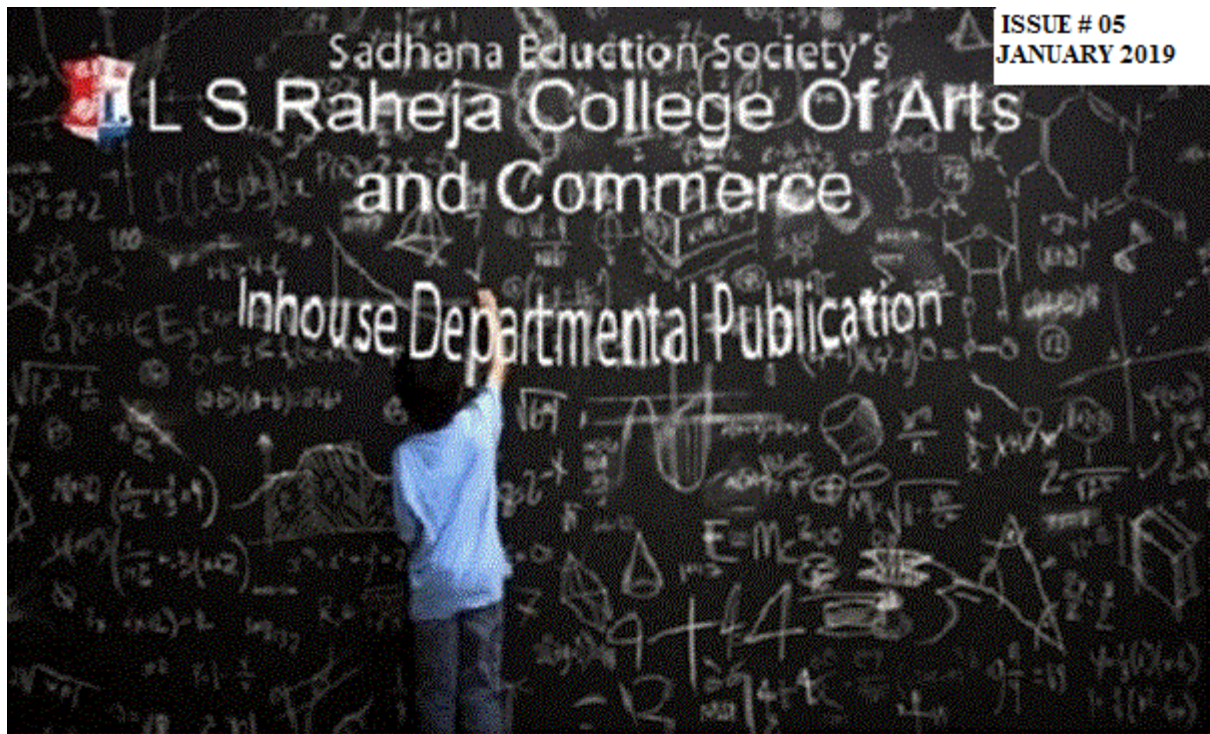# SADHANA EDUCATION SOCIETY'S

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Inhouse Departmental Publication

JIGNYASA

Department of Mathematics and Statistics

KEPLER CONJECTURE

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The **Kepler conjecture**, named after the 17th-century mathematician and astronomer Johannes Kepler, is a mathematical theorem about sphere packing in three-dimensional Euclidean space. It states that no arrangement of equally sized spheres filling space has a greater average density than that of the cubic close packing (face-centered cubic) and hexagonal close packing arrangements. The density of these arrangements is around 74.05%.

In 1998 Thomas Hales, following an approach suggested by Fejes Tóth (1953), announced that he had a proof of the Kepler conjecture. Hales' proof is a proof by exhaustioninvolving the checking of many individual cases using complex computer calculations. Referees said that they were "99% certain" of the correctness of Hales' proof, and the Kepler conjecture was accepted as a theorem. In 2014, the Flyspeck project team, headed by Hales, announced the completion of a formal proof of the Kepler conjecture using a combination of the Isabelle and HOL Light proof assistants. In 2017, the formal proof was accepted by the journal *Forum of Mathematics, Pi*

BACKGROUND

Imagine filling a large container with small equal-sized spheres. The density of the arrangement is equal to the collective volume of the spheres divided by the volume of the container. To maximize the number of spheres in the container means to create an arrangement with the highest possible density, so that the spheres are packed together as closely as possible.

Experiment shows that dropping the spheres in randomly will achieve a density of around 65%. However, a higher density can be achieved by carefully arranging the spheres as follows. Start with a layer of spheres in a hexagonal lattice, then put the next layer of spheres in the lowest points you can find above the first layer, and so on. At each step there are two choices of where to put the next layer, so this natural method of stacking the spheres creates an uncountably infinite number of equally dense packings, the best known of which are called cubic close packing and hexagonal close packing. Each of these arrangements has an average density of

The Kepler conjecture says that this is the best that can be done,no other arrangement of spheres has a higher average density.

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Sadhana Education Society's
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Inhouse Departmental Publication

PSYnalysis

Department Of Psychology

SES'S

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Conformity and its implications

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Conformity is a type of social influence involving a change in belief or behavior in order to fit in with a group.

Conformity can also be simply defined as "yielding to group pressures" (Crutchfield, 1955). Group pressure may take different forms, for example bullying, persuasion, teasing, criticism, etc. Conformity is also known as majority influence (or group pressure).

One of the most famous conformity experiment was by Solomon Asch (1951) and his line judgment experiment.Participants in Asch's research were asked to report their judgments on problems such as this one. Their task was to indicate which of the comparison lines (1, 2, or 3) best matched the standard line in length. To study conformity, he had participants make these judgments out loud, only after hearing the answers of several other people—all of whom were Asch's assistants. On certain critical trials the assistants all gave wrong answers. This exposed participants to strong pressures toward conformity. A large majority of the people in Asch's research chose conformity. Across several different studies, fully 76 percent of those tested went along with the group's false answers at least once. In contrast, only 5 percent of the participants in a control group, who responded to the same problems alone, made such errors. In further studies, Asch (1959, 1956) investigated the effects of shattering the group's unanimity by having one of the accomplices break with the others. In one study, this person gave the correct answer, becoming an "ally" of the real participant; in another study, he chose an answer in between the one given by the group and the correct one; and in a third, he chose the answer that was even more incorrect than that chosen by the majority. Results indicated that conformity was reduced under all three conditions. Another variation- give written answer, conformity reduced. *Difference between public conformity*—doing or saying what others around us say or do—and *private acceptance*—actually coming to feel or think as others do.

Types of Conformity

Kelman (1958) distinguished between three different types of conformity:

Compliance (or group acceptance)

This occurs 'when an individual accepts influence because he hopes to achieve a favourable reaction from another person or group. (Kelman, 1958, p. 53).

In other words, conforming to the majority (publicly), in spite of not really agreeing with them (privately). This is seen in Asch's line experiment.

Compliance stops when there are no group pressures to conform, and is therefore a temporary behavior change.

Internalisation (genuine acceptance of group norms)

This occurs 'when an individual accepts influence because the content of the induced behavior - the ideas and actions of which it is composed - is intrinsically rewarding. He adopts the induced behavior because it is congruent [consistent] with his value system' (Kelman, 1958, p. 53).

Internalisation always involves public and private conformity. A person publicly changes their behavior to fit in with the group, while also agreeing with them privately.

This is the deepest level of conformity were the beliefs of the group become part of the individual's own belief system. This means the change in behavior is permanent. This is seen in Sherif's autokinetic experiment.

Sherif (1935) Autokinetic Effect Experiment

Sherif (1935) conducted an experiment with the aim of demonstrating that people conform to group norms when they are put in an ambiguous (i.e. unclear) situation. Sherif used a lab experiment to study conformity. He used the autokinetic effect – this is where a small spot of light (projected onto a screen) in a dark room will appear to move, even though it is still (i.e. it is a visual illusion).It was discovered that when participants were individually tested their estimates on how far the light moved varied considerably (e.g. from 20cm to 80cm).The participants were then tested in groups of three. Sherif manipulated the composition of the group by putting together two people whose estimate of the light movement when alone was very similar, and one person whose estimate was very different. Each person in the group had to say aloud how far they thought the light had moved. Sherif found that over numerous estimates (trials) of the movement of light, the group converged to a common estimate. The person whose estimate of movement was greatly different to the other two in the group conformed to the view of the other two. Sherif said that this showed that people would always tend to conform. Rather than make individual judgments they tend to come to a group agreement.

Identification (or group membership)

This occurs 'when an individual accepts influence because he wants to establish or maintain a satisfying self-defining relationship to another person or group' (Kelman, 1958, p. 53).

Individuals conform to the expectations of a social role, e.g. nurses, police officers. It is similar to compliance as there does not have to be a change in private opinion. A good example is Zimbardo's Prison Study.

The main purpose of the study was to determine whether participants would come to behave like real guards and real prisoners—whether they would, in a sense, conform to the norms established for these respective roles. They did. The prisoners were rebellious at first, but then became increasingly passive and depressed. And the guards grew increasingly brutal and sadistic. They harassed the prisoners constantly, forced them to make fun of one another, and assigned them to difficult, senseless tasks. They also tended to dehumanize the prisoners, coming to perceive them as inferior to themselves and "less than human." In fact, these changes in behavior were so large that it was necessary to stop the study after only 6 days; initial plans

called for it to last 2 weeks. Zimbardo, who planned the research and served as "prison warden," contends that it drives home a key point about human behavior: it is the *situations* in which people find themselves—not their personal traits—that largely determine their behavior. Yes, people do differ in many ways, but place them in a powerful situation like this one, and such differences tend to disappear. Zimbardo (2007) suggests that it is this tendency to yield to situational pressures—including conformity pressures—that is responsible for much evil behavior

Explanations of Conformity

Deutsch and Gerrard (1955) identified two reasons why people conform:

Normative Conformity

Yielding to group pressure because a person wants to fit in with the group. E.g. Asch Line Study.

Conforming because the person is scared of being rejected by the group.

This type of conformity usually involves compliance – where a person publicly accepts the views of a group but privately rejects them.

Informational Conformity

This usually occurs when a person lacks knowledge and looks to the group for guidance.

Or when a person is in an ambiguous (i.e. unclear) situation and socially compares their behavior with the group. E.g. Sherif's Study.

This type of conformity usually involves internalization – where a person accepts the views of the groups and adopts them as an individual.

Non Conformity

Not everyone conforms to social pressure. Indeed, there are many factors that contribute to an individual's desire to remain independent of the group.

For example, Smith and Bond (1998) discovered cultural differences in conformity between western and eastern countries. People from Western cultures (such as America and the UK) are more likely to be individualistic and don't want to be seen as being the same as everyone else.

This means that they value being independent and self-sufficient (the individual is more important that the group), and as such are more likely to participate in non-conformity.

In contrast eastern cultures (such as Asian countries) are more likely to value the needs of the family and other social groups before their own. They are known as collectivist cultures and are more likely to conform.

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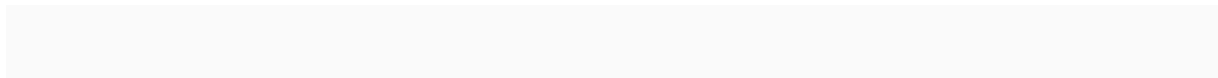
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SOCIAL ISSUES

Department Of Sociology

Sound HR practices: Right to Disconnect bill.

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The right to disconnect is a proposed human right regarding the ability of people to disconnect from work and primarily not to engage in work-related electronic communications such as e-mails or messages during non-work hours.

The Lok Sabha recently introduced a bill titled the Right to Disconnect Bill. It was introduced by Nationalist Congress Party MP Supriya Sule. Member of Parliament from the Nationalist Congress Party, Supriya Sule, has earned the respect of all people who have a boss by tabling the Right to Disconnect Bill seeking to "confer the right on every employee to disconnect from work related telephone calls and emails beyond work hours and on holidays and right to refuse to answer calls and emails outside work hours". The bill aims to give employees the right to ignore calls by the employer's after working hours. This includes responding to texts or emails after office hours. This move will enable to reduce work-related stress and strive for better work-life balance. It will apply to companies with more than 10 employees who will have to set an Employee Welfare Committee to ensure compliance. The bill also says that no disciplinary action be taken if the employee chooses to not respond to the employer after the stipulated work hours.

Globally France was the trend setter where employees have the right to disconnect since 2017 in companies that hire more than 50 employees. The Supreme Court of France recognised this as a labour problem in 2004, ruling that if an employee was not reachable on their mobile phone outside working hours, it cannot be considered misconduct. In 2017, France passed a law formalising the Right to Disconnect; and it is expected that other EU countries will follow the example. The France labour minister opined that the aim was to rebuild the boundary between professional and personal life. In Spain all companies have the disconnect policies irrespective of the number of employees. There have been attempts to bring about such laws in other countries as well, including in Italy and the Philippines. It was reported in 2012 that Volkswagen (Germany) had reached an agreement with the company's work council that its Blackberry servers would stop routing emails to workers half an hour after the end of their shifts, and only start again half an hour before their next shift. In 2014 German car and truck maker Daimler made the bold step of introducing software that automatically deletes any emails while on vacation. The right to disconnect includes work days as well as holidays.

In an attempt to tackle the never ending demands of professional life the bill is necessary. Always being connected takes a toll on the workers disrupting the family and personal space. It has increased background anxiety as researches have shown. Even when workers are not checking emails after work, the expectation of receiving an email creates anxiety.   William Becker from Virginia Tech says that this kind of 'always on' work culture creates anxiety amongst workers. A 2016 study found that always on call is linked with decreased calmness,

mood and energy levels. The study published in journal Work and Stress says the workers being told to respond to work related issues constrain employee behaviour and cannot be considered leisure time. Study by researchers from Northern Illinois University showed that workers who answered work related emails after 9 pm had bad quality sleep.

Corporate culture in India is dismissive of employees' private space outside work that includes personal time and space, often forcing them to be on call. What this approach misses is that the productivity of an employee is directly proportional to morale, which can only improve from having the time for a fulfilling personal life. This is why the Right to Disconnect would be useful.

Debating the viability of the act

Human resource officials are sceptical about its practicality though it sounds ideal for the working professionals. Human resource officials said even if the law is introduced, it will be a huge challenge to implement it. The head of human resources at a Mumbai-based manufacturing firm said they have a strict deadline of 6 pm and do not contact employees across the sector unless there is an emergency.

"If this is made a law, any mishaps at the plant cannot be addressed immediately since the concerned person can say that this is beyond their work hours," he added.

Further, HR experts also said it is a reality in India that there is a backlog of work in most companies, due to which disconnecting cannot be possible.

Sunil Goel, Managing Director, GlobalHunt said, "In India, how many people meet the deadline for completion of work? When you don't complete the work within the deadline, how can you enjoy the benefits?"

He added that to adapt work-life balance of this sort, the basics need to be corrected first.

Another human resource official working in a mid-sized IT services firm said even though it is a reality that employees carry work home, nobody is penalised for not answering calls or emails. He said considering a lot of Indian IT firms work with global companies where there is a time difference, completely switching off is not practical.

Also, HR professionals said companies blatantly violating human rights by making employees work through digital means beyond work hours can be exposed on social media very easily.

There are areas like public transport, medical industry, law enforcement as well as media where having fixed hours cannot be viable.

Rituparna Chakraborty, Executive Vice President, Team Lease Services said a doctor cannot refuse to treat a patient saying it is beyond his/her work hours. Making it law will be detrimental, she added.

"Having such a law will be counter-productive because no company has this as a rampant practice," she added.

Conclusion:

In the Indian context however it may not be possible to make this bill an act since it is a private member's bill and no bill since 1970 has become an act. Nevertheless at least an attempt has been made to trigger debate in a country where working hours are among the longest in the world. A UBS report said Mumbai leads the list of cities across the world with people working an average of 3,314 hours a year.

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