



Impact of Physics Learning to Improving Learners' Generic Science Skills: A Review

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Abstract: This study is a Literature Review article that aims to identify the most effective learning model to improve the generic science skills of learners in physics learning. A search of literature study articles obtained as many as fifteen articles that met the inclusion criteria and were relevant for review. The results of the research show that many learning models can be applied in physics learning to improve the generic science skills of learners. The findings show that the most effective guided inquiry learning model for improving students' generic science skills was characterized by the achievement of learners' scores of 91.00.

Keywords: Physics learning; Generic science Skills; Literature review.

Introduction

The Public Education Index was one of the indicators of the country's progress. Developed countries are characterized by the level of education and the ability of people to follow the development of science and technology (Doyan, *et al.* 2022). Schools as a forum to provide education to the community provide an important role to support the progress of the country. In schools, people can learn many things, including gaining and honing their skills (Susilawati, *et al.* 2021).

One of the subjects prepared by schools throughout Indonesia is physics. Physics is one of the branches of science. In essence, implementing learning is expected to positively impact increasing knowledge, attitudes, and skills (Doyan, *et al.* 2021). The implementation of education should produce outputs that are not enough only armed with knowledge, but in addition to science, students must also be equipped with skills that in this case have generic science skills.

The implementation of comprehensive learning in Indonesia still has problems. This problem is proven by

the results of the Programme for International Student Assessment (PISA) survey in 2018 showing that the Indonesian state is far behind other countries, namely at the rank of 71 out of 79 participating countries (Hewi & Saleh, 2020). Another thing shown in the report card of public education at the national assessment at the SMA/SMK level and equivalent throughout Indonesia shows that efforts to improve the quality of learning carried out by teachers are still sporadic only to complete teaching and learning tasks that are carried out repetitively.

The outcome of learning is largely determined by the quality of learning implementation. The better the activity in learning, of course, the more learning outcomes achieved by students will be maximized. To encourage the implementation of the quality of learning, teacher skills are needed in carrying out learning with various learning models that were under the characteristics of the learning material and the results to be achieved (Susilawati, *et al.* 2022). The form of achievement of learning outcomes is very varied not only limited to the cognitive realm but learning

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outcomes are also expected in the form of improving generic skills of science.

Generic science skills are basic science skills that can be developed through learning. Generic science skills have the advantage that they can be applied to learning concepts and solving problems in science (Doyan, *et al.* 2022).

Academics and practitioners in education have made various efforts to improve the generic science skills of learners. Among the efforts made is to carry out learning using various innovative learning models such as guided inquiries (Nurjanah, *et al.* 2021), the use of interactive media (Nida, *et al.* 2019), and various other learning models.

The application of these various learning models shows various discoveries. So that the author takes the initiative to review various articles that have been published so that it can be seen the various advantages and disadvantages of the model, approach, and/or learning strategy can be used as the right choice to carry out the next learning.

Method

This research is a literature study or literature review of the results of research that has been published in various journals. This literature study is limited to

physics learning articles that impact learners' generic science skills. The reviewed article includes two criteria: inclusion and exclusion (Wicaksono, 2020). The inclusion criteria are articles relevant to physics learning to improve the generic skills of science, while the exclusion criteria are articles that are incompatible with physics learning despite the resulting impact of generic science skills and the article is not accessible to the overall text. The reviewed articles were obtained from various National journals and International journals related to the teaching of science to improve the generic skills of science. The articles were accessed via the internet on the search pages of google scholar, Science Direct, and Research gate. Kata key used learning physics, and generic skills of science. Researchers also limit the reviewed article, which is the article of the last five years, namely from 2018 to 2022.

Result and Discussion

The results of searching for articles in various national and international journals researchers received several 15 articles that met the inclusion criteria. All of the article search results relevant to the generic skills of science learners in physics learning the authors summarize in the Table 1.

Table 1. Results of a search for learning models, approaches, methods, and/or strategies in improving generic science skills.

Researchers	Article Title	Achievement of Generic Science Skills
Sungkawaningtyas, 2018	Improvement of Generic Science Skills and Science (Physics) Learning Outcomes with a Learning Cycle 5e Model Accompanied by Experimental Methods in Grade Ix-c Students of SMP Negeri 1 Beji	78.13
Damayanti, <i>et al.</i> 2019	Effectiveness of Horizontal Resonance Tube-Assisted Inquiry Learning Model against Students' Science Generic Skills	81.07
Doyan, <i>et al.</i> 2019	Development of Interactive Multimedia Physics Through a Scientific Approach and Its Effect on Learning Outcomes and Generic Science Skills of Students	71.20
Hakim, <i>et al.</i> 2019	Thermodynamics Interactive Multimedia to Improve Physics Prospective Teacher's Generic Science Skills	75.58
Nida, <i>et al.</i> 2019	Implementation of Interactive Multimedia in Core-Based Physics Learning against Students' Generic Science Skills	85.94
Sari & Ahmad, 2019	Enhancing Generic Science Skills in Solar System Materials through Assisted Learning solar system scope applications for junior high school students	80.80
Anggraeni, <i>et al.</i> 2020	Use of Physics Learning Modules Based on Guided Inquiry of Dynamic Fluid Materials against Generic Science Skills	70.00
Halim, <i>et al.</i> 2020	Effect of Inquiry Learning Methods on Generic Science Skills Based on Creativity Level	75.83
Jannah, 2020	Improving Generic Science Skills of Physics Education Study Program Students Through Experiments on Learning Physics Media and Teaching Materials	43.63
Khoiri, 2020	The Effectiveness of Using Props with Inquiry Learning Models to Improve Generic Science Skills in Class X High School Motion Kinematics Materials	84.51
Rahmayanti & Connie, 2020	The Effect of Team-Assisted Individualization Learning Models on Students' Understanding of Concepts and Generic Science Skills	71.71
Yulianingsih, <i>et al.</i> 2020	The Influence of Guided Inquiry Learning Models on Students' Generic Science Skills on the Subject matter of Momentum and Impulses of Class X Science, Muhammadiyah Jayapura High School, Academic Year 2019/2020	72.61

Researchers	Article Title	Achievement of Generic Science Skills
Nurjannah, <i>et al.</i> 2021	Development of PhET Media-Assisted Guided Inquiry Model Learning Tools to Improve Problem-Solving Ability and Generic Science Physics Skills of Learners	91.00
Masyitrah, <i>et al.</i> 2021	Effect of Predict Observe Explain (POE) Learning Model on Generic Science Skills On Simple Harmonic Vibration Matter	58.50
Sudianah, <i>et al.</i> 2021	Generic Science Skills Through a Learning Model of Conceptual Change in Learners' Optical Tools Material	90.33

Based on Table 1, it was found that the lowest average grade point for science generic skills improvement was 43.63. The low increase is due to students not being used to learning with experiments and not being used to being trained in their generic science skills (Jannah, 2020). While the highest value of generic science skills that have been discovered by researchers is 91.00, the acquisition shows that the improvement of generic science skills is most effectively carried out by conducting learning with a guided inquiry model.

The application of the guided inquiry model is effective in improving learning outcomes including generic science skills because this learning model provides more opportunities for learners to make further questions and investigations so that they can indirectly train students' generic science skills (Pramudyawan, *et al.* 2020; Susilawati, *et al.* 2020).

The generic skills of science in learning can be measured using several indicators, namely logic consistency, causal calculation, direct energy, logical intelligence, basic compliance logic framework, indirect algorithm, mathematical modeling, and symbolic modeling (Jiniarti, *et al.* 2019).

Conclusion

Based on the literature studies that have been carried out, it has been obtained that the learning models that can be applied in physics learning are very diverse, one of the most effective learning models in improving the generic skills of learners' science is the guided inquiry learning model.

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