STUDENTS TOK

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**With the greatest joy and deepest gratitude,
Team "Students TOK"
acknowledges the unique opportunity
to launch students'
IBDP Theory of Knowledge (TOK)
magazine for the relentless pursuit
of knowledge and conveys thanks to**

**Principal Mr. Aloysius D'Mello
Vice Principal Mr. Nishanth Nagavar
TOK Coordinator Mr. Maxim Lobo
TOK Teachers and Enthusiasts**

**Thank you for encouraging us
to keep striving for the best.**

Editor's Note

The Students TOK magazine weaves together the perspectives of students in the context of the modern world.

Contemplating on diverse topics to produce fine articles has empowered us to think out of the box, challenge ideological biases, and reflect critically on diverse ways of knowing.

Getting an opportunity to publish a magazine for our fellow students at Greenwood High International School has instilled a sense of camaraderie and gratitude in us.

Throughout this process, deliberation on a variety of topics has motivated us to do further research as well as comprehend and reflect upon the nature of knowledge.

It has encouraged us to share our perspective on diverse topics with the Greenwood High School, a community essentially dedicated to learning.

As Editor in Chief of Students TOK, I feel great pride to put together vivid articles by the TOK team for you to peruse and reflect upon the interpretive and exploratory nature of Theory of Knowledge.

Soham Joshi
Editor in Chief
Students TOK

Nidhi Iyengar
Co-Editor
Students TOK

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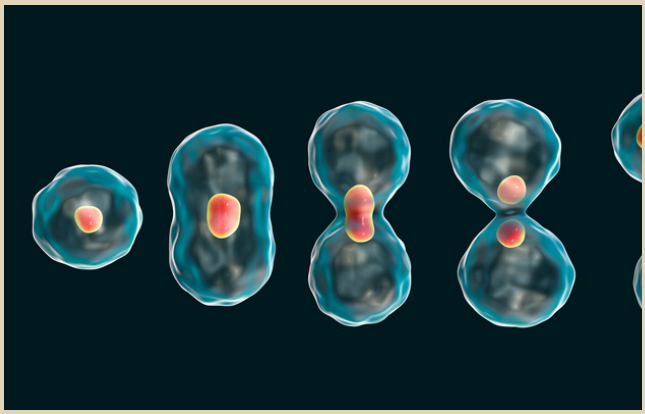

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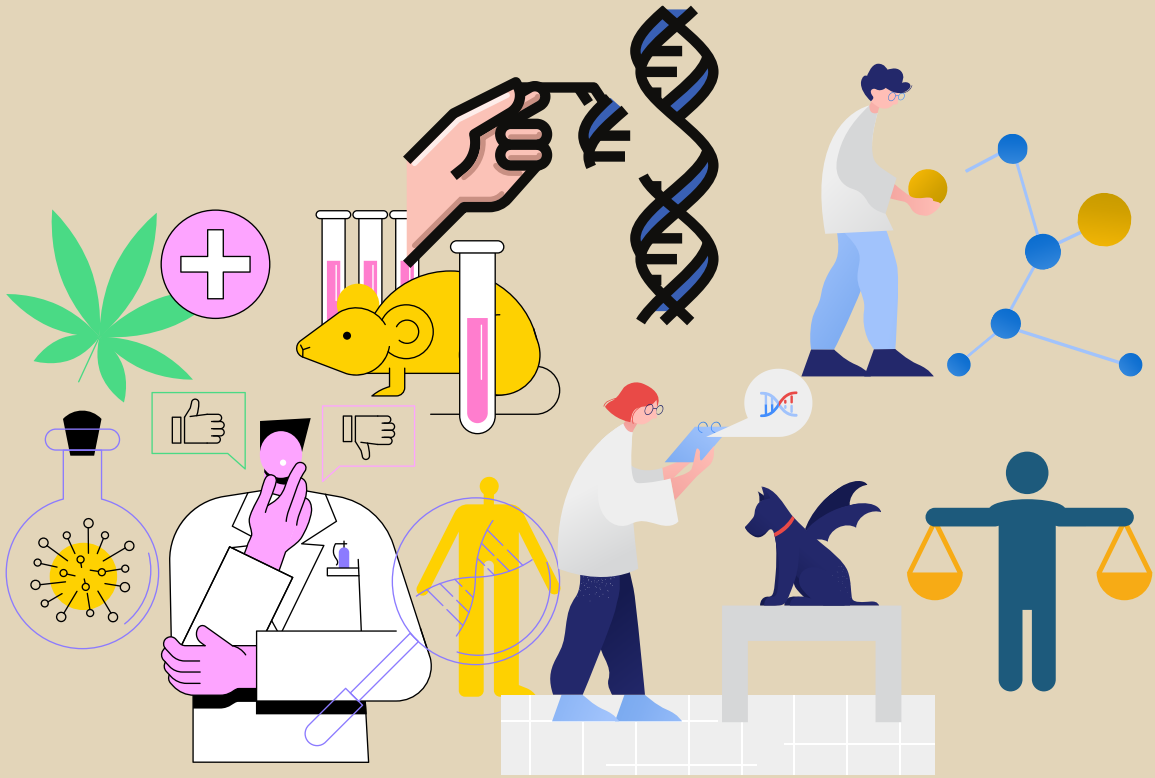


SHOULD WE DELIBERATELY NOT SEEK KNOWLEDGE DUE TO ETHICAL CONSIDERATIONS ? [TECHNOLOGY]

Soham Joshi

Knowledge is humanity's greatest strength and advantage over all other species. The pursuit of knowledge is viewed as an essential part of mankind's existence and development. The proliferation of learning is inevitable and unbounded, except for whatever limits to it is that of the finite cognition of human brain. Thus, ideally, we should not suppress or reject knowledge anyway.

Ethics as a discipline fundamentally deals with two problems. One is values it brigs and the other is obligation we have. Once moral responsibility ceases to be based on such simplistic notion of intrinsic right and wrong, the ethical problem becomes one of measurement—of having to quantify qualities it may bring such as what human benefits.

The role of ethics in the pursuit of knowledge has often remained unclear. This is because, not only recognizing the ambiguities and ambivalence of human knowledge is perplexing, but also ruling out which is outside the accepted norm is not always bound to common sense. To name few, common sense entails that seeking to know how to destroy the biosphere would be wrong.Yet, what if biosphere is contaminated with a contagious pathogen?

Learning how to kill human beings through uncontrollable means would be wrong, but what if we are at war? Surgical strikes with miniature drones would help control further human loss given to inevitability of war.

There is no human act which can be always wrong or without the possibility of being justified in conceivable circumstances, no matter how rarely or atypically this might be the case. Yet, seeking to know and develop scientific tools to induce hatred among people, indiscriminate, would be wrong. Such research is utterly culpable and outside the forum of conscience. Such an inquiry by its very nature excludes any human benefit. Such knowledge is easy to be recognized as unethical to be pursued.

It would be illogical, to think that scientists should be morally neutral like data and facts. But scientists are human beings. As human beings they may not act without value considerations of their inquiry which is a benefit to mankind. It is a very simplistic kind of reasoning but flawed if not subjected to evaluation under human conscious. Therefore, inquirers are obligated to act as moral agents guided by conscious.

THE TIME

Pursuit of knowledge cannot be self-authenticated; scientists are not their own judges and juries, nor is the knowledge they want or discover or build upon exempt from critical ethical examination. Marie Curie believed scientific research was a public good and championed its utility. Yet, both Curies were constantly ill from radiation sickness, and Marie Curie's death from aplastic anemia was caused by prolonged radiation exposure.

Furthermore, Madam Curie, although never worked on the Manhattan Project, made contributions to the study of radium and radiation that were instrumental to the future development of the atomic bomb.

Even when Marie Curie experienced the ill-effects of radiation upon her own health since beginning, the self-authentication of the goodness of the knowledge guided her self-conscious to an extent that her inquiry ended up being detrimental to her own self. Furthermore, the application of her research into an atomic bomb resulted in gruesome event for mankind. Albeit some benefits with radiation usages in diagnosis and cure of cancer or diagnosis of broken bones using x-rays even if accounted, Marie Curie's pursuit of a knowledge would have been subjected to an ethical bar, if it were done in the 21st Century.

THE PLACE

The moral problems inherent in the application of scientific knowledge and the responsibility of the scientists, is the charter of UNESCO's division in ethics of science and technology. With the development of the modern bio-sciences, the question of the moral responsibility revolves around the ethical orientation of societies characterized by scientific evolution.

Neuroscience-AI interface emulates brain activities, i.e. the attempt to use AI models to create simulations or functional representations of the human brain. This is extremely ethically sensitive nature of inquiry.

AI allows designing of the computer models of the human brain (or parts of the brain). This poses ethical challenges as subjects are required to implant semiconductor micro-chip into skull of animal subjects, which is not acceptable as this premature technology is known to have some animal deaths with invasive testing.

Yet, in developed nations the research is continued to be allowed on animal subjects and even human subjects under free will. The pursuit of this inquiry in the field of Neuroscience-AI even when it has a high likelihood of loss of life, is not deemed unethical. This demonstrates how ethical consideration is very much dependent upon the society we live in.

THE APPLICATION OF KNOWLEDGE

On the contrary, human cloning is banned for ethical, legal, and moral implications. One of the most controversial issues in this line of inquiry are those related to the violation of human dignity.The creation of genetically superior human species could subject entire humanity to irreversible damage and possible slavery to synthetic humans.

Across nations it was unanimously perceived that, this scientific method degrades the existence of individual to a simple commodity that can be sold and purchased catered to an order to meet certain characteristics.

Creating human beings by manipulating genetic characteristics annihilates individuality, autonomy, and integrity.

This showcases how the advanced societies cannot influence the universal common wisdom of value of human life and science cannot be allowed to pursue this knowledge that undermines the supremacy and uniqueness of human life.

CONCLUSION

In summary, ethical considerations to permit the pursuit of knowledge is dependent upon the time, place, and the application of the knowledge for greater good. Time is essential because when and if, the possible future adverse effect of knowledge cannot be quantified before or during the research, seeking of knowledge cannot be subject to virtuous principles. Place, where the inquiry takes place, influences the ideological biases towards ethical bar of any knowledge. Nonetheless, common wisdom that guides human conscience plays a crucial role to distinguish right versus wrong. Hence, in my view, we should leave it to human conscience to decide whether the pursuit of given knowledge is ethical or not.

HOW DO OUR PERSONAL BIASES OR VIRTUES AFFECT OUR ACQUISITION OF KNOWLEDGE? [HISTORY AND POLITICS]

Vansh Abrol

When it comes to personal biases or virtues, the best concept of theory of knowledge happens to be perspectives. As we would investigate a political lens, perspective is the key point in thinking about certain decision making from the political realm i.e., decisions made by leaders and organizations that are political in nature.

Let us take foreign policy for example, if you are the Minister of External Affairs of a nation and you are to directly involve into an aggressive measure, you cannot look only into a nationalistic lens that could be instilled in imperialistic views. There must be a thought process of resources, other foreign stakeholders, later implications and so on.

Yet, this is where personal biases come in place. The situation will make you look through all the lenses but you do have your own preferences to do what you feel is right and justified according to you. This would bring in your own factors that could have evolved with your ambitions, upbringing, or your own philosophy of foreign policy itself.

This is something which history explains on many occasions. For this situation, the US' intervention in Vietnam War is a direct example. When John F. Kennedy became the President of the United States in 1961, it happened to be the same time the tensions in Vietnam had become too overwhelming. Looking through the lens of Kennedy and his cabinet, their bias was only over the Soviet Union having their sphere of influence. Their decision of involving into such a rugged, volatile region in South East Asia was not really calculated according to the public's approval, their troops capabilities, or any other repercussion.

Even though, these factors would have been discussed about, the whole government had one aim that was to combat the Soviet Union's sphere of influence in Asia. Their bias restricted them to bother about other factors that would not go well for them later. We can explain this as political ignorance, where a policy is restricted only towards the aims of one aspect of a broader issue

In this turn of events, it would be the peace rallies that were led in the 1970s, the unanticipated defeat to the communist led North Vietnam and the miscalculated

dispersal of troops that fell prey to the Guerrilla warfare at the Mekong River. Well. At the end of the day, can we blame the US for its own failure in Vietnam? It was only trying to keep the USSR in its bounds…

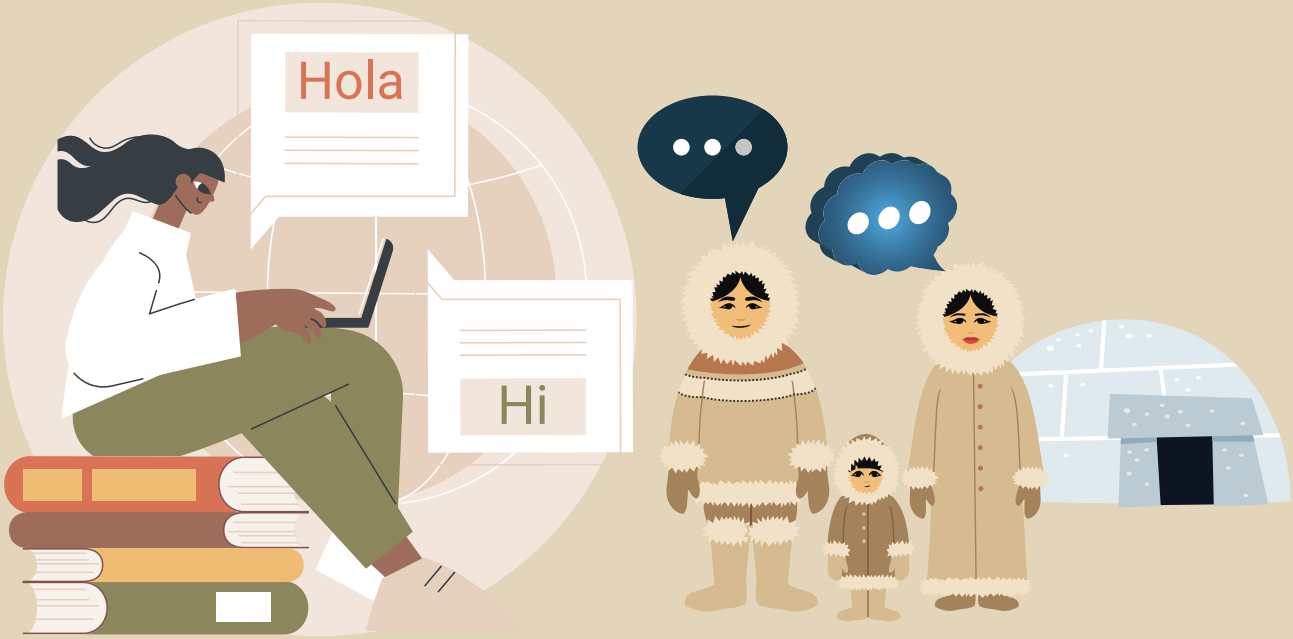
Moving on, let us just take the political perspective itself from a new lens. Look at it from an individual's perspective. An individual perspective in politics would be an individual's views over current affairs caused by the decision-making, directives, and the policies of the government.

Now getting to the point over here would be how a personal bias affects such individual perspectives. Well, if we take into consideration about knowledge, it would not be about its limitation but how an individual with political views and biases perceives that knowledge.
Well, let us take current affairs for example. If you are a citizen of a democracy and there is a new incumbent in office, you would perceive it to be good or bad news according to the political bias you have and the individual you were hoping to have in the office.

For example, the recent presidential elections for the Indian National Congress (INC) were held, where Mallikarjun Kharage defeated Shashi Tharoor to take the Congress presidency. Now, over here we can see multiple views over this piece of news. The long-time Congress supporters, who have supported the INC since the 1980s, would be happy with such a piece of information as Kharage himself aligns with the similar ideologies. While, the INC Liberal supporters would have wished Tharoor to be in power but would not be fully discontent with the piece of news as they see Tharoor as a long-term prospect for the party.

Then we come to the ruling alliance supporters, who would have wanted Tharoor to be in power only for the mere fact that he supported a few planned bills in the Parliament like the Uniform Civil Code (UCC).

Thus, we see personal biases within the government and the citizens. This does cause a conflict of interests between both the entities during many circumstances. However, humanity cannot reach full political stability and we will always have men fighting for different ideologies on the pretext of their own background, again all led by a personal virtue. We see this happen day after day and dust it under the rug as if it is not an issue, and when we do acknowledge it, we take conceptions of newer ideologies that just do not make the situation any better. So, can we ever have a form of political rest in our modern-day society? Well, that is a question for another day…



IS OUR ACCESS OR UNDERSTANDING OF KNOWLEDGE IMPACTED BY THE SOCIETY WE LIVE IN ? [LANGUAGE]

Nidhi Iyengar

Language is one of the primary building blocks to how we perceive and look at society. From the day we are born, the language we speak envelopes and shapes us, structuring our perspectives and providing an omnipresent lens that both widens and confines our pursuit of knowledge. Refined and diversified over generations, language and culture in societies have become innately linked together, providing an important outlook on the nature of knowledge.

Most importantly, language is the gateway to thought and knowledge: our perception of ideas, thoughts and reflections are made concrete by our ability to express them – to our peers and to ourselves. Our consciousness of knowledge is therefore intricately linked to our society's way of expressing it ideas would simply fade into abstract wisps of nothingness into our consciousness without language to classify them.

In George Orwell's novel 1984, a totalitarian government used its language Newspeak to "narrow the range of thought", limiting the nuance in words to subsequently "narrow the range of consciousness". Without words to express them, the government deemed rebellious thoughts impossible.

This is epitomized by the principle of "linguistic relativity", which hypothesis that the structure of language closely influences cognition and perception. Prairie Dogs, for example, have a language considered the most advanced amongst those of animals studied, which is mirrored by their highly sophisticated societal structure and cognition. The structures of local languages can therefore be both barriers and catalysts to knowledge access.

Language is an important reflection of a society's extent of knowledge and perspective. The nuance of language, therefore, is both an indicator and a door to the pursuit of knowledge. The Eskimos are known to have a staggering 50 words in their vocabulary to describe snow.

The detail of their language mirrors their access to such knowledge in a way the English language cannot: a researcher may struggle to shape hypotheses on snow due to the constraints of the English language. Interestingly, the effect of knowledge on the development of language creates a perpetual loop, with the available construct of language later constraining or aiding access to new knowledge.

Word	Meaning
qanniq	falling snow
maujaq	deep, soft snow
kinirtaq	wet, compact snow
katakartanaq	crusty snow marked by footprints
uangniut	snowdrift made by northwest wind
munnguqtuq	compressed snow softening in spring

Some Eskimo words for snow and their meanings. PC:safewater.org

A language is also deeply shaped by its society's belief system. As a result, certain beliefs and perspectives seep into our minds in early years, later becoming ingrained views that make us less open to new knowledge. Languages such as Hebrew, Pali, Greek, and Classical Arabic are considered 'sacred' languages due to their direct connection to religious texts and ideals and therefore play an important role in shaping ideals and perspectives on the world.

Interestingly, the concept the 'love' has been shown by a study to vary in meaning between languages. The language Hopi, indigenous to the tribes of North America, lacks tenses in its structure and discards the notion of past, present and future altogether, adopting a more relative approach to time. This distinctly moulds its society's perception of the world and view of knowledge.

Furthermore, language is primarily a means of communication. The disjunction of native languages therefore creates a barrier in communication and understanding that impedes the sharing and spread of knowledge. UNESCO estimated that 40 percent of students worldwide faced language barriers that prevented them from making the most of their education.

Ambiguity and loss of nuance between languages is therefore a prevalent issue that disrupts the spread of knowledge. For example, a nuanced word like "Sehnsucht" in German, meaning 'a strong longing for a different life' would lose its intricate meaning on translation to a more universal language like English. This is often results in inefficient transfer and sharing of knowledge between societies.

Not all knowledge, however, is rooted in society or language. Universal emotions and instincts, like the adrenaline of danger and survival, or the bond between a mother and her child transcend most societies and language itself : they are above words. Music can often evoke emotions and responses despite language barriers in understanding

Hindustani music, for example, has Raagas Hansdhwani and Marwa, amongst many, that evoke emotions of calm and sorrow respectively. Similarly, art and dance are means of communication that transcend words and language to create responses. Classical dances like Kathakali, Ballet, and Kathak narrate stories and emotions that resonate independent of culture and language.

Ludwig Wittgenstein once said that "The limits of my language means the limits of my world". While this has truth and weight, the connection of our shared humanity can often rise above the barriers we create to spread knowledge and advance our species.

IS OUR ACCESS OR UNDERSTANDING OF KNOWLEDGE IMPACTED BY THE SOCIETY WE LIVE IN? [INDIGENOUS SOCIETIES]

Lalitha Rao

When we think of knowledge, the ideas that sprout are schools, textbooks, and the internet, but if these are the only ideas that come about, how did people learn? How did we make advancements in science, literature, math, etc. when there was no internet? Indigenous societies live without the internet and do not have a formal education, yet how are they able to prosper?

Indigenous societies have always been isolated for it is the way they preserve their culture. Even today, we are not allowed to step foot into tribal reservations: the Sentinelese people of the Andamans are very hostile towards outsiders. Therefore, their culture and their ways are entirely unknown to you and me.

Now, before answering this question, we must understand how to define an indigenous society. Indigenous societies are different from indigenous people. For one, these societies live in isolation, far away from the modern touch: this entails that they live off of their land, and that they prosper off of their own land. This is how one can view these societies as they are constructs that are far different from what most have witnessed.

Where one originates from does have an impact on their understanding of knowledge, but not to the effect that someone may hypothesize. Thought still exists, and need still prevails. Living in an indigenous society entails that one is surrounded by one's own culture.

This is a wonderful way to explore one's surroundings; in my eyes, learning more about one's origins develops character. Many may feel that living in such a homogenous society impacts one's view of the world, but I believe that it does not.

The word "world" is a subjective term. Even with the advent of technology, the world is still too broad. As a result, the world is just the surroundings of a person, thus their knowledge is perfectly catered to the world that they live in.

Traditional knowledge is the knowledge that is passed down. It is practices that have been developed by people based on their interactions with their natural environment. Observation is key here: indigenous societies have observed their surroundings to create understanding, interpretation, and meaning, the three of which encompass religion, word views, classification, and all the other branches of knowledge. To take an example, the Kayapo people of South America had developed an extensive classification system of the ecological zones of the Amazon tropical savannah to better manage their land. The above is an example of "Traditional Ecological Knowledge" (TEK), a field of study in anthropology. This knowledge of their environments came out of need and curiosity, thus isolated from features such as profit. This knowledge is pure, by which I mean it links humans to the wholeness of nature and its elements that support life.

To define TEK, it is evolving knowledge that has been acquired by indigenous people over millennia through direct contact with the environment. It is specific to the location and includes relationships between plants, animals, natural phenomena, landscapes, and timing of events that are used for lifeways, including but not limited to hunting, fishing, trapping, agriculture, and forestry.

Indigenous knowledge is constructed through myths, stories, traditions, and values, all to represent the close relationship between humans and the natural world. Stories are inimitable insights into the visceral element of human learning and societal structure; the spread of cultural morals and knowledge through narration and storytelling is ancestral and universal. Yet this form of education challenges the linear education system of the western world. We tend to trivialize stories and myths, defining them as fairytales, figments of imagination that are suitable for only young children. What I believe is lacking is the ability to understand the messages that are embedded in this folklore.

This ignorance of the forms of knowledge has led many to believe that indigenous societies have little to no knowledge. But if they are educated in their culture, does it not mean that they have knowledge?
The following is a table explaining the differences between indigenous (TEK) and Western knowledge.

Mode of Knowing	**Indigenous knowledge**	**Western scientific knowledge**
Relationship	*Subordinate*	*Dominant*
Dominant mode of thinking	*Intuitive*	*Analytical*
Communication	*Oral, teaching through story telling*	*Literate, Didactic*
Characteristics	*Holistic Subjective Experimental*	*Reductionistic, Objective Positivist*
Data creation	*Slow/Inclusive*	*Fast/Selective*
Prediction	*Short time cycles Recognises the onset of long- term cycles*	*Short-term linear, Poor long-term prediction*
Explanation	*Spiritual – includes the Inexplicable*	*Scientific Hypotheses Theory and Laws*
Biological classification	*Ecological*	*Inclusive-internally differentiating*

Using TEK, our food choices have broadened. Most of the world's staple foods include rice, wheat, maize, etc. Though these are nutritious, they do not contain many micronutrients. Without tribes surrounding Lake Titicaca (Peru and Bolivia), quinoa would have remained unknown. The knowledge of food that they have has allowed healthier sources to reach commercial markets. Moreover, quinoa requires lesser water in comparison to other sources of protein and during production emits lesser greenhouse gasses.

To conclude, the livelihood of indigenous people can teach us about preserving natural resources, growing food in a sustainable way, and living in harmony with nature. Their knowledge and methods of learning are far different from ours, but that does not mean that their intelligence is minimal.

IS OUR ACCESS OR UNDERSTANDING OF KNOWLEDGE IMPACTED BY THE SOCIETY WE LIVE IN? [TECHNOLOGY]

Surya Sivakumar

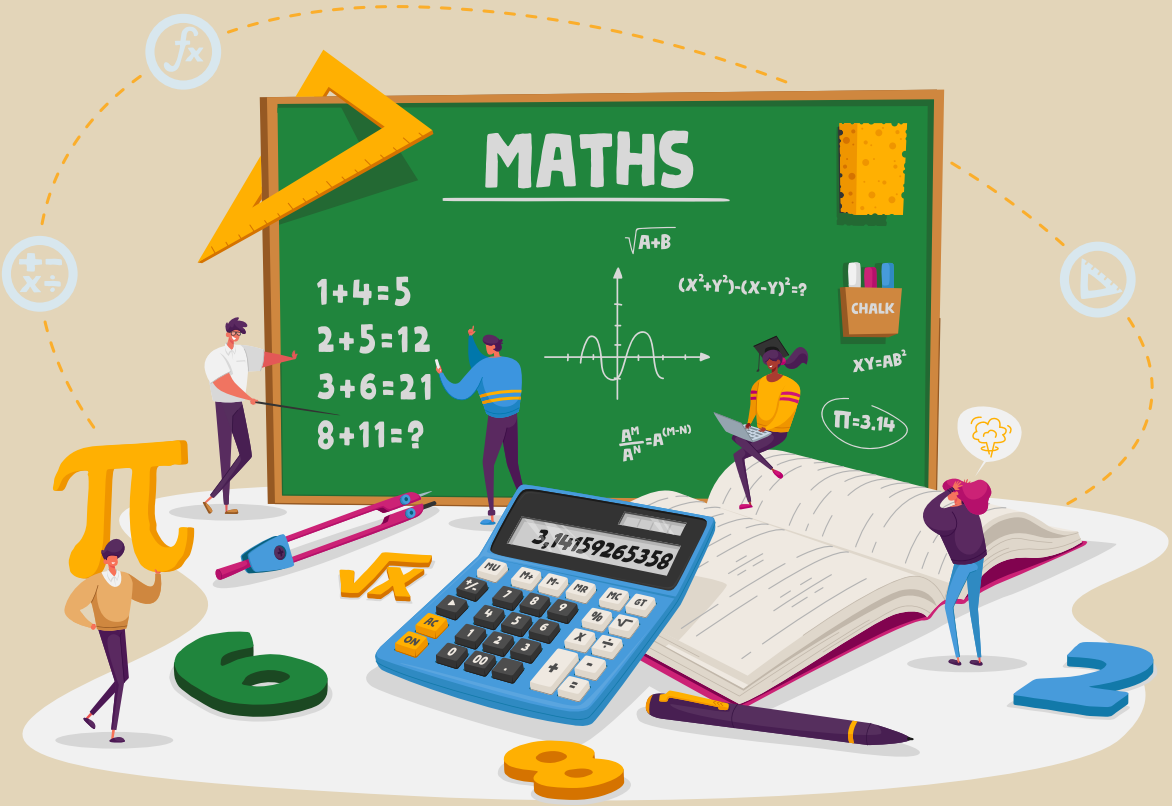
In today's day and age, technology has a massive impact on how we perceive society. It is a tool that has gradually transitioned from a desirable possession to a necessity over the last few years. Its influence is seen across multiple industries that make up our economy, such as medical care, mechanical engineering, computer engineering, software engineering and electrical engineering, to name a few. Arguably its biggest influence, however, is the platform it serves as when providing resources and information to the average consumer in our society.

Today, the most common device used to access knowledge is the internet. To be specific, the social media platforms used by most people today, such as Facebook and Twitter, control and facilitate information on an incredibly large scale. This amount of power, however, leaves a lot left to be desired, as it brings into question the morality and ethics of the practices of these large tech/social media companies. The most infamous example is Facebook's misinformation scandal in 2016. According to sources, many fake news stories circulated on Facebook around the time of the 2016 presidential elections. Recent evidence shows that 62% of adults use social media as their primary news source. It also shows that fake news stories are even more widely shared than the most popular and authentic mainstream stories on Facebook. As a result, experts believe that these fake stories being genuinely believed by people led to DonaldTrump winning the 2016 presidential election. In this case, Facebook's ineptitude in performing third-party filtering or fact checking shows the questionable ethics that are displayed towards civilians. Here, advertising revenue is prioritized over morality and this action affects the lives of hundreds of millions of people. This action also echoes the capitalistic mindset that is ever so present in large segments of our society.

Another example of social media influencing one's access to information is Twitter's handling of the Hunter Biden laptop story that occurred in 2019. Joe Biden's son Hunter Biden had a laptop which had tangible evidence such as images, text messages and emails that revealed his business deals with a Ukrainian natural gas company and a Chinese energy company that had links to the Chinese communist party. The New York Post's stories about this alleged scandal were taken down by twitter with no warning whatsoever. Not only did they block the sharing of the story, but they also suspended the New York post's actual twitter account for sharing its own article. This action could have potentially affected the 2020 election as people would have had more reasons to be skeptical of Joe Biden and his family's practices if they had access to the authentic hunter Biden stories.

However, the bigger issue here that has also been displayed by other tech giants such as Facebook is censorship. This type of censorship contradicts Twitter's claim of enabling free speech for consumers and entities such as the New YorkPost. Twitter as a company does not have the right to take down opinion pieces on such incidents even if it doesn't agree with the political claims present in the article. This action by Twitter is another reflection of our own society as it shows how people are willing to preach freedom of thought and expression until an opinion they hear collides with their own political beliefs. With what we've seen from Twitter, it isn't too far-fetched to claim that these are the type of people that possibly make up a significant percentage of Twitter's workforce. Once again, the users fall short here as victims, as their access to knowledge is shut off by a large corporation whose morals and ethics are extremely questionable.

In conclusion, our access to knowledge and our understanding of it is heavily impacted by the society we live in with respect to technology, as the technology we use serves as a tool to echo and reflect beliefs of society itself. In the cases discussed above, both Facebook and twitter have employees who are human beings and not robots. It is therefore only natural for them to have political biases when assessing certain situations. However, it is their responsibility as large cooperations to minimize their biases as much as possible and facilitate authentic information in a way that benefits society in a positive manner.



WHAT IS THE ROLE OF IMAGINATION IN THE PRODUCTION AND CONSUMPTION OF KNOWLEDGE? [MATHEMATICS]

Srivishnu Vusirikala

There are many ways we can contribute to the growth and dispersion of knowledge, but imagination is arguably one of the most important ones. Imagination can get the gears in our minds turning, and in doing so, we begin looking at many concepts in different ways. By exploring different ways of viewing the same concept, we are contributing to the development of knowledge as a whole which will further enable more contributions to knowledge. It forms this amazing circle of knowledge that helps us make greater developments and discoveries which will only serve to benefit humanity. To truly understand the impact imagination has on our development of knowledge, we must look at it through the lens of one very important field that affects all of our lives every single day – mathematics.

If we go back a few thousands of years, we see that the state of mathematics in the world was completely different than what it is today. And it's not just that we have made more developments than our ancestors – our ancestors all had different ways of viewing mathematics. The current way we view math, with numbers and symbols, came from the ancient Greeks. However, other people like the Arabs primarily viewed math through the help of geometry, while the Indians preferred to represent math with Sanskrit words, letters, and numbers with so many different ways in which math is represented. How is it possible that the discoveries they all made were the same? This is where imagination comes in. The eventual product of all the ancient mathematician's work was the same, only the route they took to get there was different. Creating the route that takes them to what they want requires true imagination and the ability to envision all their work in their head to truly understand what they are doing. When these mathematicians can envision how all their work fits together, they know that what they are doing has to be correct, no matter how they're doing it. This is why all the mathematicians eventually reached the same result, no matter how they approached it.

According to Google, mathematics is defined as "the abstract science of number, quantity, and space, either as abstract concepts or as applied to other disciplines such as physics and engineering". If we focus on the word "abstract" over here, It can be connected to the idea of imagination. Mathematics does not have a rigid structure that can restrict the growth of knowledge, but rather it is an "abstract science" that is open to different forms of interpretation. This means that any result that we get through whatever process we use, can most likely be derived through a different method as well.

This is very important if we want to contribute to the production of knowledge in this field. This is because the production of knowledge does not only mean the discovery or the introduction of new and unseen concepts, but it can also be the development of already discovered ideas. This can include the discovery of new paths to the same result. In a way, this can be compared to the work of Christopher Columbus – a man who tried to find an alternative route to India, when one had already been discovered. This parallel helps give us a greater insight into the role of imagination in the production and consumption of knowledge in mathematics.

When there is so much imagination prevalent in the realm of mathematics, let us use some of that to help create a better understanding of what mathematics can really do. Consider the following scenario: imagine you're on a beautiful green hill, with a tree on its peak, and a tire swing hanging from one of its branches. Now, imagine that the atmosphere around you is filled with a bunch of random numbers, equations, symbols, Greek letters, all floating around aimlessly, clashing into each other from time to time. There is only one thing that all this can remind you of: absolute chaos. Now imagine that you're holding a wand. You give that wand a wave and all of a sudden, all the chaotic numbers and equations and symbols around you all move around to create one single beautiful equation. This analogy can be applied to give an easy understanding of the role of mathematics: mathematics is a tool that is used to create order from chaos. As simple as that. When we look at mathematics in this way, it opens up new ways of understanding the subject which helps inculcate a greater love for the subject as a whole.By using our imagination in the development of knowledge of mathematics, we open up new paths and create new tools that help us discover more in the subject that helps open up more questions to solve.

Thus, we can see how imagination plays such a big role in the development of knowledge in the field of mathematics. It helps us open up new paths for others to pursue which will help create more paths and so on. Any contribution in the field, no matter how small, will have far-reaching impacts which will develop the field further. As mathematics is deeply ingrained in every single field today, a small development in this field has the potential to power greater developments in other fields which then has the ability to benefit humanity as a whole. Imagination is a powerful tool, and it is one that all of us have access to.

It is just up to us to use this tool as efficiently as possible to help contribute to the development of knowledge. And it is not restricted to mathematics alone. Imagination has the potential to power some of the greatest developments in any field possible. Its power is only limited by the person who wields it.

WHAT IS THE ROLE OF IMAGINATION IN THE PRODUCTION AND CONSUMPTION OF KNOWLEDGE? [INDIGENOUS SOCIETIES]

Chetan Padavala

"What is now proved was once imagined" – William Blake

It is quite unfathomable how true this quote is. No matter how much we try to think, we cannot produce an argument to refute this statement. This quote has established its presence in numerous fields. By looking at various elements of the modern world through various lenses such as mathematics, we find tokens that enrich our knowledge and appreciation for the world. The enlightening journey that is experienced by observing how various indigenous societies offer their insights into the production and consumption of their knowledge will be undertaken in this article.

Let us begin by considering a prominent philosopher whose definition of knowledge will be the basis of this exploration. Plato defined knowledge as justified, true belief. Justified here means empirically proven, true means applicable on the real world, and belief refers to the framework for the concept being proven. When this said concept is empirically proven and is applicable or useful in the real world, it becomes knowledge. With regards to the quote, we can infer that the belief was in fact imagined. This brings us to the conclusion that imagination leads to beliefs, and beliefs when proved become consumable knowledge. So, at core, the extent of a person's imagination governs the knowledge produced and consumed by the person.

With this understanding, we can approach indigenous societies. But what exactly is an indigenous society? An indigenous society can be defined as a community that comprises of people that descended from the original inhabitants of a certain area of land. Examples are the native aboriginals of Australia and the Maasai.

Every society has a set of beliefs. These beliefs are central to the community and hence, it seems rebellious and wrong to imagine and trespass these 'belief borders.' So, the consumption of knowledge within a certain society depends on the extent to which the people are allowed to imagine the belief. The greatest example for this is Nicolaus Copernicus, the Polish Astronomer, and his altercations with the catholic church. The Catholic church believed that Earth was at the centre, not the sun as per the Bible. Copernicus hypothesized that the earth in fact revolves around the sun, contrary to the Bible. Copernicus came under massive pressure and criticism from the church simply because this novel idea was contrary to their belief. The Catholics' imagination was bounded by the sayings from the bible so much so that an idea that is now considered true was shunned. This novel idea could not be consumed as knowledge because their imagination was limited by the beliefs of the Catholics.

The limitations offered by the beliefs of a society are not limited to the consumption of knowledge.

They extend to the production of knowledge. Take the Lakota tribe from native America. The Lakota believe that every natural entity, be it a rock, animal, or river, has a spirit. According to this belief, it can be argued that the Lakota believe that every natural entity is sentient. This belief argues against any thesis that can be conjured using imagination. It simply breaks the rules that have been laid down by their ancestors. Modern science asserts that not every natural creation is sentient and that there are entities purely made of atoms of various elements. This subverts the Lakota belief entirely. The main point of importance here is that if the human mind were not allowed to imagine, what could be considered modern knowledge will simply be devalued. The limitations offered by the beliefs pose as barriers to the imagination that could produce proven, factual knowledge.

Then again, indigenous beliefs are not necessarily purely restrictive in nature. Most indigenous societies such as the Māori and Inca believe in nature being part of a higher entity, an entity that they worship and swear to protect. To protect this nature, creative practices for sustainable agriculture are developed. For example, the Inca developed terrace farming, a practice still adopted today. Through modern science, we understand the urgency to protect nature and so, terrace farming was a practice that was opted to prevent soil erosion. We must acknowledge the fact that indigenous beliefs supported imagination to develop sustainable and effective practices. The final inference – indigenous beliefs encourage imagination as much as they restrict imagination.

As we approach the finale of this exploration, we understand that the innate desire to explore and imagine is either restricted or supported by beliefs in society. Indigenous societies offer a plethora of examples to support this because they are more rooted in beliefs than modern societies. The boundaries posed by the beliefs act as barriers for imagination to enable production and consumption of knowledge. Imagination is central to the production and consumption of knowledge. However, the extent to which the mind is allowed to explore defines the extent to which knowledge is produced and consumed especially in indigenous societies.

WHAT IS THE ROLE OF EXPERTS IN DETERMINING OUR ACQUISITION OR UNDERSTANDING OF KNOWLEDGE? [SOCIOLOGY]

Rohan Joshi

During the 2020 COVID 19 pandemic, a movement against lock-downs and vaccinations gained traction within some circles. It advocated against self immunization, against a 'tyrannical government' trying to 'subjugate' free citizens, against the 'elite' of doctors and researchers. While this article will scarcely touch upon the movement's political implications, the anti-vax movement does raise a serious question about how we consume knowledge – the role of the 'elite' in determining our knowledge.

THE ELITE

So, who are these mysterious 'elite'? Well, firstly, they aren't a cult or a cabal, as some would have you believe. These 'elites' are what we will call 'experts'. What are experts? Well, simply put, experts are people, or knowers, who specialize in knowing or experimenting in one kind of field, a single area of 'expertise' or knowledge. Think theoretical physicists, electrical engineers, doctors, mathematicians, economists, or anyone with vast amounts of knowledge – both second and first hand – in a field. These experts, as you may know, already play a vast role in the knowledge that flows through our intricate human network. The things we learn in our science books have been handed down from centuries by prior experts in the field, and written by experts. So, you can see economic forecasts by experts and aandemic models by experts.

There are plenty of reasons to believe that these experts can be trusted. Firstly, of course, they have plenty of experience in their fields. They know what they're doing. They have spent years learning, in schools, through experience, so we should definitely trust them.

THE GRADIENT

Humans are an intelligent species. We strive to learn more about our universe, because knowledge is a chief source of our survival. Naturally, curiosity requires us to seek out knowledge in all of its forms. If something is behind a rock, we move past that rock to peek behind – we can't resist. If a new disease is infecting us, we have to know what is going on. This lends itself to a kind of knowledge "gradient" – if someone knows something, then we would want to know what they know too. It's the way humanity has ensured that knowledge keeps flowing from one generation to another. From teachers to students, from experts to amateurs.

In fact, human curiosity can be considered a primary reason for the mistrust of experts among some people. Experts form a collection of knowledge which is rarely accessible to others. The equations, the concepts they know regarding the simplest topics is, often, turns out to be complex, rigorous, abstract, and therefore difficult for the untrained mind to grasp.

Therefore, this is forms the basis of the definition of what an expert is – rigorous, trained, scientific. From here, two possibilities might arise in the way in which a community of knowers accepts an expert.

The first scenario is that a community accepts the role of these experts in determining what they know and how they know. The community grants these experts the role of determining a fact. Think of epidemiologists, geologists, those who give information about medical safety, doctors, and engineers. Such experts are common in nearly all areas of knowledge. This scenario, as utopian as it may seem, lends itself to a kind of technocracy – we shall not debate government here – in which a class of people, 'experts' make decisions for others, make decisions and impart knowledge that seems to be in the best interests of the people. In such as system, experts would play a huge role in determining the laws of the nation, the information being handed down – from journals to teachers to students, and to future generations as well. One setback of this system is that, it completely removes the role of the individual as the knower, the observer of the universe, and relegates the task of information processing to a distinct set of people.

THE HOARDERS

Again, as naturally curious creatures, humans have a tendency to learn and to want to learn. Having a single group of people constraining what can be known would go against the aforementioned "knowledge gradient" proposed, and therefore would stir discontent in a system of knowers. Why? Because the experts have essentially hoarded knowledge for themselves, looking at the universe with their own eyes and passing along second hand information – humans like the facts they learn to be verifiable, to be digestible.

Think about Copernicus' heliocentric model – an idea colorfully rejected by the prevailing customs of the time. This skepticism of experts too, in a way, plays a big role in advancing knowledge and science as one can verify knowledge for themselves, quite simply. If the knowledge, however, is quite abstract – such as the science of COVID disease modelling – then the masses are sure to display a certain degree of cynicism with regards to the knowledge – they do not have simple, verifiable access to it.

CONCLUSION

Given the enormous role experts play in dealing with our ever – complex world, I wanted to keep the focus of this article to the skepticism that arises when people talk about scientists, doctors, economists, instead of simply just exploring their importance or praising them as messiahs of the universe. Experts aren't prophets, they're simply elements of this system of knowers that humanity lives in, and is impacted by. Experts form one half of a complex system of interconnected knowers and information flows through the group consciousness, and therefore play a much more deeper role.

I want to end this little article with two questions. How will the increasing democratization of knowledge will impact the future of humanity and its progress in technical fields? Second is an extrapolation of the first. Will society's reliance of scientific experts diminish to such an extent that knowledge will be uniformly available to each individual, creating essentially a hedonistic society? John Adams perhaps put it best – "I must study politics and war that my sons may have liberty to study mathematics and philosophy."

WHAT IS THE ROLE OF EXPERTS IN DETERMINING OUR ACQUISITION OR UNDERSTANDING OF KNOWLEDGE? [TECHNOLOGY]

Shresht Bhowmick

The storage of the knowledge of those who have experimented before us is vital to human progression, because it stops us from having to reinvent the wheel every time we try to explore a topic. Technology is the most valuable example of this- We have gone so far beyond encoding individual transistors to carry out simple mathematical tasks in computers that we can automate the entire process with quite literally microscopic precision for billions of transistors. The scale at which technological progression can move is the result of decades, centuries, even millennia, of research into thousands of different scientific fields.

When we refer to experts, we think of individuals who have studied these past experiments and upcoming potential technologies in-depth over the course of years, through their own experimentation. In general, the referral to knowledge being supplied by an “expert” result in an instant feeling of trustworthiness about the source, especially when the topic in question is one where the reader/consumer has little to no prior understanding of. Education about technology consists of a combination of consuming information supplied by these experts, and independent exploration. Existing curricula taught by institutions such as schools and universities are all created based on the creators’ decision to include certain topics because of their perceived importance in relation to the overall aims the course is supposed to achieve.

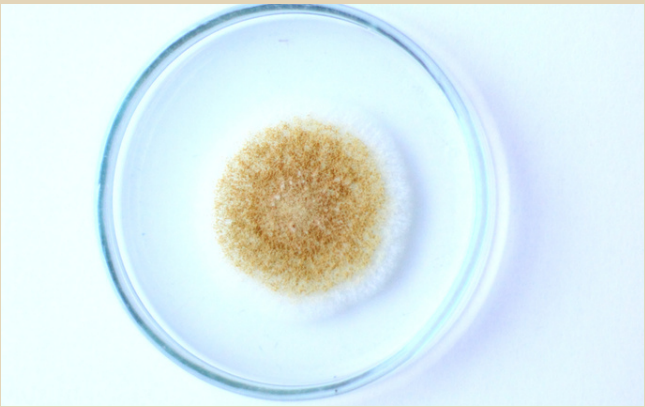
A computer science student will be required to learn a substantial amount of algebra, calculus and discrete mathematics to proceed to higher-level concepts in the area, but the student’s chosen area of study is still computer science, not math. The math courses are still included because they are vital to the understanding of compilers and operating system design, but what if these aims were deemed unworthy by the makers of the curriculum, and they instead focused on simply consumer software engineering?

That would result in a much larger number of user interface and user experience design classes. The decision of the experts to draft the curriculum based on their perceived aims of the degree impacts the students’ acquisition of knowledge, and it also impacts their understanding of the field of computer science.

On the other side of the spectrum, there are sources of knowledge about technology that do not depend on institutions where (it is presumed) only so-called “experts” on each field draft the curriculum of the concerned courses. These sources range from platforms like YouTube to independent experiments like taking apart a computer to explore the internals. Any source where information is structured in such a way that it is meant for the consumer to learn easily is impacted by “experts” in the field, while experimentation of the individual’s own choosing,

whether out of curiosity or necessity, is essentially all self-attained knowledge. This is because experimentation results in the acquisition of knowledge about specifically what the individual is searching for, or it results in a lack of information/unrelated information being attained. Unrelated information can either be already known or new, and when it is new, it can often result in new discoveries that are useful to just the individual, or to humanity as a whole.

The most common example of this is the accidental discovery of penicillin, which resulted in a whole new production method for antibiotics being developed to eradicate bacterial infections from the human populations. In this case,



Alexander Fleming could not have been an expert on the field of antibiotics, since there was no existing antibiotic in the world before his discovery, and the concept itself was not one that was a popularized theory either. In this case, an expert did not have any relation with the acquisition of knowledge, but immediately after antibiotics were discovered, the spread of this information and our understanding of how it works depended directly on Alexander Fleming's further research.

So, taking into account these examples, it can be seen that existing information is made accessible by experts in the concerned field, but the expertise of an individual is relative to the consumer. A PC enthusiast might have a ridiculously detailed knowledge of the workings of existing GPUs, but their predictions about future improvements would be limited to their perspective of consumer-released technology, which is constrained by production costs and other factors. On the other hand, a computer graphics researcher could be looking to develop rather more advanced GPU systems (with a large budget) for the purpose of scientific advancement, rather than profit.

In most cases, the biggest scientific breakthroughs in human history have resulted from years of research, rather than a random citizen discovering a completely revolutionary propulsion system in their basement. There are exceptions, but this conclusion is consistent in almost every case: Copernicus' model of the Solar System, Newton's discovery of the law of universal gravitation, Faraday's development of an electric current, Charles Darwin's theory of evolution, the Wright Brothers' invention of the airplane, and the Manhattan Project developing the first nuclear bomb.

Newton was a physicist by profession, Faraday was a physicist and chemist, Darwin was a naturalist, the Wright Brothers were inventors who were obsessed with the field of aviation, and the Manhattan Project was run by a team of over six THOUSAND scientists and engineers at Los Alamos. All of these discoveries and inventions resulted in tremendous leaps in human technology and understanding of the world around us, leading to the collective and individual human knowledge about the world skyrocketing. The common factor is that they were all experts in their field.

Valuable sources of information often stem from individuals who we do not exactly label as "experts" often, but the most vital, integral leaps in humanity's understanding of the world and the resulting technology we develop from it almost always come from these experts. The lasting truth is that research takes years of both study and experimentation, and experts throughout our world who make the results of their work accessible to the public are only pushing forward the boundaries of human exploration.

The propagation of false information is also incredibly stemmed by the testimonials of these experts, and when false information does make it to consumers, it is only considered viable in two scenarios. The first is that the consumer believes what they want to believe, based on their own political, religious or any other personally-influenced opinions, and the second scenario occurs when the experts themselves are wrong.

Thankfully, with the rise of the internet, knowledge is actually more verified than ever- there is still a lot of “fake news”, but the number of superstitions is lower than ever, especially when it relates to easily explained scientific phenomena.

To conclude, experts are vital to the progression of human technology, but more importantly, they are vital to making this knowledge accessible to the general public through sources like education institutions, the internet, books and other media.

However, where this knowledge is inaccessible, individual exploration also teaches the way for an individual to understand a system of knowledge for their specific usecase. After all, the difference between a plumber and a hydraulics engineer is that the plumber can quite probably fix every part of the system, while a hydraulics engineer can design and build one from the ground-up, while assessing limitations and potential flaws, and iteratively improve on those to progress the system beyond what it is now. Both are vital to human understanding of course, and this is the role experts play in determining our acquisition and understanding of knowledge.

"Students TOK" is a wonderful student initiative in critical thinking. In the age of instant near superficial knowledge gratification, it is heartening to see our IBDP students take a lead on their own and indulge in lengthier process of reflective writing on knowledge, its methods and implications. The pun on the words "students talking" about knowledge is interesting.

The writings here show a keenness to observe, research and comment on diverse topics. They reflect on the inevitable diverse perspectives that exists on many issues where in people quite often take strong binary reasoning or are less likely to ponder over due to assumptions. The very first edition has been impressive and has emanated because of their early foray on this path of theorizing knowledge and attempts to connect TOK to real life and academics. We are proud of these young travelers and wish them greater awareness in their journey of wisdom.

Mr. Nishanth Nagavar
Vice Principal
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Theory of Knowledge makes rapid inroads into the realm of our existence. We are essentially knowers. Pursuit of knowledge is our mission. However, TOK is couched in abstraction and therefore its study can challenge us, puzzle us, and sometimes even baffle us! But it's a journey that is replete with understanding the limits of knowledge, exploring the pitfalls of clinging onto 'I know', 'my truth' without being mindful of multiple perspectives of knowers around us that can emerge from our particular interpretations and justifications as well as values and cultures that distinguish us.

I laud the courage of Soham and his Team who have just dived into IBDP to shoulder the responsibility of reflecting on TOK topics. This is a wonderful initiative where students have tried to look at various questions through the lens of TOK. While some articles are better articulated than others, it is good to see overall, the Grade 11 students' foray into the TOK domain in each article and their endeavor to make it meaningful for them. I have no doubt that students will find this initiative informative and engaging. With Best Wishes

Mr. Maxim Lobo
Head of College Counselling & TOK Coordinator
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Design by Soham Joshi