collaboration, and the exchange of ideas and perspectives among group members. In the context of design, collective realization occurs when a group of designers, stakeholders, or users collectively gains a deep understanding of a problem or design challenge. Collective realization often arises through collaborative activities such as brainstorming sessions,

workshops, design critiques, or participatory design approaches. These activities encourage diverse perspectives and foster open dialogue, allowing participants to share their knowledge, experiences, and insights. Through this collaborative process, the group members collectively develop a deeper understanding of the problem, uncover new possibilities, and generate innovative ideas. The benefit of collective realization is that it leverages the collective intelligence and expertise of a group, leading to richer and more holistic design solutions. It allows for the integration of diverse perspectives, which can lead to more inclusive and user-centred designs. By engaging in collective realization, designers can tap into the collective creativity and problem-solving capabilities of the group, resulting in more robust and effective design outcomes.

In addition, collective realization promotes a sense of ownership and buy-in among the group members. When individuals actively contribute to the realization process, they become more invested in the final design solutions. This collective ownership fosters a sense of shared responsibility and commitment to the success of the design project.

To facilitate collective realization, it is important to create an environment that encourages open communication, active participation, and respectful collaboration. Designers can use various facilitation techniques, such as structured brainstorming, design thinking methodologies, or collaborative design exercises, to stimulate collective realization and harness the collective wisdom of the group.

Overall, collective realization is a powerful approach to design that leverages the collective intelligence, insights, and creativity of a

group. By fostering collaboration and shared understanding, it enables designers to develop more comprehensive, inclusive, and effective design solutions.

Like ants thinks in a group and their collective goal is to feed the queen ant. This leads to collective growth and finally collective achievement.

3. From experimentation to realization

Moving from experimentation to realization in the design process involves transitioning from the exploration and ideation phase to the implementation and execution of a design solution. It signifies the shift from the idea/ concept to a tangible/ virtual product through prototyping, user testing and modification. The final outcome is proof that the experiment has been realized (turned into a tangible reality or a usable virtual service). Here's a breakdown of the key steps and considerations involved in this transition:

1. ***Evaluation and refinement: After conducting experiments and generating multiple design concepts or prototypes, it is essential to evaluate and refine them. This evaluation can involve user testing, feedback collection, and analysis to identify the most promising ideas or concepts. By gathering insights from these evaluations, designers can make informed decisions about which design direction to pursue further.***

2. ***Feasibility assessment: Once a particular design concept is selected, it is crucial to assess its feasibility. Consider factors such as technical constraints, available resources, budget limitations, and time constraints. Evaluate whether the chosen concept is realistic***

and achievable within the given constraints. This assessment ensures that the design solution can be effectively implemented.

3. ***Design iteration**: Based on the evaluation and feasibility assessment, the design may undergo further iteration and refinement. Feedback from users, stakeholders, and team members is valuable in identifying areas that need improvement or adjustment. Iteration allows designers to fine-tune the design solution to better meet user needs and align with project goals.*

4. ***Prototyping and testing**: As the design concept becomes more refined, it is important to create high-fidelity prototypes or functional models that closely resemble the final product. These prototypes can be used for testing and validation. Conduct usability tests, user interviews, and gather feedback to ensure that the design solution addresses user needs and provides a satisfactory experience.*

5. ***Design documentation and specifications**: As the design matures, it is essential to create comprehensive documentation and specifications that outline the details of the design solution. This documentation serves as a guide for implementation and helps communicate the design vision to stakeholders, developers, or manufacturers. It includes design specifications, technical requirements, materials, dimensions, and any other relevant information.*

6. ***Implementation and production**: With the design solution defined and documented, the focus shifts to the implementation phase. This may involve working closely with developers, engineers, or manufacturers to transform the design into a functional product*

or system. Collaboration and effective communication are crucial during this stage to ensure that the design is accurately realized according to the intended vision.

7. Real-world deployment and user feedback: Once the design solution is implemented and deployed in the real world, it is important to gather feedback and monitor its performance. User feedback and data analysis can provide valuable insights into the success and effectiveness of the design in meeting its objectives. This feedback can then be used to inform future improvements and iterations.

The transition from experimentation to realization in the design process is a critical phase that requires careful consideration, collaboration, and iterative refinement. By following these steps, designers can successfully transform their ideas and prototypes into tangible and effective design solutions.

Realization for the future:

Realization for the future in the context of design refers to designing and creating solutions that anticipate and address the emerging needs, challenges, and opportunities that may arise in the future. It involves envisioning and shaping designs that are forward-thinking, sustainable, adaptable, and responsive to the evolving landscape.

Here are some key considerations and approaches for realization for the future in design:

1. *Future-oriented research: Designers need to engage in comprehensive research to understand the trends, technological advancements, societal changes, and environmental factors that are*

likely to shape the future. This research helps identify potential future needs, emerging user behaviours, and new design possibilities.

2. ***Anticipating user needs****: Designers must anticipate and envision the future needs and desires of users. This requires considering how people's lifestyles, values, and preferences might evolve and how technology and other factors may influence their behaviours. By understanding and empathizing with the future user, designers can create solutions that are relevant and meaningful.*

3. ***Design for sustainability****: Realization for the future involves integrating sustainability principles into design practices. This includes considering the environmental impact of designs, promoting circular economy approaches, minimizing waste, and maximizing energy efficiency. Designers can explore eco-friendly materials, renewable energy sources, and sustainable production methods to create designs that contribute positively to the future.*

4. ***Flexibility and adaptability****: Designs for the future should be flexible and adaptable to accommodate changing needs and contexts. Consider designing modular systems that can be easily reconfigured or upgraded, or products that can be personalized or customized by users. Flexibility enables designs to remain relevant and useful over time.*

5. ***Embrace emerging technologies****: Realization for the future often requires embracing and leveraging emerging technologies. Designers can explore the potential of technologies like artificial intelligence, internet of things (IoT), virtual reality, and augmented reality to create innovative and transformative experiences. By*

understanding and harnessing these technologies, designers can create solutions that are cutting-edge and future-ready.

6. Co-creation and collaboration: Realizing designs for the future often necessitates collaboration with stakeholders, experts, and users. Engaging in co-creation processes can help capture diverse perspectives, insights, and expertise, resulting in more comprehensive and future-proof designs. Collaboration also fosters collective ownership and fosters a shared vision for the future.

7. Continuous learning and adaptation: Designers should embrace a mindset of continuous learning and adaptation to stay abreast of evolving trends and technologies. The future is dynamic and unpredictable, so designers need to be open to new ideas, feedback, and iterative processes. By continually refining and adapting their designs, designers can ensure their solutions remain relevant and effective.

Realization for the future requires a proactive and forward-thinking approach. By considering future scenarios, user needs, sustainability, emerging technologies, collaboration, and adaptability, designers can create designs that not only address the present but also prepare us for the challenges and opportunities of the future. We have not seen the future, because it is literally after, and we live in the present which is now. So, to realize what will come after is crucial and takes a lot of effort and knowledge. Because only by observing and analysing the past and planning the present can we achieve a tomorrow that is future-ready.

Eg. How the market will accept a new vehicle segment? This can be understood only by analysing the present market condition and the demand for it.

Different stages of realization based on the level of civilization

The video named 'Alien Civilization from level 1 to 7' shows various levels of civilization ranging from type zero to type seven and how their energy needs increase over time and how they meet that requirement by venturing into new unexplored directions. Each of them has their own way of living and skill set. Starting from the most basic to the most advanced each civilization has its own unique character that has become the turning point for that civilization. These turning points can be in different areas. One can be the energy needs and demands, the other can be the level of consciousness. Thirdly it can be about the level of realization both mentally and physically. To realize beforehand when is the correct time to move on is the most critical aspect here. This can be done only if we have a wholesome understanding of humankind. The level of realization can be categorized in the following way.

***Level 0** – Realizing the most basic needs (have to survive)*

***Level 1** – Realizing the ways to survive. There are many reasons for it, such as the*

***Level 2** – Realizing the need to survive*

***Level 3** – Realizing that only the fittest will survive*

***Level 4** – Realizing the factors of being the fittest because it is not only about the daily needs and desires, it's truly about being in the present and living the expected life and practising the fittest habits.*

***Level 5** – Realizing the need to control desires and wants. Only then humans will truly be practising sustainability and healthy living.*

***Level 6** – The next step will be to realize that just because our brain is more mature than other life forms does not give us the capacity to exercise command.*

This level of realization has been/ will be the guiding factor because they have/ will occur to humankind eventually that without being consciously aware nothing could possibly be achieved.

Realizing as a feeling:

When we feel something, we tend to find both the good and bad aspects of a situation. The good aspect makes us feel relieved and the bad aspect keeps us reserved and closed. Because when we keep something to ourselves it builds a burden and if we don't let it out our level of performance is reduced and restricted. This is a realization that will affect our productivity and outcome.

- **Factors affecting realization:**

1. ***Ignorance** – when we choose to ignore any aspect of an entity, we deliberately make a decision, not to deep dive into that topic. This is undesirable because it is a lack of full dedication towards that topic. Hence the realization is incomplete.*
eg. If we choose to ignore the real-world effects of global warming then it will lead us to bigger problems which would be irreversible.

***2. Lack of information** – this can or cannot be under our control. But it will have a lasting effect on any endeavour. eg. In the automotive world we build concepts and ideas that might be relevant for the projected time, but it is impossible to know for sure if that concept will flawlessly fit. This is because we lack practical information about the needs and desires of the potential users of that vehicle and their needs and preferences.*

***3. Time (the earlier the better)** - the faster we realize the better it is. Because with time conditions, needs, preferences, and capability changes. In the 19th and 20th centuries the focus was all on coming up with new vehicle concepts, but now in the 21st century, it is about the experience of travelling in a vehicle. So, with time companies and brands have realized that people's (customers') need has shifted from owning a vehicle to enjoying the journey. The companies have realized it over time.*

***4. Influence** – the factors that direct decision-making. eg. In the automotive world the structure of a car is defined by safety regulations. Such as the thickness of A, B, and C pillars are defined by their load-bearing capacity in the case where the car is overturned upside down in an accident, such that they should be able to hold the weight of the entire car and not crumple under the load.*

Observation + contemplation + conclusion

Observation is looking + analysing + understanding. Contemplation on the other hand is deep thinking + analysis and understanding in all aspects. Realizing this basic difference is very crucial as it might make or break a situation because what appears on the top might

not be the underlying case and if not contemplated then it might cause repercussions while concluding.

Eg. The grave event of 9/11 which we all remember to this day is a good example. We all know who was responsible for the attack and after several years that responsible person was framed and killed by the US army. This seems to be the ideal situation where a crime is committed, a suspect is caught who also happens to have taken responsibility for the attack, and a coordinated counter-attack is conducted using two so-called stealth attack helicopters which were under development, and then he gets killed. The entire situation seems too scripted because 1st using two under-development helicopters indicated a foolish move to demonstrate tech. supremacy. 2nd there is just a claim that the perpetrator was killed and there was no evidence, in-fact the demand was denied by saying that the video is too brutal. 3rd the role of global politics is immense because US income is majorly dependent on arms export, and other countries don't need arms if there is no need for them. So just to boost their sales they needed a context. Again, the attack on the world trade centre is in itself suspicious because on that day along with the twin tower there were other buildings that were either demolished or damaged because of the attack and which were several locks away. So, was it a pre-planned attack with a framed culprit who would be accused after the incident? Or was it a genuine attack in the name of protecting Islam?

IMPLEMENTATION

1. *Man-made world – A man-made world is an artificial and biological world. We build and we reproduce. The machines we build,*

the life we create, and the technologies we develop are all human-made. They are in a way very rudimentary and basic. Because we strive to achieve the best outcome ignoring its harmful side effects of it. We are driven by the idea of gain no matter the outcome, and this leads to unsustainable practices.

Eg. mycologist Paul Stamets says that if we stop emitting carbon, the mycelium would clean the atmosphere in five years. Humankind should and must reach this level of realization where they consciously choose to let self-gain go for the better of the universe. Another example is the automotive world we build vehicles and we contribute to pollution.

2. ***Natural world*** *– Nature on the other hand employs the rule of optimal. It creates a life that is not always the best but is definitely optimal and supportive. For example, trees. Created by the nature are life-giving. Everything in nature works as a system. And every component in that system is a vital and critical part of it. And every process is cyclic. For example, mycologist Paul Stamets says that if we stop emitting carbon, the mycelium would clean the atmosphere in five years. So, here a clear atmosphere will lead to better thinking and a functioning mind, a better functional mind leads to clear ideas, clear ideas lead to better societies, better societies lead to great nations and great nations represent great practices. Great practices lead to a clean atmosphere. The earlier we realize this cyclic process the better is it for us. Another example is what nature creates but it decomposed and decays and helps another life form to survive.*

3. ***Extended time and space*** *– Spacetime are a scientific model that combines 3d space with time (the fourth dimension). It's a*

common scientific idea that we live in a world with four dimensions because of which we are able to see and live in 3 dimensions such as length, width, and height. Other than this the fourth dimension is time. our mind is programmed to perceive things in a quantifiable manner, which means that our mind accepts tangible concepts and anything abstract is difficult to accept and understand. It is a complex idea that time can be a dimension because we cannot see it, we can only experience it. But the relevance of time is immense as it is the most important because every day is another step towards our last day. There is also the aspect of change when we consider time. Everything in this universe is changing. Change is the law of life and the universe. Nothing is without change. Any action is impossible unless there is a feeling in itself of a deficiency that can be filled up by an active endeavour to possess the missing part that would contribute to the completion.

- **Aware of oneself in the context of harmony**

(This concept was introduced by prof. Lalit Kumar Das as an observation of the previous discussion)

Being aware is what we strive for in this material world, because, mostly we try to attain peace of mind through the material possessions that we hold so dearly close to us. But most of us fail to understand that actual peace happens when we realize and understand. Understand how short life is, and understand that the real inner self is the consciousness in us. Because it leads to the path of selflessness and harmony.

Harmony is about being in sync with every aspect that is part of life. And a harmonious life leads to balanced, congeniality (best

personality), and relaxation. A life where one is in tune with oneself, surrounded by people with whom one has reciprocal love and respect, a life that is marked by tranquillity and contentment, and where one feels appreciated, valued, and understood.

Most realizations are about harmony. Harmony in life, harmony at work, harmony in the environment. In our life, we tend to live harmoniously with nature. Because nature is the ultimate, the epitome, the pinnacle of design, and anything that is well-designed attracts us naturally and gives us peace of mind.

Eg. When we see a green paddy field, we feel fresh. It is soothing to the eye. This happens because all the paddy shoots appear to be of the same height which gives a sense of uniformity and peace. In the back of our minds, we subconsciously have an idea about the beauty of nature. About the proportions and ratios (the golden mean).

Eg. We realize using resources in our environment. We harmonize with the environment in a way such that when the sun rises, we wake. When the sun sets, we sleep. In long winters animals hibernate because food supplies become scarce, so this is again trying to sync with nature as if trying to harmonize with nature.

Eg. In the automotive world we find many vehicles to be naturally beautiful and are attracted to them without consciously knowing why. Such a brand is Rolls Royce and its vehicles

Imagination vs realization

Imagination and realization are two important aspects of the design process, and they play distinct but interconnected roles.

Imagination refers to the ability to conceive and generate new ideas, possibilities, and visions. It involves the creative and exploratory process of envisioning something that does not yet exist. Imagination is a powerful tool for designers as it allows them to think beyond current limitations, challenge conventions, and generate innovative concepts. It involves the ability to visualize, ideate, and imagine potential solutions.

Realization, on the other hand, involves the practical implementation and actualization of ideas. It is the process of turning conceptual designs into tangible and functional outcomes. Realization brings imagined ideas into the physical or digital realm, making them concrete and accessible to users. It encompasses the technical aspects, production considerations, feasibility, and execution of the design solution.

While imagination sparks creativity and drives innovation, realization ensures that the ideas are transformed into practical and usable designs. The interplay between imagination and realization is crucial in the design process. Here's how they relate to each other:

1. ***Inspiring ideation****: Imagination fuels the ideation phase of the design process. It allows designers to explore a wide range of possibilities, envision alternative approaches, and think beyond traditional boundaries. Imagination helps generate a pool of creative ideas that can be further refined and evaluated.*

2. ***Guiding realization****: Imagination provides a guiding vision for realization. It sets the direction and goals for the design process, shaping the decisions and actions taken during the realization phase. The imaginative ideas serve as a reference point for*

designers as they work towards implementing and bringing the design to life.

3. Iterative process: The design process often involves an iterative cycle between imagination and realization. Imagination generates ideas and concepts, which are then tested, refined, and realized through prototyping, user feedback, and iteration. The feedback and insights gathered during the realization phase can inspire new imaginative ideas, leading to further refinement and iteration.

4. Collaboration: Imagination and realization often benefit from collaboration and multidisciplinary teamwork. The imaginative ideas can inspire and guide the realization efforts of engineers, manufacturers, and other stakeholders involved in the production process. Collaborative processes allow different perspectives to contribute to both the imaginative and realization aspects of design.

Ultimately, successful design requires a balance between imagination and realization. Imagination sparks innovation and helps push the boundaries of what is possible, while realization ensures that those imaginative ideas are transformed into practical and impactful designs. By effectively harnessing both imagination and realization, designers can create innovative, functional, and meaningful solutions.

Imagination can also be something that generates in our minds to counter the boredom we might be feeling at that time.

Realization is knowing that any imagination/ idea is possible to build. Maybe not now, maybe five or ten years later. To believe that this imagination can or cannot be brought to life by the existing

technology is a realization. Without realization, we cannot put our imagination to life.

Eg. Once a certain someone imagined that if only, we could have gone to the moon how great would it be, then the next stage would probably have been let's try to cover the distance and reach the outermost layer of earth's atmosphere, then the next stage must have been to cover the distance and rotate around the moon, then it would have been let's try to land a probe on the moon's surface followed by let's put human beings on the moon. These would have been the possible broad levels of realization. Along with these, there must have been other factual considerations such as the aspect of atmospheric re-entry, heat generated during re-entry, the surface coating needed to protect the shuttle from getting damaged, the payload capacity of the rockets that can be delivered, the speed the shuttle has to gain to leave the gravitational pull of the earth, etc. these factual considerations are also realizations in the sense that they are scientific aspects which must be taken into consideration.

Someone had dared to imagine all these in the first place and realize that gaining knowledge about the world and universe around us is the first step to understanding life.

Eg. The first car is believed to be the three-wheeled cart vehicle built by Karl Benz. He dared to imagine a self-propelled version of then-used horse-pulled karts. It was both a realization that led to the imagination and innovation changing our lives forever.

It's moments like this when we as human beings recognize our potential and believe in the impossible until it's no more impossible.

It's this driving force that has manifested creativity in us and produced miracles.

- **Realization is always in layers**

(This concept was introduced by prof. Sugandh Malhotra as an observation of the previous discussion)

Realization can also happen in steps/ layers.

Eg. Arka is in the Mobility and Vehicle design discipline of IDC of IIT in Powai in Maharashtra in India in Asia. Now if Arka encounters any problem in his life during his stay in Mumbai, then it is quite logical and reasonable to consider that something at the aforementioned layers must have changed which is not in accord with him, and therefore the problem (uncomfortable situation).

Eg. At present vehicle manufacturers don't use the term 'new vehicle' whenever there is a new launch, instead they talk about the experience of the new product. How the customer will feel when they are in the vehicle? They talk about the experience that the product will give because they realized that a car is no longer a commute to take the passengers from point A to point B instead it is about the duration of the journey and how pleasant and comfortable it can be made.

Just within the time

At first, the idea might look like not being good enough, because just within the time sounds like not making enough effort towards any situation. Because similar to just in time (not the management philosophy) it invokes not being responsible enough to perform wholeheartedly. But it conveys a message of performing at the last

moment. But, on the other hand, it might also be that just-in-time is a saviour.

Eg. The patient was brought to the hospital for the surgery just in time.

There are many similar incidents where realizing the idea of just in time may help us understand the importance of the event. `Just-in-time' is a management philosophy

It originally referred to the production of goods to meet customer demand exactly, in time, quality and quantity, whether the `customer' is the final purchaser of the product or another process further along the production line.

It has now come to mean producing with minimum waste. "Waste" is taken in its most general sense and includes time and resources as well as materials. Elements of JIT include.

- **We can move in space but not in time**

(This concept was introduced by prof. Lalit Kumar Das as an observation of the previous discussion)

As human beings, we move in space as in real 3d space, the landmasses, the roads, mountains, etc. Moving in time is not a concept that we are able to grasp easily because time travel is still majorly fictional and not a reality, and that is because figuring out how to send tangible mass through an intangible path is not possible with the available technology. Because time is not physically visible it's the moment that we live in. So, traversing at the moment is not physically travelling or covering a distance it is about covering a time span where one can live the moment faster than others. So, to

realize that we can travel in time was the first stage, the next might be why do we need to travel in time? And followed by how it could be done. So, then ideas generate as to how mass can be transported over time and how will it be if the transport is made possible.

Eg. If it is a human, is to be timeported (time transported), will that person's age change? if she/ he is sent 5 years ahead or will the age not change? Then the next stage can be to realize how much quantity at a time one can send or transport through time.

We all think that to make time travel possible we need to go faster than the speed of light. But is it really true? Can time travel also be going the slowest? We consider light because we cannot imagine going beyond the speed of light or for that matter not even close to the speed of light.

Then the next realization will be to think that are there any parallel species who travel in time in general but the idea of moving in space is completely new to them. How will they react? How will they think of this new concept? How will they approach it? These are some of the questions that are fascinating.

· Realizing time as a dimension

We live in a 4-dimensional world and so we are able to observe the 3 dimensions which are length, width, and height. We are able to see the three dimensions because they are physical in nature and not intangible concepts. But Time is a moment and it is intangible. So, it is difficult to accept time as a dimension because we cannot see it or

measure it in the way we measure spans/ lengths. Instead, time can be measured in terms of moments.

eg. Let us consider a case where a person is sitting on a chair at a particular location, and let's imagine the same person sitting on the same chair in the same location, ten years from now. Are these two different events? Or the same event even though it's the same person and the same chair in the same place. These will be two different events in which one dimension is changing, which is time. Here we realize that time is a span but not a length in a typical sense that can be measured with a measuring tape. The length here is the number of hours or weeks or years covered.

Maybe it can be measured with a measuring tape, but then the tape has to run for 24 hours, 7 days a week, 365 days a year for 10 years directionless. And what about how fast the measuring tape is travelling? Because the faster it travels the longer will it be. Maybe then we can write that a person was sitting on a chair at 24^{o}E, 45^{o} W and she was sitting on a chair at 24^{o}E, 45^{o} W, 35,00,56kmh away. Here the thing to notice is that,

1. ***The unit is not km/h but kmh which is the distance in hours.***
2. ***The distance covered depends on the speed at which the measuring tape is drawn***
3. ***There is no specific direction in which the measuring tape is to be drawn because it would then be one of the three axes. But it cannot be in any of the known axes.***

So, it is evident, that time cannot be measured in units of length but it is a dimension that is part of every occurrence. It is the only dimension that is not constant.

Another way to understand this is to visualize time in a clock. The hour's hand completes one rotation in one hour and then the rotation is repeated again. It's a constant loop. Now, what if we extrude this rotation of 24 loops in a day? What if we pull it out of the clock in front of the clock? We will get a spring-like structure in the known 3D world, which is a span, but it is not a length that can have a unit of kilometres or meters, but a unit of kilometer-hour.

This is why time is a dimension. And we live in a 4D world.

Eg. Similarly in the automotive world, we have facelift versions of various models which is essentially the same model with a fresh exterior design that is launched after several years the initial version was launched. Here two things have changed, the look of the vehicle and the time during which it has been launched. So, there is a change in the 4^{th} dimension

- **Realizing time as unidirectional but is recorded in bidirectional**

(This concept was introduced by prof. Sugandh Malhotra as an observation to the previous discussion)

Time is unidirectional, it only flows in the forward direction. When a moment is gone, it is lost forever. It will never come back. But it can be recorded bidirectionally, such as the past which we call history. It is a testament to how why when and who.

Conclusion

From this study, it is completely evident that realization is the primary means/ tool for design. Because if we do not realize the

above-discussed aspects then in time the design concept will become irrelevant and lost.

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