INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 15, Issue 11, (2025) E-ISSN: 2222-6990

Artificial Intelligence Hallucination Risk Assessment Using the SOAR Model: How Possible is it?

Nur Ashiela Abdul Manaf, Mohd Effendi @ Ewan Mohd Matore*

Faculty of Education, National University of Malaysia, Selangor, Malaysia

Email: p161692@siswa.ukm.edu.my

Corresponding Author Email: effendi@ukm.edu.my

DOI Link: http://dx.doi.org/10.6007/IJARBSS/v15-i11/26949

Published Date: 22 November 2025

Abstract

The integration of artificial intelligence (AI) into educational practices has become increasingly prevalent, particularly among secondary school students who utilize this technology to access information and complete academic tasks. While artificial intelligence offers considerable advantages in educational contexts, it also introduces potential risks, notably the phenomenon of 'AI hallucinations,' wherein the system generates outputs that appear credible but are, in fact, inaccurate, irrelevant, or entirely fabricated. This phenomenon can undermine students' digital literacy and critical thinking. This study aims to develop a valid and reliable risk assessment scale for AI hallucinations, based on four key constructs which is factual, contextual, multimodal, and logical hallucinations. The development of this scale is guided by the SOAR Model (Strengths, Opportunities, Aspirations, Results), which emphasizes a strategic, strengths-based, and future-oriented approach. The key findings indicate that the SOAR model effectively demonstrates its potential by identifying individual strengths, challenges, available options, responses, and overall effectiveness within an educational context. The scope was deliberately confined to the SOAR model to encourage constructive engagement with the development of AI hallucination mitigation strategies. It also contributes to the development of a more comprehensive and ethical AI literacy curriculum for stakeholder's purposes. The implications can benefit educational policy, teacher professional development, and improvements in AI systems. Future research could expand upon this analysis by employing alternative futuristic frameworks to gain broader perspectives and greater analytical depth. The scale is designed not only as a diagnostic tool but also as a foundation for targeted pedagogical interventions. It can be used by teachers and counsellors to identify students at high risk and to plan appropriate intervention programs. Overall, the initiative supports efforts to build a generation of students who are technologically literate, critical thinkers, and capable of using AI responsibly.

Keywords: AI Hallucinations, SOAR Model, Risk Assessment, Artificial Intelligence, Secondary Student

Introduction

The integration of artificial intelligence (AI) in education is becoming increasingly widespread, particularly among secondary school students who utilize this technology to search for information and complete school assignments. While AI offers numerous benefits, it also poses certain risks, including the phenomenon known as "AI hallucinations." AI hallucinations refer to instances where AI systems generate information that is inaccurate, irrelevant, or illogical, despite appearing convincing. Ciubotaru (2025) emphasizes that AI hallucinations can undermine the accuracy and trustworthiness of digital learning. Similarly, Erümit and Sarıalioğlu (2025) highlight that students who extensively rely on AI are at risk of receiving incorrect information, which may negatively affect their understanding. To accurately assess this issue in real-world educational contexts, a risk assessment scale for AI hallucinations is proposed, focusing on four key constructs such as factual hallucinations, contextual hallucinations, multimodal hallucinations, and logical hallucinations.

Developing a risk assessment for AI hallucinations is crucial in the context of education and national development, as it helps identify students' awareness and ability to critically evaluate AI-generated information, particularly content that may contain hallucinations or false data. AI hallucinations refer to the phenomenon where AI systems produce content that appears credible but is inaccurate or fabricated (Kaur Sidhu, 2025). In educational settings, such hallucinations can erode trust in technology and contribute to the spread of misinformation among students (Ciubotaru, 2025). Yingzhe LI (2025) underscores the importance of cultivating fact-checking and information evaluation skills among students as a key strategy to address this issue. Therefore, the development of an AI hallucination risk assessment scale not only supports efforts to enhance digital and AI literacy among students but also contributes to the nation's goal of nurturing a tech-savvy, critical-thinking generation capable of using AI safely and responsibly.

The construction of this risk assessment aligns with the Malaysian Digital Education Policy 2021–2025, which aims to produce digitally fluent students through ethical and responsible integration of technology within the education ecosystem (Ministry of Education, 2023). This study also supports the implementation of the 2027 School Curriculum, which will introduce foundational AI education at both primary and secondary levels as one of the seven core competencies students are expected to master (Ministry of Education, 2025). This initiative is consistent with Sustainable Development Goal 4 (SDG 4), which advocates for inclusive, quality education and lifelong learning, including digital literacy as a fundamental 21st-century skill (UNICEF, 2023). Accordingly, the main purpose is to elaborate on the development of an AI hallucination risk assessment scale for secondary school students in Malaysia, guided by the strategic planning framework of the SOAR Model (Strengths, Opportunities, Aspirations, Results). It is hoped that this initiative will contribute to the development of a safe, ethical, and effective digital education ecosystem, fostering a generation that is technologically literate and globally competitive.

Soar Model Assessment – Strategic Planning Tool

SOAR is a new approach to strategic planning, published in 2003, has a potent technique for strategic planning. It stands for strengths, opportunities, aspirations and results, assisting firms in making the most of their advantages, investigating fresh prospects, establishing challenging objectives and producing measurable outcomes. The philosophy behind the

SOAR framework is an appreciative inquiry, used to formulate plans that are aligned with the planned insights (Aziz et al., 2019).

SOAR model is also applied worldwide. For instance, Sugiarti et al. (2023) study shows that the results of the SWOT analysis, then re-analysed with SOAR, create new co-creations for digital marketing businesses. Kamran et al. (2025) used a qualitative research method to explore the strengths, opportunities, aspirations and results (SOAR) factors that could optimise the teaching and learning process for children with special educational needs in the context of an inclusive school located in Karachi, Pakistan. Putri & Pertiwi (2025) recently analysed and described the public information disclosure strategy through the Information and Documentation Management Officer (PPID) of East Java Province using SOAR analysis. The SOAR Analysis Model can be illustrated as in Figure 1.0 as below:

Figure 1.0: SOAR Model Assessment Framework

In the SOAR matrix, strengths are the foundational elements that set research apart. These are internal attributes that contribute to its competitive research advantage. Identifying and leveraging strengths are crucial for a successful SOAR action plan in research. These are the internal attributes, capabilities or resources that give an organization a competitive advantage or contribute to its success. Identifying strengths helps organizations understand what they do well and what sets them apart from others in the digital era (Omran, Ahmed, and Al-magarbi, 2023).

Opportunities, in the SOAR Matrix, is used to recognize and capitalize on opportunities that are key to staying agile in research and responsive to the education market dynamics. Aspirations encompass the visionary goals and ambitions that guide research towards future success. In the SOAR matrix, this part is about picturing what the educational organization (schools, HEI, etc) wants to achieve and deciding where it wants to go for growth. Results in SOAR analysis focus on the positives and measurable outcomes in the research topic. This involves evaluating the effectiveness of strategic initiatives and ensuring that the organization (schools, HEI, etc) achieves its objectives.

SOAR has been contrasted to the classic SWOT diagnostic analysis that diverts organizational resources away from strengths and opportunities by focusing on weaknesses and threats. Rather, SOAR is dialogue-based (Cole, Stavros, Cox, and Stavros, 2022). It has been demonstrated that SOAR is a flexible and successful strategic framework that fosters innovation, energy and organizational engagement. Strength, Opportunity, Aspiration and Result are the acronyms for SOAR. It is a dynamic, contemporary and creative method for developing strategic thinking, assessing individual and group performance, developing strategies and formulating plans in SOAR's strategic thinking and strategic planning.

SOAR is a framework that emphasizes the development and application of positive strategies through the identification of strengths, chances for constructive creativity, encouraging individuals and groups to share goals, and determining quantifiable and significant outcomes. Thus, strategic planning is accelerated by this approach. The Strength, Opportunities, Aspirations, and Results (SOAR) analytical approach has gained popularity as a planning and analysis tool for strategic initiatives over the past ten years. By applying this technique to identify environmental correlations, a firm can engage with its surroundings and establish business strategy. For more than 20 years, SOAR has established a reputation as a framework that provides a flexible way to think strategically and develop strategies (Muhammad and Hromada, 2023).

Organizations have found success using the SOAR Model to improve student performance, motivation and engagement while facilitating change and development. The SOAR framework's goal is to accomplish the product target management aspiration by using the strategic planning approach based on the development of opportunities and strengths. In order to create plans that are in line with the planned insights, the SOAR framework is based on an appreciative inquiry. The analysis integrates the group's thoughts and promotes cooperation inside the company.

The SOAR framework also provides a flexible approach to strategic thinking, planning and leadership that invites the entire system into a strategic planning or strategy process by incorporating all who have an interest in the future success of the organization. These stakeholders can be internal workers such as employees or external participants such as suppliers, consumers, and societies. SOAR (Strengths, Opportunities, Aspirations, Results) analysis is an appreciative inquiry tool that is uniquely tailored to enable strategic planning around well-defined goals. SOAR analysis differs from the well-known SWOT (strengths, weaknesses, opportunities, and threats) analysis within two dimensions; it focuses on the future prospects and results from a subject of interest while SWOT aims at inherent weaknesses and perceived threats (Prabu et al., 2023).

Strength (s) – What Can We Build On?

The proliferation of generative AI tools, such as ChatGPT and Gemini, has positioned them as integral components of the academic toolkit for secondary school students (Farrokhnia, Banihashem, Noroozi, and Wals, 2024). This rapid integration presents a significant challenge, as it gives rise to the phenomenon of AI hallucination, in which artificial intelligence systems produce information that appears convincing but is actually false or entirely fabricated (Li, Fengchao, and Zhang, 2024). This poses a significant risk, as students who depend on AI for homework or research are highly susceptible to accepting and disseminating false

information. Addressing an urgent and timely need within the current educational landscape, the investigation contributes valuable insights.

A key strength lies in the specific methodological contribution and originality of the work. It moves beyond examining perceptions, focusing instead on developing a psychometric assessment scale for AI hallucinations targeted at secondary school students. While general AI literacy scales are beginning to emerge (Zhou et al., 2025), a validated instrument that specifically measures students' risk perception or vulnerability to AI hallucinations remains a clear research gap. In response to the identified gap, the development and validation of a novel psychometric instrument is undertaken.

The deliberate focus on secondary school students as a specific, high-risk target population underscores the importance of early intervention. This demographic is in a critical phase of cognitive development. Research indicates that students at this stage already face significant difficulties in evaluating the credibility of online information (Allbee and Marburger, 2024). The introduction of fluent, authoritative-sounding, yet potentially inaccurate AI-generated text is likely to exacerbate this vulnerability. Therefore, the intervention targets a developmental stage where critical thinking skills are still actively forming.

Furthermore, the initiative promises clear and actionable practical implications. Its outcomes extend beyond theoretical contribution, with the developed scale serving as a primary practical output. Schools and educators can employ this scale as a diagnostic tool to identify students with high-risk levels. This aligns with the global call to develop effective AI literacy competencies and interventions in schools (UNESCO, 2023). Based on the scale's findings, targeted intervention programs can be designed to enhance fact-checking skills and foster a healthy, realistic scepticism towards AI-generated outputs.

The scope is intentionally focused and well-defined, ensuring clarity and precision in its objectives. The study is bounded by its clear objectives which is conducting a ‘Risk Assessment' (the instrument/process), focused specifically on 'Artificial Intelligence Hallucinations' (the core problem), within the 'Secondary Student' population. Such a defined scope is highly recommended in educational research as it facilitates in-depth data collection and more precise analysis than broader studies like stated by J.W.Creswell (2017). In summary, the integration of three essential components defines the work: addressing a pressing issue related to AI risk, focusing on a vulnerable population of secondary students, and introducing a novel, practical methodological approach through scale development. This combination ensures a meaningful contribution, not only to the academic body of knowledge but also directly to pedagogical practices in schools.

Opportunities (o) – What Is Our Stake-Holders Asking For?
Addressing the critical need to enhance technological literacy among secondary school students, the focus is placed on identifying and evaluating risks associated with artificial intelligence. hallucinations. In an increasingly complex digital landscape, students require skills to evaluate the veracity of information from technologies like ChatGPT and Gemini. As research by Ciubotaru (2025) underscores, awareness of hallucination risks is fundamental to the responsible use of A.I. in digital education. This phenomenon can mislead students and compromise learning outcomes if not adequately addressed. Such efforts are essential for

cultivating student awareness of the limitations of artificial intelligence and promoting critical evaluation of information.

A primary contribution is the development of a risk assessment scale that serves as a foundation for creating interactive and contextual learning modules aimed at enhancing students' understanding of A.I. functionalities and potential errors. *We propose the integration of pedagogical approaches such as the Socratic method and the SIFT strategy (Fulsher, Pagkratidou, and Kendeou, 2025) to train students in critical thinking rather than passive information acceptance. These findings can inform the development of a more comprehensive digital literacy curriculum covering ethics, trust, and information accuracy.*

Beyond its pedagogical relevance, its present considerable implications for policy formulation and implementation. The empirical data generated can inform evidence-based guidelines to protect students from false and manipulative information. As (Elsayed, 2024) warns, erroneously generated information can undermine students' conceptual understanding and erode trust in authentic knowledge. The findings also highlight the urgent need for teacher professional development, enabling educators to guide students in responsible A.I. use, aligning with national initiatives such as the 2027 School Curriculum (Ministry of Education, 2025).

The scope is inherently interdisciplinary, bridging psychology (student perception and trust), education (pedagogy and curriculum), and information technology (A.I. system design). The challenge of A.I. hallucinations is not merely technological but also cognitive, social, and ethical. As Fulsher et al. (2025) note, GenAI can function to either correct or propagate misinformation, depending on its pedagogical application. The work lays the groundwork for a holistic approach and opens pathways for longitudinal studies on the long-term effects of A.I. on student identity and independent decision-making.

In conclusion, the developed scale serves not merely as a diagnostic tool but as a foundational instrument for informing learning modules, educational policy, and A.I. system enhancements. By fostering essential interdisciplinary and cross-cultural inquiry, the initiative contributes meaningfully to the broader educational discourse. Ultimately, it supports the critical mission of cultivating a generation of students who are not only technology-literate and responsible but also equipped with the cognitive skills necessary to critically evaluate information in an increasingly A.I.-driven world.

Aspirations (a) – What Do We Care Deeply About?
The primary and foundational goal is to develop a diagnostic tool that is both practical and psychometrically valid. In an era where secondary school students are increasingly immersed in the AI ecosystem, a critical gap has emerged between the widespread use of technology and a nuanced understanding of its limitations. The objective is to transition the discussion from informal observations to quantifiable evidence. The development of this scale is driven by an urgent need to quantify risk specifically which is to objectively identify which students are most susceptible to AI hallucinations and to understand the underlying causes. Without a valid measurement instrument, any attempt to address this issue remains speculative (Møgelvang and Grassini, 2025).

Once the diagnostic tool is established, the objective shifts toward the implementation of targeted pedagogical interventions. The scale is not the end goal, but rather a starting point for corrective action. This aspiration is grounded in practical objectives, aiming to empower teachers, counsellors, and school administrators. With data derived from the scale, educators can determine whether the greatest risks stem from poor fact-checking skills, uncritical trust in technology, or an inability to discern confidently presented but incorrect outputs(Zhang, Perry, and Lee, 2025). The goal is to enable schools to design efficient intervention programs, strategically allocating limited resources to address the root causes affecting the most vulnerable student groups.

Fundamentally, the initiative seeks to promote and protect critical thinking in contemporary educational settings. AI hallucinations represent an existential threat to students' ability to evaluate information. When AI systems can generate essays that appear flawless yet contain convincingly false content, foundational academic skills such as research, source verification, and information synthesis are at risk. Accordingly, a key underlying goal is to reinforce the importance of critical thinking (Yingzhe LI, 2025). The scale serves as a reminder that in an age of instant answers, the ability to question is more crucial than the ability to ask.

The long-term aspiration is to build 'digital immunity' among students, recognizing that they are entering a phase of lifelong interaction with AI. This aspiration is proactive and not about restricting AI usage, but about vaccinating students against its potential harms. By making the risks of hallucinations visible and measurable, the initiative aims to initiate a cognitive shift as stated in the guidance for generative AI in education and research (UNESCO, 2023). The goal is to cultivate a generation of discerning AI users who treat AI as a fallible assistant rather than an infallible oracle.

In summary, the objective extends beyond the mere development of a questionnaire, aiming instead to contribute meaningfully to broader pedagogical and analytical frameworks. Its true ambition is to nurture a generation of AI-literate secondary school students who can harness the power of AI for learning without falling prey to its limitations particularly in hallucinations. It also seeks to equip educators with the tools they need to guide students through this evolving landscape.

Results (r) – How Do we Know we are Succeeding?

The primary objective of developing this scale is to produce a valid and reliable instrument for assessing the risk of AI hallucination, which refers to the phenomenon where artificial intelligence systems generate inaccurate or fabricated information. This instrument is urgently needed due to the lack of specialized assessment tools in this field, especially considering the significant impact of AI hallucinations in educational contexts, particularly among secondary school students. The development of this scale will involve constructing items based on current theories and practices, along with psychometric testing to ensure its validity and reliability (Perkins, Furze, Roe, and Macvaugh, 2024). The expected outcomes include the empirical validation of the scale through statistical analysis and the publication of findings in academic journals recognized by the AI research community, thereby contributing to a more systematic and effective approach to AI risk assessment.

In academic research, the scorecard comprises three main dimensions which is value and impact, stakeholder benefit, and sustainability. In terms of impact, the success of this scale is measured by its publication in reputable, peer-reviewed educational or technology journals, aligning with principles of academic and social impact assessment in high-quality research (Nica, Chiriță, and Georgescu, 2025). From the perspective of stakeholder benefit, the scale's practical applicability for teachers and counsellors serves as a crucial measure of success. Success is achieved when the scale is not only statistically valid but also practically applicable in the field. It is supposed to be easy to administer, not overly time-consuming for students, and capable of producing score reports that are easy for teachers to interpret for intervention purposes (Allbee and Marburger, 2024). From a sustainability standpoint, success is defined by the long-term relevance of the scale. A key indicator is the scale's ability to be used as both a diagnostic tool (pre-test) and an impact assessment tool (post-test) to measure the effectiveness of any AI literacy intervention program.

Over the next decade, AI hallucination risk assessment for secondary students will evolve from a simple, reactive check for factual errors to a sophisticated measure of critical thought. Initially, in the digital literacy phase, assessments will focus on the technical skill of *spotting* fakes. This will mature into an integrated skills phase, where students are assessed on their *process* of verifying and improving AI-generated content. Finally, it will enter a cognitive ethics phase, where the risk assessment becomes holistic, focusing on a student's ability to *critique* the AI's hidden biases, logical omissions, and ethical implications, ultimately merging AI risk assessment with critical thinking assessment itself. The key takeaway is that the focus will shift away from the technology and onto the student.

Figure 2 is the SOAR Framework Model on Artificial Intelligence Hallucination Risk Assessment that shows the aspect that needs to be empowered by action taken from holistic approach. What we can learn from this framework is that the SOAR will help to monitor the development awareness of AI hallucination in future especially for secondary educational context.

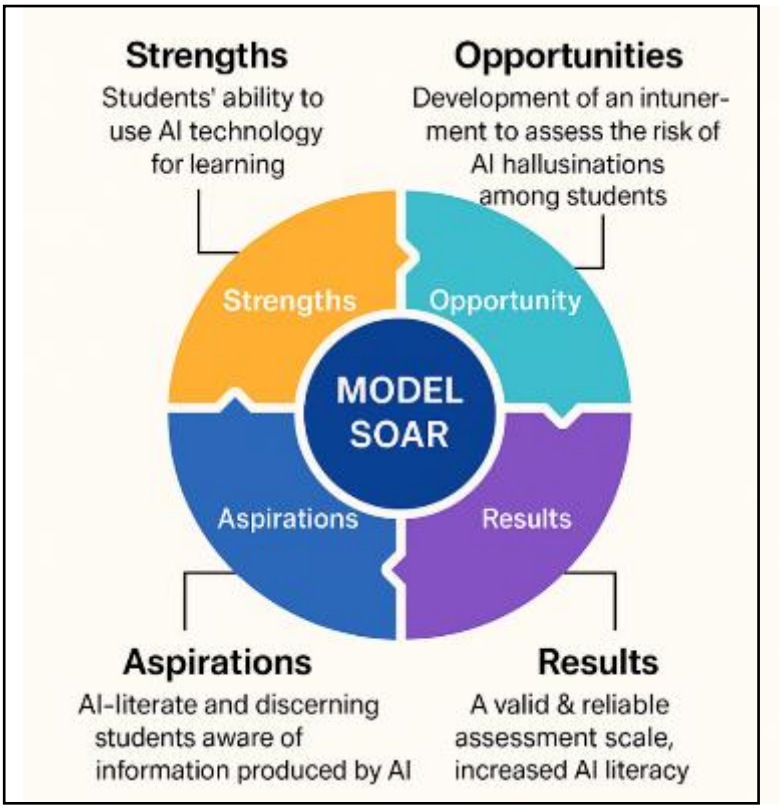

Figure 2: SOAR Framework Model on Artificial Intelligence Hallucination Risk Assessment

Summary

In this investigation, the aim was to assess that SOAR models provide a structured and student-friendly framework for assessing AI hallucination risks, particularly in secondary education contexts where critical thinking and digital literacy are still developing. In the further ahead, the hope that it can empowers students to evaluate AI-generated content, recognize potential risks, and propose responsible actions. The study's theoretical contributions are on the discussion on SOAR models that can improve the understanding of the potential of AI hallucination risks assessment. Besides, the contextual contributions provide the wide application on the educational setting. The education context rarely discussed on AI hallucination risks, and able to give a fresh perspective on the AI body of knowledge especially at schools. The findings of the SOAR model discussion can contribute to this growing area of research by exploring new potential grey area for AI hallucination risks assessment. By doing this, it can benefits educators to be more alert on the aspect of cheating in assessment. The insights gained from this study may be of assistance to enhance the significance in AI applications worldwide and the future effects on the pattern of students learning as well. SOAR is not just a model but can spark the idea for better attempt on the local implementation at school.

One of the more significant findings is that the initial application of the SOAR model serves as a foundational guide for developing a risk assessment framework aimed at helping secondary students evaluate AI-generated content for accuracy and reliability, particularly in relation to misinformation and ethical concerns. This finding has important implications for curriculum design, especially in integrating AI literacy into classroom activities that promote ethical and responsible technology use. Besides that, the result could help in developing assessment tools that empower students to recognize and respond to hallucinated outputs

in AI systems. The generalisability of these results is subject to certain limitations. Due to practical constraints, this paper cannot provide a comprehensive review of SOAR. While this approach maintained the study's focus, subsequent research would be enriched by integrating alternative strategic frameworks to offer a more comprehensive analysis and a broader spectrum of perspectives. It further facilitates avenues for future inquiry and the development of comprehensive educational interventions. Further research should focus on developing validated pedagogical rubrics and teaching methods to assess a student's ability to critique AI bias, not just identify factual errors. Concurrently, new studies should test the SOAR model's practical effectiveness for school-wide policy implementation and track the long-term, equitable impact of these skills on students as they progress to higher education.

Acknowledgment

We gratefully acknowledge financial support from Dana Penyelidikan SDG FPEND 2024 (GG-2024-044) by Faculty of Education, UKM. We thank everyone who is involved in The Publication Accelerator Course Lab (PACE-Lab) that provided insight and expertise that greatly assisted the research. We thank all my friends in Measurement and Evaluation course for assistance with constructive comments that greatly improved the manuscript.

References

Allbee, D., & Marburger, J. (2024). *A Case Study of the Impact of Lateral Reading Instruction On A Case Study of the Impact of Lateral Reading Instruction On Students' Evaluation of Digital Information Students' Evaluation of Digital Information* (pp. 1–44). UNI ScholarWorks Graduate. https://scholarworks.uni.edu/grp/4198

Aziz, R. C., Hamzah, S., Hashim, N. A. A. N., Rahim, M. A., Zulkifli, W. F. W., & Ahmad, G. (2019). S.O.A.R Model : An Alternative Approach for 21 th Century Education to Shift from "Classroom Management" to "Classroom Leadership." *International Journal of Academic Research in Progressive Education and Development*, *8*(2), 485–493. https://doi.org/10.6007/IJARPED/v8-i2/6142

Ciubotaru, B. I. (2025). The hallucination problem in Generative Artificial Intelligence: accuracy and trust in digital learning. *Proceedings of the International Conference on Virtual Learning*, *20*, 35–45. https://doi.org/10.58503/icvl-v20y202503

Cole, M. L., Stavros, J. M., Cox, J., & Stavros, A. (2022). Measuring Strengths, Opportunities, Aspirations, and Results: Psychometric Properties of the 12-Item SOAR Scale. *Frontiers in Psychology*, *13*, 1–17. https://doi.org/10.3389/fpsyg.2022.854406

Elsayed, H. (2024). The Impact of Hallucinated Information in Large Language Models on Student Learning Outcomes: A Critical Examination of Misinformation Risks in AI-Assisted Education. *Northern Reviews on Algorithmic Research, Theoretical Computation, and Complexity*, *9*(8), 1–13. https://northernreviews.com/index.php/NRATCC/article/view/2024-08-07

Erümit, A. K., & Sarıalioğlu, R. Ö. (2025). Artificial intelligence in science and chemistry education: a systematic review. *Discover Education*, *4*(1). https://doi.org/10.1007/s44217-025-00622-3

Farrokhnia, M., Banihashem, S. K., Noroozi, O., & Wals, A. (2024). A SWOT analysis of ChatGPT: Implications for educational practice and research. *Innovations in Education and Teaching International*, *61*(3), 460–474. https://doi.org/10.1080/14703297.2023.2195846

Fulsher, A., Pagkratidou, M., & Kendeou, P. (2025). GenAI and misinformation in education: a

systematic scoping review of opportunities and challenges. In *AI and Society*. Springer Science and Business Media Deutschland GmbH. https://doi.org/10.1007/s00146-025-02536-y

J.W.Creswell, & J.D.Creswell. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publication.

Kamran, M., Bano, A., & Sohni, K. (2025). Optimising the teaching and learning process for children with special educational needs in an inclusive school : A SOAR analysis in Karachi , Pakistan. *British Journal of Special Education*, *52*(1), 37–48. https://doi.org/10.1111/1467-8578.12569

Kaur Sidhu, B. (2025). Hallucinations in Artificial Intelligence: Origins, Detection, and Mitigation. *International Journal of Science and Research (IJSR)*, *14*(1), 8–15. https://doi.org/10.21275/sr241229170309

Li, L., Fengchao, Y., & Zhang, E. (2024). A systematic review of learning task design for K-12 AI education: Trends, challenges, and opportunities. *Computers and Education: Artificial Intelligence*, *6*. https://doi.org/10.1016/j.caeai.2024.100217

Ministry of Education, M. (MoE). (2023). *Dasar Pendidikan Digital* (pp. 1–82). Ministry of Education, Malaysia (MoE). https://www.moe.gov.my/dasarmenu/dasar-pendidikan-digital

Ministry of Education, M. (MoE). (2025). *Kurikulum Persekolahan 2027 Terkini* (pp. 1–14). Ministry of Education, Malaysia (MoE). https://www.moe.gov.my/storage/files/shares/images/KPM/UKK/2023/12_Dis/Kurikulum Persekolahan 2027 Terkini.pdf

Møgelvang, A., & Grassini, S. (2025). Validating the AI attitude scale (AIAS-4) and exploring attitudinal differences in a large sample of Norwegian university students. *Discover Education*, *4*(1). https://doi.org/10.1007/s44217-025-00657-6

Muhammad, H., & Hromada, M. (2023). Evaluating an E-Government Stage Model by Using SOAR-AHP Process. *Transportation Research Procedia*, *74*, 1538–1545. https://doi.org/10.1016/j.trpro.2023.11.131

Nica, I., Chiriță, N., & Georgescu, I. (2025). Triple Bottom Line in Sustainable Development: A Comprehensive Bibliometric Analysis. *Sustainability (Switzerland)*, *17*(5). https://doi.org/10.3390/su17051932

Omran, F., Ahmed, K., & Al-magarbi, A. O. (2023). Strengthening Libyan Hospitality : A SOAR Analysis of Digital Marketing Strategies and Practices in the Tourism and Hospitality Sector. *Journal of Economics, Management and Trade Volume*, *29*(12), 144–159. https://doi.org/10.9734/JEMT/2023/v29i121181

Perkins, M., Furze, L., Roe, J., & Macvaugh, J. (2024). The Artificial Intelligence Assessment Scale (AIAS): A Framework for Ethical Integration of Generative AI in Educational Assessment. *Journal of University Teaching and Learning Practice*, *21*(6). https://doi.org/10.53761/q3azde36

Prabu, A., Id, K., Omprakash, A., Kumar, P., Mani, C., Id, M. K., Wael, D., & Sathiyasekaran, B. W. C. (2023). E-learning and E-modules in medical education — A SOAR analysis using perception of undergraduate students. *PLoS ONE*, *18*(5), 1–14. https://doi.org/10.1371/journal.pone.0284882

Putri, A. I., & Pertiwi, V. I. (2025). Analisis SOAR Terhadap Strategi Keterbukaan Informasi Publik Melalui Pejabat Pengelola Informasi Dan Dokumentasi Provinsi Jawa Timur. *Jurnal Tata SejutaSTIA MATARAM*, *11*(1), 87–102.

Sugiarti, W. S., Pujangkoro, S. A., & Sembiring, M. T. (2023). Analisis SOAR (Strength,

Opportunity, Aspiration & Result) Sebagai Upaya Peningkatan Penjualan Melalui Digital Market. *Jurnal Ilmiah Manajemen Dan Kewirausahaan*, *2*(2), 25–34.

UNESCO. (2023). Guidance for generative AI in education and research. In *Guidance for generative AI in education and research*. UNESCO. https://doi.org/10.54675/ewzm9535

UNICEF. (2023). *Education 2030 in Malaysia 5-Year National Progress Report on SDG 4*. www.unicef.org/malaysia

Yingzhe LI. (2025). Addressing "Hallucinations" in AI-Generated Content: Strategies for Developing Student Fact-Checking and Information Evaluation Skills. *Artificial Intelligence Education Studies*, *1*(2), 48–62. https://doi.org/10.6914/aiese.010204

Zhang, H., Perry, A., & Lee, I. (2025). Developing and Validating the Artificial Intelligence Literacy Concept Inventory: an Instrument to Assess Artificial Intelligence Literacy among Middle School Students. *International Journal of Artificial Intelligence in Education*, *35*(1), 398–438. https://doi.org/10.1007/s40593-024-00398-x

Zhou, J., Zhang, J., Wan, R., Cui, X., Liu, Q., Guo, H., Shi, X., Fu, B., Meng, J., Yue, B., Zhang, Y., & Zhang, Z. (2025). Integrating AI into clinical education: evaluating general practice trainees' proficiency in distinguishing AI-generated hallucinations and impacting factors. *BMC Medical Education*, *25*(1). https://doi.org/10.1186/s12909-025-06916-2