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Social media-based learning in Chemistry learning: A review

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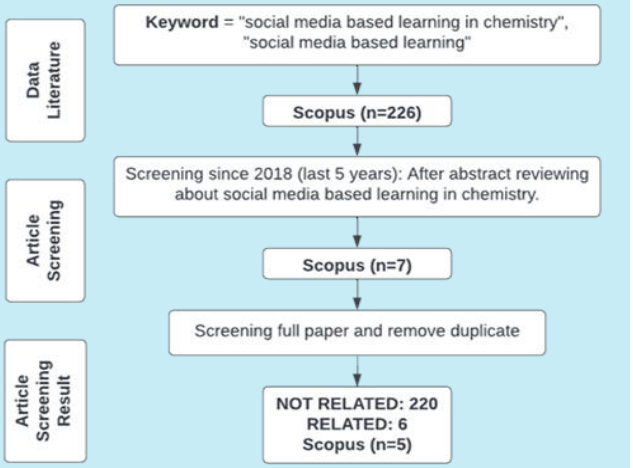
ABSTRACT: Social media-based learning can involve students in open, competitive, and running learning according to the speed of each understanding. This study aims to examine empirical articles about social media increasing the motivation to study chemistry for high school and undergraduate students using the Systematic Literature Review method, namely, to identify, analyze, and interpret findings on research topics published from 2018 to 2022. Five articles were identified through the publish or perish search engine using Scopus databases. The articles studied reviewed the effect of using social media in learning. The results of the study focused on the use of social media in chemistry learning which can increase student motivation for both high school and undergraduate students.



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1. Introduction

Today, the Internet has become a lifestyle for most people in the world, with the current world population of over 7.7 billion and Internet users being 4.4 billion. The field of education has gained many new approaches to improve learning, one of which is social media-based learning. Social media-based learning can involve students in intense, open, competitive learning, and can do problem-solving with enthusiasm where students can discover new things in a relaxed and informal atmosphere but at the same time stay focused and motivated (Zdravkova, 2016). This is highly expected in a learning process where students can be more motivated and enthusiastic in participating in learning. Social media-based learning can also change students from passive learners to active learners so that learning can be student-centered (Ziegler, 2007). The above benefits can of course be achieved with the help of social interactions fostered by students, students' technological knowledge, and the role of the teacher to manage and control class activities (Rinda *et al.*, 2018).

The active role of students in the learning process has direct involvement with the learning model applied by educators. This is often found because students often experience an atmosphere and enthusiasm for learning that does not absorb and accept the material presented by the teacher. High school chemistry teaching materials have many concepts that are quite difficult for students to grasp, making many students less confident in understanding the material because it is abstract, simplified from the actual situation, sequential, and tiered (Lutfi and Hidayah, 2021).

Learning science, especially chemistry in schools using social media-based learning models, is an effective method to improve explanation and understanding of basic chemistry topics (Fosu *et al.*, 2019). The use of appropriate learning methods and strategies by educators will determine a good and effective chemistry learning process (Sari *et al.*, 2017). Previous research has shown that the use of social media in learning has a positive effect on student-learning and can increase self-efficacy so that many researchers continue to develop social media-based learning media by using various features in it (Hayes *et al.*, 2020).

Based on research conducted by Danjou (2020), social media-based learning can allow each student to progress at their own space because the material can be accessed anytime, anywhere, and can be watched/viewed many times. Research conducted by Smith (2014) on chemistry learning showed that involving students in creating chemistry video content keeps them enthusiastic and helps to develop their creativity and communication skills.

A literature review conducted by Beemt *et al.* (2020) with the topic of increasing students' understanding of the use of social media in the learning process states that the role of social media in learning is to motivate students and to increase transparency in communication (internal and external), assessment and evaluation. However, this can be achieved if the teacher as educator also has good technology skills.

Various kinds of content designs and social media features are designed in chemistry learning, such as DingTalk and WeChat, which are proven to make learning activities interesting and can be used to attract students' attention in the classroom (Xiao *et al.*, 2020). In another study that mentions the use of technology-based learning tools, the content presented aims to help students interact in the management experience by learning skills and knowledge to improve literacy (Hight *et al.*, 2021). Literacy in reading is very important so that students can explore a lot of reading sources that support the subject matter provided by the teacher (Putri *et al.*, 2022).

This research has been conducted so that it may become the latest research trend regarding social media-based learning that can be applied to chemistry material for both high school and undergraduate students. Therefore, the research objectives and appropriate learning methods will provide an overview of the interest in this social media-based research. The learning outcomes that social media-based learning researchers will emphasize are the focus of the current review. Thus, the main research question that the study seeks to answer is: Can social media increase motivation to study chemistry for high school and undergraduate students?

2. Experimental

The method of writing a journal review in searching for literature data using a Systematic Literature Review, which is a method that has stages of identifying, evaluating, and interpreting findings and is used to answer predetermined research questions (Shay and Lafata, 2015). In this review, the Scopus database was used to obtain social media-based learning research articles, using the publish or perish software.

In this study, the data used with the keyword "social media-based learning in chemistry" with a journal publication time span of 2018–2022 (last 5 years). After the application was run, the researcher read the title and abstract of the article to select articles that met the following inclusion criteria: 1) Articles about social media-based learning in chemistry learning; 2)

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Publication of reputable, accredited, and full-text articles. This study has exclusion criteria, namely articles not related to social media-based learning in chemistry learning as well as articles published before 2018.

The search results found 226 articles related to the related topics studied. Then, reselection was carried out based on inclusion criteria so that 7 articles were obtained. Furthermore, the data were sorted by assessing and considering the suitability of the research topic, abstract, and research content in order to obtain 5 articles that met all the requirements.

The article search process described above can be seen in Fig. 1.

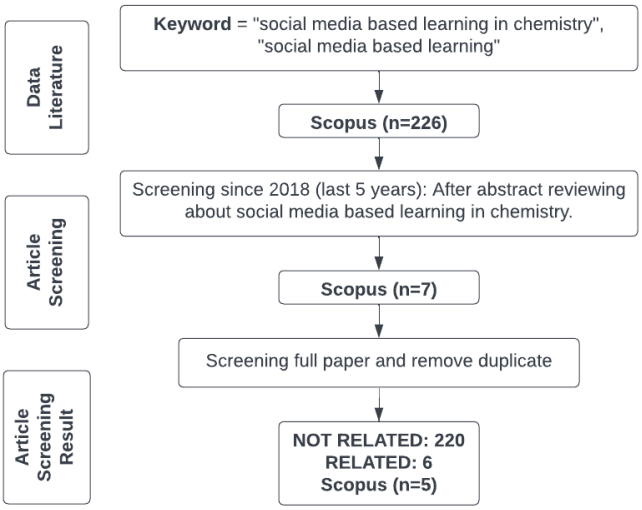

Figure 1. Search flowchart.

3. Results and discussion

The analyzed results of the review research focused on the influence of social media use in learning in senior high schools and undergraduate colleges.

Literature study information in terms of abstracts, background, research questions, objectives, methods, and research results are presented in Table 1. Of the 5 articles reviewed, 1 article was published in 2018, 1 article was published in 2019, 2 articles were published in 2020, and 1 article was published in 2021. The following chemistry learning materials that can be applied to social media-based learning can also be seen in Table 1.

Based on Table 1, the results of research in social media-based chemistry learning can be said to be effective and able to increase the motivation to study chemistry. The participation of students in making videos can in fact increase the enthusiasm for learning so that it can have a positive effect on student learning outcomes, which is in line with the research results of Hight *et al.* (2021). However, this literature review found a gap between the possible learning experiences of students on social media and the learning outcomes or learning focus they assessed.

Two important aspects that have not been discussed in this research are: how social media content is designed and implemented; and that diversity and innovation in compiling social media content that is easy for students to understand is very important and should play a very important role in making learning effective and more interactive.

Table 1. Social media-based learning.

Author	Use of social media	Results
Hurst (2018)	Learning chemistry using the Snapchat platform, especially the Story feature to share things related to chemistry in everyday life.	Snapchat can be used to engage students in chemistry by contextualizing the subject matter in the real world together by giving students insight into the research and living environment, especially in chemistry. Based on the data obtained from the research, it is known that 83% of the 59 respondents said they felt more engaged with chemistry because of Snapchat.
Fosu *et al.* (2019)	Students are asked to publish their study results using the Twitter application	From the survey, it appears that students have a positive perception of the use of social media for studying chemistry. About 83 (61.48%) students strongly agreed that social media can be a good platform to support the learning of chemistry. Based on their posts, it is evident that students found the social media platform to be a convenient medium for learning, and even wished that the platform was frequently used for teaching. Students reported that using Twitter helped in their understanding of the material.
Danjou (2020)	Chemistry learning is carried out asynchronously and synchronously. Synchronous sessions were carried out with the teacher sharing learning videos via Facebook so that students can access them anytime and anywhere.	Learning becomes more efficient because teachers do many alternative technologies in learning. Based on data, 95% of respondents think that the use of videos visible on Facebook is more suitable for exercise solutions explanation without requiring more effort than for live explanation. From the activities that have been carried out, students feel enthusiastic about learning chemistry.

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Hayes et al. (2020)	Innovative video creation and posted on the TikTok app with the aim of introducing the audience that chemistry is fun.	The video that was made was successfully watched 8,500 times and managed to attract visitors by 82.7% of the initial number.
Hight et al. (2021)	Making creative chemistry learning videos using TikTok.	From the research conducted, it is proven that the involvement of students in making learning videos can increase students' understanding of the material that will be made later.

4. Conclusions

The results of research in social media-based chemistry learning can be said to be effective and able to increase the motivation to study chemistry. The effectiveness of a social media platform in increasing the motivation to study chemistry for high school and undergraduate students has its own advantages and disadvantages, so the decision regarding the use of learning media lies in the mastery skills of the teacher to apply media, especially social media in learning. There are many types of platforms that can be applied in learning chemistry such as Twitter, Instagram, Facebook, YouTube, Discord, and many more. The characteristics of the right platform are that the platform can support learning outcomes both in the short and long term.

Social media has the potential to connect a broad knowledge into small parts that can be separated. How students perceive and what can be utilized from this different social media-based learning experience needs further exploration.

Authors' contribution

Conceptualization: Widarti, H. R.; Rokhim, D. A.
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Formal Analysis: Sriwahyuni, T.
Funding acquisition: Not applicable.
Investigation: Not applicable.
Methodology: Sriwahyuni, T.
Project administration: Widarti, H. R
Resources: Rokhim, D. A.
Software: Not applicable.
Supervision: Not applicable.
Validation: Not applicable.
Visualization: Sriwahyuni, T.
Writing – original draft: Widarti, H. R.; Sriwahyuni, T.; Rokhim, D. A.; Syafrudin, A. B.
Writing – review & editing: Widarti, H. R.; Sriwahyuni, T.; Rokhim, D. A.; Syafrudin, A. B.

Data availability statement

All data sets were generated or analyzed in the current study

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