

Integrating Artificial Intelligence (AI) in Teaching and Learning

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Abstract

Artificial Intelligence (AI) has taken control of the world in many disciplines. The focus of this article is limited to education industry nonetheless in sports, medical or advertising as long as education is incorporated and taught in any field. AI which is commonly being used is ChatGPT and robots in other circumstances. This article scope is on literature review which states the purpose and the importance of the systematic literature review (SLR). It compares SLR with narrative literature review which has different purposes. SLR is also distinguished with meta-analysis. The objective of the literature review is to find the research gap on issues in teaching and learning study. There is a plethora of database that can be reviewed likewise Scopus, Mendeley, Clarivet, ScienceDirect and PubMed. Systematic Literature Review is used to synthesise the ideas based on a list of literature review. This article has obtained information from 16 literature review. The methodology that was being used include a proper direction for the search engine to obtain information by using similar keywords as the title for a wider scope of search. Inclusion and exclusion studies were carried on and the search managed to gather 37 journals pertaining to AI. All the literature review was not taken into account as some were related to other aspects ignoring teaching and learning. Only 16 articles were included excluding 21. Each two articles were compared and synthesised. Information gathered says that AI has increased performance of students. Besides, this article has also extracted perceptions on teachers integrating AI to educate students from science background. There is also drawback on the use of AI as it increases the rate of plagiarism. Thus, findings indicate that AI will be subject to human control.

Keywords: Artificial Intelligence, Integrating, Teaching and Learning

1.0 Introduction

The advancement in technology as brought ease to all the sectors especially in banking, agriculture and not forgetting in the world of education. Incorporating Artificial Intelligence (AI) in learning not only convenient to students as well as the educators. What is AI? It is incorporated with a stream of scientific rules, techniques and theories merely to replace the cognitive ability of humanoid. It is created to minimize workload and to perform a complex task. AI was actually designed decades ago; however, it only outshines from the year 2020 with the power of computer and started with a remote-controlled mouse (Roser M., 2022). Ten years lately, it was claimed that machines were not as capable as human in terms of language and image recognition. Nevertheless, with the introduction of AI, it took over human but to a certain extend

there was a mix capability of both human and AI simultaneously (Roser M., 2022). With this, it does not mean that AI can replace teachers but it exercises exciting and challenging way to complete a task. The topic that will be in discussion in this review is ‘Integrating Artificial Intelligence (AI) in Teaching and Learning’ The research objective would be the positive outcomes of integrating AI in education field and challenges of assimilating AI in teaching and learning. AI has also manifested good result in the field of medicine nonetheless owing to some restriction (Elsevier, 2020). This would be carried out with a study using systematic literature review, developing critical analysis through a comparison of various articles and finally synthesizing into complex information. AI includes robots, ChatGPT, AI chatbots like new Bing Chats and Google Barts and also images that are created artificially (Diaz M., 2023). Therefore, this review is going to have an introduction on the research objectives and the topic, followed by the definition of a systematic literature review, a comparative of narrative and systematic literature review, the type of methodology is being used, analysing the findings and research gap and finally the wrap up.

2.0 Systematic Literature Review (SLR)

SLR is a procedure to gather information from all the articles related to a topic or research question using keywords and to narrow the search and gather information to be reviewed, compared and synthesized. It assists in doing a more precise and fruitful review with a string of articles. It compromises conceptual and empirical results. Not only that, a good literature review has the version of summary and synthesis. (David J., et al, 2023). Literature review is more on critical review based on few articles. It is more to reviewing a set of articles and making a comparison with some opinion or critical reviews. It can be analysing a book, scholar articles, journal or other relevant sources. Based on those study, there should be some critiques or identifying research gap based on the study that is being conducted. Overall, a literature review varies from a book review. Systematic literature review is more structured and comprehensive (USC, 2023).

2.1 Purpose

There are few prominent reasons of doing a literature review. Firstly, to demonstrate a solid and precise knowledge of the title. Secondly, to distinguish specific field related to learning to avoid repetitive and to provide recognition to other researchers. Next, is to study on the discrepancies likewise the research gap, disputes form other related research and also open-ended questions that needs other researchers to ponder and justify reasons. Also, investigate the connection of works related and their contribution to the research title along with the need of additional research if it requires. Finally, prioritizing researcher’s very own research among the means of other existing literature, providing reasons or justifications why it requires additional learning (Work K.L., 2023).

2.2 Importance

A good literature review gives a good framework why the research is being conducted. For a literature review, there is a certain guideline to be adhered. Firstly, by identifying the questions for the research and the topic. A clear idea should be visualised before conducting the research as it eases the researcher on the literature review. Relevant literature should be collected in a form of a database for a better comparison and synthesizing. Attention should be given for the most recent articles. All articles pertaining to the topic should be 5 years ahead from the current year. This followed by analysing the sources, keywords, themes, strength and weaknesses. A literature review consists of an introduction, body and the conclusion. The

introduction is on the research question and the topic; the body is a comparison, analysing and synthesizing of literature reviews from various sources in a form of a database with a clearer version and final one would be a conclusion where it has findings to the research and an overview (Akverdi H., 2023). All these stages, if it is followed precisely, will give a comprehensive framework of literature review that will assist in research.

2.3 How it Defers from Other Types of Literature Reviews

There are vast differences among literature review, systematic or structured review and meta-analysis review in terms of methodology being used in identifying, evaluating and synthesizing the existing facts. Literature review is just a collection of articles that need to be paraphrased without any specific methodology. Systematic literature reviews use a particular methodology likewise identifying, comparing, analysing and synthesizing the evidence available from the resources. Another point to highlight is literature review is a summarise version of a certain topic whereas systematic literature review will be a synthesize of a few literature reviews based on the evidence provided and research question (Aimlay, 2023).

3.0 Comparative Analysis

There are obvious differences between Narrative Literature Review, Systematic Literature Review and Meta-Analysis Review.

3.1 Narrative Literature Review vs Systematic Literature Review

Narrative literature review is usually exposed to students who are pursuing their first degree. It does not focus on any research question. It is just with a research topic and students are to look for other related topics. There are no standard protocols for this type of literature review unlike systematic review. Narrative review is learning the problem but not looking at related problems from various articles. The steps are conducting a search based on the research topic. The search is done using different database to cover all the articles pertaining to the search with no means of neglecting. Disregarding any database will cause some important articles or journals to be missed which could be the main source of the research. Some of the famous databases are Scopus, ScienceDirect, Mendeley and PubMed. All this database will give 1000's of articles pertaining to the search but it should be narrowed using specific keywords. Identifying keywords or similar words will ease the search. After identifying, reviewing the search is vital as all repetitive sources can be erased to avoid any duplication. Then, the remaining articles' abstracts are reviewed and taken into account. The final stage would be interpreting the collection of articles and to be reviewed and documented into writing. References are made based on the articles. Document search need not to be documented (Makawana, et al., 2019).

Narrative literature review basically summarises the literature without a systematic and reproducible methodology. However, it is flexible and broad, and much useful for new and complex areas. Nonetheless, it can be subjected to biasness and prone to interpretive errors. Unlike systematic literature review which is an exhaustive and systematic search of literature, appraising and synthesizing evidence. This review caters for qualitative and quantitative unlike narrative only for qualitative. Research questions are clearer in systematic literature review as the narrative review the questions are general covering a wider scope. The search for systematic literature review is on published and unpublished materials. Narrative review

would be on a random search and does not cover all literature and requires no database. Papers are found according to researcher's priority which would be randomly chosen. Once again, systematic literature review usually states the type of study with a lot of descriptions to narrow down or limit the search unlike narrative review is more bias and not reported (UAB Libraries, 2022).

3.2 Systematic Literature Review vs Meta-Analysis

Systematic literature review is high level of overview based on primary research in connection to the research questions in an orderly manner in identifying, selecting, evaluating and synthesizing all highly qualified research facts pertaining to the questions for a logical answer. With this type of review, it produces an in-depth summary with high index literature reviews responding to research questions. This systematic literature review is produced by a panel of experts taking into consideration on all the evidence form published and unpublished journals. This review is initiated from biomedical study and presently on the decision making ground and behavioural practice based on evidence. Meta-analysis uses a combination of data on using statistical techniques based on individual study concurrently using pooled data to make a statistical overview. All meta- analysis practices systematic literature review but not necessarily all systematic literature review applies meta-analysis. The prime differences of this both reviews are systematic review focuses on the process which is selection, evaluation and synthesizing. As for meta-analysis, it is more on statistical based on all the data in a wider scope which means a combination of data from the systematic literature review by analysing and formulating the impacts and the consequences. The overview of meta-analysis is more intense than a sole research paper. Meta-analysis is typically used in biomedical science and social field. Conversely, there could be some limitation on the validity which may cause misleading information or results. Systematic reviews are more applicable in the medical field therefore majority of articles touches on this ground. Both reviews are significant as it produces high quality facts from primary sources in conjunction to the research questions (National University Library, 2023).

4.0 Methodology

For this search, the researcher used systematic literature review. Scopus was the database that was used for the search and also some parts from this search was taken from google. Scopus was used mainly to obtain a search based on the Research Question. The search was narrowed to 37 journals. There were 5 reviews, 1 conference and 1 editorial. The following ones were all articles. The keywords that were used were 'integrating, Artificial Intelligence (AI), Teaching and Learning.' The synonym for integrating is incorporating. For Artificial Intelligence, the abbreviation of 'AI' was used. As for the word 'teaching' similar words like pedagogy, educating and instructing were being used. Synonyms for 'learning' is 'acquiring, memorising, discovering, reading and studying.' The source titles that the researcher obtained from the search are from BMC Medical Education, Sustainability Switzerland, Smart Learning Environment, Computer and Education, Nurse Education Today, International Journal of Educational Technology in Higher Education, Journal of Chemical Education, Nurse Education in Practise and as the list goes on.

4.1 Inclusion and Exclusion Studies

Some criteria of inclusion are the application of Artificial Intelligence in Education field no matter in the field of medical or advertising as long as it is related to using AI in any education sector. Whatmore, the

inclusion criteria is related to some studies that were from the aspects of various education likewise nursing, technology, chemical and advertising. However, all these studies were in the base of education using AI. Secondly, the parameter that the researcher has set is the articles are extracted within the year 2023. The search covers 37 articles related to AI. For the exclusion, only 16 articles are taken into consideration for this research. The exclusion standard is on some search regarding AI that were not related to education were neglected. The search engine was set in such that any articles less than 2023 is not taken into account for the research albeit it is in education concerning AI. This is because the researcher wants the latest articles related to AI for better study. There were 37 related journals.

4.2 Data Extraction and Synthesizing

There were two articles concerning AI in medical field and university which have given the good side as well as the setback. An article titled ‘Advantages and Pitfalls in Utilizing Artificial Intelligence for Crafting Medical Examinations: a Medical Education Pilot Study with GPT-4’ claims that AI produces false accuracies when medical practitioner evaluated as it used outdated terminologies and was insensitive towards age and gender group (Klang, et al., 2023). In the article ‘Generative AI and ChatGPT in School Children’s Education: Evidence from a School Lesson’ relates to using ChatGPT 3-5 for preparing materials for different ability group which creates interest among pupils aged between 8-14 years. This method of instilling and motivating students in this era integrating AI increases performance. However, these instruments needed to be steered according to student’s ability to form a constructive and productive learning (Jauhiainen, et al., 2023).

In an editorial titled ‘The Challenges Imposed by Artificial Intelligence: Are We Ready in Medical Education?’, AI was found to be essential in medical field prioritising in education. AI is being used to rate or evaluate assessment of medical students. Therefore, positive feedbacks are given in view in this article (Azer, et al., 2023). Observing another article ‘Adoption of Artificial Intelligence in Science Teaching: From the Vantage Point of the African Science Teachers’ recommends teachers in-service and pre-service to be trained to use AI in classroom which can motivate students to learn. This article caters to teachers on their perception using AI in classroom learning for science subject (Nia C.O., et al., 2023).

Blended learning is integrated with the use of information and communication technology (ICT) that reflects on the reading performance in the article ‘Examining ICT attitudes, use and support in blended learning settings for students’ reading performance: Approaches of Artificial Intelligence and Multilevel Model.’ Pedagogies should cater students with the need of ICT with a user-friendly mode to have a better comprehension meanwhile focusing on the students learning abilities (Peng, et al., 2023). In the medical field, AI has become extremely handy in proving it can help nurses in the administrative issues, meanwhile nurses focusing on the wellbeing of the patients. In this article ‘Nursing Education in the Age of Artificial Intelligence Powered Chatbots (AI-Chatbots): Are we Ready Yet?’, this act depicts AI can be adapted by anyone without any special skills. It minimises nurses’ workforce and reserves energy for the improvement of the nursing sector. However, over reliance could create plagiarism as most of the nurses are going to overlap with the same source while minimising their creativity which could be a drawback. Therefore, everything should be done in moderation (Tam, et al.; 2023).

Publication also prefers latest technology to be incorporated for a higher index rate. Coding and extracting

data using AI for analysing in the article ‘Artificial Intelligence in Higher Education: the State of the Field’ has been an ease with the use of an application known as PRISMA. 138 articles were easily extracted without missing. New innovations were included with the rapid increase of AI in higher education learning. However, there was a research gap to include ChatGPT for a better outcome or results (Crompton H., et al., 2023). Comparing this article to another publication whereby they called upon scholars to submit their article compromising the use of AI in this new generation. This article ‘Virtual Special Issue Call for Papers: Investigating the Uses and Impacts of Generative Artificial Intelligence in Chemistry Education’ calls upon chemistry educators to assimilate AI in the classroom teaching which could be an exciting way of learning using tools like ChatGPT (Yuriev E., et al., 2023). Both these articles use ChatGPT to create excitement in classroom teaching and create convenience in extracting data for research.

Another interesting article relating to nursing in education integrating AI is ‘Student Nurses' Attitudes, Perceived Utilization, and Intention to Adopt Artificial Intelligence (AI) Technology in Nursing Practice: A Cross- Sectional Study.’ It encourages student nurses to apply AI in nursing particularly in coursework, experiential learning and training to expose themselves in familiarising AI technology. Enhancing the use of AI in education in nursing will gauge student nurses to introduce or practise it in health line services in the near future (Labrague, et al., 2023). In relation to other fields, AI is also being adapted by advertising industry or education sectors. This is to prepare the new generation to get familiar with the functions of AI which brings benefits to the industry. This was apparent in the article ‘Preparing for the New Era of Artificial Intelligence: My Experience of Teaching “Artificial Intelligence in Advertising”’. In house practice were given to boost understanding and exploring the technology with different concepts of applications in advertising (Yang J., 2023).

Observing this article ‘Artificial Intelligence in Sport Management Education: Playing the AI game with ChatGPT’ AI brings merits and demerits to the extend where it produces exact output for short answers nonetheless it is not applicable for all type of questions. (Keiper, et al., 2023). AI can never replace human but it only can minimise the work load or increase the effectiveness and productivity in a sector. However, AI should be operated by human which cannot be denied fully. This is apparent in the article ‘Challenges for Future Directions for Artificial Intelligence Integrated Nursing Simulation Education.’ Nurses still play an important role in the medical field but with the advancement of AI in nursing health stream becomes more advance (Jung S., 2023).

Nursing educators has the perception that with the use of ChatGPT emergence with technology helps in with conversations and creates opportunities and challenges. AI has some limitations however with the collaboration of both regulatory; nursing and the power to be, will assist to create framework on the significant of AI in nursing sector. Owing to this, both educators and students should welcome AI for innovations and have critical thinking skills to develop the noble professions in this millennial era (Castonguay, et al., 2023). The article on ‘Acceptance of Artificial Intelligence Among Pre-Service Teachers: a Multigroup Analysis’, states that pre-service teachers have different perception in integrating AI. This study also analyses how AI is accepted by different individual according to their importance. Different behavioural signs were manifested by individuals of pre-service teachers and the absorption of AI (Zhang, et al., 2023).

With the introduction of multiple types of technology and AI, studying outcome has improved rapidly. Indeed, it is convenient for the educators to fulfil their administrative task with the help of AI, also not forgetting to modify the content and curriculum catering to the students' needs. The advancement in AI with various techniques, increases students' performances (Nguyen et al., 2023). In this article 'The Knowledge and Innovation Challenges of ChatGPT: A Scoping Review' the quality of answers provided is not to the expectations. There is still a research gap to be analysed in the future. It also implies that the satisfaction rate of using technology, emerging innovations or ChatGPT still needed to be reviewed (Ali O., 2023).

5.0 Findings

Analysing the articles above, it depicts that ChatGPT is the most famous application of AI being used in almost all the industries or sectors. One of the most is the nursing and education sector. There is also bane in this AI as it manifests some faultiness and inaccuracies particularly in medical field among practitioner (Klang, et al., 2023). Also, to an extent AI can be modified and catered according to student's ability and this should be done by the educator in schools. It clearly defines AI still need the presence of human and some adjustments in certain field (Jauhiainen, et al., 2023). There are some cases where AI has reflected good performance among students which is constructive (Azer, et al., 2023). However, teachers need to increase their knowledge in learning and familiarising the use of AI in the daily task which could be challenging and time consume (Nja C.O., et al., 2023). As mentioned, student's abilities need to be prioritised to suit accordingly and to ease teaching and learning (Peng Y.; et al., 2023). Thus, AI can be convenient if there is not convergence of other sources or similar studies (Tam, et al., 2023).

Besides, with the advancement of AI articles were easily extracted without going through difficult search and not missing any one of that. However, ChatGPT can produce a better outcome in this scenario (Crompton H., et al., 2023). Moreover, incorporating AI in chemistry learning boost student's motivation which may directly increase performance with the use of ChatGPT (Yuriev E., 2023). Indeed, nursing students can be overwhelmed with the convenience of AI that ease their studies in many ways which can also further assist in the healthline industry (Labrague, et al., 2023). In the advertising line, students were given in house training to increase their understanding in attaining AI and had increased sales (Yang J., 2023). However, AI does not suit all types of questions. There should be human interference in some cases (Keiper, et al., 2023). To emphasis, AI cannot replace the nurse fully. It still need human for some reasons (Jung S.; 2023). All questions do not apply with the use of AI, some questions application of AI is impossible (Keiper, et al., 2023).

In another incident in an article, both support from the nursing field and the government is handy in creating guidelines that accepts innovations and critical thinking skills with integration of AI (Castonguay, et al., 2023). AI can always be modified according to their needs and priority (Zhang, et al., 2023). In fact, AI is beneficial to both learners and educators. The advancement of AI reflects performance in students results and also ease educators in administration (Nguyen, et al., 2023). As mentioned earlier, the use of AI still had its limitation. Therefore, it needs to be reviewed (Ali O., 2023).

5.1 Research Gap

The study compromises more on ChatGPT. There should be other types of AI that can focus on both short

questions and long answers. Inaccuracies in AI can cause complications in the medical field or in teaching industry. Therefore, errors should be minimised to increase the quality. AI should be user-friendly thus, even the senior workers who are still in workforce is able to adapt instantly with less tedious involve otherwise they may want to step down merely due to unable to adapt to the latest digital epoch. Furthermore, this research on AI in education is only taken in the year 2023 with only 16 articles included. Database used was Scopus as some of the others needed some fee for subscription. Hence, other articles could not be included in this review. Future studies to include articles within the 5 years for a better comparison and coverage for potential avenues.

6.0 Conclusion

This study is about the use of AI in education in school learning, university, advertising, sports and medical field. It uses a systematic review by summarising and synthesizing the articles. This study focuses on how AI assist students in their studies. For students from the medical field, it benefits them in their working environment as well. The applications used during hands on training can also be used at the work place. AI increases performance in school however, it needs human to operate some of the applications as everything cannot be justified by AI. Hence, it has minor limitations.

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