Plagiarism and similarity index issues in research

Dharmendra Singh Rawat, in his correspondence[1], refers to the problem of plagiarism in the field of plant taxonomy. In my view, plagiarism, as defined by University Grants Commission (UGC)[2], has become a big handicap for Indian researchers. The purpose of UGC was to promote original research and punish candidates who engage in copy-paste from published literature or theses already submitted to universities. Unfortunately, most Indian journals adopted the UGC guidelines to check plagiarism in research papers and ask authors to keep it down to less than ten per cent for submitted papers.

Most of the software used for checking plagiarism report, percentage of overlap of text with published literature, called similarity index. Plagiarism and similarity index are being used interchangeably. The reasons for high degree of similarity of text are as follows:

(i) Standard procedures are used for sample collection, analysis of data and interpretation of results.
(ii) Standard formulae and mathematical models are used to calculate the results.
(iii) Citation of literature without changing the original text. Changing the text of a published document is considered a criminal act in legal parlance, but our journal Editors call it plagiarism if the original text is kept intact in citations.

Recently, I submitted a research paper based on original groundwater contamination data due to potential toxic elements (PTEs like uranium and other heavy metals) to an international journal. It was rejected by the Editor without undergoing a review process as there was an overlap of text, called similarity index, of 43%. The overlap was due to materials and methods used for analysis, which are standard procedures followed by all scientists in this area of research. Another reason for overlap of text was use of formulae used to calculate toxicity due to PTEs, which are internationally approved.

In my view, plagiarism needs to be defined independent of similarity index of text, keeping in view the area of research and originality of data used.

1. Rawat, D. S., *Curr. Sci.*, 2023, **125**(8), 813.
2. https://www.ugc.gov.in/pdfnews/7771545_academic-integrity-Regulation2018.pdf (accessed on 25 October 2023).

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Cashless economy

A recent article by Kumari *et al.*[1] titled 'Cashless economy: the impact of digital innovation in India' explores the effects of digital advancements on India's financial infrastructure. The study analyses the increased use of electronic transactions in India post-demonetization, highlighting the impact of digital developments on the nation's financial system. It discusses the growth of the digital economy, where 98% of transactions are now conducted digitally, leading to enhanced job opportunities and decreased cash-related fraudulent activities. Moreover, the study stresses the significance of cyber security, digital literacy, internet accessibility in rural areas, and expansion of the domestic market.

The authors, Kumari *et al.*[1], utilized the compound annual growth rate (CAGR) to assess the expansion of the digital payment index[1] and digital payment transactions in terms of volume and value[1]. Despite presenting figures and tables, the authors could have explained the used CAGR equation. An error was identified in the computation of the CAGR, with detailed corrections outlined in Table 1. Furthermore, discrepancies were noted in the reported CAGR value, where 43.09 was inaccurately presented instead of the correct value of 43.29 for transaction volume. Similarly, 10.96 was presented for transaction value instead of 11.01.

The methodology utilized to validate the computed CAGR value has been explicated in previous research studies[2,3]. An examination of the findings indicates that the authors employed an erroneous formula (eq. (1)), leading to inaccurate results, whereas the correct formula (eq. (2)) addresses this mistake[2]. For example, based on the data provided in figure 5 in the original article, the DPI index of 100 in March 2018 should be escalated to 349.3 in March 2022. Application of formula 1 (eq. (1)) indicates a potential increase to 272, resulting in a deficit of 77, whereas formula 2 (eq. (2)) yields a targeted value of 349.3.

$$\text{CAGR} = \left(\left(\frac{V_{\text{final}}}{V_{\text{begin}}} \right)^{\frac{1}{t}} - 1 \right) * 100, \qquad (1)$$

$$\text{CAGR} = \left(\left(\frac{V_{\text{final}}}{V_{\text{begin}}} \right)^{\frac{1}{t-1}} - 1 \right) * 100, \qquad (2)$$

where t is the number of years.

Table 1. Observation

Source of data	Initial value	Final value	t	$t-1$	CAGR (%) Authors	CAGR (%) Actual
Figure 5 (ref. 1)	100 (March 2018)	349.3 (March 2022)	5	4	28.42	36.71
Table 4 (Volume)[1]	96 (2010–11)	7195 (2021–22)	12	11	43.29	48.06
Table 4 (Value)[1]	498 (2010–11)	1744 (2021–22)	12	11	11.01	12.07

Academic writing requires scholars to possess a careful and systematic method to derive valuable knowledge from the errors highlighted in the final remarks and apply this understanding to prevent similar mistakes in future instances.

1. Kumari, S. S., Singh, K. M. and Ahmad, N. A., *Curr. Sci.*, 2024, **126**(6), 650–661.
2. Elango, B., *COLLNET J. Scientomet. Inf. Manage.*, 2019, **13**(2), 331–337.
3. Elango, B., *Curr. Sci.*, 2024, **126**(5), 522–523.

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Response:

We appreciate Bakthavachalam Elango for his interest in our article and for the detailed comments he provided. In response to the concerns raised by him, we would like to point to the fact that our article, 'Cashless economy: the impact of digital innovation in India', provides insight into the cashless economy and how digital innovation has impacted India's financial system[1].

To better understand the growth pattern in digital payments and validate our insight, data on transactions in terms of volume and value and the digital payment index were also accessed using the compound annual growth rate (CAGR). The calculated growth rate is an average rate representing the available observation over time. It does not necessarily match the actual growth rate between any two periods due to the influence of the error term.

The growth rate per annum for the time series data on digital transactions was computed using a linear regression model[2].

The formula used is as follows

$$\log Y = \log a + t \log b,$$

where Y is the digital transactions volume/ digital transactions value, a the intercept, t the time period (say $t = 1, 2, 3, \ldots, n$) and b is the regression coefficient.

For convenience, if we put $\log a = A$ and $\log b = B$, then this can also be written as

$$\log Y = A + Bt.$$

Further, for deriving a percentage rate of compounded growth per annum from the computed regression coefficients, the following formula has been used:

$$r = (\text{Antilog } B - 1) \times 100.$$

The formula used for computing CAGR for digital payment index (DPI) is as follows[3]:

$$\text{CAGR} = \left[\left(\frac{\text{Ending value}}{\text{Begining value}}\right)^{\frac{1}{n}} - 1\right] \times 100.$$

Thus, the formula used for computing CAGR is correct. Using the given referred formula does not affect any other part of our study, with the overall perception remaining the same. As such, the analysis presented in our article and the inferences drawn related to digital transactions stand valid and unchanged.

1. Kumari, S. S., Singh, K. M. and Ahmad, N., *Curr. Sci.*, 2024, **126**(6), 650–661.
2. Ujwala Rani, S., Kumar, P., Singh, N. P., Paul, R. K., Padaria, R. N. and Tadigiri, S., *Int. J. Plant Soil Sci.*, 2022, **34**(5), 72–80.
3. Verma, M. K. and Shukla, R., *DESIDOC J. Libr. Inf. Technol.*, 2019, **39**(3), 125–130.

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