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Analysis of similarity index between iThenticate and Ouriginal plagiarism detection software: a comprehensive study

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ABSTRACT

Intellectual property plagiarism is increasingly prominent in contemporary society, involving the unethical practice of claiming someone else's ideas, words, or creative works without proper acknowledgment. This study aimed to compare the performance of iThenticate and Ouriginal plagiarism detection software by analyzing their similarity index. Twenty original manuscripts (N=20) were examined for content similarity, with each manuscript analyzed first with Ouriginal and then with iThenticate. The focus was on comparing the two tools based on matched sources, word matches, and overall similarity index percentage. Data analysis using SPSS v26 included descriptive statistics, an independent t-test, correlation, and ranking of the similarity percentages, with significance set at $p<0.05$. The results indicated no significant differences in matching sources, matching words, or similarity index ($p>0.05$) between iThenticate and Ouriginal. A strong positive correlation ($r=.758$, $p<.000$) was observed between the similarity indices of the two software programs. The analysis of the low similarity range (≤10%) also revealed no statistical significant difference ($p>.05$). However, the mean similarity percentage detected by iThenticate was higher at 11.40%, compared to 6.85% for Ouriginal. Based on the findings, both iThenticate and Ouriginal demonstrated comparable effectiveness in detecting plagiarism, highlighting their importance in curbing academic dishonesty and protecting intellectual property rights.

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1. INTRODUCTION

The term “plagiarism” has been part of the English lexicon since the 1600s, derived from the Latin word “plagiare,” which means “to kidnap” [1]. Plagiarism is the practice of taking someone else’s work or ideas and presenting them as one’s own without proper attribution [2]. This unethical behavior includes the direct replication of text, concepts, or any form of expression without acknowledging the original source [3]. The severity of plagiarism ranges from minor text copying to the more egregious act of duplicating entire

works, all involving the unauthorized use of another's content [4]. Essentially, plagiarism is the act of using someone else's intellectual work-be it texts, ideas, or findings-and passing it off as one's own, which can occur either deliberately or inadvertently [5], [6]. Khadilkar [7] identifies that plagiarism can encompass a wide range of elements including ideas, concepts, hypotheses, titles, text, methodologies, complete clinical data, discussions, and even visual and informational materials such as charts, tables, figures, and videos. Therefore, any component of scholarly work can be susceptible to plagiarism. According to word count, plagiarism is defined as the repetition of six consecutive words or the overlap of seven to eleven words within a thirty-word segment [8]. When only one item is original and any duplicates are copies, using such copies without permission constitutes plagiarism [9].

Plagiarism stands as a highly significant issue within the realms of academic and scientific research [10]. Educational institutions are urged to address plagiarism through a multifaceted approach that fosters a climate of academic integrity and honesty [11]. In today's academic landscape, plagiarism is a prevalent issue, with academic dishonesty being a long-standing challenge extensively researched in higher education [12]. Studies indicate that plagiarism and academic dishonesty often stem from inadequate creative thinking, limited academic English writing skills, and challenges faced by researchers in countries where English is not the mother tongue [13], [14]. Furthermore, the rise of the internet and computers has facilitated the overcoming of linguistic barriers for non-native English-speaking researchers, thus contributing to the complexity of plagiarism issues [15]. To effectively combat academic plagiarism, a three-layered model is recommended. This model organizes the approach into increasingly abstract categories: plagiarism detection methods (concrete techniques), plagiarism detection systems (tools implementing these techniques), and plagiarism policies (institutional frameworks) [16]. This systematic approach aims to provide a comprehensive understanding and practical solutions for maintaining academic integrity and upholding the quality of academic and scientific research.

Plagiarism detection tools are crucial in maintaining the integrity of scholarly work. They help verify the originality of manuscripts and uphold academic standards [17]. These tools utilize a "similarity index" which quantifies the overlap of the text in a manuscript with existing published materials [18]. Although a useful measure, the similarity index is distinct from a plagiarism index and does not directly determine whether the content is plagiarized [19], [20]. Higher similarity indices may prompt further scrutiny of the work, as they indicate more extensive textual matches, which can be grounds for suspicion of plagiarism. However, the threshold for acceptable similarity varies among journal editors; while some may accept a similarity up to 5%, others might require stricter standards, with similarities above 10% potentially leading to manuscript rejection [21]-[24]. In light of this, it is essential for scholarly journals to clearly articulate their plagiarism policies in author guidelines and on their websites to ensure transparency and fairness in the submission process [25]. Interestingly, reviews often show higher similarity indices than research articles due to the nature of their content; with the introduction being the most commonly plagiarized section [26]. To effectively combat plagiarism, scholars must adhere to rigorous ethical practices such as crediting original ideas, quoting directly when necessary, acknowledging all sources, and accurately paraphrasing and citing references [27].

Plagiarism detection is a critical aspect of maintaining academic integrity and originality in research and educational institutions. Two of the foremost software systems widely used for this purpose is iThenticate and Ouriginal. These tools employ complex algorithms to scan extensive databases, including academic papers, journals, and web content, to identify potential matches and detect plagiarized content. Despite sharing the common goal of plagiarism detection, iThenticate and Ouriginal differ in their processes, efficiency, and sensitivity. iThenticate is renowned as a leading plagiarism checker, partnered with Turnitin. It is particularly favored by researchers and publishers for pre-publication originality checks. It plays a vital role in both academic and professional fields, ensuring the authenticity of work. iThenticate provides a "Similarity Score" to highlight text matches but does not explicitly label content as plagiarized [28]. On the other hand, Ouriginal, previously known as Urkund and now under Turnitin, is notable for its text-matching and writing style analysis capabilities. It is highly effective in detecting plagiarism across multiple languages and is known for its user-friendly interface and reliability. Ouriginal's comprehensive database includes internet sources, published works, and past student submissions, making it a robust tool for text authenticity verification [29].

In today's globalized world, the rapid advancements in information and communication technology and the web have revolutionized the way information is shared, allowing for instant dissemination across the globe. However, this ease of access and distribution has also led to an increase in plagiarism incidents by unethical individuals [30], [31]. Piracy, a phenomenon that predates the internet, saw a significant transformation with the advent of powerful search engines in the early 2000s. During this period, software was developed to detect plagiarism, marking a time when authors had easy access to diverse sources, often leading to unintended copying [32]. The digital era has further evolved the landscape of plagiarism, offering

effortless access to vast information repositories and introducing advanced tools for detecting such unethical practices [33].

This study compared the effectiveness of two plagiarism detection software programs, iThenticate and Ouriginal, by examining the similarity index each produced. Given these considerations, both iThenticate and Ouriginal plagiarism software were chosen for similarity index analysis. Despite being built on valid algorithms, researchers raise two primary arguments. First, there exists a notably high correlation between iThenticate and Ouriginal plagiarism software concerning their variables, suggesting concurrent validity. Second, there appears to be a lack of similarity between the two software platforms based on performance metrics. These points highlight the complexity of evaluating plagiarism detection tools and underscore the need for comprehensive assessments when selecting the most suitable software for academic endeavors.

2. METHOD

2.1. Software study sample

iThenticate and Ouriginal software were selected for this study, and these are commercially available software tools designed to detect plagiarism. Ouriginal and iThenticate were launched in 2000 and 2004, respectively. iThenticate is a partner of Turnitin that compares submitted text to an extensive database of scholarly journals, billions of web pages, and countless other resources to calculate a similarity index, a percentage that indicates the amount of text overlap and offers a quick, a low-cost manuscript checks for plagiarism detection [28], [34]. Ouriginal (formerly Urkund), is notable software acquired by Turnitin in 2021. It provides a system that automatically checks submitted documents with a broad database of connections, such as web pages, academic papers, and student submissions. Ouriginal ensures compliance with EU regulations and US laws for consumer privacy policies, and all documents are handled with the highest level of privacy and security [29]. In this study, all manuscripts were checked for similarity index using Ouriginal and iThenticate plagiarism software.

2.2. Analysis study sample

A total of twenty (N=20) original manuscripts were selected for us to examine the similarity index. All manuscripts were first checked for similarity index by Ouriginal plagiarism software. The same manuscripts were again checked by iThenticate plagiarism software. Each manuscript, as submitted by the authors, along with the final report, is to be downloaded in PDF format. Table 1 displays the matching sources, matching words, and similarity index percentages for each manuscript report. Figure 1 shows the numerical similarity index in percentage between iThenticate and Ouriginal plagiarism detection software.

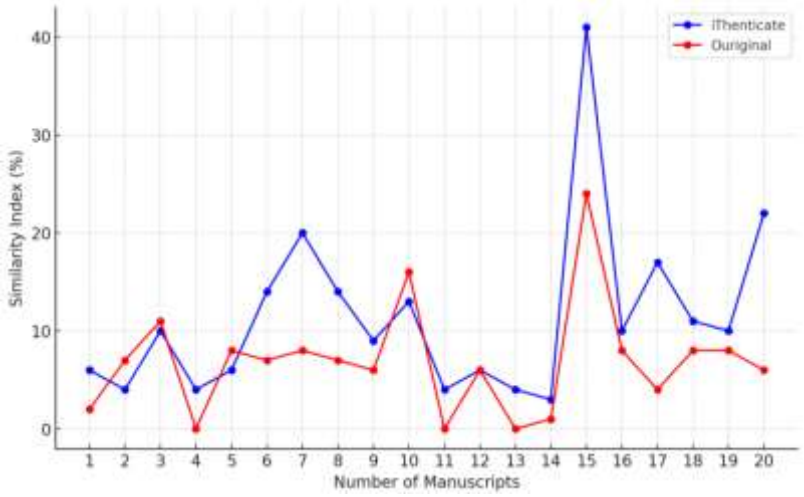

Figure 1. Similarity index (%) between iThenticate and Ouriginal plagiarism detection software

2.3. Inclusion or exclusion criteria for similarity check

The criteria checked similarity using commercial plagiarism detection software (iThenticate and Ouriginal) on 20 manuscripts and all manuscripts were original works written in English. The references or bibliography sections and direct quotations these manuscripts were excluded from the analysis.

Table 1. Manuscript-based similarity detected by iThenticate and Ouriginal

Manuscript (No.)	Plagiarism software	Paper ID	Matching sources (No.)	Matching words (No.)	Similarity index (%)
Manuscript 1	iThenticate	84230783	2	63	6%
	Ouriginal	D129572209	1	22	2%
Manuscript 2	iThenticate	84230746	2	25	4%
	Ouriginal	D128684327	3	78	7%
Manuscript 3	iThenticate	84232338	3	212	10%
	Ouriginal	D130834496	8	236	11%
Manuscript 4	iThenticate	84230824	2	26	4%
	Ouriginal	D131207083	0	0	0%
Manuscript 5	iThenticate	84230869	3	40	6%
	Ouriginal	D131354612	3	48	8%
Manuscript 6	iThenticate	84230656	8	204	14%
	Ouriginal	D129729023	5	123	7%
Manuscript 7	iThenticate	84230555	11	236	20%
	Ouriginal	D129129048	5	133	8%
Manuscript 8	iThenticate	84230612	5	115	14%
	Ouriginal	D129389419	4	74	7%
Manuscript 9	iThenticate	84230343	10	105	9%
	Ouriginal	D130237164	4	87	6%
Manuscript 10	iThenticate	84230419	3	50	13%
	Ouriginal	D130412648	2	83	16%
Manuscript 11	iThenticate	87616395	8	104	4%
	Ouriginal	D141886323	0	0	0%
Manuscript 12	iThenticate	87616259	14	215	6%
	Ouriginal	D141886324	3	93	6%
Manuscript 13	iThenticate	103148246	4	56	4%
	Ouriginal	D130584393	0	0	0%
Manuscript 14	iThenticate	103148269	6	56	3%
	Ouriginal	D130584388	1	1	1%
Manuscript 15	iThenticate	104040347	2	993	41%
	Ouriginal	D131253244	21	605	24%
Manuscript 16	iThenticate	104039979	6	269	10%
	Ouriginal	D129729030	7	244	8%
Manuscript 17	iThenticate	104040069	25	675	17%
	Ouriginal	D129788131	7	164	4%
Manuscript 18	iThenticate	104040212	2	186	11%
	Ouriginal	D131242496	3	160	8%
Manuscript 19	iThenticate	104040268	8	224	10%
	Ouriginal	D130252734	9	171	8%
Manuscript 20	iThenticate	103148286	29	391	22%
	Ouriginal	D130584396	6	142	6%

2.4. Statistical analysis

In this analysis, descriptive statistics for categorical variables were presented as the mean, and standard deviation. An independent (2-tailed) t-test was used to compare variables. Levene's test confirmed equal variances, and the Shapiro-Wilk test indicated a normal distribution of the data. Additionally, the correlation coefficient was determined to evaluate the percentage of similarity among plagiarism detection software's. All statistical procedures were conducted using IBM's SPSS version 26 for Windows. *p* values less than 0.05 were designated as statistical significance.

3. RESULTS AND DISCUSSION

The mean value and standard deviation in Table 2 of the matching sources, matching words, and similarity index for iThenticate and Ouriginal plagiarism software were 7.65±7.49 and 4.60±4.71; 212.25±239.50 and 123.20±135.70; 11.40±8.88 and 6.85±5.67, respectively. In all cases, iThenticate typically reported a slightly higher average similarity. Table 3 shows that iThenticate and Ouriginal plagiarism software's matching sources t(38)=1.54, sig.=0.131, $p>0.05$; matching words t(38)=1.45, sig.=0.156, $p>0.05$; and similarity index t(38)=1.93, sig.=0.061, $p>0.05$, respectively. Statistical analysis indicated that the matching sources, matching words, and similarity index between iThenticate and Ouriginal plagiarism software did not show any significant differences. However, in the similarity index, the iThenticate plagiarism software mean similarity percentage (m=11.40%) was higher as compared to the Ouriginal plagiarism software (m=6.85%), and the *p* value was on the edge of significance ($p=0.061$). There is a strong positive correlation ($r=.758$**, $p<.000$) between iThenticate (similarity index %) and Ouriginal (similarity index %) plagiarism software, which is significant at the 0.01 level (2-tailed). Figure 2 shows a scatter plot of the correlation between the similarity index (%) of both software.

Table 2. Descriptive statistics of iThenticate and Ouriginal plagiarism software

Items	Tools	N	Mean	Std. deviation	Std. error mean	Coefficient of variation
Matching sources	iThenticate	20	7.65	7.49	1.67	97.87%
	Ouriginal	20	4.60	4.71	1.05	102.39%
Matching words	iThenticate	20	212.25	239.50	53.55	112.78%
	Ouriginal	20	123.20	135.70	30.34	110.15%
Similarity index	iThenticate	20	11.40	8.88	1.99	77.89%
	Ouriginal	20	6.85	5.67	1.27	82.77%

Table 3. An independent sample t-test between iThenticate and Ouriginal plagiarism software

Items	Tools	Mean difference	Std. error difference	t	df	Sig. (2-tailed)
Matching sources	iThenticate Ouriginal	3.05	1.98	1.54	38	0.131
Matching words	iThenticate Ouriginal	89.05	61.55	1.45	38	0.156
Similarity index	iThenticate Ouriginal	4.55	2.36	1.93	38	0.061

*. Significant at 0.05 level

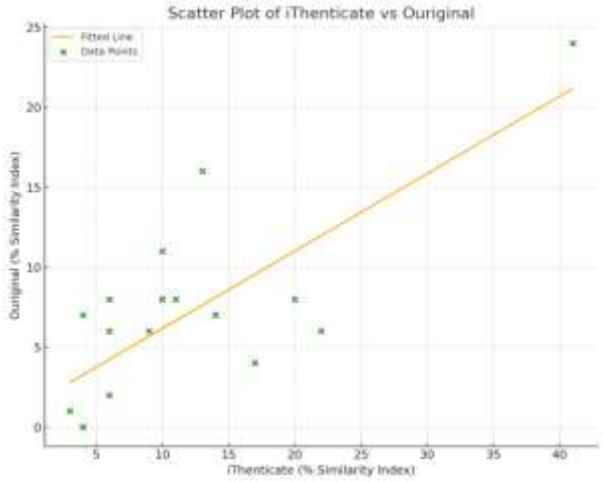

Figure 2. Scatter plot shows the correlation of the similarity index

The range of similarity index values in Table 4 was used to categorize and rank the different levels of similarity percentages within the categories. The findings indicated that iThenticate 60% (n=12) and Ouriginal 85% (n=17) had a low similarity (≤10%) range. The low similarity range (≤10%) of the two software was not statistically significant t(26)=1.16, Sig.=0.256 (2-tailed), and (p>.05). However, in low similarity (≤10%), the iThenticate plagiarism software mean similarity % (m=6.33%) was higher than the Ouriginal plagiarism software (m=5.06%). The average similarity index for sequences low, moderate and high is 72.5%; 20%; and 7.5%, respectively.

Table 4. Similarity index (%) range between two software

S. No.	Similarity index range	Categories	iThenticate (n=20)	Ouriginal (n=20)	Average similarity rate
1	≤10%	Low	60% (n=12)	85% (n=17)	72.5%
2	11% - 20%	Moderate	30% (n=6)	10% (n=2)	20%
3	21% - 41%	High	10% (n=2)	05% (n=1)	7.5%

For individuals and publishers, iThenticate offers plagiarism detection services, whereas Ouriginal is tailored for use in educational settings. iThenticate with access to Crossref's vast scholarly database that screens manuscripts for 1,500 leading publishers globally. It checks against a vast database, including 97% of the most-cited journals, over 89 million academic resources, 200+ million open access materials, and 99.3 billion web pages. Annually, it reviews 14 million documents [28]. Ouriginal by Turnitin offers advanced

plagiarism detection by combining text-matching and style analysis, utilizing a vast database including 47 billion web pages, 190 million academic papers, and 1.9 billion student articles [29], [35]. Overall, both software tools appear equally effective based on the metrics analyzed. Comparing the similarity indices produced by different plagiarism detection software revealed no notable distinction between the similarity index and matching sources generated by iThenticate and Ouriginal [36]. The manuscript underwent a plagiarism check using iThenticate, Turnitin, and Urkund software and the similarity percentages were found to be 7% in both iThenticate and Urkund, and Turnitin found 13% [37]. Other plagiarism detection results from iThenticate, Urkund, and Turnitin showed low matching content, with iThenticate and Turnitin having 12% and 5% more matches compared to Urkund's 1% [38]. The study conducted by Baskaran *et al*. [39] evaluated 77 extensively referenced papers and found that iThenticate reported a comparatively lower average similarity index than Turnitin.

A doctoral thesis was analyzed by two anti-plagiarism tools, where Ouriginal reported a 6% similarity score, but turnitin showed no similarity at all [40]. Nine text-matching software programs were evaluated for plagiarism detection in five documents, and the results show notable functional categories include Turnitin, iThenticate, PlagAware, PlagScan, and StrikePlagiarism.com [41]. When comparing iThenticate and Grammarly (paid) and DupliChecker and Small SEO tools (free) using 100 articles, Grammarly showed the highest average similarity index, outperforming iThenticate. The free tools displayed almost equal and lower average similarity indexes than their paid counterparts [42]. Free plagiarism detection software typically only assesses text similarity and may not be as advanced as the fee-based iThenticate [23]. In a comparison focusing on performance and features among five anti-plagiarism tools, iThenticate consistently secures the top position [43]. Jain *et al.* [44] analyzed 25 manuscripts and found iThenticate to be the most effective for text similarity, followed by Plagiarism Checker X and Viper. A study analyzing 310 Scopus-indexed journal papers found no significant differences in similarity across quartiles (Q1–Q4) but noted that plagiarism occurred most frequently in Q2 journals [45]. This study revealed no significant statistical differences in similarity performance between the two software programs. However, compared to the Ouriginal software, iThenticate demonstrated superior performance across several metrics, including matched sources, words, and index percentage. Consequently, according to the results of this study, iThenticate is considered more effective for similarity index evaluation.

The study's limitations include a small sample size, limiting applicability, and a narrow focus on similarity detection, overlooking other factors in choosing plagiarism detection software. Although the analysis primarily uses quantitative metrics, qualitative dimensions could provide deeper insights. However, the study's strength lies in its comprehensive comparison between iThenticate and Ouriginal, offering valuable insights for stakeholders concerned with academic integrity. By incorporating previous research, the study establishes a robust framework. Future research should explore longitudinal patterns, use qualitative methodologies for a nuanced understanding, consider diverse influencing factors, and prioritize ongoing enhancements of detection algorithms to improve the efficacy of plagiarism detection tools.

4. CONCLUSION

Based on the findings, there were no notable discrepancies between iThenticate and Ouriginal plagiarism software in terms of identifying matching sources, the number of matched words, and the overall similarity index. However, iThenticate reported an average percentage of similarity index (m=11.40%) higher than Ouriginal's (m=6.85%), and the p value was on the edge of significance (p=0.061). The low similarity range (≤10%) of the two software programs was not significant, while both reports exhibited a high average similarity rate of 72.5%. The study highlighted that academic institutions, publishers, and researchers can safeguard against plagiarism by utilizing both iThenticate and Ouriginal software for comprehensive similarity index evaluations, ensuring accurate detection of potential similarities.

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REFERENCES

[1] N. Das and M. Panjabi, "Plagiarism: why is it such a big issue for medical writers?," *Perspectives in Clinical Research*, vol. 2, no. 2, p. 67, 2011, doi: 10.4103/2229-3485.80370.

[2] M. Joy and M. Luck, "Plagiarism in programming assignments," *IEEE Transactions on Education*, vol. 42, no. 2, pp. 129–133, May 1999, doi: 10.1109/13.762946.

[3] S. Hannabuss, "Contested texts: issues of plagiarism," *Library Management*, vol. 22, no. 6/7, pp. 311–318, Sep. 2001, doi: 10.1108/EUM0000000005595.
[4] P. Kumar, N. Priya, S. Musalaiah, and M. Nagasree, "Knowing and avoiding plagiarism during scientific writing," *Annals of Medical and Health Sciences Research*, vol. 4, no. 9, p. 193, 2014, doi: 10.4103/2141-9248.141957.
[5] G. Helgesson and S. Eriksson, "Plagiarism in research," *Getting to Good: Research Integrity in the Biomedical Sciences*, vol. 18, no. 1, pp. 262–273, Feb. 2018, doi: 10.1007/s11019-014-9583-8.
[6] B. Joob and V. Wiwanitkit, "Plagiarism: either intentional or unintentional, it is still plagiarism!," *Perspectives in Clinical Research*, vol. 9, no. 3, p. 151, 2018, doi: 10.4103/picr.PICR_17_18.
[7] S. S. Khadilkar, "The plague of plagiarism: prevention and cure!!!," *Journal of Obstetrics and Gynecology of India*, vol. 68, no. 6, pp. 425–431, Dec. 2018, doi: 10.1007/s13224-018-1182-9.
[8] I. Masic, "Plagiarism in scientific publishing," *Acta Informatica Medica*, vol. 20, no. 4, pp. 208–213, 2012, doi: 10.5455/aim.2012.20.208-213.
[9] I. Masic, "Plagiarism in scientific research and publications and how to prevent it," *Materia Socio Medica*, vol. 26, no. 2, p. 141, 2014, doi: 10.5455/msm.2014.26.141-146.
[10] S. K. Chauhan, "Research on plagiarism in India during 2002-2016: A bibliometric analysis," *DESIDOC Journal of Library and Information Technology*, vol. 38, no. 2, pp. 69–74, Mar. 2018, doi: 10.14429/djlit.38.2.12298.
[11] T. Bretag, "Challenges in addressing plagiarism in education," *PLoS Medicine*, vol. 10, no. 12, pp. 1–4, Dec. 2013, doi: 10.1371/journal.pmed.1001574.
[12] S. Awasthi, "Plagiarism and academic misconduct: a systematic review," *DESIDOC Journal of Library and Information Technology*, vol. 39, no. 2, pp. 94–100, Mar. 2019, doi: 10.14429/djlit.39.2.13622.
[13] O. Zimba and A. Y. Gasparyan, "Plagiarism detection and prevention: a primer for researchers," *Reumatologia*, vol. 59, no. 3, pp. 132–137, Jul. 2021, doi: 10.5114/reum.2021.105974.
[14] J. R. Higgins, F.-C. Lin, and J. P. Evans, "Plagiarism in submitted manuscripts: incidence, characteristics and optimization of screening—case study in a major specialty medical journal," *Research Integrity and Peer Review*, vol. 1, no. 1, p. 13, Dec. 2016, doi: 10.1186/s41073-016-0021-8.
[15] A. M. Rogerson and G. McCarthy, "Using Internet based paraphrasing tools: original work, patchwriting or facilitated plagiarism?," *International Journal for Educational Integrity*, vol. 13, no. 1, p. 2, Dec. 2017, doi: 10.1007/s40979-016-0013-y.
[16] T. Foltýnek, N. Meuschke, and B. Gipp, "Academic plagiarism detection: a systematic literature review," *ACM Computing Surveys*, vol. 52, no. 6, pp. 1–42, Nov. 2019, doi: 10.1145/3345317.
[17] Y. Eshet, "The plagiarism pandemic: inspection of academic dishonesty during the COVID-19 outbreak using originality software," *Education and Information Technologies*, vol. 29, no. 3, pp. 3279–3299, Jun. 2024, doi: 10.1007/s10639-023-11967-3.
[18] C. Adithan and A. Surendiran, "Plagiarism software," in *Thesis Writing for Master's and Ph.D. Program*, Singapore: Springer Singapore, 2018, pp. 305–317.
[19] T. Foltýnek *et al.*, "Testing of support tools for plagiarism detection," *International Journal of Educational Technology in Higher Education*, vol. 17, no. 1, p. 46, Dec. 2020, doi: 10.1186/s41239-020-00192-4.
[20] S. Meo and M. Talha, "Turnitin: Is it a text matching or plagiarism detection tool?," *Saudi Journal of Anaesthesia*, vol. 13, no. 5, pp. S48–S51, 2019, doi: 10.4103/sja.SJA_772_18.
[21] W. C. G. Peh and J. Arokiasamy, "Plagiarism: a joint statement from the Singapore Medical Journal and the Medical Journal of Malaysia," *Medical Journal of Malaysia*, vol. 63, no. 5, pp. 354–355, 2008.
[22] P. W. Swaan, "Editorial: Publication ethics-a guide for submitting manuscripts to pharmaceutical research," *Pharmaceutical Research*, vol. 27, no. 9, pp. 1757–1758, Sep. 2010, doi: 10.1007/s11095-010-0188-5.
[23] O. Mahian *et al.*, "Measurement of similarity in academic contexts," *Publications*, vol. 5, no. 3, p. 18, Jun. 2017, doi: 10.3390/publications5030018.
[24] D. Kadam, "Academic integrity and plagiarism: the new regulations in India," *Indian Journal of Plastic Surgery*, vol. 51, no. 2, pp. 109–110, May 2018, doi: 10.4103/ijps.IJPS_208_18.
[25] J. Debnath and M. P. Cariappa, "Wishing away plagiarism in Scientific Publications! Will it work? A situational analysis of plagiarism policy of journals in PubMed," *Medical Journal Armed Forces India*, vol. 74, no. 2, pp. 143–147, Apr. 2018, doi: 10.1016/j.mjafi.2017.09.003.
[26] A. Rohwer, E. Wager, T. Young, and P. Garner, "Plagiarism in research: a survey of African medical journals," *BMJ Open*, vol. 8, no. 11, p. e024777, Nov. 2018, doi: 10.1136/bmjopen-2018-024777.
[27] M. Bahadori and M. Hoseinpourfard, "Plagiarism: concepts, factors and solutions," *Iranian Journal of Military Medicine*, vol. 14, no. 3, pp. 168–177, 2012.
[28] "iThenticate" https://www.ithenticate.com/ (accessed Mar. 20, 2024).
[29] "Ouriginal" https://www.ouriginal.com/ (accessed Mar. 20, 2024).
[30] A. Kumar, "Plagiarism detection tools: iThenticate, Turnitin and Urkund," *International Journal of Information Library and Society*, vol. 5, no. 2, p. 2016.
[31] P. Šprajc, M. Urh, J. Jerebic, D. Trivan, and E. Jereb, "Reasons for plagiarism in higher education," *Organizacija*, vol. 50, no. 1, pp. 33–45, Feb. 2017, doi: 10.1515/orga-2017-0002.
[32] C. M. Anson and O. Kruse, "Plagiarism detection and intertextuality software," in *Digital Writing Technologies in Higher Education: Theory, Research, and Practice*, Cham: Springer International Publishing, 2023, pp. 231–243.
[33] P. M. Scanlon and D. R. Neumann, "Internet plagiarism among college students," *Journal of College Student Development*, vol. 43, no. 3, pp. 374–385, 2002.
[34] C. B. Carter and C. F. Blanford, "Plagiarism and detection," *Journal of Materials Science*, vol. 51, no. 15, pp. 7047–7048, Aug. 2016, doi: 10.1007/s10853-016-0004-7.
[35] "Turnitin." https://www.turnitin.com/. (accessed Mar. 20, 2024).
[36] M. H. Rahman, M. S. Islam, S. M. H. Andrabi, J. P. Sharma, and M. N. Reza, "Comparing the similarity index across iThenticate, Ouriginal, and Turnitin plagiarism detection software," *Journal of Physical Education and Sport*, vol. 24, no. 2, pp. 419–424, 2024, doi: 10.7752/jpes.2024.02051.
[37] S. K. Patra and D. K. Kirtania, "OpenAI ChatGPT generated content and similarity index: a study of selected terms from the library & information science," *Annals of Library and Information Studies*, vol. 70, no. 2, pp. 99–101, 2023, doi: 10.56042/alis.v70i2.1189.
[38] D. K. Kirtania, "ChatGPT generated content and similarity index in chemistry," *Journal of Chemical Information and Modeling*, vol. 64, no. 7, pp. 2132–2135, Apr. 2024, doi: 10.1021/acs.jcim.3c01110.

[39] S. Baskaran *et al.*, "Is there plagiarism in the most influential publications in the field of andrology?," *Andrologia*, vol. 51, no. 10, Nov. 2019, doi: 10.1111/and.13405.
[40] S. T. Kale, "Anti-plagiarism software check to the doctoral theses in Indian Universities and Institutions," in *Plagiarism: An International Reader*, 2019, no. March, [Online]. Available: https://www.researchgate.net/publication/331638674.
[41] A. M. Elkhatat, K. Elsaid, and S. Almeer, "Some students plagiarism tricks, and tips for effective check," *International Journal for Educational Integrity*, vol. 17, no. 1, p. 15, Dec. 2021, doi: 10.1007/s40979-021-00082-w.
[42] A. M. E-T. Ali, H. M. D. Abdulla, and V. Snášel, "Overview and comparison of plagiarism detection tools," *CEUR Workshop Proceedings*, vol. 706, pp. 161–172, 2011.
[43] A. Anil *et al.*, "Are paid tools worth the cost? A prospective cross-over study to find the right tool for plagiarism detection," *Heliyon*, vol. 9, no. 9, p. e19194, Sep. 2023, doi: 10.1016/j.heliyon.2023.e19194.
[44] H. Jain, S. Das, and A. Garg, "Google versus other text similarity tools in detection of plagiarism: a pilot study in the journal of clinical and diagnostic research," *European Science Editing*, vol. 42, no. 4, pp. 87–91, 2016, doi: 10.20316/ESE.2016.42.012.
[45] R. Menshawey, E. Menshawey, A. Mitkees, and B. A. Mahamud, "A plagiarism paperdemic: determining plagiarism among COVID-19 articles in infectious disease journals between 2020 and 2021," *Bulletin of the National Research Centre*, vol. 47, no. 1, p. 151, Oct. 2023, doi: 10.1186/s42269-023-01129-3.

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