Application of Class Points as a Form of Spatial Literacy

Suci Frisnoiry[1], Edy Surya[2], Tiur Malasari Siregar[3], Elfitra[4], Sindi Sahela[5]

{sucifrisnoiry@unimed.ac.id[1],edysurya@unimed.ac.id[2],tiurmalasarisiregar@unimed.ac.id[3], elfitra@unimed.ac.id[4],sindisahela7@gmail.com[5]}

[1,2,3,4,5]Mathematics Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Medan, Indonesia, 20221

Abstract. The use of Class Points in learning has been carried out by many researchers. With the interactive nature of Class Point, it is assumed that it can help teachers improve students' abilities. However, nowadays literacy has put more emphasis on its application. One of them is spatial literacy. Therefore, this study aims to see how Class Point is applied in learning when viewed from the results of the students' spatial literacy. The research method used is literature review or literature study, which contains theories that are relevant to research problems. The results of this study found that the application of Class Point can increase students' active participation in the learning process.

Keywords: Class Point, Partial Literacy.

1 Introduction

In an era of rapidly advancing technology and information, spatial literacy is an important skill to have. Spatial literacy is the ability to understand and use information related to space and location effectively[1]. This involves an understanding of spatial concepts, the use of maps, and the ability to analyze and interpret geographic data. The concept of spatial literacy in general has been explained. Apart from a general point of view, spatial literacy is also considered important in terms of a more specific scope. One of them is in the world of education.

Spatial literacy in education refers to a person's ability to understand, analyze, and interpret spatial or geographic information in physical and digital environments. It includes an understanding of the location, distribution, interactions, and characteristics of physical and human phenomena in geographic space. Spatial literacy involves the ability to read, draw, understand maps, utilize geospatial technology, and think spatially to make informed and

ICIESC 2023, October 24, Medan, Indonesia

DOI 10.4108/eai.24-10-2023.2341909

contextual decisions[2]. The real form of the formation of Spatial Literacy skills can be seen from the Understanding of Space Concepts, namely students have an understanding of the basic concepts of space such as scale, dimensions, distance, direction, and spatial relationships between objects or places, one of them is in the world of education[3].

Spatial literacy skills have many interests for students at various levels of education. Not only does it help students better understand the world around them, but it also equips students with skills that will be useful throughout life. Some reasons for the importance of spatial literacy skills for students are students becoming more understanding of the concept of space and understanding Spatial literacy involves understanding basic spatial concepts such as scale, dimensions, distance, direction, and spatial relationships between objects or places[4]. Furthermore, through spatial literacy, it can involve students in critical thinking, evaluation of information sources, and data analysis to form a more comprehensive understanding[5]. In addition, students who have spatial literacy skills are better able to solve problems and design solutions in creative ways[6]. Thus, it is clear that spatial literacy skills provide a solid foundation for students to develop critical thinking skills, adapt to technology, and have a deeper understanding of the complex global world.

This study aims to explore the application of the Class Point concept as a method that can be used to improve spatial literacy. Class Point is a method used in spatial analysis to identify and map certain points in a space[7]. In the context of spatial literacy, Class Point allows users to understand the relationships between objects.

The results of this study are expected to provide a deeper understanding of the potential for applying Class Point in increasing spatial literacy. In addition, this research is also expected to provide practical recommendations and guidelines for the development of other approaches and methods that can be used to improve spatial literacy in the context of formal and non-formal education. By expanding knowledge and understanding of spatial literacy, it is hoped that this research can make a significant contribution in developing spatial literacy skills in various groups of people.

2 Methods

This research adopts a research methodology approach based on related theories and relevant research articles. The concept of literature review refers to a process that involves in-depth exploration, critical evaluation, investigation, and identification of scientific information[8]. Within the scope of literature review, the output of a study is thoroughly explored and analyzed using content analysis techniques. The series of literature reviews applied in this article includes the selection of national journals, international journals and a number of books that are relevant to the topic. The stages are data collection in the form of journals and books related to research titles, in-depth analysis of the collected data, evaluation of the results of data analysis and preparation of conclusions and recommendations based on the results of the review. In analyzing and interpreting data, researchers use NVivo 12 Software.

3 Results and Discussion

3.1 Results

The results of this study contain an in-depth exploration of the content contained in each book and journal that has been previously selected, by applying a methodological approach to literature review or literature study. The analysis process is carried out with the aim of uncovering research findings that are manifested in each journal and seeing the relationship with existing theories. These findings are intended as a contribution that articulates a more comprehensive understanding in the application of Class Point from the perspective of students' spatial literacy.

Theory Relevant to Spatial Literacy in Mathematics

Students' spatial literacy in the context of learning mathematics involves several theories and approaches that can help students understand and apply mathematical concepts in a spatial context. The results of theoretical findings related to the theme of this research, namely theories related to students' spatial literacy in learning mathematics are described as follows:

- Theory of Spatial Visualization. This theory suggests that good spatial visualization skills can help students understand spatial mathematical concepts, such as geometry. Students with strong visualization skills tend to be better at understanding and solving geometric problems[9].
- Theory of Embodied Cognition. This theory emphasizes the importance of physical and sensory experiences in learning mathematic. Through physical experience and direct interaction with spatial objects, students can build a deeper understanding of mathematical concepts.[4]
- Spatial Mnemonics Theory. This theory proposes that the use of mnemonic strategies related to space can help students remember and relate mathematical concepts. For example, associating mathematical concepts with specific locations in the physical environment.[6]
- Multiliteracies Approach. In learning mathematics, students not only need to understand the language of mathematics, but also spatial representations such as graphs, diagrams and maps. The multiliteracy approach integrates the ability to read and analyze visual representations in learning mathematics[10].
- Spatial Reasoning Theory. The ability to think spatially is closely related to understanding mathematics[11]. This theory emphasizes the importance of developing students' spatial thinking to help them understand mathematical concepts related to space and position.
- Technology-Enhanced Spatial Learning. The use of technology such as simulation software, modeling programs, and digital visualization tools can improve students' ability to understand mathematical concepts involving space and shape[12].

- Sociocultural Theory. This theory recognizes the importance of social interaction and cultural context in learning[13]. In the context of student spatial literacy, interactions with classmates or teachers in solving spatial problems or discussing mathematical concepts can deepen student understanding[14].

The application of these theories in learning mathematics can help teachers design teaching strategies that are more effective in developing students' spatial literacy. The use of methods that integrate mathematical concepts with spatial elements can facilitate a deeper and contextual understanding for students.

Relevant Theory related to the Application of Class Points in Learning

The application of Class Point in learning is certainly not far from the supporting theories. From the search results, there are three theories that are directly related to the practice of applying these Class Points. These theories are as follows.

- Cognitive Psychology Theory. This theory proposes that active interaction with the physical environment and spatial information can enhance spatial understanding[15]. The use of the Class Point application provides users with hands-on experience interacting with physical space, potentially increasing their spatial understanding[16].
- Active Learning Theory. This theory emphasizes the importance of active involvement of students in learning. Use of the Class Point app encourages students to search for information in specific locations, participate in space exploration, and collaborate on problem solving, all of which contribute to their spatial literacy[17].
- Educational Technology Theory. This theory supports that the integration of technology in learning can increase the motivation and effectiveness of learning[18], [19]. The Class Point application, as a technological tool, can increase students' interest in understanding space and location, and encourage them to actively interact with the physical environment.

Relevant Research related to the Application of Class Points

From the research search results that are relevant to the themes in the research, there are several articles that discuss the results of his research in implementing the Class Point application. Some of them are described as follows.

- Research by Kurniawan. This study analyzes the effectiveness of using interactive quizzes using classpoint. This application can simplify the learning process. Teachers can more easily make quizzes because they are integrated with PowerPoint. In addition, the classpoint application makes it easier for teachers to make the evaluation process more interesting and interactive[20].
- Research by Setiyanto. This research has proven that student responses as respondents to testing aspects of motivation, usability, and cognitive and psychomotor development in the implementation of Class Point in lectures get very positive responses from students. A number of interesting features/facilities that can support Classpoint's role as an interactive learning media, support its suitability for use in learning process activities, and have caused a very positive response to Classpoint media[21]

- Research by Waty. This study confirms that Classpoint is an interactive digital classroom e-learning application that facilitates teachers in creating interactive materials or discussions in a power point that is digitally connected and web-based or android from students in a fun way. Through compiling power point applications that are web and android based and connected to classpoint in learning, students can enjoy learning and achieve better learning targets[22].
- Research by Sundari et al. This research examines the results of applying media using Class Point. The results of the research show that this classpoint presentation media can attract students' attention so that students can focus and motivate themselves to study in a pleasant atmosphere so as to make students make learning efforts which result in increasing their learning outcomes[23].
- Research by Mazlan. This study found that the ClassPoint Application increased student engagement and motivation to learn. Students are more engaged in learning when the ClassPoint app is used[24].
- Research by Abdelrady et.al. This study provides information that empirically, it is proven that integrating ClassPoint tool activities into the learning environment significantly increases student satisfaction in participating in e-learning when compared to learning modes that are not integrated with Class Point[25].
- Research by Ritonga. This study explains that the use of classpoint learning media as a learning medium is very liked by students because learning becomes fun and interactive. In addition, Class Point has other advantages, namely classpoint presentation media has features that allow students to ask and answer questions with a variety of attractive views, including in the form of multiple word choices, word clouds, short answers, slide images, uploaded images and whiteboard backgrounds[26]
- Research by Zaenab. This study explains that the application of ClassPoint interactive learning strategies in terms of increasing student learning activities[27].

The application of the Class Point application as a form of spatial literacy has a strong theoretical basis and has been supported by relevant research. The use of this application stimulates an understanding of space and location, and increases students' active participation in the learning process. Thus, the Class Point application can be considered as an effective tool in increasing spatial literacy among students.

3.2 Discussion

The implementation of ClassPoint in learning has been proven to be able to have a positive effect in various assessment angles. This is because the ClassPoint application is an interactive application so that it can increase student activity and motivation in learning. This also continues to result in the ability of student learning outcomes to increase. And what is no less important is that the application of this Class Point can improve students' Spatial Literacy.

Based on the research results, it can be seen that there are many theories that support the implementation of ClassPoint. From the point of view of learning theory, there are three theories, namely cognitive psychology theory, active learning theory and educational technology theory. This is also in accordance with research conducted by Sugrah (2020). According to him, these three theories can help students build knowledge that originates from the experiences that students have, thereby enabling the development of students' knowledge in science learning more effectively[28]. Furthermore, there is also a link between learning theory and the theory contained in Spatial Literacy. Where are the theories in Spatial Literacy including Theory of Spatial Visualization, Theory of Embodied Cognition, Spatial Mnemonics Theory, Multiliteracies Approach, Spatial Reasoning Theory, Technology-Enhanced Spatial Learning and Sociocultural Theory[29]. The following describes the relationship between learning theory and spatial literacy theory on the implementation of ClassPoint in learning.

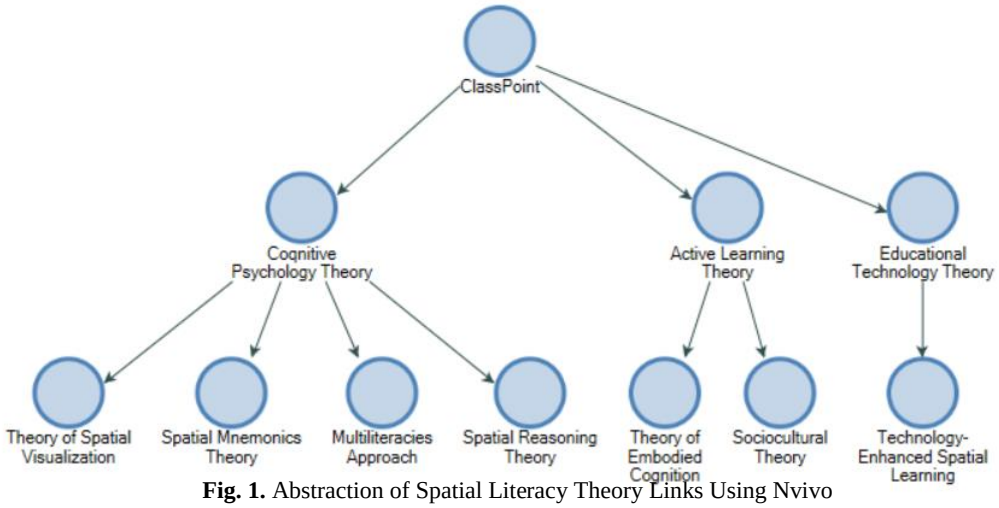

Fig. 1. Abstraction of Spatial Literacy Theory Links Using Nvivo

The Class Point implementation also shows a positive response from users. Where both teachers and students feel the benefits that can be felt directly. According to the teacher's point of view, the use of Class Point in learning really helps the teacher in making the exercises or questions given to students more interactive. In addition, the easy use of Class Point makes teachers more enthusiastic about using this application. The results of using Class Point also show an increase in students' cognitive abilities and psychomotor development. Of course this shows the effectiveness in its use. This effectiveness also has a big influence on improving student learning outcomes, student learning motivation and student activity in the classroom. The implementation of Class Point in learning is also very liked by students, students find learning to be more fun. This is because learning runs interactively. Therefore, according to teachers and students the use of the Class Point application is very helpful in implementing learning in achieving learning goals and can improve students' Spatial Literacy.

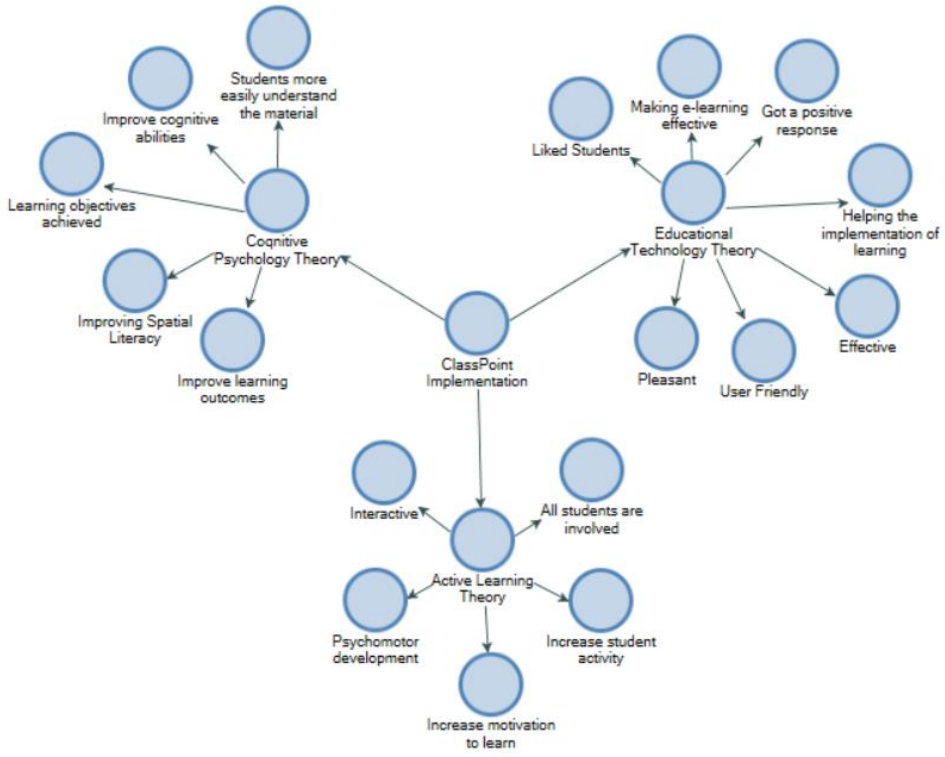

Fig. 2. Abstraction of Class Point's Relationship with User Responses Using Nvivo

Spatial literacy refers to an individual's ability to understand, interpret, and interact with information related to space. The application of technology in an educational context can play an important role in increasing spatial literacy. One example is the application of the Class Point application, study materials as learning elements.

The Class Point application is a technology that allows its use as a form of spatial literacy. There are many theories that support the use of the ClassPoint application in learning. And many researchers who have conducted research on the use of ClassPoint have always found positive responses, one of which is in improving students' Spatial Literacy abilities.

4 Conclusion

Based on the explanation of the data that has been collected on the results of the research and coding and data analysis has been carried out, it can be concluded that implementing the ClassPoint application in learning can improve students' Spatial Literacy. Given the importance

of Spatial Literacy for students, the use of ClassPoint in learning is one of the right choices so that learning is more effective, interactive and can improve students' Spatial Literacy.

References

[1] N. Sutarna and E. Maryani, "Literasi Spasial Mahasiswa Calon Guru Sekolah Dasar," *DWIJA CENDEKIA J. Ris. Pedagog.*, vol. 5, no. 2, p. 351, 2021, doi: 10.20961/jdc.v5i2.57620.

[2] W. Maharani and E. Maryani, "Peningkatan Spatial Literacy Peserta Didik Melalui Pemanfaatan Media Peta," *J. Geogr. Gea*, vol. 15, no. 1, pp. 46–54, 2016, doi: 10.17509/gea.v15i1.4184.

[3] J. L. Mohler, "A review of spatial ability research," *Eng. Des. Graph. J.*, vol. 72, no. 2, pp. 19–30, 2008.

[4] J. V. Sullivan, "Learning and Embodied Cognition: A Review and Proposal," *Psychol. Learn. Teach.*, vol. 17, no. 2, pp. 128–143, 2018, doi: 10.1177/1475725717752550.

[5] F. S. Bellezza, "Mnemonic Devices and Memory Schemas," *Imag. Relat. Mnemon. Process.*, pp. 34–55, 1987, doi: 10.1007/978-1-4612-4676-3_2.

[6] P. Farrokh, H. Vaezi, and H. Ghadimi, "Visual Mnemonic Technique : An Effective Learning Strategy," *GIST – Educ. Learn. Res. J.*, vol. 23, no. 23, pp. 7–32, 2021, doi: 10.26817/16925777.1042.

[7] M. Navehebrahim, "Multiliteracies Approach to empower learning and teaching engagement," *Procedia - Soc. Behav. Sci.*, vol. 29, pp. 863–868, 2011, doi: 10.1016/j.sbspro.2011.11.315.

[8] Muh. Fitrah & Luthfiyah, "Metode Penelitian: Penelitian Kualitatif, Tindakan Kelas & Studi Kasus." p. 44, 2018.

[9] R. Yuliardi and R. Rosjanuardi, "Hypothetical learning trajectory in student's spatial abilities to learn geometric transformation," *JRAMathEdu (Journal Res. Adv. Math. Educ.*, vol. 6, no. 3, pp. 174–190, 2021, doi: 10.23917/jramathedu.v6i3.13338.

[10] A. Reyes-Torres and M. P. Raga, "Multimodal approach to foster the multiliteracies pedagogy in the teaching of EFL through picturebooks: The snow lion," *Atlantis*, vol. 42, no. 1, pp. 94–119, 2020, doi: 10.28914/Atlantis-2020-42.1.06.

[11] M. Ragni, D. Brand, and N. Riesterer, "The Predictive Power of Spatial Relational Reasoning Models: A New Evaluation Approach," *Front. Psychol.*, vol. 12, no. October, pp. 1–15, 2021, doi: 10.3389/fpsyg.2021.626292.

[12] S. Fowler, C. Cutting, J. P. Kennedy, S. N. Leonard, F. Gabriel, and W. Jaeschke, "Technology enhanced learning environments and the potential for enhancing spatial reasoning: a mixed methods study," *Math. Educ. Res. J.*, vol. 34, no. 4, pp. 887–910, 2022, doi: 10.1007/s13394-021-00368-9.

[13] A. Hameed and P. Corresponding, "Sociocultural Theory and its Role in the Development of Language Pedagogy," vol. 7, no. 6, 2016, doi: 10.7575/aiac.alls.v.7n.6p.183.

[14] H. Pathan, R. A. Memon, S. Memon, A. R. Khoso, and I. Bux, "A Critical Review of Vygotsky's Socio-Cultural Theory in Second Language Acquisition," *Int. J. English Linguist.*, vol. 8, no. 4, p. 232, 2018, doi: 10.5539/ijel.v8n4p232.

[15] Novelti, "Implikasi aliran psikologi kognitif dalam proses belajar dan pembelajaran," *J. Univ. Muhammadiyah Sumatera Barat*, vol. 1, no. 2, pp. 1–16, 2017.

[16] Nurhadi, "Teori kognitivisme serta aplikasinya dalam pembelajaran," vol. 2, pp. 77–95, 2020.

[17] C. J. Brame, “A guide To active learning -Vanderbilt white paper,” *Vanderbilt Univ. Cent. Teach.*, 2017, [Online]. Available: https://cft.vanderbilt.edu/active-learning/.
[18] J. R. Ouyang and N. Stanley, “Theories and Research in Educational Technology and Distance Learning Instruction through Blackboard,” *Univers. J. Educ. Res.*, vol. 2, no. 2, pp. 161–172, 2014, doi: 10.13189/ujer.2014.020208.
[19] C. Costa, M. Hammond, and S. Younie, “Theorising technology in education : an introduction,” *Technol. Pedagog. Educ.*, vol. 28, no. 4, pp. 395–399, 2019, doi: 10.1080/1475939X.2019.1660089.
[20] N. D. Kurniawan and Ika Yatri, “Kuis Interaktif Menggunakan Aplikasi Classpoint pada Materi Indahnya Keragaman di Negeriku untuk Siswa Kelas IV Sekolah Dasar,” *J. Ilm. Pendidik. Profesi Guru*, vol. 5, no. 1, pp. 86–95, 2022, doi: 10.23887/jippg.v5i1.48502.
[21] S. Setiyanto, “Pandangan Mahasiswa Dalam Penggunaan Media Pembelajaran Interaktif Pada Mata Kuliah Dokumentasi Kebidananmenggunakan Classpoint,” *J. Innov. Futur. Technol.*, vol. 5, no. 1, pp. 69–78, 2023, [Online]. Available: http://ejournal.lppm-unbaja.ac.id/index.php/iftech/article/view/2463.
[22] Hilda Rafika Waty, “Pengembangan media pembelajaran interaktif E-Learning Pendidikan Agama Islam melalui aplikasi Classpoint,” *J. Manag. Islam. Educ.*, vol. 4, no. 1, pp. 1–10, 2023, doi: 10.32832/idarah.v4i1.4583.
[23] Sundari, D. Hadiyani, and I. Muhlis, “Penerapan Media Presentasi Classpoint Untuk Meningkatkan Hasil Belajar Siswa Pada Mata Pelajaran Bahasa Inggris MAN 19 Jakarta,” *J. Pemikir. dan Pengemb. Pembelajaran*, vol. 3, no. 3, pp. 1–9, 2021.
[24] N. A. Mazlan, K. H. Tan, Z. Othman, and W. Wahi, “ClassPoint Application for Enhancing Motivation in Communication among ESL Young Learners,” *World J. English Lang.*, vol. 13, no. 5, pp. 520–526, 2023, doi: 10.5430/wjel.v13n5p520.
[25] A. H. Abdelrady and H. Akram, “An Empirical Study of ClassPoint Tool Application in Enhancing EFL Students’ Online Learning Satisfaction,” *Systems*, vol. 10, no. 5, pp. 1–14, 2022, doi: 10.3390/systems10050154.
[26] S. A. Ritonga, U. H. M. T. 3) D. P. 4) R. Sahbuki Ritonga, and A. R. 5)Wahyu A. Ritonga, “The Effect of ClassPoint Learning Media as Interactive and Fun Learning,” *Int. J. Humanit. Educ. Soc. Sci.*, vol. 2, no. 6, pp. 2206–2212, 2023.
[27] Zaenab, “Peningkatan aktivitas dan hasil belajar siswa melalui strategi pembelajaran interaktif ClassPoint,” *J. Oase Nusant.*, vol. 2, no. 1, pp. 13–23, 2023.
[28] N. U. Sugrah, “Implementasi teori belajar konstruktivisme dalam pembelajaran sains,” *Humanika*, vol. 19, no. 2, pp. 121–138, 2020, doi: 10.21831/hum.v19i2.29274.
[29] L. Li and D. Zhang, *Reading in Chinese as an Additional Language*, no. December. 2022.