JPPIPA 9 (Special Issue) (2023)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

Exploring the Revolutionary Potential of Contextual Approach in Increasing Students' Interest in Learning Chemistry

Dwiani Ratna Sari[1*], Syaza Syahana[1], Lisya Asmiati[1], Elma Pujiana[1], Suyanta[1]

[1] Master of Chemistry Education, Faculty of Mathematics and Natural Sciences, Yogyakarta State University, Yogyakarta, Indonesia.

Received: October 13, 2023
Revised: November 27, 2023
Accepted: December 25, 2023
Published: December 31, 2023

Corresponding Author:
Dwiani Ratna Sari
dwianiratna.2022@student.uny.ac.id

DOI: 10.29303/jppipa.v9iSpecialIssue.4710

Abstract: Chemistry is considered an abstract discipline, characterized by many concepts that make students uninterested in engaging in its learning. One approach to stimulate interest is through the application of contextual learning, where acquired knowledge is applied in a practical context. The purpose of this journal review is to provide insight into the implications of using contextual approaches in chemistry education, particularly about fostering student interest and engagement in the subject matter. The research design used in this study was a systematic literature review using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) as a tool and guide for evaluating articles. The search for articles published in Scopus and Web of Science using the selected keywords: contextual approach, learning interest, and its extension based on the selected PICO framework. Based on the search results, 50 articles were obtained to be analyzed. Findings from diverse data consistently show that the application of contextual or everyday learning approaches contributes to increasing students' interest in learning, especially in the chemistry domain. Students' interest in learning chemistry has a significant influence on their learning outcomes, motivation, and critical thinking levels. This is because the greater the student's interest in learning chemistry, the stronger the curiosity and understanding of the subject matter. When students have a strong understanding of the subject matter, their critical thinking skills and chemical learning outcomes improve.

Keywords: Chemistry; Contextual approach; Learning interest

Introduction

Education has an important role in the progress of a nation because of its function in changing and developing individuals for the better and developing. Therefore, the challenge of low quality education is a problem faced in the world of education. Overcoming this, various efforts have been made to build and develop the potential of education in accordance with the development of increasingly modern times (Supriadi et al., 2020).

Based on the Bill on the National Education System Sisdiknas Year 2022, the purpose of national education is to educate the nation's life, form a religious society, uphold diversity, democratic and dignified, advance civilization, and improve the welfare of humanity physically and mentally.

The importance of education must be in line with the increasing ability of students in learning. The implementation of learning is one of the main factors in education. The success of students is highly dependent on the role of the teacher in carrying out learning activities in the classroom (Sanjani, 2020). The teacher not only acts as a provider of subject matter, but also acts as a facilitator and motivator for students so that learning objectives can be achieved properly.

Chemistry is seen as a process and a product. Chemistry is a branch of science that studies the composition, properties, matter, and changes in matter (Yulita, 2017). Chemistry is obtained through experiments to answer questions about what, why, and how natural phenomena occur. Therefore, chemistry teaches about specific phenomena that occur in substances and everything related to substances,

How to Cite:
Sari, D. R., Syahana, S., Asmiati, L., Pujiana, E., & Suyanta, S. (2023). Exploring the Revolutionary Potential of Contextual Approach in Increasing Students' Interest in Learning Chemistry. *Jurnal Penelitian Pendidikan IPA*, *9*(SpecialIssue), 285-293. https://doi.org/10.29303/jppipa.v9iSpecialIssue.4710

including the composition, structure, properties, transformations, dynamics, and energetics of substances. An understanding of chemistry involves the development of logical thinking skills and abilities. Based on the material and nature of chemistry, chemistry is abstract learning and the need for the implementation of an appropriate learning process in order to achieve learning success.

The success of students is not only seen from the selection of books or learning tools, but can also be carried out with approaches, strategies, and learning models that are in accordance with the material to be taught (Sanita et al., 2020). The approach refers to the method used by a teacher to convey messages or material to students in the learning process (Hidayah et al., 2019). Approaches are very important to use in learning, because by using the right approach in learning, it is hoped that students will be able to find and exercise their potential optimally (Broman et al., 2022). To prevent learners from feeling afraid or shy, learner involvement and participation is very important during the teaching and learning process. However, learners will not be able to develop their abilities if learning is only teacher-centered. When learners can participate in the learning that takes place, their interest in learning will be seen. Learners' learning achievement increases when they are involved in the lesson, but when they are not involved in the lesson, learners' achievement decreases (Muchtar et al., 2020). Because they have been accustomed to using only mathematical formulas and the implementation of learning that is absract, students usually have difficulty in understanding and solving problems. The contextual approach is one of the methods that can be evaluated for problem solving, influencing the correct understanding of concepts, and relating to everyday life.

Contextual learning approach or known as CTL is an approach that encourages teachers to be more innovative in connecting the material taught with the real world situation of their learners (Asrizal & Utami, 2021). This approach can also encourage learners to make connections between what they know and how it can be applied in everyday life (Nursyahraini et al., 2020). The application of learning with a contextual approach is expected to help students to foster interest in learning which will have an impact on learning outcomes (Sapulete et al., 2023)(Whatoni & Sutrisno, 2022). This can be seen from the results of previous research on the use of contextual approaches in the implementation of learning. The results of previous research prove that the implementation of learning by using a contextual approach to the Scaffolding learning model can improve students' mathematical critical thinking skills (Sunaryo & Fatimah, 2019)(Suryawati & Osman, 2018). Other studies also provide good results from the application of contextual approaches when implementing learning, where the application of contextual approaches can provoke students' thinking in increasing students' interest in learning (Maisaroh et al., 2020). The contextual approach based on local culture also has many advantages, including: increasing achievement, increasing interest in learning, and increasing students' appreciation of mathematics (Sulistyawati et al., 2020).

The contextual approach in chemistry learning introduces a new paradigm that shifts the focus from mere conceptual understanding to practical application in everyday life. In contrast to conventional approaches that are often theoretical and detached from contextual reality, this approach allows students to see the practice (Yani et al., 2021). The value of learning chemistry directly is an innovation in the field of chemical education that can stimulate student interest by connecting chemical concepts with real-world phenomena that they experience daily (Handayani et al., 2021).

The increasing complexity of global challenges, such as climate change, energy crisis, and environmental health, requires future generations to have a strong understanding of chemistry and the ability to apply it in a practical context. However, there is a tendency for declining interest in chemistry among learners, which may be due to the lack of relevance between the material taught and their daily lives. Therefore, an innovative and contextual approach is needed to stimulate interest in chemistry so that it can affect students' achievement, learning outcomes, creative thinking and critical thinking.

This research is important to facilitate teaching staff in choosing the right approach to increase students' interest in learning chemistry. In addition, this research can also help other researchers to read the interpretation of the analysis results and map the relationship between keywords in augmented reality.

Method

Research Design

The research design used in this study is a *systematic literature review*. A systematic literature review is a research method that identifies, evaluates and interprets relevant research results related to the topic of interest (Setyaningtyas et al., 2022). This systematic literature review is carried out by collecting information or sources on a particular topic using various sources such as journals, books, the internet and other literature (Sari & Asmendri, 2018). This systematic literature review is based on articles published between 2013 and 2023, fully readable in PDF format and scholarly (peer-reviewed journals). Research designs related to this

scientific inquiry are experimental research, mixed research, surveys, cross-sectional studies.

Literature Search Strategy

This study used the *Preferred Reporting Items for Systematic Reviews and Meta Analyses* as a tool and guide for evaluating research in systematic reviews or meta-analyses. The flowchart of PRISMA was applied in the procedure of selecting research articles for publications relevant to the research question and was conducted in four stages. Finding articles on the implication of contextual approach to increase interest in learning chemistry begins with the research question by developing PICO with Patient/Population (P): learners; Intervention (I): contextual approach; Comparison (C): - Contextual approach; and Outcome (O): contextual approach can increase learning interest. The search for publication articles was carried out on Scopus and Web of Science in accordance with the inclusion and exclusion criteria which will then be analyzed for each journal.

Data Synthesis

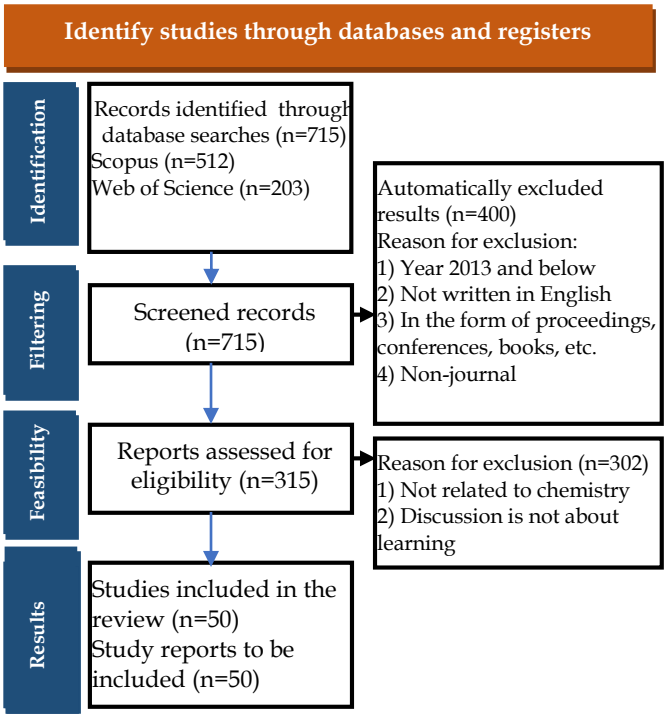

Figure 1. Flowchart Detailing the Application of PRISMA 2020 to Published Studies between 2015 and 2021

Searching for publication articles on scopus and web of science using keywords related to learning interest and contextual approaches that have been carried out with keyword expansion. The results of the initial identification will proceed to the screening stage to select the desired articles and continue at the feasibility stage by looking at the procedure, design, and content which will get the final result or journal to be analyzed. The literature research is extended with bibliometric analysis and evaluation using the help of VOS viewer which aims to further analyze the research trends in the influence of contextual learning approaches in improving interest skills.

Result and Discussion

The implementation of learning will be conveyed to students if the students are interested in learning (Rukmana & Salirawati, 2024). Learning interest in the learning process is one of the most important factors, this is because the greater the interest of students to study chemistry, the greater the curiosity and understanding of chemistry learning material (Fandakova & Gruber, 2021)(Ten et al., 2021). When students have understood the material, their critical thinking skills and chemistry learning outcomes will also increase. This statement is in line with previous research, that interest in learning is directly proportional to student learning outcomes (Nurhasanah & Sobandi, 2016).

The contextual approach has characteristics and various advantages so that it is expected that by applying contextual learning it can increase students' interest in learning chemistry (Milanto et al., 2023). There are seven characteristics in the contextual approach, namely: (1) constructivism, (2) inquiry, (3) questioning, (4) modeling, (5) learning community, (6) reflection and (7) authentic assessment (Sugandi & Bernard, 2018). A context-based learning approach can result in overall content acquisition and increased interest in the classroom (Sevian et al., 2018). The contextual approach is not a teacher-focused approach, but rather a learner-focused approach that will be able to better explore the ability of students on the topic of material to be taught. The implementation of context-based learning also has a significant impact on the development of problem-solving skills, motivation, attitudes, improved test scores and learner achievement (Broman et al., 2018)(Magwilang, 2016)(Ulusoy & Onen, 2014). CBL can teach learners to think at a higher level when there is new knowledge in different contexts, this requires learners to be able to better identify problems in learning chemistry.

The review article does not focus only on the contextual approach, but looks at the contextual approach broadly. One of the focuses is the implementation of learning that connects material to everyday life. There are several other models and approaches that involve students to connect the material learned with events that occur in everyday life, such as: socioscientific issues, Chemo entrepreneurship

approach, problem-oriented socio-critical approach, context-based chemistry course and ethnoscience-based contextual collaborative learning.

This article review is strengthened by looking at the latest trends in the implementation of learning using contextual approaches. This visualization was conducted on 50 articles that had been selected based on the inclusion and exclusion criteria. Visualization is done using VOS vierwer by looking at the keywords of each article. The visualization results using VOSviewer can be seen in Figure 2.

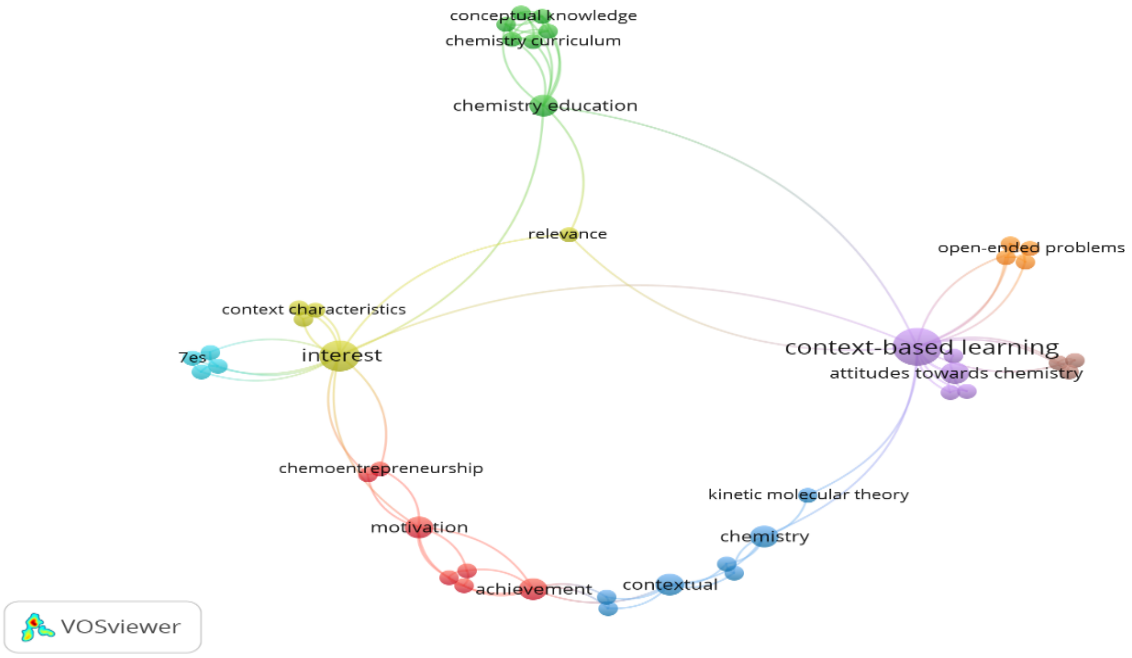

Figure 2. Results of VOSviewer Network Visualization

Based on Figure 2. it can be seen that the keyword distribution data from 50 articles related to contextual approaches with high school students' chemistry learning interest there are 117 keywords with the most keywords found in context-based learning and learning interest. The keywords of each journal are key in seeing trends in problems or fields that are the center of conversation at that time. To see the trend based on the year can be seen in Figure 3.

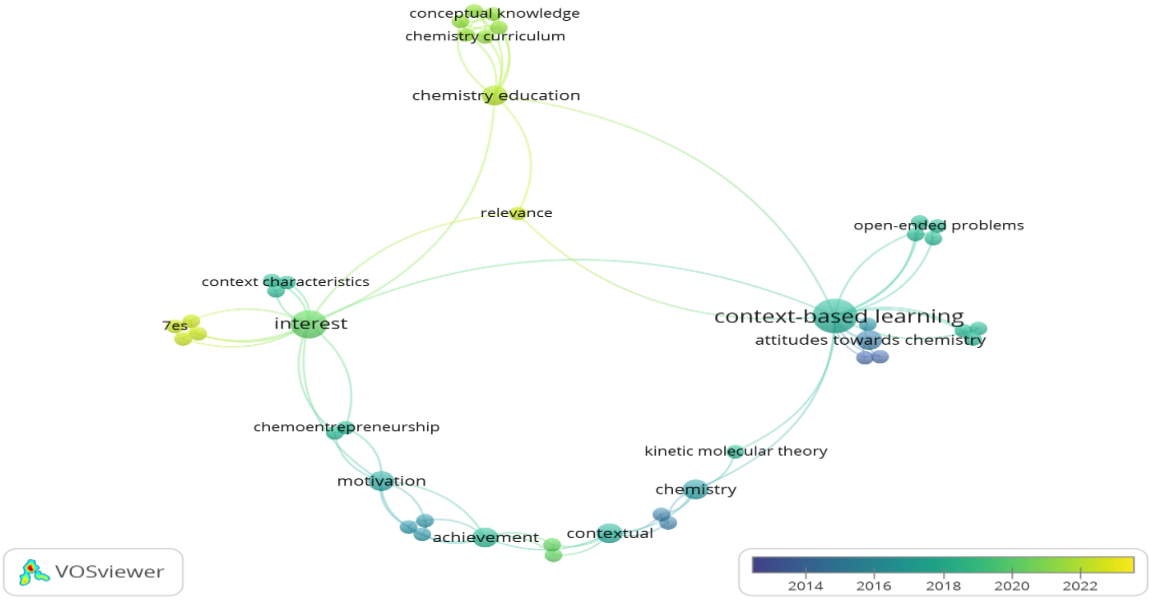

Figure 3. Results of Overlay Visualization

Based on Figure 3. we can know the year of journal release from 2013-2023 related to interest in learning chemistry and contextual learning approaches. The results obtained there are journals that discuss contextual learning in 2018-2020 and for learning interest in 2020-2022. Although it has become a trend topic in the past 4 years, the issue of interest in learning chemistry is still a problem today. One way to overcome it is by implementing appropriate learning implementation. The contextual approach not only focuses on personal interest, but can also increase students' situational interest. An unsupportive learning environment, no connection between chemistry material and real life, the subject matter studied in chemistry is very much the root of the problem of students not being interested in learning chemistry. The results of seeing interest in learning chemistry after the implementation of contextual learning by measuring using the RIASEC model get the results of students with low interest prefer learning tasks related to everyday life, while students with high interest prefer tasks related to situations, which are not part of everyday life (Habig et al., 2018). The difference is because students who have a high interest in chemistry will have learned more about chemistry and know the relationship between chemistry and the surrounding environment, so they will like learning more that they just know.

Science literacy is also one that is related to students' interest in chemistry. The implementation of the context approach can increase students' science literacy. The increase can be seen from the comparison results of the experimental and control groups. Comparison of context-based approach (CBA) with traditional instruction (TI) got higher CBA results with an overall score of 32.97, while TI scored 26.79 (Cigdemoglu & Geban, 2015). A comparison of teaching between two approaches was also carried out between Context-Based Chemistry Course (CBCC) and traditional teaching and found that implementing CBCC learning was more effective in improving student learning outcomes than traditional learning (Ilhan et al., 2016). This statement is supported by the results of research by Ade Mutia et al., (2020) which looks at the effect of implementing a guided inquiry learning model with a contextual-based approach (CBA) on chemical literacy has much better results than the control class. One of the causes of the low results of the control class compared to the experimental class is due to improper implementation of learning so that it affects students' interest in learning chemistry.

The implementation of learning cycle 5E (LC 5E) with socioscientific issues (SSI) has increased the average learning outcomes from 68.96 to 74.95 (Cahyarini et al., 2016). The occurrence of this increase is apart from the application of the LC 5E model syntax, it is also due to the application of socioscientific issues. Socioscientific issues are representations of issues or problems related to social problems that occur around society or in everyday life which include concepts and technology and their relation to science or the material being taught (Mudawamah, 2020). The results of this study indicate that socioscientific issues can increase interest which will have an impact on learning outcomes. There are similarities between socioscientific issues and the contextual approach, namely in terms of the application of learning that connects material with social issues in society or everyday life. In addition to SSI, the implementation of learning that relates to social issues is also found in critical social and problem-oriented approaches. This critical social approach also involves social issues that become problems in the surrounding life. The socio-critical and problem-oriented approach can be used as an alternative approach in implementing applicable and contextualized chemistry learning, this is because it can improve critical thinking skills, motivation, and student involvement in the chemistry learning process (Purwanto et al., 2022)(Ilyas & Liu, 2020). Motivation and critical thinking are also things that really need to be achieved in the implementation of learning, this can strengthen the use of CTL in the learning process because it has a very good impact on the sustainability of students (Sarwinda et al., 2020).

Chemistry is a subject that is closely related to everyday life, this will make it easier for teachers and students to identify chemistry topics with lessons in everyday life. The implementation of local culture-based learning can also increase students' interest and insight. Ethnoscience learning involves the establishment of a learning environment designed by considering culture as an integral element in the educational process at school (Imansari et al., 2018). The implementation of contextual learning based on ethnoscience has increased the capacity of science literacy content, process, and attitude of students (Dewi et al., 2021).

In addition to ethnoscience, the implementation of experiments or direct demonstrations to students with materials in the surrounding environment also affects interest and learning outcomes (Rahmawati & Kamaludin, 2023)(Flaherty et al., 2017). There is an increase in concept understanding, motivation and quality of students produced when learning with experiments is carried out (Vinko et al., 2020)(Baunsele et al., 2020). This is because students are directly involved in the experiments carried out so that they are interested in trying and students can design, carry out and draw conclusions independently which affects concept mastery. Learning is not only done in a formal environment, but the non-formal environment also affects learning interest. Making chemical designs or

projects by directly involving someone or visitors in the implementation of experiments is one way to attract someone's attention. The Explore Science: Let's Do Chemistry project that was piloted in the museum received results in increasing interest, self-efficacy and relevance to chemistry (Anderson et al., 2021). CIPI (Cooperative Integrated Process Inquiry) with the CEP (Chemo entrepreneurship) approach is a solution in connecting chemistry learning with everyday life that will benefit from the results of the process carried out. The results of learning can produce products that have selling value so as to attract interest and the usefulness of the material taught. The percentage of students' entrepreneurial interest increased from 47.64% to 51.17%; 72.16% and 81.10%. In addition to entrepreneurial interest, learning motivation also increased from 49.55% to 56.08%; 68.21% and 76.32% (Sumarti et al., 2018).

Based on the analysis of 50 journals related to the context approach to students' interest in learning, it can be seen that students prefer and are interested in learning in real life, because they can imagine directly without abstract forms. As for the advantages of the contextual approach: learning is more meaningful and real, learning centers on the activeness of students, stimulates students to participate actively, provides freedom of ideas, fosters self-confidence, encourages independence and initiative of students and learning is more productive (Nurmawarni, 2019)(Sukra, 2016)(Bujuri & Baiti, 2019).

Conclusion

Based on the results of the review of 50 articles and other supporting literature, it can be concluded that the contextual approach can increase students' interest in learning, especially in chemistry lessons. The implementation of learning that links the topic of learning material with events in everyday life will be able to make students better understand the material being taught, so that it has an impact on increasing students' interest in chemistry. Growing students' interest in chemistry is very necessary, this is because increased interest will be directly proportional to learning outcomes, motivation, self-efficacy, relevance and the level of critical thinking of students.

Authors Contributions

Conceptualization; D. R. S & S. S methodology; L. A & E. P., analysis; S., writing—original draft preparation; D. R. S. Revised: D. R. S., S. S., L. A & E. P., visualization: S. All authors have read and agreed to the published version of the manuscript.

Finding

This research was independently funded by researchers.

Conflicts of Interest

There are no conflicts or interests.

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