Building Learning Ecosystem through Teaching Innovation in Higher Education

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Abstract - The largest economy in Southeast Asia, Indonesia, has charted impressive economic growth since overcoming the Asian financial crisis of the late 1990s. Indonesia has successfully built a virtuous economic cycle, bringing Indonesia to be one of the leading global economies associated with human resource development. Indonesia is concerned about the digital skills and resources shortage and needs a breakthrough to overcome this problem. Through public policy, The Ministry of Education, Culture, Research and Technology of Indonesia is starting a step to bring digitalization and innovation by synergizing between Academics, Business, Community, Government, and Media as part of the Penta helix ecosystem.

This study aims to recommend the learning model of teaching innovation in higher education by connecting all elements in the Pentahelix ecosystem. The action research will take two programs that are implemented and integrated into the certified independent study (SIB-Kampus Merdeka) by the Ministry of Education, Culture, Research and Technology in Indonesia; and the International Hackathon program as the platform to bring the young generation to higher education to solve the problem with the global environment.

This study shows the importance of connecting the ecosystem elements, such as academics, business, community, government, and media, to accelerate teaching innovation in higher education. Furthermore, this learning process will improve the quality of human resources in digitalization and innovation to align with Sustainable Development Goals (SDGs) in the Decent Work and Economic Growth in Indonesia.

Keywords: innovation, creativity, project-based learning, design thinking, learning ecosystem

Introduction

Indonesia has charted impressive economic growth since overcoming the Asian financial crisis of the late 1990s. Indonesia has successfully built a virtuous economic cycle, bringing Indonesia to be one of the leading global economies associated with human resource development. However, Indonesia has a barrier to being a digital country. The Communication and Informatics Ministry (Kominfo) said Indonesia's biggest challenge in the digital transformation age is the lack of what he considers 'digital talents.' It cited World Bank data in 2018 stating that Indonesia would need at least 9 million talents for the next 15 years, or an average of 600 thousand people annually.

The SMERU research institute in February 2022 shared the result of the diagnostic report that showed Digital Skill Landscape in Indonesia. One of the key findings stated that 50% of Indonesia's labor force's digital skill level is basic and intermediate, while the advanced level is less than 1%. The research results recommended overcoming the barrier that digital development demands more developed literacy competencies than traditional literacy, including reading, writing, and numeracy skills. Therefore, this signals education institutions to find a breakthrough

to accelerate the skills intentionally and strategically. The improvement is not only in digital skills but also other skills that are connected with the 21 st century skills. Students are now expected to be able to pick up knowledge, overcome complex obstacles, adapt to changing environments, and build meaningful relationships. All of these are made possible by adopting 21st-century learning to develop 21st-century skills.

The 21st Century Skills

Based on the article by Stauffer (2022), 21st-century skills are the set of skills that students need to survive in the information era. The 21st-century skills are divided into three categories:

1. Learning skills

   Learning skill teaches students the mental processes required to adapt and improve a modern work environment. The four learning skills are:

   - Critical thinking: Finding solutions to problems
   - Creativity: Thinking outside the box
   - Collaboration: Working with others
   - Communication: Talking to others

2. Literacy skills

   Literacy skills focus on how students discern facts, publishing outlets, and the technology behind them. There is a strong focus on determining trustworthy sources and factual information to separate it from the misinformation that floods the Internet. The three literacy skills are:

   - Information literacy: Understanding facts, figures, statistics, and data
   - Media literacy: Understanding the methods and outlets in which information is published
   - Technology literacy: Understanding the machines that make the Information Age possible

3. Life skills

   Life skills look at intangible elements of a student's everyday life. These intangibles focus on both personal and professional qualities. The five life skills are:

   - Flexibility: Deviating from plans as needed
   - Leadership: Motivating a team to accomplish a goal
   - Initiative: Starting projects, strategies, and plans on one's own
   - Productivity: Maintaining efficiency in an age of distractions
   - Social skills: Meeting and networking with others for mutual benefit

The 21st-century skills encompass a broad set of knowledge, skills, and character that everyone needs and yet requires to enhance the quality of human resources in the workplace and life. Therefore, we must prioritize the effort to implement and integrate these skills. Since we realized that integrating this skill into human life is more challenging than turning the palm, they need a process. The most effective laboratory to build and maintain a journey of a learning process is at school. We know that schools have the same concern about this issue. However, they need to find an effective learning model that empowers educators to accompany the student doing the learning process. The learning model itself will be more effective if it emphasizes student-centered learning.

Project based Learning and Design Thinking

Based on Artama et al. (2023), Project-based learning can be viewed as a complex learning model covering aspects such as critical thinking, real problem context, teamwork, and communication. The main characteristic of project-based learning is the project itself. Educators are expected to guide students in conducting the investigation based on the actual situation and students' level in the learning activity. Educators can be a facilitator in implementing project-based learning, whereas students conduct investigations. Students and educators need to follow several steps in accomplishing the project, as stated in Edutopia (2007), which are detailed below:
1. Start with the Essential Question
2. Design a Plan for the Project
3. Create a Schedule
4. Monitor the Students and the Progress of the Project
5. Assess the Outcome
6. Evaluate the Experience

Project-based learning is one of the learning models that promote 21st-century skills and can be adopted in school with some consideration of school management, students, and educators' characteristics. Since the project-based learning model has advantages and disadvantages from the school's perspective, the researcher suggested that project-based learning can be integrated with other learning models.

Beth Holland (2016) proposes that there are two challenges that school leaders and educators face in implementing project-based learning. First, Schools are more concerned about changing the environment, but they must remember to consider the beliefs and behavior of the administrator, teachers, and students. Second, project-based learning focuses more on authenticity, inquiry, real work context, and reflection. As an alternative, combining project-based learning and design thinking models (Fig 1) might be a good idea.

The educator attempts to integrate the pedagogy and creative frameworks by implementing two learning models. Combining project-based learning and design thinking leads to better projects and deeper learning (Spencer, 2022). On the other hand, when a student's characteristics merge with the effective learning model and an open-minded educator, it promotes integrating knowledge, skills, and behavior to produce innovation for human welfare.
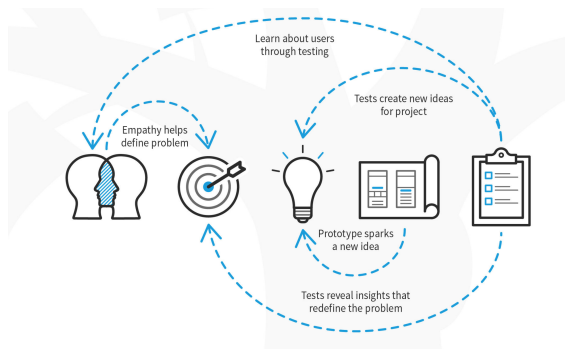
- Empathize: research about users' needs.
- Define: state users' needs and problems.
- Ideate: challenge assumptions and create ideas.
- Prototype: start to create solutions.
- Test: try the solutions out.

Fig 1. Design Thinking Process (interaction-design.org)

However, to prepare better quality students, schools cannot stand alone. They need to collaborate with other sectors as part of the stakeholder of education. A new strategy should exist to represent an effective network in certain societies.

ABGCM Penta Helix Ecosystem

Based on Halibas et al. (2017), The Penta Helix model specifies a strategic blueprint for developing an effective innovation network where HEIs and other key players can collaborate to meet national development goals. This innovation network has begun to gestate in Oman through the synergy of various sectors of society. HEIs universally have played a critical role in inducing the innovation network.

In Indonesia, based on Sudiana et al. (2020), the Penta Helix ecosystem is adopted and integrated into five elements: Academicians, Business, Government, Community, and Media (ABGCM). In this case, the university as an educational institution should cooperate with these five ecosystem components to produce excellent, creative, and innovative human resources.

Public Policy Kampus Merdeka

The Minister of Education, Culture, Research, and Technology published a policy of *Kampus Merdeka*. The policy gives university students opportunities to take subjects out of their program study for one semester and do activities outside the university for two semesters. The purpose is to enhance the competence of graduates in soft skills and hard skills so that they will be more ready and relevant toward future challenges, to prepare the graduates as excellent and strong personality future leaders. Every university provides *Kampus Merdeka* activities based on the need and interests of the student. Based on the information on the official website *of Kampus Merdeka,* this is the activities that are being provided in *Kampus Merdeka* program:

- Certified internship
- Certified Independent Study (CIS)
- Teaching Campus

- Freedom Exchange Student
- Village Cultivating
- Humanity Project

- Indonesian International Student Mobility Awards
- Research
- Entrepreneurship

Students who are involved in *Kampus Merdeka's* activity will greatly influence student career readiness by ensuring students keep observing the changes that occur off campus while also experiencing the knowledge and skill in real life.

The Implementation and Discussion

The implementation is taken from 3 batches (January 2022 until June 2023) of the Kampus Merdeka program that is run with more than 200 partners in ABGCM Penta helix ecosystem for the Certified Independent Study (CIS) program, named Socio-Economic Accelerated Lab (SEAL) that based in Malang, East Java, Indonesia. Every partner may have a notion to propose an online course outside of the primary course in the university that aims to equip students with a set of knowledge, skills, and values related to student needs, government, and industrial challenges. The representative of Kampus Merdeka has a system and regulations to arrange this program efficiently and effectively. Every selected partner should follow all of the requirements for students to join the course. The duration is one semester. Students learn some skills from experts according to the curriculum that SEAL makes.

Furthermore, students will be divided into groups and guided by a mentor that ensures the students understand and grasp the knowledge from the expertise. In the next step, the students meet up with the government and start to practice their knowledge and skills by implementing design thinking in a project-based learning model by following this process:

1. Empathize : Collecting data using empathy map (say, do ,think, feel)
   - Observe
   - Immerse
   - Engage
2. Define : Dig the insight to define the problem
   - Categorizing the data
   - Explore what is interesting, important
   - Find the point of view of user persona
3. Ideate : Explore the idea to find the best solution
   - How might we
   - General, specific, creative to find alternatives
   - Find one solution
4. Prototype
   - Create prototype with low fidelity
5. Test
   - Ask opinions and criticizing from user persona
   - Review, revise
6. Create Minimum Viable Product
   - Trial

At the end of the semester, students conduct a demo day. The purpose of the demo day is:

1. Students can present their learning journey, the product, and the values they learned from this program
2. The organizing partner can appreciate the educator and mentor accompanying the students during the teaching-learning process.

3. The organizing partner can promote the accomplishment and benefit of this program to the committee of MBKM SIB
4. The organizing partner able to strengthen the networking among Penta-Helix synergy

Fig 2. The Implementation of Merdeka Belajar activities

During the demo day, SEAL invites the representative from ABGCM (Academian, Business, Government, Community, and Media); each of them play their role as follows:

- Academician: The representatives from universities that send the students to join this program criticize the curriculum, and suggest the conjunction between universities and organizing partners under MBKM-SIB, so this program will give more experiences to implement the knowledge, skills, and values as a preparation to the future career of the students when they are graduated
- Business: The representatives from business and industry criticize the problem-solving skills of the students and give inputs toward the product usage in reality
- Government: The representatives from the government give recommendations for the work ethics and skills of the students when they students doing the project; they also give appreciation toward the result of the project and suggestions for upgrading the effectiveness of the project
- Community: the governor, the major, head of education office, expertise, etc. They appreciate the breakthrough model of 'link and match' and also give recommendations for the betterment of the next batch for each sector in our country.
- Media: The representatives of television, newspaper, and social media share the idea, process, and result of the program to society.

On the other side, Krya implements project-based learning for students by running a hackathon program in southeast Asia as the platform for students to learn and showcase their projects in cross-country activities related to Sustainable Development Goals (SDG). This program is taken from 14 to 16 October 2023 in online mode. Hackathons become an excellent platform to facilitate students in identifying the problem until proposing a solution. In the implementation, the hackathon follows a design thinking process and a chance to meet mentors to find the best version of the solution. The three days activities on hackathon concern three main activities that are based on Krya's learning cycle: Inspiring, Creating, and Dedicating (fig 3)

Fig 3. Krya learning cycle

1. Inspiring

An inspiring session is concerned with giving students inspiration regarding empathizing with the situation of the problem. Since the program is run in online mode, the experts were invited to give some inspiration to students in solving the problem. The inspiring session discussed many perspectives to see the big picture related to the program.
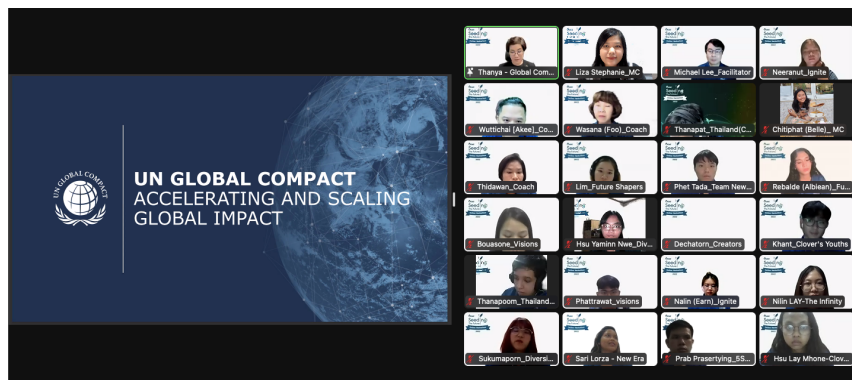

Fig 4. Inspiring session

2. Creating

This session is concerned with triggering students to make their ideas happen. The session was run by inviting some mentors to guide students to make the solutions more feasible to be implemented. Mentors shared their knowledge related to the project that students did. In another part, this session will bring students more clarity with the technical parts of proposing solutions,

including the involvement with media and technology to improve a realistic solution to an innovation. Because of this concern, the mentors should come from different areas and backgrounds to give more perspective to students in doing their projects.
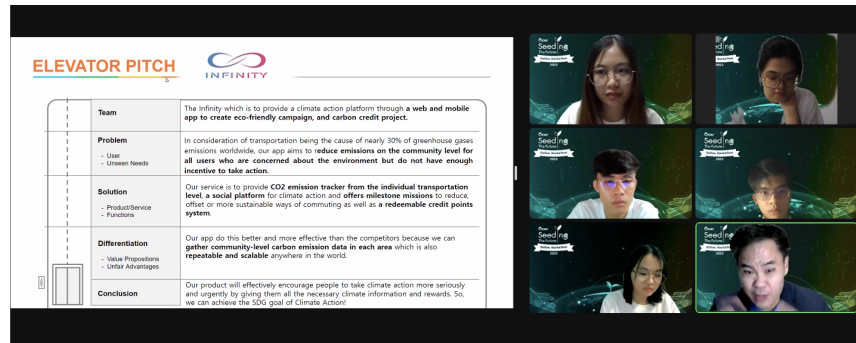

Fig 5. Creating session

3. Dedicating

In this session, the students can share their projects in front of some experts that come from different backgrounds and knowledge. The experts can come from education sectors, industry, media and technology experts, government, investors, and society to give more perspectives to students in implementing their project. The session can be a good platform for each element to support each other. Dedicating stage can be continued when the project is ready to be implemented in the proposed area to reach society.
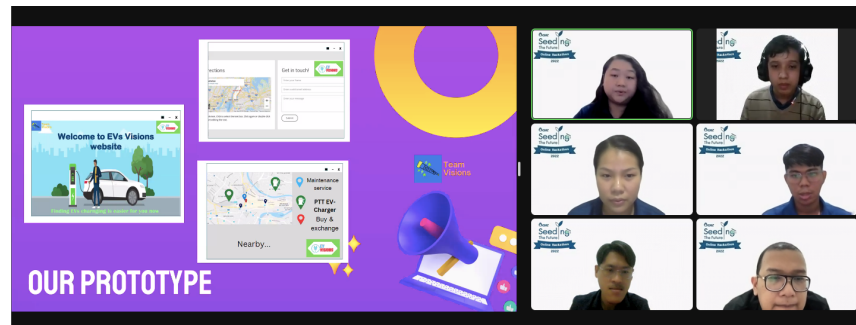

Fig 6. Dedicating session

From implementing two different activities in different stages, teaching innovation in higher education should be delivered differently. The ecosystem should be built to see more perspectives on innovation. The ecosystem is needed from the implementation to make teaching innovation more realistic and applicable in the real world. Based on the two activities, media, and technology will be important in making the innovation happen. Through the implementation, teaching innovation in higher education can be done when the ecosystem is built well to facilitate the students in making their innovation happen. The insight is about connecting education with professionals/ industry and is enabled by media and technology. Through this connectivity, higher education can produce innovation at the university level. To make it more impactful, the innovation can be continued by connecting to the government, society, and investors, as described in Fig 7.
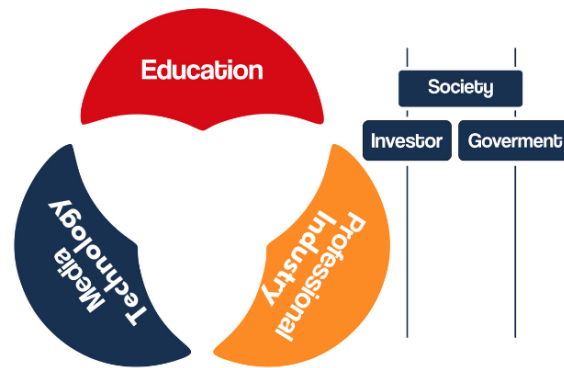
Fig 7. Learning Ecosystem in teaching innovation

The collaboration of sectors and elements of education, professional industry, and media technology connected to society, investors, and government can be an excellent ecosystem to produce innovation in higher education in line with Sustainable Development Goals (SDG). In this case, each element of SDG can be pointed to as the learning objective, especially SDG 4 (Quality Education) and SDG 8 (Decent Work and Economic Growth). Teaching innovation in higher education can synergize the learning process with the outcome of human resources needed in this era.

Conclusion and Recommendations

This research study concluded that students not only need a set of knowledge, skills, and values, but they also need to experience real-life problems in different institutions. Furthermore, they can find a creative solution and, after being tested by some experts, stakeholders and other related elements. This kind of learning process promotes 21st-century skills.

At the end of the learning process, students can create an innovative product connected with the institutions' needs. A synergy between Education, Professional Industry, and Media Technology which are connected to society, government, and investors, will be a good ecosystem that is built to influence and support each other, and sharpen innovation from different perspectives. This learning process supports the sustainable development goal of enhancing the quality of education and promoting decent work and economic growth.

After following the implementation of the learning process through teaching innovation in higher education, there are some recommendations to make it better in the future implementation as below:

- Consider the culture of the school is essential to initiate a breakthrough program

- Implementation of a new learning model in certain schools needs to examine the student's characteristics and the readiness of the teacher

- The commitment of the other sector to engage with this program with the intersection roles.

- The availability and openness of the government institution to provide a real laboratory for students

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