

Mathematics Unlocked in Lockdown: A Glimpse across Indian Newspapers

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ABSTRACT

Newspapers are a great medium of science communication. They have the potential to popularise mathematics and its concepts, but often their coverage is limited to news and events about mathematics, results and phobia associated with mathematics rather than mathematical concepts. However, during the lockdown period in India (March-May 2020) few newspapers tried to expand their coverage to mathematical concepts. In coverage of COVID-19 news, mathematical and statistical concepts also found space in newspapers. The paper highlights these developments in the field of science communication through some news articles as examples.

KEYWORDS: COVID-19, Lockdown, Mathematics in media, Mathematics communication, Mathematics popularisation, Science communication

Introduction

The COVID-19 pandemic is a phase where scientific temper and science communication need to play a significant role on a massive scale. During this phase, often news related to COVID-19, as published in newspapers, has been full of figures, data and other information like factors of transmission, prevention measures, dos and don'ts etc. There are various terminologies and concepts associated with data which the newspapers have tried to communicate to make the public realise the impact of the pandemic.

Newspapers have been publishing about various concepts like infection rate, test ratio; recovery rate, etc. even before COVID-19 was declared a pandemic and also during the phases

of the lockdown¹. To understand these terms one needs to have some mathematical and statistical literacy. Not everyone is aware of these concepts and terms. Thus, the role and responsibility of newspapers has become even more significant as they have to make the public aware about the pandemic through the power of data and use of mathematical and statistical terms.

It was also observed that a few newspapers published articles on mathematics and mathematical concepts during the lockdown period. In the paper “Science Communication for Mathematics” (Mishra, 2019), the author discussed the presentation of mathematics in Indian newspapers through a few examples. The paper discussed how mathematics is presented synonymous with fast calculations and basic arithmetic operations. News articles about mathematics are mainly related to workshops, seminars, events, competitions, board examination results or glorification of tricks and formulas to excel in mathematics. Such presentation or publication about mathematics in news coverage can create as well as strengthen a calculation centric image of mathematics among its readers, especially among the public.

There is not much coverage about mathematical concepts in newspapers (except few newspapers which have a dedicated section for science and technology). However, the nationwide lockdown across India seemed to *unlock* mathematics and broaden its presentation to some extent. During this period, schools and universities remained closed across the country also putting a brake on the series of academic activities and events which were to take place in these institutions. Newspapers didn't have much to cover about such events and faced the lack of educational content (news) directly from the campus. Perhaps, such a scenario turned out as an opportunity for newspapers to publish articles (educational and scientific) which could enlighten and engage the readers.

The present paper highlights such examples in the context of a positive development towards mathematics communication and science communication through newspapers. In this paper,

¹ A nationwide lockdown across India came into effect from 25 March 2020.

Mathematics Unlocked refers to communication of mathematical concepts i.e. mention, discussion or explanation of a mathematical concept. In the paper, lockdown refers to the period from 25 March 2020 to 31 May 2020.

Mathematics Unlocked: Few Examples

During the lockdown, a Hindi newspaper *दैनिक भास्कर* [Dainik Bhaskar] carried out a special series of article on mathematics by Anand Kumar² as the author. The series of articles on mathematics appeared from 11th April 2020. Apart from articles on mathematics, other motivational stories also got published under this column. The title of the column is synonymous to ‘Sources of success during adverse times (Corona Crisis)’ [कोरोना संकट के बीच विपरीत परिस्थितियों में सफलता के सूत्र]. These articles (in Hindi) appeared on a weekly basis or at a gap of 2-3 days. Articles on mathematics covered various developments related to mathematics, mathematicians and mathematical concepts such as Story of Geometry; Importance of understanding mathematical theorems; Prizes in Mathematics; Mathematical Olympiads; History of Mathematical Olympiad in India; Story of a famous mathematical proof of Fermat’s theorem by Andrew Wiles; Story of Indian Statistical Institute (ISI), Story of Chennai Mathematical Institute (CMI) and Story of Mathematics Training and Talent Search Programme (MTTS). Some articles also carried questions at the end for readers. These questions were based on mathematical operations, number series, pattern recognition and mathematical creativity. Answers got posted in the subsequent articles.

Publication of these articles in a newspaper can be considered a significant development in communication of mathematics, as newspapers seldom cover articles of such nature in a detailed manner. These articles not only provide insights into development of mathematics but also try to define mathematics as a part of culture and society. The public can

² Anand Kumar is known for his ‘Super 30’ initiative. Super 30 is an educational programme run under the banner of the Ramanujan School of Mathematics, Patna, India. Source: <http://www.super30.org/>

develop a sense of appreciation for mathematics through presentation of these articles. For example: the article on development of Geometry takes one through the life of Euclid and expands the definition of mathematics from numbers to geometry; the article on proof of Fermat's theorem by Andrew Wiles takes one through the interesting world of mathematics and mathematicians. The article also emphasises 'patience' as one of the keys to excel in mathematics. Articles on Mathematical Olympiads, MTS, Indian Statistical Institute and Chennai Mathematical Institute highlight the historical development of various mathematics programmes in India. These articles also make the public aware of the various educational opportunities in the field of mathematics and statistics.

एजुकेशन भास्कर

कोरोना संकट के बीच विपरीत परिस्थितियों में सफलता के सूत्र
सुपर-30 के आनंद कुमार के शब्दों में

आज पढ़िए ज्योमेट्री के शुरू होने की कहानी, जानिए 'फादर ऑफ ज्योमेट्री' को

बात लगभग 300 वर्ष ईसा-पूर्व की है, जब गणित का मतलब सिर्फे अंक-गणित ही समझा जाता था। जिस में जमे यूक्लिड बचपन से ही मेधावी थे। उनकी मेहनत और निराल्पण प्रतिभा से सभी शिक्षक प्रभावित रहते थे। कई बार यूक्लिड गणित के कठिन



सवाल को तुरंत हल कर देते थे। अब यूक्लिड की पढ़ाई पूरी हो चुकी थी। उनके पिता ने उन्हें एक छोटी सी परचुर को टुकड़न संभालने का काम दे दिया। लेकिन, वे हमेशा खाली से जमीन पर कुछ आकृतियाँ बनाने में व्यस्त रहते थे। जब कोई उनसे पूछता कि क्या कर रहे हो तब वे बताते कि मैं गणित का अध्ययन कर रहा हूँ। सब आश्चर्य करते थे कि ये कैसा मेडिमेडियम है, जिससे सिर्फे निच बनाए जा रहे हैं। यूक्लिड की व्यस्तता चिजें के अध्ययन में इतनी बढ़ गई कि वे अपनी टुकड़न नहीं संभाल पाए और

(a)

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धैर्य ऐसा होना चाहिए: गणितज्ञ एंड्रयू वाइल्स एक थ्योरम हल करने के लिए 7 साल लगे रहे

23 जून 1993 गणित के इतिहास में एक बहुत बड़ा दिन था। कैम्ब्रिज यूनिवर्सिटी में नामचीन गणितज्ञों के सम्मेलन ब्रिटिश प्रोफेसर एंड्रयू वाइल्स ने गणित का कठिनतम समूह 'जागे वाले 350 साल पुराने सवाल' 'फर्मिट लास्ट थ्योरम' का हल प्रस्तुत करके दुनिया को आश्चर्य कर दिया। जब न्यूयॉर्क टाइम्स के रिपोर्टर ने वाइल्स से पूछा कि उन्हें पहली बार इस थ्योरम के बारे में क्या पता चला था तब उन्होंने जवाब दिया कि 10 साल की उम्र में लड़कपन में एक किताब पढ़ने के दरम्यान पहली बार उन्हें इस सवाल के बारे में पता चला। और उन्होंने उसी समय टान किया था कि चाहे जितनी भी मेहनत करनी पड़े, इस थ्योरम का प्रमाण खोज कर ही रहेंगे। दरअसल 'गिनितिक बुक ऑफ रिकॉर्ड' द्वारा घोषित गणित का कठिनतम सवाल 'फर्मिट लास्ट थ्योरम' देखने में बड़ा सरल लगता



(b)

Fig 1: (a) An article on development of Geometry (13 May 2020) (b) An article on famous mathematical proof by mathematician Andrew Wiles (6 May 2020) (Source: epaper.dainikbhaskar.com)

Another Hindi newspaper *नवभारत टाइम्स* [Navbharat Times, NBT] published a section dedicated to mathematics – “मनोरंजक Maths” [Fun Maths] by Anand Kumar. Articles covered problems and solutions related to different concepts of

mathematics using storytelling. These articles asked readers to utilise their time during the lockdown by solving and enjoying these problems. Characters in the form of two children – *Bholu* and *Rikki* – also appeared in these articles. The series of articles first appeared on 24th April 2020. 18 columns (around 3-4 columns per week) of these articles were published by May 2020. Some of the problems have been put in the context of rules that are relevant during the lockdown. For example: a problem was based on distributing food items by maintaining a distance of 2 m from each other (Figure 2).

NBT
नवभारत टाइम्स

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मनोरंजक Maths आनंद कुमार
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भले ही आमतौर पर लोगों को गणित नीरस और उबाऊ लगता है। लेकिन गणित है बड़ा मनोरंजक। सुपर 30 फेम मशहूर गणितज्ञ आनंद कुमार आपके लिए गणित का मनोरंजक विचित्र लाए हैं। इसमें आपको बड़ा मजा आएगा। साथ ही आप सवाल का हल ढूँढते-ढूँढते गणित भी सीख जाएंगे और लॉकडाउन में आपका समय कैसे बीत गया आपको पता भी नहीं चलेगा :

Q लॉकडाउन के दिनों में किसी को रोजगार की समस्या है, तो कोई भर पेट खाना नहीं खा पा रहा है। मोहल्ले में कुछ परिवार लॉकडाउन के दौरान भूख से परेशान थे। भोलू ने कुछ लोगों से बातचीत करके उन लोगों की मदद के बारे में सोचा। मददगार सामने आए और इस तरह से काफी सामग्री इकट्ठा हो गई। अब भोलू ने एक काउंटर बनाया जिस पर सारा सामान रख दिया। कोरोना वायरस के खतरे को ध्यान में रखते हुए भोलू ने काउंटर से 5 मीटर दूर जमीन पर एक घुत्त (सर्कल) बनाया। फिर उस घुत्त से 2-2 मीटर की दूरी पर 29 और घुत्त बनाए। अर्थात् काउंटर से 5 मीटर दूर 2-2 मीटर की दूरी पर कुल 30 घुत्त बनाए। अब सभी 30 घुत्तों पर 30 लोग आकर खड़े हो गए। भोलू काउंटर के पास गया और सामान का एक पैकेट उठाया और पहले घुत्त पर खड़े आदमी को दिया। फिर वहाँ से वापस आकर दूसरा पैकेट उठाया और अगले आदमी को दे दिया। इस तरह भोलू ने सभी 30 लोगों को जाकर सामान दिया। अब आप बताएं कि भोलू ने सामग्री वितरण करने में कुल कितनी दूरी तय की?

A पहले व्यक्ति तक पहुँचने में भोलू को 5 मीटर दूरी तय करनी पड़ी। लेकिन दूसरे व्यक्ति तक पहुँचने के लिए भोलू को 5 मीटर वापस आना पड़ा और फिर 7 मीटर और चलना पड़ा अर्थात् उसे 12 मीटर दूरी तय करनी पड़ी। तीसरे जरूरतमंद तक पहुँचने के लिए भोलू को 7 मीटर वापस आना पड़ा और फिर 9 मीटर फिर चलना पड़ा अर्थात् उसे 16 मीटर दूरी तय करनी पड़ी। चौथे जरूरतमंद तक पहुँचने के लिए भोलू को 9 मीटर वापस आना पड़ा और फिर 11 मीटर फिर चलना पड़ा यानी उसने 20 मीटर की दूरी तय की। ध्यान से देखा जाए, तो यह क्रम दूसरे टर्म के बाद सामानांतर श्रेणी में है। अब इसे जोड़ना आसान होगा। अर्थात् भोलू को कुल $5+(12+16+20...+124)=5+(12+124) \times 29/2=1977$ मीटर दूरी तय करनी पड़ेगी।

Fig. 2: A mathematics question published in the form of a story (1 May 2020) (Source: <http://epaper.navbharattimes.com/details/107238-23025-1.html>)

Publication of these articles and puzzles during the lockdown can be observed as a good strategy by the newspapers. As readers spent their time at home during the lockdown, they would have brainstormed on such questions. Digital form (e-paper and online version) of newspapers have also helped these articles reach various sections of users and readers. Given the popularity of Anand Kumar, his act of posting mathematics problems on social media during lockdown also became

a piece of news (Kishor, 2020). It also reflects how science communication (especially for popularising and presenting mathematics in a broader context) can expand when renowned personalities contribute ‘responsibly’ through popular mediums of mass communication like newspapers. For the public understanding of mathematics, mathematicians need to increase public awareness (Stewart, 2006). Infact, publication of these articles on mathematics in the form of a series sets a great example in development of science communication for mathematics where media and mathematics educators, teachers and mathematicians reach out to each other.

Articles describing the relevance of mathematics and data in controlling an epidemic also got featured in newspapers and its blogs. For example: *The Indian Express* published an article on Florence Nightingale and her mathematical skills. *The Hindu* published an article explaining R_0 value.

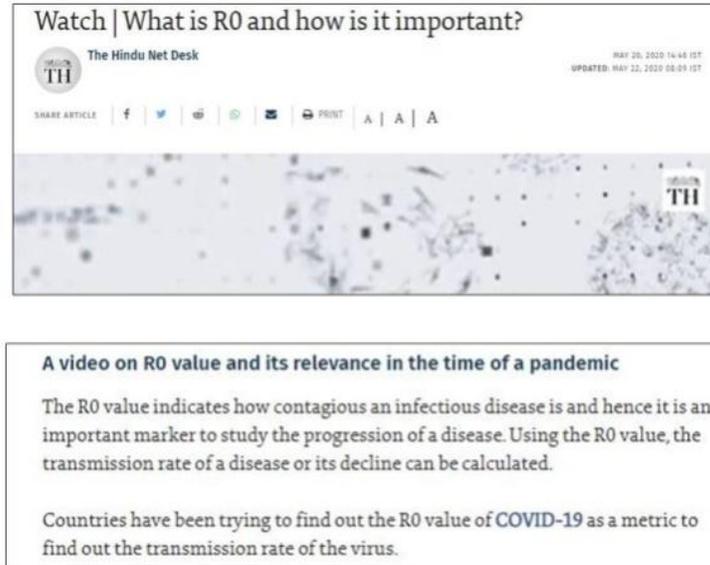


Florence Nightingale (1820-1910).

The 200th birth anniversary of Florence Nightingale, founder of modern nursing, falls on Tuesday, May 12. Her relevance today cannot be understated, given the Covid-19 pandemic. And yet the events leading up to the anniversary can only be called ironic.

Nightingale (1820-1910), who had considerable mathematical skills, is credited with being the first healthcare professional to use data to show that infection control improves health outcomes. Through her career she stressed a practice that is relevant as ever today — handwashing. The irony is that the pandemic has not only ruined her anniversary but is also threatening part of her legacy. The Florence Nightingale Museum in London, which no longer gets the visits that sustain it, has announced it is facing a battle for survival and launched fundraising schemes to save itself.

(a)



(b)

Fig. 3: (a) An article on Florence Nightingale highlights her mathematical skills and her contribution in controlling diseases like cholera and typhus through statistics and stress on sanitisation (12 May 2020); (b) An article explains the R_0 value through visualisation (20 May 2020)

Statistics, graphs and various mathematical terms have become an integral part of COVID-19 news. During this phase, COVID-19 statistics got published on a daily basis in newspapers. Infact, it led to frequent appearance of various terms (mathematical concepts) like graph, infection rate, growth rate, recovery rate, test ratio, curve, R_0 value, etc.

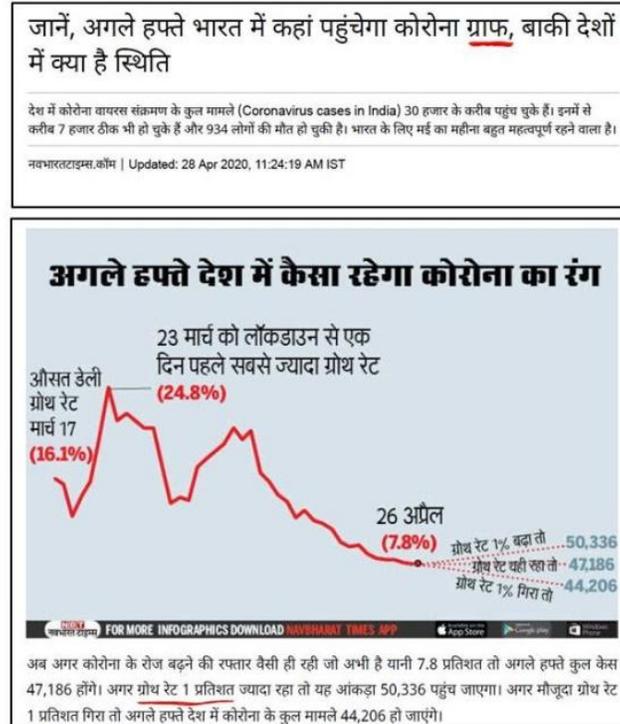


Fig. 5: Clippings of an article about graph and growth rate (Source: <https://navbharattimes.indiatimes.com/india/how-many-coronavirus-cases-may-india-see-in-next-week-different-scenario-comparisons-to-similar-countries/articleshow/75421621.cms>)

Conclusion

A pandemic like COVID-19 has put the world in an unprecedented situation. It is a testing time for science communication and scientific temper as well as a great opportunity for science communication to broaden its spectrum. COVID-19 news coverage is based on data and various mathematical and statistical concepts. Unlike other news, this news is crucial for the society to keep them updated and aware of the nature of the pandemic. The more the public understands data, mathematical-statistical terms, the better prepared it is in times of an epidemic or a pandemic like this. The same holds true for journalists and media persons – the more they

understand data and mathematical-statistical terms, the more it gets easy for them to publish and communicate these terms.

A crisis like this has brought out the importance of data and mathematical skills (literacy). Newspapers have published COVID-19 news with help of infographics, data and mathematical terms. It has also led to popularisation of some mathematical concepts. The lockdown period also provided the public with ample time to read and explore mathematics through these articles as well as an opportunity to write for mathematics (example of Anand Kumar's articles).

During this period, newspapers also adapted a new style of publication for mathematics. In a way, it wouldn't be wrong to say that mathematics got unlocked in newspapers during this phase. Infact, mathematics has got unlocked across the globe during lockdown – one, through the popularisation of mathematical terms-concepts and second, through the publication of articles on mathematics during the lockdown period. If such enriching content (a dedicated section on mathematical concepts) is given weightage by newspapers, it can engage and motivate mathematicians, educators and teachers to write for public understanding of mathematics. The usual presentation of mathematics (as a subject of formula and calculation) in media might also improve. Articles in the form of story can also be applicable to other topics in the context of scientific development. Such coverage through newspapers can boost the development of mathematical temper and hence development of scientific temper in the society.

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