

**Survey and research on IP education by
Japanese companies through SDGs/CSR
and its contribution to youth innovation**

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1. IP Creation Education in Japan

(1) Current Status of IP Creation Education

a. Emergence of the term "IP creation education"

In Japan, the term "IP creation education" appeared in 2017. The term "IP creative education" was identified in the documents¹ of the then launched IP Creative Education Promotion Consortium, and the subsequently published IP Promotion Plan 2017 included a direction for the promotion of IP creative education. In fact, this trend had emerged even before this, for example, in the Intellectual Property Strategic Program 2016², the need to promote IP education from the elementary school level was pointed out under the slogan "Everyone in Japan as an IP human resource".

b. Concept of IP Creation Education

The scope of IP creation education is broad, and according to the IP creation education pamphlet³, it is defined as "IP creation education promotes the understanding and internalization of the idea of "creating something" and "valuing something created" and thereby enriches society, while allowing students to enjoy the process".

¹ Intellectual Property Creation Education Consortium Committee (1st) January 2017
https://www.kantei.go.jp/jp/singi/titeki2/tyousakai/kensho_hyoka_kikaku/2017/consortium_suishin/dai1/gijisidai.html (Japanese Only)

https://www.kantei.go.jp/jp/singi/titeki2/tyousakai/kensho_hyoka_kikaku/2017/consortium_kentou/dai1/gijisidai.html (Japanese Only)

² Intellectual Property Strategy Headquarters, "Intellectual Property Strategic Program 2016", May 2016

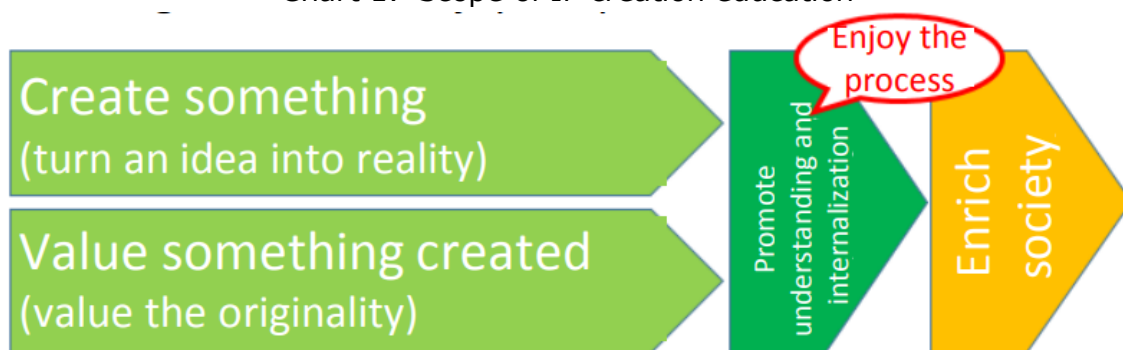
https://www.kantei.go.jp/jp/singi/titeki2/kettei/chizaikeikaku20160509_e.pdf

³ Secretariat of Intellectual Property Strategy Headquarters, "Cabinet Office, IP creation education pamphlet"

<https://www.kantei.go.jp/jp/singi/titeki2/tizaikyouiku/pdf/s-1e.pdf>

In the Intellectual Property Strategic Program 2017⁴, where the term "IP creation education" was first published, the definition of IP creation education is expressed as "Refers to developmental stage-appropriate IP education that cultivates creativity as the source of new discoveries and scientific thinking, as well as fostering a positive attitude toward IP protection and utilization and a greater understanding of the importance of these activities, and, thereby cultivating human resources to create a virtual cycle of intellectual creation from IP creation to IP protection and utilization".

Chart 1. Scope of IP creation education



source: Secretariat of Intellectual Property Strategy Headquarters, "Cabinet Office, IP creation education pamphlet"

In other words, IP creation education is not just about knowing the IP system represented by patents and copyrights, but it is a broad concept that includes the attitude and mindset to create new intellectual property.

The Cabinet Office is actively promoting this concept, and for example, in the materials of Intellectual Property Creation Education Consortium Committee⁵, it emphasizes the message that IP creation education is related to all subjects, as shown in Chart 2.

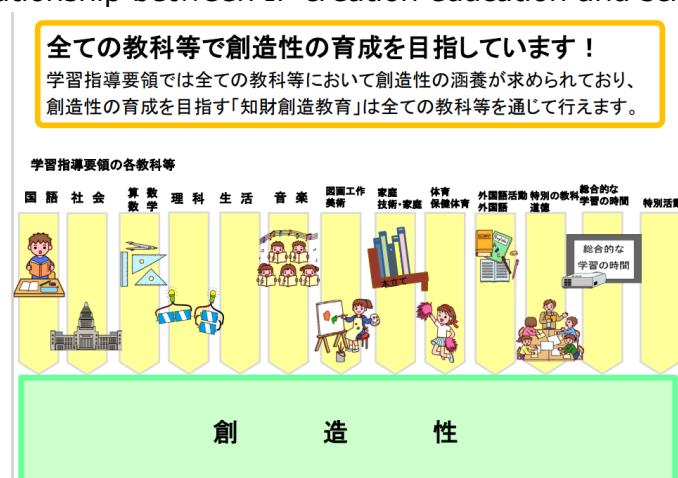
⁴ Intellectual Property Strategy Headquarters, "Intellectual Property Strategic Program 2017", May 2017

https://www.kantei.go.jp/jp/singi/titeki2/kettei/chizaikeikaku20170516_e.pdf

⁵ Intellectual Property Strategy Headquarters, "Contents of IP creation education", Intellectual Property Creation Education Consortium Committee (3rd)

https://www.kantei.go.jp/jp/singi/titeki2/tizaikyoku/consortium_kentou/dai3/siryoku3.pdf (Japanese Only)

Chart 2. Relationship between IP creation education and school education



Currently, Japan is developing measures for IP creation education based on this concept. In 2020, a working group was set up to study the promotion and practice of IP creation education, and a report was compiled on the direction of the promotion and practice⁶. In the report, the measures to realize the future spread of the practice are divided into the following processes: "learning about IP creation education," "practicing IP creation education," and "continuing the practice of IP creation education". In Japan, efforts for IP creation education are being made in accordance with this process.

⁶ Working Group on Promotion and Practice, "Toward the Development of Human Resources for the New Normal -Spread and practice of IP creation education-", March 2021 https://www.kantei.go.jp/jp/singi/titeki2/tizaikyoku/consortium_kentou/jissen_wg/pdf/saisyu_houkoku.pdf (Japanese Only)

Chart 3. Process of Promotion and Practice

Phase	Action Plan Examples
1. Learn	<ul style="list-style-type: none"> ● Promote the use of opportunities that can ensure the delivery of IP creation education to educational settings ● Penetration of IP creation education according to educational stage ● Study of visualization of the effects of IP creation education ● Providing opportunities for faculty to learn about "intellectual property" ● Enhancement of "intellectual property education" into university curricula
2. Practice	<ul style="list-style-type: none"> ● Further enhancement and provision of educational programs that lead to practical application ● Provide information that leads to concrete images of teaching methods ● Efforts in collaboration with the Teachers' Network ● Collaboration with external personnel (school support personnel)
3. Continue practicing	<ul style="list-style-type: none"> ● Transition from teacher initiatives to school initiatives ● Developing a system to encourage teachers and schools

source: Working Group on Promotion and Practice, "Toward the Development of Human Resources for the New Normal -Spread and practice of IP creation education-"

This trend is accelerating the promotion and practice of IP creation education. For example, in FY2021, the JPO conducted a survey and research aimed at spreading IP creation education in high schools. In this research, a model that breaks down the concept of IP creation education has been proposed, and there is an attempt to find contact points for IP creation education in more diverse subjects and courses. If the model is broken down in this way, it may be possible to promote IP creation education in a way that encompasses school education as a whole, and it may also serve as a reference when planning the "cross-curricular initiatives" that have been attracting attention in the educational field in recent years.

Chart 4. Image of the components of IP creation education

Component	Creativity	Value / Respect	Affluent Society (Goal)
Component	Issue / Problem	Respect mind of others	Enrich the life
	Solution / Idea	Value existing ideas	Contribute to sustainable society
	Communication / Explanation	Value strong points of others	Contribute to our future
Think with a borderless viewpoint			

source: https://www.jpo.go.jp/resources/report/sonota/document/zaisanken-seidomondai/2021_03_yoyaku.pdf (Japanese Only) translation by the author

(2) Examples of IP Creation education contents

a. Positioning of contents that can be used for IP creation education

As mentioned above, IP creation education is at the stage of expanding dissemination and practice in the future. Naturally, the central role will be played by teachers, but given the current situation where IP creation education is still in its infancy, external support is essential.

One example of this is the emerging trend to develop content that can be used for IP creation education and provide it widely.

b. Contents collected, created, and published by the Cabinet Office and

JPO

In anticipation of this trend, the Cabinet Office was quick to collect and release content that can be used for IP creation education.

The results are available on the website, and the list is not only in terms of elementary schools, junior high schools, and high schools/technical colleges,

but is further subdivided by subject area⁷.

Many organizations cooperated in the collection of this content, and the site includes a page that organizes the content by the organization that provided it.

In addition, content that can be used in high schools was created and published in a research project conducted by the JPO in FY2021⁸. This is intended to be used in the "Period for Inquiry-Based Cross-Disciplinary Study" in high school. Recently, SDGs education has been attracting attention in high schools, and this project adds the essence of IP creation education to the SDGs content.

⁷Intellectual Property Creation Education Consortium, "Educational Programs about IP creation education"

<https://www.kantei.go.jp/jp/singi/titeki2/tizaikyoku/program.html> (Japanese Only)

⁸ JPO, "SDGs and Value Creation - Entrance to Inquiry- (IP creation education content for use in the classroom)"

<https://www.jpo.go.jp/resources/report/kyozai/sdgs.html> (Japanese Only)

2. Cases of corporate involvement

(1) Summary

In this section, we will focus on examples of companies' contributions in terms of IP creation education. Among them, there are cases in which companies have contributed to IP creation education as practical examples with support from the Cabinet Office, and there are also cases that do not use the name "IP creation education" but are IP creation education-like.

The former is a simple description since it has already been made public by the Cabinet Office and others. The latter is a potential source of information for the dissemination of IP creation education, so we attempted to focus on this issue.

(2) Concrete Cases

a. Examples of IP creation education in practice

The survey report⁹ conducted by the Cabinet Office from FY 2017 to FY 2020 provides examples of IP creation education in practice.を。

For example, the survey report for the Hokkaido region prepared in FY 2017 introduces past practices in the private sector, and the survey report for the Chugoku region in FY 2018 introduces examples of cooperation by private companies.

b. Cases in which the name "IP creation education" is not used, but the content is like IP creation education

There are many other examples of corporate involvement in education in general. An analysis of these examples shows that some of them are IP creation

⁹ Intellectual Property Strategy Headquarters, "Introduction of Regional Consortiums" https://www.kantei.go.jp/jp/singi/titeki2/tizaikyouiku/consortium_shoukai.html (Japanese Only)

education.

This time, we surveyed cases in which the name "IP creation education" was not used, but the content was IP creation education-like, and in which companies contributed. The results of the survey are presented on the next and subsequent pages.

a. Children's Idea Contest

Company	Honda Motor Company
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.honda.co.jp/philanthropy/ideacontest/
Role of the Company	Lesson Contents/Materials Event/Contest
Period	Once a year (held annually since 2002)
Summary	<ul style="list-style-type: none"> • This program aims to help children experience the importance and fun of "having dreams," "taking on challenges," and "being creative" by giving shape to ideas that only children can come up with, and to help them grow socially in the process. • Under the theme of "the future," participants will express their "what they wish existed" as artworks by drawing or creating them, and make a presentation. • After the final judging, the Grand Prize, Excellence Award, Judges' Special Award, and Kids' Grand Prize are selected for each of the lower grade and upper grade divisions. • 11,868 entries in 2021. Entries may be submitted by schools or classes. • By participating in this contest, children will experience the process of 1. thinking of an idea, 2. drawing an illustration, 3. creating a three-dimensional work, and 4. making a presentation. Process 1 leads to the development of imagination and the ability to discover issues; Process 2 leads to the development of the ability to express and investigate; Process 3 leads to the development of the ability to create, plan, and devise; and Process 4 leads to the development of confidence, courage, the ability to communicate, and initiative.

b. Honda Innovation Tokyo Education and Research Programs(Honda Academy)

Company	Honda Motor Company
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	http://waseda-innovation-edu.jp/honda
Role of the Company	Lesson Contents/Materials Event/Contest
Period	-
Summary	<ul style="list-style-type: none"> • The program aims to develop human resources who understand "respect for humanity" and "the three joys" and who can contribute to solving issues as entrepreneurs or intrepeneurs in response to global environmental problems and increasingly complex international situations through industry-academia collaboration and the fusion of the humanities and sciences. • In addition to Honda employees, lecturers include Waseda University faculty, faculty from other universities, and private company employees • The program includes a lot of content related to innovation, entrepreneurship, startups, etc. For example, examples of curriculum include "Fundamentals of Artificial Intelligence, Advanced Robot Technology and Biotechnology and Learning Startups," "Innovation Leadership," "Industrial Innovation and Career Design," "Innovative Business Creation," "Business Model Hypothesis Testing," etc.

c. CurioStep with Sony

Company	Sony Corporation
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.sony.com/ja/SonyInfo/csr/ForTheNextGeneration/curiostep/
Role of the Company	Lesson Contents/Materials Event/Contest
Period	2020~
Summary	<ul style="list-style-type: none"> As part of its CSR activities, Sony has been conducting educational activities based on the concept of "Inspiring the curiosity of young children with dreams and the power to move the world. Sony is working with STEAM education in mind and with an emphasis on exposing children to the real thing. offers a wide variety of programs and prepares workshops, contests, etc. on various topics. For example, they offer "invention workshops," workshops aimed at "learning the principles and techniques of science," design workshops, etc., as well as workshops for girls in science. In 2022, the company held an event titled Summer Challenge 2022. As part of the event, the "Create Excitement for Your Loved Ones" contest was held. Participants were to create an exciting idea through programming thinking and express it as a work of art. The uniqueness of the idea, the ingenuity of the trick, and the intention to make it exciting were the main criteria for judging.

d. HAKKEN LENS -Developing "food" in space and creating the future together
SPACE FOODSPHERE edition-

Company	Leave a Nest Co., Ltd.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.steam-library.go.jp/content/174
Role of the Company	Lesson Contents/Materials Event/Contest
Period	-
Summary	<ul style="list-style-type: none"> • STEAM educational content that traces the path of entrepreneurs who aim to realize their visions and solve social issues, while enabling students to learn about R&D and its social implementation across disciplines. • This content provides video interviews and hands-on work with entrepreneurs who have a passion for realizing their vision and solving social issues, and who have launched R&D themes from scratch. • The content is designed to allow users to follow the activities of SPACE FOODSPHERE, which is taking on the challenge of solving food problems in space and on Earth by bringing together friends through a fascinating vision of food production and food experiences in space. <p><Ability to acquire></p> <ul style="list-style-type: none"> • This content allows visitors to relive the original experiences of Mizuki Komasa, the founder of SPACE FOODSPHERE, Kosuke Yamada of PLANTX Inc. as a venture founder, Yuki Hanyu and Ikko Kawashima of IntegriCulture Corporation, and the challenge of technological development in an environment so harsh that they are confronted with death. • The goal is that through these experiences, students themselves will be able to feel the connection between their schoolwork and the real world, and foster an attitude of proactive thinking and action about the future of space and the Earth. The four-panel content is designed around three themes: "find," "touch," and "explore."

e. Solving Climate Change with Human-Centered Innovation!

Company	HLAB,Inc.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.steam-library.go.jp/content/123
Role of the Company	Lesson Contents/Materials Event/Contest
Period	-
Summary	<p>Learn how to create "innovation" on the global issue of "climate change."</p> <p>This course consists of seven lectures, in which participants will consider together the question of how climate change affects and is affected by their daily lives.</p> <p>In the second half of the course, participants will consider ways in which they can take action on climate change by utilizing innovation creation methods.</p> <p>Supervision by innovation creation expert: Shunsaku Komatsuzaki, University of Tokyo Associate Professor, Department of Infrastructures, Graduate School of Engineering, University of Tokyo.</p>

f. Where is the technology of light hidden in everyday life? “Science of Light to Support Our Lives - Solving Social Issues through Innovation Vol.5”

Company	SHARP Corporation & a.school, inc.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.steam-library.go.jp/content/115
Role of the Company	Lesson Contents/Materials Event/Contest
Period	-
Summary	<p>Explore the nature of light and its relationship to people, society, and the natural world, and learn about the benefits of light and feel a new light of your own.</p> <p><Discovery Part> (2 x 50-minute classes) The content traces the history of the evolution of the science and technology of light and captures how the storage of information and the display of images have changed, and together we consider what the world will look like in the future, starting from the relationship between people's lives and the science and technology of light and its further possibilities for the future.</p> <p><Inquiry part> (2~9 x 50-minute classes) A project-based class in which students are challenged to define their own theme area, conduct research, and formulate some ideas based on the interest and curiosity they found in the discovery part.</p> <p>Three projects (9 patterns in total) are available for three time periods (short, medium, and long term), which can be freely selected for use. The system can be flexibly arranged and utilized in accordance with the actual conditions at the educational site.</p>

g. What does the future look like with IoT technology? “The World Enabled by IoT - Solving Social Issues through Innovation Vol.4”

Company	SHARP Corporation & a.school, inc.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.steam-library.go.jp/content/113
Role of the Company	Lesson Contents/Materials Event/Contest
Period	-
Summary	<p>The content of the program is designed to find situations where students can utilize their latent wisdom about technologies related to AI and IoT, which are used in all aspects of our daily lives.</p> <p><Discovery Part> (2 x 50-minute classes)</p> <p>The program will capture how people's lives and society have been changed by the evolution of AI and IoT-related technologies, and will consider together what the world will look like in the future, starting from the further possibilities that AI x IoT technologies hold.</p> <p><Inquiry part> (2~9 x 50-minute classes)</p> <p>A project-based class in which students are challenged to define their own theme area, conduct research, and formulate some ideas based on the interest and curiosity they found in the discovery part.</p> <p>Three projects (9 patterns in total) are available for three time periods (short, medium, and long term), which can be freely selected for use. The system can be flexibly arranged and utilized in accordance with the actual conditions at the educational site.</p>

h. "How to make things around you" - What is it made of? How is it made? -

Company	NHK ENTERPRISES, INC.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.steam-library.go.jp/content/106
Role of the Company	Lesson Contents/Materials Event/Contest
Period	-
Summary	<p>This content includes videos showing how processed foods such as tofu and mayonnaise, vegetables produced in plant factories, fish produced by genome editing, clothing, plastics, and paper are each made.</p> <p>The objective is to discover how elements that have been studied in science and technical home economics classes are used, and what kind of trial and error and ingenuity are used by the people who develop and produce them.</p> <p>In addition, students will freely think about and explore the things around them, including changing the form, material, and function based on what they have now.</p> <p>The program also looks at "issues" derived from manufacturing and fosters perspectives on law, ethics, and environmental stewardship.</p>

i. - Problem Solving Thinking - Let's use design thinking!

Company	EDUCATIONAL SOLUTION CONSORTIUM & Uchu co.Ltd.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.steam-library.go.jp/content/102
Role of the Company	Lesson Contents/Materials Event/Contest
Period	-
Summary	<p>Learn "design thinking" and develop the ability to create innovation. The main part of the content is a space school trip section. This material consists of</p> <ol style="list-style-type: none"> (1) Short animations for each phase of Design Thinking (2) Animation explaining the framework used in each frame <p>In addition, there is one feature-length animation that connects all phases of design thinking. In this educational material, students can enjoy learning design thinking with unique characters.</p> <p><Five Phases of Design Thinking></p> <ul style="list-style-type: none"> - Empathize - Define - Ideate - Prototype - Test <p><ability to acquire></p> <ul style="list-style-type: none"> - Ability to observe and listen (ability to think with others) - Ability to formulate and test hypotheses (scientific thinking) - Ability to express oneself (ability to present one's own opinions and communication skills) - Ability to try and error (a cycle of learning that never gives up no matter how many times you fail) - Ability to identify and solve problems (manufacturing to meet people's needs)

j. Nursing care robot (Japanese Edition) / The Potential of Robots to Solve Social Issues and Meet the Needs of an Aging Society

Company	Britannica Japan Co., Ltd.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect (mind existing ideas strong point of others) Society (life sustainability future)
Source	https://www.steam-library.go.jp/content/69
Role of the Company	Lesson Contents/Materials Event/Contest
Period	-
Summary	<p>Analyze a variety of data and the changing needs of the elderly to develop a rationale for the need for nursing care robots. In addition, learn about existing caregiving robots, evaluate their impact, and propose innovative robot designs.</p> <p>Students will be able to respond to real-world needs, consider the feelings of end users (seniors), examine socially responsible product design, and learn about jobs such as product design and caring for the elderly.</p> <p><Learning Goals></p> <ul style="list-style-type: none"> - Examine data on the age distribution of the population in Japan and other countries and consider the challenges faced by aging populations. - Consider data collection methods to consider the aging issues facing the community in which you live. - Evaluate new technologies and how they can be used to support the elderly. - Explain the importance of beautiful design by relating the beautiful design of robots to human anxiety, comprehension, and mood. - Consider whether the beauty of the robot is important to the care function. - Design the care robot of the future and explain why you decided on the robot's design and functionality.

k. biohybrid (Japanese Edition) / Technological innovation and its potential to contribute to Society 5.0

Company	Britannica Japan Co., Ltd.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.steam-library.go.jp/content/47
Role of the Company	Lesson Contents/Materials Event/Contest
Period	-
Summary	<p>This theme will help students understand bio-hybrid technologies and how they can contribute to our march toward Society 5.0. They will also apply their prior knowledge of the nervous system to scientific research on sensation and movement, and explore how biology and engineering disciplines can work together to create innovative solutions to societal problems. They will examine how the contributions to medical research made by these technological innovations can enrich people's lives in Society 5.0, and creatively explore how the concept of biohybrids, as seen in entertainment productions, can be realized.</p> <p><Learning Goals></p> <ul style="list-style-type: none"> - Understand bio-hybrid technologies and how they can contribute to our march toward Society 5.0. - Apply prior knowledge of the nervous system to scientific research on sensation and movement. - Explore how the disciplines of biology and engineering can work together to create innovative solutions to societal problems. - Examine the ways in which and the relationships between the contributions to medical research made by technological innovations can enrich people's lives in Society 5.0. - Creatively explore how the concept of bio-hybrids found in entertainment and other works can be realized.

I. What lies ahead in the evolution of technology? “Development of Display Technology -Solving Social Issues through Innovation Vol.3”

Company	SHARP Corporation & a.school, inc.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.steam-library.go.jp/content/13
Role of the Company	Lesson Contents/Materials Event/Contest
Period	-
Summary	<p>Whether at home, outdoors, or in vehicles, our informed lives are filled with displays (screen displays): televisions, computers, tablets, smart phones, thermometers, billboards, and more. This content consists of an exploration of how display technology has evolved to date, what possibilities exist beyond "display" applications, and what impact it could have on society in the future, from both a technological and social perspective.</p> <p><Discovery Part> (2 x 50-minute classes)</p> <p>This content traces the history of the evolution of display technology, and shows how people's lives and the way they interact with information have changed over the years. It also aims to encourage students to think together about what the world will look like in the future, starting from the further possibilities that are hidden in displays.</p> <p>Part I: Development of Display Technology - Displays and People's Lives Part 2: Development of Display Technology - Technological Evolution of Displays</p> <p><Inquiry part> (2~9 x 50-minute classes)</p> <p>A project-based class in which students are challenged to define their own theme area, conduct research, and formulate some ideas based on the interest and curiosity they found in the discovery part.</p> <p>Three projects (9 patterns in total) are available for three time periods (short, medium, and long term), which can be freely selected for use. The system can be flexibly arranged and utilized in accordance with the actual conditions at the educational site.</p> <p>A. Technology Research Project - Researching display-related technologies B. Product Planning Project - tackling social issues through product planning related to displays C. Social Analysis Project -Exploring the History and Future of Media</p>

m. Future Earth School ~Democratization of creativity, from fragmentation to co-creation

Company	steAm, Inc.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.unicef.or.jp/kodomo/sdgs/17goals/
Role of the Company	Lesson Contents/Materials Event/Contest
Period	2021
Summary	<ul style="list-style-type: none"> • With the aim of realizing playful learning and providing an environment where everyone can work independently with rich creativity, the program intertwines information, mathematics, art, AI, liberal arts, etc. to transmit, express, and solve important and familiar issues. • The program is organized around two axes: "Playful Coding New Media Expressions of Information, Mathematics, Art, and AI" and "Environmental, SDGs, Mathematics and Society, etc." • Support is provided through the use of local university students, supplemented by online lectures by experts. • It helped reduce the burden on teachers and became one of the model cases of "college student mentors. • The program is ready for online classes.

n. Development and demonstration of a model of teacher learning and evaluation methods to realize inquiry-centered curriculum management.

Company	Z-kai Inc.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.learning-innovation.go.jp/verify/e0113/
Role of the Company	Lesson Contents/Materials Event/Contest
Period	FY 2021
Summary	<ul style="list-style-type: none"> • This content aims to "1. develop an inquiry-based curriculum" and "2. promote teacher learning to support 1." <ul style="list-style-type: none"> ➤ Identifying issues in establishing a cycle of "curriculum development, materials development, teaching, evaluation, curriculum development" in inquiry-based classes ➤ Implemented classes using content from the Ministry of Economy, Trade and Industry's "STEAM Library" and ZKai's inquiry-based teaching materials "Asteria" to identify issues in establishing a model case for inquiry-based classes. ➤ Through the above two activities and training, the goal is to identify teacher learning necessary to establish an inquiry-oriented curriculum and to link it to practice. • The curriculum for "Exploration Week" is structured with the goal of "teaching a class (15 minutes) of 'expertise' that only you know at the demonstration school to other students (name: Classroom Challenge)". • To simplify the evaluation, a rubric has been created for the above "Classroom Challenge".

o. High School "Period for Inquiry-Based Cross-Disciplinary Study" to solve social issues - Inquiry x IT to realize creative inquiry that leads to society

Company	Life is Tech, Inc.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.learning-innovation.go.jp/verify/e0095/
Role of the Company	Lesson Contents/Materials Event/Contest
Period	2020
Summary	<ul style="list-style-type: none"> • Building a curriculum (from "research learning" to "problem-solving learning") and structure that enables students to discover and find solutions to familiar problems in the school classroom, and to do so through the use of technology such as websites. • In the first step, students learn how to discover issues and plan solutions to them. While experiencing interviews with companies, Internet research, advice from teachers and university student mentors, each student examines and plans their own solutions through workshops, filling in seek sheets, group discussions, etc. • In the second step, students learn to use IT tools such as "programming for website production," "presentations that better convey the thoughts and ideas," and "creating documents." • At the end of the session, students will present their problem-solving methods.

p. Development & demonstration of STEAM program to connect schools with the real world

Company	Leave a Nest Co., Ltd.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.learning-innovation.go.jp/verify/e0105/
Role of the Company	Lesson Contents/Materials Event/Contest
Period	2020
Summary	<ul style="list-style-type: none"> There is still a large gap between what is learned in school and the thinking required in the real world. In this project, we created encounters between schoolteachers and companies, researchers, and venture technology working to solve problems, to connect learning at school with the real world. In the process, we designed and demonstrated lessons with teachers in which students learn from a variety of subject angles so that they can be moved emotionally and see social issues as their own personal matters. As a specific example, we developed and implemented a curriculum of lessons on the theme of "food" to learn about issues in a subject-integrated manner. In a total of eight classes, the students were exposed to the issue of protein deficiency through an online tour of the development site and a lecture by the founder of IntegriCulture Inc., a company that develops technology to produce artificially cultured meat at low cost, and came up with ideas for dissemination activities to communicate this issue. The course is divided into three courses: Science Course, Global Course, and Business Course. In all courses, students work on testing their hypotheses and materializing their ideas through experiments and hearings by actually working with their hands, and make a final presentation.

q. Demonstration project for generalization of entrepreneurship program

Company	TAKTOPIA & Co.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification <input type="text" value="idea"/> <input type="text" value="communication"/>) Respect(mind existing ideas <input type="text" value="strong point of others"/>) Society(<input type="text" value="life"/> sustainability future)
Source	https://www.learning-innovation.go.jp/verify/e0094/
Role of the Company	<input type="text" value="Lesson"/> <input type="text" value="Contents/Materials"/> <input type="text" value="Event/Contest"/>
Period	FY 2020
Summary	<ul style="list-style-type: none"> • The project aims to demonstrate the effectiveness of entrepreneurship education as a form of "inquiry-based learning" and to develop teaching materials that can be implemented by teachers in the high school curriculum. • Promoting the need for entrepreneurship in the sense that no matter what advanced skills you have acquired, if you don't have the mindset to deliver value to society/the world, you are a waste of treasure. • Aiming at the development goal of "entrepreneurial leaders with the power of social implementation" through a comprehensive and complex program of study during the three years of the program. • 2 x 50-minute lectures in 10 sessions, aiming to acquire the basic review process and necessary mindset/skills to be held as an entrepreneur.

r. Simulator-based STEAM Education and Evaluation of Science and Mathematics Inquiry Skills @ Mie Prefecture

Company	Trustee Entity: Institution for a Global Society Corporation Demonstration Partner: Tokyo Gakugei University, Fusion INC
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.learning-innovation.go.jp/verify/e0092/
Role of the Company	Lesson Contents/Materials Event/Contest
Period	2020
Summary	<ul style="list-style-type: none"> • Develop CASE-themed STEAM educational content and platform for COVID-19 • Developing a Comprehensive Assessment of the Learning Effectiveness of STEAM Education. • Program Flow <ol style="list-style-type: none"> 1. visualization of pre-program qualities and abilities using "Ai GROW" and clarification of strengths and goals before the program 2. work on the "training game for becoming an entrepreneur using a simulator" linked to the study guide, and proceed at their own pace while gaining the knowledge necessary to create a business plan for their services (including data analysis and how to use RESAS) 3. the corporate value after 5 years is calculated based on the teacher's evaluation and an algorithm of the macro environment of the industry, and the feasibility, future potential, social contribution, and originality of the service are considered in the process of trial and error on how to raise this corporate value. 4. after the program, the quality abilities are measured by "Ai GROW" and the science and math inquiry skills (hypothesis testing, experimental design, critical thinking, and idea creation) are also evaluated using a simulator.

s. Creative Project based Learning with Games(CPBLG)

Company	Life is Tech, Inc.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.learning-innovation.go.jp/verify/d0090/
Role of the Company	Lesson Contents/Materials Event/Contest
Period	2019
Summary	<ul style="list-style-type: none"> • A program to realize exploratory STEAM education that unlocks the potential of middle and high school students on the theme of games. • By examining the origins, mechanisms, and creator's ingenuity of the games that students usually play as users, students learn that games are made up of various components. • Aiming to acquire practical programming skills while handling PCs and the Internet as freely and independently as stationery. • Using the knowledge and skills acquired, students plan games aimed at solving familiar problems in school and home life, and create and present games that can be used in the real world.

t. Regional Revitalization x SDGs Innovation Project@ Human resource development program based on the Nishi-Awa region of Tokushima Prefecture

Company	Trustee: CAPLAN Corporation Demonstration Partners: Pasona Inc., Pasona JOB HUB.Inc
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.learning-innovation.go.jp/verify/d0070/
Role of the Company	Lesson Contents/Materials Event/Contest
Period	2019
Summary	<ul style="list-style-type: none"> Building practical capacity-building programs on local social issues Fostering "transformational human resources capable of fusing business and STEAM to create social innovation" by improving initiative, problem-setting and discovery skills, and co-creating with diverse human resources. Participants with diverse backgrounds such as business people, designers, engineers, etc. form project teams with local businesses in Nishi-Awa area (Mima City, etc.) in Tokushima Prefecture as the fieldwork site. Reconsider local issues from the perspective of SDGs, conduct action plans and market research to solve newly set issues, and develop and test services and products using STEAM ideas.

u. Smart Agriculture x STEAM learning program for agricultural high schools

Company	Trustee: vegetalia, inc. Demonstration Partners: steAm, Inc., filament Inc., Tetsuya Nakamura, WaterCell Inc., INAHO INC., Asial Corporation, DOCOMO gacco, Inc., InfoCom Research, Inc.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.learning-innovation.go.jp/verify/d0063/ https://www.learning-innovation.go.jp/verify/z0044/
Role of the Company	Lesson Contents/Materials Event/Contest
Period	2019
Summary	<ul style="list-style-type: none"> • STEAM learning program at an agricultural high school, one of the specialized high schools, where students think about issues they want to solve and specific solutions based on their own interests. • Learn how to identify problems and build solutions using the latest solutions for smart agriculture, which is attracting attention not only in the agricultural industry but also in the wider industrial world. In addition, while learning how to think independently, students will engage in hands-on training in the creation of robots and sensing systems, and learn the basic mechanisms of these technologies. • After the study, students will aim to construct a concrete solution plan based on their own ideas.

v. Creating an Ecosystem to Nurture Local Changemakers - Creative PBL using IT for Junior High, High School, and University -

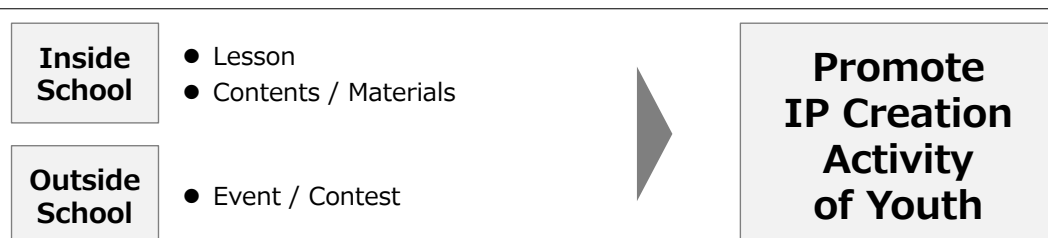
Company	Life is Tech, Inc.
Target	A: elementary school student (6-12 years old) B: junior high school student (13-15 years old) C: high school student (16-18 years old) D: technical college student E: Undergraduate and graduate students F: working adult
Domain	Creativity (issue identification idea communication) Respect(mind existing ideas strong point of others) Society(life sustainability future)
Source	https://www.learning-innovation.go.jp/verify/a0004/
Role of the Company	Lesson Contents/Materials Event/Contest
Period	2018
Summary	<ul style="list-style-type: none"> Project aimed at "creating changemakers in the region who can use IT to creatively solve problems" and "creating an ecosystem in the region to foster creative changemakers". Create a cycle of developing changemakers throughout the region by providing learning opportunities in school classes as a preliminary step to CPBL (Creative PBL). This is a creative PBL (CPBL) program in which local junior and senior high school students set real-world issues based on interviews with local residents, etc., and actually create services to solve those issues. The students will experience being a changemaker by discovering the issues, formulating a solution plan, and then actually creating and improving the service by exercising their creativity. Local university students will acquire IT skills and "teaching" skills with the goal of being able to teach in CPBL for junior high and high school students. Through this, the program will also contribute to the formation of an ecosystem for IT human resource development.

3. Conclusion

(1) Significance of corporate involvement in IP creation education

As described above, there are many cases in which companies are involved in IP creation education or IP creation education-like efforts. As a result, the following types of roles of companies can be identified.

Chart 5. Type of Involvement in IP Creation Education by Companies
Example pattern of corporate contribution to IP creation education



a. Patterns of corporate involvement in school initiatives

First, there is the pattern of corporate involvement in educational activities within schools. For example, companies take the lead in planning and implementing classes and other activities.

In addition, there are examples of companies developing and providing content (teaching materials, etc.) that can be used by faculty and staff, although the companies do not plan and implement the classes.

b. Patterns of corporate involvement in out-of-school initiatives

There is also a pattern of corporate involvement in educational activities outside of schools. In this section, we focus on company-led events and contests.

c. Significance of corporate involvement

It is true that school faculty and staff play a central role in IP creation education, and this has been supported by the efforts of the faculty and staff to date.

However, in the context of education policy in Japan, where "education programs open to society"¹⁰ are advocated, the participation of local communities, including businesses, in education is highly significant.

For example, the MEXT document makes the following reference to the realization of curricula that are open to society.¹¹¹²

- To take a broad view of society and global conditions, with the goal of creating a better society through better schooling, and to share that goal with society through the educational process.
- Clarify and nurture in the curriculum the qualities and abilities required for children, who will create the society of the future, to face and interact with society and the world, and to develop their own lives.
- In implementing the curriculum, we will make use of local human and material resources and collaborate with social education by utilizing after-school and Saturdays, etc. In addition, to realize school education without confining it to the school, while sharing and collaborating with society in its aims.

Thus, the involvement of businesses and other players that make up the local community in education is widely called for in education. Therefore, it is highly significant and current for companies to contribute by playing an IP creation education role in the ways mentioned so far.

¹⁰ <https://manabi-mirai.mext.go.jp/torikumi/chiiki-gakko/syakaini-hirakareta.html>

(Japanese Only)

¹¹ Central Council for Education, "Improvement of Courses of Study and Other Necessary Measures for Kindergartens, Elementary Schools, Junior High Schools, Senior High Schools, and Special Needs Schools (Report)"

https://www.mext.go.jp/b_menu/shingi/chukyo/chukyo0/toushin/_icsFiles/afieldfile/2017/01/10/1380902_0.pdf (Japanese Only)

¹² In order to realize educational programs open to society, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) publishes educational programs and case studies by companies and other organizations.

<https://manabi-mirai.mext.go.jp/index.html> (Japanese Only)

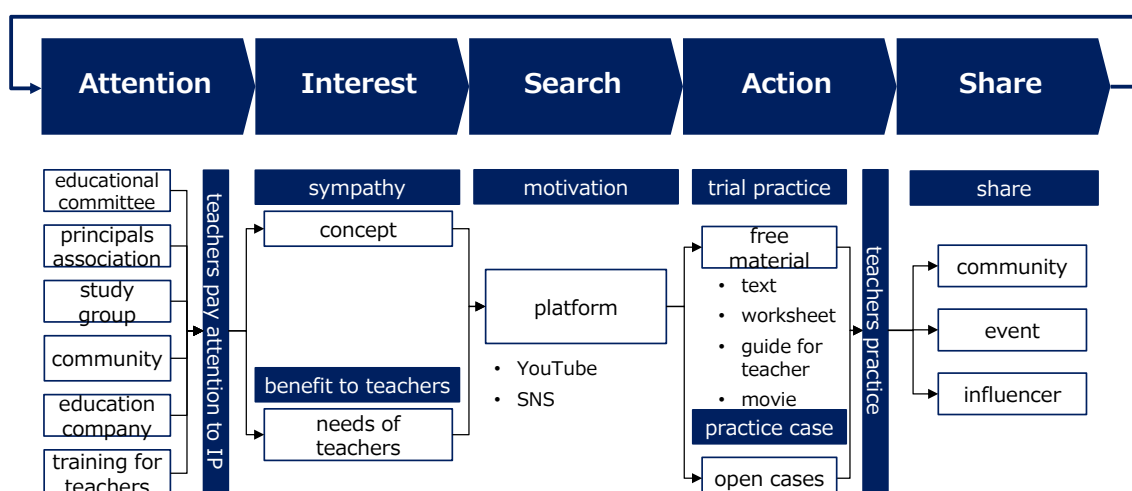
(2) Issues related to IP creation education and the role that companies can contribute

a. Issues related to IP creation education

In Japan, there are people throughout the country who are committed to IP creation education efforts. This is evident in the activities and practices of each regional consortium.

On the other hand, it is not yet widely accepted throughout Japan. Some people say that the term "IP creation education" is not well known in the first place and that the aim of IP creation education is misunderstood. In other words, it can be said that there is a challenge to disseminate IP creation education in the future, and the JPO has organized a proposal for a dissemination process targeting high schools.

This can be understood as a process using the marketing concept. Specifically, the process is expressed as follows: "faculty members recognize IP creation education," "faculty members become interested in IP creation education," "interested faculty members research IP creation education (develop a platform that can be found when researching)," "faculty members try IP creation education in practice," and "share the results of IP creation education in practice."



source: https://www.jpo.go.jp/resources/report/sonota/document/zaisanken-seidomondai/2021_03_yoyaku.pdf (Japanese Only) translation by the author

b. Direction of contribution by companies

<Diverse ways to contribute>

As mentioned above, there are many examples of companies contributing to IP creation education. While it is desirable to continue to strengthen such activities, it would also be a good idea to look at how companies can contribute from a different angle in light of the issues described here.

For example, companies can take the lead in building a platform to promote IP creation education initiatives, or they can host or sponsor IP creation education events. It is also possible to hold events in which companies provide needs and students think of ideas to solve them.^{13 14}

Similarly, the JPO's survey and research report¹⁵, lists "cooperation in needs assessment hearings," "advice on idea improvement," "promotion consideration," "lending of equipment necessary for trial production," "trial production," and "involvement of other companies" as examples of how companies have contributed to the commercialization of ideas by students¹⁶.

¹³ The Yamaguchi University Intellectual Property Center's "Report on the IP Creation Koshien Using Online" also points out that "the framework in which a company provides a problem and students develop a solution through PBL is effective.

https://www.kantei.go.jp/jp/singi/titeki2/tizaikyoku/consortium_suisin/dai4/siryou5.pdf
(Japanese Only)

¹⁴ In the "Survey of Learning Support System Contributing to 'IP Creation Education' in Collaboration with Local Communities and Society (Kinki and Shikoku)" by Deloitte Touche Tohmatsu LLC, an IP creation education program was provided by ITOKI Co. The report noted, "This is a win-win relationship between the school and the company and is an excellent mechanism, not only because of the benefits to the school, but also because Itoki can use it for its own new product development work.

https://www.kantei.go.jp/jp/singi/titeki2/tizaikyoku/pdf/report_03.pdf (Japanese Only)

¹⁵ Mitsubishi UFJ Research and Consulting Corporation, "Research Study Report on the Use of Ideas by Elementary, Junior High and High School Students and University Students" (March 2020)

https://www.jpo.go.jp/resources/report/sonota/document/zaisanken-seidomondai/2019_04_01.pdf (Japanese Only)

¹⁶ Japan Patent Office, "Tips for Supporting the Use of Ideas by Students and Others".

From the company's perspective, this would be a CSR activity and could also be seen as a type of SDG activity. In addition, the term "CSV management" is becoming more common these days, and it may be useful for companies to consider IP creation education as part of their CSV management.

At this point, it is important to keep in mind that schools have their own educational policies, especially when companies try to contribute to school initiatives. For example, there is a major direction in school education as represented by the curriculum guidelines. According to a report published by the Cabinet Office¹⁷, many teachers, in their attempts to use content from the private sector and other sources in the classroom, place a high priority on compatibility with the Curriculum Guidelines. Of course, this does not mean that the content cannot be used in educational settings if it does not fully conform to the curriculum guidelines. For example, it is expected to be relatively flexible to be used in Period for Inquiry-Based Cross-Disciplinary Study. However, awareness of these school circumstances could increase the accuracy of the contribution made by the company.

<enrichment of contents>

As summarized so far, there are many examples of company-led IP creation education initiatives, although the term "IP creation education" is not used. For example, many of them are designed to present social issues, etc., and then come up with ideas for solutions to them. While we do not disagree that this is an excellent initiative in itself, we believe that the content could be further enhanced by adding an IP creation education component. Specifically, the value of IP creation education will be further enhanced if it includes content that allows students to view their ideas as intellectual property. The content could be something like researching for similar ideas from an IP perspective or considering protecting one's ideas as intellectual property.

https://www.jpo.go.jp/resources/report/sonota/document/zaisanken-seidomondai/2019_04_05.pdf (Japanese Only)

¹⁷Survey of learning support systems contributing to "IP creation education" in collaboration with local communities (Tohoku, Kanto, Chubu, Kinki)

https://www.kantei.go.jp/jp/singi/titeki2/tizaikyoku/pdf/h31_report2.pdf (Japanese Only)

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<Collaboration with Local Communities>

Another useful approach is to promote IP creation education activities in collaboration with local communities rather than companies alone. There should be a movement toward cooperation between businesses and the local community outside of the business community to promote the event in an integrated manner.

The slogan "Curriculum open to society" looks at cooperation with the local community at large, including not only local businesses but also universities and other institutions. Based on this concept, it would be meaningful for various local stakeholders, including companies, to collaborate and contribute to the promotion of IP creation education.

<Experience Sharing>

The creation of a platform for these companies to share their activities with each other and to serve as a forum for dialogue would further invigorate the promotion of IP creation education.