Freedom to Learn and Freedom to Teach in Science Learning through ChatGPT: Systematic Literature Review

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Abstract: Education is very important in preparing people to be able to maintain and improve the quality of life as individuals with dignity. The severity of the challenges faced in all fields can be seen from various kinds of reports such as student learning outcomes, the inability of the community to keep their children successful in educational institutions up to the age of compulsory education. The evaluation system, education management and what is most often highlighted by the mass media today is the problem of the concept of Freedom to Learn and Freedom to Teach in Science Learning through ChatGPT. The purpose of this study is to examine Freedom to Learn and Freedom to Teach in Science Learning. A review is conducted on the state-of-the-art methods using the preferred reporting items for reviews and meta-analyses (PRISMA) guidelines. The results of this study can be seen from the aspects of affective learning and teaching models, learning methods, and self-learning methods sharing for information can facilitate the learning process in the independent curriculum, using the help of ChatGPT technology which functions to provide easiness in the process of achieving education. As part of modern technological innovation, ChatGPT has an impact on the world of education. Schools, teachers, and students can benefit from this artificial intelligence technology. ChatGPT can be a useful learning partner in implementing the Independent Curriculum.

Keywords: ChatGPT; Freedom to teach; Learning; Science

Introduction

Freedom to learn is one of the initiative programs of the Minister of Education and Culture (Medikbud) who wants to create a fun learning atmosphere. The purpose of this independent learning is to make teachers, students, and parents have a pleasant learning atmosphere. The concept of independent learning according to the Minister of Education and Culture can be interpreted as the application of the curriculum in the learning process which must be fun and can also hone the development of creative and innovative thinking by teachers. This can foster a positive attitude of students in responding to learning (Pinahayu, 2017). The meaning of independent learning is to explore the greatest potential of teachers and students to innovate and improve the quality of learning independently.

Apart from that various things can be done to apply AI in learning activities. The times are growing, demanding all fields including education to adapt and collaborate to solve problems. ChatGPT has the potential to offer a variety of benefits, including increasing student engagement in lectures, collaboration, and broad accessibility of learning resources (Javaid et al., 2023). However, this tool also raises various challenges and concerns, especially those related to honesty, academic integrity, and plagiarism.

The world of Indonesian education has entered a new chapter with the implementation of the Independent Curriculum by the Indonesian Ministry of Education and Culture in 2022. In simple terms, this

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curriculum aims to free the curriculum from dependence on textbooks, so that schools and teachers can develop a more relevant curriculum. This development can also be adjusted to the needs of the community or stakeholders as users of the services of the graduates that will be created later. So, recently the world was shocked by the emergence of artificial intelligence technology, the AI language model, namely ChatGPT.

Of the various benefits provided by ChatGPT, librarians can use ChatGPT to search for information sources, create search strategies, paraphrase, synthesize information, and make citations and bibliography. Four tips in dealing with information obtained from ChatGPT, namely verifying any information obtained from credible sources, consulting with supervisors or lecturers, acknowledging or quoting information obtained from ChatGPT, and entering ChatGPT as a source in the Bibliography (Dwivedi et al., 2023).

In 2020, Teaching in Higher Education published a paper by Stephen Finn entitled 'Academic Freedom and choice of Teaching Methods' (Macfarlane, 2021) in which the author argued that professors' freedom to teach should be limited concerning teaching methods. In adopting this position, Finn provides a conventional interpretation of the freedom of teaching in terms of protecting university professors who present or discuss controversial issues in class. He argued that the choice of teaching method should be determined based on educational effectiveness rather than personal preference as this would not compromise the professor's freedom to teach in any way. I think that teachers should be required to teach in a certain way and that such requirements are not a violation of academic freedoms.

Based on the background above, the purpose of this study is to examine Freedom to Learn and Freedom to Teach in Science Learning

Method

We conducted this study as a systematic review following PRISMA guidelines. The PRISMA guidelines provide several things to consider when preparing a systematic review. In this study, we will mainly focus on several main items: namely Encouraging students to think creatively and critically and Facilitating teachers in

delivering learning materials. According to a report from the World Economic Forum (WEF) published in October 2020, the educational need for Virtual Reality technology will reach 70 percent by 2025. This proof has been carried out in many countries in the form of university scientific research and independent research. Therefore, the Virtual Reality method for Future Education: A review will also be carried out in this study.

Result and Discussion

We conducted this study as a systematic review following PRISMA guidelines. The PRISMA Guidelines provide several points to consider in preparing a systematic review. In this study, we will mainly focus on a few main items: ChatGPT; freedom to Teach; learning; and science This helps form the basis of our assessment. Initially, we collected the latest studies on Freedom to Learn and Freedom to Teach in Science Learning through ChatGPT, based on selected keywords. Then, we apply eligibility criteria to the collection. We only selected literature published in 2017 or later to provide an overview of current trends. In addition, we limit the type of literature, namely only literature in the form of journals and proceedings.
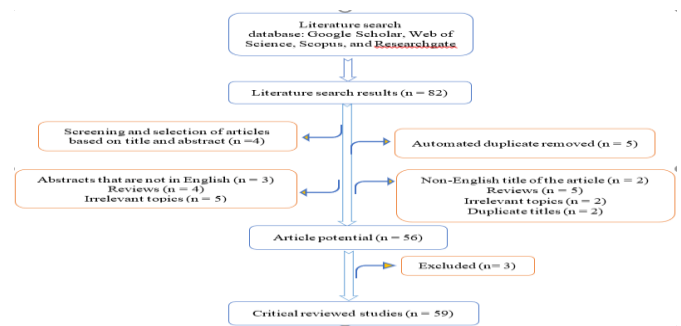

Figure 1. Flow Process literature search based on PRISMA guidelines

Complete articles published in international journals in 2017-2023, indexed in the database, and themed Complete articles published in international journals in 2017-2023, indexed in the database, and themed Freedom to Learn and Freedom to Teach in Science Learning via ChatGPT.

Table 1. Learning and Teaching

Sources	Three aspects of Learning and Teaching models
(Bamidis, 2017); (Casey & Fernandez-Rio, 2019); (Teraoka et al., 2021); (Darling-Hammond et al., 2020); (Wu & Huwan, 2022)	Affective
(Weinstein et al., 2018); (Ruiz-Martín & Bybee, 2022); (Aljabreen, 2020); (Zhu et al., 2021);	Cognitive
(Asih, 2019); (Plummer et al., 2021); (Alonso-Vargas et al., 2022); (Shaker, 2018)	Psychomotor

From Table 1 can are Three aspects of Learning and Teaching models Affective is the interaction of teachers and students as the main meaning of the teaching process which plays an important role in achieving teaching goals. Cognitive is defined as a theory among learning theories which understand that learning is organizing cognitive and perceptual aspects to gain understanding and Psychomotor is the development of assessment tools which are often considered difficult where the teacher must prepare appropriate assessment instruments such as observation sheets.

Table 2. Independent Learning Curriculum

Sources	Method parameters in the independent learning curriculum
(Wang, 2021); (Virk et al., 2022); (Trullàs et al., 2022); (Landøy et al., 2020)	Problem-based learning method
(Hirsh et al., 2022); (Yang et al., 2023); (Almulla, 2020); (Wörner et al., 2022)	Experimental method
(Ten Cate, 2017); (Zhang et al., 2020); (Engels et al., 2021); (Olulowo et al., 2020)	Peer teaching method
(Dejene, 2019); (Kandiko Howson & Kingsbury, 2021); (Trinter & Hughes, 2021); (Li et al., 2019)	Design method

Table 2 it can This Problem-Based Learning is a learning method to solve a problem in a group way. In this method, students are required to think critically and selectively. In addition to giving students an understanding of tolerance and listening to different opinions from other people. In the experimental method, the goal is to prove to students that this material is true by proving it through experiments. Students more fully accept this method, because it is not only taught in theory in class. This experimental method makes students people who have high curiosity. This peer teaching method further reactivates how groups work, discuss, and present and then teach the results of the discussions to their classmates. After that, allow other friends to ask questions. The design method activates knowledge, attitudes, and skills into a unified method and is carried out by creating a project individually or in groups.

Table 3. Self-Study and Self-Teaching Methods in Science Learning

Sources	Self-study and self-teaching methods in science learning
(Diem Le et al., 2021); (Pokojová & Bártlová, 2018); (Laato et al., 2020); (Abbas et al., 2022)	sharing information
(Gerrard, 2020); (Levy & Moore Mensah, 2020); (Stern, 2017); (Hanson et al., 2023);	Learn from experience
(Tan et al., 2023); (Schneider et al., 2022); (Yuan et al., 2019); (Chimentão Punhagui, 2019)	Learning through Problem Solving

From Table 3 Independent Learning Methods Sharing information (Information Sharing) in a way, brainstorming (brainstorming), cooperative, collaborative, group discussions (group discussions), panel discussions (panel discussions), symposiums, and seminars. Learn from experience (Experience Based) using simulations, role-playing, games, and meeting groups. Learning through Problem Solving (Problem Solving Based) using Case studies, tutorials, and workshops. The SCL method is now considered more in line with current external conditions which are a challenge for students to be able to make effective decisions about the problems they face.

Table 4. ChatGPT

Sources	ChatGPT function in Science Learning
(Cooper, 2023); (Stojanov, 2023)	Generating text
(Grassini, 2023); (Forman et al., 2023)	Language understanding
(Montenegro-Rueda et al., 2023); (Haleem et al., 2022)	Dialogue systems
(Liu et al., 2023)	Language Translation
(Hassani & Silva, 2023); (Ritala et al., 2023)	Text summarization
(Ellis & Slade, 2023); (Tlili et al., 2023)	Text completion

The function of ChatGPT in Science Learning is to generate text: ChatGPT can be used to generate text that fits the given context. For example, it can be used to write short stories, and articles, or answer questions in text form. Language understanding: ChatGPT can be used to understand the natural language spoken by the user and extract relevant information from the received text. Dialogue systems: ChatGPT can be used to develop chat systems, such as virtual assistants, that can answer questions and complete tasks assigned by users. Language translation: ChatGPT can be used to translate text from one language to another. Text summarization: ChatGPT can be used to simplify long and complex texts into easy-to-read summaries. Text completion: ChatGPT

can be used to complete missing or incomplete text rendered.

Conclusion

The world of Indonesian education has entered a new chapter with the implementation of the Independent Curriculum by the Indonesian Ministry of Education and Culture in 2022. In simple terms, this curriculum aims to free the curriculum from dependence on textbooks, so that schools and teachers can develop a more relevant curriculum. This development can also be adjusted to the needs of the community or stakeholders as users of the services of the graduates that will be created later. So, recently the world was shocked by the emergence of artificial intelligence technology, the AI language model, namely ChatGPT.

Author Contributions
Conceptualization, L. S., K. T. N., R. R., S. M., A. N. I., A. E., A. E. P., Y. S.; methodology, L. S.; validation, K. T. N and R. R.; formal analysis, S. M.; investigation, A. N. I and A. E.; resources, A. E. P and Y. S.; data curation, L. S.: writing—original draft preparation, K. T. N and R. R.; writing—review and editing, S. M.: visualization, A. N. I and A. E.; supervision, A. E. P.; project administration, Y. S.; funding acquisition, L. S. and Y. S. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest
The authors declare no conflict of interest.

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