







Application of the collaborative learning model to improve 21st-century civic skills

Suyato¹ 
Yayuk Hidayah² 
Lutfia Septiningrum³ 
Iqbal Arpanudin⁴ 



(✉ Corresponding Author)

^{1,2,4}Department of Civic Education and Law Universitas Negeri Yogyakarta, Yogyakarta, Indonesia.

¹Email: suyato@uny.ac.id

²Email: yayukh@uny.ac.id

⁴Email: iqbala@uny.ac.id

³Department of Public Administration, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia.

³Email: lutfias@uny.ac.id

Abstract

The study examines the application of the collaborative learning model to improve 21st-century civic skills. The 21st century presents a number of unique challenges in the world of education. Rapid changes in technology, economics, and politics have placed new demands on individual learning and development. One of the key aspects of preparing students for these challenges is the development of strong civic skills. These skills include not only an understanding of the duties and rights of citizens but also the ability to collaborate with diverse individuals and groups in order to create positive change in society. The application of the Collaborative Learning Model has emerged as a highly relevant approach to developing civic skills in the modern era. This model emphasizes cooperation, active engagement, and knowledge sharing between students, which encourages them to collaborate in solving social problems, understanding cultural differences, and designing innovative solutions. In this study, the research method he research method in this study was a pseudo-experiment with a non-equivalent control group design. The data analysis technique used is the independent sample t-test with a significance level of 5%. Results showed that the model applied significantly influenced students' 21st-century citizenship skills, and collaborative learning models effectively improved these skills. This study concludes that the Collaborative Learning Model can be used to improve students' 21st-century civic skills.

Keywords: 21st – century, Civic education, Civic skills, Collaborative learning.

Citation | Suyato, Hidayah, Y., Septiningrum, L., & Arpanudin, I. (2024). Application of the collaborative learning model to improve 21st-century civic skills. *Journal of Education and E-Learning Research*, 11(3), 456–463. 10.20448/jeelr.v11i3.5753

History:

Received: 27 October 2023

Revised: 8 January 2024

Accepted: 30 January 2024

Published: 26 June 2024

Licensed: This work is licensed under a [Creative Commons](https://creativecommons.org/licenses/by/4.0/)

Attribution 4.0 License 

Publisher: Asian Online Journal Publishing Group

Funding: This study received no specific financial support.

Institutional Review Board Statement: The Ethical Committee of the Universitas Negeri Yogyakarta, Indonesia has granted approval for this study on 9 January 2023 (Ref. No. B/4137/UN34.14.TU.01.00/2023).

Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

Contents

1. Introduction	457
2. Literature Review	458
3. Methods	459
4. Results and Discussion	460
5. Conclusion	462
References	462

Contribution of this paper to the literature

This research is useful for teachers and educational researchers, providing a path to increasing 21st century civic skills through the application of a collaborative learning model for senior high school students. Policymakers, practitioners, and education researchers can also use research results to plan the effectiveness of learning models by adjusting student characteristics.

1. Introduction

21st-century learning refers to the type of education equipped with skills that students need to succeed in the modern era (De-Alba-Fernández, Navarro-Medina, & Pérez-Rodríguez, 2021). The concepts in the 21st-century learning are to prepare students to become lifelong students, focusing on metacognitive skills, concept understanding, and adaptability to change. Furthermore, the ability to work effectively with others is an important skill in the 21st-century (Hiddinga & De Langen, 2019). Having skills in effective communication can result in conveying ideas and information clearly (Hanakata & Bignami, 2023). In the 21st-century, important digital skills include the ability to understand the use of digital security software, information retrieval skills, and the ability to adapt to technological developments (Manby, 2021).

Civic education is one of the important learning subjects in Indonesian schools. Hence, it is not enough just to be memorized. Broadly, civic education educates citizens about their lives. In the context of learning, civic education plays a role in increasing citizens' awareness of the society (Chiva-Bartoll, Ruiz-Montero, Olivencia, & Grönlund, 2021). Citizens in civic education are subjects that learn about the purpose and direction of the country. In an era of globalization, 21st-century civic skills have become crucial in preparing young people to face complex and dynamic challenges and are also becoming educational challenges. 21st-century civic skills refer to the set of skills and competencies that are essential for students in the 21st-century. These skills include the ability to think critically, communicate, collaborate, and have a deep understanding of global issues (Ata & Yildirim, 2019).

These skills are beneficial in solving problems (Ülker, Gemalmaz, & Yüksesek, 2022). Critical thinking involves the ability to collect and analyze information (Kallio, Wood, & Häkli, 2020). Individuals also need skills in making arguments and rational decisions (Birnie & Bauböck, 2020). Citizenship skills can facilitate the development of a deep understanding of relevant social, political, and economic issues. 21st-century civic skills are essential in helping individuals function as active, skilled, and contributing citizens in an increasingly complex and globalized society. Enhancing these skills through education and experiential learning is essential to shaping future generations who are ready for the challenges of the modern world. To enhance these skills, collaborative learning approaches have been introduced and applied in various educational institutions around the world.

One of the main advantages of applying a collaborative learning model is that it presents a context that is relevant to real life (Supena, Darmuki, & Hariyadi, 2021). In a broadly connected global society, students need to understand global issues and be able to work with people from different cultural and ethnic backgrounds. Using a collaborative learning model, students can learn about diversity, tolerance, and direct interaction with their classmates (Rachman, Margana, & Priyanto, 2022). Students can apply their knowledge and civics skills to collaborative projects involving the issues of the real world today, such as climate change, intercultural conflict, and social inequality.

The objectives of the collaborative learning model are to increase relevant social and problem-solving skills, cooperation, and communication in the context of learning (Bhati & Song, 2019). The collaborative learning model recognizes the importance of student skills such as critical thinking, creativity, and the ability to work together. The collaborative learning model can apply students' knowledge and skills to investigate social issues (Ma & Li, 2021). This approach allows students to actively learn and develop 21st-century skills such as those mentioned above. The collaborative learning model helps students in explore, observe, and experiment.

The collaborative model in civic learning provides students with opportunities to be more active (Vallath, De Natale, Lorenz, Bhatnagar, & Mickelsen, 2021). Through collaboration, students can learn to appreciate differences of opinion, work in teams, and achieve a deeper understanding of complex civic issues. Applying a collaborative approach means inviting students to develop effective communication skills. Moreover, in collaborative projects, students also learn about solving real problems in the community (Krismadinata & Susanti, 2021). The collaborative learning model makes students participate in the planning and implementation of learning (Dante et al., 2022). A collaborative learning model allows students to apply knowledge and skills (Al-Qora'n, Jawarneh, & Nganji, 2023). Students can develop their skills when the learning process supports them. The collaborative learning model can enrich the learning experience, provide access to extensive educational resources, and facilitate adaptive and interactive learning (Ahmed, 2022).

One way to find learning models to improve 21st-century civic skills is to investigate the learning process. To improve 21st-century civic skills, various teaching models in schools continue to be developed. Exploring the relationship of learning models to 21st-century civic skills that include collaborative, communication, and creative skills, as well as spiritual and social attitudes, is an attempt at understanding teaching that produces civic skills that are not just limited to specific teaching models. A diverse and flexible approach is needed to meet the needs of different students (De Leeuw, 2023).

Research on the implementation of a collaborative learning model to improve 21st-century civic skills is important because of its relevance to the demands of the times, its contribution to education, access to the latest research, broadening of horizons, and overall quality of education. In the pre-research stage on teaching models that can improve 21st-century skills for students, researchers have interviewed junior high school teachers from Lombok, Banjarmasin, Jambi, Cirebon, Medan, Kendari, Tasikmalaya, and Sorong from March 5 to May 7, 2023. Researchers found that the use of teaching models to increase 21st-century skills varies.

The need for finding a model that is relevant to civic skills will make the learning process for students more meaningful (Suastika, Suartama, & Sanjaya, 2022). In addition, teaching models that can develop 21st - century civic skills also play an important role in expanding students' awareness of global issues (Low, Nash, Butler-Henderson, & Lloyd, 2021). Effective learning models play an important role in improving civic skills for 21st-century students (Al-Momani & Alsmadi, 2020). Many studies have been done on the use of collaborative learning

model. Hence, in this case we focus on the dependent variable, namely 21st-century civic skills for students in civic education subject. In this case, it is imperative to investigate the utilization of collaborative learning models in enhancing civic skills for the 21st - century. The collaborative learning model applied in civic education subject is an independent variable that has an impact on 21st-century civic skills. The diagram in Figure 1 illustrates the detailed framework in civic education subject of the collaborative learning model.

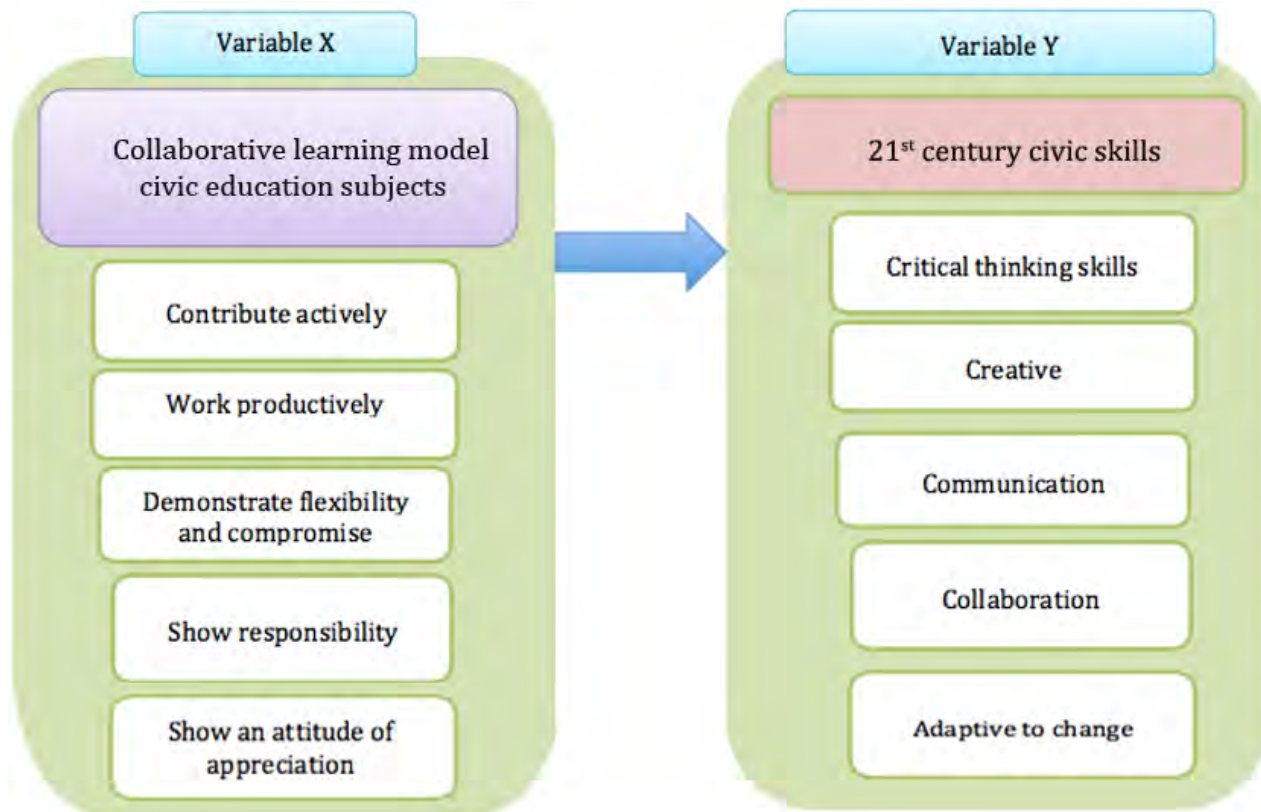


Figure 1. Scheme of collaborative learning model in civic education subject.

Previous research on similar topics included the relationship between implementing project-based collaborative learning using PowerPoint and improving 21st century skills from a student's perspective (Aifan, 2022). Collaborative learning in learning activities in the Internet learning space (Kayama & Okamoto, 2002). Increasing knowledge and understanding of international culture through collaborative learning (McInally, Metcalfe, & Garner, 2015). Use of technology in collaborative educational environments (Cho, Schmelzer, & McMahan, 2002) and the design and construction of collaborative learning (Gale, Martin, Martin, & Duffey, 2014).

Based on Figure 1, the gap in this study lies in the dependent variable, namely the 21st-century civic skills for students in civic education subject to achieve optimal results. In the context of civic education, collaboration is important because it involves students' active participation in group activities to promote a deeper understanding of civic issues and social values that form part of 21st-century skills. This research explores collaborative learning that can enhance students' understanding of this 21st-century skill, thereby strengthening their skills and facilitating active participation in democratic discussion and decision-making.

2. Literature Review

2.1. Collaborative Learning

Collaborative learning is a learning approach that involves active participation and cooperation between students in a group to achieve common learning goals (Kasyap & Tripathy, 2024). This theory emphasizes that learning does not only occur through interaction between teachers and students but also through interaction between students. Instead, these skills include the ability to think critically, work collaboratively in complex situations, and have a deep understanding of social and global issues (Wang et al., 2024). Therefore, empowering students with 21st-Century citizen skills not only supports the development of competent and adaptive individuals but also fosters a more inclusive, competitive, and sustainable society in the modern era (Armstrong, 2010). Collaborative learning contributes to the understanding of innovation in students (Oswald & Zhao, 2021).

Collaborative learning encourages knowledge significantly (Bélanger, 2008). The use of collaborative learning highlights the improvement of gaps in students (Morris, Ida, Migliaccio, Tsukada, & Baker, 2020). There is social interaction in collaborative learning (Vuopala, Hyvönen, & Järvelä, 2016). In addition, socio-emotional interaction in collaborative learning situations focuses on the quality of students (García, Olivares, Simão, & Dominguez, 2021). Developments in collaborative learning define the most important parts of students (Araya & Peters, 2010). In social interaction during collaborative learning, there is a convergence of interactions (Isohätälä, Näykki, & Järvelä, 2020).

Students benefit from collaborative learning (Hugh-Jones & Madill, 2008). Collaborative learning groups increase students' positive attitudes towards their environment (Slusser & Erickson, 2006). In addition, the use of collaborative learning strategies connects theory with the real world (Pedersen, 2010). Collaborative learning creates social togetherness (Gyasi & Zheng, 2023). A collaborative learning approach will successfully increase student engagement (McDuff, 2012).

3. Methods

The research method in this study was a pseudo-experiment with a non-equivalent control group design. In this design, the experimental and control classes were utilized. Moreover, the research design is described in Figure 2.

Table 1. Summary research is as follows.

No	Author	Research theme
1	Aifan (2022)	Applying a collaborative learning strategy centered around project-based activities through the utilization of PowerPoint to enhance the 21st-century skills of students.
2	Kayama and Okamoto (2002)	Cooperative learning within the online learning environment: A structure for creating a learning atmosphere and managing knowledge in an educational setting
3	Cho et al. (2002)	Equipping hospitality managers for the 21 st century: Integrating just-in-time education, critical thinking, and collaborative learning
4	McInally et al. (2015)	Enhancing the student experience via a collaborative cultural learning framework
5	Gale et al. (2014)	The Burnout phenomenon: An comparative examination of student perspectives on collaborative learning and Sustainability

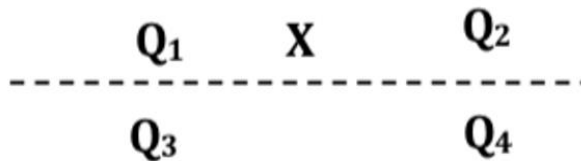


Figure 2. Non-equivalent control group design.

Desc: Q1 is a pre-test in the experimental class; Q3 is a pre-test in the control class; X is the treatment of collaborative learning model; Q2 is a post-test in the experimental class; and Q4 is post-test in the control class.

The population in this study was all grade X students majoring in science at SMA N 2 Yogyakarta. Researchers conducted simple random sampling techniques in two classes of 80 respondents with ages 15-16. In the experimental class, the collaborative learning model was used, and in the control class, the conventional model was used.

The researchers conducted four meetings in the experimental (collaborative learning model) and control (conventional) classes. The pre-test was given to the students in the first meeting for both classes. Next, the post-test was given to students at the last meeting to find out students' understanding of 21st-century skills.

Before being used for data collection, the learning and research instruments that have been designed underwent a trial stage. Of the 20 questions identified, 10 were considered valid. Questions that have been declared valid were then tested for reliability to assess the extent to which the instrument was consistent as a measuring instrument. The calculation results of the reliability test showed a value of 0.85, which indicated that the research instrument was reliable in a high category.

The researchers used the independent T-test to test the hypothesis using the data on 21st-century skills obtained. The statistical test used a significance level of 5%, assisted by PASW 18 software. Homogeneity and normality tests were also conducted.

Table 2. Flowchart of collaborative learning model in civic education subject.

Teachers' aspect	
<ul style="list-style-type: none"> • Students' are classified in homogeneous groups. • Collaborative learning models are introduced and explained. • Conduct observations on the students. • Provide pre-test and post-test. 	
Students' aspect	
21 st -century skills	Collaborative
Students are taught to analyze, evaluate, and infer information logically and objectively. They learn to ask questions (Critical thinking).	Students work in small groups to discuss specific topics or issues. They share knowledge, ask questions, and find solutions together. These discussions promote deeper understanding, the development of social skills, and diverse perspectives.
Students are encouraged to develop new ideas. They may be asked to create art, write stories, or devise innovative solutions to problems at hand (Creativity).	Students work together in teams to complete projects involving research, planning, and task execution. They divide tasks, collaborate on data collection, and present their work. The project develops skills of cooperation, leadership, and shared responsibility.
Students work in groups to create solutions together, share ideas, and solve complex problems. They learn to collaborate, respect differences, and support each other (Collaboration).	The writers divide into different small groups, where each member of the group has a different piece of information or topic. After studying and understanding their material, group members with the same topic gather to discuss and share knowledge. Then, they return to their home group to teach other students about their topic. These activities encourage collaboration, comprehensive understanding, and interdependence.
Students practice conveying ideas and information effectively, both orally and in writing. They use relevant technology and media, compose compelling presentations, and are able to communicate with diverse audiences.	Students participate in simulations or role-playing games involving real-life situations or problems. They work in groups to take on specific roles, interact, and overcome existing challenges. This activity trains communication, negotiation, cooperation, and decision-making skills.

Furthermore, the details of the participants are as follows:

Table 3. Participant details.

Gender	Age	Education level	Sum
Man	15-16 years	Senior high school	40
Woman	15-16 years	Senior high school	40

4. Results and Discussion

Data on 21st-century skills are obtained from 40 students in the experimental class aged 15-16 years using the collaborative learning model and 40 students in the control class aged 15-16. Data on students' 21st-century skills in the control and experimental classes to improve 21st-century skills in civic education can be observed in Table 2. Based on the results in Table 1, it can be seen that the average score of the 21st-century skills in civic education of the experimental class is higher than that of the control class. When viewed from a standard deviation (Standard Deviation), it can be seen that the distribution is more uniform.

Table 4. Results of applying collaborative learning model to improve 21st - century skills.

Group	Number of data	Max. score	Min. score	Average	Std. dev.
Experimental class (Collaborative model)	40	95	70	80.56	9.93
Control class (Conventional model)	40	80	60	61.08	10.05

The students' percentage of the 21st-century skill scores for the experimental and control class indicators is presented in Figure 3. Based on Figure 3, it can be observed that for all indicators, the percentages of the experimental class are higher than the control class. The highest percentage of the indicators for the experimental class is obtained with a value of 90% for creativity and communication, while the highest percentage of the control class is obtained with a value of 85% for creativity. This shows that thinking creatively is the highest improvement of 21st-century civic skills achieved using collaborative and conventional learning models. On the other hand, the lowest percentage is obtained at a value of 70% in the control class for collaboration. This is because in the control class, the conventional learning model is used, which does not focus on collaboration.

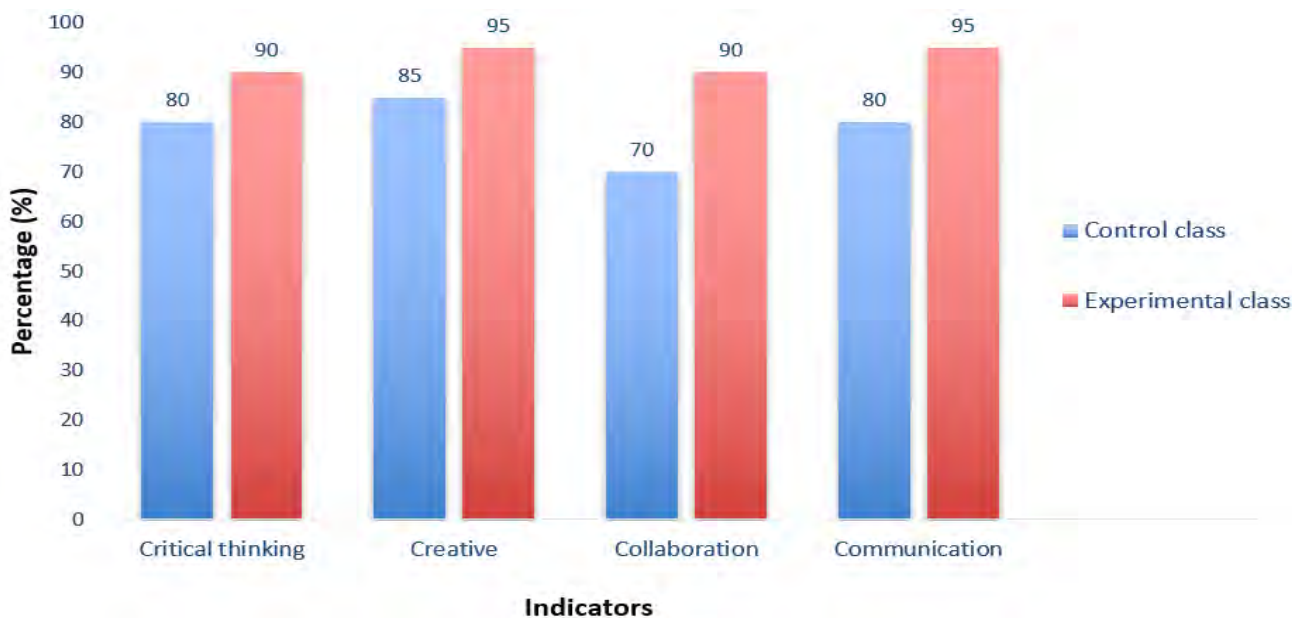


Figure 3. Percentage of 21st - century skill indicators of the control and experimental classes.

The independent T-test sample is utilized in the hypothesis test. The test criteria state that if sig. > 0.05, then Ho is accepted, i.e., there is no effect; otherwise, Ho is rejected, i.e., there is an effect. Before that, the normality and variance homogeneity tests are conducted. If the data have a normal distribution, then the parametric statistical method can be applied. However, if the data are not normally distributed, then the non-parametric statistical method is required.

Table 5. The results of the normality test.

Group	Test	Significance	Result
Experimental	Pre-test	0.085	Normal
	Post-test	0.300	Normal
Control	Pre-test	0.097	Normal
	Post-test	0.300	Normal

Table 5 presents the normality values obtained from the Kolmogorov-Smirnov test. The test results for each group show a significance value of more than 0.05, indicating normal test results. It can be seen that the results of the pre-test and post-test data in the control and experimental classes are normally distributed.

To identify the variance between the control and experimental classes, a homogeneity test is performed. In this study, the variance homogeneity test uses the help of PASW 18.00 software with a significance level of 5% or 0.05. The homogeneity test is carried out on the pre-test and post-test data in the control and experimental classes. Based on the homogeneity test criteria, if the significance value is greater than 0.05, then the data are homogeneous; otherwise, the data are not homogeneous. The results of the homogeneity test can be found in Table

3. Table 3 indicates that the homogeneity of the sig. test scores of 21st-century students' skills on the pretest and posttest is > 0.05. From these results, it can be inferred that the control and experimental classes have the same variance, i.e., they are homogeneous.

Table 6. Results of the homogeneity test.

Data	F	Significance	Criteria
Pre-test post-test	1.588	0.117	Homogeneous
Data	0.888	0.808	Homogeneous

Table 6 presents the data following normal and homogeneous distributions (parametric statistics); a T-test is performed. The T-Test has a requirement that if the sig. value is greater than 0.05, then Ho is accepted, which means there is no significant difference or effect. However, if the sig. value is less than 0.05, then Ho is rejected, indicating a significant effect or difference. The results of the T-test can be seen in Table 4. Based on Table 4, it can be concluded that the significance value is 0.000, which satisfies sig. < 5%, hence Ho is accepted. It can be inferred that there is an influence or difference in the model used. This means that the collaborative learning model has affected the 21st-century civic skills of students. Finally, the effect size analysis is used to determine the impact and/or influence of the collaborative learning model. This can be seen in Table 7. It may be observed from Table 7 that the influence of the collaborative learning model is 0.7, in a moderate category.

Table 7. The result of the independent sample T-test.

Data	t	Significance	Result
21 st - century skills	3.300	0.000	There is an influence

Table 8. Effect size analysis results.

Class	(g)	z	Std. dev.	Effect size (d)	Category
Experimental	0.77		0.19	0.70	Moderate
Control	0.55		0.12		

The 21st-century civic skills are an integral part of the development of education, and their mastery facilitates students in their future (Adefila et al., 2021). Based on Table 8, the effect size test shows that collaborative models are effective in improving 21st - century skills. The collaborative model is effective for training 21st-century skills in students because it encourages them to work collaboratively, communicate well, solve problems creatively, and develop social abilities. From the results of the analysis of the 21st-century skill scores in Figure 3, the aspects of collaboration, communication, creative thinking, and critical thinking have high scores in the experimental class. Thus, the application of these aspects can broaden students' understanding, encouraging them to share ideas, consider different points of view, and learn to work in an inclusive and diverse environment. According to these findings, prior research demonstrating that collaborative models offer real-life-oriented learning experiences, prepare students to face the challenges of an ever-evolving world, and cultivate skills that are relevant and necessary in the modern era supports the findings of this study (Nouri, Zhang, Mannila, & Norén, 2020). Collaborative learning model reinforces tolerance, justice, and diversity, which are part of civic values (Jones & Palmer, 2022). The impact of technological development acceleration in the world just shows the importance of the education system in training and acquiring skills (Sabag & Cohen, 2022). The use of a collaborative learning model equips students with 21st-century skills that are highly sought-after in the world today. In an increasingly connected environment with cross-functional groups, the ability to work collaboratively becomes crucial.

Previous research on collaborative learning models that can increase attitudes towards respecting diversity has been done (Hitipeuw, Danardana, & Pali, 2023). Discussion activities in a collaborative learning model can promote openness and develop critical thinking skills to solve problems. In addition, this learning model prepares students to face complex challenges in teams, value each individual's contribution, and achieve better results through group synergy. The results of previous research showing that the use of collaborative learning models increases student participation support this conclusion (Gaunt et al., 2021).

The appropriate teaching model should be based on the learning objectives. Combinations or variations of models can be used to create holistic and effective learning experiences for students (Chao et al., 2022). The learning model is a conceptual framework that serves as a guideline for conducting learning. Learning models are arranged systematically to achieve learning objectives. The teaching process concerns syntax, social systems, and principles (Trzeciakowska, 2020).

In the collaborative model, the role of the teacher is very important and includes a variety of activities that support students' collaborative learning. The teacher serves as a facilitator who encourages interaction and cooperation between students. The teacher organizes group activities, provides guidance and direction, and facilitates discussions that promote the exchange of ideas and joint problem-solving. In addition, teachers also provide constructive feedback and individualized guidance to students to help them develop 21st-century skills effectively. With the active involvement of teachers in this model, students can feel strong support and gain the direction needed to achieve collaborative learning goals.

Civic education can develop technical skills using the collaborative learning model, i.e.: information literacy, collaboration, and leadership inherent in 21st - century skills. These results are supported by the findings of previous research that the collaborative learning model can be used as a guideline for improving learning activities in the classroom (Deng et al., 2022). Moreover, the collaborative learning model can increase students' involvement in the learning process (Li, 2021). In the collaborative model, students have the opportunity to apply 21st - century skills in relevant contexts and develop a deep understanding of the real life.

Previously, research has found that a collaborative learning model can develop skills, help students prepare for future challenges, and also encourage students to develop relevant skills (Tiruneh et al., 2020). The application of collaborative learning model can enrich the learning experience and help students achieve optimal learning outcomes (Chong, Lim, & Tan, 2019). The choice of learning model must be in harmony with the learning

objectives that the teacher wants to achieve. Thus, the collaborative model provides a strong foundation for the development of skills essential to face the challenges and demands of the modern world in the 21st-century.

The application of the collaborative learning model has proven to be an effective method for improving 21st-century civic skills in civic education. Previous research found that collaborative learning models provide opportunities for students to interact and work together in groups. Through collaboration, students learn to develop social skills and teamwork (Arthur, Kristjánsson, & Vogler, 2021). To have civic skills, students need to be able to interact with diverse individuals and communities (Lash, 2021). Student proficiency in technology readiness will have an impact on students (Maryani, Latifah, Fatmawati, Erviana, & Mahmudah, 2023). The collaborative learning model engages students in problem-solving activities involving groups. Students are invited to work together to identify problems, gather information, and find innovative solutions. In this process, they learn to think creatively, face challenges, and overcome obstacles. These collaborative problem-solving skills are particularly relevant in 21st-century citizenship, where students need to be able to deal with change and find sustainable solutions. Therefore, the results of this study have confirmed all the results of the study.

5. Conclusion

In conclusion, the study highlights the effectiveness of the collaborative learning model in enhancing 21st-century civic skills, encompassing attitudes, knowledge, and problem-solving abilities crucial for modern citizenship. The findings emphasize the model's potential to foster cross-cultural interactions, preparing students to navigate global challenges and appreciate diversity. However, the study underscores the need for teachers to embrace creativity and innovation in implementing the collaborative learning model to achieve the objectives of 21st-century civic skills. The research suggests key recommendations: integrating civic skills into the national curriculum, providing comprehensive teacher training, promoting student-centered learning approaches, and establishing partnerships with external entities. These recommendations aim to ensure that students are equipped with the necessary skills and values to thrive in a rapidly changing society. Looking ahead, future research should explore the long-term impact of collaborative learning on civic engagement and delve into innovative teaching strategies aligned with evolving societal needs. Continuous efforts in these areas will contribute to the ongoing development of 21st-century civic skills among students.

References

- Adefila, A., Arrobbio, O., Brown, G., Robinson, Z., Spolander, G., Soliev, I., . . . Wimpenny, K. (2021). Ecologized collaborative online international learning: Tackling wicked sustainability problems through education for sustainable development. *Journal of Teacher Education for Sustainability*, 23(1), 41-57. <https://doi.org/10.2478/jtes-2021-0004>
- Ahmed, A. M. (2022). Business English instruction: Empowering learners with the 4Cs of the 21st century. *Frontiers in Education*, 7, 1-15. <https://doi.org/10.3389/feduc.2022.998987>
- Aifan, H. (2022). Implementing a project-based collaborative learning approach using PowerPoint to improve students' 21st-century skills. *E-Learning and Digital Media*, 19(3), 258-273. <https://doi.org/10.1177/20427530211030642>
- Al-Momani, M. O., & Alsmadi, M. A. (2020). Students' degree of possessing digital-citizenship skills from their points of view at Al-Balqa Applied University. *Universal Journal of Educational Research*, 8(8), 3335-3345. <https://doi.org/10.13189/ujer.2020.080805>
- Al-Qora'n, L. F., Jawarneh, A., & Nganji, J. T. (2023). Toward creating software architects using mobile project-based learning model (Mobile-PBL) for teaching software architecture. *Multimodal Technologies and Interaction*, 7(3), 31. <https://doi.org/10.3390/mti7030031>
- Araya, D., & Peters, M. A. (2010). Peer-to-peer networks and collaborative learning. *E-Learning and Digital Media*, 7(4), 326-327. <https://doi.org/10.2304/elea.2010.7.4.326>
- Armstrong, C. (2010). Catalyzing collaborative learning: How automated task distribution may prompt students to collaborate. *E-Learning and Digital Media*, 7(4), 407-415. <https://doi.org/10.2304/elea.2010.7.4.407>
- Arthur, J., Kristjánsson, K., & Vogler, C. (2021). Seeking the common good in education through a positive conception of social justice. *British Journal of Educational Studies*, 69(1), 101-117. <https://doi.org/10.1080/00071005.2020.1724259>
- Ata, R., & Yildirim, K. (2019). Turkish pre-service teachers' perceptions of digital citizenship in education programs. *Journal of Information Technology Education: Research*, 18, 419-438. <https://doi.org/10.28945/4392>
- Bélanger, M. (2008). Online collaborative learning for labor education. *Labor Studies Journal*, 33(4), 412-430. <https://doi.org/10.1177/0160449X07306652>
- Bhati, A., & Song, I. (2019). New methods for collaborative experiential learning to provide personalized formative assessment. *International Journal of Emerging Technologies in Learning*, 14, 179-195. <https://doi.org/10.3991/ijet.v14i07.9173>
- Birnie, R., & Bauböck, R. (2020). Introduction: Expulsion and citizenship in the 21st century. *Citizenship Studies*, 24(3), 265-276. <https://doi.org/10.1080/13621025.2020.1733260>
- Chao, W.-Y., Huang, L.-C., Hung, H.-C., Hung, S.-C., Chuang, T.-F., Yeh, L.-Y., & Tseng, H.-C. (2022). Effectiveness of digital flipped learning evidence-based practice on nurses' knowledge, attitude, and practice: A quasi-experimental trial. *Healthcare*, 10(7), 1257-1257. <https://doi.org/10.3390/healthcare10071257>
- Chiva-Bartoll, O., Ruiz-Montero, P. J., Olivencia, J. J. L., & Grönlund, H. (2021). The effects of service-learning on physical education teacher education: A case study on the border between Africa and Europe. *European Physical Education Review*, 27(4), 1014-1031. <https://doi.org/10.1177/1356336x211007156>
- Cho, W., Schmelzer, C. D., & McMahon, P. S. (2002). Preparing hospitality managers for the 21st century: The merging of just-in-time education, critical thinking, and collaborative learning. *Journal of Hospitality & Tourism Research*, 26(1), 23-37. <https://doi.org/10.1177/1096348002026001002>
- Chong, H. T., Lim, C. K., & Tan, K. L. (2019). Teaching and learning insight among higher education students utilizing e-tool for game development subject. *International Journal of Recent Technology and Engineering*, 8(2), 285-290. <https://doi.org/10.35940/ijrte.B1050.0782S219>
- Dante, A., La Cerra, C., Caponnetto, V., Masotta, V., Marcotullio, A., Bertocchi, L., . . . Lancia, L. (2022). Dose-response relationship between high-fidelity simulation and intensive care nursing students' learning outcomes: An Italian multimethod study. *International Journal of Environmental Research and Public Health*, 19(2), 617. <https://doi.org/10.3390/ijerph19020617>
- De-Alba-Fernández, N., Navarro-Medina, E., & Pérez-Rodríguez, N. (2021). School inquiry in secondary education: The experience of the Fiesta De La Historia youth congress in seville. *Social Sciences*, 10(5), 165. <https://doi.org/10.3390/socsci10050165>
- De Leeuw, R. R. (2023). Student reflections on the curriculum and citizenship education using card sorting in group settings. *International Journal of Educational Research Open*, 4, 100237. <https://doi.org/10.1016/j.ijedro.2023.100237>
- Deng, S.-Q., He, M.-Z., Wang, W., Zhang, C., Shen, J.-J., Shen, J.-L., & Liu, M. (2022). Teaching of human parasitology during the COVID-19 pandemic in China. *Frontiers in Education*, 7, 1-8. <https://doi.org/10.3389/feduc.2022.882232>
- Gale, A. J., Martin, D., Martin, K., & Duffey, M. A. (2014). The burnout phenomenon: A comparative study of student attitudes toward collaborative learning and sustainability. *Journal of Interior Design*, 39(1), 17-31. <https://doi.org/10.1111/joid.12022>
- García, A., Olivares, H., Simão, L. M., & Dominguez, A. L. (2021). Socioemotional interactions in collaborative learning: An analysis from the perspective of semiotic cultural psychology. *Culture & Psychology*, 27(2), 208-226. <https://doi.org/10.1177/1354067x20976513>
- Gaunt, H., Duffy, C., Coric, A., González Delgado, I. R., Messas, L., Pryimenko, O., & Sveidahl, H. (2021). Musicians as "makers in society": A conceptual foundation for contemporary professional higher music education. *Frontiers in Psychology*, 12, 3159. <https://doi.org/10.3389/fpsyg.2021.713648>
- Gyasi, F. J., & Zheng, L. (2023). Idea improvement and socially shared regulation matter in cross-cultural online collaborative learning. *SAGE Open*, 13(1), 1-17. <https://doi.org/10.1177/21582440221148625>

- Hanakata, N. C., & Bignami, F. (2023). Platform urbanization, its recent acceleration, and implications on citizenship. The case of Singapore. *Citizenship Studies*, 27(2), 189-209. <https://doi.org/10.1080/13621025.2022.2077568>
- Hiddinga, A., & De Langen, M. (2019). Practices of belonging: Claiming elderly care through deaf citizenship. *Citizenship Studies*, 23(7), 669-685. <https://doi.org/10.1080/13621025.2019.1651086>
- Hitipeuw, I., Danardana, F., & Pali, M. (2023). Research on factors that influence college academic performance: A structural equation modelling approach. *European Journal of Educational Research*, 12(1), 537-549. <https://doi.org/10.12973/eu-jer.12.1.537>
- Hugh-Jones, S., & Madill, A. (2008). Collaborative learning alongside independent project work: A pilot study. *Psychology Learning & Teaching*, 7(2), 26-33. <https://doi.org/10.2304/plat.2008.7.2.26>
- Isohäätä, J., Näykki, P., & Järvelä, S. (2020). Convergences of joint, positive interactions and regulation in collaborative learning. *Small Group Research*, 51(2), 229-264. <https://doi.org/10.1177/1046496419867760>
- Jones, E., & Palmer, T. (2022). A review of group-based methods for teaching statistics in higher education. *Teaching Mathematics and its Applications: An International Journal of the IMA*, 41(1), 69-86. <https://doi.org/10.1093/teamat/hrab002>
- Kallio, K. P., Wood, B. E., & Häkli, J. (2020). Lived citizenship: Conceptualising an emerging field. *Citizenship Studies*, 24(6), 713-729. <https://doi.org/10.26686/wgt.12291227>
- Kasyap, H., & Tripathy, S. (2024). Privacy-preserving and byzantine-robust federated learning framework using permissioned blockchain. *Expert Systems with Applications*, 238, 122210. <https://doi.org/10.1016/j.eswa.2023.122210>
- Kayama, M., & Okamoto, T. (2002). Collaborative learning in the internet learning space: A framework for a learning environment and knowledge management in the educational context. *Industry and Higher Education*, 16(4), 249-259. <https://doi.org/10.5367/000000002101296360>
- Krisadinata, & Susanti, W. (2021). Comparison of collaborative learning models to improve programming competence. *International Journal of Online and Biomedical Engineering*, 17(10), 48-58. <https://doi.org/10.3991/ijoe.v17i10.24865>
- Lash, C. L. (2021). Multicultural citizenship education as resistance: Student political development in an anti-immigrant national climate. *Teaching and Teacher Education*, 105, 103405. <https://doi.org/10.1016/j.tate.2021.103405>
- Li, Y. (2021). Educational psychology-based strategy for instrumental music teaching in normal college. *Frontiers in Psychology*, 12, 657788. <https://doi.org/10.3389/fpsyg.2021.657788>
- Low, S., Nash, R., Butler-Henderson, K., & Lloyd, S. (2021). Transversal competency development in healthcare professionals: A scoping literature review to identify effective educational paradigms, principles and strategies. *Journal of University Teaching & Learning Practice*, 18(8), 05. <https://doi.org/10.53761/1.18.8.5>
- Ma, H., & Li, J. (2021). An innovative method for digital media education based on mobile internet technology. *International Journal of Emerging Technologies in Learning (IJET)*, 16(13), 68-81. <https://doi.org/10.3991/ijet.v16i13.24037>
- Manby, B. (2021). Naturalization in African states: Its past and potential future. *Citizenship Studies*, 25(4), 514-542. <https://doi.org/10.1080/13621025.2021.1926098>
- Maryani, I., Latifah, S., Fatmawati, L., Erviana, V. Y., & Mahmudah, F. N. (2023). Technology readiness and learning outcomes of elementary school students during online learning in the new normal Era. *Pegem Journal of Education and Instruction*, 13(2), 45-49. <https://doi.org/10.47750/pegegog.13.02.06>
- McDuff, E. (2012). Collaborative learning in an undergraduate theory course: An assessment of goals and outcomes. *Teaching Sociology*, 40(2), 166-176. <https://doi.org/10.1177/0092055x12437968>
- McNally, W., Metcalfe, S., & Garner, B. (2015). Enriching the student experience through a collaborative cultural learning model. *Creative Nursing*, 21(3), 161-166. <https://doi.org/10.1891/1078-4535.21.3.161>
- Morris, P., Ida, A. K., Migliaccio, T., Tsukada, Y., & Baker, D. (2020). Collaborative learning in sociology research methods courses: Does race matter? *Teaching Sociology*, 48(4), 300-312. <https://doi.org/10.1177/0092055x20953876>
- Nouri, J., Zhang, L., Manila, L., & Norén, E. (2020). Development of computational thinking, digital competence and 21st century skills when learning programming in K-9. *Education Inquiry*, 11(1), 1-17. <https://doi.org/10.1080/20004508.2019.1627844>
- Oswald, K., & Zhao, X. (2021). Collaborative learning in makerspaces: A grounded theory of the role of collaborative learning in makerspaces. *SAGE Open*, 11(2), 1-13. <https://doi.org/10.1177/21582440211020732>
- Pedersen, D. E. (2010). Active and collaborative learning in an undergraduate sociological theory course. *Teaching Sociology*, 38(3), 197-206. <https://doi.org/10.1177/0092055x10370119>
- Rachman, D., Margana, M., & Priyanto, P. (2022). The application of mobile-enhanced collaborative learning models on oral presentation competence in rural area during Covid-19 pandemic. *International Journal of Learning, Teaching and Educational Research*, 21(3), 71-87. <https://doi.org/10.26803/ijlter.21.3.5>
- Sabag, Z., & Cohen, S. E. (2022). Adapting the education system to 21st century skills: The case of Israel. *European Journal of Educational Research*, 11(4), 1911-1921. <https://doi.org/10.12973/eu-jer.11.4.1911>
- Slusser, S. R., & Erickson, R. J. (2006). Group quizzes: An extension of the collaborative learning process. *Teaching Sociology*, 34(3), 249-262. <https://doi.org/10.1177/0092055x0603400304>
- Suastika, I. N., Suartama, I. K., & Sanjaya, D. B. (2022). Urgency of social media-based civics education instruction in higher education. *World Journal on Educational Technology: Current Issues*, 14(3), 630-643. <https://doi.org/10.18844/wjet.v14i3.7198>
- Supena, I., Darmuki, A., & Hariyadi, A. (2021). The influence of 4C (constructive, critical, creativity, collaborative) learning model on students' learning outcomes. *International Journal of Instruction*, 14(3), 873-892. <https://doi.org/10.29333/iji.2021.14351a>
- Tiruneh, S. T., Abegaz, B. A., Bekel, A. A., Adamu, Y. W., Kiros, M. D., & Woldeyes, D. H. (2020). Facility-related factors affecting academic performance of medical students in human anatomy. *Advances in Medical Education and Practice*, 11, 729-734. <https://doi.org/10.2147/amep.s269804>
- Trzeciakowska, J. (2020). Non-native English speakers' attitudes towards Polish-accented English. *Theoria et Historia Scientiarum*, 17, 77-94. <https://doi.org/10.12775/THS.2020.003>
- Ülker, N., Gemalmaz, Ö., & Yükses, Y. (2022). *Towards 21st century citizenship through sustainable development goals in foreign language education*. Paper presented at the Towards a New Future in Engineering Education, New Scenarios that European Alliances of Tech Universities Open Up.
- Vallath, N., De Natale, M., Lorenz, K. A., Bhatnagar, S., & Mickelsen, J. (2021). Development and progress of a collaborative learning model for quality improvement in the field of palliative care in India. *Indian Journal of Palliative Care*, 27(2), 189. https://doi.org/10.25259/ijpc.414_20
- Vuopala, E., Hyvönen, P., & Järvelä, S. (2016). Interaction forms in successful collaborative learning in virtual learning environments. *Active Learning in Higher Education*, 17(1), 25-38. <https://doi.org/10.1177/1469787415616730>
- Wang, H., Zhang, D., Feng, J., Cascone, L., Nappi, M., & Wan, S. (2024). A multi-objective segmentation method for chest X-rays based on collaborative learning from multiple partially annotated datasets. *Information Fusion*, 102, 102016. <https://doi.org/10.1016/j.inffus.2023.102016>