International Journal of Language Pedagogy
Vol. 4, No. 2, pp 138-149, November 2024
E-ISSN 2777-1229, P-ISSN 2797-1783
DOI: https://doi.org/ 10.24036/ijolp.v4i2.81

NEEDS ANALYSIS OF GROUP-DISCOVERY LEARNING MODEL TO IMPROVE THE 21ST CENTURY SKILLS OF HIGH SCHOOL STUDENTS

Trisna Helda[1)], Atmazaki[2)], Erizal Gani[3)]
[1)]Universitas PGRI Sumatera Barat, [2)3)]Universitas Negeri Padang
[1)2)3)]Jl. Prof. Dr. Hamka, Air Tawar Padang, Sumatera Barat
*Corresponding Author, email: trisnahelda4@gmail.com

Received: September, 25, 2024 Revised: November, 29, 2024 Accepted: November, 30, 2024

Abstract

The is a part of research and development of a learning model that emphasizes a combination of discovery learning and group learning to develop 21st century skills in learning Indonesian for senior high school students, called the Group-Discovery Learning model. This research begins with the needs and context analysis, literature review, and conceptual theory development. This type of research is quantitative. The research data was obtained by conducting interviews with 12 teachers and distributing questionnaires to 112 students from two schools (SMAN 7 Padang and SMAN 8 Padang). Data about the problems commonly faced by students and teachers as well as their needs to improve the 21st century skills in the Indonesian language learning process in high schools were obtained. The results of the needs and context analysis show that the competence of 21st century students is still relatively low in learning Indonesian, but has great potential. The literature review revealed that the Group-Discovery Learning model can improve students' critical thinking, creative thinking, collaboration, and communication. Also, it can gain overall knowledge. These findings indicate that the development of the Group-Discovery Learning model can be a solution in accommodating high school students to develop 21st century skills in learning Indonesian.

Keywords: Learning Model, Group-Discovery Learning, The 21st Century Skills, Indonesian

Introduction

Students must have communication skills to deal with changes in the paradigm of life in the 21st century, in addition to the ability to think critically, collaborate in group performance, be creative and innovative, and have digital literacy skills (Care & Kim, 2018; Chiong & Jovanovic, 2012; Trilling & Fadel, 2009; Wrahatnolo & Munoto, 2018). Communication skills are useful for students to identify accurate sources of information, add new knowledge, and make information additional knowledge for their self-development. However, a survey conducted by NACE (National Association of Colleges and Employees) found that 67.5% of students had low communication skills. That is, they have difficulty processing information, integrating their thoughts, and adapting to the environment (Wood & Hartshorne, 2017).

Schools in Indonesia are expected to help students improve their 21st century skills. However, students in Indonesia are struggling to acquire the skills they need to compete in the 21st century. This is shown by the results of the OECD Program for International Student Assessment (PISA) released in 2022 that was down compared to the result of PISA reading 2018 (Education GPS, 2024). The average score of Indonesian students in the reading literacy section was 359 points (lower than the OECD average score, which is 476. This shows that Indonesian students were not able to understand basic reading skills and unable to think critically about concepts (Alberida, 2019). Indonesian students did well in understanding one text, but had difficulty understanding multiple texts. Indonesian students

were good at finding information, evaluating it, and reflecting on it, but lacked at understanding information. From PISA 2018 it was also reported that the ability of 21st Century students in critical thinking, analysis, problem solving, collaboration, information literacy, media literacy, and ICT literacy is still low. In response, the government re-implemented the 2016 Curriculum (Alberida, 2019).

Based on the findings above, to improve student's 21st Century skills requires teachers to implement student-centered learning models that help them construct subject matter so as to improve their Indonesian learning outcomes (Atmazaki, 2009). One model that can help is Discovery Learning which was developed by Bruner and is based on students' ability to find something through a structured and well-organized inquiry process. This is in line with Siregar in Ilahi (2012) who argues that Discovery Learning is a learning process that allows students to find things related to their own difficulties in learning.

Indonesian language subjects at schools aim to improve students' ability to communicate, both orally and in writing. Argaw (2019) states that students who learn Indonesian must be skilled in communicating so they are able to formulate ideas, thoughts and scientific arguments in a responsible and academic ethical manner, and communicate them through the media to the academic community and the wider community (Saputro, 2020). One of the most important components in communicating is speaking skills. Usually, students (Indonesian children) are very fluent when communicating outside of school, but when they are asked to speak in front of the class, their fluency will decrease. Students are not used to expressing opinions clearly and completely in communicating both orally and in writing. Learning aspects of speaking have not been fully mastered by students (Hidayat, 2021). This resulted in students with lack of confidence when appearing in front of the class, feeling nervous when expressing opinions, afraid of being wrong, and feeling embarrassed (Permana, 2016).

By studying aspects of speaking, students who learn Indonesian will become more confident when appearing in front of the class, and better in expressing their opinions effectively and responsibly (Argaw, 2019). One of the most important aspects of effective communication is being able to speak clearly and confidently. This often does not happen to Indonesian children when asked to communicate in front of the class. This lack of fluency can cause students to feel nervous, afraid of being wrong, and embarrassed (Saputro, 2020). This includes teaching them how to form ideas, thoughts and scientific arguments in an academic and ethically responsible manner, and to communicate these ideas through the media to the academic community and the wider community (Permana, 2016).

Eggen and Kauchak (2012) emphasized that for learning in the 21st century, both teachers and students need to have strong communication and collaboration skills, creative and innovative thinking skills, and problem solving skills. However, to keep up with the times, teachers must be able to use technology in their lessons, and students must be able to learn using new, better learning models. The Discovery Learning model is an example of a new enhanced learning model.

However, the Discovery Learning model also has weakness, which is not effective for everyone. Some students are unable to pay attention to the entire learning process, and this can make it difficult for them to understand the material. According to Jones (2017) basically, every teacher expects that the material being studied can be accepted as a whole by students. However, in reality not all learning materials can be understood and mastered by students. Teachers must understand that the characteristics of their students are different, in terms of interest, potential, intelligence, and effort in the learning process. That is, not all students can carry out the learning process using the discovery-based learning model.

To overcome the weaknesses of the Discovery Learning model, the Group Investigation learning model will help strengthen the Discovery Learning model by encouraging student participation and activity. This will help train students to develop thinking skills. Active student involvement can be seen starting from the first stage to the final stage of learning. This Group Investigation Model can foster student creativity so that learning becomes more fun. Students will get direct learning experience in groups. Group Investigation learning model is a cooperative learning strategy in which students work in a small group to research (investigate) a learning topic (Kagan,

2009). Several research results have shown the successful application of the Group Investigation learning model.

The discovery learning model allows students to remember information. It can also be used to condition students to develop higher-order thinking skills (such as HOT, scientific thinking), and make them independent when solving problems (Sari, 2020; Hardianti, 2015; Wijayanti, 2015), meanwhile, students can become individualistic with their own findings. High-ability students may not want to share their findings with low-ability students, which can create gaps in the class. The group learning model on another hand, is effective in inviting students to work collaboratively and share their findings. Nevertheless, group learning can be more time consuming and lead to gaps within the classroom (Svinicki, 1998; Balim, 2009; Saab, 2005). From the advantages and disadvantages of discovery learning and group learning, these two models can complement each other, so that the Group-Discovery Learning model needs to be developed.

Based on the background of the research problem above, this study can be formulated as follows: What kind of Group-Discovery Learning model do high school students, who take Indonesian language subjects, need to improve 21st century skills?

Methods

This study uses a descriptive qualitative method to determine the initial needs of the learning model used in Indonesian language subjects in high schools. The research data are in the form of interview results obtained from 12 Indonesian language teachers and 112 students from two schools in Padang City (SMAN 7 Padang and SMAN 8 Padang) and curriculum analysis scores and learning devices. The needs analysis was carried out on students and teachers using an interview guideline sheet. Then the analysis of the curriculum and learning devices used by the teacher was developed with the following grid; 1) analysis of learning achievements, 2) analysis of teaching modules, and 3) analysis of learning resources. The results of the needs analysis are useful as a basis for creating a prototype of the Group-Discovery Learning model.

The activities carried out in the initial research consisted of three stages, namely; 1) context analysis and needs; 2) theoretical and concept analysis; 3) design of the theoretical and conceptual framework. This is shown in Table 1.

Table 1. Stages of Initial Research Regarding Teacher's and Student's Needs

Research Analysis	Activity Description
Context analysis and needs	1. Gather information about the description of the learning model used by high school students 2. Gather information information regarding the competency level of 21st century students is carried out by high school students 3. Gather information about the potential for group-discovery learning of SMA students
Theoretical and analysis of concepts	Analyze theories and concepts related to the Group-Discovery Learning model to improve students' 21st century skills in learning Indonesian in high school.
The design of the theoretical and conceptual framework	Designing the conceptual framework and theoretical framework of the Discovery-Group Learning model to enhance students' 21st Century Skills in learning Indonesian

Result and Discussion

The activities carried out in this initial research consisted of three stages, namely; 1) context analysis and needs; 2) theoretical and concept analysis; 3) design of the theoretical and conceptual framework. The following stages of this research can be seen as follows.

1. Needs and Context Analysis

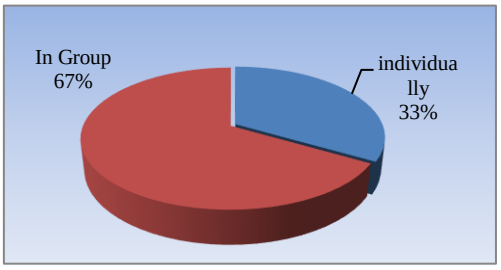
The results of the interviews provide information on important matters that are relevant to the needs of the research sample. This is shown in Table 2.

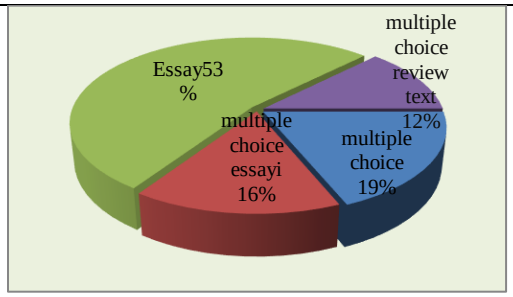
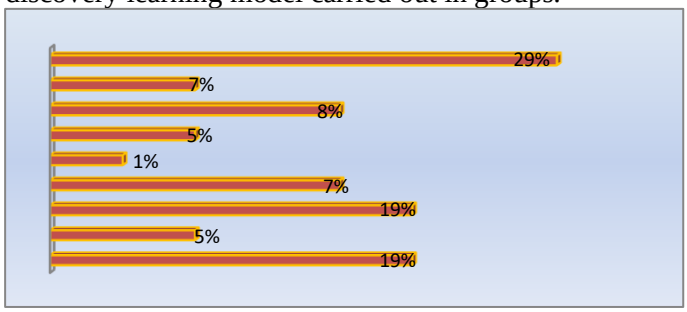
Table 2. Indonesian Language Teacher Interview Results

No	Aspects	Interview Results
1	Implementation of Learning	It takes a learning model that fits the characteristics of students, namely understanding and practicing learning concepts by finding knowledge in groups.
2	Characteristics of students in Indonesian language subjects	It takes a learning model that is able to facilitate students who have heterogeneous characteristics. Using the discovery learning model in groups will help all students understand the material more clearly.
3	Graduate Profile	It takes a learning model that is oriented to a discovery in groups.
4	Curriculum	A learning model is needed that can optimize mastery of the material and is in accordance with the character of graduates.
5	Teacher Role	A learning model is needed that accommodates the teacher's role as a guide, co-worker and motivator in learning.
6	Suggestion	• A learning model is needed that helps students to increase their creativity, apply collaborative and creative learning to find something in the learning process. • Model products are packaged in such a way as to have high appeal, using a language structure that suits potential users, using fonts and layouts that refer to existing book standards, using graphic and color illustrations that are capable of presenting concepts. • Model products have clear targets/goals, the components of the preparation are relevant to the substance of learning. • Using multiple choice tests and essays as an evaluation system • Several choices of teaching materials for trials; a) based on the level of difficulty/ease of concept, the options are: observation reports, exposition texts, negotiating texts; b) based on the level of coherence of the structure of the material: procedural text, explanatory text, c) based on the attractiveness of the concept: drama and writing scientific papers. • Adapting the learning model to the independent learning curriculum • Learning model products can be used wherever students study

A summary of the questionnaire responses to the student's character needs obtained from the results of the questionnaire and the follow-up results of the Group-Discovery Learning model are in Table 3.

Table 3. Summary of Student Needs

No	Response	Follow-up
1	Discovery learning conducted in groups is expected to: • Be precise and easy • Master learning as a whole • Work together well • Be able to cover learning activities well • Facilitate the exchange of ideas and information • Make students active • Communicative	Be a reference for model support systems
2	Learning involves the active role of students in groups and the role of teachers as guides.	Be a reference for the reaction principle
3	Teacher reactions in learning that students want: • Giving good feedback/response • Giving detailed explanations on the application of findings • Responding well to student activities • Appreciating every student's findings • Managing the class well • Being patient in explaining material that is not yet understood • Guiding students in learning • Evaluating learning	Be a reference for the reaction principle of the Discovery-Group Learning model
4	Conducive learning environment for students: • A collaborative learning environment • A learning environment with more interaction • A social learning environment that can help the learning process • A fun learning environment • A mutually beneficial learning environment • A learning environment that creates a spirit of learning	Be a reference for the social system of the Group Discovery Learning model
5	Choice of learning methods preferred by students  The graph above shows that the majority of respondents chose group learning, namely 67%, and 33% chose individual learning.	The criteria that apply as a reference for the social system of the Group Discovery Learning model are taken from the most popular student choices: group learning.
6	Choice of test questions for mastery of the material desired by students:	The majority of respondents chose the essay form of questions to be used to see students'

No	Response	Follow-up
	 The graph above shows that the majority of students choose the essay question format to measure their knowledge ability, namely 53% of the total number of students.	knowledge in learning.
7	The choice of the form of Indonesian language learning material that students want to apply in implementing the discovery learning model carried out in groups.  1. Short story text 2. Fiction and non-fiction 3. Explanation text 4. Exposition text 5. Procedure text The graph above illustrates that the majority of students want to apply the learning material, namely short story texts, to be applied in the Discovery-Group Learning model.	The Indonesian language learning material for students to be applied in the Group Discovery Learning model is short story text.

Based on student responses to the needs analysis questionnaire reported in table 3 above, the researcher obtained an overview of the information as a reference for the development of the Group-Discovery Learning model. The collection of student responses was redacted into social systems, reaction principles, support systems, evaluation systems and material topics when implementing the Group-Discovery Learning model.

2. Data from Curriculum Analysis results

The learning implementation plan (RPP) for the analyzed Indonesian language can be seen in the appendix. The summary of the results of curriculum analysis in lesson plans is explained in Table 4 below.

Table 4. Results of the Analysis of the Indonesian Language Lesson Plans

Aspects of Assessment	Results of Observation and Analysis RPP	Follow Up
Conformity of format with Regulation of the Minister of Education and Culture Number 22 of 2016 concerning Process	The school identity already exists and is complete	Stay and be a reference
	Learning Objectives already exist	Stay and be a reference

Standards for Elementary and Secondary Education	Media, materials and learning resources already exist	Stay and be a reference
	The learning steps already exist	Stay and be a reference
	The important points of learning material already exist	Stay and be a reference
	Assessment of learning outcomes already exists	Stay and be a reference
Learning Objectives are described in the attainment of attitudes, knowledge and skills.	It's there, but it's not complete	Developed
Learning objectives are described by bloom taxonomy groups	Yes, but not yet clear about the groups	Developed
Indicator	There isn't any yet	Additions were made
The learning steps describe the preliminary, core and closing activities	It already exists, but not yet varied	Developed
Assessment of learning outcomes (assessment)	It already exists, but it is not yet complete with an assessment rubric	Developed
Learning Experience	The details are there, but not yet relevant to 21st Century skills	Developed
21st Century skills assessment	The details of the criteria and forms of assessment do not yet exist to measure 21st Century skills indicators	Additions were made

Learning Implementation Plans (RPP) for Indonesian subjects in the Learning Objectives component need to be described in terms of achieving attitudes, knowledge and skills as shown in table 4, this is done because the realm of knowledge, skills and attitudes has not yet led to learning outcomes and 21st Century skills outcomes Thus it is necessary to add learning indicators. Likewise the learning steps in describing the preliminary, core and closing activities as well as the assessment of learning outcomes need to be developed. Identity, media, materials and learning resources already exist and important points in the material have not been changed and remain a reference in the development of lesson plans based on the Group-Discovery Learning model.

Next, the results of the analysis of the Indonesian language evaluation system are explained in the following table.

Table 5. Results of the Analysis of the Indonesian Language Subject Evaluation System

Assessment Aspects	Results of the Assessment and Analysis of the Evaluation System for Indonesian Language Subjects	Follow-up
Learning objectives	Evaluation tools are relevant to learning objectives, but not yet fully relevant to the achievement of 21st Century skills	Become a reference in measuring 21st Century skills
Assessment rubric	All of the evaluation tools are accompanied by an assessment rubric, but the daily and weekly assignments do not provide details on the scoring criteria	Become a reference in measuring 21st Century skills
Learning Evaluation Tool	1) Structured tasks a. Questions at the end of the material	Assessment techniques can

	b. Weekly tasks 2) Group activity assessment rubric 3) Group report assessment rubric 4) UTS and UAS questions	be adopted in this study

3. Conceptual Framework Development

The development of the conceptual framework of the Group-Discovery Learning model refers to the results of literature studies and curriculum and context analysis. The conceptual framework developed includes; characteristics and objectives of the Group-Discovery Learning model and the components of the Group-Discovery Learning model (syntax, support systems, social systems, reaction principles, instructional impacts and accompanying impacts). An explanation of the development of each component of the model that has been adapted to the study of the results of the literature as well as the results of the needs and context analysis are described in table 6 as follows.

Table 6. Discovery Learning Effects

Competence	Research
Creativity	Aditomo dkk., 2013; Duran & Dökme, 2016; Fuad dkk., 2017; Cinta dkk., 2015; Madhuri dkk., 2012; Marshall dkk., 2017; Wartono dkk.,
Critical thinking	2018 Arsal,
Collaboration	2017; Chen dkk., 2018; Duran & Dökme, 2016; Fuad dkk., 2017; Furtak dkk., 2012; Ham & Myers, 2019; Hong dkk., 2019; Kaiser et al., 2018;
Communication	Cinta dkk., 2015; Margunayasa dkk., 2019; Marshall dkk., 2017; Minner dkk., 2009; Wartono dkk., 2018
	Aditomo dkk., 2013; Bevins & Harga, 2016; Chen dkk., 2018; Ham & Myers, 2019; Cinta dkk., 2015; Sinha dkk., 2015; Xing dkk., 2019 Aditomo
	dkk., 2013; Bevins & Harga, 2016; Chen dkk., 2018; Ham & Myers, 2019

Group Learning Components. Components of group learning that can increase competency according to some researchers can be described as in table 5 below

.Table 7. Components of Group Investment Learning

Component	Research
Identification of Topics and Group Arrangements (Grouping)	Mitchell, M.G., Hilary, M.C.H., & Stuart, D. 2008; Sutama, 2007; Tan, I.V.C., Sharan, S., & Lee, C.K.E. 2007;
Cooperative Planning (Planning)	Yacob, GM., Lee,C., & Ng,M.1997; Tan, I.V.C., Sharan, S., & Lee, C.K.E. 2007; Ericae, 2006. C; Dumas, A. 2006.
Implementation (Investigation)	Khatoon, T. & Mahmood, S. 2010.
Analysis and Synthesis (Organizing)	Muin, M. A. 2015; Mcdregor, D., 2017; Joyce. (2018)
Presentation of Final Results (Presenting)	Kaiser et al., 2018; Cinta dkk., 2015; Margunayasa dkk., 2019; Marshall dkk., 2017;
Evaluation	Kiely, R. & Dickins, P. 2005; Guba, E. & Lincoln, Y.. 1981; Richards, J.C. 2001

4. The Design of the Theoretical and Conceptual Framework

The classical syntax of the Discovery-Group Learning model is developed from the steps of the Discovery Learning model designed by In'am and Sitti Hajar, (2017); Orr, (2016); Saab (2009); Thomas & Trapp (2007) and the theory of the steps of the Group Investigation model designed by

Tsoi, et al (2004); Tan & Lee (2007). A detailed explanation of the grand design syntax of the Discovery-Group Learning model can be seen in the following table.

Table 8. Grand Design Syntax of the Discovery-Group Learning Model

Theory Source	Grand Design Explanation
Group Learning (discovery learning) by Thomas & Trapp (2007)	Frame the problem: 1. The teacher invites students to understand the nature of the problem to be solved, consistent with recommendations for the right problems involving students with challenges. 2. Students learn new problems and the teacher provides the necessary motivation to learn these new skills. Explore for solutions: 1. The teacher creates a suitable environment in which students can experiment with solutions that will solve the movement challenges presented. 2. Students experiment with solutions, the facilitator must move among students, observe their behavior, and provide the necessary encouragement and feedback to keep students focused on finding solutions to the challenges that have been given Report back with solutions 1. Students reunite after the experiment they found with their colleagues. 2. Through skillful questioning, the group leader distills the solutions identified by students and highlights reasonable solutions. Adjust our thinking and motor plans 1. Students develop their frame of mind based on experiential learning cycles, because the solutions recognized by students are criticized, perfected, and improved before moving to the final stage. 2. The group leader needs to facilitate group discussion to identify agreements and disagreements, and distill wisdom into shared solutions to create a synthesis of ideas that can be tested at a later stage. Learn by testing the new solutions 1. The teacher encourages students to apply their learning to new contexts or situations. 2. The range of solutions identified in the previous step is tried out by students. Student representatives demonstrate the results of their trials and solutions from other students in the group need to reinforce the correct findings when students test new solutions.
Discovery learning oleh Saab (2009)	Orientation 1. The teacher presents events or phenomena that allow students to find problems. 2. Students manage information from teachers and add from other sources to construct concepts (knowledge), and use information to complete findings. 3. The teacher gives questions / which stimulate students to think and act to complete the findings. Hypothesis generation 1. The teacher guides students to make questions, choose questions that are appropriate to learning activities. 2. Students formulate hypotheses. 3. Students think of alternative answers or propose answers.

	4. Students process data to try and explore their conceptual knowledge competencies. Hypothesis testing 1. Students can prove the hypotheses that have been formulated previously. 2. Students collect data and literature according to their findings. 3. Students can interpret their findings. Conclusion 1. Students interpret the data obtained from the findings. . 2. The teacher and students convey the final conclusions of the findings
Ggroup investigation oleh Tan dan Lee (2007)	Grouping The teacher presents a problem to each group. Planning The group plans an investigation. investigation The group conducts an investigation. Organizing The group plans the presentation. presenting Groups make presentations. Evaluation Teacher and students evaluate the project.

The grand design shown in the table above is the conceptual basis for designing and building the syntax of the Group-Discovery Learning model.

Conclusion

Based on the results of preliminary research on the development of the Group-Discovery Learning model to improve students' 21st century competence in learning Indonesian in high school, it can be concluded as follows: the implementation of learning Indonesian through the discovery process is still not optimal. it can be suggested that from the teacher's point of view the learning model that should be developed; (1) carried out according to the characteristics of students, namely understanding and practicing learning concepts by finding knowledge in groups, (2) facilitating heterogeneous student characteristics in a collaborative discovery atmosphere, (3) orienting on a discovery in groups, (4) optimizing mastery of the material and in accordance with the character of graduates, (5) accommodate the teacher's role as a guide, co-worker and motivator in learning, (6) the evaluation system uses multiple choice tests and essays, (7) trials are carried out on the subject matter of observation reports, exposition texts, and negotiating text. Based on the student's response to the needs analysis questionnaire that was reported, the student's response was edited into the form of social systems, reaction principles, support systems, evaluation systems and material topics when implementing the Group-Discovery Learning model. The development of the conceptual framework of the Group-Discovery Learning model refers to the results of literature studies and curriculum and context analysis. The conceptual framework developed includes; characteristics and objectives of the Group-Discovery Learning model and the components of the Group-Discovery Learning model (syntax, support systems, social systems, reaction principles, instructional impacts and accompanying impacts).

References

Aditomo, A., Goodyear, P., Bliuc, A.M, & Ellis, R.A (2013). Pembelajaran berbasis inkuiri di pendidikan tinggi: Bentuk kepala sekolah, tujuan pendidikan, dan variasi disiplin. *Higher Education Studies, 38* (9), 1239–1258.

Alberida, H. (2019). Pengembangan Model Pembelajaran Problem Solving untuk Meningkatkan Keterampilan Abad 21 Siswa pada Pembelajaran IPA SMP. *Disertasi*. Padang: Universitas Negeri Padang. Tidak dipublikasikan.

Atmazaki. (2009). Mengungkap Masa Depan: Inovasi Pembelajaran Bahasa Indonesia dalam Konteks Pengembangan Karakter Cerdas. *Artikulasi, 8*(2), 434–452.

Argaw, A.S, Haile, B.B., Ayalew, B.T., & Kuma, S.G. (2016). The effect of problem-based learning (PBL) instruction on students' motivation and problem-solving skills of physics. *Eurasia Journal of Mathematics Science and Technology Education, 13*(3), 857-871.

Azwar, S. (2012). *Penyusunan Skala Psikologi (Edisi 2)*. Yokyakarta: Pustaka Pelajar.

Balım, A. G. (2009). The Effects of Discovery Learning on Students' Success and Inquiry Learning Skills. *Eurasian Journal of Educational Research (EJER)*, 35.

Care, E & Kim, H. (2018). Assessment of Twenty-First Century Skills: The Issue of Authenticity. Springer International Publishing AG 2018 E. Cere et al. (eds), *Assesment and Teaching of 21st Century Skills, Educational Assesment in an Information Age*, p 21-39.

Chiong, R. & Jovanovic, J. (2012). Collaborative Learning in Online Studi Groups: An Evolutionary Game Theory Perspective. *Journal of Information Technology Education, 11*, 81-101.

Duran, M., & Dökme, I. (2016). Pengaruh pendekatan pembelajaran berbasis inkuiri terhadap keterampilan berpikir kritis siswa. *Jurnal Eurasia Pendidikan Matematika, Sains dan Teknologi, 12*(12), 2887–2908.

Education GPS, *OECD*, 12/31/2024, 3:05:22 PM http://gpseducation.oecd.org

Eggen, P. & Kauchak, D. (2012). Educational Psychology: Windows on Classrooms Plus MyEducationLab with Pearson eText—access card package. Pearson.

Fuad, N.M., Zubaidah, S., Mahanal, S., & Suarsini, E. (2017). Meningkatkan kemampuan berpikir kritis SMP berdasarkan tes tiga model pembelajaran yang berbeda. *Jurnal Instruksi Internasional , 10* (1), 101–116.

Hardianti, R.D. (2015). Hubungan Antara Aktivitas Belajar Dengan menggunakan Metode Group Investigation Terhadap Hasil Belajar Kognitif Ips Siswa Kelas VIII SMP Negeri 1 Cawas. (Undergraduate Thesis). Universitas Negeri Yogyakarta.

Hidayat, T. (2021). *Tips Menguasai Seni Bicara*. Guepedia.

Ilahi, M. T. (2012). *Pembelajaran Discovery Strategi Dan Mental Vocation Skill.* Jogjakarta: Diva Press

Jones, G. T., Tromp, G., Kuivaniemi, H., Gretarsdottir, S., Baas, A. F., Giusti, B., Strauss, E., Van't Hof, F. N., Webb, T. R., Erdman, R., Ritchie, M. D., Elmore, J. R., Verma, A., Pendergrass, S., Kullo, I. J., Ye, Z., Peissig, P. L., Gottesman, O., Verma, S. S., Malinowski, J., … Bown, M. J. (2017). Meta-Analysis of Genome-Wide Association Studies for Abdominal Aortic Aneurysm Identifies Four New Disease-Specific Risk Loci. *Circulation research, 120*(2), 341–353. https://doi.org/10.1161/CIRCRESAHA.116.308765.

Kagan & Kagan. (2009). *Cooperative Learning*. San Clemente: Kagan Publising.

Permana, E. P. (2016). Pengembangan Media Pembejaran Boneka Kaus Kaki untuk Meningkatkan Keterampilan Berbicara Siswa Kelas II Sekolah Dasar. *Profesi Pendidikan Dasar, 2*(2), 133-140.

Saab, N., van Joolingen, W.R. and van Hout-Wolters, B.H.A.M. (2005), Communication in collaborative discovery learning. *British Journal of Educational Psychology, 75*, 603-621. https://doi.org/10.1348/000709905X42905

Saputro, B. (2020). *Pengembangan model problem based learning dalam meningkatkan keterampilan komunikasi ilmiah calon guru IPA era revolusi industri 4.0*. Salatiga: Aswaja Pressindo.

Svinicki M. D. (1998). A theoretical foundation for discovery learning. *The American journal of physiology*, *275*(6 Pt 2), S4–S7. https://doi.org/10.1152/advances.1998.275.6.S4

Sari, T. M., & Ernawati. (2020). Meningkatkan Hasil belajar Kognitif Siswa dengan menggunakan Model Pembelajaran Kooperatif Group Investigation (GI). *Diklabio: Jurnal Pendidikan dan Pembelajaran Biologi*, 4(1), 79-85.

Tan. I.V.C., Sharan, S., & Lee, C.K.E. (2007). Group Investigation Effects on Achievement, Motivation, and Perceptions of Students in Singapore. *Journal of Education Research, 100*(3), 142-154.

Trilling, B. & Fadel, C. (2009). *21st Century learning skill*. San Franciscoo: John Wiley & Sons.

Wijayanti, F. M., Sukarmin, & Wiyono, E. (2015, September). Penerapan Model Pembelajaran Group Investigation (Gi) dengan Menggunakan Media Flash Card untuk Meningkatkan Aktivitas Belajar dan Kemampuan Kognitif Siswa. *In PROSIDING: Seminar Nasional Fisika dan Pendidikan Fisika, 6*(4), 225-231.

Wood, L., & Hasrtshorne, M. (2017). Literacy: *The role of communication skills*. Retrieved at http://www.sec-ed.co.uk/best-practice/literacy-the-role-ofcommunication-skills/#null at 1 August 2018.

Wrahatnolo, T and Munoto. (2018). 21st centuries skill implication on educational system. *The Consortium of Asia-Pacific Education Universities (CAPEU).* IOP Conf. Series: Materials Science and Engineering 296 (2018) 012036. Doi: 10.1088/1757-899X/296/1/012036.