ASPEED Technology Inc.

Women in Tech Cultivation Project

Social Return on Investment (SROI) Report

2023

2024

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ASPEED Technology Inc. Women in Tech Cultivation Project - Social Return on Investment (SROI) Report

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Acknowledgment

We sincerely extend our gratitude to every stakeholder who participated in the “Women in Tech Cultivation Project,” especially those who devoted their time and expertise to jointly design, prepare, and execute the activities.

We would also like to express our deep appreciation to the Deloitte & Touche Sustainability and Risk Advisory Co., Ltd. Your professional support and contributions laid the essential foundation for this SROI report and enabled a thorough analysis of the project’s outcomes.

Through this collaborative effort, the “Women in Tech Cultivation Project” has successfully demonstrated measurable social impacts, including cultivating young female talents in technology, inspiring career aspirations, promoting diversity, equity, and inclusion, and bridging intergenerational understanding.

As a leading IC design company rooted in Taiwan, ASPEED remains committed to channeling education resources to remote areas, fostering technological expertise, and advancing female empowerment in the technology field. The findings of this SROI analysis will serve as an important reference for optimizing future strategies, with the goal of amplifying our impact and contributing to sustainable social development.

We sincerely thank all stakeholders once again for their support and engagement. Together, we will continue to promote education, inclusion, and innovation for a brighter future.

Sustainability Development Committee
ASPEED Technology Inc.

Summary

ASPEED Technology Inc. (hereafter “ASPEED”) is a leading fabless IC design company established in 2004 and headquartered in Hsinchu, Taiwan. The company has long devoted to social welfare, channeling education resources to remote areas and strengthening cultivation of young students.

ASPEED dedicates resources to diversity equity and inclusion (DEI) and the development of female talents in technology, through face-to-face discussions with stakeholders, and by connecting the industrial topics, ASPEED’s sustainability values, and its future development path. In 2023-2024, ASPEED initiated the “ Women in Tech Cultivation Project” and organized the “Panoramic View Monitoring Course (PVM Course)”, “High School Semiconductor Exploration Camp (HSSE Camp, Winter Break)” and “HSSE Camp (Summer Break)”, with the schools and ASPEED engineers joining efforts in the design and preparation. Through the activities, ASPEED exerts impacts to promote topics on female talents in technology, and cultivates diverse talents with technological expertise for the industries through education and knowledge sharing.

This research is based on the Social Return on Investment (SROI) methodology, which is used to itemize and calculate the social impact of “WTC Project” of 2023-2024. Through interviews, questionnaires, meetings and discussions, the research identified the following outcomes that were created for the stakeholders by the “WTC Project”:

“Course participants” of the “PVM Course” achieved “development of learning motivation and career goal setting”, “enhancement of knowledge and practical skills in the field of technology”; “Course preparatory and operational staff” achieved “enhancement of personal soft skills”, “enhancement of intergenerational understanding and interactions”, “enhanced sense of purpose (such as sense of purpose at work, generation of social impact, self-realization)”, and also “feeling of stress”.

“Camp participants” of “HSSE Camp (Winter Break)” achieved “enhancement of personal soft skills”, “development of learning motivation and career goal setting”, and “enhancement of knowledge and practical skills in the field of technology”; “Camp staff” achieved “expansion of professional networks in the field of technology”, “enhancement of personal soft skills”, and “enhanced attention to or involvement in female empowerment in the technology field”.

“Camp participants” of “HSSE Camp (Summer Break)” achieved “enhancement of knowledge and practical skills in the field of technology”, “development of learning motivation and career goal setting”, and “advancement in self-challenge and breakthrough”; “Camp staff” achieved “enhancement of personal soft skills”, “expansion of professional networks in the field of technology”, “inspired career imagination”, and also “feeling of stress”.

The SROI analysis shows that for every NT$1 invested, the “WTC Project” generates impacts valued at NT$14.14 for the stakeholders. The sensitivity interval of the SROI value is 13.85-21.06. The research result of this project will become an important reference for strategy optimization and activity improvement of future projects, with hopes to expand the corporation’s impacts and promote cultivation of female talents in technology.

Chapter 1 Project Background

1.1Introduction

Along with advancement in 5G and artificial intelligence (AI), global demand for semiconductors has been growing, and highly technical talents become a key resource for the development of the semiconductor industry. Thus, talent recruitment and cultivation have become an important task for semiconductor enterprises. In the meantime, “She Power” has become non-negligible in the technology industry (Chen, 2021). Statistics shows that after COVID-19, the percentage of female employees in the technology field has grown to 35%, meaning among the 2.5 million tech employees, 900,000 are female. Such a phenomenon is also seen in European countries, which demonstrates the rise of female presence in the technology field (Wu, 2024). Since 2022, ASPEED began planning and implementing a program for sustainable impact of diverse tech talents. ASPEED dedicates resources to diversity, equity and inclusion (DEI) and the development of female talents in technology, through face-to-face discussions with stakeholders, and by connecting the industrial topics, ASPEED’s sustainability values, and its future development path.

Two sustainable talent workshops were held in 2022. Eight participants were invited from among the College of Education, National Tsing Hua University (hereafter NTHU), NTHU students, and the seed volunteers within ASPEED who are interested in being involved. They joined discussions and created the Women in Tech Cultivation Project (WTC Project, hereafter “this project”). Funds and volunteer resources began to be allocated in 2023, including ASPEED’s expertise, which is the core industrial techniques, and sharing sessions by its volunteer engineers, as well as the academic resources from NTHU College of Education. We launched impactful activities for female high school students, and hope to inspire potential talents in the female population to develop interest and capability in the technology field.

An elective 36-hour microcourse of self-directed learning in a diversity of topics was developed based on the Sustainable Development Goals (SDGs) of the United Nations and the spirit of STEAM education and exploratory and hands-on learning under the Curriculum Guidelines of 12-Year Basic Education (Curriculum Guidelines) released by the Ministry of Education (Chu, 2017). The self-directed elective microcourse is offered at National Hsinchu Girls' Senior High School (HGSH). The course applies the DDMT model of NTHU’s STEAM School, which allows students to identify issues awaiting solution from the 17 SDGs. They would take steps including discover, define, model & modeling and transfer through team discussions, and then develop solutions based on the exploratory and hands-on spirit.

The purpose of this project is to exert ASPEED’s impacts to promote topics on female talents in technology, and to assist the new-generation high school students in their understanding of the technology industry, and develop their interest therein. We hope that this project can be expanded to more schools in the future, and enable true gender equality through education and knowledge sharing and by cultivating diverse talents with technological expertise for the industry.

1.2 Methodology: SROI

Social Return on Investment (SROI) was designed by Roberts Enterprise Development Funds in the United States and is used to evaluate the values of projects. The methodology helps make financial calculations for work effectiveness which is then consolidated to form a more comprehensive cost effectiveness analysis (Kelly & Tim, 2017).

This project applies "evaluative SROI" to analyze the social values of the WTC Project, based on the six stages (Figure 1) and the eight principles of social value (Table 1) in "A Guide to Social Return on Investment 2012".

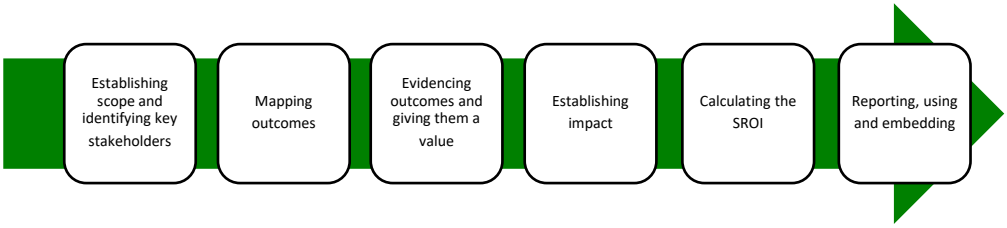


Figure 1. The six stages of SROI analysis

We followed the six stages of SROI analysis to thoroughly evaluate the social impact of this project . The six stages of SROI analysis are detailed as the following.

1. Establishing scope and identifying key stakeholders:

   Confirm that the scope of the project can help us more efficiently identify stakeholder groups, and in the meantime determine in what form the stakeholders will be involved.

2. Mapping outcomes:

   Through questionnaires and interviews, understand the inputs and outputs of this project, and by mapping the chain of events, identify all outcomes generated by this project, both positive and negative. More thoroughly understand the impacts made by this project by identifying all outcomes.

3. Evidencing outcomes and giving them a value:

   Establish a threshold to assess whether outcomes occurred for this project, and use financial proxy to give the outcomes a value.

4. Establishing impact:

   Four factors (detailed below) are used for analyzing the value of outcomes, to avoid any overestimation or underestimation of the impact of the outcomes generated by this project, enhancing credibility of the analysis results.

   - Deadweight: Would the outcomes still have occurred without this project?
   - Displacement: Would the outcomes generated by this project be displaced elsewhere?

- Attribution: Level of contribution to the project outcomes by people and things not related to this project.
- Drop-off: Would the outcomes of this project diminish with time?

5. Calculating the SROI:

   All positive- and negative-impacting financial values are summed and discounted, in order to confirm the total value created by this project, and to further calculate the SROI ratio.

6. Reporting, using and embedding:

   By using the SROI report, outcomes can be communicated with the stakeholders, to ensure their ideas are fully considered. Furthermore, the SROI analysis result can also be used to formulate future improvement measures for this project.

Table 1. The eight Principles of Social Value

Principle 1	Involve stakeholders
Principle 2	Understand what changes
Principle 3	Value the things that matter
Principle 4	Only include what is material
Principle 5	Do not overclaim
Principle 6	Be Transparent
Principle 7	Verify the Result
Principle 8	Be Responsive

We used the eight Principles of Social Value to ensure our research was measured, reported, and decisions were made based on those measurements. The eight Principles of Social Value are detailed as the follows.

1. Involve stakeholders: Inform what gets measured and how this is measured and valued in an account of social value by involving stakeholders.
   We involved the stakeholders at every stage to ensure that the perspectives of stakeholders were fully collected and evaluated.
2. Understand what changes: Articulate how change is created and evaluate this through evidence gathered, recognising positive and negative changes as well as those that are intended and unintended.
   We used interviews and questionnaires to understand the positive and negative changes experienced by stakeholders.
3. Value the things that matter: Making decisions about allocating resources between different options needs to recognise the values of stakeholders. Value refers to the relative importance of different outcomes. It is informed by stakeholders' preferences.
   We valued the significance of the changes to stakeholders and quantified outcomes by the Value Game.
4. Only include what is material: Determine what information and evidence must be included in the accounts to give a true and fair picture, such that stakeholders can draw reasonable conclusions about

impact.

We used qualitative interviews and quantitative questionnaires to ensure outcomes are highly relevant and material to stakeholders.

5. Do not overclaim: Only claim the value that activities are responsible for creating.
   We considered impact factors to ensure that the analyzed data are not overclaimed.
6. Be Transparent: Demonstrate the basis on which the analysis may be considered accurate and honest, and show that it will be reported to and discussed with stakeholders.
   We reported and discussed the outcomes of our analysis with stakeholders and during the engagement meeting.
7. Verify the Result: Ensure appropriate independent assurance.
   We collected data in a rigorous manner and validated the outcomes, such as interviews, questionnaires, and the engagement meeting.
8. Be Responsive: Pursue optimum Social Value based on decision making that is timely and supported by appropriate accounting and reporting.
   To gather feedback from the stakeholders during the event. The team responded positively to stakeholders and continued to make improvements.

1.3 Research Limitations

I. Limitation on stakeholder engagement

1. Reason:

Due to the large number and diversity of stakeholders, it was impossible to engage everyone. The interviews take one hour each and were arranged with a sampled list of stakeholders having high participation rate in the activities and were willing to be interviewed. The interviews mostly rely on stakeholders' subjective feedback, which may have an impact on the comprehensiveness of the outcomes.

2. Impact on SROI outcomes:

Potential overestimation or underestimation of the impact, especially the possibility of bias due to the project's inability to engage with all stakeholders.

3. Response:

Diversity is ensured by interviewing a sampled group of interviewees with diverse backgrounds (such as gender, age and expertise), based on the stakeholders' roles in this project. Furthermore, third-party observation is introduced to verify changes. Reliability of the conclusion is enhanced through the objective evaluations by the lecturers and teaching assistants.

II. Limitation on students' imagination of career exploration

1. Reason:

Students' imagination of career exploration stagnates at before the College Entrance Examination. They are not yet equipped with sufficient practical experience and deep thinking, which may affect their perception of future career developments.

2. Impact on SROI outcomes:

The students' imagination of careers is relatively superficial, which can cause overestimation or underestimation of the benefits for them in the SROI analysis, especially on the long-term impact of career exploration.

3. Response:

It is suggested to add long-term follow-up with students on their career development, and also design targeted questions to understand specific changes in their career exploration in future surveys.

III. Limitations of the Financial Proxy

1. Reason:

Some project outcomes (e.g., *Development of learning motivation and career goal setting*) may require a longer period to manifest their effects and reveal their value. Moreover, the stakeholders involved in this activity include both students and working adults, whose perceptions of monetary value and outcome value may be influenced by their age and status. As a result, stakeholders may not be able to accurately assess the value of the outcomes.

2. Impact on SROI outcomes:

This may lead to an overestimation or underestimation of the financial proxy.

3. Response:

This study conducted a sensitivity analysis on the financial proxies of all stakeholder outcomes to reduce the risk of the SROI ratio failing to reflect the actual value.

IV. Limitations of Duration

1. Reason:

The duration of activities in this project varied, ranging from as short as two days to as long as an entire academic year. In addition, the questionnaire was not administered immediately after the activities ended, and no long-term follow-up was conducted. This may result in stakeholders having difficulty accurately linking the outcomes to the activity due to the passage of time.

2. Impact on SROI outcomes:

This may lead to an overestimation or underestimation of the duration of outcomes.

3. Response:

   This study conducted a sensitivity analysis on the duration of all stakeholder outcomes to reduce the risk of overestimating or underestimating the SROI ratio.

V. Limitations of the Interview and Questionnaire Research Methods

1. Reason:

   As the stakeholders involved in this activity include both students and working adults, certain interview and questionnaire questions were designed differently (e.g., the displacement question) to enhance stakeholder comprehension. This inconsistency may have resulted in stakeholder responses that do not accurately reflect the concepts of the SROI methodology.

2. Impact on SROI outcomes:

   This may lead to an overestimation or underestimation of impact, and potential bias in the survey results.

3. Response:

   Sensitivity analysis was conducted on impact factors that may raise concerns to reduce the risk of bias.

VI. Limitations of Outcome Name Adjustment

1. Reason:

   To avoid double counting, outcomes with similar meanings were consolidated. This process may have led to an overestimation or underestimation of outcome values.

2. Impact on SROI outcomes:

   This may result in an overestimation or underestimation of outcome values.

3. Response:

   This study conducted a sensitivity analysis on the number of outcomes to reduce the risk of overestimating or underestimating the SROI ratio.

Chapter 2 Basic Information of the SROI Report

2.1 Scope of SROI Calculations and Activities

The analysis of this project covers September 14, 2023 to July 12, 2024. Included in the scope of the analysis and calculations are preparation, design, and activity implementation of the WTC Project, which results in this evaluative SROI report.

Vision	● Enhance high school students' understanding of semiconductor/IC design industries and relevant topics through fun activities ● Develop female high school students' interests in the technology industry and field, and thereby cultivate female talents in technology ● Assist high school students with their selection of colleges and departments and development of their career plans, in alignment with the Curriculum Guidelines of 12-Year Basic Education
Scope	Following the eight Principles of Social Value, ASPEED's three activities along the two axes of the WTC Project between September 2023 and July 2024 are analyzed and monetized for their value of social impacts on the stakeholders. The activities are as the following: ● Axis 1: Panoramic View Monitoring Course (PVM Course): September 2023 to April 2024 ● Axis 2: NTHU x ASPEED High School Semiconductor Exploration Camp (HSSE Camp): January 24-25, 2024 (Winter Break) and July 10-12, 2024 (Summer Break)
Stakeholders	Stakeholders that were directly or indirectly involved in the PVM Course and HSSE Camps (Winter and Summer Breaks). Refer to Chapter 2.2 for details.

Description of the activities:

I. PVM Course

The PVM Course is a diverse elective course launched in girls' high schools, with the first time being at the HGSH in 2023. Through the collaboration and discussion between the staff of HGSH and NTHU, and the ASPEED engineers, they combined their industrial knowledge and practical experience, and customized a semiconductor course suitable for female high school students. The course is aimed at attracting female high school students who are still exploring college departments and a career path, or those who are interested in the tech field, to voluntarily elect to enroll. This is within the scope of mandatory education, and thus students do not need to shoulder any additional fees and spend additional time. In other words, the course offers female high school students an opportunity to explore their interests in the course with minimum entry requirement. They have access to panoramic view monitoring, which inspires their interest in technology. Through exploratory and hands-on practices, they work in teams to identify issues, plan research, develop arguments and build models, and present and share. All these enhance the female high school students' ability in teamwork, communication and

problem-solving, diversifying their learning journey.

II. HSSE Camp (Winter and Summer Breaks)

The HSSE Camp is organized by the NTHU staff and Science Service Club members in collaboration with ASPEED. The activities cover technological hands-on practices, visits to university labs, ASPEED lectures and visits. Through planning and implementation of winter and summer camps, the high school students are connected to the STEM industries. Their understanding of the STEM industries further assists them in their selection of STEM related departments in college, and also in their future career planning in the STEM field.

2.2 Identifying Stakeholders

2.2.1 Who are the stakeholders

Based on "Principle 1: Involve Stakeholders" among the eight principles established by Social Value UK, the stakeholders' involvement helps avoid overestimation or underestimation of the calculated outcomes (Özgün, 2024) in the SROI project. The project identified stakeholders through the following three steps (Figure 2).

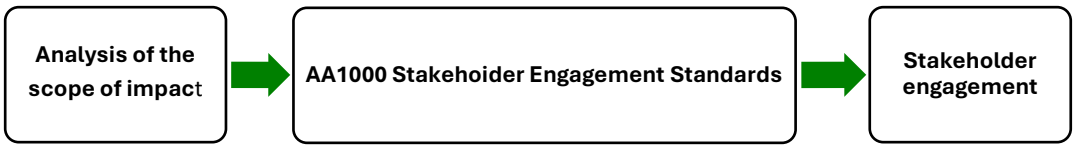


Figure 2. Procedures of stakeholders identification

First, with WTC Project in the core, and focusing on the two main axes therein "PVM Course" and "HSSE Camp", preliminary stakeholder identification was carried out through analyzing the scope of impact and by following the three aspects below:

1. Individuals or organizations directly or indirectly impacted by this project.
2. Individuals or organizations having impact on this project.
3. Individuals or organizations involved in this project.

According to the "Identification aspect" and "Explanation" of the table below, we identified the stakeholders of PVM Course, which include course participants and course preparatory and operational staff; while the stakeholders of HSSE Camp (Winter and Summer Breaks) includ camp participants, camp participants' parents and camp staff.

In addition, it was discovered through the interviews that certain course planners, preparers and coordinators also served as lecturers, which made it impossible to confirm the source of the outcomes. Thus, no subcategories were assigned, and instead a more general title of "course preparatory and

operational staff" will be used in the analyses moving forward. Similarly, certain camp activity planners, preparers and coordinators also served as camp facilitators or lecturers, which made it impossible to confirm the source of the outcomes. Therefore, no subcategories were assigned, and instead a more general title of "camp staff" will be used in the analyses moving forward.

Activity	Stakeholders	Subcategory	Role in the project	Identification aspect	Explanation
PVM Course	Course participants	N/A	Course beneficiaries	Individuals directly impacted by and involved in this project	• Acquired knowledge from the course • Devoted time for course participation
	Course preparatory and operational staff	Course planners, preparers and coordinators	Course providers	Individuals directly impacted by, having impact on and involved in this project	• Built capability and experience in course preparation and operation • Decision maker on course contents • Devoted manpower, funds, goods and materials, and time to course preparation
		Lecturers			
HSSE Camp (Winter and Summer Breaks)	Camp participants	N/A	Camp beneficiaries	Individuals directly impacted by and involved in this project	• Learned knowledge and others' experiences from the camp • Devoted time for camp participation
	Camp participants' parents	N/A	Camp beneficiaries	Individuals indirectly impacted by this project	• Reduced pressure of finding resources for children's

					exploration of college departments and careers
	Camp staff	Camp planners, preparers and coordinators	Camp providers	Individuals directly impacted by, having impact on and involved in this project	• Built capability and experience in camp preparation and operation • Decision maker on camp contents • Devoted manpower, funds, goods and materials, and time to camp organization
		Camp facilitators			
		Camp lecturers			

2.2.2 Re-confirmation of stakeholders

Results from Step 1 of stakeholder identification is re-confirmed based on the five aspects of the AA1000 Stakeholder Engagement Standard (AA1000SES) of AccountAbility. According to the analysis of AA1000SES below, we confirmed that step 1 of stakeholder identification has not changed.

Aspect	**Details**	**Identified stakeholders**	
		PVM Course	**HSSE Camp (Winter and Summer Breaks)**
Dependency	Groups or individuals who directly or indirectly rely on the activities, products or services and related performance of the organization, or those that the organization relies on for its operations	Course participants, and course preparatory and operational staff	Camp participants, camp participants' parents, and camp staff

Responsibility	Groups or individuals for whom the organization has or will likely have responsibility	Course participants, and course preparatory and operational staff	Camp participants, and camp staff
Tension	Groups or individuals needing immediate attention from the organization	Course participants	Camp participants
Influence	Groups or individuals who may have influence on the organization's or stakeholders' decision-making	Course preparatory and operational staff	Camp staff
Diverse Perspectives	Groups or individuals of different perspectives may lead to new understanding of the organization, and identification of action opportunities that would not have otherwise occurred	Course participants	Camp participants, and camp participants' parents

2.2.3 Inclusion and exclusion of stakeholders

Lastly, based on the stakeholder identification results described above and confirmed by ASPEED, the stakeholders of PVM Course include course participants and course preparatory and operational staff. The stakeholders of HSSE Camp (Winter and Summer Breaks) include camp participants, camp participants' parents and camp staff. Next, interviews, engagement meeting and data collection were performed with the stakeholders. Through engagements, it was assessed whether the stakeholders thought other groups were affected by this project, and their involvement and changes during this project were thoroughly studied. The engagement results were then used as references for the inclusion and exclusion of stakeholders. (For details on engagement outcomes and interview outline, refer to Chapter 2.3.1 and Appendix 1.)

Regarding PVM Course, course participants were the primary impacted party of this project, found through interviews to have experienced intellectual enhancement through the course, and thus included based on the materiality principle. Regarding course preparatory and operational staff, through interviews, it was found that tasks such as planning, preparation and coordination enhanced their capability. Lecturing and acting as judges also caused notable mental changes. They were thus included based on the materiality principle.

Regarding HSSE Camp (Winter and Summer Breaks), camp participants were primary impacted party of this project, found through interviews to have experienced enhancement of knowledge through the camp, and thus included based on the materiality principle. Regarding camp staff, it was discovered through interviews that the planning, preparation and coordination tasks enhanced their capability. Lecturing and serving as judges also caused notable mental changes. They were thus included based on the materiality principle. However, it was discovered through interviews that although camp participants' parents observed

changes in their children, they did not directly participate in the camp and, therefore did not experience any apparent outcomes. As a result, we excluded camp participants' parents from the stakeholders of this project.

The identification of the stakeholders in this project is as follows:

Activity	Stakeholders	Role in the project		Include/excluded
PVM Course	Course participants	Course beneficiaries	● Course participation ● In-class presentation	Included
	Course preparatory and operational staff	Course providers	● Course design, resource preparation and administration ● Lecturing and experience sharing in the course, and acting as judges for the presentations	Included
HSSE Camp (Winter and Summer Breaks)	Camp participants	Camp beneficiaries	● Participation in courses, lectures and business visits of the camp ● Team presentation	Included
	Camp participants' parents	Camp beneficiaries	N/A	Excluded
	Camp staff	Camp providers	● Activity design, and resource preparation ● Acting as counselors and care-takers of the students during the camp ● Lecturing and experience sharing, and acting as judges for the presentations during the camp	Included

We further considered possible subcategories based on the interview results and information of the included stakeholders, to ensure outcomes from stakeholders of different backgrounds, genders, ages and organizations were completed calculated.

Course participants of PVM Course: It was discovered through interviews that since the PVM Course is an elective course, the outcomes of each participant were not differentiated by their age (grade). Thus, no subcategories were created to distinguish between them; It was discovered through interviews that due to the similar age (grade) of course participants, distinguishing subcategories based on age (grade)

did not result in differences in data analysis outcomes. Furthermore, the outcome changes were not affected by differences in age (grade); therefore, subcategories were not further distinguished.

Course preparatory and operational staff of PVM Course: It was discovered through interviews that although the camp staff were from three organizations —ASPEED, HGSH and NTHU—and of different genders and ages, their role in the project was "course providers". Their outcomes were thus similar, and no subcategories were created to distinguish between them; It was discovered through interviews that most course preparatory and operational staff were from NTHU, making it difficult to differences organizational influence. Additionally, differentiating subcategories by age, gender, or organization did not result in variations in the data analysis outcomes; therefore, subcategories were not further distinguished.

Camp participants of HSSE Camp (Winter Break and Summer Break): It was discovered through interviews that since the HSSE Camp is an extracurricular activity and the outcomes of each participant are not differentiated by their age (grade) and school, no subcategories were created to distinguish between them; It was discovered through questionnaire analysis that as the camp participants were of similar ages (grades) and attended schools within the same region, distinguishing subcategories by age (grade) or school did not lead to differences in the data analysis results. Furthermore, the outcomes were not influenced by age (grade) or school differences; therefore, subcategories were not further distinguished.

Camp staff of HSSE Camp (Winter Break and Summer Break): It was discovered through interviews that although the camp staff were from three organizations —ASPEED, HGSH, and NTHU—and of different genders and ages, their role in the project was "camp providers". Their outcomes were thus similar, and no subcategories were created to distinguish between them; It was discovered through questionnaire analysis that most camp staff were from NTHU, making it difficult to distinguish differences in organizational influence. Additionally, differentiating subcategories by age, gender, or organization did not result in variations in the data analysis outcomes; therefore, subcategories were not further distinguished.

The identification result is as following:

Activity	Stakeholder	Potential subcategory	Identification result
PVM Course	Course participants	Age (grade)	No subcategories were created to distinguish between them.
	Course preparatory and operational staff	Age, gender and organization	No subcategories were created to distinguish between them.
HSSE Camp (Winter Break and Summer Break)	Camp participants	Age (grade) and school	No subcategories were created to distinguish between them.
	Camp staff	Age, gender and organization	No subcategories were created to distinguish between them.

2.3 Stakeholder Engagement

2.3.1 Engagement approaches

To understand the impact scope of this project, we engaged the stakeholders in three phases, utilizing the following engagement strategy.

Strategy for stakeholder engagement:

We defined the engagement strategy based on the materiality of the stakeholders to this project. However, every interview took one hour, and not every stakeholder was willing to attend interviews of such a length. Although we were unable to interview all stakeholders, we could ensure the quality of this study by managing the number of completed questionnaires in the second stage. Therefore, our management of questionnaire response rate for the important groups was determined based on a statistical confidence level of 90% and a sampling error of within 10%. These ensured representativeness and reliability of the data.

Three phases of the stakeholder engagement are as follows:

Phase	Engagement approach	Details
I. Understand outcomes	In-person or online video interviews	ASPEED assisted in inviting the preparatory and operational team of this project for the interviews. In terms of the primary beneficiaries, students participating in the activities or courses were interviewed based on their willingness. In order to gain in-depth understanding of the impact and changes the stakeholders experienced through this project, we conducted a roughly one-hour interview with every interviewee at this stage.
II. Confirm outcomes	Questionnaires	All relevant outcomes were consolidated based on the interviews in the first stage and literature review. A questionnaire was thereby designed and distributed to all stakeholders related to this project, in order to completely and thoroughly understand their feelings and changes through this project, and to confirm the four impact factors and financial proxy of each change.
III. Verify outcomes	Online video meeting	APSEED assisted in inviting at least one representative from each stakeholder group to participate in the engagement. The representative is mainly one who had been more involved, and the

		stakeholders who participated in the first phase of stakeholder engagement (Understand Outcomes) and were interviewed had experienced significant outcomes. Their feedback was considered sufficiently representative. Other stakeholders were also invited to join the online engagement meeting, for a broader benefit of the engagement. In the meeting, the stakeholders were asked to confirm whether the analysis result of the questionnaires (including, stakeholder types, outcomes, financial proxies, relative value or importance of the outcomes, and impact factors) are aligned with their actual perception. Through this verification phase, we confirmed that our outcome conclusions are not biased and true to the actual status.

The outcomes of stakeholder engagement are as follows:

Activity	Stakeholder group	Population size	Engagement participants			Total engagement participants
			Phase 1 – Understand outcomes (In-person or online video interviews)	Phase 2 – Confirm outcomes (Questionnaires)	Phase 3 – Verify outcomes (Online video meeting)	
PVM Course	Course participants	40	4 (10%)	28 (70%)	2 (5%)	34
	Course preparatory and operational staff	16	7 (43.7%)	14 (87.5%)	2 (12.5%)	23
HSSE Camp (Winter Break)	Camp participants	15	3 (20%)	14 (93.3%)	1 (6.67%)	18
	Camp staff	35	3 (8.5%)	28 (80%)	4 (11.43%)	35
HSSE Camp (Summer Break)	Camp participants	19	6 (31.5%)	18 (94.7%)	1 (5.26%)	25
	Camp staff	40	6 (15%)	28 (70%)	3 (7.5%)	37

Chapter 3 Theory of Change, Outcomes, and Chain of Events

3.1 Inputs and Outputs

3.1.1 Input calculation

To more accurately calculate the SROI, we itemized the inputs and outputs of this project. The definition of input by Social Value International is “every stakeholder group’s contribution for the development of events”. The calculation of resources dedicated to the WTC Project will be performed from the perspective of stakeholders. The resources include the following.

1. Funds, materials and goods dedicated to this project
2. The cost of manpower and time dedicated to this project

The purpose of the WTC Project is to cultivate female talents in technology. The course preparatory and operational staff, as well as the camp staff, were jointly engaged from three organizations: ASPEED, HGSH, and NTHU. All project costs were fully sponsored by ASPEED. The inputs for PVM Course, HSSE Camp (Winter Break) and HSSE Camp (Summer Break) are listed and summed as the following.

Activity	Stakeholders	Input			Source of information
		Items	Value of input (NT$)	Note	
PVM Course	Course participants	-	-	The course participants are the primary beneficiaries of this project and do not actually incur cost of input. The value is thus set at 0.	-
	Course preparatory and operational staff	Manpower	231,066	Preparatory and operational meetings of the course preparatory	Income and expenditure statement provided by ASPEED

				and operational staff, as well as attendance at the event, were included. Personnel costs were calculated based on the identity and position of the staff members.	
		Materials and goods	4,603	Course preparatory and operational meeting-related materials and catering expenses.	-
HSSE Camp (Winter Break)	Camp participants	-	-	The course participants are the primary beneficiaries of this project and do not actually incur cost of input. The value is thus set at 0.	-
	Camp staff	Manpower	133,641	Preparatory and operational	Income and expenditure statement

				meetings of the camp staff, as well as attendance at the event, were included. Personnel costs were calculated based on the identity and position of the staff members.	provided by ASPEED
		Materials and goods	118,157	Venue and equipment rental fees, and catering expenses.	-
HSSE Camp (Summer Break)	Camp participants	-	-	The course participants are the primary beneficiaries of this project and do not actually incur cost of input. The value is thus set at 0.	-
	Camp staff	Manpower	246,667	Preparatory and operational meetings of the camp staff, as well as	Income and expenditure statement provided by ASPEED

				attendance at the event, were included. Personnel costs were calculated based on the identity and position of the staff members.	
		Materials and goods	122,823	Venue and equipment rental fees, and catering expenses.	-
Total input		(NT$) 856,957			

3.1.2 Outputs of the project

The outputs of this project, the achievements of the WTC Project, are as follows.

Activity	Stakeholders	Outputs
PVM Course	Course participants	● 40 female high school students benefited from the course ● 27 Google Sites were created for exploration of college departments
	Course preparatory and operational staff	● 16 individuals served as the course preparatory and operational staff ● 12 classes were given as part of the PVM Course
HSSE Camp (Winter Break)	Camp participants	● 15 female high school students benefited from the course ● 6 team presentations on their creative results
	Camp staff	● 35 individuals served as the camp staff ● In a two-day HSSE Camp (Winter Break): ✓ 4 hours of technological and hands-on sessions ✓ 2 hours of scientific activities ✓ 2 hours of lectures and visits at technological corporations

HSSE Camp (Summer Break)	Camp participants	● 19 female high school students benefited from the course ● 6 team presentations on their creative results
	Camp staff	● 40 individuals served as the camp staff ● In a three-day HSSE Camp (Summer Break): ✓ 2 hours of paper discussion and lab sessions ✓ 6 hours of technological and hands-on sessions ✓ 4 hours of visits to university labs ✓ 1 hour of scientific activities ✓ 3.5 hours of lectures and visits at technological corporations

3.2 Project Outcomes

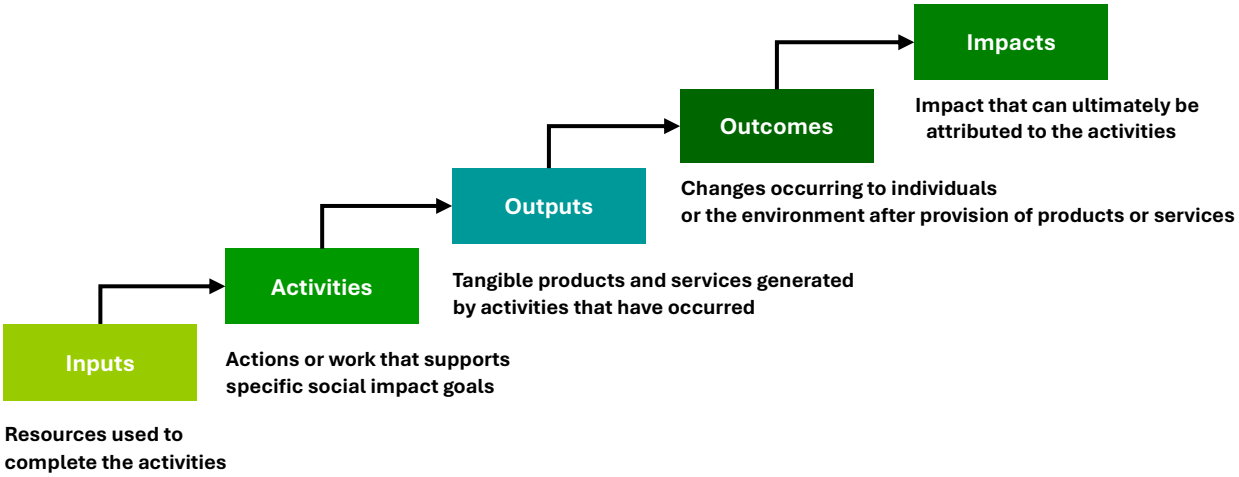
Based on the definition in "Principles 2: Understand What Changes" published by Social Value International, "outcome" indicates change experienced by stakeholders after participating in activities. There are five possible types of change that stakeholders may experience: circumstance, behavior, capacity, awareness and attitude.

In this report, we evidenced the outcomes of this project based on the literature including other published SROI reports and research papers, as well as interviews, questionnaires and engagement meeting with stakeholders. We interviewed stakeholders who were voluntarily invited by the project's organizers and co-organizers, who had a high level of participation in the activities. They were selected to ensure diversity while minimizing redundancy. We also set a requirement for the number of returned questionnaires, ensuring that stakeholders could fairly present both their positive and negative results, as well as other ideas (refer to Appendix 1, Appendix 2 and Chapter 2.3 for details). Finally, we invited representatives of stakeholders who had been interviewed and had completed the questionnaire to participate in the engagement meeting to confirm that the significant outcomes aligned with the actual situation (refer to Chapter 4.3 for details).

3.2.1 Theory of Change

The chain of events represents the process of change, with an emphasis on the causal relationship between inputs, outputs and outcomes (Figure 3). We used the Theory of Change to organize the outcomes gained by stakeholders through this project.

Figure 3. Theory of Change



We understood the sequence of outcomes for various stakeholders through two stages: literature review and stakeholder interviews

1. Literature review

   We gained preliminary understanding of potential impacts of this project on stakeholders through studying several research papers related to STEAM education. We also used the literature as guidance for our Phase 1 interviews, to enable interviewers to better understand the interviewees' feelings, and to more timely grasp the content and direction of the interviews, which formed the basis for the chain of events later on. The literature that we referred to provides us the following insights (Chang & Yang, 2014; Huang & Lin, 2014).

   - *Interdisciplinary STEM education can better arouse students' willingness to learn, as compared to other individual subjects (such as mathematics)*
   - *STEM hands-on courses can improve students' attitude and behavioral intentions for STEM knowledge integration*
   - *The earlier students are exposed to STEM education, the more likely that they choose related fields in college or as a profession*
   - *The course design of STEM education can be linked to the then current scientific development, and allow students to understand applications of conceptual knowledge and practice using procedural knowledge through hands-on activities and discussions, which in the meantime also enhance teamwork.*
   - *Behavioral intention of knowledge integration is affected by the perceived behavioral control thereof, and thus students should be urged to cultivate capabilities and build self-confidence and thereby enhance self-efficacy.*

2. Stakeholder interviews:

   Through literature review, we confirmed the most likely potential outcomes of this project and their causes, which formed basis for our understanding of the chain of events. We thereby designed a semi-

structured interview outline to understand from stakeholders their involvement in and changes from the activities, which leads to confirmation of their change process and eventual outcomes, and also mapping of the chain of events. Comparing literature review and the stakeholder interviews, we were able to confirm the chain of event process for the stakeholders is correct and true to the actual status.

3.2.2 Stakeholder Outcomes

After literature review and stakeholder interviews, we presented the change process through a chain of events, and eventually inferred the final expected outcomes. The causal relationships between outcomes within the chain of events are based on stakeholder interviews conducted during Stage 1 (Understand Outcomes) of the stakeholder engagement process. In these interviews, stakeholders described the process of change and resulting outcomes according to a chronological timeline. The chain of events is presented as follows.

Activity	Stakeholders	Outcomes	Brief description of the chain of events
PVM Course	Course participants	Development of learning motivation and career goal setting	● First semester course → Collect information on colleges and departments → Explore in-depth interested departments/learn about new departments → Reference for future department selection → Development of learning motivation and career goal setting ● First semester course → Learn to use Google Sites and ChatGPT → Create learning portfolio → Development of learning motivation and career goal setting *Quotes from interviews:* *"I thought the department options for the science track only include electrical engineering, electronics and computer science. But now, because of this course, I got to learn about more departments such as mechanics and earth science."* *"I wanted to see if there are other interesting departments under track 2 (science track without biology) but afterward I felt more inclined toward track 3 (science track with biology)."*
		Enhancement of knowledge and practical skills in the field of technology	● Second semester course → Create in-class presentation → New thinking pattern for creating presentations → Complete the final presentation → Enhancement of knowledge and practical skills in the field of technology *Quote from interviews:* *"The first semester is focused on exploring college departments, while the second semester requires you to fully comprehend the 6 sessions of the course before creating the presentation. Typically comprehending the materials is for exam preparation, but the final presentation of this course*

			requires speaking in front of the class. Improvement of my poise in public speaking is very rewarding."
	Course preparatory and operational staff	Enhancement of personal soft skills	● Prepare and plan for the course → Provide ideas on course contents → Integrate course contents with ASPEED products → Enhance ability to translate information → Enhancement of personal soft skills ● Prepare and plan for the course → Plan course themes and implementation → Turn professional knowledge into teaching contents → Enhance ability to translate information/ understand expertise in different fields/ enhance interdisciplinary communication skills/ enhance ability to match resources → Enhancement of personal soft skills ● Participate in and implement the course → Observe and participate in the course → Understand channels and skills for information collection/learn new knowledge → Apply new knowledge to work or life → Enhancement of personal soft skills *Quote from interviews:* *"When the team comes up with a topic, the teacher would try to create a course out of it. The team's focus is on this thing is cool and to be shared with the students; the teacher's focus is on whether we can dissect the topic for the students to understand. In our discussions, we need to compromise or find a balance."*
		Enhancement of intergenerational understanding and interactions	● Participate in and implement the course → Share one's own educational and work experiences/ serve as a judge for the final presentation of the course → Understand generational differences → Ponder upon education for children in the future → Enhancement of intergenerational understanding and interactions *Quote from interviews:* *"The syllabus and selection of contents are different now. Although I felt a generation gap, this is still a good opportunity to understand them better. I wanted to understand them. When I became aware that times have changed, I thought about new employees in the company. The children before and nowadays experience different educational environments. Changes are constant, and we need to care for their feelings."*
		Enhanced sense of purpose (such as sense of purpose at	● Participate in and implement the course → Observe and participate in the course → Observe students' growth → Feel contribution to the society → Enhanced sense of purpose (such as sense of purpose at work, generation of social impact, self-realization) *Quote from interviews:*

		work, generation of social impact, self-realization)	*"Mentally, I feel that I am at a stage where I can contribute to the society and that makes me feel good."*
		Feeling of stress	● Prepare and plan for the course → Plan course themes and implementation → Turn professional knowledge into teaching contents → Increased workload → Feeling of stress *Quote from interviews:* *"There was additional workload, such as meetings and in-class participation, which compressed time for other tasks. There's also additional pressure from interpersonal relations, such as asking colleagues to act as lecturers and participate in activities."*
HSSE Camp (Winter Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	● Hands-on courses → Learn programming codes and using breadboards → Find hands-on materials novel and interesting → Enhance interest in the STEM area → Enhancement of knowledge and practical skills in the field of technology ● Visit ASPEED → Listen to sharing of industrial experience → Learn about technology sector jobs → Understand capabilities required for employment in the technology sector → Enhance interest in the STEM area → Enhancement of knowledge and practical skills in the field of technology ● Final team presentation → The teacher and teammates provide suggestions for improvement and feedback → Enhancement of knowledge and practical skills in the field of technology *Quote from interviews:* *"I've never seen a breadboard before. I felt nervous at first, but during the class, the neighboring classmate and I asked each other questions, and the teacher's explanation was also very clear. I realized it's not that hard after actually doing it, and I could also draw references about other cases from this one instance. I succeeded in making the breadboard and was quite happy about it."*
		Enhancement of personal soft skills	● Hands-on courses → Learn programming codes and using breadboards → Can not properly apply codes and feel frustrated → Discuss with teammates and work together to resolve issues → Enhancement of personal soft skills

			● Final team presentation → The teacher and teammates provide suggestions for improvement and feedback → Enhancement of personal soft skills *Quote from interviews:* *"It's the first time I had to complete a presentation within such a short period of time. But in the process everyone actively communicated and worked with each other, and therefore we could eventually complete it."*
		Development of learning motivation and career goal setting	● Hands-on courses → Learn programming codes and using breadboards → Find hands-on materials novel and interesting → Enhance interest in the STEM area → Development of learning motivation and career goal setting *Quote from interviews:* *"This camp allowed me to explore and ponder upon the future. I got to understand more of what I want, whether it's track selection in my second year of high school or choice of future work. I got to have a clearer understanding of my own thoughts."*
	Camp staff	Expansion of professional networks in the field of technology	● Implement camp activities → Serve as a coordinator → Collaborate with other staff members → Become more familiar with work partners → Expansion of professional networks in the field of technology *Quote from interviews:* *"During preparation and implementation of the camp, and the communication with the team leads and camp facilitators, I felt much closer interactions."*
		Enhanced attention to or involvement in female empowerment in the technology field	● Post-activity review meeting → Share with family and friends experience of the activity → Feel a sense of meaning and honor with the outcomes of the activity → Actively understand other activities related to female empowerment in science → Enhanced attention to or involvement in female empowerment in the technology field *Quote from interviews:* *"Because of my involvement in the camp preparation, I feel like understanding the other organizations and activities related to female empowerment."*
		Enhancement of personal soft skills	● Pre-activity preparation and planning → Design and prepare teaching materials → Encounter difficulty during preparation → Work with team members to resolve the issues → Smoothly resolve the issues → Enhancement of personal soft skills

			● Implement camp activities → Serve as a camp facilitator → Guide high school students in the activities → Enhancement of personal soft skills *Quotes from interviews:* *"When I didn't understand the activity plan, I felt that preparation would be very difficult. However, it became much smoother after my discussion with the preparation team members."* *"Student facilitators learned how to organize activities during the process."*
HSSE Camp (Summer Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	● Take technology and hands-on courses → Gain semiconductor knowledge →Enhancement of knowledge and practical skills in the field of technology ● Create a presentation with teammates → Discuss with teammates the content of the presentation → Experience different work allocation and collaboration approaches → Learn new collaboration techniques → Enhancement of knowledge and practical skills in the field of technology *Quotes from interviews:* *"I learned a different way of observation and thinking, such as to look in the long run. I also learned different teamwork approaches in the team-based activities."* *"Listening to the facilitators explain semiconductors and the lab visits are very interesting. I learned new knowledge."*
		Development of learning motivation and career goal setting	● Visit labs and experiment centers → Understand work in the lab → Enhance imagination for future college departments → Development of learning motivation and career goal setting ● Visit ASPEED → Understand work environment of the technology industry → Become interested in the ASPEED work environment → Enhance imagination of the future career → Understand the future career trajectory → Development of learning motivation and career goal setting *Quotes from interviews:* *"The biggest attraction of this camp for me is visits to technology companies. Having mostly visited government agencies before, I was really amazed entering the ASPEED headquarters. I aspire to work in such an environment in the future."* *"The camp helps me explore future careers and college departments, such as having more understanding of what people do in semiconductors, and what human resources look for in your job application."*

		Advancement in self-challenge and breakthrough	● Create a presentation with teammates → Discuss with teammates the content of the presentation → Feel very nervous about in-class presentation → Present → Advancement in self-challenge and breakthrough *Quote from interviews:* *"My presentation skills improved. I feel more confident articulating my opinions and engaging in in-depth discussions."*
	Camp staff	Expansion of professional networks in the field of technology	● Plan activities → Share with family and friends the experience organizing the activities → Add topics for conversations and interaction opportunities → Expansion of professional networks in the field of technology ● Serve as a camp facilitator → Engage with various staff members → Expansion of professional networks in the field of technology *Quote from interviews:* *"Organizing a camp means collaboration with various departments, such as for ordering snacks, lunch boxes, arranging for equipment. This allows us to know each other better and build a stronger relationship."*
		Inspired career imagination	● Implement camp activities → Visit the ASPEED office → Listen to talks of the ASPEED Chairman and other professionals → Inspired career imagination *Quotes from interviews:* *"The Chairman's reflection on the company's foundation, engineers' career planning, and the office visit, all inspired me to think what abilities I need to plan on acquiring in the future."* *"I feel inspired career-wise by the Chairman's speech, about how you should select your career of life, based on companies with growth potentials, positions and managers, for example."*
		Enhancement of personal soft skills	● Plan activities → Follow administrative procedures → Become more familiar with procedures and details of activity operation → Enhancement of personal soft skills ● Pre-activity preparation and planning → Design course content → Discuss with other experienced teachers → Improve course content → Enhancement of personal soft skills *Quote from interviews:* *"The course is more difficult. When I encounter difficulty I would seek advice from others and adjust exercise problems accordingly. The success of this*

			camp also makes me more confident in incorporating hands-on sessions into the regular courses."
		Feeling of stress	● Plan activities → Practice performance and guidance in the activities → Practice until late into the night → Feeling of stress *Quote from interviews:* *"The preparation time is too short. Some college students in the staff rehearsed and practiced until late into the night."*

3.2.3 Outcome Threshold

Following SROI requirements, we need to set a threshold for outcomes, as an evidence for the actual occurrence of outcomes and for the number or percentage of occurrences within the groups. When determining the threshold, we not only referred to the stakeholders' subjective feelings but also included relatively objective references from the literature review, in order to prevent the threshold from being too lenient or biased and to ensure that all included outcomes have actually occurred and comply with Principle 5: Do not overclaim.

The following are "the Outcome thresholds":

1. Objective: Interviews and observation results
2. Objective: Literature review
3. Subjective: Based on the stakeholders' responses to the questionnaire, the outcomes are included in the calculation only when the "level of change" before and after the activity is above 0.

In the stakeholder interviews, we first confirmed the factual occurrence of outcomes. In Phase 2 of the stakeholder engagement, we then used questionnaires to confirm the outcomes with the stakeholders. In the questionnaires, we requested stakeholders to indicate the level of change in specific feelings or abilities before and after the activities.

Using "HSSE Camp (Summer Break)" staff's perception of "Expansion of professional networks in the field of technology" as an example:

Pre-change self-evaluation	**Your perception of your level of achievement or ability in this area before participating or becoming involved in this activity:** (1 indicates the ability or feeling is very weak, while 5 indicates proficient ability or strong feeling)				
	○1	○2	○3	○4	○5
Post-change self-evaluation	**Your perception of your level of achievement or ability in this area after participating or becoming involved in this activity:** (1 indicates the ability or feeling is very weak, while 5 indicates proficient ability or strong feeling)				
	○1	○2	○3	○4	○5

3.2.4 Outcome Materiality Assessment

Following the confirmation of outcome thresholds, we conducted an outcome materiality assessment in accordance with Principle 4: Only include what is material. Outcomes that met both significance and relevance criteria were identified as outcomes. For unintended outcomes, in addition to ensuring that the change experienced by stakeholders before and after the activity is sufficient to establish the outcome and that the stakeholders consider the outcome important, we also applied sensitivity analysis to avoid overclaiming the outcomes.

Significance verification method:

We requested that the stakeholders evaluate the importance of the outcomes on a Likert scale of 1 to 5, to ensure adherence to Principle 4: Only include what is material. If “important” and “very important” were selected under the “level of importance” question, the outcomes were considered for inclusion in the calculation.

Using “HSSE Camp (Summer Break)” staff’s perception of “Expansion of professional networks in the field of technology” as an example:

Importance	**What’s your perceived level of importance of this change or gain after participating or becoming involved in this activity:**				
	○Very unimportant (2)	○Unimportant (4)	○Moderately important (6)	○Important (8)	○Very important (10)

Relevance verification method:

Based on the questionnaire data analysis, we adopted the "project vision and objectives" (see below: "Project Vision and Objectives") as the relevant outcome criteria, and retained only the outcomes related to this project.

Project Vision and Objectives:

- Promote topics on female talents in technology
- Assist the new-generation high school students in their understanding of the technology industry
- Develop female high school students’ interests in the technology industry and field
- Thereby cultivate female talents in technology
- Assist high school students with their selection of colleges and departments and development of their career plans

The following presents the outcome materiality assessment for this project:

During interviews, participants of the PVM Course and the HSSE Camp (Winter Break) both mentioned the outcome of "expansion of social circle." However, since the course did not specifically include peer interaction activities and group formations were self-organized by students, it was difficult to expand new

social networks through this activity. Furthermore, camp participants came from different schools and regions. Given the short duration of the two-day, one-night winter camp, students had limited opportunities to develop deep connections with other participants. After the camp, due to differing living environments and social circles, maintaining contact was challenging. This resulted in the outcome showing a shorter duration and lower value in the questionnaire data analysis. Additionally, considering that "Expansion of social circle" is not an objective of this project and its relevance is low, this outcome was excluded from the evaluation.

The course preparatory and operational staff of the PVM Course mentioned in interviews the outcome of "enhancement of intergenerational understanding and interactions." Although this was not an anticipated outcome, questionnaire data analysis showed a significant and lasting impact on work and intergenerational interactions. Moreover, since the preparatory and operational staff have backgrounds in technology and education, understanding generational differences is beneficial for advancing issues related to women in technology in the future. This outcome was therefore assessed as relevant and included in the outcome calculations. Sensitivity analysis will also be conducted to further mitigate the risk of overestimating the project's impact.

Course participants of the PVM Course, camp participants of the HSSE Camp (Winter Break and Summer Break), and camp staff all mentioned in interviews the outcome of "development of positive emotions." Although "development of positive emotions" is not an intended project goal, the interviews revealed that these positive emotions help stakeholders actively share their experiences and gains from the activity with others and view the outcomes positively. While it is not a outcome, it primarily serves to reinforce the value of other outcomes.

Regarding the issue of "Women in Tech empowerment," existing social expectations create significant barriers to women's engagement in the technology field. In alignment with the project's vision and goals, we consider cognitive changes as important outcomes of this project. Therefore, "development of learning motivation and career goal setting", "enhanced attention to or involvement in female empowerment in the technology field," and "Inspired career imagination" were all assessed and included in the outcome calculations.

Based on the outcome materiality assessment, the outcomes presented in Section 3.2.2 "Stakeholder Outcomes" have been confirmed for inclusion.

The following are the outcomes of this project that meet the outcome threshold and have undergone outcome materiality assessment. Analysis confirmed that the outcome proportion for each has a value greater than zero; therefore, all outcomes are included in the outcome calculations:

Activity	Stakeholders	Outcome	Outcome ratio[1]	Average stakeholders' change[2]	Average importance[3]	Included/excluded
PVM Course	Course participants	Enhancement of knowledge and practical skills in the field of technology	21 (53%)	1.67	9.52	Included

		Development of learning motivation and career goal setting	21 (53%)	1.85	9.71	Included
	Course preparatory and operational staff	Enhancement of personal soft skills	5 (31%)	1.8	9.6	Included
		Enhancement of intergenerational understanding and interactions	7 (44%)	1.71	9.42	Included
		Enhanced sense of purpose (such as sense of purpose at work, generation of social impact, self-realization)	7 (44%)	2	9.42	Included
		Feeling of stress	1 (6%)	1	10	Included
HSSE Camp (Winter Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	8 (53%)	1.37	9	Included
		Enhancement of personal soft skills	7 (47%)	1.14	8.57	Included
		Development of learning motivation and career goal setting	5 (33%)	1.4	9.2	Included
	Camp staff	Expansion of professional networks in the field of technology	2 (6%)	1.5	8	Included
		Enhanced attention to or involvement in female empowerment in the technology field	2 (6%)	2.5	9	Included
		Enhancement of personal soft skills	2 (6%)	1	9	Included
HSSE Camp (Summer Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	16 (84%)	1.56	9.37	Included
		Development of learning motivation and career goal setting	17 (89%)	1.94	9.17	Included
		Advancement in self-challenge and breakthrough	13 (68%)	1.61	9.38	Included
	Camp staff	Expansion of professional networks in the field of technology	13 (33%)	1.38	8.61	Included
		Inspired career imagination	13 (33%)	1.3	8.92	Included
		Enhancement of personal soft skills	11 (28%)	1.54	8.9	Included

		Feeling of stress	3 (8%)	1.67	8	Included

Note 1: Outcome ratio = number of outcomes / population size

Note 2: "Average stakeholders' change" refers to the average "level of change" reported in all stakeholder questionnaires that meet the outcome thresholds, based on self-evaluations conducted before and after the change.

Note 3: "Average importance" refers to the average level of "Importance" reported in all stakeholder questionnaires that meet the outcome thresholds.

3.2.5 Duration

Every outcome has a different duration due to its nature. This project assessed the duration and drop-off of each outcome for stakeholders by asking how long they believed the outcomes would last through interviews and questionnaires (refer to Appendix 1 and Appendix 2 for details). It was determined in the stakeholder engagement meeting to round up the average duration to the nearest integer with year as the unit, which will be used to calculate the duration value of the outcomes. To follow Principle 5: Do not overclaim, we also adjusted the duration in the Sensitivity Analysis section, in order to reduce the risk of underestimating or overestimating the SROI value.

Activity	Stakeholders	Outcome	Duration
PVM Course	Course participants	Enhancement of knowledge and practical skills in the field of technology	1
		Development of learning motivation and career goal setting	1
	Course preparatory and operational staff	Enhancement of personal soft skills	2
		Enhancement of intergenerational understanding and interactions	2
		Enhanced sense of purpose (such as sense of purpose at work, generation of social impact, self-realization)	2
		Feeling of stress	1
HSSE Camp (Winter Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	2
		Enhancement of personal soft skills	2
		Development of learning motivation and career goal setting	1
	Camp staff	Expansion of professional networks in the field of technology	1
		Enhanced attention to or involvement in female empowerment in the technology field	1
		Enhancement of personal soft skills	2
HSSE Camp (Summer Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	2
		Development of learning motivation and career goal setting	3
		Advancement in self-challenge and breakthrough	2

	Camp staff	Expansion of professional networks in the field of technology	2
		Inspired career imagination	2
		Enhancement of personal soft skills	2
		Feeling of stress	1

Note: Certain outcomes have a duration of less than one year according to the questionnaire responses but are listed as “one year” here.

3.3Outcome Evaluation

Based on Principle 3: Value the things that matter, we need to assess the monetary value of every stakeholder outcome by using a financial proxy. We used the Monetary Valuation Approach to determine the financial proxy for outcome evaluation.

Through stakeholder engagement and considering the characteristics of the stakeholder groups of this project, we will perform monetary valuation of stakeholder outcomes by referring to the “value game” under the “stated preference”. The gift list of the value game is designed in the following steps.

1. Phase 1: Through one-on-one interviews using open-ended questions, respondents were asked to list their gift list from the perspectives of “willing to give or take” and “important”.
2. Phase 2: Based on the gift list provided by interviewees in Phase 1, the price range of the gift list was established. Through desk research, and used to supplement and adjust the gift list. The adjusted list was then used to create the questionnaire.
3. Phase 3: Through the questionnaire, we provided respondents with a gift list that included clearly defined prices.The questionnaire asked respondents to answer “what changes or gains occurred after participating in/organizing the WTC Project, and which product from the gift list are you willing to exchange for these changes or gains?”. We also included open-ended questions allowing respondents to freely express any additional thoughts beyond the questionnaire’s scope. During the stakeholder engagement meetings, we confirmed the design of the gift list with stakeholder representatives to ensure that it reasonably reflects the value of the outcomes to the stakeholders.

Gift list

Stakeholders	Items important for stakeholders	Monetary value (NTD)
Course/Camp participants	Starbucks beverage voucher * 1	135
	EATOGETHER dining voucher * 1	950
	Brand name sneakers * 1 pair	3,978
	Nintendo Switch console * 1	8,980
	Apple iPhone 15 Pro Max * 1	44,900
	Apple MacBook Pro 16-inch * 1	84,900
	Five-star hotel room voucher * 1 night	6,928

Course preparatory and operational staff/Camp staff	Dyson V12 vacuum cleaner * 1	17,900
	Apple iPhone 15 Pro Max * 1	44,900
	Gogoro S1 scooter * 1	131,980
	14-day luxury northern Europe trip	259,900
	Toyota Yaris car * 1	710,000

According to the questionnaire responses, evaluation of each stakeholder outcome is as the following

Activity	Stakeholders	Outcome	Financial proxy	Price* (NTD/year)
PVM Course	Course participants	Enhancement of knowledge and practical skills in the field of technology	Monetary value of items the interviewees were willing to exchange for the outcomes (such as dining voucher, mobile phone and home appliances), shown in average value.	4,833.33
		Development of learning motivation and career goal setting		11,235.71
	Course preparatory and operational staff	Enhancement of personal soft skills		110,311.20
		Enhancement of intergenerational understanding and interactions		153,945.14
		Enhanced sense of purpose (such as sense of purpose at work, generation of social impact, self-realization)		199,076.57
		Feeling of stress		-44,900.00
HSSE Camp (Winter Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	Monetary value of items willing to exchange for the outcomes (such as dining voucher, mobile phone and home appliances), shown in average value.	43,593.50
		Enhancement of personal soft skills		20,700.00
		Development of learning motivation and career goal setting		28,531.20
	Camp staff	Expansion of professional networks in the field of technology		358,464.00
		Enhanced attention to or involvement in female empowerment in the technology field		133,414.00

		Enhancement of personal soft skills		484,950.00
HSSE Camp (Summer Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	Monetary value of items willing to exchange for the outcomes (such as dining voucher, mobile phone and home appliances), shown in average value.	31,560.38
		Development of learning motivation and career goal setting		44,566.82
		Advancement in self-challenge and breakthrough		51,235.85
	Camp staff	Expansion of professional networks in the field of technology		386,956.92
		Inspired career imagination		398,563.69
		Enhancement of personal soft skills		274,263.00
		Feeling of stress		-188,233.33

Note: Certain outcomes have a duration of less than one year according to the questionnaire responses but are listed as “one year” here.

3.4 Impact Factors

After the outcome evaluation, we performed an analysis based on the four SROI impact factors, clarifying the percentage of outcomes attributed to the project. The impact factors are defined as follows:

1. Deadweight: The probability that the outcome would have occurred even without the project, expressed as a percentage.
2. Attribution: The percentage of the outcome attributed to the contributions of other organizations or individuals, expressed as a percentage. It primarily assesses the project's relative contribution to the outcomes.
3. Drop-off: The decrease in outcomes over time after the project is completed, expressed as a percentage. It primarily assesses the sustainability of the outcomes.
4. Displacement: Impact stakeholders both within or outside this project when getting outcomes from this project; however, not all outcomes will result in displacement.

We asked stakeholders to confirm the data of the impact factors through the engagement meeting, and performed a sensitivity analysis to calculate the impact factors of different possibilities (refer to Chapter 4.2 for details) to prevent over-exaggeration following Principle 5: Do not overclaim.

We asked stakeholders the following questions: “If you did not participate in this activity, would this change or gain have occurred?”, “The contribution level of this activity to this change or gain.”, “If you believe this ‘impact of change or gain would last more than one year’, what would the impact be in the second year?” and “Did any issues occur with you or your surroundings during your participation in this activity?” (Refer to Appendix 1 and Appendix 2 for details). We collected stakeholders’ impact factor percentages for each outcome, and asked them to openly explain their reasons through questionnaires (refer to Appendix 2 for details) and interviews (refer to Appendix 1 for details) to confirm the rationality of the values. Additionally, we used the questionnaire data to analyze the impact factors of each outcome by calculating the mean values for the calculations. (Table 2)

Table 2. Impact Factors are analyzed as follows:

I. Deadweight

For PVM Course, among the two outcomes of “course participants”, the deadweight for "enhancement of knowledge and practical skills in the field of technology" was set at 40%, as similar outcomes may also occur in school life and extracurricular activities. For instance, other school courses may cover basic principles of imaging, and university-organized departmental camps may offer similar teaching content. In contrast, the deadweight for "development of learning motivation and career goal setting" was assessed to be lower, as the course included career-sharing sessions by ASPEED employees and student group presentations, providing course participants with more time and opportunities to gain deeper insights into various academic fields. Among the four outcomes of “course preparatory and operational staff”, the deadweight of each is below 30%. The interviewees mentioned the course preparation and implementation is coordinated between three organizations, increasing opportunities of interdisciplinary interactions and involvement, while the interaction with students of different generations in the course enhanced a sense of purpose. These are less available from other tasks in the day-to-day operations. However, they also felt stressed because it’s the first time they needed to coordinate between organizations and handle course design.

For “HSSE Camp (Winter Break)”, all three outcomes of “course participants” have a deadweight value of above 40%. This is because similar outcomes can also occur in school. Among the three outcomes of “camp staff”, the deadweight values of all except “enhancement of personal soft skills” are below 30%. The deadweight of “expansion of professional networks in the field of technology” is 0%. The interviews revealed that the camp offered more opportunity to interact and collaborate with personnel from different units, area and age groups. As for “enhancement of personal soft skills”, it has higher deadweight values because camp staff can achieve similar outcomes through their own work and daily life.

For “HSSE Camp (Summer Break)”, the deadweight values of all three “course participants” outcomes are above 30%. This is because similar outcomes can also occur in school. Among the four outcomes of “camp staff”, the deadweight values of all except “feeling of stress” are above 30%. The interviews revealed that part of the camp staff achieved similar outcomes through the HSSE Camp (Winter Break) or other camps. On the 8% deadweight of “feeling of stress”, we learned from the interviews that since HSSE Camp (Summer Break) is scheduled for 3 days, with more contents to prepare than HSSE Camp (Winter Break), and with a shorter preparation timeline, it’s more likely to cause additional stress and fatigue.

II. Attribution

For PVM Course, among the two outcomes of “course participants”, the attribution for the outcome "enhancement of knowledge and practical skills in the field of technology" was assessed at 40%, whereas the attribution for "development of learning motivation and career goal setting" was lower. According to course participants, the PVM Course provided insights into career paths in the technology field that are difficult to obtain through regular school curricula or extracurricular activities. Therefore, this outcome was attributed more directly to the intervention, resulting in a lower attribution rate.. Among the four outcomes of “course preparatory and operational staff”, all except “feeling of stress” have attribution values below 40%. This shows these outcomes are less available from other channels. The fact that the attribution of “feeling of stress” is as high as 75% reflects that stress mainly comes from other regular tasks.

For “HSSE Camp (Winter Camp)”, among the three outcomes of “course participants”, the attribution for the outcomes "enhancement of knowledge and practical skills in the field of technology" and "development of learning motivation and career goal setting" was assessed to be below 40%, while the attribution for "enhancement of personal soft skills" was 43%. This reflects the fact that camp participants can still achieve “enhancement of personal soft skills” from participating in other camps. As for “enhancement of knowledge and practical skills in the field of technology” and “development of learning motivation and career goal setting” with lower attribution, the interviewees mentioned that corporate collaboration and visits are less available in other camps. This reflects that the activity achieved better outcomes in skills training and career development engagement compared to other camps. Among the three outcomes of “camp staff”, all except “expansion of professional networks in the field of technology” have attribution values that are below 30%. This reflects the fact that camp staff can less likely achieve similar results from other channels. The 62% attribution of “expansion of professional networks in the field of technology” indicates camp staff may still expand personal network through their daily tasks.

For “HSSE Camp (Summer Break)”, “enhancement of knowledge and practical skills in the field of technology”, “development of learning motivation and career goal setting” and “advancement in self-challenge and breakthrough” all three outcomes of “camp participants” have below 30% attribution. This means these outcomes are less available from other camps, showing that the camp has good actual impacts. Among the four outcomes of “camp staff”, “inspired career imagination” and “enhancement of personal soft skills” all have above 30% attribution except “expansion of professional networks in the field of technology” and “feeling of stress”. This means camp staff can still achieve similar outcomes through their other tasks. With “expansion of professional networks in the field of technology” and “feeling of stress”, involvement in the camp organization allowed the staff more opportunity to meet and interact with people of different backgrounds, but in the meantime created additional stress and fatigue because the camp organization tasks are less related to their regular work.

III. Drop-off

For PVM Course, all two outcomes of “course participants” have 100% drop-off, because the course content is less relevant to regular courses at school, and if students do not stay in touch with related contents after the course ended, the outcome would fade away. Among the four outcomes of “course preparatory and operational staff”, the drop-off of “feeling of stress” is 100%, indicating that the stress is

removed as the course ends. The rest of the drop-off values range between 75-90%, indicating that the outcomes decrease substantially after the course.

For “HSSE Camp (Winter Break)”, among the three outcomes of “camp participants” of “High School Semiconductor Camp (Winter Break)”, “enhancement of knowledge and practical skills in the field of technology” and “enhancement of personal soft skills”, all except “development of learning motivation and career goal setting” have drop-off values ranging between 60-80%. This indicates that after the camp, the generated outcomes decrease substantially. The 100% drop-off of “development of learning motivation and career goal setting” indicates that the outcome diminishes easily after the end of the camp. Among the three outcomes of “camp staff”, “expansion of professional networks in the field of technology” and “enhanced attention to or involvement in female empowerment in the technology field”, all except “enhancement of personal soft skills” have 100% drop-off, which indicates disappearance of the outcomes after the camp. As for the 13% drop-off of “enhancement of personal soft skills”, interviewees indicated that it’s a sustainable ability.

For “HSSE Camp (Summer Break)”, all three outcomes of camp participants have 40-60% drop-off, meaning the outcome is halved as the camp ends. Among the four outcomes of “camp staff”, “expansion of professional networks in the field of technology”, “inspired career imagination” and “enhancement of personal soft skills”, all except “feeling of stress” have 60-90% drop-off. This indicates that the outcomes diminish substantially after the camp, while the additional stress and fatigue caused by the camp organization would be entirely gone afterwards.

IV. Displacement

Through the interviews and questionnaire results, it was discovered that for both “PVM Course” and “HSSE Camp (Winter Break and Summer Break)”, the displacement value of each stakeholder outcome is 0%.

Table 2. Impact Factors

Activity	Stakeholders	Outcome	Deadweight	Attribution	Drop-off	Displacement
PVM Course	Course participants	Enhancement of knowledge and practical skills in the field of technology	40%	40%	100%	0%
		Development of learning motivation and career goal setting	24%	25%	100%	0%
	Course preparatory and operational staff	Enhancement of personal soft skills	10%	20%	85%	0%
		Enhancement of intergenerational understanding and interactions	14%	25%	75%	0%
		Enhanced sense of purpose (such as sense of purpose at	14%	39%	89%	0%

		work, generation of social impact, self-realization)				
		Feeling of stress	25%	75%	100%	0%
HSSE Camp (Winter Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	44%	28%	81%	0%
		Enhancement of personal soft skills	50%	43%	75%	0%
		Development of learning motivation and career goal setting	40%	30%	100%	0%
	Camp staff	Expansion of professional networks in the field of technology	0%	62%	100%	0%
		Enhanced attention to or involvement in female empowerment in the technology field	13%	25%	100%	0%
		Enhancement of personal soft skills	38%	25%	13%	0%
HSSE Camp (Summer Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	45%	25%	50%	0%
		Development of learning motivation and career goal setting	44%	28%	40%	0%
		Advancement in self-challenge and breakthrough	37%	25%	52%	0%
	Camp staff	Expansion of professional networks in the field of technology	35%	27%	83%	0%
		Inspired career imagination	37%	33%	71%	0%
		Enhancement of personal soft skills	30%	41%	64%	0%
		Feeling of stress	8%	25%	100%	0%

Chapter 4 Impact Mapping

4.1 Calculation Results

This report bases discount rate calculation of the value of outcomes on the three-year term fixed rate of 1.625% of the Postal Savings (Chunghwa Post Co., Ltd.) in March 2023. The SROI is calculated as the total present value divided by the total value of input, which yields an SROI result of 14.14:1 for this project.

Total Value of Inputs	Total Value of Outcomes	Total Present Value (PV)	Net Present Value (NPV)	SROI
NT$856,957	NT$9,384,022.55	NT$12,118,045.23	NT$11,261,088.23	14.14:1

Undiscounted value of impact = value of outcome*number of outcomes*(1-deadweight)*(1-displacement)*(1-attribution)

The calculation results for different stakeholders are consolidated as the following:

1. PVM Course

Stakeholders	Population size	Outcome	Value of outcome	Outcome ratio[1]	Number of outcomes	Duration	Deadweight	Displacement	Attribution	Drop-off	Undiscounted value of impact
			Shown in average value								
Course participants	40	Enhancement of knowledge and practical skills in the field of technology	4,833.33	53%	21	1	40%	0%	40%	100%	36,539.97
		Development of learning motivation and	11,235.71	53%	21	1	24%	0%	25%	100%	134,491.45

		career goal setting									
Course preparatory and operational staff	16	Enhancement of personal soft skills	110,311.20	31%	5	2	10%	0%	20%	85%	397,120.32
		Enhancement of intergenerational understanding and interactions	153,945.14	44%	7	2	14%	0%	25%	75%	695,062.31
		Enhanced sense of purpose (such as sense of purpose at work, generation of social impact, self-realization)	199,076.57	44%	7	2	14%	0%	39%	89%	731,048.98
		Feeling of stress	-44,900.00	6%	1	1	25%	0%	75%	100%	-8,418.75

Note 1: Outcome ratio = number of outcomes / population size

2. HSSE Camp (Winter Break)

Stakeholders	**Population size**	**Outcome**	**Value of outcome**	**Outcome ratio[1]**	**Number of outcomes**	**Duration**	**Deadweight**	**Displacement**	**Attribution**	**Drop-off**	**Undiscounted value of impact**
			Shown in average value								

Camp participants	15	Enhancement of knowledge and practical skills in the field of technology	43,593.50	53%	8	2	44%	0%	28%	81%	140,615.19
		Enhancement of personal soft skills	20,700.00	47%	7	2	50%	0%	43%	75%	41,296.50
		Development of learning motivation and career goal setting	28,531.20	33%	5	1	40%	0%	30%	100%	59,915.52
Camp staff	35	Expansion of professional networks in the field of technology	358,464.00	6%	2	1	0%	0%	62%	100%	272,432.64
		Enhanced attention to or involvement in female empowerment in the technology field	133,414.00	6%	2	1	13%	0%	25%	100%	174,105.27
		Enhancement of personal soft skills	484,950.00	6%	2	2	38%	0%	25%	13%	451,003.50

Note 1: Outcome ratio = number of outcomes / population size

3. HSSE Camp (Summer Break)

Stakeholders	**Population size**	**Outcome**	**Value of outcome**	**Outcome ratio[1]**	**Number of outcomes**	**Duration**	**Deadweight**	**Displacement**	**Attribution**	**Drop-off**	**Undiscounted value of impact**
			Shown in average value								

Camp participants	19	Enhancement of knowledge and practical skills in the field of technology	31,560.38	84%	16	2	45%	0%	25%	50%	208,298.51
		Development of learning motivation and career goal setting	44,566.82	89%	17	3	44%	0%	28%	40%	305,478.81
		Advancement in self-challenge and breakthrough	51,235.85	68%	13	2	37%	0%	25%	52%	314,716.21
Camp staff	40	Expansion of professional networks in the field of technology	386,956.92	33%	13	2	35%	0%	27%	83%	2,386,943.76
		Inspired career imagination	398,563.69	33%	13	2	37%	0%	33%	71%	2,187,038.54
		Enhancement of personal soft skills	274,263.00	28%	11	2	30%	0%	41%	64%	1,245,976.81
		Feeling of stress	-188,233.33	8%	3	1	8%	0%	25%	100%	-389,642.99

Note 1: Outcome ratio = number of outcomes / population size

4.2 Sensitivity Analysis

The original SROI is 14.14, meaning every NT$1 investment can generate a value of NT$14.14. Since SROI relies on numerous assumptions and estimates, the analysis involves some degree of uncertainty. Therefore, following Principle 5: Do not overclaim, sensitivity analysis was conducted after the outcome calculations. We adjusted the original SROI results by ±10% and further tested the sensitivity of the analysis by key factors including the impact factors (displacement, attribution, deadweight and drop-off), the financial proxy, the duration and the quantity of the outcome, to enhance the transparency and credibility of the SROI.

It was determined through the sensitivity analysis that the SROI value of this project ranges between 11.16~ 16.97. The highest SROI value of 16.97 comes from "conducting sensitivity analysis by increasing the quantity of the outcome by 20%." The lowest SROI value of 11.16 comes from "reducing the duration of all outcomes by 1 year. This result indicates that the SROI analysis of this project is particularly sensitive to two assumptions: the quantity of outcomes and the duration of outcomes. In other words, if the number of people who experienced the changes is higher than initially estimated, the overall social value will increase significantly. Conversely, if the outcomes last for a shorter period than expected, the total value will decline accordingly. Therefore, strengthening the project's ability to reach more stakeholders and extending the duration of those outcomes could be key directions for improving the project in the future.

Adjusted item	Adjustment	Adjustment value	SROI after adjustment	Percentage difference
SROI	Sensitivity analysis was conducted by increasing or decreasing values. The SROI value was increased and decreased by 10%.	Increase by 10%	15.55	10.00%
		Decrease by 10%	12.73	-10.00%

1. Impact factors (displacement, attribution, deadweight and drop-off)

Adjusted item	Adjustment	Adjustment value	SROI after adjustment	Percentage difference
Displacement	It was discovered through interviews and questionnaires that all stakeholder outcomes have 0% displacement. To mitigate risks arising from differences in interview and survey, and in accordance with Principle 5: Do not overclaim, the displacement values were adjusted to 10% and 20%.	All adjusted to 10%	12.73	-10.00%
		All adjusted to 20%	11.31	-20.00%

Attribution	Since the questionnaire was not completed immediately after the activity was finished and was only completed by a limited number of respondents, stakeholders' judgments may have been influenced by external factors. Attribution was increased and decreased by 20% for all stakeholder outcomes. Additionally, attribution factors originally below 10% and above 30% were respectively adjusted to 10% and 30% for sensitivity analysis.	Increase by 20%	12.78	-9.61%
		Decrease by 20%	15.50	9.61%
		<10% adjusted to 10%	14.14	0.00%
		<30% adjusted to 30%	13.73	-2.91%
Deadweight	Since the questionnaire was not completed immediately after the activity was finished and was only completed by a limited number of respondents, stakeholders' judgments may have been influenced by external factors. Therefore, for sensitivity analysis, deadweight was increased and decreased by 20% for all stakeholder outcomes. Additionally, Deadweight below 10% or 30% were adjusted to 10% and 30%, respectively.	Increase by 20%	12.74	-9.87%
		Decrease by 20%	15.54	9.87%
		<10% adjusted to 10%	14.12	-0.15%
		<30% adjusted to 30%	13.62	-3.68%
Drop-off	Since the questionnaire was not completed immediately after the activity was finished and was only completed by a limited number of respondents, stakeholders' judgments	Increase by 20%	12.69	-10.28%

	may have been influenced by external factors. Drop-off was increased and decreased by 20% for all stakeholder outcomes.	Decrease by 20%	15.65	10.70%

2. Financial proxy

Adjusted item	Adjustment	Adjustment value	SROI after adjustment	Percentage difference
Financial proxy	Part of the project outcomes—such as development of learning motivation and career goal setting—may require time to be reflected in academic or career performance. To avoid underestimating or overestimating outcomes, the financial proxies for all stakeholder outcomes were increased and decreased by 10% for sensitivity analysis.	Increase by 10%	15.55	10.00%
		Decrease by 10%	12.73	-10.00%

Since financial proxies reflect stakeholders' subjective perceptions, they may vary depending on individual understanding, context, or stakeholder background. Therefore, further analysis was conducted to examine the impact of adjusting financial proxies for different stakeholder groups.

Adjusted item	Adjustment	Stakeholders	Adjustment value	SROI after adjustment	Percentage difference
Financial proxy	Based on different stakeholders, the financial proxies for each outcome were adjusted by ±10%	Course participants	Increase by 10%	14.16	0.14%
			Decrease by 10%	14.12	-0.14%
		Course preparatory and operational staff	Increase by 10%	14.39	1.75%
			Decrease by 10%	13.89	-1.75%
		Camp participants (Winter Break)	Increase by 10%	14.16	0.23%

			Decrease by 10%	14.12	-0.23%
		Camp staff (Winter Break)	Increase by 10%	14.39	1.06%
			Decrease by 10%	13.89	-1.06%
		Camp participants (Summer Break)	Increase by 10%	14.17	1.13%
			Decrease by 10%	14.11	-1.13%
		Camp staff (Summer Break)	Increase by 10%	14.29	5.69%
			Decrease by 10%	13.99	-5.69%

3. Duration

Adjusted item	Adjustment	Adjustment value	SROI after adjustment	Percentage difference
Duration	The duration of activities in this project varied, ranging from as short as two days to as long as a full academic year. In addition, the questionnaire was not completed immediately after the activity was finished, and long-term follow-up was not conducted. Therefore, according to Principle 5: Do not overclaim, a sensitivity analysis was conducted by increasing or decreasing the duration of outcomes by one year.	Increase by 1 year	15.29	8.10%
		Decrease by 1 year	11.16	-21.07%

4. Quantity of the outcome

Adjusted item	Adjustment	Adjustment value	SROI after adjustment	Percentage difference
Quantity of the outcome	Since the questionnaire was not completed immediately after the activity was finished and was only answered by a limited number of respondents, stakeholders' judgments may have been influenced by external factors, making it difficult to fully reflect the actual number of people experienced the changes. Therefore, in the sensitivity analysis, we adjusted the quantity of outcomes by ±20%.	Increase by 20%	16.97	20.00%
		Decrease by 20%	11.31	-20.00%

Due to the limited sample size in data collection, some activities received fewer stakeholder questionnaires, which may affect the estimated number of people who experienced changes under individual outcomes. Therefore, in the sensitivity analysis, a ±20% variation was applied to the number of people affected for each outcome.

(1) Quantity of the outcome：Course participants

Outcomes	Adjustment value	SROI after adjustment	Percentage difference
Enhancement of knowledge and practical skills in the field of technology	Increase by 20%	14.15	0.06%
	Decrease by 20%	14.13	-0.06%
Development of learning motivation and career goal setting	Increase by 20%	14.17	0.22%
	Decrease by 20%	14.11	-0.22%

(2) Quantity of the outcome：Course preparatory and operational staff

Outcomes	Adjustment value	SROI after adjustment	Percentage difference

Enhancement of personal soft skills	Increase by 20%	14.25	0.75%
	Decrease by 20%	14.03	-0.75%
Enhancement of intergenerational understanding and interactions	Increase by 20%	14.34	1.43%
	Decrease by 20%	13.94	-1.43%
Enhanced sense of purpose (such as sense of purpose at work, generation of social impact, self-realization)	Increase by 20%	14.33	1.34%
	Decrease by 20%	13.95	-1.34%
Feeling of stress	Increase by 20%	14.14	-0.01%
	Decrease by 20%	14.14	0.01%

(3) Quantity of the outcome：Camp participants (Winter Break)

Outcomes	Adjustment value	SROI after adjustment	Percentage difference
Enhancement of knowledge and practical skills in the field of technology	Increase by 20%	14.18	0.28%
	Decrease by 20%	14.10	-0.28%
Enhancement of personal soft skills	Increase by 20%	14.15	0.08%
	Decrease by 20%	14.13	-0.08%
Development of learning motivation and career goal setting	Increase by 20%	14.15	0.10%
	Decrease by 20%	14.13	-0.10%

(4) Quantity of the outcome：Camp staff (Winter Break)

Outcomes	Adjustment value	SROI after adjustment	Percentage difference
Expansion of professional networks in the field of technology	Increase by 20%	14.20	0.45%
	Decrease by 20%	14.08	-0.45%
Enhanced attention to or involvement in female empowerment in the technology field	Increase by 20%	14.18	0.29%
	Decrease by 20%	14.10	-0.29%
Enhancement of personal soft skills	Increase by 20%	14.34	-1.38%

	Decrease by 20%	13.95	-1.38%

(5) Quantity of the outcome：Camp participants (Summer Break)

Outcomes	Adjustment value	SROI after adjustment	Percentage difference
Enhancement of knowledge and practical skills in the field of technology	Increase by 20%	14.21	0.51%
	Decrease by 20%	14.07	-0.51%
Development of learning motivation and career goal setting	Increase by 20%	14.28	0.98%
	Decrease by 20%	14.00	-0.98%
Advancement in self-challenge and breakthrough	Increase by 20%	14.25	0.76%
	Decrease by 20%	14.03	-0.76%

(6) Quantity of the outcome：Camp staff (Summer Break)

Outcomes	Adjustment value	SROI after adjustment	Percentage difference
Expansion of professional networks in the field of technology	Increase by 20%	14.79	4.60%
	Decrease by 20%	13.49	-4.60%
Inspired career imagination	Increase by 20%	14.80	4.64%
	Decrease by 20%	13.48	-4.64%
Enhancement of personal soft skills	Increase by 20%	14.53	2.78%
	Decrease by 20%	13.75	-2.78%
Feeling of stress	Increase by 20%	14.05	-0.64%
	Decrease by 20%	14.23	0.64%

4.3 Verification

During Phase 3 of the engagement, we invited stakeholder representatives and other stakeholders willing to participate in the engagement meeting to provide details of this project and confirm values related to the SROI research, in order to verify the above-mentioned calculation and analysis.

Thirteen participants joined the stakeholder engagement meeting, and none had suggested any revision or supplement to this research analysis. Therefore, this SROI report was written based on such a consensus.

Items and contents of the stakeholder engagement:

Engagement item	Description
Project introduction	Introduce the goals, organizer and co-organizers, and activities of the WTC Project, to enable stakeholders' better understanding of the project.
SROI introduction	Introduce methodology and processes of SROI, the research tool of this project, enabling stakeholders' understanding of the SROI terms, and the significance, purpose and benefits of ASPEED's use of SROI in the evaluation of this project. These are intended to enhance effectiveness of the engagement.
Purpose of the stakeholder engagement	Introduce definition of the stakeholder engagement and explain the engagement items and processes.
Stakeholder engagement	Introduce stakeholder types in the SROI research, explain the analysis results and confirm with the stakeholders whether the results are aligned with the actual situations. Items for confirmation include: stakeholder types, outcomes, value of outcomes, durations, and financial proxies. Stakeholders are also asked if they have any revision or supplement suggestions to the analysis results and values of the research, which will be included in the report.

4.4 Result Analysis

Activity	Total Value of Outcomes
PVM Course	1,985,844.28
HSSE Camp (Winter Break)	1,139,368.62
HSSE Camp (Summer Break)	6,258,809.64

I. PVM Course – Course participants

Stakeholder	Outcome	Occurrence rate	Duration (Year)	Financial proxy	Undiscounted value of impact (Ratio)
Course participants	Enhancement of knowledge and practical skills in the field of technology	53%	1	4,833.33	36,539.97 (21.36%)
	Development of learning motivation and career goal setting	53%	1	11,235.71	134,491.45 (78.64%)
Overall benefit					171,031.42 (100%)

The primary outcome of course participants is “development of learning motivation and career goal setting”, which accounts for almost 70% of the total value generated for this group of stakeholders. The occurrence rate of this outcome is also the highest, with over 50% of the course participants having such an experience. This shows that the course is substantially helpful for the high school students’ exploration of their career goals and development of learning motivation. The outcome value of “enhancement of knowledge and practical skills in the field of technology” was relatively low, possibly because although the imaging content of the course was built upon students’ prior physics knowledge, the subsequent application did not continue after the PVM Course. As a result, the impact duration of this outcome was limited, which led to a lower overall value.

For course participants, the duration of every outcome is one year. It was learned through the interviews that since most participants are second-year high school students, and that many interviewees consider high school graduation as an important turning point in their lives, the impact of high school courses is less likely to extend into their college life. Therefore, many outcomes last only one year, until the end of their high school studies.

II. PVM Course – Course preparatory and operational staff

Stakeholder	Outcome	Occurrence rate	Duration (Year)	Financial proxy	Undiscounted value of impact (Ratio)

Course preparatory and operational staff	Enhancement of personal soft skills	31%	2	110,311.20	397,120.32 (21.88%)
	Enhancement of intergenerational understanding and interactions	44%	2	153,945.14	695,062.31 (38.30%)
	Enhanced sense of purpose (such as sense of purpose at work, generation of social impact, self-realization)	44%	2	199,076.57	731,048.98 (40.28%)
	Feeling of stress	6%	1	-44,900.00	-8,418.75 (-0.46%)
Overall benefit					1,814,812.86 (100%)

For the course preparatory and operational staff, the values of "enhancement of intergenerational understanding and interactions" and "enhanced sense of purpose (such as sense of purpose at work, generation of social impact, self-realization)" are similar, indicating their incentive to participate in the activities is not monetary rewards but the more valuable spiritual gains. Also, compared to high school students, the duration of outcomes is longer for course preparatory and operational staff; adults also feel stronger and longer impacts from spiritual gains. What's noteworthy is the negative impact that this activity brought to a small portion (roughly 6%) of the course preparatory and operational staff. Since the number of individuals impacted is small, and the duration of impact is relatively short, its impact on the overall value is minimal.

III. HSSE Camp (Winter Break) – Camp participants

Stakeholder	Outcome	Occurrence rate	Duration (Year)	Financial proxy	Undiscounted value of impact (Ratio)
Camp participants	Enhancement of knowledge and practical skills in the field of technology	53%	2	43,593.50	140,615.19 (58.15%)
	Enhancement of personal soft skills	47%	2	20,700.00	41,296.50 (17.08%)
	Development of learning motivation and career goal setting	33%	1	28,531.20	59,915.52 (24.78%)
Overall benefit					241,827.21 (100%)

For camp participants, the impact of "enhancement of knowledge and practical skills in the field of technology" is notable and significant, which accounts for 58.15% of all impacts and with over half (53%) of participants experiencing this outcome. This may be attributed to the camp's integration of both theoretical knowledge and practical application, along with a moderate level of course difficulty that successfully stimulated participants' interest in learning and resulted in positive feedback regarding their gains. The financial proxy of this outcome is also the highest. The second most impactful outcome is "enhancement of personal soft skills." Participants generally reported that the teamwork ability developed through the program could be extended to their school life and even future university experiences. As a result, this outcome was commonly perceived to have a longer duration of impact and relatively higher value. However, for camp participants, the outcome "development of learning motivation and career goal setting" was perceived to have higher value. This may be attributed to the fact that academic exploration represents a significant life decision for students at this age, thereby leading to greater perceived impact.

IV. HSSE Camp (Winter Break) – Camp staff

Stakeholder	Outcome	Occurrence rate	Duration (Year)	Financial proxy	Undiscounted value of impact (Ratio)
Camp staff	Expansion of professional networks in the field of technology	6%	1	358,464.00	272,432.64 (30.35%)
	Enhanced attention to or involvement in female empowerment in the technology field	6%	1	133,414.00	174,105.27 (19.40%)
	Enhancement of personal soft skills	6%	2	484,950.00	451,003.50 (50.25%)
Overall benefit					897,541.41 (100%)

In general, a lower percentage of the camp staff experience outcomes. It was learned through interviews that since the effort dedicated by each staff member is different, or because they have more experience in other similar activities, the impact of this activity on them is relatively weak. However, for staff members who experienced the outcomes resulting from this activity, such outcomes are valuable, which is also reflected by the value of the outcomes. Using "enhancement of personal soft skills" as an example, communication and collaboration during the camp also contributed to camp staff's self-awareness and improvement of personal capabilities. Although the activity cannot bring more widespread impact for the HSSE camp staff (Winter Break), the impact on a small portion of the staff is significant.

V. HSSE Camp (Summer Break) – Camp participants

Stakeholder	Outcome	Occurrence rate	Duration (Year)	Financial proxy	Undiscounted value of impact (Ratio)
Camp participants	Enhancement of knowledge and practical skills in the field of technology	84%	2	31,560.38	208,298.51 (25.14%)
	Development of learning motivation and career goal setting	89%	3	44,566.82	305,478.81 (36.87%)
	Advancement in self-challenge and breakthrough	68%	2	51,235.85	314,716.21 (37.99%)
Overall benefit					828,493.53 (100%)

The camp staff improved and optimized the activity, adding the amount of activities related to career exploration, and extended the duration of the camp from 2 days to 3 days. Thus, the camp participants have shown substantial increase in their feeling of the overall outcomes, with 68% of them feeling breakthrough in self-challenge through this activity. Furthermore, 84% of the students enhancement of knowledge and practical skills in the field of technology and 89% of them development of learning motivation and career goal setting. The duration of the outcomes also results in deeper impacts as the activities were optimized. Using "development of learning motivation and career goal setting" as an example, due to the higher percentage of corporation and lab visits and hands-on activities in the summer camp, the interviewed students generally believe that the camp is more helpful in solidifying their learning in related fields and in enhancing their career exploration. Therefore, the duration of the outcome is extended by almost 3 times ("Development of learning motivation and career goal setting" of the winter camp lasts for 1 year while "development of learning motivation and career goal setting" of the summer camp lasts for 3 years).

VI. HSSE Camp (Summer Camp) – Camp staff

Stakeholder	Outcome	Occurrence rate	Duration (Year)	Financial proxy	Undiscounted value of impact (Ratio)
Camp staff	Expansion of professional networks in the field of technology	33%	2	358,464.00	2,386,943.76 (43.96%)
	Inspired career imagination	33%	2	133,414.00	2,187,038.54 (40.27%)
	Enhancement of personal soft skills	28%	2	420,990.00	1,245,976.81 (22.94%)
	Feeling of stress	8%	1	484,950.00	-389,642.99 (-7.18%)
Overall benefit					5,430,316.11

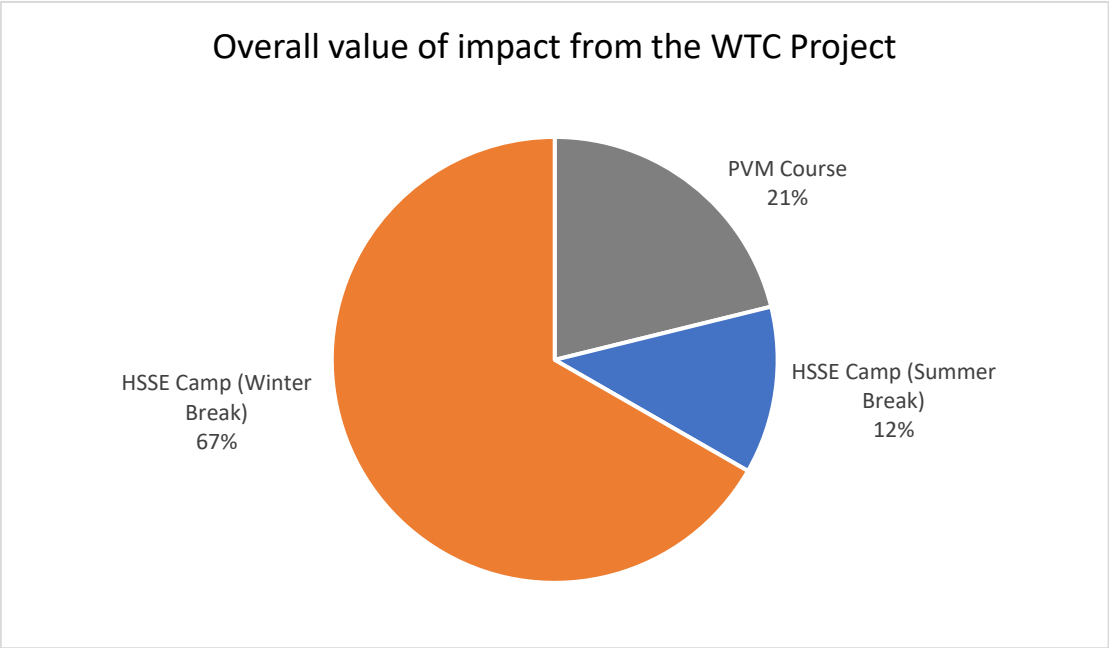
	(100%)

After the HSSE Camp (Winter Camp), the staff re-designed and re-planned the activity based on their experience and feedback received. The stress and experience through the process thus feel different for each individual. The highest-valued outcome is “expansion of professional networks in the field of technology” and “inspired career imagination”. It was learned through interviews that most staff members are NTHU students about to start job search after graduation, and therefore the activity not only helps them expand personal network in the industry but also has impact on their career imagination through the lecturers of industrial speakers and the office visits. Furthermore, the review, re-design of activities and teaching content cause increase in the workload for certain staff members, and thus leading to negative impacts to a certain level. For example, “feeling of stress”. However, the interviewees generally believe that this impact has a relatively short duration and usually disappears within a year, and thus its impact on the overall value of the activity is low.

A summary of the above outcomes indicates that for stakeholders whose outcomes did not meet the outcome threshold, questionnaire data analysis confirmed that no change had occurred. This was further verified during the third phase of stakeholder engagement (outcome verification) through an online video conference.

4.5 Suggestions and Conclusion

The WTC Project hosted by ASPEED derived 3 activities. Among them, the HSSE Camp (Summer Break) has the most impactful outcomes, with a total impact value of NT$6,258,809.64, accounting for 67% of the total impact value of this project. Over 80%, or NT$5,430,316.11 of the impact value is on the camp staff, mainly in “expansion of professional networks in the field of technology” and “inspired career imagination”. For high school participants, the HSSE Camp (Summer Break) generated the highest impact value, with a total value of 828,493.53. The greatest benefits were observed in the following outcomes: "advancement in self-challenge and breakthrough," "development of learning motivation and career goal setting," and "enhancement of knowledge and practical skills in the field of technology." Overall, the implementation of this project fulfills the goal of “assisting high school students in their college and department selection and career planning”. Furthermore, the impact goes beyond the female high school students and extends to the staff members involved in this activity. In their planning and participation in the activities, they also developed new ideas and expectations of their career development, which is an impact that was not anticipated in the beginning of the activity planning.



Furthermore, based on the consolidated suggestions from stakeholders collected during the engagement process, the following suggestions are proposed:

I. PVM Course: Course participants

The course is designed with 36 hours of diverse-themed, self-guided learning elective micro-course. Since most enrolled students are in their second year in high school, the course preparatory staff lowered difficulty of the course contents to avoid too much stress from this elective course to the extent that the students’ performance in their primary subjects would be affected. The interviewees have mixed feelings with the approach.

The following suggestions for the future are proposed by referring to the feedback collected through interviews and analysis data from the research.

(1) Provision of course design suitable for the target audience of this project: Interviewees who wish to learn deeper knowledge in the technology field feel that the course content is too simple. On the contrary, students who are in the career exploration stage and wants to avoid additional learning stress believe that the difficulty level of the course is suitable, but they wish to have more contents on career sharing. It is suggested to enable enrolled students to better understand the expected gains from this course through the syllabus and course design.

(2) Enhancement of course interactivity: Most student interviewees stated that they expected more hands-on practice with technological products from the course. It is suggested to increase hands-on and teacher-student interactive sessions. Through actual operations, participants can become more involved in their research interests in this field, and thereby achieve the project goals of "enhancement of high school students' understanding of semiconductor/IC design industries and related topics" and "cultivation of female talents in technology".

(3) Increase in female career sharing in the technology field: It is suggested to reflect on the project goals and arrange for more career experience sharing from female speakers, introduce resources from outside of the schools, and increase discussions on female tech talents in the course. For example, discussions on the reasons why female tech talents are rare, and potential challenges in the future workplace.

(4) Enhancing the duration of outcome impact: The outcomes of the PVM Course demonstrated a significantly shorter duration compared to other activities within the project. Most student interviewees indicated that the course content—particularly in the area of imaging—could not be continuously applied in other contexts. It is therefore recommended that future course design consider aligning the content with students' daily lives and learning needs.

II. PVM Course: Course preparatory and operational staff

This project is implemented through concerted efforts between ASPEED, HGSH and NTHU. During the three-way collaboration, each party had its considerations, and the course content design was completed through opinion exchanges between them. However, in order to take into account the opinions from multiple parties, the implementation of certain activities did not adhere to the initial project goals, and therefore the final outcomes did not turn out as expected.

The following suggestions for the future are proposed by referring to the feedback collected through interviews and analysis data from the research.

(1) Clear goals and expected outcomes: It is suggested for the organizer (ASPEED) to provide clear goals for the courses and expected outcomes, and for the implementation parties to plan and implement the course contents accordingly. This would help optimize achievement of the overall goals of the project.

(2) Provision of sufficient manpower and resources: It is suggested to provide lecturers resources and trainings related to the project goals, such as introductory course on female tech

empowerment, professional knowledge training courses and materials, or sharing and lecturing by professionals in specific fields. These will effectively facilitate more focus on the project goals and direction for the implementation, and lower negative impacts of the activities.

III. HSSE Camp (Winter Break): Camp participants

Although at the beginning of the project planning, the expected impact is mainly for the participants, it was discovered through the calculation results that they are not the primary beneficiaries. The reason for the lower percentage value of outcomes for them may be partly due to the smaller number of participants. The organizer capped the number of participants at the registration stage in order to maintain the quality of activity implementation. Many participants, recognizing the contents and effects of the activities, suggested in the interviews to increase the quota so that their friends can join as well.

The following suggestions for the future are proposed by referring to the feedback collected through interviews and analysis data from the research.

(1) Increase in number of courses/camps and participant quota: It is suggested to increase the number of courses/camps and participant quota, which is not only beneficial for a stronger impact value among the stakeholder groups, but can also expand the reach of benefits from this activity, more effectively bringing the project to it full impact potential.

(2) Increase of discussion and Q&A time for team presentations: The interviewees stated that discussion time for the team presentations was not sufficient, and that they needed to fully consider what they learned before being involved in discussions and asking questions. It is suggested to boost the camp's impact on participants through activity design in the future.

(3) Suitability of the difficulty level: Most interviewees stated that the course design is very suitable for inexperienced learners, which is also reflected in the percentage of impact from outcome "enhancement of knowledge and practical skills in the field of technology". It is suggested to maintain the current difficulty level of the course.

IV. HSSE Camp (Winter Break): Camp staff

The camp staff members come from different fields and age groups and have more opportunity interacting, communicating and collaborating with each other. Also, most staff members joined the effort voluntarily, and had clear goals, and therefore they feel a higher value in their gains from the camp. Some staff members provided feedback that the organization and implementation experience not only greatly enhanced their problem-solving ability but also made them more confident in women's careers in the technology industry. Through participation in the activities with the camp participants, they explored career development together and became clearer on their future career direction and professional goals.

The following suggestions for the future are proposed by referring to the feedback collected through interviews and analysis data from the research.

(1) Enhancement of course interactivity: It is suggested to allow more time and opportunity for the speakers to interact with students, which improves students' concentration in class and positive interactions between the teachers and students.

(2) Strengthening communication of goals and outcomes with the staff: Considering the lower occurrence rate of outcome “enhanced attention to or involvement in female empowerment in the technology field”, it is suggested that the organizer provide camp staff communication and resources related to the project goals”, in order to achieve the overall goals in the best way.

V. HSSE Camp (Summer Break): Camp participants

HSSE Camp (Summer Break) lasts for three days and contains more contents than the 2-day HSSE Camp (Winter Break), with more opportunities to visit corporations and labs, allowing “enhancement of knowledge and practical skills in the field of technology” and “development of learning motivation and career goal setting” to have outstanding impacts. Most camp participants have positive reviews of the activity, and also hope that the camp can be expanded with more participant quota.

The following suggestions for the future are proposed by referring to the feedback collected through interviews and analysis data from the research.

(1) Increase in number of courses/camps and participant quota: It is suggested to increase the number of courses/camps and participant quota, which not only is beneficial for a stronger impact value among the stakeholder groups, but can also expand the reach of benefits from this activity, more effectively bringing the project to it full impact potential.

(2) Increase in female career sharing in the technology field: Some interviewees provide feedback that the goals of the courses are not clear. It is suggested to reflect on the project goals and arrange for more career experience sharing from female speakers, introduce resources from outside of the schools, and increase discussions on female tech talents in the course. For example, discussions on the reasons why female tech talents are rare, and potential challenges in the future workplace.

(3) Lab and corporation visits: Most interviewees stated stronger interest in career sharing sessions and the work environment, which is also reflected by the occurrence rate of outcomes “enhancement of knowledge and practical skills in the field of technology” and “development of learning motivation and career goal setting”. It is suggested to maintain the on-site visits and related interactions and sharing sessions.

VI. HSSE Camp (Summer Break): Camp staff

Although the camp staff are more capable of achieving similar outcomes from other daily tasks, the value of outcome for them is more notable as the HSSE Camp (Summer Break) has a longer duration and more abundant contents, and as the organizer becomes more experienced.

The following suggestions for the future are proposed by referring to the feedback collected through interviews and analysis data from the research.

(1) Manpower recruitment: Based on the feedback from interviewees, if the scale of the camp is expanded, the manpower can be sourced from students of the College of Education. This will not only ensure sustainable source of manpower, but can also assist students to combine their learning with the practice and to accumulate experiences. These will all help contribute to stronger benefits of the activity.

(2) Strengthening communication of goals and outcomes with the staff: Most interviewees did not mention their observation and feeling about female empowerment, and thus it is suggested that the organizer provides camp staff communication and resources related to the project goals, in order to achieve the overall goals in the best way.

Appendix 1 Interview Outline

Interview outline for stakeholders		
Category	**No.**	**Question**
General	1	Why did you participate in this activity?
	2	What were you most impressed with during the activity?
	3	In addition to this activity, have you participated in other similar activities?
	4	Which people/groups did you interact with during this activity?
Outcome	4	Did you experience any changes during your participation in this activity?
	5	How did the above-mentioned changes affect your life, social activities, academic performance and family? How did people around you view such changes?
Drop-off	6	Do you believe that the impact of the above-mentioned changes diminished with time?
Deadweight	7	Would the above-mentioned changes have occurred if you did not participate in this activity?
Attribution	8	Can the above-mentioned changes occur through other people or things outside of this activity?
	9	If the changes can occur through other people or things, what do you think the level of contribution is from this activity?
Displacement	10	Did any issues occur with you or your surroundings during your participation in this activity?
Pricing	11	Please list items and monetary amounts you are willing to offer in exchange for or to prevent the above-mentioned changes.
Importance	12	Please list the changes that occurred during your activity participation in the order of their significance and explain why.
Other	13	Do you have any other thoughts or suggestions on this activity?

Appendix 2 Questionnaire for Confirming Stakeholder Outcomes

Respondent	**Course/Camp participants**	**Course preparatory and operational staff/Camp staff**
General information	（Personal information）	
Outcome confirmation	**Your perception of your level of achievement or ability in this area before participating or becoming involved in this activity (1 indicates the ability or feeling is very weak, while 5 indicates proficient ability or strong feeling):** ○ 1	

<table>
<tr><td></td><td colspan="2">○ 2
○ 3
○ 4
○ 5</td></tr>
<tr><td></td><td colspan="2">Your perception of your level of achievement or ability in this area after participating or becoming involved in this activity (1 indicates the ability or feeling is very weak, while 5 indicates proficient ability or strong feeling):
○ 1
○ 2
○ 3
○ 4
○ 5</td></tr>
<tr><td>Importance level</td><td colspan="2">What's your perceived level of importance of the change or gain after participating or becoming involved in this activity:
○ Very unimportant
○ Unimportant
○ Moderately important
○ Important
○ Very important</td></tr>
<tr><td>Outcome value</td><td>After participating in this activity, you may experience some changes or gains. Please evaluate: Which of the following product are you willing to offer in exchange for or to prevent this change or gain?
Gift list:
○ Starbucks beverage voucher * 1
○ EATOGETHER dining voucher * 1
○ Brand name sneakers * 1 pair
○ Nintendo Switch console * 1
○ Apple iPhone 15 Pro Max * 1
○ Apple MacBook Pro 16-inch * 1</td><td>After participating in this activity, you may experience some changes or gains. Please evaluate: Which of the following product are you willing to offer in exchange for or to prevent this change or gain?
Gift list:
○ Five-star hotel room voucher * 1 night
○ Dyson V12 vacuum cleaner * 1
○ Apple iPhone 15 Pro Max * 1
○ Gogoro S1 scooter * 1
○ 14-day luxury northern Europe trip
○ Toyota Yaris car * 1</td></tr>
<tr><td>Attribution[1]</td><td colspan="2">The contribution level of this activity to this change or gain. For example, if this activity accounts for 75% of this change, and the other factors 25%, then please check 75%.
○ 0%
○ 25%
○ 50%
○ 75%
○ 100%</td></tr>
</table>

Deadweight	**If you did not participate in this activity, would this change or gain have occurred?** ○ Entirely impossible (0%) ○ Almost impossible (25%) ○ Possible (50%) ○ Highly possible (75%) ○ Definitely will (100%)
Duration	**How long can this change or gain last?** ○ Within a month ○ One to three months ○ Three months to six months ○ Six months to one year ○ Above one year
	Following the above question, if you chose "above 1 year" please explain the exact duration.
Drop-off	**If you believe this "impact of change or gain would last more than one year", what would the impact be in the second year?** ○ No drop-off from the first year (0%) ○ Slight drop-off from the first year (25%) ○ Half the impact from the first year (50%) ○ Substantial drop-off from the first year (75%) ○ No impact in the second year (100%)
Displacement	**Did any issues occur with you or your surroundings during your participation in this activity?** ○ Yes: ___ ○ No

Note 1: To facilitate respondents' understanding of the question, the "attribution" item was designed in an inverse structure, resulting in responses that reflect values opposite to the SROI definition of attribution factors. This issue was addressed during data analysis by adjusting the attribution analysis value (attribution analysis value = 100% − respondent's reported percentage).

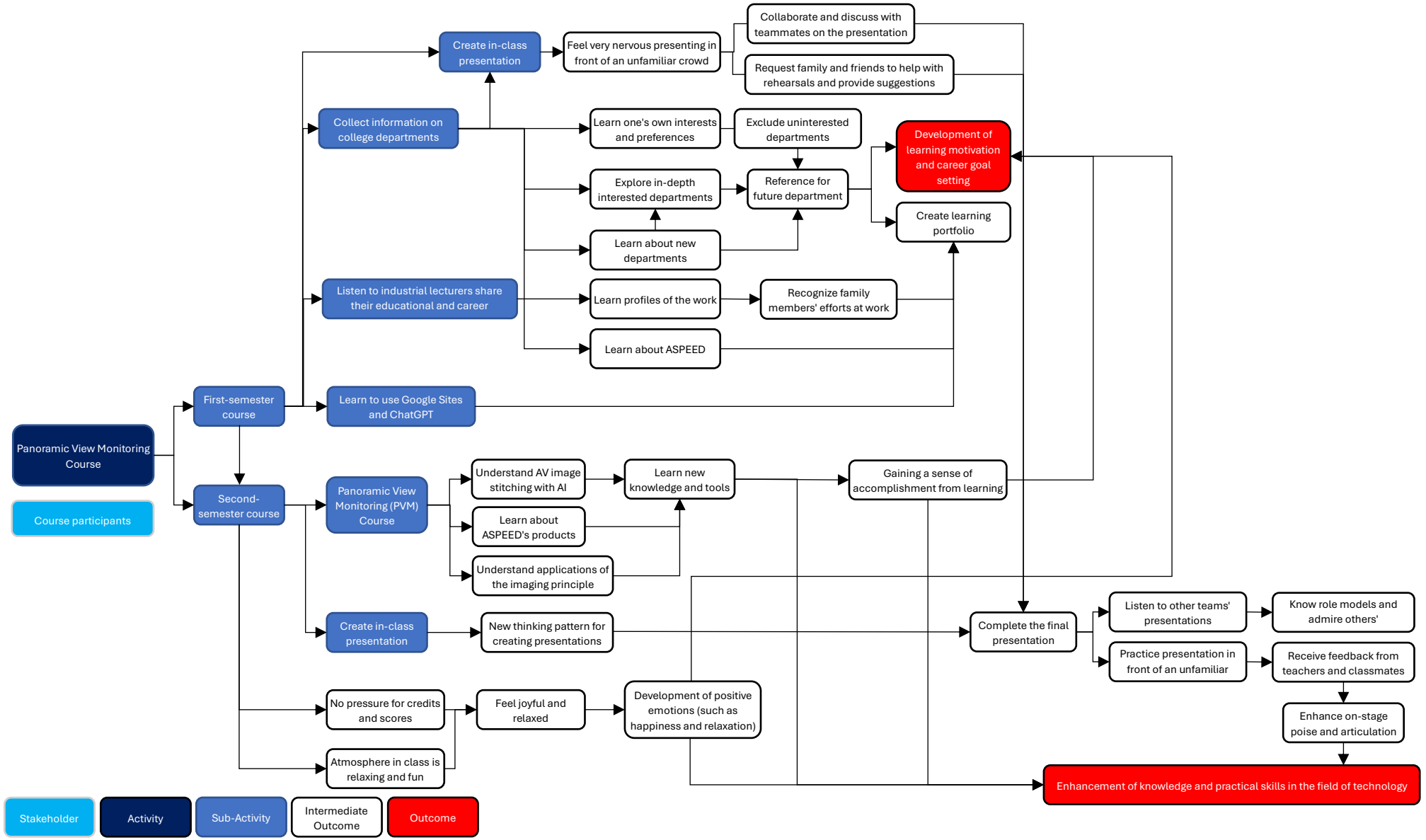
Appendix 3 Stakeholder Engagement

Activity	Stakeholder group	Population size	Engagement participants			Total engagement participants
			Phase 1 - interview	Phase 2 - questionnaire	Phase 3 – Online video meeting	

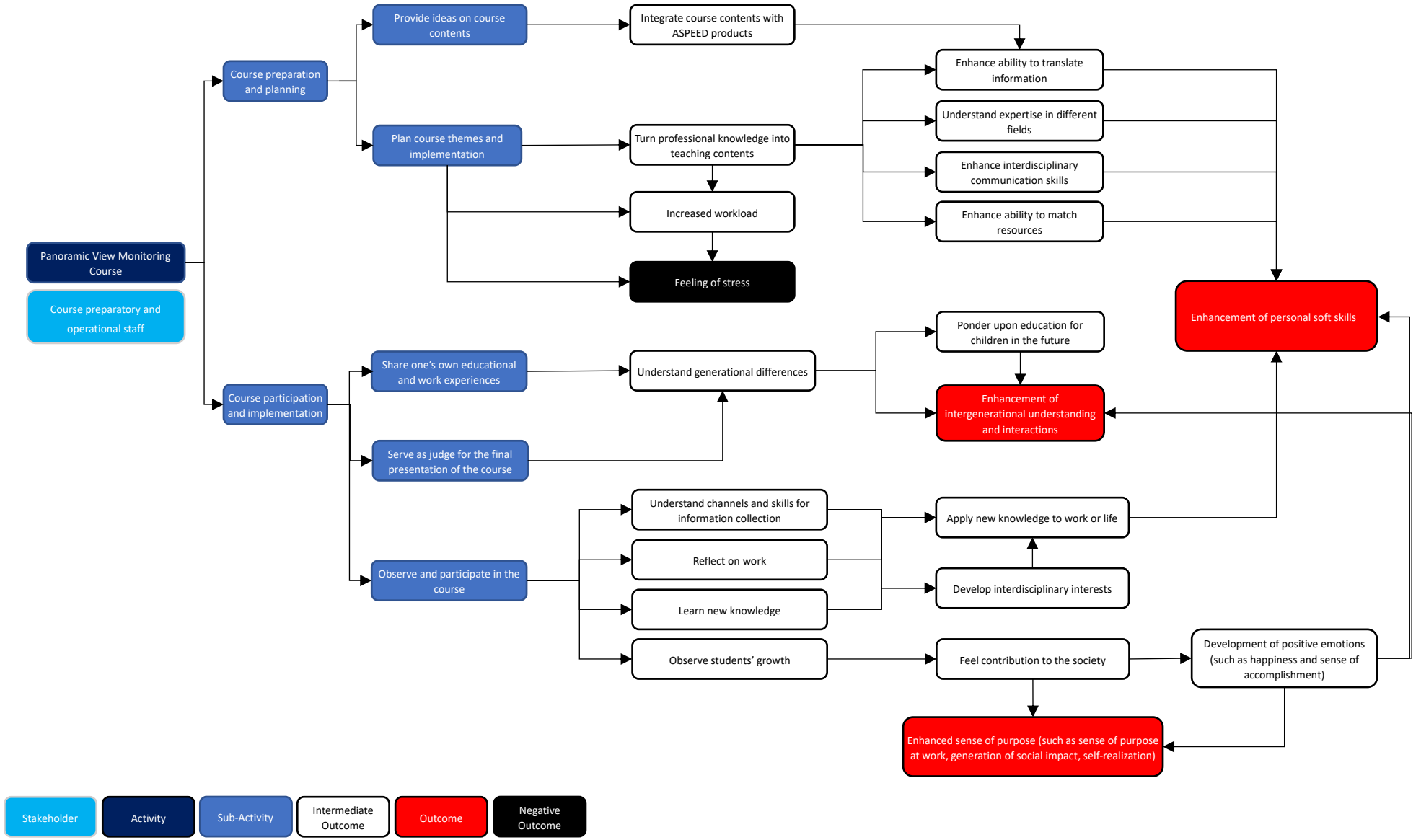
PVM Course	Course participants	40	4 (10%)	28 (70%)	2 (5%)	34
	Course preparatory and operational staff	16	7 (43.7%)	14 (87.5%)	2 (12.5%)	23
HSSE Camp (Winter Break)	Camp participants	15	3 (20%)	14 (93.3%)	1 (6.67%)	18
	Camp staff	35	3 (8.5%)	28 (80%)	4 (11.43%)	35
HSSE Camp (Summer Break)	Camp participants	19	6 (31.5%)	18 (94.7%)	1 (5.26%)	25
	Camp staff	40	6 (15%)	28 (70%)	3 (7.5%)	37

Appendix 4 Chain of Events

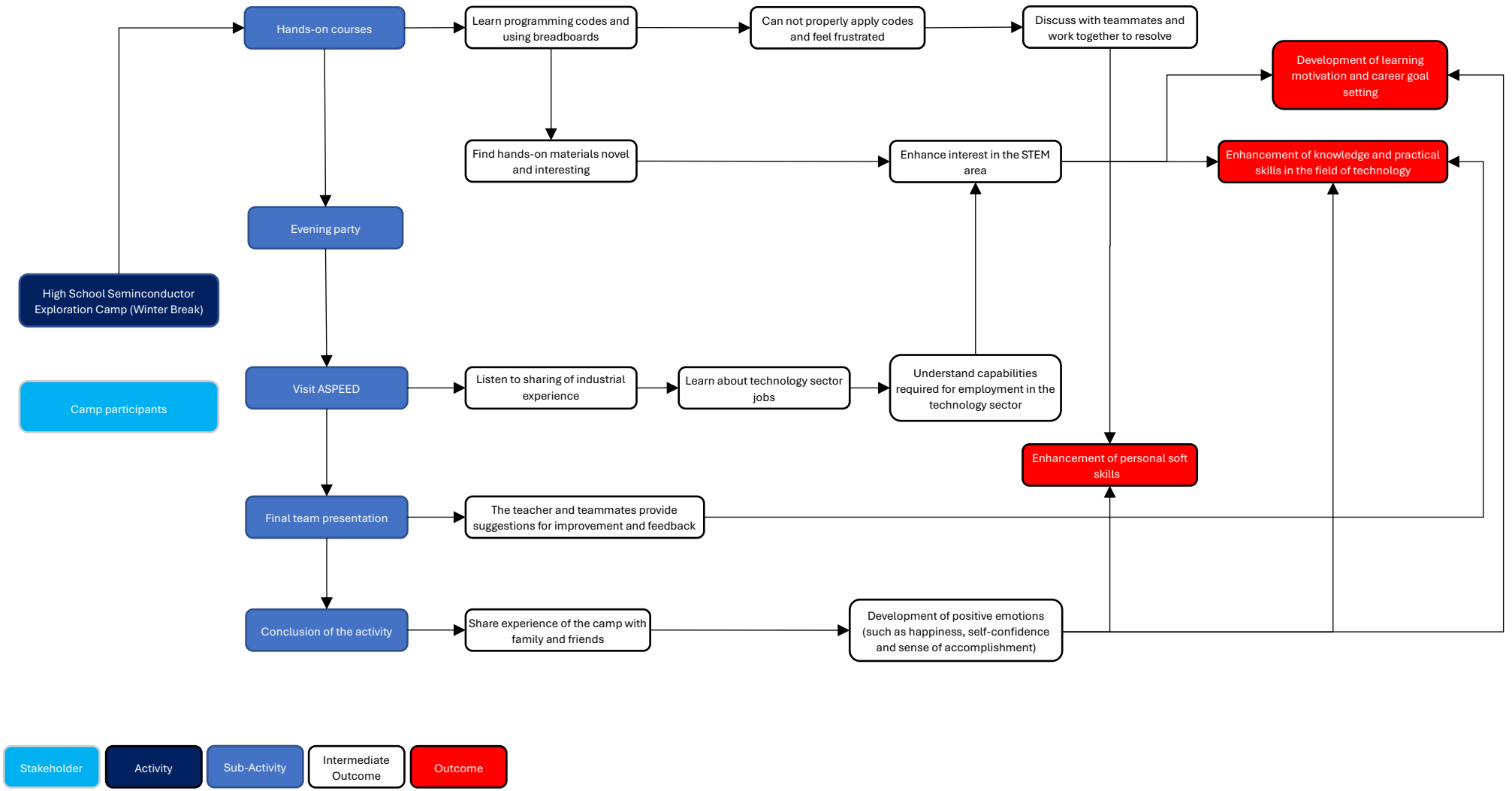
“Panoramic View Monitoring Course” chain of events – course participants



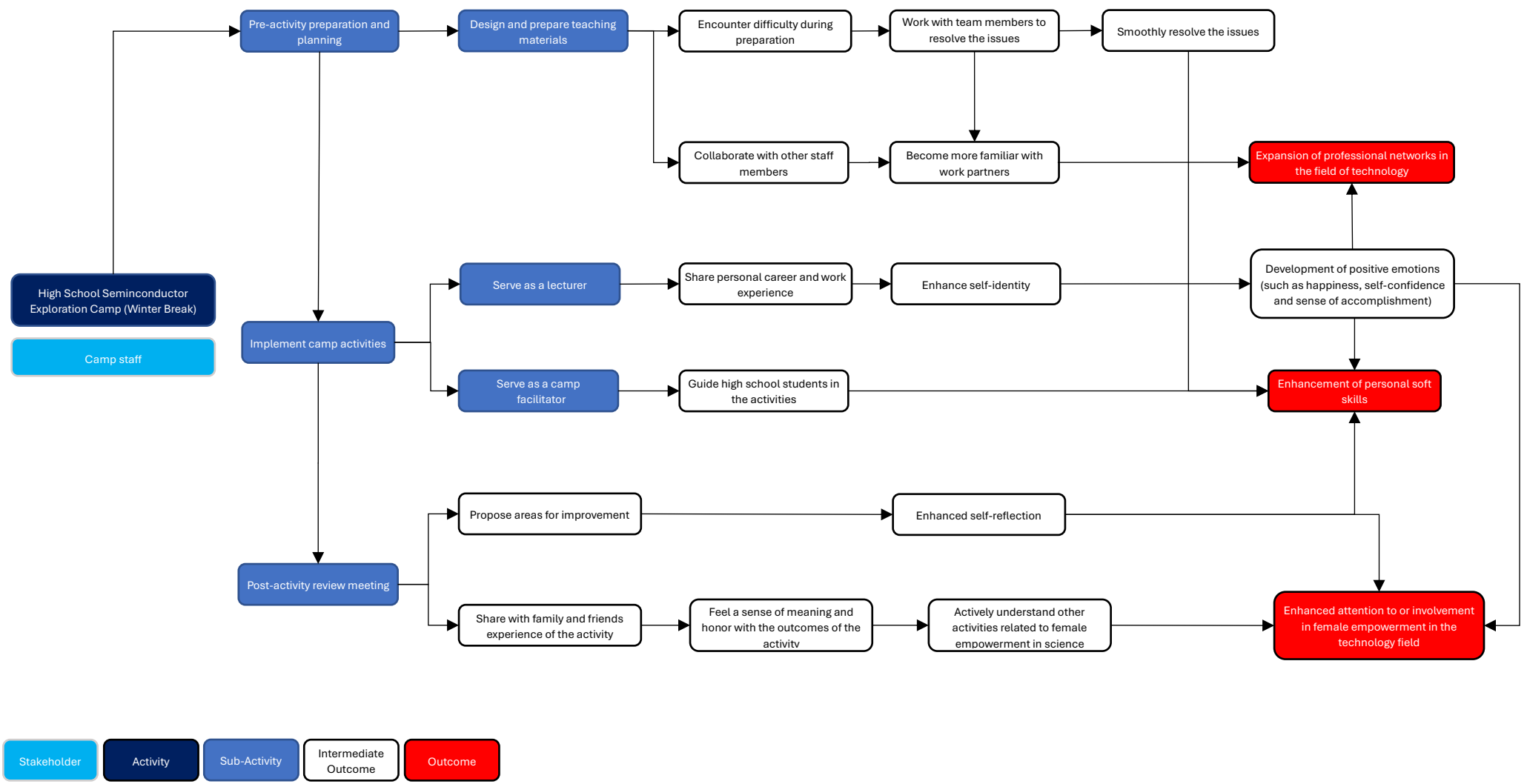
“Panoramic View Monitoring Course” chain of events – course preparatory and operational staff



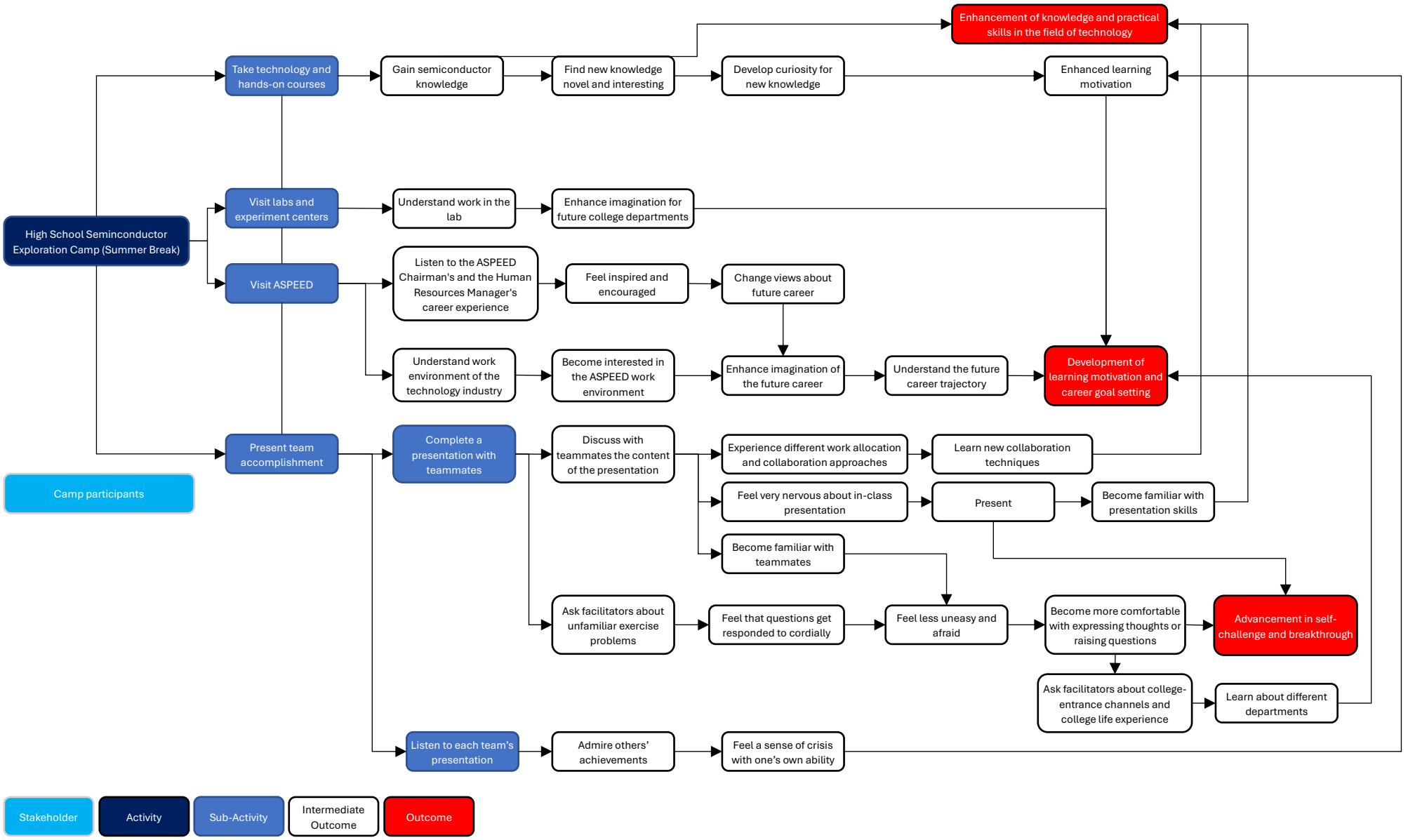
“High School Semiconductor Exploration Camp” chain of events – camp participants (Winter Break)



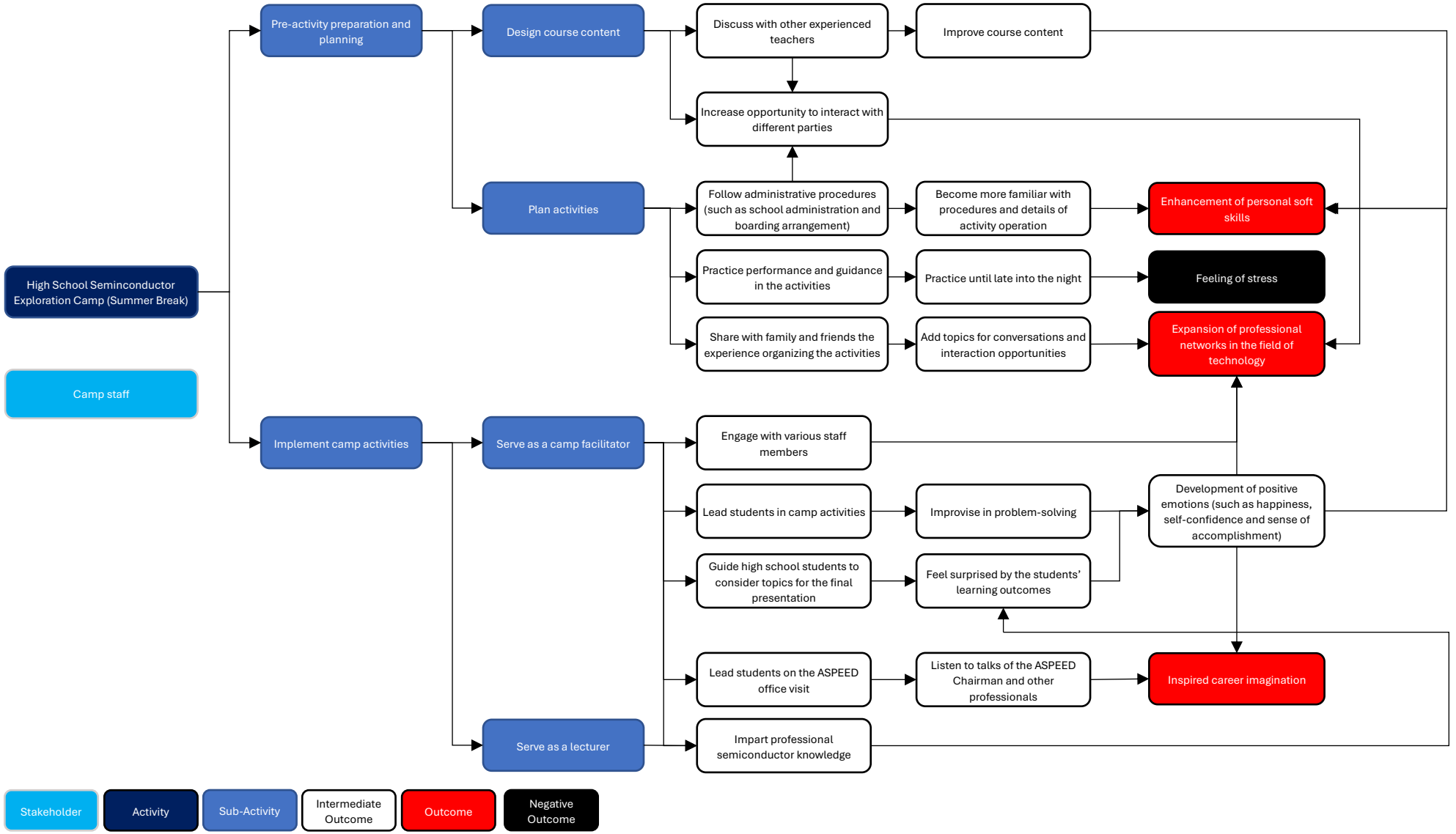
“High School Semiconductor Exploration Camp” chain of events – camp staff (Winter Break)



“High School Semiconductor Exploration Camp” chain of events – camp participants (Summer Break)



“High School Semiconductor Exploration Camp” chain of events – camp staff (Summer Break)



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Appendix 6 Impact Mapping

PART 1 Outcome Threshold

Activity	Stakeholders	Outcome	Included/excluded	Outcome threshold
PVM Course	Course participants	Enhancement of knowledge and practical skills in the field of technology	Included	1. Objective: interviews and observation results 2. Objective: Literature review 3. Subjective: Based on the stakeholders' responses to the questionnaire, the outcomes are included in the calculation only when the "level of change" before and after the activity is above 0
		Development of learning motivation and career goal setting	Included	
	Course preparatory and operational staff	Enhancement of personal soft skills	Included	
		Enhancement of intergenerational understanding and interactions	Included	
		Enhanced sense of purpose (such as sense of purpose at work, generation of social impact, self-realization)	Included	
		Feeling of stress	Included	
HSSE Camp (Winter Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	Included	
		Enhancement of personal soft skills	Included	
		Development of learning motivation and career goal setting	Included	
	Camp staff	Expansion of professional networks in the field of technology	Included	

		Enhanced attention to or involvement in female empowerment in the technology field	Included	
		Enhancement of personal soft skills	Included	
HSSE Camp (Summer Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	Included	
		Development of learning motivation and career goal setting	Included	
		Advancement in self-challenge and breakthrough	Included	
	Camp staff	Expansion of professional networks in the field of technology	Included	
		Inspired career imagination	Included	
		Enhancement of personal soft skills	Included	
		Feeling of stress	Included	

PART 2 Financial Proxies

Activity	Stakeholders	Outcome	Financial proxy	Price* (NTD/year)
PVM Course	Course participants	Enhancement of knowledge and practical skills in the field of technology		4,833.33

		Development of learning motivation and career goal setting	Monetary value of items the interviewees were willing to exchange for the outcomes (such as dining voucher, mobile phone and home appliances), shown in average value.	11,235.71
	Course preparatory and operational staff	Enhancement of personal soft skills		110,311.20
		Enhancement of intergenerational understanding and interactions		153,945.14
		Enhanced sense of purpose (such as sense of purpose at work, generation of social impact, self-realization)		199,076.57
		Feeling of stress		-44,900.00
HSSE Camp (Winter Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	Monetary value of items willing to exchange for the outcomes (such as dining voucher, mobile phone and home appliances), shown in average value.	43,593.50
		Enhancement of personal soft skills		20,700.00
		Development of learning motivation and career goal setting		28,531.20
	Camp staff	Expansion of professional networks in the field of technology		358,464.00
		Enhanced attention to or involvement in female empowerment in the technology field		133,414.00
		Enhancement of personal soft skills		484,950.00
HSSE Camp (Summer Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	Monetary value of items willing to exchange for the outcomes (such as dining voucher, mobile phone and home appliances), shown in average value.	31,560.38
		Development of learning motivation and career goal setting		44,566.82
		Advancement in self-challenge and breakthrough		51,235.85

	Camp staff	Expansion of professional networks in the field of technology		386,956.92
		Inspired career imagination		398,563.69
		Enhancement of personal soft skills		274,263.00
		Feeling of stress		-188,233.33

Note: Certain outcomes have a duration of less than one year according to the questionnaire responses but are listed as “one year” here.

PART 3 Impact Factors

Activity	Stakeholders	Outcome	Deadweight	Attribution	Drop-off	Displacement
PVM Course	Course participants	Enhancement of knowledge and practical skills in the field of technology	40%	40%	100%	0%
		Development of learning motivation and career goal setting	24%	25%	100%	0%
	Course preparatory and operational staff	Enhancement of personal soft skills	10%	20%	85%	0%
		Enhancement of intergenerational understanding and interactions	14%	25%	75%	0%
		Enhanced sense of purpose (such as sense of purpose at work, generation of social impact, self-realization)	14%	39%	89%	0%
		Feeling of stress	25%	75%	100%	0%
HSSE Camp (Winter Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	44%	28%	81%	0%
		Enhancement of personal soft skills	50%	43%	75%	0%
		Development of learning motivation and career goal setting	40%	30%	100%	0%
	Camp staff	Expansion of professional networks in the field of technology	0%	62%	100%	0%
		Enhanced attention to or involvement in female empowerment in the technology field	13%	25%	100%	0%
		Enhancement of personal soft skills	38%	25%	13%	0%

HSSE Camp (Summer Break)	Camp participants	Enhancement of knowledge and practical skills in the field of technology	45%	25%	50%	0%
		Development of learning motivation and career goal setting	44%	28%	40%	0%
		Advancement in self-challenge and breakthrough	37%	25%	52%	0%
	Camp staff	Expansion of professional networks in the field of technology	35%	27%	83%	0%
		Inspired career imagination	37%	33%	71%	0%
		Enhancement of personal soft skills	30%	41%	64%	0%
		Feeling of stress	8%	25%	100%	0%