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RESEARCH ARTICLE

SUSTAINABLE DEVELOPMENT GOAL 4 TOWARDS GOLDEN INDONESIA: CROSS-BORDER EDUCATION

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ABSTRACT - This study explores the importance of balancing hard skills, soft skills, and trends in educational technology innovation in cross-border education to support the ability to adapt to new environments. This study, using document and conceptual analysis. Indonesia implements the concept of cross-border education for Sustainable Development Goal of four through two programs: student exchange and student exchange between ASEAN countries. This program implementation emphasizes the importance of educational institutions in developing soft skills, improving hard skills, and broadening insights into technological trends in education. The higher education curriculum in Indonesia is expected to meet the needs of the labor market with the need for soft skills of 80%, hard skills of twenty per cent and technological trends and innovation for career success. This study identifies various challenges in the implementation of cross-border education in Indonesia, such as the still minimal weight of soft skills in the university curriculum and there are still many obstacles in technological trends and educational innovations, such as the gap in access to technology, digital skills of teachers and education personnel and the availability of quality learning materials. Educational facilities related to technology and educational innovation in Indonesia still need to be perfectly distributed.

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INTRODUCTION

Sustainable Development Goal 4 (SDG4) is a commitment to ensure quality, inclusive, equitable education and encourage lifelong learning for all. This target is a driver for positive change, to emphasizing the transformative power of education to foster an equitable and sustainable world of education (Elfert, M., 2019). To achieve the SDG4 goals in Indonesia, the government has set indicators such as (1) Free primary and secondary education; (2) Equal access to quality early childhood education; (3) Equal access to technical, vocational and higher education; (4) Increase the number of people with relevant skills for financial success; (5) Eliminate all discrimination in education; (6) Universal literacy and numeracy; and (7) Education for sustainable development and global citizenship (Gutiérrez-Ponce, H., & Wibowo, S. A., 2023).

Education for sustainable development and global citizenship can be realized by improving human resources through learning programs such as cross-border education (CBE) without space and time limits. In recent decades, (CBE) has become a means to build capacity at the individual level because it can lead learners to various educational opportunities that are unavailable domestically (Yoshiko et al., 2013). CBE plays a significant role in contributing to the UN 2030 Agenda and provides a robust and comprehensive foundation for achieving the sustainable development goals (SDG4) by fostering international cooperation, intercultural understanding, and exchange of knowledge among countries and peoples and has a significant direct impact on achieving goals such as eradicating poverty, promoting gender equality, improving quality education, providing decent employment, and fostering sustainable economic growth (Lopes et al.; A., 2024). Achieving SDG4 goals through collaboration between countries such as CBE and policy implementation becomes an effective means of practice in environmental protection, promoting peace and social justice, and strengthening global partnerships.

The exchange of educational experiences, innovative methodologies, and scientific knowledge is essential to address global challenges such as climate change, resource scarcity, social inequality, and gender disparities. Through CBE programs, governments and international organizations can move towards more just, inclusive, and resilient societies capable of addressing the challenges of a global and interdependent world. In this context, CBE programs expand learning opportunities for individuals and play a vital role in promoting intercultural dialogue, building more tolerant societies, and forming global citizens committed to sustainability and global solidarity. All learners from various origins or geographical locations have the opportunity to improve their knowledge, technology, hard skills, and soft skills in preparation for facing the challenges of an increasingly competitive and demanding world. However, the social processes that learners experience in a new educational environment can affect growth and development individually and in groups.

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Personality development is a complex process that includes stages of evolutionary growth, namely the emergence of new characteristics compared to previous stages, revolutionary changes such as the loss of previously formed mental traits and qualities, and heterochromatic characteristics can influence personality development, including the sociocultural environment of the educational space (Kim & Lee, 2023; Aliyeva, 2023).

The current era, sociocultural transformation and global value shifts raise questions about students' adaptability to different environments. Universities are the leading institutions of socialization and adaptation, so the fundamental changes in students under new sociocultural conditions pose a real threat of losing their essence. That is why studying the formation of hard and soft skills, their development, and updating their content is a relevant topic of scientific research (Krasnoshchok et al., 2024). Knowledge, psychomotor, affective, and others require a comprehensive understanding of competencies that refer to the formation of individual characterization defined as hard skills and soft skills to consider success in a professional context (Schulze et al., 2017). Exploration of hard skills and soft skills has a close relationship with other types of intelligence, such as general intelligence and technical-practical knowledge, as well as a close relationship with the specific context and concrete action system of students in the new educational environment (Almeida et al.; J., 2023). Hard and soft skills in the scope of individual skills are needed to enter the labour market, adaptability, and can be considered for mitigating sociocultural environmental risks.

Furthermore, the current complex technological pyramid reduces humans to one of the elements of technological logistics. It leads to society grouping into several professionals involved in digital technology and most non-professionals (Timotheou et al., 2023). The CBE program is a means to develop technological trends and innovations to create new platforms and tools for collaboration between countries. Investments can be made through projects that explore great potential, such as virtual reality, artificial intelligence, and online learning, to promote Interaction and knowledge exchange between students from different countries. In the digital era, technological trends and innovations have a role in transforming knowledge and technology in CBE programs internationally. Technology opens the education process widely without space and time constraints. Students can access learning materials wherever and whenever through the online learning platform. However, this opportunity for students in remote areas still faces many obstacles, such as limited internet access. The government can build better educational facilities as an investment in efforts to empower students or students to use them effectively towards quality education. This condition can pave the way towards inclusive, collaborative and global education.

LITERATURE REVIEW

Cross-border education (CBE) is the movement of students, knowledge, programs, education providers, and curricula across national or regional borders as part of the internationalization of higher education that refers to double degree programs, branch campuses, and virtual education delivery. This education model is related to development cooperation programs, student exchange programs, and commercial initiatives. CBE can include higher education, education providers, and profit-oriented which are held in various forms such as face-to-face learning (conventionally meaning students move to the country of the education provider) on foreign campuses, distance learning with the application of technology, and e-learning (Knight, J., 2006; Knight, 2008; OECD & World Bank, 2007). The latest forms of CBE are twinning arrangements, joint degrees, dual degrees, franchising, and branch campuses involving a program or education provider (Koda et al., T., 2013). Some of the critical aspects of CBE are: (1) Form: Education can take many forms, including identical education programs, branch campuses, double degrees, and education delivered online; (2) Provider and Recipient Countries: The provider country is the source of the program or qualification, while the recipient country delivers the program; (3) Approach: There are various approaches to cross-border education, such as mutual understanding, skilled migration, and income-generating approaches.

This comprehensive definition of cross-border education refers to people, programs, providers, and reference materials that cross borders using various modalities. It differs from transnational education by placing national boundaries as the central concept, whereas cross-border education emphasizes that each learner and the awarding institution are in different countries. This type of education offers many opportunities, such as increased access to higher education, strategic alliances between countries, and expansion of human resources and institutional capacity. CBE is an educational context that refers to collaboration between countries to provide learning opportunities without geographical limitations through the exchange of educational experiences, innovative methodologies, and scientific knowledge essential in addressing global challenges. This educational model is vital in promoting intercultural dialogue, building a more tolerant society, and forming global citizens committed to sustainability and international solidarity. This article examines how hard skills, soft skills, and trends in technological innovation have an essential role in adapting students in Cross-border education so that Sustainable Development Goal 4 can be achieved in Indonesia.

Soft skills are interpersonal skills, namely a person's ability to interact with others, and intra-personal skills, namely a person's ability to manage themselves and develop them optimally in professional activities. Personality traits, attitudes, and behaviours in soft skills are intangible but have a visible side in the adequate and desired behaviour, resulting from the qualities of leadership, facilitation, mediation, and negotiation that emerge as valuable tools in utilizing individual potential (Dabke, 2015). Soft skills are associated with professional career development but are related to non-technical behaviour (Klaus, 2007). Examples of soft skills include the habit of being on time, adaptability in organizations, communication skills, leadership, teamwork, negotiation skills, time management, stress management, and ethics (Dean

& East, 2019). Soft skills can be applied in different professional environments from those in which they were acquired, adapting to different professional performances (Sá & Serpa, 2018; Schulz, 2008; Succi & Wieandt, 2019).

Hard skills (HS) are specific technical skills that are quantitative, tangible, and measurable, can be proven with a diploma or certificate, and are directly related to professional activities. HS includes the level of academic training, knowledge accumulated in the professional path, practical knowledge, language skills, and computer skills (Robles, 2012). HS synthesizes competencies such as mobilizing, integrating, and transferring knowledge, resources, and skills in a specific professional context and situation. Competencies can be positioned as knowledge, namely knowing what to do; Ability to know how to do it; and attitude, namely the desire to do it (Sá & Serpa, 2018).

RESEARCH METHODS

This study is an integrative, descriptive, and explorative review. The research question is: What hard skills, soft skills, and technology trends should educational institutions develop to equip students to participate in the cross-border education program initiated by the Indonesian government to achieve SDG4 goals? Data was collected through a database from the Indonesian Ministry of Education and Culture (KEMDIKBUD) link and articles related to this study, such as developing soft and hard skills, sustainable development (SDGs), and educational technology innovation.

The goal of SDG 4 in Indonesia is quality education, which is described as ensuring inclusive and equitable quality education and increasing lifelong learning opportunities. Indonesia has three education programs to achieve these goals: student exchange and student exchange between ASEAN countries (cross-border education). Student exchange is a program that provides opportunities for students to study at other educational institutions both domestically and abroad from certain institutions. Two countries generally implement this program. Student exchange is a program that facilitates students' study at other schools or universities, both domestically and abroad. This program is implemented for a duration of one or two semesters. The student exchange program (cross-border education) between ASEAN countries is an educational program that supports regional integration through cooperation. Through this program, students and students from ASEAN member countries can broaden their horizons to get to know and learn about the culture, education system, and learning environment in ASEAN countries.

Universities must be able to design and implement innovative learning processes so that students can optimally achieve learning outcomes that cover aspects of attitudes, knowledge, and skills and are always relevant. The Independent Learning-Independent Campus (MBKM) Program, as one of Indonesia's efforts to achieve SDG4, is expected to be able to answer the challenges of universities to produce graduates who are in line with the times, advances in science and technology, demands of the business world and the industrial world, and the dynamics of society. (Krisnanik, Saphira, & Indriana, 2021). Cross-border education implements the MBKM policy to develop hard skills, soft skills, science and technology. The expected development of hard skills includes (1) Academic knowledge, namely taking courses at other universities that may not be available at the home university; (2) Practical experience, namely using facilities and technology available at the destination campus; (3) Technical skills, namely developing specific skills according to their respective fields of study. Soft skills developed through CBE include: (1) Communication skills, Students learn to interact with new and diverse environments; (2) Leadership, namely the opportunity to lead projects or study groups; (3) Teamwork, namely working with students from various backgrounds; (4) Adaptability, namely adjusting to different cultures and education systems. The CBE program improves academic competence and prepares students to face challenges in the increasingly complex work and social life world. In student exchange programs such as cross-border education, students and educational institutions can take many benefits such as:

i. Cultural experience: learning and understanding new cultures to broaden horizons and increase tolerance.
ii. Language skills: Studying abroad requires students to strengthen their foreign language skills through direct practice at the target school or college.
iii. Soft skill improvement: Adapting to challenges in a new environment is necessary. This condition will increase students' independence, self-confidence, and problem-solving skills.
iv. International network: Students can create a network of friends to broaden their professional horizons, which will be helpful in the future.
v. Academic improvement: Different conditions and environments will give different results. Students have the opportunity to improve their academic abilities in different education systems.

The essential requirements that must be prepared include:

i. Important documents such as (a) Passport: Make sure your passport is still valid for at least 6 months after the return date; (b) Visa: Arrange a student visa according to the destination country; (3) Health Insurance: Have health insurance that covers treatment abroad.
ii. Academic preparation such as (a) Transcripts: Bring copies of transcripts and other academic documents and (b) Study Plan: Know the subjects or courses that will be taken in the destination country.
iii. Health, such as (a) Vaccinations: Ensure you have received the vaccinations required for the destination country and (b) Medicines: Bring personal medicines and doctor's prescriptions if needed

iv. Finances such as (a) Reserve Funds: Prepare reserve funds for unexpected needs and (b) Credit/Debit Cards: Bring a credit or debit card that can be used abroad.

v. Mental and emotional preparation includes (a) cultural knowledge, which teaches about the culture, customs, and habits of the destination country, and (b) language, which improves your language skills in the destination country if necessary.

vi. Communications such as (a) Emergency Contact Numbers: Save emergency contact numbers, including the embassy or consulate of your home country and (b) Communication Apps: Download communication apps that can be used to stay connected with family and friends.

vii. Personal Items such as (a) Clothing: Bring clothes that are appropriate to the climate and culture of the destination country and (b) Personal Items: Bring critical personal items, such as a laptop, cellphone, and charger (Copilot with GPT-4 (bing.com).

In 2021, the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) launched the Independent Curriculum to improve the quality of education in Indonesia through a contextual, inclusive, and student-centred approach. Also, in 2021, Kemenristekdikti officially launched the Independent Student Exchange Program (PMM) and the Program of Indonesian International Student Mobility Awards (IISMA) as an implementation of the independent learning campus (MBKM) program.

The PMM program is a domestic student exchange program that was implemented for one semester. It is equivalent to credit recognition of up to 20 credits.

Table 1. Data on participants and universities receiving PMM

Year	Participants	Recipients College
2021	11.751	215
2022	12.420	138
2023	15.505	204
2024	16.000	128

Table 1 shows that the number of students interested in the PMM program is increasing, but the number of universities willing to accept PMM program participants still fluctuates. To increase the role of universities in accepting PMM programs, an evaluation of the program's results, both the benefits and obstacles, must be carried out.

In the implementation of cross-border education, the Indonesian government provides the Indonesian International Student Mobility Scholarship (IISMA), a scholarship scheme organized by the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia in collaboration with the Education Fund Management Institute (LPDP) to finance Indonesian students who will be placed in various leading universities and leading industries abroad. This program is implemented for one semester, namely four to six months, with the target being universities abroad as partners. Two schemes are offered: the scheme for undergraduate students (S1) and the vocational student scheme (Diploma). The aim is to train Indonesian students, especially those interested in socio-culture and academic climates, by working on projects and academic practices to hone and improve their skills internationally. Table 2 below shows an overview of the year of implementation, the number of applicants and the formations provided by the government related to the IISMA program.

Table 2. Data on IISMA program applicants and recipients

Year	Participants	Accepted participants
2021	2.546	955
2022	7.501	1.150
2023	9.116	1.692
2024	11.029	2.275

Based on Table 2, student interest in the IISMA program is very enthusiastic, and the increase in registration is many times compared to previous years. The increase in IISMA registration must be a severe consideration for the government, especially regarding the increased quality achieved by IISMA participants with the available budget. Enthusiasm for the CBE program has increased significantly every year. According to a report by IDP Australia (2002), this condition estimates that demand for international education will increase fourfold from 1.8 million students in 2000 to 7.2 million in 2025.

RESEARCH FINDING AND DISCUSSION

Development of Soft Skills and Hard Skills in the 21st Century

Universities must make maximum efforts to equip students with hard and soft skills through education in and outside the classroom. They can involve all students in association activities at university and study program levels. At this time, hard skills in technological growth and development, knowledge, and professional skills are becoming obsolete quickly,

so adaptability or soft skills are needed (Mykytuk et al., 2023). Complex problem-solving education and training carried out by universities can be used to express individual qualities (Tropin et al., 2021). One crucial technique for training students to solve problems and develop their professional activities is integrating and developing flexible skills in the learning process (Almeida & Morais, 2023).

In general, universities in Indonesia offer hard skills development. Around ninety per cent of the rest is soft skill development. This is certainly very far from the needs of the labour market, which states that the need for soft skills is eighty per cent and twenty per cent is hard skills for someone to succeed in a career. To achieve the SDG4 goals towards a golden Indonesia, it must refer to the needs of professional workers in the 21st century. The results of the cross-border education program, namely the PMM and IISMA programs, must be reflected in the quantity and quality of students' hard and soft skills to compete globally as professionals. The effectiveness of professional workforce activities depends on many factors, including the quality of hard skills and soft skills that are professionally significant. In the process of activity, these hard skills and soft skills undergo modification, development, and self-improvement according to their environment (Basyuk et al., 2023). The concept of hard and soft skills, such as knowledge, skills, and special abilities needed for certain positions in specific organizations, is a trend in modern scientific research. Hard skills are abilities that a person has in the form of technical skills that can be obtained from formal education, training, or work experience. Soft skills are non-technical abilities that can be developed through habituation to form personal character. In this context, there is a significant relevance between hard skills and soft skills in showing professional self-quality (Cowan & Kodak, 2024).

The need for hard skills depends on the intended field of work, such as coding, which is a skill that a programmer must possess. Some of the hard skills needed in the 21st century for manufacturing to energy are coding (the ability to master technology such as Python, Java, or HTML), data analysis (data scientist or business analyst), graphic design is generally used in the creative world with tools such as Photoshop or Illustrator, digital marketing (Google, social media marketing, or email marketing), project management (can be developed through certified training such as project management professional), financial analysis (the ability to prepare financial reports, budget analysis, and predict cash flow), public speaking (the ability to master formal public speaking techniques), copywriting (the ability to write interestingly and effectively for readers in an effort to promote products or services), video editing (visual content in the form of videos is very popular today with tools such as Adobe Premiere or Final Cut Pro), cybersecurity (the ability to protect data and systems from cyber-attacks), search engine optimization (SEO) is usually used in online businesses or content creators, sales and negotiation, namely the ability to offer products and negotiate, data base management (mastery of several tools such as SQL or Oracle), foreign language proficiency (mastery of foreign languages, especially languages that are widely used in the international world (such as English, Mandarin, or Spanish), and mechanical engineering (skills in the field of mechanical engineering such as the ability to design, develop, and maintain mechanical machines or systems).

Soft skills are critical in specific professional fields and in general to achieve success in life (Yong & Ling, 2023). In addition, soft skills can play a role in improving and developing a personality that will significantly support students' professional careers in the future. At the same time, acquiring soft skills depends on more than just learning. For example, emotional intelligence training lays a strong foundation for improving skills from experience gained through trial and error. Soft skills are also needed to overcome risks and adapt to new environments. The main factor in overcoming risks is the improvement of universal soft skills that can significantly increase professional effectiveness in the future (Krasnoshchok et al., 2024). In addition, forming soft skills in students in an educational environment is very important for sustainable development goals (SDGs). Thus, it is wise to consider and study the impact of risks, especially sociocultural factors, on forming students' soft skills (Rukman et al., 2023). The risks that students in cross-border education programs often face are cultural adaptability, language skills, health, safety, costs, and academic abilities.

Higher education faces the challenge of radically transforming the sociocultural environment due to globalization, innovation, informatization, commercialization, marketization, and privatization of social life (Krasnoshchok et al., 2024). This condition emphasizes that the higher education system is fundamental to individual socialization. Education and fostering in higher education is an integrated process to develop and train professional competence, broad knowledge, culture, and creative thinking and form a holistic and unique personality (Espina-Romero et al., 2023). Some of the primary soft skills to help students adapt to the sociocultural environment are Comprehensive problem solving, Critical thinking, creativity in the broadest sense, ability to manage people, Interaction with people, Emotional intelligence, to form your own opinions and make decisions, Customer focus, Negotiation skills, and flexibility of the mind Adapting (Krasnoshchok et al., 2024).

Comprehensive problem solving is the ability to analyze problems at various levels of complexity and find practical solutions, considering various aspects and possible consequences. Critical thinking is evaluating information objectively, understanding reasons and evidence, and formulating reasonable and objective conclusions. Creativity is creating new ideas, solutions, and approaches to solving problems and applying them in practice. Managing people effectively manages work and interpersonal relationships and motivates teams to achieve common goals. Interaction with people is Building and maintaining effective interpersonal relationships and demonstrating empathy, tolerance, and listening skills. Emotional intelligence is the ability to understand, control, and express their own emotions and empathetically understand and respond to the emotions of others. Forming your opinions and making decisions is the ability to analyze information,

evaluate alternatives, and choose the best course of action, considering your values and beliefs. Customer focus is the ability to understand and meet customer needs and expectations by actively working to improve the quality of service or product delivery. Negotiation skills are building mutual understanding and reaching mutually beneficial agreements when negotiating and agreeing to terms and agreements with other parties. The flexibility of the mind Adapting is having the ability to adapt flexibly to new conditions, quickly changing views and approaches in solving problems, and learning from mistakes. Schooley (2017) stated that companies, governments, and business organizations have observed several gaps in soft skills in new professional engineering graduates in recent years. Therefore, Higher Education Institutions must build curricula that are tailored to the demands of the labour market that allow the development of soft skills in the teaching and learning process (Almeida et al.; J., 2023), this approach must be directed both to professional practice and to the personal and social development of individuals (Chamorro Premuzic, et al., 2010).

Furthermore, there is a paradigm shift in higher education where, in previous centuries, the main task was to train and develop critical thinking skills, build causal relationships, and create intellectual products (Wulandari et al., 2023). In today's era, technological developments are so rapid that students do not need high-level knowledge search skills because computers can do this task. The average computer user plays the computer as a machine used to reproduce information and knowledge, while artificial intelligence has a creative role that differentiates the abilities of each individual (Hladoshchuk et al., 2023). Universities provide various forms, such as formal and informal student associations, to facilitate student activities and help shape and develop various competencies (Volkova et al., 2020). Even world-class universities develop students' personalities and soft skills as specific targets by assigning many student associations to involve all students in their association activities (Danilyan et al., 2018). This shows that developing personality and soft skills is essential to education. Soft skills such as creativity, time management, problem-solving, and emotional intelligence (Almeida & Buzády, 2019) are essential for a professional and everyone who wants to succeed in the modern world (Afroze et al., 2019).

Soft skills will develop optimally if the soft skill-based learning process is included in the curriculum and there is a commitment from the university. In addition, the competence of educators must be directly proportional to the soft skill-based curriculum that has been designed. Lecturers are the spearheads in realizing the curriculum must be able to change the mindset in learning, such as: (1) Knowledge is the result of construction or transformation of students, so the role of Lecturers is to facilitate students to rediscover knowledge not just transfer knowledge; (2) Learning is the process of actively and explicitly seeking and constructing knowledge not just receiving knowledge; (3) Teaching is a process to help students learn with various strategies not just carrying out teaching that has been designed.

Trends in Technological Innovation in Education

To help achieve the SDG4 goals towards a Golden Indonesia, we must encourage education transformation through potent tools today, namely technology and innovation. By considering and analyzing the challenges and utilizing the opportunities that arise, Indonesia can develop a quality, inclusive, and equitable education system for all citizens by the mandate of the 1945 Constitution of the Republic of Indonesia. Emerging trends and technological innovations have played an essential role in the evolution, especially in Cross-Border Education. Devices such as virtual reality, artificial intelligence, and current learning are revolutionizing how students interact, learn, and collaborate nationally and internationally. Mobile platforms and applications allow instant information sharing and access to educational resources from various countries, creating a global learning environment. In addition, automatic translation integration systems and video conferencing have eliminated language barriers, encouraging effective communication between participants and teachers from various countries. These technological trends and innovations can potentially increase the accessibility, quality, and relevance of cross-border education, providing a more comprehensive educational experience. One of the widely used devices is the computer. Computers play an essential role in education, such as developing human resources, increasing the quantity and quality of communication, simplifying administrative systems, and developing learning models. Computers can make many fundamental contributions to the advancement of education, especially teaching and learning activities. Computers can overcome individual student differences, teach concepts, calculate, and stimulate learning (Siann, G., Macleod, H., Glissov, P., & Durndell, A., 1990).

The use of computer technology in educational progress and innovation is increasingly rapid. Educational progress and innovation, especially in teaching and learning activities and the design of interactive teaching materials, require computer technology. Computer programs can be implemented to teach several concepts that are difficult to handle manually, require high accuracy, require much repetition, and require concept exploration. This condition provides opportunities in software development. The use of computer software for learning activities is unlimited (Fey & Heid, 1984, p. 21). The potential of computer technology as a medium in the teaching and learning process is so great (Fletcher, 1983, p. 1). The advantages of computers, especially in the teaching and learning process, are: (1) Unlimited patience, not related to feelings like humans in general; (2) Ability to motivate students with specially designed praise; (3) Provide opportunities to experiment without being haunted by fear of damage that can occur; (4) Non-discriminatory; (5) Provides students with valuable skills for their future; (6) Accelerating the calculation process which if done manually would take a very long time to complete, or even be impossible to do at all (Wepner, 1990; Bialo & Sivin, 1990; Braun, 1990; Robertson, 1987). Interactive learning can be created using computers and provides several advantages, such as (1) Improving student abilities, (2) Accelerating student mastery of concepts, (3) Improving student memory, and (4) Improving students' positive attitudes towards science. (Kulik, 1985; Bangert-Drowns, 2004). The benefits of computers

in learning are: (1) Training students to explore concepts; (2) Improving reasoning skills; (3) Encouraging students to think systematically, logically and analytically; and (4) Improving student interest in learning. The types of interactions that can be designed in computer-based learning are (1) Exercises and Practice, (2) Tutorials, (3) Simulations, (4) Interactive discovery; (5) Games; (6) Presentations or demonstrations; (7) Communication; (8) Tests; and (9) Information Sources.

Teachers can develop several interactive learning software to involve students in learning, such as (1) Identifying mathematical ability demands in the curriculum, (2) Evaluating existing software, (3) Improving the quality of existing software, and (4) Developing new software. Although computer-based learning is a trend in the world of education, there are also limitations, such as in the implementation of interactive learning, namely: Computers are not a panacea; (2) Computers cannot replace the role of teachers; (3) Computer programming languages are difficult to master; (4) Making teaching materials with computers is very time-consuming, and (5) Interactive teaching material makers must also master the field of pedagogy.

The development of technology and innovation in education can change the learning paradigm such as (1) Learning is more interactive and exciting through the use of virtual reality (VR), augmented reality (AR), and simulations will encourage students to understand complex knowledge/concepts and can generate better learning motivation; (2) Wider access to education by utilizing internet facilities and online learning platforms so that everyone can access learning materials without being limited by space and time. Learning techniques like this can be used as a means for equalizing and equalizing education and increasing inclusion, especially for marginalized students; (3) Personalizing learning through the use of technology such as adaptive learning and artificial intelligence (AI) can help teachers adjust teaching materials and learning methods according to the needs and abilities of students personally, and (4) Optimizing educational administration through the use of educational management tools and educational data systems. Technology like this can help teachers and school administration staff work efficiently and effectively in managing their tasks so that it can save time and resources and focus on improving the quality of learning. Some examples of the application of technology and innovation in the teaching and learning process are (1`) virtual classes through learning platforms such as Zoom and Google Meet can reach students without being limited by location; (2) Online learning can use platforms that can be accessed by anyone such as Khan Academy and Coursera which provide various learning materials and online courses; (3) Educational applications such as Ruang Guru and Zenius which provide learning materials and can be accessed via smartphones or tablets; and (4) Educational games such as Minecraft Education Edition and Kahoot are interactive and fun learning for students.

Although technology and innovation provide the hope of better-quality education outcomes, challenges still need to be overcome, such as the gap in access to technology, digital skills of teachers and education personnel and the availability of quality learning materials. Educational facilities related to technology and educational innovation in Indonesia could be more evenly perfect. Textbooks, complete computer laboratories, internet, and classroom equipment are obstacles to providing a more complete and adequate learning experience. With access to these materials and facilities, students feel it is more accessible, and teachers find it easier to provide varied and exciting learning (Sukmana, O., 2024). Educators are at the forefront of producing quality learning outcomes. Therefore, educational institutions and governments must have continuous development programs to facilitate and encourage the training of teachers and facilitators, equipping them to effectively utilize these innovative tools in the context of cross-border education. Through workshops, training sessions, and capacity-building programs, educators will be equipped with the skills to make the most of these emerging technology trends. In this way, they can promote inclusive and global education, enriching the student experience and preparing them for today's challenges. These innovations also enable students to access various educational resources regardless of location. For example, students can explore far-flung places through virtual reality and have immersive experiences without leaving the classroom. Artificial intelligence also plays a vital role by providing students with immediate and personalized feedback on their performance, allowing them to improve their skills and knowledge more efficiently. Online learning, in turn, allows students and teachers to connect beyond physical boundaries, facilitating real-time collaboration and exchange of ideas. Through online learning platforms, students from different countries can work on projects together, share information, and learn from each other, enriching their learning process and broadening their horizons.

Although technology and innovation hope for better quality education outcomes, challenges still need to be overcome, such as the gap in access to technology, the digital skills of teachers and education personnel, and the availability of quality learning materials. Educational facilities related to technology and educational innovation in Indonesia could be more evenly perfect. Textbooks, complete computer labs, internet, and classroom equipment are obstacles to providing a more complete and adequate learning experience. In practice, the challenges that must be faced, especially by teachers, are: (1) This learning method takes longer because not all students can quickly understand how to use technological tools or other interactive activities, so that learning can be slower; (2) Teachers need extra effort to keep the class orderly, especially when learning activities involve a lot of Interaction and freedom, which can trigger noise; (3) If teachers fail to manage the class well, the classroom atmosphere can become noisy and uncontrolled, which can disrupt student concentration and reduce learning effectiveness; and (4) Technical disruptions such as unstable internet connections, damage to aids, and others can affect the learning process, especially if using technological applications or online learning so that student's understanding of the material can be hampered.

CONCLUSION

To help achieve the SDG4 goal towards Golden Indonesia, which is implemented through cross-border education, the curriculum in Indonesia must provide around twenty per cent hard skills and eighty per cent soft skills and encourage educational transformation through potent tools today such as technology trends and innovation by considering and analyzing challenges and utilizing emerging opportunities so that Indonesia can develop a quality, inclusive, and equitable education system for all citizens and be able to compete globally. Some of the hard skills needed in the 21st century are coding, data analysis, graphic design, digital marketing, project management, financial analysis, public speaking, copywriting, video editing, cybersecurity, search engine optimization (SEO), sales and negotiation, foreign language proficiency, and mechanical engineering. The primary soft skills that help students to adapt quickly to the sociocultural environment are Comprehensive problem solving, Critical thinking, Creativity in the broadest sense, Ability to manage people, Interaction with people, Emotional intelligence, to form your own opinions and make decisions, Customer focus, Negotiation skills, and flexibility of the mind Adapting. Azmi et al. (2018) emphasize that specialized knowledge determines individual success in the labor market. However, soft skills are progressively emerging as determinants (Patacsil et al., 2017). The ability of individuals to relate harmoniously with others contributes to creating a healthy, productive and sustainable work environment. Soft skills are a determining element in team productivity and are increasingly valued in the labor market (Cimatti, 2016).

In general, institutions have different prospects in achieving the target of developing soft skills in learning. However, there is a common goal, namely having a balance between hard skills and soft skills according to the job market's needs or students' future. In practice, universities must have mechanisms and innovations to evaluate soft skills development, their relevance in specific disciplines, and the importance of involving the community in this process. Community involvement is not just a strategy, but a crucial part of the process, giving students a strong sense of identity and understanding how these skills are essential for their personal and professional activities (Guerra-Báez, 2019). An important technique in developing students' professional activities is to integrate and develop flexible skills in the learning process. Integrating and developing flexible skills in the learning process is essential in developing students' professional activities. The use of technology and educational innovation has very significant benefits in efforts to improve the quality of education such as (1) Students can be involved and participate directly in the learning process, which can increase their interest and motivation and can improve their understanding of knowledge/learning materials both individually and in groups; (2) Learning materials become more accessible to understand by students because the methods used are more exciting and interactive. Conditions like this can reduce student boredom in understanding the concepts taught compared to conventional learning; (3) The learning atmosphere becomes more enjoyable, full of joy, and cheerful so that students are more enthusiastic and motivated to learn. This learning atmosphere indirectly gives students the idea that learning is very dense because the material is indirectly given while playing; (4) Technology and innovation can be explored in various ways and any tools if the Teacher works creatively. The technology and innovation chosen in the learning process can be adjusted to the limitations of facilities, and the learning process can be designed to be enjoyable for students. (5) Teachers find it easier to help students increase their enthusiasm for learning because interesting learning methods can increase student interest and involvement.

LIMITATION AND FURTHER RESEARCH

Challenges, threats, problems, and potential negative consequences are integrated aspects in the implementation of cross-border education. Further research should be aimed at developing and implementing socio-cultural risk management programs through the development of hard skills, soft skills and educational innovation trends in educational institutions in order to effectively strengthen responsibility and improve community readiness in facing today's most significant challenges.

REFERENCES

Afroze, R., Tamanna, P. E., & Sarker, A. R. (2019). Do soft skills matter? A study on employability of engineering graduates in Bangladesh. *Journal of Intercultural Management*, *11*(3), 21-44.

Aliyeva, G. B. (2023). The use of e-learning tools for teaching English in high school. *E-Learning Innovations Journal*, *1*(2), 39-67.

Almeida, F., & Morais, J. (2023). Strategies for developing soft skills among higher engineering courses. *Journal of Education*, *203*(1), 103-112.

Almeida, F., & Buzády, Z. (2019). Learning entrepreneurship in higher education through flow theory and FLIGBY game. *International Journal of Virtual and Personal Learning Environments (IJVPLE)*, *9*(1), 1-15.

Azmi, A. N., Kamin, Y., & Noordin, M. K. (2018). Competencies of engineering graduates: what are the employer's expectations. *International Journal of Engineering & Technology*, *7*(2.29), 519-523.

Basyuk, N., Hordiienko, O., Marushchak, O., Miroshnychenko, O., & Dmytruk, O. (2023). Socionomic factors of the creation educational environment of the institution higher education as a condition for the formation of professional competences of future specialists' socionomic professions. *Financial and Credit Activity: Problems of Theory and Practice*, *1*(48), 461–472.

Bialo, E., & Sivin, J. (1990). *Report on the Effectiveness of Microcomputers in Schools* (ED327177). Software Publishers Association, Washington, DC.

Braun, W. J., Rebollar, R., & Schiller, E. F. (1996). Computer aided planning and design of manual assembly systems. *International Journal of Production Research*, *34*(8), 2317-2333.

Chamorro-Premuzic, T., Arteche, A., Bremner, A. J., Greven, C., & Furnham, A. (2010). Soft skills in higher education: Importance and improvement ratings as a function of individual differences and academic performance. *Educational Psychology*, *30*(2), 221-241.

Cimatti, B. (2016). Definition, development, and assessment of soft skills and their role in the quality of organizations and enterprises. *International Journal for Quality Research*, *10*(1), 97–130.

Cowan, L. S., & Kodak, T. (2024). Professional skills for behavior analysts: a survey on the proficiency and importance of hard and soft skills. *Behavior Analysis in Practice*, *17*(1), 199-211.

Dabke, D. (2015). Soft skills as a predictor of perceived internship effectiveness and permanent placement opportunity. *The IUP Journal of Soft Skills*, *9*(4), pp. 26–42.

Danilyan, O. G., Dzeban, A. P., Kalinovsky, Y. Y., Kalnytskyi, E. A., & Zhdanenko S. B. (2018). Personal information rights and freedoms within the modern society. *Informatologia*, *51*(1-2), 24-33.

Dean, S. A., & East, J. I. (2019). Soft skills needed for the 21st-century workforce. *International Journal of Applied Management and Technology*, *18*(1), 17–32.

Elfert, M. (2019). Lifelong learning in Sustainable Development Goal 4: What does it mean for UNESCO's rights-based approach to adult learning and education? *International Review of Education*, *65*(4), 537-556.

Espina-Romero, L. C., Franco, S. L. A., Conde, H. O. D., Guerrero-Alcedo, J. M., Parra, D. E. R., & Ramírez, J. C. R. (2023). Soft skills in personnel training: Report of publications in Scopus, topics explored and future research agenda. *Heliyon*, *9*(4), E15468.

Fey, J., & Heid, M. K. (1984). Imperatives and possibilities for new curricula in secondary school mathematics. *Computers in Mathematics Education*, 20-29.

Fletcher, S. G. (1983). Dynamic orometrics: A computer-based means of learning about and developing speech by deaf children. *American Annals of the Deaf*, *128*(5), 525-534.

Guerra-Báez, S. P. (2019). A panoramic review of soft skills training in university students. *Psicologia Escolar e Educacional*, *23*, 1–10.

Gutiérrez-Ponce, H., & Wibowo, S. A. (2023). Sustainability Reports and Disclosure of the Sustainable Development Goals (SDGs): Evidence from Indonesian Listed Companies. *Sustainability*, *15*(24), 16919.

Hladoshchuk, O., Saienko, V., Shyshkina, O., Shlieina, L., & Khrapatyi, S. (2023). Activities and development of open universities in the states of Europe. *Journal of Curriculum and Teaching*, *12*(2) Special Issue, 144-153.

IDP Education Australia. 2002. The Global Student Mobility 2025 Report. Canberra: IDP Australia.

Kim, S. W., & Lee, Y. (2023). Investigation into the influence of sociocultural factors on attitudes toward artificial intelligence. *Education and Information Technologies*, 1–29.

Klaus, P. (2007). The hard truth about soft skills. HarperCollins.

Knight, J. (2008). The Internationalization of higher education in the 21st century: new realities and complexities. In Higher education in Turmoil (pp. 1-18). Brill.Knight, J., (2006). Cross-border education: conceptual confusion and data deficits. *Perspectives in Education*, *24*(4), 15–27.

Koda, Y., & Yuki, T. (2013). The labour market outcomes of two cross-border higher education degree programs between Malaysia and Japan. *International Journal of Educational Development*, *33*(4), 367-379.

Krasnoshchok, I., Kravtsova, T., Zahorodnia, L., Kravchuk, O., & Savelchuk, I. (2024). Assessment of the Impact of Sociocultural Risks of Soft Skills Formation in Different Educational Environments for SDGs. *Journal of Lifestyle and SDGs Review*, *4*(2), e02164-e02164.

Krisnanik, E., Saphira, Q., & Indriana, I. H. (2021). Desain model MBKM dan kolaborasi kerja sama model pentahelix guna meningkatkan daya saing lulusan. *Proceeding KONIK (Konferensi Nasional Ilmu Komputer)*, *5*, 138-142.

Lopes, G. C. D., de Farias, W. S., Lopes, P. C. P., da Silva, R. T., & Catapan, A. (2024). The importance of cross-border education in contexts of collaboration between countries according to the SDGS. *Journal of Lifestyle and SDGs Review*, *4*(2), e02054-e02054.

Microsoft. (2025). Copilot (GPT-4). https://copilot.microsoft.com/

Mykytuk, O., Tiurina, T., Yukhymenko-Nazaruk, I., Voloshyn, M., Babkina M., & Yaremko, H. (2023). Features of the formation of pedagogical competence of a teacher of the university of banking. *Financial and Credit Activity Problems of Theory and Practice*, *2*(49), 469–480.

OECD and World Bank, 2007. Cross-border Tertiary Education: A Way Towards Capacity Development, Paris.

Patacsil, F., Lourrine, C., & Tablatin, C. L. (2017). Exploring the importance of soft and hard skills as perceived by IT internship students and industry: A gap analysis. *Journal of Technology and Science Education*, *7*(3), 347–368.

Robertson, R. (1987). Globalization theory and civilization analysis. *Comparative Civilizations Review*, *17*(17), 3.

Robles, M. M. (2012). Executive perceptions of the top 10 soft skills needed in today's workplace. *Business Communication Quarterly*, *75*(4), 453–465.

Rukman, W. Y., Urath, S., Harini, H., Ausat, A. M. A., & Suherlan, S. (2023). Philosophy education is a means of developing students' soft skills. *Edumaspul: Jurnal Pendidikan*, *7*(1), 281-286.

Sá, M. J., & Serpa, S. (2018). Transversal competencies: Their importance and learning processes by higher education students. *Education Sciences*, *8*, 1–12.

Schooley, R. (2017). Why are soft skills missing in today's applicants (Doctoral dissertation, Murray State University).

Schulz, B. (2008). The importance of soft skills: Education beyond academic knowledge. *Journal of Language and Communication*, *6*, 146–154.

Schulze, J., Schultze, M., West, S. G., & Krumm, S. (2017). The knowledge, skills, abilities, and other characteristics required for face-to-face versus computer-mediated communication: Similar or distinct constructs? *Journal of Business and Psychology*, *32*, 283–300.

Succi, C., & Wieandt, M. (2019). Walk the talk: Soft skills' assessment of graduates. *European Journal of Management and Business Economics*, *28*(2), 114–125.

Siann, G., Macleod, H., Glissov, P., & Durndell, A. (1990). The effect of computer uses on gender differences in attitudes to computers. *Computers & Education*, *14*(2), 183-191.

Sukmana, O. (2024). Analisis Permasalahan Belajar Matematika Siswa SD Negeri Cikampek Kota. *Jurnal Bintang Pendidikan Indonesia*, *2*(2), 81-87.

Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S. V., Giannoutsou, N., Cachia, R., ... & Ioannou, A. (2023). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and Information Technologies*, *28*(6), 6695-6726.

Tropin, Y., Latyshev, M., Saienko, V., Holovach, I., Rybak, L., & Tolchieva, H. (2021). Improve wrestlers' technical and tactical preparation by considering an individual combat style. *Sport Mont*, *19*(2), 2328.

Volkova, N., Zinukova, N., Vlasenko, K., & Korobeinikova, T. (2020). Soft skills, their development and mastering among post graduate students. In *SHS Web of Conferences* (vol. 75, p. 04002). EDP Sciences.

Wepner, S. B. (1990). Computers, reading software, and at-risk eighth graders. *Journal of Reading*, *34*(4), 264-268.

Yong, B. P. P., & Ling, Y. L. (2023). Skills gap: The importance of soft skills in graduate employability as perceived by employers and graduates. *Online Journal for TVET Practitioners*, *8*(1), 25-42.