The synergy between workforce, students, and lecturers in collaborative learning

Marsofiyati[1], Etin Solihatin[2], Robinson Situmorang[3]
[1]Office Administration Education Study Program, Faculty of Economics, Universitas Negeri Jakarta, Jakarta, Indonesia
[2]Pancasila and Citizenship Education Study Program, Faculty of Social Science, Universitas Negeri Jakarta, Jakarta, Indonesia
[3]Educational Technology Study Program, Faculty of Education, Universitas Negeri Jakarta, Jakarta, Indonesia

Article Info

ABSTRACT

This research focuses on applying technology in collaborative learning, specifically through online platforms that connect students and the workforce. It is objective is to enhance synergy among the workforce, students, and educators to improve learning quality. The case study methodology follows Creswell's qualitative approach with five key steps: planning the case study; data collection; analysis; result interpretation; and reporting. The research explores innovative online platforms to create a comprehensive and diverse learning experience. Technology enables access to materials, virtual classrooms, e-books, mobile learning, and internship programs, fostering flexible and engaging education. Collaborative learning with workforce participation enhances effectiveness and skills. Students gain work experience related to their fields through active interaction with practitioners. At the same time, educators refine teaching methods and understand workforce demands-the synergy among the workforce, students, and educators' mutually beneficial relationships. The workforce leverages student resources for problem-solving and innovation, while students enhance their networks. Educators gain input for curriculum improvement. The research enhances education quality, prepares students for the dynamic workforce, and aligns educational programs with industry demands. It emphasizes the importance of collaborative learning, integrating online platforms to increase skill development.

This is an open access article under the CC BY-SA license.

Corresponding Author:

Marsofiyati
Office Administration Education Study Program, Faculty of Economics, Universitas Negeri Jakarta
Pulo Gadung, East Jakarta, Jakarta Capital Special Region 13220, Indonesia
Email: marsofiyati@unj.ac.id

1. INTRODUCTION

Massive changes in technology and an increasingly competitive job market have made companies look for employees who have skills and expertise that are relevant and up to date with the trends of the workforce. Therefore, the need is growing for universities to work closely with the workforce in developing relevant curricula and required skills [1], [2]. Many companies and organizations have begun to get involved in education through internship programs, project collaborations, or scholarships can benefit students as they can gain work experience and connect with practitioners in their field [3]. In addition, companies can also help by hiring employees who have skills relevant to their business needs [4].

The launch of the independent learning curriculum in 2020 has sparked a shift in the role of lecturers and teachers, transforming them into learning facilitators who create an environment conducive to active student engagement, fostering the development of independent and collaborative learning skills [5],

[6]. The involvement of lecturers or teachers in the independent learning curriculum can increase interaction and cooperation between students or students, both within the scope of learning activities and outside the scope of learning [7]. Lecturers or teachers can also provide direction and constructive feedback for students in the collaborative learning process so that the learning process can take place effectively and efficiently. In addition, the involvement of lecturers or teachers in the independent learning curriculum can also help students develop skills needed in collaborative learning, such as communication, teamwork, problem-solving, and critical skills [8]. Through collaborative learning supported by the involvement of lecturers or teachers, students can learn more actively, creatively, and innovatively. They can be better prepared to face the challenges of an increasingly complex and dynamic workforce in the future.

The coronavirus disease 2019 (COVID-19) pandemic has accelerated changes in the workforce, such as technology adoption and changes in business models [9], [10]. Skills like the ability to work flexibly, work remotely, and work in teams virtually are becoming increasingly important. Therefore, there is a growing need for educational institutions to develop these skills through collaborative learning approaches that involve the workforce [11]. Several studies have shown the success of collaborative learning approaches that involve the workforce; such as studies by Ha *et al.* [12] stated that collaborative learning approaches have long been used in education and are known to be effective in increasing active participation, activeness, and student involvement in the learning process. Collaborative learning approaches that integrate the workforce consistently demonstrate their effectiveness in enhancing students' problem-solving abilities and interpersonal skills. [2], [13], [14]. However, with the development of technology and changes in the workforce, there is an increasing need to increase synergy between the workforce, students, and lecturers in collaborative learning [15], [16]. The synergy between these elements yields benefits for students, the workforce, and the educational institution. Some of these benefits include: i) students can gain work experience relevant to their field of study and directly connected to the latest practices in the workforce; ii) lecturers can gain new experience in teaching and develop skills relevant to their field of study; and iii) the workforce can engage in student education, contribute to the curriculum, and develop skills relevant to the job market's needs [14], [17].

The novelty of the collaborative learning approach that involves the workforce in this research is the application of technology in learning, which allows students to study online and offline, attend lectures remotely, and connect with the workforce through online platforms. The application of more integrated learning, where students can directly engage in work practice, connect with practitioners in their field and gain work experience relevant to their field of study. The increased synergy between educational institutions, the workforce, and students significantly benefits all parties.

The synergy of involvement of industrial workers, universities and students in Indonesian universities has not been extensively explored. This research tries to complement the results of previous study [2], which examines collaboration between universities and industry in designing curriculum and learning but has not integrated the use of ICT in learning. Research on partnerships between universities and industry was also researched by Jonbekova *et al.* [3]. However, it has not yet reached the practice of involving industrial workers in the learning process in class. In Indonesia, similar research has also been conducted by Handayani *et al.* [7] which examines industry involvement in the curriculum renewal process in higher education. This research also contributes to a holistic understanding of the synergy between the workforce, students, and lecturers in collaborative learning in the context of non-Western higher education, which can provide direction for higher education policy in Indonesia and add to international literature.

2. LITERATURE REVIEW
2.1. Collaborative learning theory

For the past two decades, various levels of education have widely adopted the collaborative learning model [18]–[21]. Collaborative learning could be categorized as one form of social interaction during learning processes that provide an additional platform for coordination within formal and informal learning environments [22]. Collaborative learning is usually used to develop conceptual models that contain general theories, abstract verbal descriptions, ideas related to existing reality, and a synthesis that is interrelated with each other and supported by experience and data that is quite limited. Collaborative learning is an approach based on student cooperation to increase understanding and achieve better learning goals [23]. Collaborative learning theory states that effective learning occurs when individuals work together in a group or team [24]. In addition, collaborative learning allows students to play specific roles in real-world situations to develop skills and understand people's perspectives.

Collaboration fosters relationships with the previously unknown, extending learning to unreachable audiences. Using digital tools, students broaden their perspectives and enrich their learning. Through collaboration, students could interact with people or resources previously unavailable in traditional learning

[25], [26]. This collaboration can involve students working with classmates, teachers, or individuals outside the school environment, locally and globally, using digital tools such as social media, online learning platforms, or collaborative applications [1], [18]. In this collaborative process, students have access to diverse points of view, experiences, and knowledge that can broaden their understanding of a particular topic [12]. By interacting with people with different perspectives, students can look at problems or topics from a broader perspective, gain new insights, and develop critical thinking.

In addition, digital tools also allow students to access resources that were previously difficult to reach geographically or environmentally. With access to the internet and various digital platforms, students can explore resources, learning materials, or research relevant to the studied topic [27]. It enriches their learning with new information, case studies, or previously unavailable perspectives. Thus, collaboration in a digital context helps students broaden their perspectives, connect with new people or resources, and enrich their learning with broader information and experience [10], [28]. It helps them develop critical thinking, hones social skills, and prepares them to interact with an increasingly connected and complex world.

In the context of collaborative learning, students work closely with lecturers and practitioners of the workforce to create a collaborative and interactive learning environment [18], [29]. Nowadays, learning no longer only takes place in the classroom but also through social networks and information technology [30]. In collaborative learning, students can develop networks with the workforce and lecturers to gain more comprehensive experience and knowledge [3]. In addition, the individual actively builds his knowledge through experience and reflection [15]. In the context of synergy between the workforce, students, and lecturers, this concept can help students to develop their understanding of how theory can be applied in practice. Collaboration between companies, students, and lecturers to create innovative solutions to problems faced by industry [9], [22]. In the context of collaborative learning, co-creation can help students to develop skills needed in the collaborative process. Furthermore, in collaborative learning, students must be able to interact in certain situations. Situated learning creates synergy between the workforce, students, and lecturers, and this theory can help students to understand how the approach can be applied in relevant and specific contexts in the workforce.

2.2. The concept of synergy

Synergy is a concept in which the combination of two or more elements produces an effect more significant than the effect of each component. In collaborative learning, synergy is created when the workforce, students, and lecturers work together to achieve the same goal: developing skills relevant to industry needs [31], [32]. Novelty synergy between the workforce, students, and lecturers in collaborative learning refers to a learning approach in which the three entities work together synergistically to achieve more effective learning goals. The following are some critical elements in synergy. First, in collaborative learning, students and lecturers work together as partners in the learning process. Lecturers act as facilitators, guides, and sources of knowledge, while students actively participate in exploration, discussion, and problem-solving. This collaboration creates an environment where students can learn from lecturers' practical experiences and share their knowledge and perspectives [33]. Second, collaborative learning can facilitate the direct application of academic concepts. Lecturers can bring real examples and case studies from the workforce into the classroom, so students can see the relationship between theory and practice more clearly. Equipping students with relevant skills and knowledge prepares them to enter the workforce upon graduation [18], [34].

Third, greater synergy can be achieved by involving stakeholders from the workforce, such as industry professionals, companies, or related organizations. In collaborative learning, these stakeholders can be guest speakers, provide assessment and feedback on student projects or assignments, or participate in other learning activities. Engaging students in real-world experiences through internships and collaborations help them establish valuable connections, broaden their professional network, and gain deeper insights into the evolving demands and expectations of the workforce [4], [17]. Lastly, collaborative learning often involves project-based learning, where students work in groups or teams to complete assignments or projects relevant to their field of study [5], [26]. Throughout this process, students develop vital skills such as teamwork, effective communication, problem-solving, and the integration of knowledge. Lecturers act as mentors and provide direction while students could develop collaborative, leadership, and time-management skills. With the synergy between the workforce, students, and lecturers in collaborative learning, learning is expected to be more relevant and interactive and provide better preparation for students to face future workforce challenges. Figure 1 shows the synergy of three elements of collaborative learning.

2.3. The concept of education is responsive to the needs of the workforce

Education responsive to workforce needs involves developing curricula aligned with contemporary business requirements [7], [35]. Collaboration between the workforce, students, and lecturers cultivates skills relevant to the job market. Regular curriculum updates keep pace with technological advancements. Practical

training and internships prepare students for the workforce, providing exposure to professional and industry standards. Fostering 21st-century skills like communication, creativity, collaboration, and problem-solving is crucial. A comprehensive educational approach that integrates these elements ensures that graduates are equipped to meet the workforce's expectations and thrive in the modern world [13]. These proficiencies are increasingly sought in today's job market, enabling individuals to adapt swiftly and excel in team-based environments [8], [11].
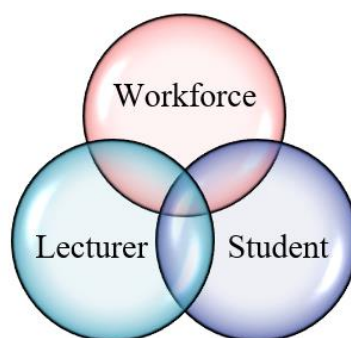

Figure 1. The synergy of three elements of collaborative learning in office practice

In recent years, online learning platforms, web-based systems designed for educational purposes, have gained significant attention to facilitate collaborative learning and enhance the synergy between the workforce, students, and lecturers [30], [36]. Utilizing learning management systems (LMS), an online learning platform, has revolutionized traditional education methods, offering a range of benefits for all stakeholders involved [37]. These platforms enable educators to create and deliver online courses, provide resources such as multimedia content and interactive assessments, facilitate communication and collaboration among participants, and track student progress [27], [38]. One of the critical advantages of online learning platforms is the ability to foster collaboration between the workforce, students, and lecturers. Through LMS, students and lecturers can engage in real-time discussions, share resources, and collaborate on projects, regardless of their physical location. This collaborative approach allows for the exchange of diverse perspectives and experiences, enriching the learning process for all participants.

Project-based learning is a concept where students learn through projects or assignments related to real life [39]. In collaborative learning, students work with lecturers and practitioners of the workforce to complete projects or assignments relevant to the industry [13], [34]. Project-based learning (PjBL) is a collaborative learning technique that allows students to learn through significant, results-oriented projects [40], [41]. PjBL can be applied in office practice learning by providing projects that demand cooperation and joint problem-solving. Educational goals can be achieved through methodologies like service learning, design thinking, and the flipped classroom approach. Service learning involves students learning through providing services to the community or organizations. Continuous learning emphasizes lifelong skills development and collaboration between students, lecturers, and the workforce. It creates a sustainable learning environment and prepares individuals for the evolving job market. Concepts like self-directed learning [42], lifelong learning [43], and experiential learning [44] can be utilized to foster continuous learning. These diverse methods and concepts contribute to a comprehensive and practical educational experience.

In collaborative learning, continuous learning can be achieved through developing social and collaborative skills, information and communication technology skills, and skills that follow the demands of the job market and the workforce's needs [16]. With collaboration between the workforce, students, and lecturers, students can gain work experience and practical knowledge that can help them prepare for future challenges [45]. Continuous learning can encourage students to continue learning and developing skills outside the classroom through internships, work experience, or volunteering. In this way, students can develop the skills needed to succeed in the workforce and continue to adapt to future changes [14]. It is, therefore, crucial to integrate work experience into learning to prepare students for their careers. Within the synergy framework among the workforce, students, and lecturers, work-integrated learning (WIL) facilitates the connection between theoretical knowledge acquired in the classroom and its practical application in the workforce [3], [30].

3. RESEARCH METHOD

This study aims to analyze the application of technology in collaborative learning, focusing on online platforms so that students who attend lectures remotely can connect with the workforce and gain work experience relevant to their field of study. This research is expected to create synergy between the workforce, students, and lecturers and improve the quality of learning and career readiness after graduation.

To fulfil the study's objectives, researchers employ the case study method, which enables an in-depth exploration of specific phenomena within particular contexts [46]. Researchers can select an organization or institution that implements collaborative learning, allowing them to investigate the synergy between the workforce, students, and lecturers within that setting. Case study research, a qualitative approach outlined by Creswell and Poth [47], involves a systematic process comprising five steps: planning the case study, data collection, data analysis, result interpretation, and result reporting as shown in Figure 2.
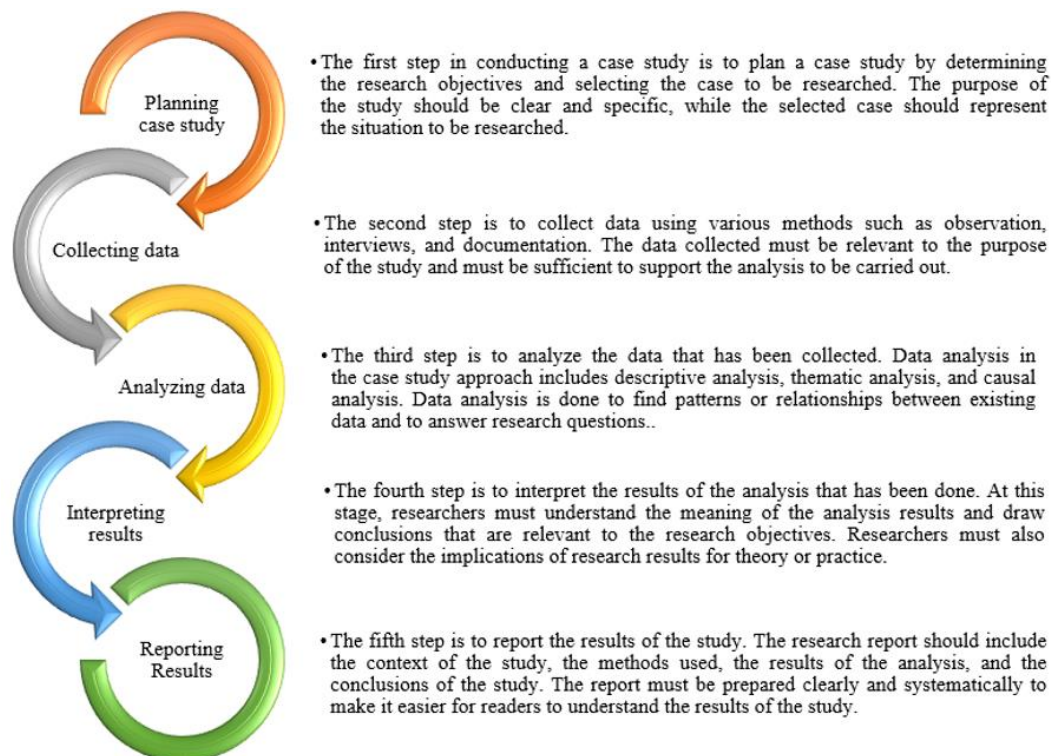

Figure 2. Case study research step [47]

Data collection in this study used questionnaires, interviews, and field observations. The subject research was conducted on students of the Digital Office Administration Study Program class of 2019 Faculty of Economics, Universitas Negeri Jakarta, Indonesia. Data was collected through interviews with four Industrial Supervisors (PI), four students, and two lecturers. Furthermore, questionnaires were distributed to 29 students, and observations were made in office practice classes. Questionnaires can be used to measure how effective collaborative learning programs are in improving students' skills, the program's relevance to the workforce's needs, and the program's effectiveness in preparing students for work in the workforce.

Meanwhile, interviews with workforce practitioners, students, and lecturers can provide a more in-depth view of the benefits of collaborative learning programs, their expectations for the future, and how programs can be optimized from the perspective of the workforce. Field observations and feedback from supervisors can provide an overview of students' abilities and skills, how active students are in collaborating, and how effective the program is in improving student performance in the workplace. After that, the data is analyzed to understand better the case and how it can be resolved or improved. The study employed data analysis techniques, as suggested by Miles and Huberman [48], which included data reduction, data presentation, and inference/verification.

4. RESULTS AND DISCUSSION

4.1. Results

The analysis shows that the synergy between the workforce, students, and lecturers can expand the range of learning and increase the flexibility of time and place; with online platforms, students can study anywhere and anytime, allowing them to learn the material most effectively. Lecturers can also access state-of-the-art resources and learning aids and hold discussions and group work online. In collaborative learning with an online platform, the results achieved are expected to be more effective in developing communication, collaboration, and problem-solving skills. Students' utilization of technology for online communication and collaboration fosters the development of essential technical skills and enhances their ability to collaborate effectively. Moreover, integrating online platforms boosts student engagement and active participation in the learning process by facilitating direct interaction and expedited feedback among peers. Figure 3 illustrates student skills improvement before and after using online platforms in collaborative learning model.
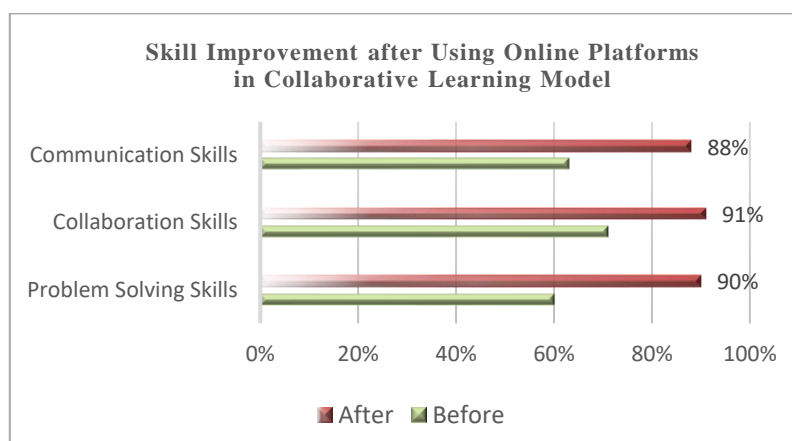

Figure 3. Chart of skill improvement

Meanwhile, when viewed from a student point of view, the collaboration between the workforce, students, and lecturers is essential in collaborative learning using online platforms because this can help students gain work experience relevant to the field of study. In addition, this collaboration can also help students understand how the theory learned in the classroom can be applied in the workforce. One of the benefits of collaborating with the workforce and lecturers in collaborative learning through online platforms is the opportunity to learn from experienced practitioners according to their fields of study. In addition, this collaboration can also help students gain skills needed by the workforce, so they are better prepared for work after graduation. Employing online platforms in collaborative learning is a highly effective means to engage with the workforce and acquire enhanced practical experience. By leveraging these platforms, students can actively participate in projects supervised by industry professionals and educators, enabling them to gain firsthand insights into the specific field or profession they aspire to pursue.

Students are optimistic that involving the workforce in learning can gain greater insight into the industry or job they want to enter and gain the skills needed by the industry. The synergy between the workforce, students, and lecturers in collaborative learning can increase added value for students during college. In addition, discussion sessions and discussions involving the workforce help students better understand how theoretical concepts can be applied in practice. In addition, the workforce also allows students to build a more comprehensive network and potentially open career opportunities in the future.

Based on the perspective of industry supervisors as representatives of the workforce, the use of online platforms in collaborative learning as an excellent opportunity to engage directly with students and lecturers by sharing the experiences of industry supervisors can help students understand how theoretical concepts can be applied in practice. In addition, industry supervisors can also assess students' abilities directly and help them prepare for work in the industry. The synergy between the workforce, students, and lecturers in collaborative learning can increase the relevance between curriculum and industry needs. Industry tutors are pleased that students can get involved in industry projects and gain practical experience to help them better prepare for future work. Figure 4 illustrates the effects of collaborative learning with an online platform model in situations with synergy among the workforce, students, and lecturers.

Based on the results of interviews, the lecturer's opinion explained that using online platforms in collaborative learning helps lecturers expand the range of learning. Lecturers can interact directly with students and the workforce from different locations and gain greater insight into the industry or job students' desire. The collaborative partnership among the workforce, students, and lecturers in collaborative learning represents a powerful approach to enhancing the quality of education. By leveraging these diverse stakeholders' collective experience and expertise, we can effectively equip students with the essential skills sought by industries, enabling them to better prepare for their future careers.
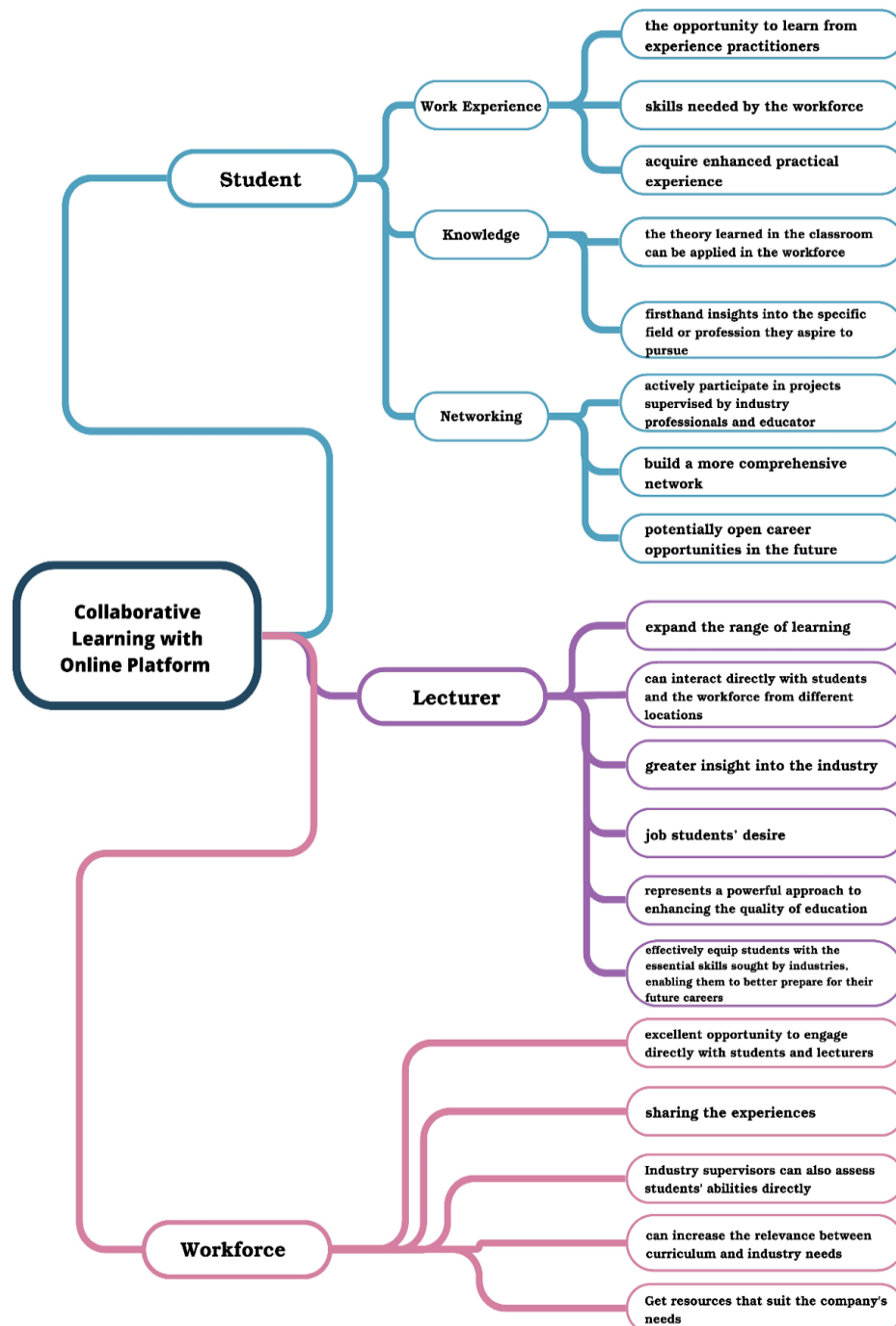

Figure 4. The effects of collaborative learning with an online platform model

Observations are carried out to improve students' teamwork skills and interpersonal skills. There were 29 students involved in the collaborative learning program for six months. The program consists of a series of collaborative tasks performed by small groups. These tasks include business case analysis, preparation of recommendations, and presentation of results to company management and examining lecturers. Each group consists of four members, each of whom has a different role in the group. The results of this case study show that collaborative learning effectively improves students' teamwork and interpersonal skills. Program participants consistently attest to their enhanced ability to collaborate effectively in teams and their heightened understanding of communicating and cooperating with colleagues. In addition, students also experience improvements in business analysis skills and preparation of recommendations. They also reported that this collaborative learning program helped them develop presentation and public speaking skills. Overall, the results of this study show that collaborative learning can be an effective learning method for improving teamwork and interpersonal skills in an office environment.

4.2. Discussion

The synergy between the workforce, students, and lecturers in collaborative learning is essential in improving the quality of education and preparing students with relevant skills for the workforce [45], [49]. The research explores the innovative use of online platforms to create a comprehensive and diverse learning experience. By incorporating technology, students access learning materials, participate in virtual classrooms, use e-books, engage in mobile learning, join internship programs, and connect with practitioners in their fields. This blended approach offers flexibility in time and place, fostering higher student engagement, and faculties members gain valuable input for curriculum improvement.

Synergy among the workforce, students, and lecturers in collaborative learning fosters a dynamic exchange of invaluable knowledge and experience. Lecturers impart their expertise and practical insights from the workforce, enabling students to understand real-world contexts and challenges firsthand [18], [22]. Simultaneously, students bring fresh perspectives and innovative ideas, enriching discussions and contributing based on their unique experiences [4], [12]. The synergy between the workforce and collaborative learning guarantees the direct alignment of taught material with the needs and demands of the industry. Lecturers skillfully bridge theoretical concepts with real-world examples, case studies, or industry-relevant projects [50]. This approach enables students to perceive a tangible link between their learning and practical application, fostering enhanced comprehension and motivation.

In collaborative learning, students learn to work in teams, communicate effectively, divide tasks, and contribute to problem-solving [10], [18]. Collaboration with the workforce helps students develop collaborative skills needed in the workplace, such as adaptability to teams, negotiation, interpersonal communication, and leadership [1], [11]. Students can be better prepared to face team dynamics and work environments through this synergy [51]. The synergy between the workforce and collaborative learning allows students to apply work principles and best practices in the industry. Lecturers can teach concepts relevant to the latest industry expertise and trends [14], [52]. Students can then use this knowledge in projects or assignments that require real problem-solving or industry-based solution development [39], [40]. By immersing students in the actual work context, they gain a comprehensive understanding of the field and become well-equipped to tackle its challenges.

Synergies between the workforce, students, and lecturers in collaborative learning can also provide opportunities to build professional networks and career opportunities [3], [53]. Students can expand their networks and forge valuable connections by engaging with industry stakeholders. Moreover, integrating technology into learning enables students to gain comprehensive and diverse educational experiences [8], [54], [55]. Students learn from textbooks or lectures, can engage directly in work practices, and connect with practitioners in their fields. Such preparation will equip students with better readiness for the workforce after graduation.

5. CONCLUSION

With the synergy between the workforce, students, and lecturers, it is hoped that students can develop skills and experiences relevant to their needs to prepare them well to enter the workforce. In addition, the synergy between the workforce, students, and lecturers is hoped to create mutually beneficial relationships for all parties. The workforce can draw on student and faculty resources to solve problems and explore new ideas, while students can gain valuable work experience and build professional networks. Lecturers can also get input from the workforce to improve their curriculum and teaching methods. Overall, it is expected that the synergy between the workforce, students, and lecturers in collaborative learning can create qualified graduates relevant to the workforce's needs and ready to face challenges in the workforce. Thus, the conclusion of collaborative learning with online platforms can increase the effectiveness of

learning and skill development, flexibility of time and place, and higher student engagement, both involvement as university students and student involvement as peers of fieldwork practices in the workforce. The results have both practical and theoretical implications, practically universities and educational institutions can adopt program development strategies that encourage interaction between students, lecturers and industry practitioners. This of course includes classroom learning, internships, joint projects, or project-based learning opportunities that can be integrated using online platforms. Theoretically, this research contributes to the development of collaborative theory in the context of higher education, it helps understand how patterns of cooperation between students, lecturers and workforce can enrich the learning experience.

This research is also inseparable from several limitations, including i) the sample size may limit the research on synergy between the workforce, students, and lecturers in collaborative learning. A small sample might lack diversity in context, the field of study, or education level, which can restrict the generalizability of research findings; ii) the scope of research focusing on the synergy between the workforce, students, and lecturers in collaborative learning may be relevant to only specific industries or fields. Therefore, it is essential to include various industrial sectors in research for a more comprehensive understanding; and iii) collaboration dynamics between the workforce, students, and lecturers are influenced by external factors such as educational institution policies, changes in the work environment, and industry trends. Based on the limitations of the research, several recommendations are formulated for further researchers: i) future research can use a longitudinal approach to track changes and development of synergies between the workforce, students, and lecturers in collaborative learning over time. By involving continuous observation, research can evaluate the long-term impact of this collaboration on achieving student learning goals and career readiness; ii) considering various contexts in further research will provide a more comprehensive understanding of the synergies between the workforce, students, and lecturers in collaborative learning; and iii) it is crucial to evaluate the impact of synergies between the workforce, students, and lecturers in collaborative learning.

REFERENCES

[1] U. C. Okolie, C. A. Nwajiuba, B. Eneje, M. O. Binuomote, C. Ehiobuche, and D. Hack-Polay, "A critical perspective on industry involvement in higher education learning: Enhancing graduates' knowledge and skills for job creation in Nigeria," *Industry and Higher Education*, vol. 35, no. 1, pp. 61–72, Apr. 2021, doi: 10.1177/0950422220919655.
[2] M. A. V. Bermejo, M. Eynian, L. Malmsköld, and A. Scotti, "University-industry collaboration in curriculum design and delivery: A model and its application in manufacturing engineering courses," *Industry and Higher Education*, vol. 36, no. 5, pp. 615–622, Dec. 2022, doi: 10.1177/09504222211064204.
[3] D. Jonbekova, J. Sparks, M. Hartley, and G. Kuchumova, "Development of university-industry partnerships in Kazakhstan: Innovation under constraint," *International Journal of Educational Development*, vol. 79, pp. 1–10, 2020, doi: 10.1016/j.ijedudev.2020.102291.
[4] M. Cheng, O. Adekola, J. Albia, and S. Cai, "Employability in higher education: a review of key stakeholders' perspectives," *Higher Education Evaluation and Development*, vol. 16, no. 1, pp. 16–31, 2022, doi: 10.1108/heed-03-2021-0025.
[5] J. Jumadi, R. Perdana, M. H. Hariadi, W. Warsono, and A. Wahyudi, "The impact of collaborative model assisted by Google Classroom to improve students' creative thinking skills," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 10, no. 2, pp. 396–403, Jun. 2021, doi: 10.11591/ijere.v10i2.20987.
[6] S. Riyadi, A. M. Sibuea, E. Napitupulu, and P. Dongoran, "Implementation of collaborative learning based on environmental projects building solution of students learning cracter for Covid-19 pandemic time in Padangsidimpuan City," in *KnE Social Sciences*, 2023, pp. 151–157, doi: 10.18502/kss.v8i4.12894.
[7] E. Handayani, S. Wahyuni, and W. N. Yanuarto, "Implementation of the new higher education curriculum in Indonesia: perceptions and participation in the process," *International Journal of Research in Business and Social Science*, vol. 11, no. 3, pp. 237–249, 2022, doi: 10.20525/ijrbs.v11i3.1713.
[8] S. Strachan *et al.*, "Reflections on developing a collaborative multi-disciplinary approach to embedding education for sustainable development into higher education curricula," *Emerald Open Research*, vol. 3, 2021, doi: 10.35241/emeraldopenres.14303.1.
[9] H. Gouda, "Exploring the effects of learning abilities, technology and market changes on the need for future skills," *Higher Education, Skills and Work-based Learning*, vol. 12, no. 5, pp. 900–913, Jan. 2022, doi: 10.1108/HESWBL-10-2021-0200.
[10] S. Lester and M. Crawford-Lee, "Learning from digital adaptations to the pandemic: enhancing work-based higher education," *Higher Education, Skills and Work-based Learning*, vol. 13, no. 4, pp. 786–799, Jan. 2023, doi: 10.1108/HESWBL-01-2022-0008.
[11] R. Krishnamoorthy and K. Keating, "Education crisis, workforce preparedness, and COVID-19: reflections and recommendations," *American Journal of Economics and Sociology*, vol. 80, no. 1, pp. 253–274, Jan. 2021, doi: 10.1111/ajes.12376.
[12] N. T. N. Ha, E. Dakich, and S. Grieshaber, "Factors influencing the participation of industry professionals in Work-Integrated Learning in Vietnamese universities: a qualitative approach," *Higher Education, Skills and Work-based Learning*, vol. 12, no. 3, pp. 574–587, Jan. 2022, doi: 10.1108/HESWBL-03-2021-0042.
[13] K. Torii, *Connecting the worlds of learning and work: Prioritising school-industry partnerships in Australia's education system.* Melbourne: Mitchell Institute, 2018.
[14] D. Jackson, H. Shan, and S. Meek, "Employer development of professional capabilities among early career workers and implications for the design of work-based learning," *International Journal of Management Education*, vol. 20, no. 3, 2022, doi: 10.1016/j.ijme.2022.100692.
[15] H. Mora, M. T. Signes-Pont, A. Fuster-Guilló, and M. L. Pertegal-Felices, "A collaborative working model for enhancing the learning process of science and engineering students," *Computers in Human Behavior*, vol. 103, pp. 140–150, 2020, doi: 10.1016/j.chb.2019.09.008.
[16] A. Oke and F. A. P. Fernandes, "Innovations in teaching and learning: Exploring the perceptions of the education sector on the 4th industrial revolution (4IR)," *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 6, no. 2, pp. 1–22, 2020, doi: 10.3390/JOITMC6020031.

[17]   M. L. Castelló, C. Barrera, and L. Seguí, "Bridging the academia-industry gap in the food sector through collaborative courses and internships," *Education for Chemical Engineers*, vol. 42, pp. 33–43, 2023, doi: 10.1016/j.ece.2022.11.003.

[18]   M. Turnbull, A. Littlejohn, and M. Allan, "Preparing graduates for work in the creative industries: a collaborative learning approach for design students," *Industry and Higher Education*, vol. 26, no. 4, pp. 291–300, Aug. 2012, doi: 10.5367/ihe.2012.0105.

[19]   M. Özer and H. E. Suna, "The linkage between vocational education and labor market in Turkey: employability and skill mismatch," *Kastamonu Eğitim Dergisi*, vol. 28, no. 2, pp. 558–569, 2020, doi: 10.24106/kefdergi.704878.

[20]   A. K. Jäppinen, M. Leclerc, and D. Tubin, "Collaborativeness as the core of professional learning communities beyond culture and context: evidence from Canada, Finland, and Israel," *School Effectiveness and School Improvement*, vol. 27, no. 3, pp. 315–332, 2016, doi: 10.1080/09243453.2015.1067235.

[21]   M. H. Tahili, I. Tolla, M. A. Ahmad, S. Samad, A. Saman, and Pattaufi, "Developing the strategic collaboration model in basic education," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 11, no. 2, pp. 817–828, 2022, doi: 10.11591/ijere.v11i2.21907.

[22]   M. A. Fakomogbon and H. O. Bolaji, "Effects of collaborative learning styles on performance of students in a ubiquitous collaborative mobile learning environment," *Contemporary Educational Technology*, vol. 8, no. 3, pp. 268–279, 2020, doi: 10.30935/cedtech/6200.

[23]   P. Dillenbourg, M. Baker, A. Blaye, and C. O'malley, "The evolution of research on collaborative learning," in *Learning in Humans and Machine: Towards an interdisciplinary learning science*, Oxford: Elsevier, 1996, doi: 10.1186/s40461-021-00114-2.

[24]   C. E. Hmelo-Silver, C. A. Chinn, C. K. K. Chan, and A. M. O'Donnell, *The international handbook of collaborative learning*. London: Routledge, 2013.

[25]   P. S. Lisenbee, J. Pilgrim, and S. Vasinda, *Integrating technology in literacy instruction: Models and frameworks for all learners*. New York: Routledge, 2020.

[26]   H. Aifan, "Implementing a project-based collaborative learning approach using PowerPoint to improve students' 21st- century skills," *E-Learning and Digital Media*, vol. 19, no. 3, pp. 258–273, Dec. 2022, doi: 10.1177/20427530211030642.

[27]   P. T. Pham *et al.*, "Learning management system in developing countries: a bibliometric analysis between 2005 and 2020," *European Journal of Educational Research*, vol. 11, no. 3, pp. 1363–1377, 2022, doi: 10.12973/eu-jer.11.3.1363.

[28]   A. Ensslin and W. Slocombe, "Training humanities doctoral students in collaborative and digital multimedia," *Arts and Humanities in Higher Education*, vol. 11, no. 1–2, pp. 140–156, Dec. 2012, doi: 10.1177/1474022211428897.

[29]   L. de Jong, J. Meirink, and W. Admiraal, "School-based collaboration as a learning context for teachers: A systematic review," *International Journal of Educational Research*, vol. 112, 2022, doi: 10.1016/j.ijer.2022.101927.

[30]   C. Glavas and L. Schuster, "Design principles for electronic work integrated learning (eWIL)," *Internet and Higher Education*, vol. 47, 2020, doi: 10.1016/j.iheduc.2020.100760.

[31]   C. Snyder, N. Hutchins, G. Biswas, M. Emara, S. Grover, and L. Conlin, "Analyzing students' synergistic learning processes in physics and ct by collaborative discourse analysis," *Computer-Supported Collaborative Learning Conference, CSCL*, vol. 1, pp. 360–367, 2019, doi: 10.22318/cscl2019.360.

[32]   A. F. Wise, S. Knight, and S. B. Shum, "Collaborative Learning Analytics," in *International Handbook of Computer-Supported Collaborative Learning*, U. Cress, C. Rosé, A. F. Wise, and J. Oshima, Eds. Cham: Springer International Publishing, 2021, pp. 425–443.

[33]   M. Á. Herrera-Pavo, "Collaborative learning for virtual higher education," *Learning, Culture and Social Interaction*, vol. 28, 2021, doi: 10.1016/j.lcsi.2020.100437.

[34]   Y. Song, R. Berger, M. Rachamim, A. Johnston, and A. Fronzetti Colladon, "Modeling the industry perspective of university-industry collaborative innovation alliances: Player behavior and stability issues," *International Journal of Engineering Business Management*, vol. 14, pp. 1–19, May 2022, doi: 10.1177/18479790221097235.

[35]   A. Dieudé and T. S. Prøitz, "Curriculum policy and instructional planning: Teachers' autonomy across various school contexts," *European Educational Research Journal*, pp. 1–20, Feb. 2022, doi: 10.1177/14749041221075156.

[36]   J. A. Larbi-Apau, I. Guerra-Lopez, J. L. Moseley, T. Spannaus, and A. Yaprak, "Educational technology-related performance of teaching faculty in higher education," *Journal of Educational Technology Systems*, vol. 46, no. 1, pp. 61–79, Jan. 2017, doi: 10.1177/0047239516685849.

[37]   A. Nurabadi, F. Suhariadi, A. Mardiyanta, T. Triwiyanto, and M. A. Adha, "Digital principal instructional leadership in new normal era," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 11, no. 3, pp. 1090–1098, 2022, doi: 10.11591/ijere.v11i3.22483.

[38]   E. Edelhauser and L. Lupu-Dima, "Is Romania prepared for elearning during the COVID-19 pandemic?" *Sustainability (Switzerland)*, vol. 12, no. 13, pp. 1–29, 2020, doi: 10.3390/su12135438.

[39]   D. A. Sudjimat, A. Nyoto, and M. Romlie, "Implementation of project-based learning model and workforce character development for the 21st century in vocational high school," *International Journal of Instruction*, vol. 14, no. 1, pp. 181–198, 2020, doi: 10.29333/IJI.2021.14111A.

[40]   S. Bell, "Project-based learning for the 21st century: skills for the future," *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, vol. 83, no. 2, pp. 39–43, Jan. 2010, doi: 10.1080/00098650903505415.

[41]   R. Christanti and A. A. Sukoco, "Freedom to learn-independent campus policy: Do we really find our freedom?" *Journal of Education and Learning (EduLearn)*, vol. 16, no. 2, pp. 189–198, 2022, doi: 10.11591/edulearn.v16i2.20477.

[42]   M. S. Knowles, E. F. Holton III, R. A. Swanson, and P. A. Robinson, *The adult learner: The definitive classic in adult education and human resource development*, 9th ed. London: Routledge, 2020.

[43]   J. Field, *Lifelong learning and the new educational order*. ERIC Institute of Education Press, 2006.

[44]   D. A. Kolb, *Experiential learning: experience as the source of learning and development*. Western Reserve University, 1984.

[45]   M. Doyle-Kent and B. W. Shanahan, "The development of a novel educational model to successfully upskill technical workers for Industry 5.0: Ireland a case study," *IFAC-PapersOnLine*, vol. 55, no. 39, pp. 425–430, 2022, doi: 10.1016/j.ifacol.2022.12.072.

[46]   R. K. Yin, *Case study research and applications: Design and methods*, 6th ed. London: SAGE Publications, 2018.

[47]   J. W. Creswell and C. N. Poth, *Qualitative inquiry and research design: choosing among five approaches*, 4th ed. Thousand Oaks: SAGE Publications, 2016.

[48]   M. B. Miles and A. M. Huberman, *Qualitative data analysis: An expanded sourcebook*. Los Angeles: Sage, 1994.

[49]   J. Cavanagh, M. Burston, A. Southcombe, and T. Bartram, "Contributing to a graduate-centred understanding of work readiness: An exploratory study of Australian undergraduate students' perceptions of their employability," *International Journal of Management Education*, vol. 13, no. 3, pp. 278–288, 2015, doi: 10.1016/j.ijme.2015.07.002.

[50] R. Rampersad, "Pedagogical approaches to cooperative education in South Africa: A work-integrated learning model for the public relations industry," *Industry and Higher Education*, vol. 24, no. 4, pp. 279–286, Aug. 2010, doi: 10.5367/000000010792609727.

[51] J. Fleming and T. J. Pretti, "The impact of work-integrated learning students on workplace dynamics," *Journal of Hospitality, Leisure, Sport and Tourism Education*, vol. 25, 2019, doi: 10.1016/j.jhlste.2019.100209.

[52] L. Schuster and C. Glavas, "Exploring the dimensions of electronic work integrated learning (eWIL)," *Educational Research Review*, vol. 21, pp. 55–66, 2017, doi: 10.1016/j.edurev.2017.04.001.

[53] P. McIlveen, S. Brooks, A. Lichtenberg, M. Smith, P. Torjul, and J. Tyler, "Perceptions of career development learning and work-integrated learning in Australian higher education," *Australian Journal of Career Development*, vol. 20, no. 1, pp. 32–41, Apr. 2011, doi: 10.1177/103841621102000105.

[54] C. Swart, "An assessment of work-integrated learning for public relations in an open distance learning context," *Public Relations Review*, vol. 40, no. 2, pp. 387–396, 2014, doi: 10.1016/j.pubrev.2013.10.008.

[55] S. J. Prior, P. Griffin, L. O'Brien, and P. J. Van Dam, "Delivering a work-integrated learning postgraduate course during COVID-19: Experiences, challenges and strategies," *Journal of Medical Education and Curricular Development*, vol. 7, Jan. 2020, doi: 10.1177/2382120520965253.

BIOGRAPHIES OF AUTHORS

Marsofiyati is an associate professor of office administration, currently pursuing a Ph.D. in the educational technology study program at the postgraduate level at Universitas Negeri Jakarta. Her expertise lies in managing and coordinating various administrative tasks and operations within a workplace setting. The person holds a teaching position at the Faculty of Economics, Universitas Negeri Jakarta, where they specialize in the study of office administration education. Her research focuses on educational technology and office technology, with a specific interest in office administration educational technology. Her published topics include digital office administration, digital archive, e-correspondence, virtual office, virtual meetings, and learning technology media for office administration. She can be contacted at email: marsofiyati@unj.ac.id.

Etin Solihatin is a Professor of Pancasila and citizenship education technology at the Faculty of Social Science, Universitas Negeri Jakarta. Her areas of expertise are Pancasila moral education, social science, and educational technology. Her published articles are the Development of QR Code-Based Character Education Teaching Materials (2021). She can be contacted at email: etinsolihatin@unj.ac.id.

Robinson Situmorang is a Professor of Educational Technology at the Faculty of Education, Universitas Negeri Jakarta. He has over 40 years of experience as an Academician and is one of Indonesia's educational technology experts. His current research interests include His research focus on instructional design, instructional system development, human performance technology, foundation of educational technology, educational technology research area, and information and communication technology in education. His publication topics include Environmental education in schools (2020), Developing a learning module for equalizing students' competence in the first piano minor course (2020), and the implementation of education for sustainable development (2020). He can be contacted at email: robinsonsitumorang@unj.ac.id.