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Undergraduate Chemistry Students' Ability to Evaluate Online Chemistry Claims, Evidence and Soil Management Practices: A Perspective of Scientific Misinformation on Social Media

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Abstract

Scientific misinformation on social media presents a growing challenge for undergraduate Chemistry students, as online claims about chemical processes, fertilisers, soil acidity and soil-management practices may appear credible without adequate scientific evidence. This study examined students' ability to evaluate online Chemistry claims, supporting evidence and soil-management information, focusing on the relationship between Chemistry knowledge and evaluation ability. A cross-sectional survey design was adopted, involving 250 Nigerian undergraduate students selected through multistage sampling. Data were collected using a structured questionnaire addressing scientific misinformation, online Chemistry claims, evidence and soil-management information. Mean, standard deviation and one-way analysis of variance (ANOVA) were used for data analysis at the 0.05 significance level. The findings indicated that students demonstrated a high ability to evaluate online Chemistry claims and evidence ($M = 3.30$, $SD = 0.74$). Their ability to evaluate Chemistry-based soil-management information was also high ($M = 3.28$, $SD = 0.55$). ANOVA revealed a statistically significant difference in evaluation ability according to Chemistry knowledge level, $F(2, 247) = 45.67$, $p < .001$. Students with high Chemistry knowledge achieved the highest evaluation score ($M = 3.56$, $SD = 0.39$), followed by those with moderate knowledge ($M = 3.21$, $SD = 0.43$) and low knowledge ($M = 2.84$, $SD = 0.48$). The study concluded that Chemistry knowledge plays an important role in students' ability to scrutinise online scientific claims and soil-management information. It recommended that Chemistry departments integrate regular social-media-based evaluation activities into undergraduate courses to strengthen the application of chemical principles, source verification and evidence-based judgement.

Keywords: chemistry education; online claims; scientific misinformation; social media; soil management.

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Introduction

The rapid growth of social media has transformed how undergraduate students access, exchange and interpret scientific information. Platforms such as Facebook, YouTube, Instagram, TikTok and X enable students to encounter scientific explanations, demonstrations, opinions and claims beyond conventional educational resources, including textbooks, lectures and scholarly publications. Although these platforms provide opportunities for informal learning and scientific engagement, they also expose students to credible evidence, incomplete explanations, exaggerated statements, misleading interpretations and false scientific claims. Kresin, Kremer and Büssing (2024) established that the absence of traditional information gatekeeping on social media facilitates the spread of scientific misinformation and reinforces the need for science media literacy. Similarly, Siani, Joseph and Dacin (2024) examined secondary school students' susceptibility to scientific misinformation and their perceptions of the reliability of information sources, highlighting the importance of distinguishing trustworthy scientific information from misleading online content. Pimentel (2025) also emphasised the importance of developing students' ability to evaluate the credibility of online scientific sources. Furthermore, Ononiwu (2024) found that some young people deliberately shared information they knew to be false, with exaggeration and financial motivation among the factors associated with such behaviour. Eshiet (2025) demonstrated positive relationships between digital literacy, fact-checking behaviour and resistance to misinformation, indicating the importance of practical verification skills in evaluating scientific information. Scientific misinformation is particularly concerning in Chemistry education because many chemical claims circulated online involve concepts that cannot be verified through everyday observation alone.

Online statements concerning chemical reactions, toxicity, acidity and alkalinity, fertilisers, pesticides, household chemicals, water treatment and environmental contamination may appear convincing because they contain technical terminology, diagrams, photographs or numerical data. Nevertheless, scientific language and persuasive presentation do not necessarily establish a claim's validity. Undergraduate Chemistry students therefore require not only sound knowledge of chemical concepts but also the ability to assess source credibility, examine supporting evidence and evaluate the reasoning underlying scientific claims. Ojukwu and Saidu (2025), in their study of undergraduate students at the Federal University Lokoja, Nigeria, examined students' information sources, recognition of false information, verification strategies and challenges associated with evaluating online information. Their work highlights the importance of strengthening scientific literacy, critical thinking and information-verification skills among Nigerian undergraduates. Alex-Nmecha and Ejitagha (2023) and Pimentel (2025) similarly emphasise source credibility in information evaluation, while Osborne and Pimentel (2023) highlight the need to examine the relationship between scientific claims, supporting evidence and conclusions. Students should consequently assess authors' qualifications, possible conflicts of interest, the reliability of evidence and consistency with established scientific knowledge rather than accepting claims because they are popular or confidently presented. Scientific information evaluation also requires students to distinguish between the plausibility of a scientific claim and the trustworthiness of its source. Zilz and Höttecke (2025) distinguish between plausibility strategies, which involve judging whether information is scientifically reasonable, and trust strategies, which involve evaluating the reliability of the communicator or source. Both are important because a credible source may occasionally make an error, while an unreliable source may present a scientifically plausible statement without adequate evidence.

Pimentel (2025) investigated students' scientific online reasoning and found that explicit instruction improved their ability to distinguish sources of different levels of credibility and increased their use of external sources when evaluating scientific information. Kresin et al. (2024) found that students applied different criteria relating to content, source credibility and the presentation of scientific information when evaluating social media posts about climate change, demonstrating the complexity of applying credibility criteria in actual online environments. Similarly, Barzilai and Stadtler (2025) found that practising evaluation strategies in an online game improved participants' ability to distinguish accurate information from misinformation. Silva and Arroio (2025), in their systematic review of teaching acid–base theories in an era of disinformation, identified Chemistry teaching, critical thinking and media literacy as interconnected areas requiring attention. Chemistry knowledge is particularly relevant to evaluating online soil-management information because soil fertility and environmental quality depend on chemical and biological processes involving soil pH, nutrient availability,

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organic matter, salinity, contamination, fertiliser application and soil amendments. Social media provides a convenient channel through which students, farmers, businesses and the public encounter recommendations concerning these issues. However, some recommendations may be anecdotal, commercially motivated or presented without adequate supporting evidence. Vanlauwe et al. (2015) explained that integrated soil fertility management involves combining appropriate fertilisers, organic resources and agronomic practices while accounting for variations in soil fertility and local environmental conditions. Their work demonstrates why generalised recommendations about soil amendments and fertiliser application may not be appropriate for every location. In the Nigerian context, Adelakun and Adedigba (2025) examined perceptions of climate change and soil-quality sustainability in Oyo Metropolis, highlighting the relevance of soil quality to environmental sustainability. Afolayan and Oderinde (2018) also investigated variations in soil nutrient conditions under different cocoa cultivation systems in south-western Nigeria, demonstrating the importance of cultivation practices and nutrient management. These studies provide a relevant environmental context for examining whether Chemistry students can distinguish scientifically supported soil-management recommendations from unverified online assertions.

Effective evaluation of soil-management information requires students to connect chemical knowledge with evidence-based environmental reasoning. Soil responses vary according to pH, texture, organic matter content, climate, land-use history and other environmental conditions; consequently, a recommendation that produces favourable results in one location may not necessarily produce the same outcome elsewhere. Vanlauwe et al. (2015) emphasised the importance of locally adapted approaches to soil fertility management in sub-Saharan Africa, while Adelakun and Adedigba (2025) highlighted soil conservation, integrated soil management and environmental awareness in the context of soil-quality sustainability in Oyo Metropolis. The ability to evaluate such information is therefore relevant to sustainable agriculture, environmental protection and responsible scientific communication. Adelakun et al. (2025) examined undergraduate students' perceptions of the flipped-classroom approach to Chemistry teaching, including technological access and self-directed learning, while Makinde and Oyeniyi (2024) discussed emerging technologies in Chemistry teaching and learning and their potential contribution to sustainable development. Critical thinking and science media literacy provide important foundations for addressing these challenges. Höttecke and Allchin's work on science media literacy positions the evaluation of scientific information as an important component of scientific literacy, while Kresin et al. (2024) emphasise the need for learners to assess the credibility of scientific information encountered on social media. Towler (2025) argues that science education needs to respond more effectively to the contemporary information environment in which students encounter scientific claims through internet-based media. Pimentel and Campbell (2025) developed the Credibility Claim–Evidence–Reasoning (C-CER) approach, which emphasises evaluating the credibility of online scientific sources alongside the claims, evidence and reasoning presented. Taylor et al. (2025) reported that interventions addressing scientific misinformation commonly focus on fact-checking, scientific consensus and peer review, although limitations remain in the number and methodological strength of existing intervention studies. These contributions support educational activities in which Chemistry students identify claims, investigate their sources, examine supporting evidence, compare alternative explanations and determine whether conclusions are scientifically defensible. The Scientific Online Reasoning (SOR) framework provides a direct theoretical basis for examining undergraduate Chemistry students' ability to evaluate scientific information on social media. The framework concerns how learners search for, evaluate and verify the credibility of scientific information encountered online. Pimentel (2025) explains that scientific online reasoning combines credibility criteria, including relevant expertise, conflicts of interest and scientific consensus, with strategies such as lateral reading, examining multiple sources and verifying information beyond the original post or webpage. Zilz and Höttecke (2025) further demonstrate the importance of distinguishing the scientific plausibility of a claim from the trustworthiness of its source. Science Media Literacy (SML) provides a complementary perspective by explaining the knowledge and skills required to interpret scientific information communicated through different media formats. Kresin et al. (2024) highlights the need for learners to recognise how scientific information is presented and circulated online, while Towler (2025) supports pedagogical approaches that prepare students to distinguish accurate information from misinformation. Despite these contributions, a research gap remains in understanding how undergraduate Chemistry students' disciplinary

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knowledge relates to their ability to evaluate online Chemistry claims, supporting evidence and soil-management recommendations within a single investigation, particularly in the Nigerian higher-education context. Although Kresin et al. (2024), Siani et al. (2024), Pimentel (2025), Barzilai and Stadtler (2025), and Zilz and Höttecke (2025) provide insights into scientific misinformation and online information evaluation, and Ojukwu and Saidu (2025) contribute evidence from Nigerian undergraduates, the literature presented does not establish adequately whether students can transfer their Chemistry knowledge to the independent evaluation of practical soil-management claims encountered on social media. The present study therefore examines undergraduate Chemistry students' ability to evaluate online Chemistry claims, evidence and soil-management information without relying on artificial intelligence tools to perform the evaluation for them.

The increasing use of social media as a source of scientific information presents a significant challenge for undergraduate Chemistry education, as students frequently encounter online claims concerning chemical reactions, fertilisers, pesticides, soil acidity, nutrient availability, contamination and soil-management practices. Although some claims reflect established chemical principles, others may be based on incomplete evidence, commercial interests, personal experiences or scientifically inaccurate interpretations. The use of chemical terminology, numerical data and laboratory images may make misleading information appear credible, potentially causing students to accept or share misinformation without verifying its source, supporting evidence, scientific reasoning or contextual relevance. This is particularly concerning because inaccurate soil-management information may contribute to inappropriate agricultural decisions and unsustainable soil practices. Despite growing research on scientific misinformation, digital literacy and online information evaluation, a significant research gap remains concerning undergraduate Chemistry students' ability to evaluate chemistry-related misinformation specifically within the context of soil management. Limited empirical evidence establishes whether students can distinguish scientifically supported soil-management claims from misleading online assertions and whether their Chemistry knowledge influences their assessment of the credibility and quality of supporting evidence. The present study therefore seeks to investigate students' ability to evaluate online Chemistry claims, assess supporting evidence and determine the scientific credibility of social-media information relating to soil-management practices.

Objectives of the Study

The study aims to examine undergraduate Chemistry students' ability to evaluate scientific misinformation on social media, with particular emphasis on online Chemistry claims, evidence and soil management practices**.** The study specifically seeks to: determine the level of undergraduate Chemistry students' ability to identify and evaluate scientific misinformation on social media; examine undergraduate Chemistry students' ability to assess the credibility and quality of evidence supporting online Chemistry claims; assess undergraduate Chemistry students' ability to evaluate social-media information relating to Chemistry-based soil management practices and determine the relationship between students' Chemistry knowledge and their ability to evaluate online Chemistry claims, evidence and soil management information.

Research Questions

1. What is the level of undergraduate Chemistry students' ability to identify and evaluate scientific misinformation on social media?
2. What relationship exists between students' Chemistry knowledge and their ability to evaluate online Chemistry claims, evidence and soil management information?

Null Hypotheses

The following null hypotheses were tested at the 0.05 level of significance:

H_{o1}: There is no significant relationship between undergraduate Chemistry students' Chemistry knowledge and their ability to evaluate online Chemistry claims, evidence and soil management information.

H_{o2}: There is no significant relationship between undergraduate Chemistry students' ability to evaluate online Chemistry claims and their ability to evaluate social-media information relating to soil management practices.

Research Methodology

A cross-sectional survey design was adopted for the study to examine undergraduate Chemistry students' ability to evaluate scientific misinformation on social media, particularly online Chemistry claims, evidence and soil management practices. The study was conducted among undergraduate Chemistry students in selected universities in Nigeria, from which 250

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students were selected using a multistage sampling technique involving purposive selection of relevant institutions, proportionate sampling of eligible Chemistry students and simple random sampling to select the final respondents. Data were collected using a structured questionnaire titled "Scientific Misinformation, Chemistry Claims and Soil Management Evaluation Questionnaire (SMCCSMEQ)", developed from the objectives of the study and reviewed by experts in Chemistry education, science education and educational measurement to establish face and content validity. The instrument comprised sections covering students' demographic characteristics, ability to identify scientific misinformation, evaluation of online Chemistry claims and evidence, and evaluation of social-media information relating to soil management practices. A pilot test was conducted among undergraduate Chemistry students who were not included in the main study, and the internal consistency of the instrument was established using Cronbach's alpha, with a coefficient of 0.70 or above considered acceptable. The questionnaires were administered directly to the selected respondents with appropriate research clearance and informed consent, and completed copies were retrieved for analysis. The data were coded and analysed using mean and standard deviation to answer the research questions relating to students' ability to identify and evaluate scientific misinformation and online Chemistry and soil-management claims, while Pearson Product-Moment Correlation (PPMC) was used to test the relationships between Chemistry knowledge, evaluation of online Chemistry claims, evidence evaluation and soil-management information. The two null hypotheses were tested at the 0.05 level of significance**,** with results presented in tables and interpreted in relation to the research objectives

Presentation of Results

Table 1: Undergraduate Chemistry students' ability to evaluate scientific misinformation on social media

S/N	Statement	Mean	SD
1	I can identify scientific information on social media that contradicts established Chemistry principles.	3.34	0.71
2	I can distinguish between evidence-based Chemistry information and unsupported scientific claims on social media.	3.28	0.74
3	I check the credibility of the source before accepting Chemistry-related information shared on social media.	3.41	0.68
4	I compare Chemistry claims found on social media with information from textbooks, scientific journals or other reliable sources.	3.16	0.82
5	I can recognise misleading or exaggerated Chemistry claims presented as scientific facts on social media.	3.31	0.73
Total		**3.30**	**0.74**

Source: Authors' Survey, 2026

The results indicate a high level of undergraduate Chemistry students' ability to identify and evaluate scientific misinformation on social media, with an overall mean of **3.30** and standard deviation of **0.74**. The highest mean score was recorded for checking the credibility of sources before accepting Chemistry-related information (M = 3.41, SD = 0.68), suggesting that source credibility was an important evaluation practice among the students. This was followed by the ability to identify information that contradicts established Chemistry principles **(**M = 3.34, SD = 0.71**)** and recognise misleading or exaggerated Chemistry claims **(**M = 3.31, SD = 0.73**)**. Comparing social-media claims with textbooks, journals and other reliable sources recorded the lowest mean **(**M = 3.16, SD = 0.82**)**, although it remained above the 2.50 criterion. The relatively moderate standard deviations indicate that responses showed some variation but were generally concentrated around agreement.

Table 2: High ability to assess online Chemistry claims

S/N	Statement	Mean	SD
1	I can determine whether the evidence presented in an online Chemistry claim comes from a credible scientific source.	3.36	0.70
2	I can assess whether the evidence provided online is sufficient to support a Chemistry-related claim.	3.24	0.76
3	I can distinguish between scientific evidence from research studies and personal opinions or testimonials presented online.	3.39	0.67

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4	I can check whether references or research findings cited in an online Chemistry claim actually support the conclusion being made.	3.18	0.81
5	I can compare evidence from different reliable sources before accepting an online Chemistry claim as scientifically valid.	3.29	0.74
Total	**Altimate ability to assess credibility and evidence quality**	**3.29**	**0.74**

Source: Authors' Survey, 2026

The results show that undergraduate Chemistry students demonstrated a high ability to assess the credibility and quality of evidence supporting online Chemistry claims, with an overall mean of 3.29 and standard deviation of 0.74. The highest mean was recorded for the ability to distinguish scientific evidence from personal opinions or testimonials (M = 3.39, SD = 0.67), followed by the ability to determine whether evidence originated from a credible scientific source (M = 3.36, SD = 0.70). Comparing evidence from different reliable sources also recorded a high mean (M = 3.29, SD = 0.74). The lowest mean was observed for checking whether cited references actually supported the conclusions presented (M = 3.18, SD = 0.81), although this remained above the 2.50 criterion. The findings indicate that the students possessed a relatively high capacity to examine the credibility, sufficiency and relevance of evidence used to support Chemistry claims encountered online.

Table 3: Undergraduate Chemistry students' ability to evaluate social-media Chemistry information

Variables	N	Mean	SD	r	p-value	Decision
Evaluation of social-media Chemistry information	250	3.31	0.52			
Evaluation of Chemistry-based soil-management information	250	3.28	0.55	0.684	< .001	Significant

Source: Authors' Survey, 2026

The result shows a positive and statistically significant relationship between undergraduate Chemistry students' ability to evaluate social-media Chemistry information and their ability to evaluate Chemistry-based soil-management information, $r(248) = .684$, $p < .001$. This indicates a moderately strong positive relationship: students who demonstrated stronger ability to critically evaluate Chemistry information on social media also tended to demonstrate stronger ability to evaluate information relating to Chemistry-based soil-management practices. Since the obtained p-value (.001) is less than the 0.05 significance level, the relevant null hypothesis is rejected. The finding suggests that students' general capacity to evaluate online Chemistry information is significantly associated with their ability to critically assess social-media information concerning soil management. This relationship is important because soil-management recommendations involving pH, fertilisers, nutrients, amendments, salinity and contamination require students to apply both Chemistry knowledge and evidence-evaluation skills.

Table 4: Students' Ability to Evaluate Online Chemistry

Source of variation	Sum of Squares	df	Mean Square	F	p-value	Decision
Between groups	18.42	2	9.21	**45.67**	**< .001**	Significant
Within groups	49.77	247	0.20			
Total	68.19	249				

Source: Authors' Survey, 2026

The result indicates a statistically significant difference in students' ability to evaluate online Chemistry claims, evidence and soil-management information across the three Chemistry-knowledge groups, $F(2, 247) = 45.67$, $p < .001$. Students with high Chemistry knowledge recorded the highest mean evaluation score (M = 3.56, SD = 0.39), followed by those with moderate Chemistry knowledge (M = 3.21, SD = 0.43), while students with low Chemistry knowledge recorded the lowest mean (M = 2.84, SD = 0.48). Since $p < .05$, the null hypothesis is rejected. This suggests that students' ability to evaluate online Chemistry claims, evidence and soil-management information differs according to their level of Chemistry knowledge. A post-hoc test such as Tukey HSD should subsequently conducted to determine which specific knowledge groups differ significantly from one another.

Discussion of Findings

The finding that undergraduate Chemistry students demonstrated a high ability to evaluate online Chemistry claims and supporting evidence is consistent with Ojukwu and Saidu (2025) identified social media as a major information source,

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accounting for 35% of responses. Despite students' confidence in recognising false information, the authors highlighted the need to strengthen scientific literacy, critical thinking and verification skills in a study of 485 undergraduates at the Federal University Lokoja. Similarly, Elom et al. (2025), studying 206 students in Nigerian public universities, found that WhatsApp and Telegram supported learning, although concerns about mistrust, poor organisation and irresponsible use persisted. Ama-Abasi et al. (2026) also examined misinformation among undergraduates, reinforcing the importance of critical evaluation of online information. These findings suggest that students' reported competence is encouraging but requires continuous development through subject-specific verification exercises. The finding also agrees with Pimentel (2025) reported that explicit instruction in scientific online reasoning improved students' ability to distinguish between more and less credible scientific sources and encouraged the use of external sources to verify information. The author noted that students could initially rely on website appearance and technical features when judging credibility. Similarly, Pimentel and Campbell (2025) proposed the Credibility Claim–Evidence–Reasoning (C-CER) approach, which encourages learners to evaluate the credibility of information sources alongside the claims, supporting evidence and scientific reasoning. This supports the importance of systematic verification rather than accepting online information based on its presentation or apparent authority. Furthermore, the finding that students demonstrated a high ability to evaluate Chemistry-based soil-management information suggests that they could apply scientific reasoning to information concerning fertilisers, soil acidity and related agricultural practices. This is important because misleading recommendations may encourage inappropriate soil-management decisions. The finding is consistent with Pimentel (2025) and Pimentel and Campbell (2025), whose work emphasises source evaluation, evidence verification and reasoned judgement. Ojukwu and Saidu (2025) similarly highlighted the importance of critical thinking and information-verification skills in addressing online misinformation. The findings indicate that undergraduate Chemistry students possess a promising foundation for evaluating online scientific information. However, self-reported competence should not be interpreted as proof of consistently accurate evaluation. Chemistry departments should therefore incorporate practical social-media-based activities that require students to verify sources, compare scientific evidence and assess the validity of Chemistry-related soil-management claims.

Conclusion

The study concluded that undergraduate Chemistry students demonstrated a high ability to evaluate online Chemistry claims, supporting evidence and Chemistry-based soil-management information. The findings further revealed that students' evaluation ability differed significantly according to their level of Chemistry knowledge, with students possessing high Chemistry knowledge achieving the highest scores. This suggests that sound Chemistry knowledge contributes to students' ability to scrutinise scientific claims and assess the credibility of online information. However, continued instruction is necessary to strengthen source verification, critical thinking and evidence-based judgement when evaluating social media content. Therefore, Chemistry departments should integrate regular social-media-based evaluation activities into undergraduate courses to promote responsible information sharing and scientifically informed soil-management practices.

Recommendation

1. Chemistry education programmes should include regular practical activities that require undergraduate students to critically evaluate social media claims about Chemistry and soil-management practices.
2. Chemistry departments should incorporate regular source-verification exercises into undergraduate courses, enabling students to assess the credibility of online sources, examine supporting evidence and apply established chemical principles to evaluate claims about Chemistry and soil-management practices before accepting or sharing them.
3. Chemistry departments should incorporate authentic social media examples of soil-management claims into undergraduate Chemistry courses, requiring students to verify sources, examine supporting evidence and apply established chemical principles before determining whether the claims are scientifically valid.
4. These activities should require students at different levels of Chemistry knowledge to verify sources, compare scientific evidence, apply established chemical principles and assess the validity of online claims before accepting or sharing the information.

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References

Adelakun, L. L., & Adedigba, T. A. (2025). Perception of climate change and soil quality sustainability in Oyo Metropolis. Emmanuel Alayande University of Education Journal of Multidisciplinary Studies, 2(1), 91–110. https://doi.org/10.60787/eaued-jms.vol2no1.35

Adelakun, T.A., Olorundare, S.A.& Makinde, S.O.(2025).Perception of undergraduate students on use of flipped classroom for teaching chemistry in Oyo State.*Journal of Education Research and Library Practice,* 9(8)http://doi.org/10.70382/ajerip.v9i8.042

Afolayan, O. S., & Oderinde, F. O. (2018). Evaluation of deterioration index in soil nutrients due to cultivation of different cocoa species in southwest Nigeria. *Journal of Applied Sciences and Environmental Management*, 22(4), 547–552. https://doi.org/10.4314/jasem.v22i4.20

Alex-Nmecha, J. C., & Ejitagha, S. (2023). An evaluation of digital information literacy skills among undergraduate students of Library and Information Science in universities in Nigeria. Mousaion: *South African Journal of Information Studies*. https://doi.org/10.25159/2663-659X/12326

Ama-Abasi, R. D., Angrey, C. U., & Agbo, O. E. (2026). Demographic factors and the dissemination of misinformation on social media among undergraduate students in University of Calabar, Cross River State, Nigeria. *Global Journal of Educational Research*, 25(1), 1–8. https://doi.org/10.4314/gjedr.v25i1.1

Barzilai, S., & Stadtler, M. (2025). Learning to evaluate (mis)information in an online game: Strategies matter! Computers & Education, 227, Article 105210. https://doi.org/10.1016/j.compedu.2024.105210

Elom, C. O., Ayerakwa, H. M., Ibrahim-Olesin, S., Deffor, E. W., Uwaleke, C. C., & Onyeneke, R. U. (2025). Determinants of WhatsApp and Telegram usage for learning support in Nigerian universities: A quantitative study. Frontiers in Education, 10, Article 1581514. https://doi.org/10.3389/feduc.2025.1581514

Eshiet, G. B. (2025). The role of digital literacy in information discernment and misinformation resilience: A dual-outcome analysis in the Nigerian social media context. Àgídìgbo: ABUAD *Journal of the Humanities*, 13(2), 766–788. https://doi.org/10.53982/agidigbo.2025.1302.22-j

Kresin, S., Kremer, K., & Büssing, A. G. (2024). Students' credibility criteria for evaluating scientific information: The case of climate change on social media. Science Education, 108(3), 762–791. https://doi.org/10.1002/sce.21855

Makinde, S. O., & Oyeniyi, N. O. (2024). The roles of emerging technology in chemistry teaching and learning for a sustainable development. *Indonesian Journal of Teaching in Science*, 4(2), 177–188. https://doi.org/10.17509/ijotis.v4i2.75554

Ojukwu, N. N. C., & Saidu, D. (2025). Strategies for tackling misinformation, disinformation and malinformation for sustainable science communication among undergraduate students at the Federal University Lokoja, Nigeria. *South African Journal of Libraries and Information Science*, 91(1), 1–9. https://doi.org/10.7553/91-1-2476

Olufadi, O. H. (2024). Perceived credibility of social media information among Unilorin students: A study of Mass Communication Department. ResearchGate. https://doi.org/10.13140/RG.2.2.33482.34243

Ononiwu, R. C. (2024). "I know it is fake news but I share": Motivations for deliberate fake news sharing among 20 young people in Lagos State, Nigeria. Covenant Journal of Communication, 11(2). https://journals.covenantuniversity.edu.ng/index.php/cjoc/article/view/4886

Osborne, J., & Pimentel, D. (2023). Science education in an age of misinformation. Science Education, 107, 553–571. https://doi.org/10.1002/sce.21790

Pimentel, D. R. (2025). Learning to evaluate sources of science (mis)information on the internet: Assessing students' scientific online reasoning. *Journal of Research in Science Teaching*, 62(3), 684–720. https://doi.org/10.1002/tea.21974

Pimentel, D. R., & Campbell, V. (2025). Flipping the script on claim, evidence, and reasoning: The Credibility CER (C-CER). The Science Teacher, 92(4), 37–41. https://doi.org/10.1080/00368555.2025.2500938

Siani, A., Joseph, M., & Dacin, C. (2024). Susceptibility to scientific misinformation and perception of news source reliability in secondary school students. Discover Education, 3, Article 93. https://doi.org/10.1007/s44217-024-00194-8

Vanlauwe, B., Descheemaeker, K., Giller, K. E., Huising, J., Merckx, R., Nziguheba, G., Wendt, J., & Zingore, S. (2015). Integrated soil fertility management in sub-Saharan Africa: Unravelling local adaptation. Soil, 1(1), 491–508. https://doi.org/10.5194/soil-1-491-2015

Yila, U. M. (2024). Undergraduate students' utilisation of digital information resources at the University of Lagos, Nigeria: The role of digital literacy. *University of Dar es Salaam Library Journal*, 19(2), 130–139. https://doi.org/10.4314/udslj.v19i2.10

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