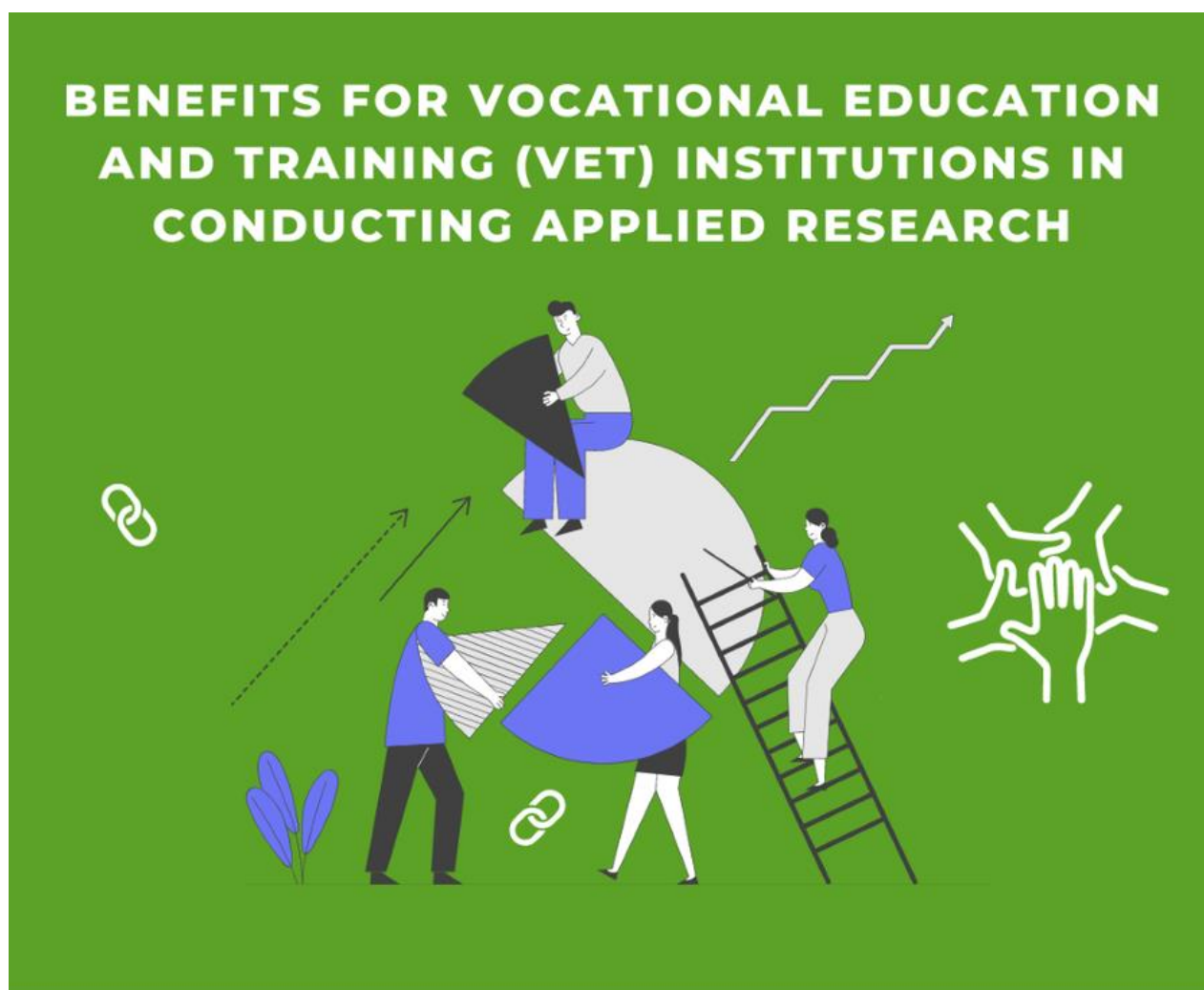


Catalogue of interesting practices re: Implementation of company-school cooperation in VET with recoms for WP4



BARCOVE
BUILDING AN APPLIED RESEARCH FACILITY INTO

2.3 Catalogue of interesting practices re: Implementation of company-school cooperation in VET with recoms for WP4

BARCOVE's definition on applied research:

- Applied research is when research is put to practical use and when practical experience is used for research.
- Applied research is the bridge or gap glue between researchers and performing craftsmen.

Method of this desk research

- Literature
- Interviews with several stakeholders in schools and companies (including some video's)
- Observations during excursions

Results: examples of best practices in each country

Because of the abundance of so many great examples we've made a list of good examples in Denmark, Spain, the Netherlands and one for global examples. We came up with these examples by doing some literature research and interviewing stakeholders involved in these good examples. Beside that we also did a lot of other interviews with stakeholders in other schools and companies. These examples, didactical methods and lessons learned gives a great input for WP 3 and WP4.

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2.3.1 Examples of best practices of applied research in VET Denmark

Introduction of cooperation between companies and VET schools in Denmark

Schools in Denmark are self-governing institutions managed by independent boards, in which representatives of employers, employees, municipality, school management, staff and students have seats. The school board employs the head of the school (director, rector, principal), who is responsible to the board. In Denmark, there is a very strong –and quite old –tradition for close cooperation between employers, workers, the education sector and the authorities. The cooperation is formalized in the sense, that representatives of the world of work has a well-defined and legally based influence on the content of the VET programs. Thus, at the national level, there is a large number of professional committees (so-called “Faglige udvalg”) –one for each vocation –where representatives of employers and employees continuously discuss and develop the educational structure, learning objectives, examination methods etc. for the actual vocational program. At the local level, there are additional local education committees (“Lokale uddannelsesudvalg”), through which the local employers and employees can make their mark on the educations. In theory –and to a certain extent: in practice –the close involvement of the labour market partners helps to ensure that the content of the courses at all times corresponds to the requirements of the labour market. In this way, the transition from education to employment will be as smooth as possible.

Next to the formalized cooperation in the form of professional and local education committees lies a large field of school-company cooperation, which is characterized by great differences from school to school. The most important is probably the collaboration on the students’ company internship. Thus, company representatives are often involved as guest teachers, visiting hosts during excursions or external censors/reviewers for practical tests. The companies are often also involved as partners in Danish and international school development projects. On the other hand, the local VET school is often the natural choice when companies want to up-skill their employees (in-service training). For this purpose, separate modularized C-VET programs are offered to companies.

The school-company collaboration is not without challenges and complications, and sometimes collaborative efforts are drowned in silo thinking and distrust. In recent years, several VET schools have developed specific cooperation agreements with companies. For example: sponsorship or testing of various tools and other production equipment. Just a decade ago, such arrangements aroused deep distrust among many school people, who were quick to point out corporate self-interest in cheap marketing and quick access to new, competent labour as their main motivation for approaching VET schools. With such a history in the bag, it is hardly surprising that ambitious initiative around joint school-enterprise-based innovation (as presented in BARCOVE) signify a real and extremely important change in Denmark.

A good examples of school company cooperation is the European Platform for Urban Greening. For the Danish community of practice there is a cooperation with OKNygaard and Green Academy Arhus.

See: [Home - European Platform for Urban Greening - Urban greening is essential for climate resilience, biodiversity and the well-being of city dwellers \(platformurbangreening.eu\)](#)

[Green Academy - European Platform Urban Greening](#)

[OK Nygaard - European Platform Urban Greening](#)



2.3.1.1: Project ERASDG as a best practice of involving companies and schools together in ‘a real-life challenge’. Organizations Den Grønne mand and Green Academy



In 2021-2022, Green Academy was a lead of the ERASDG project. The project involved 9 partners from 8 different EU countries. The major bulk of activities was implemented from January 2021 until December 2022 with the practical assistance of 4 associated partners from the world-of-work and from EUROPEA, the European association of green vocational schools. Furthermore, in this project, students from Green Academy engaged in a learning activity, in which they were working in groups to solve a real-life challenge provided from the landscaping company “Den Grønne mand”.

Below you can read about Innovation Camp workshop. The real-life challenge is presented during the interview with the owner of “Den Grønne mand” Peter Hjorth in this link [Innovation camp challenge](#).

Innovation Camp

The Innovation Camp is a process – a way of thinking and working that aims at producing new insights and perspectives on how to address challenging societal issues. It is a collective process of solution seeking through reframing, where the participants work in teams. In the context of ERASDG, a workshop, “How to use innovative landscaping to deal with wet surfaces” using Innovation Camp, was developed and implemented by Green Academy Aarhus with the participation of ERASDG students and teachers from 8 countries. The real-life workshop challenge was prepared in close cooperation with landscape company Den Grønne Mand (The Green Man). Subsequently, based on the Danish experience, the Innovation Camp format was tested by Hungarian ERASDG-partner KMASZE.

Description of the Real-Life Challenge:

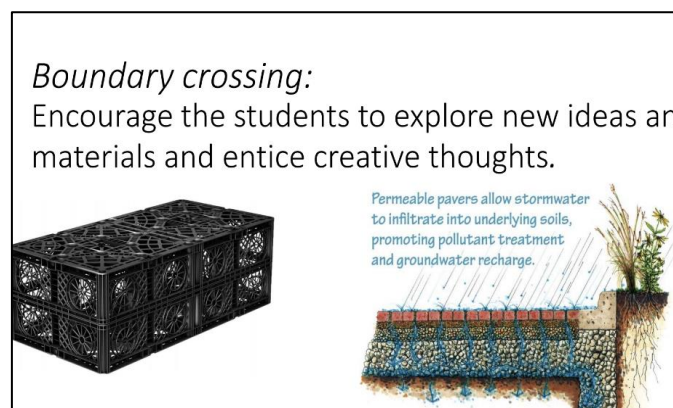
Because of climate change, periodically large amounts of rainwater are an increasing problem in Denmark. That is why water management and innovative landscaping skills are needed to deal with wet surfaces in the cities and turn them into sustainable living areas for citizens. This is a problem that Peter’s company faces quite often.

Main Issues: Flooding makes simple sustainable gardening impossible.

Underlying Issues: Climate change is worsening the problem.

Opportunities: The ways to tackle this challenge are many and varied.

Obstacles: A ‘one size fits all’ solution is not an option, due to the buildings in the area housing different types of people. A more tailored solution approach is needed.



In this challenge students had to:

- Create a sustainable living space and solve the flooding problem.
- Offer a tailored approach to more than one citizen group.
- Gain insight into modern urban issues and the Sustainable Development Goals: 4,9,11, 12, 13 and 17

Recommendation:

- That the teachers have the courage to move away from blackboard teaching and give free rein to learning in the work with applied research. That is, give students the freedom to learn while working with problem cases.
- The close school-business collaboration is dependent on relationships between people and therefore requires a lot of resources to maintain.
- Real-Life challenge educational planning. Innovation Camp and solving a Real-Life challenge is a method that needs to be integrated part of a curriculum together with learning outcomes, learning contents, tools, and evaluation. The Innovation Camp is an educational approach only when the organizing teacher/team plans the competences that needs to be developed through the innovation camp and evaluate the progress of the students.
- Real-Life challenge educational planning event management. It refers to choosing the partner and formulating the challenge, selecting students, setting up the event's agenda and venue, delivering the event and collecting feedback.

Challenges:

- That the teachers have the courage to move away from blackboard teaching and give free rein to learning in the work with applied research. Their role is more facilitating not teaching. That give students the freedom to learn while working with problem-based cases.
- The close school-business collaboration is dependent on relationships between people and therefore requires a lot of resources to maintain.
- Time consuming, due to COVID-19 pandemic, this workshop took place online.
- Conflict of interest

More information: <https://erasdgd.eu/innovation-camp>

This is a project within the Erasmus+ 'Erasdgd': [ERASDGD](https://erasdgd.eu)

Other good examples of applied research are described in this project. For example: the challenge in the Netherlands (familiar village)



2.3.2 Examples of best practices of applied research in VET Spain

Introduction of cooperation between companies and VET schools in Spain

Vocational training in Spain is undergoing a process of great change in the last decade. Traditionally, VET schools have had a link with companies due to the need to send students to do their final internships in a company. This link has not been like in the rest of Europe, except in the case of the Agricultural Family Schools and some other small schools, which had their own system of alternating company-school and which, during more than 50 years of existence, has allowed us to weave a very broad collaboration network with companies.

In fact, Applied Research was exclusive to the university world and or to the R+D+I departments of the companies themselves and with the collaboration of scholarship students.

The appearance of Dual Vocational Training in VET and the imitation of the German model in 2010 represents an important change of direction since the relationship with the company begins to be strategic. Public administrations, from that moment on, have stood out for the promotion of applied research in vocational training schools, through regulations and calls with important economic endowments for its development. It is true that a change in culture requires time in Spain, and it is here where the EFAs (Agrarian Family Schools), due to both their previous relationship with the business world and their flexibility, have been able to adapt and take advantage of this new line of strategy to connect more with the business world and carry out Applied research in their schools.



General speaking there are some examples of successful VET applied research projects in Spain:

- Green Roof Project: This project, led by the Institute of Education Sciences of Catalonia and the Polytechnic University of Catalonia, aimed to develop a training program for green roof technicians. The project involved collaboration between VET institutions, research centres, and companies in the green roof industry.
- Smart Water Management Project: This project, led by the Andalusian Knowledge Agency, aimed to develop a smart water management system for irrigation in agriculture. The project involved collaboration between VET institutions, research centers, and companies in the agriculture and water management sectors.
- TKNIKA. Good examples will be described later in 2.3.2.1 – 2.3.2.3

- "BriDGE: Bridging Diversity in the Green Economy" - This project is a collaboration between several VET institutions and industry partners in the fields of renewable energy, energy efficiency, and sustainable building. Its aim is to promote diversity in the green economy by developing and implementing training programs that address the needs of underrepresented groups, such as women and immigrants. The VET institutions involved are responsible for designing and delivering the training programs, as well as conducting research to identify the specific needs and challenges faced by these groups.
- "GREENOMED: Innovative Vocational Training for Green Jobs in the Mediterranean" - This project involves VET institutions and industry partners from several countries in the Mediterranean region, including Spain, Italy, and Tunisia. Its goal is to develop and implement innovative training programs in the green economy, with a focus on the needs of small and medium-sized enterprises (SMEs). The VET institutions involved are responsible for designing and delivering the training programs, as well as conducting research to identify the specific needs and challenges faced by SMEs in the region.
- "GreenVET: Promoting Green Skills in VET for a Sustainable Future" - This project is a collaboration between VET institutions and industry partners in the fields of renewable energy, energy efficiency, and sustainable building. Its aim is to promote the development of green skills among VET students, with a focus on the needs of SMEs. The VET institutions involved are responsible for designing and delivering the training programs, as well as conducting research to identify the specific skills and knowledge required by the green economy.

These projects demonstrate the successful collaboration between VET institutions, research centres, and industry partners in Spain to address real-world problems and develop innovative solutions through applied research. VET institutions involved in the projects presented above played a crucial role in facilitating the applied research process and ensuring its success. They provided the necessary infrastructure and expertise for carrying out the research, as well as the training and support for the students and teachers involved.

In some cases, the VET institutions also acted as mediators between the companies and other research institutions involved in the project. They helped to establish the partnership and coordinated the activities between the different parties. Overall, the VET institutions played an important role in bridging the gap between the academic and business worlds and ensuring that the research conducted was relevant and applicable to real-world problems.

In all of these projects, the VET institutions play a crucial role in designing and delivering training programs that meet the needs of the green economy, as well as conducting research to identify these needs and challenges. They also work closely with industry partners to ensure that the training programs are relevant and up-to-date with the latest developments in the field. Overall, the VET institutions involved are instrumental in bridging the gap between education and industry, and preparing students for successful careers in the green economy.

Recommendation:

- Necessary infrastructure and expertise
- Training and support for the students and teachers involved.

Challenges:

- That there is an understanding between research and the actual challenges in the real world.



2.3.2.1 Aquaponics project. Organization Centro Integrado de Formación y Experiencia Agraria (CIFEA) and research stakeholders.

CIFEA is the acronym in Spanish for “INTEGRATED CENTRE OF VOCATIONAL TRAINING AND AGRICULTURAL EXPERIENCES”.

Interview Placido Varó, he is the director of the Integrated Center of Agricultural Training and Research of Torre Pacheco (Murcia, Spain):

This vocational training school opened in 1974, and currently offers intermediate and upper degrees in floriculture and gardening, agricultural production and landscaping, and rural environment. The main objective of this center is to provide the knowledge and skills that are necessary to find a job in the sector of plant production, carry on the family farm, start business, or continue their training at university.

The aim of the center is that the students finish their studies technically and professionally prepared. They want them to learn about most of the crops and gardening in the area to facilitate their insertion into the world of work. The center makes an effort to have the equipment and tools that correspond to the skills and competences that the students need to acquire. It also tries to get in contact with companies and research organizations that can support this innovation and continuous updating, in order to be up to date with most of the agriculture tendencies, equipment and machinery.

At the moment, they are running an aquaponics project which consists of producing plants in three hydroponics systems while producing tilapia fish for food. The aim is to evaluate the viability of different aquaponic systems for future implementation on farms in Murcia. The main advantage is the sustainability of the system, which optimizes water use, reduces waste and produces both vegetables and fish.

A very positive aspect is the direct and practical contact developed in the research and technology transfer trials carried out at CIFEA, in collaboration with IMIDA (Institute of Agriculture and Food Research and Development of Murcia Region), Universities of Murcia and Cartagena, and the Centre of Edafology and Applied Biology of Segura (CEBAS). CIFEA – Torre Pacheco participates in research projects of the last two organizations, in which the center’s staff collaborate with researchers from these organizations. These projects are shown to the students to let them know what research is.

The director of the center is open-minded and have a vocation, believe in the projects. This is the only way to be able to convey the importance of these projects to the team of professionals at the center and to encourage their participation. This is important.

Placido Varó: “We want our students to know what research is and its tangible results. We want them to know that research results and conclusions can be applied not only in a laboratory, but also in operations or used in commercial products or services. For us, the best way to convey the potential applications of research is to have practical examples of its implementation in the center which can be visited at any moment. Research is a complex task and requires protocols that must be rigorously followed, statistical analyses, qualified and trained personnel to undertake research, etc. CIFEA-Torre Pacheco provides its facilities, while interested companies and organizations contribute researchers, equipment, and funds.



The center participates in the research and the subsequent dissemination of results. A public center does not have the economic capacity to dispose of the latest high-tech equipment or materials in its facilities. What we do is to find companies in the agricultural sector that want to get involved with the center so they can also get benefits from that collaboration, such as the dissemination of their equipment. When the current students finish their studies, they will hold technical positions where they will use and buy this equipment. Therefore, it is beneficial both for students to learn and for companies to publicize their equipment. On the other hand, companies can also bring clients to the school to show them a fully operational installation, as well as organize masterclasses or participate on continuous education courses for people who are already working in the sector.”



They believe that collaboration between the center and companies is fundamental. At the moment they are also collaborating with other Spanish VET schools and companies in a knowledge transfer project, the Smart Green City 4.0 project. The purpose of this project is the transference of knowledge between vocational training schools and companies in the green infrastructure sector to adapt the educational offer to the sector needs.

More information on this project: <https://sftt.info/index-01-07-21.html>

Recommendation:

- Open minded.
- Practical examples of its implementation in the centre.
- **Knowledge transfer.**

Challenges:

- Secure knowledge among the students, so that it is ensured that they know what research is and its tangible results it can create.



2.3.2.2 – 2.3.4.4: TKNIKA, VETcentre of bioscience and technology

Tknika is a center promoted by the Deputy Ministry of Vocational Education and Training of the Education Department of the Basque Government. Innovation and applied research are at the core of Tknika in its ongoing efforts to place Basque Vocational Training at the European forefront. Tknika is modelled after some of the world's most advanced vocational training centers. Through networking and direct involvement by the Basque Vocational Training teaching staff, the Centre develops innovative projects in the areas of technology, education and management.

More information: <https://tknika.eu/en/areas-2/biosciences-and-sustainable-development/>



2.3.2.2 collaborative space for research-innovation and training in BIM Methodology; smart green buildings, organization Tknika.

This project, led by the Basque Country VET Agency, aimed to develop a training program for energy efficiency technicians in the building sector. The project involved collaboration between VET institutions, research centers, and companies in the building and energy sectors.

The BIM methodology is not mandatory in Europe, however, the European Parliament issued DIRECTIVE 2014/24 / EU of the European Parliament and Council of February 26, 2014, urging the 28 countries of the Union to implement the BIM methodology in all those public financing construction projects.

Based on this directive, in August 2015, the Ministry of Public Works created the “BIM Committee”, which establishes a roadmap that will make the use of BIM mandatory for all public bids in two phases: December 17, 2018 Public Tenders for Construction, expanding on July 26, 2019 for Public Tenders for Infrastructures.

For these and many more reasons it is necessary to train with BIM technology, in all those Vocational Training specialties that can benefit from this new work process and all that it implies. We want to continue offering a BIM generalist training in a transversal way to each specialty within the sectors of construction, infrastructure and facilities and at the same time complete it separately with the BIM competences.

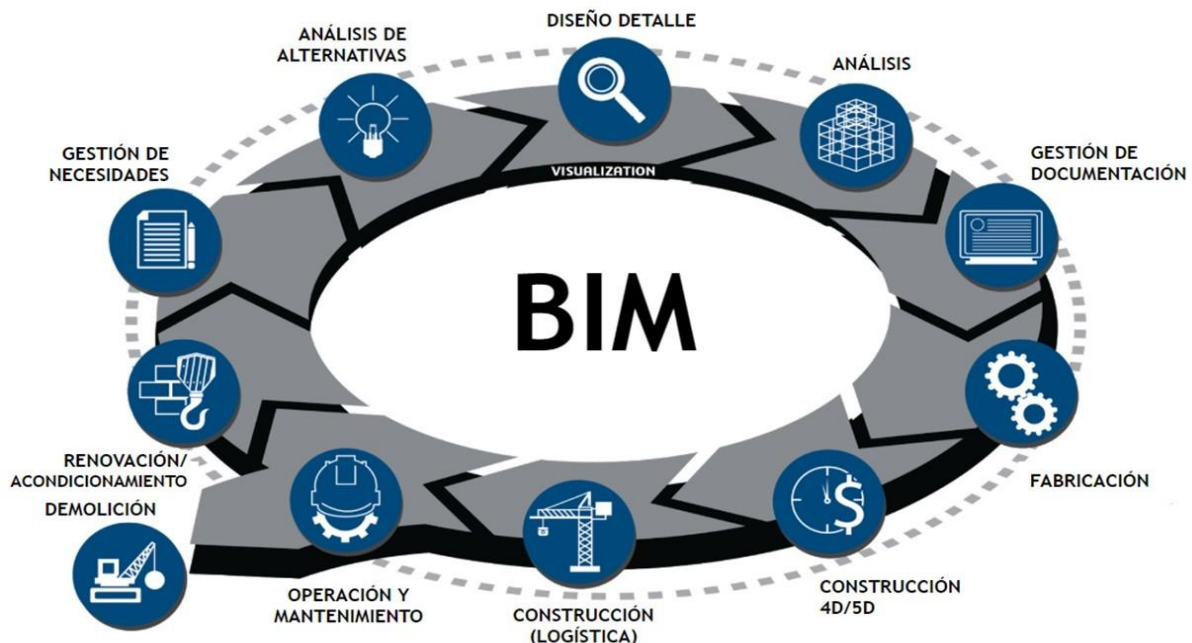


<https://tknika.eus/cont/proyectos/bim-3/>

2021-2022: Virtual Reality and collaborative BIM: The potential of the collaborative BIM methodology must be reflected in the different technologies used, beyond computers. To this end, we have worked on the use of Virtual Reality in a collaborative way, which allows us to enter BIM models simultaneously with VR glasses, maintaining the BIM parameters of the original model. A document has been drafted to explain the procedure.

The 2022-2023 course is aimed from a more general perspective of organising a collaborative work process, allowing workflows, communication between different work teams, organisation of the project in the cloud, document control, etc.

<https://youtu.be/Cmx5xWJU-0U>



2.3.2.3 LANDARRAIN, Food Innovation Laboratory, organization Tknika.

Within the Bio economics Network Applied to Vocational Training, the Landarrain Food Innovation Laboratory in collaboration with the Vocational Training centers of the Agrarian sectors, Food Processing Industry sector, Culinary and Tourism sector, researches and innovates in new products of the food value chain.

<https://tknika.eus/en/cont/proyectos/landarrain/>

In our facilities we have an aquaponics system. Aquaponics combines hydroponics with aquaculture in order to produce fish and vegetables in a recirculation system. The wastewater left over from the fish production tanks is used as a source of nutrients for plants, which, in turn, act as biological filters, cleaning the water returning to the tanks. This in turn keeps the system in balance, ensuring proper water quality.

The experiences so far have shown that aquaponics has a number of advantages compared to conventional fish and vegetable cultivation.

Aquaponics helps improve water reuse, maximizing efficiency in the use of productive space and productivity, ensuring the complete traceability of the system, improvement of the productivity of certain plant species and diversification of production with fish species. The aquaponic system is also more efficient than those of conventional fish farms, as it provides a higher quality product, and diversifies the end result with vegetables.



Tknika's Landarrain project is structured as the focal point for this productive technology in the Basque Country Autonomous Community, with the aim of building the Basque technical aquaculture sector and supplying the markets with new quality products.

Video: <https://youtu.be/BTwfO84T3rE>

2.3.2.4 Installation of individual electric self-consumption in an urban park, organization Tknika in cooperation with SN VIATOR and URBABIL

The project is about integral solution for energy production by means of photovoltaic panels connected to an internal network with surpluses and receiving power compensation with a nominal peak of 7.7 KW

Tasks performed:

- Selection of generating elements (photovoltaic panels, inverters, cables...).
- Analysis and legalization of the connection model to the electricity distribution network.
- Design an integral solution, within the possibilities, according to the Royal Decree 244/2019 of Self-consumption

Information: <https://tkgune.eus/en/project/installation-of-individual-electric-self-consumption-in-an-urban-park/> and <https://urbabil.es/proyectos/cubierta-sabino-arana/>



2.3.3 Examples of best practices of applied research in VET Netherlands

2.3.3.1: Project bread paste. Organization Bakery Faber Smits and MBO Life Science



Bakery Faber Smits supplies large and small bread to supermarkets, among others. Bread that has not been sold at the end of the day will be returned the next day. This return stream is partly intended as animal feed, the rest goes to the biodigester.

In collaboration with Bakery Sweets Center, the opportunity as a Food Innovation course was given the opportunity to take on this project. (<https://www.aeresmbo.nl/leeuwarden/mbo-life-sciences>). EBIC has developed a process to convert the obtained return bread into a bread paste with the help of enzymes. The enzymes convert the starches into sugars. The research question of the above organizations was to see how bread paste could possibly be used in products of human consumption. This brings the return bread back into the food chain.

In order to understand the raw material and the possible applications, various applications were investigated by applying skills, looking up information and conducting experiments/ tests. From the first findings, products were made by the students. These have been assessed for taste, texture and analysis. Both chemically and microbiologically. By varying recipes and flavors, we finally came up with the 11 product concepts for the event. On 10 November 2023, these 11 promising products were presented at a symposium and a tasting. 60 visitors from the sector were present. Products that have been developed include: bread, scones, cookies, gingerbread, pancakes, jam, bread spread, syrup, sorbet ice cream and ice cream.



Films and articles:

<https://www.youtube.com/watch?v=KnLqsfGOyGk>

<https://bakerysweetscenter.nl/megaproject-bakery-sweets-center-rondom-opwaarderen-retourbrood-30-minder-verspilling/>



2.3.3.2 and 2.3.3.3 Introduction 'Pratoraten' Netherlands

Interview Jorrick Scheeren, head of pratoraten Netherlands:

A pratorate is an expertise platform within an MBO institution where practical applied research is carried out. The aim is to spread knowledge and innovation, and to train innovative craftsmanship. A pratorate consists of a 'circle of knowledge' with a practor and lecturer-researchers. Teachers, students and partners from the (regional) business community are also actively involved. The pratorate bridges the gap between education, research and (regional) business.

There are roughly two types of pratorates:

- one that places more emphasis on professional innovation (in healthcare, technology, agri, etc.),
- one with an emphasis on educational innovation (through citizenship, media literacy, activating didactics, etc.).

In practice, of course, both innovations are present in every pratorate.

In short is a practor is a teacher researcher for applied research in VET. The practor is a figurehead, inspirer and/or engine of a pratorate. As a practor you are responsible for the development, application and dissemination of knowledge, both internally and externally. Practice-oriented research and the professionalization of teachers are also important tasks. There are no requirements from the foundation for the role of practor, this choice lies entirely with the VET institution involved. (uit: [Practoraten.nl – Platform voor praktische innovatie](https://practoraten.nl))

Jorrick Scheeren from the institute of Pratorate Netherlands: "The movement of pratoraten continues to develop, both qualitatively and quantitatively. In the past period, various initiatives have been further developed and strengthened in the form of a fully-fledged pratorate. Applied research in VET has gained solid ground in our education system."



**Prac//
toraten**
platform voor praktische innovatie



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2.3.3.2: Practor Heidi Kamerling 'Green Livable Cities': Monitoring vegetation in relationship to biodiversity. Organization Yuverta

Yuverta



Interview practoraat Heidi Kamerling from Yuverta:

The practoraat of Heidi studies the topic of 'Green Livable cities'. Within this practoraat there is a project regarding monitoring vegetation in relationship to biodiversity.

A partnership of six municipalities, the Hollandse Delta water board and various nature organisations has taken the initiative to develop a bee landscape in the south west region of the Netherlands. A bee landscape is a large coherent green and flowery network with sufficient food and nesting places for wild bees. Students of the Liveable City and Climate programme of Yuverta Dordrecht are participating in this project by monitoring the vegetation in this area. They do this monitoring together with lecturer researcher Tom Lievense and Heidi Kamerling, practoraat Green Liveable City of Yuverta. This fits in well with the monitoring of wild bees that is done by the EIS Foundation, knowledge center insects.

In both spring and autumn, Yuverta students will spend a few days in the field for an ecological baseline measurement. Their emphasis will be on mapping the species richness of the vegetation relevant to wild bees. They did the first monitoring on Friday 18 March and the following week they received a masterclass in practice-oriented research and fieldwork by practoraat Heidi Kamerling. She will also assist them (together with the teacher) in processing the data, after which they will provide a report this autumn with the results of the baseline measurement.

It is important that this bee landscape is created, because the wild bees in our country are not doing well. The goal is to provide more food and nesting opportunities for wild bees and other pollinators. This is not only good for these insects but also for the increase of biodiversity in this area. The province wants to turn the whole of South West region of the Netherlands into a large bee landscape by 2030 and is financing the support of the project. This contiguous flowery network is good for the insects and therefore also for other small animals and birds that eat these insects. The bee landscapes thus ensure that the basis for healthy nature is in order in this region.

Heidi Kamerling: The students carry out the fieldwork, they count the number of species in the roadsides. "The other day a student from the green, land and infrastructure program said: 'Thank you. I never look at grass the same as I mow it. It's not just grass, it's nature. There are also herbs, in which up to thirty species of insects live.' That awareness, that's so beautiful!"

Heidi is clear about her didactic ambition: within all green MBO programs, there is room for inquiry-based learning in the curriculum. Heidi is convinced that students enjoy an inquisitive attitude throughout their lives, with which they can gain knowledge. "Actually, inquiry-based learning is just being curious about your surroundings," she says. "But then we have to bring the student into that environment within education. So out of the classroom! I want to facilitate that change in thinking."

Information

[Studenten Yuverta monitoren vegetatie voor bijenlandschap | Blauwe Hotspot Dordrecht](#)
[Practoraat Heidi Kamerling gaat voor groen in de stad \(groenpact.nl\)](#) and [Groene Leefbare Stad – Practoraten.nl](#)



**3.2.3.3: Practor Sara Albone ‘animal welfare and health’:
Catching methods chicks and research horses. Organization Aeres Barneveld.**



Interview practor Sara Albone from Aeres:

The animal welfare and health practorate was established on 1 September 2021 and is based in Aeres MBO Barneveld. In addition to the practor Sara Albone, the practorate consists several teacher-researchers from the various 'animal' MBO education teams and locations. There are two main goals that the practorate is working on in the coming years. Firstly, gaining substantive knowledge about animal welfare and health by carrying out (practical) research on the housed animals at Aeres and in the business community. This research is designed and carried out by students, lecturers, lecturer-researchers and stakeholders. Secondly the practorate wants to strengthen the investigative capacity of those directly involved: students, teachers, lecturer-researchers and the business community. By working together in professional learning communities, we learn from and with each other. This contributes to the research and quality culture of the organization.

'To measure is to know' is the basis on which the practorate works. Animal welfare is a difficult concept to measure. The livestock and pet sectors both face different challenges. For example, livestock farmers try to ensure good well-being under economic and environmental pressure. The pet sector has laws and regulations that are difficult for private individuals to translate into individual actions. The practorate wants to serve the entire animal sector by conducting practical research, aimed at measuring and subsequently improving the welfare of all kept animals. The knowledge gained is directly interwoven in education, enabling future animal employees to act critically and consciously.

One of the teacher researchers is Jan Gundelach. Since January 2022, Jan has been working as a teacher researcher at the practorate Animal Welfare and Health. He does this with great pleasure and conducts research into the different catching methods (traditional and upright catching method) for broiler chickens. Research sharpens the mind and deepens the lessons in poultry farming & animal welfare. Learning together from and with each other in the practorate is a win he says.

Another teacher researcher is Elbert Koelewijn. In addition to his work for the practorate, Elbert can be found both in the workfield and in the classroom in his role as an equestrian teacher. Because of his years of experience in training and training equestrian combinations, it is a logical follow-up for him to substantiate assumptions in the horse world through research. One of the researches is about energy of horses in relationship to horse riding and lunging.

See this movie to gain some information on this practorate:

<https://youtu.be/hAlhSYjALNA> Jan's project 'catching methods chicks' is explained from 1.43- 2.50. ... project 'horse health' is explained from 2.51-3.46

Also: [Dierenwelzijn en -gezondheid \(aeresmbo.nl\)](https://www.aeresmbo.nl)

[EVEN VOORSTELLEN: SARA ALBONE – PRACTOR DIERENWELZIJN EN GEZONDHEID – Practoraten.nl](https://www.practoraten.nl)



Examples of best practices of applied research in VET Global

3.3.4.1: NCVER on behalf of the Australian Government Department of Education and Training. VET applied research: driving VET's role in the innovation system.



This research of 2017 examines the vocational education and training (VET) sector's potential for applied research and innovation and presents a roadmap towards increasing the sector's participation in the national innovation agenda. Central to this participation is the capability to identify, nurture and impart the sorts of skills Greenspan identifies and which we have called 'applied research' skills. In essence, we are talking about research with a focus on solving real-world problems. Such activity can create new knowledge, and/or use existing knowledge in new and creative ways.

In our explorations into how the VET sector could realize its potential in this area, the capabilities of its educators and other professionals emerged as a significant factor, in both pursuing opportunities and in sustaining them as part of the everyday work of the registered training organization (RTO). We argue that increasing the applied research skills of VET professionals is also one way to revitalize VET's place in industry policy and workforce development. Our primary focus was therefore on how to develop an applied research capability in the sector, one that could assist in securing a place for VET in the innovation system. To this end we have developed a framework for VET applied research, set out in the accompanying document, Explaining the VET applied research developmental framework. This report, whose findings underpin the framework, draws on the literature and our fieldwork – discussions with VET institutions, applied research organizations, industry bodies and policy-makers, mainly on the eastern seaboard.

Our hypothesis was that the current innovation agenda does not fully recognize the role of VET because the sector's latent potential is not well understood, either within or beyond the sector, and because many in the VET workforce first need to be equipped to play a greater part in the innovation cycle. Our investigation confirms that, despite a strong commitment to professional practice and innovation in many VET organizations, the notion of 'applied research' as a part of that practice is at best novel and often alien. Beyond the sector, the idea of VET as a research partner hardly surfaces. There is, however, a foundation on which to build. We outline what is already underway in this area, both in Australia and elsewhere, in particular, Canada. The rationale for these existing efforts is the place VET occupies between knowledge generation and its application in the workforce. This position opens up possibilities for improving Australia's ability to translate its good ideas into improvements in industry and into higher productivity. Productivity also depends on a skilled workforce. Again, VET's role in training should position it better than other education sectors to align curricula and teaching methods with the fast-changing requirements of enterprises.

For applied research in VET it demands strong institutional and research leadership to shape and endorse the research effort and to ensure that all members of staff have appropriate levels of research awareness and skills. The adoption of a systematic approach such as this will also lift the research and innovation skills of students, who are then more likely to graduate as the creative problem-solving workers that employers are asking for. If VET is to take its place in the innovation economy, applied research should not be seen as only the business of educators; it must become part of an organisation's strategic direction and capability planning.



At the moment, much of the VET applied research effort depends on the enthusiasm, industry knowledge and contacts of individuals. The sector itself needs to further champion its achievements and invest in its capability. This would be facilitated by a coalition of peak organisations able to uncover and disseminate existing research and research resources; offer professional development, partnerships and mentoring; and represent the sector at external research, industry and policy tables. The sector has already been exhorted to 'name and claim' its applied research. In so doing, it must look outwards and engage with industry to solve real-world problems in real time. Thus VET could become another driver of innovation in Australia. Now, in 2023 the project is put on hold unfortunately.

Research: [VET-applied-research-driving-VETs-role-in-the-innovation-system.pdf \(ncver.edu.au\)](https://ncver.edu.au/research/vet-applied-research-driving-vets-role-in-the-innovation-system.pdf)

2.3.4.2: European Training Foundation (ETF) Mapping study on international best practices on the contribution of VET to applied research and innovation



ETF just got started (2023) with a mapping study on international best practices on the contribution of VET to applied research and innovation (approximately four country case studies). This study is interesting for BARCOVE.

Main questions of this research:

- What is the current level of involvement of different VET systems (4 countries) in applied research projects and partnerships?
- How do different policy frameworks allow the participation of VET systems in applied research projects and partnerships?
- What are the common processes and activities deployed in applied research projects in the selected VET institutions?
- What are the main processes and activities deployed by VET institutions to engage private companies in applied research projects?
- How do these VET institutions include VET students in applied research activities?
- What are the possible benefits for students of participating in applied research activities?
- How is applied research linked with other Innovation Hubs' services (e.g. business incubators, commercial infrastructure, access to funding, ecosystem building and networking, or strategy development for businesses)?

Answers to these questions are given in next coming years because the project just got started in february 2023.

2.3.4.3 Arrivet, applied research result in VET



Applied Research Results in
Vocational Education & Training

ARRIVET - Applied Research Results in Vocational Education and Training is the magazine edited by the World Federation of Colleges and Polytechnics Applied Research Affinity Group (WFCP ARIAG).

ARRIVET is an international, interdisciplinary publication dedicated to the documentation and dissemination of applied research results. Its focus is on the application of research to the solution of business and industry problems, and the use of applied research in vocational learning and teaching. It addresses any person who is interested in solving practical research problems of business and industry, with particular focus on those committed to the dialogue between production and instruction, the professional and the vocational.

ARRIVET launched in February 2023 and will publish manuscripts from applied research practitioners around the world. It is particularly receptive to work from women, Indigenous Peoples, persons with disabilities, members of visible minorities/racialized groups, and members of LGBTQ2+ communities. ARRIVET produces one publication annually, in an electronic format, online, and open source. As BARCOVE but also other applied VET research in future we have a platform for publishing articles.

ARRIVET Statement of Principles:

- **Goals:** ARRIVET is a publication dedicated to the documentation and dissemination of applied research results gathered through inquiry, investigation, innovation, and insight. Its focus is on the application of research to the solution of business and industry problems, and the use of applied research in vocational learning and teaching.
- **Audience:** ARRIVET speaks to engineers and cognate professions, technologists and technicians, teachers and trainers, students, and employees. It addresses any person who is interested in the application of test/retest methodologies to the practical research problems of business and industry, with particular focus on those committed to the dialogue between production and instruction, the professional and the vocational.
- **Processes:** ARRIVET produces one publication annually, in an electronic format, online, and open source.
- **Demographics:** ARRIVET is an international publication seeking to publish manuscripts from applied research practitioners around the world. It is particularly receptive to work from women, Indigenous Peoples, persons with disabilities, members of visible minorities/racialized groups, and members of LGBTQ2+ communities.
- **Author Expectations:** ARRIVET authors are expected to submit only their own work, to attribute all quotations, cite all sources, and credit all supporting organizations.
- **Submission Protocols:** ARRIVET submission manuscripts are encouraged and accepted between February and November of each year, and each submission will be acknowledged by email.



2.3.4 Didactics on applied research

From all the best practices from each country we've learned that didactics are important to implement applied research in VET Schools. These didactical methods are important for wp3, the Hackathon and wp 4, the Recipe book. Here we describe which didactics were used in several practices.

One of the didactics is problem-based learning.

For Project-based learning (PBL), small groups of students are assigned to solve authentic (business or social) problems. For example, students make designs or give advice for products, services, business, communication plans or a general strategy. PBL can be part of a regular education program with lectures and work groups. The projects can be short-term (for example, two days, one week) or long-term (for example, six months). They are interdisciplinary in nature and require different creative methods to reach insights, solutions, or decisions. They involve a realistic business, organizational or societal problem for which a solution is needed. The underlying idea of PBL is that authentic cases, collaboration and interaction, motivate students to actively learn.

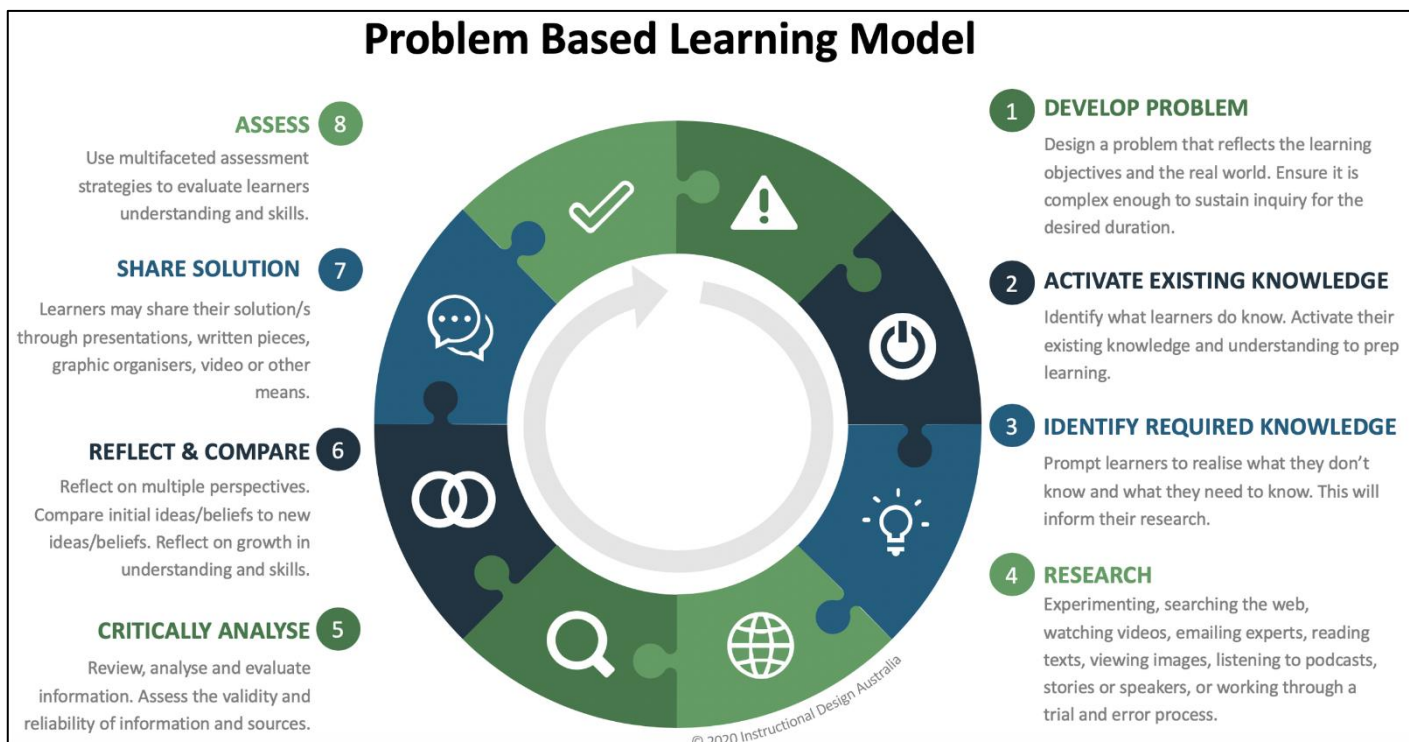
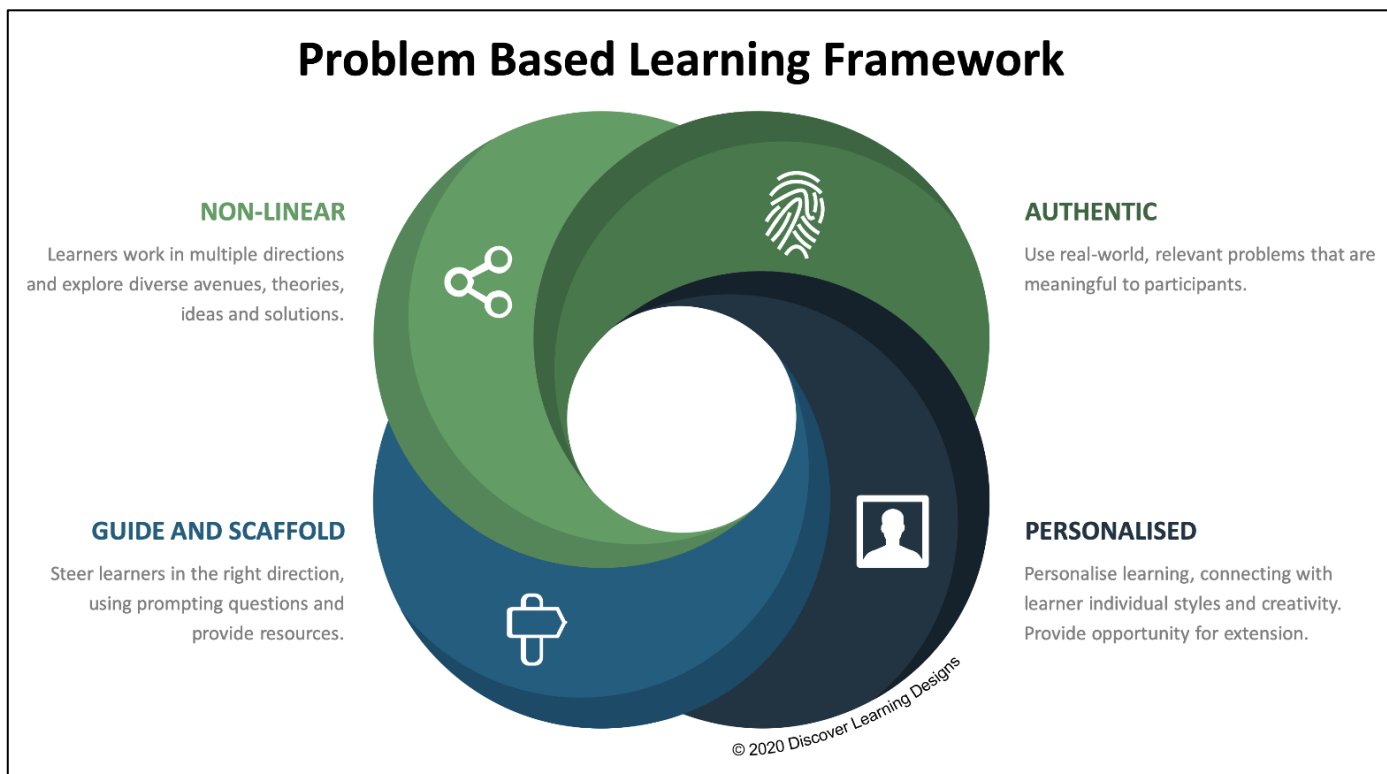
Project-based education is more specifically defined than, say, Challenge-based learning, but less so than Problem-based learning or Case-based learning. In any case, it is not an optional form of education. As with creating, for instance, a thesis or doing research, it is important to plan clear phases and timelines. Conceptually, these phases are often based on the empirical cycle and include steps such as:

- the problem analysis or in the case of applied research hypothesis
- determining the solution or research approach;
- devising the conceptual solutions (execution of research itself);
- selecting the most promising solutions;
- working out or testing the solution (obtaining results);
- evaluating (drawing conclusions).

A good project requires a lot of preparation and good planning, with all those involved (teachers and students) informed of what needs to be done. There is a lot of room for feedback by supervisors to guide a project in terms of content and process, including group dynamics. Consider, among other things, a concern such as free-riding.

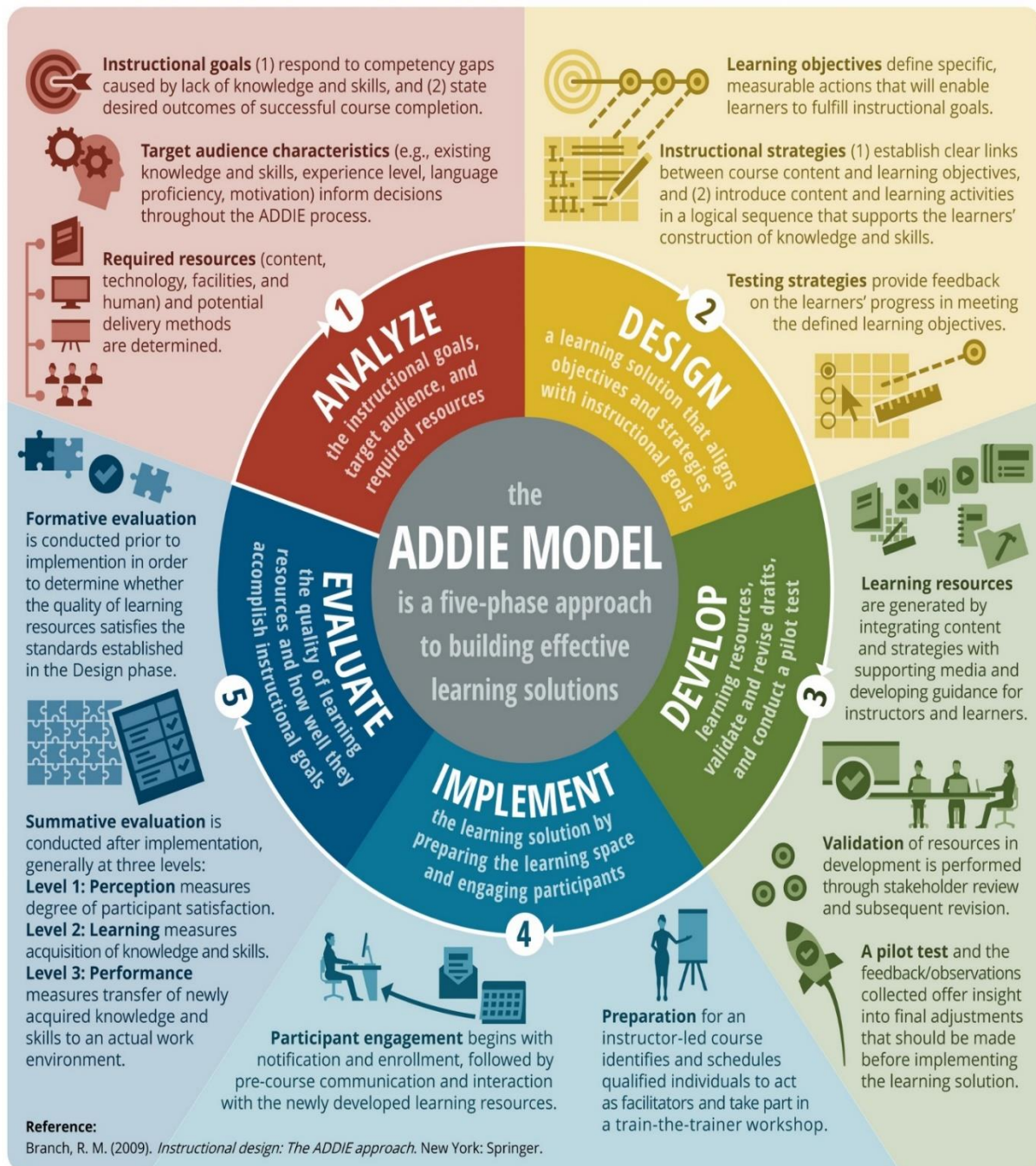
The end product is important, but so is the process and the presentation. The end product plays a significant role in PBL because it makes learning visible. By testing or making something, students show that they have gained the knowledge and skills needed to do so. But for a project, students also write a report in which they describe the process they went through (the steps of the project), the choices they made and the reasons behind them. In addition, they describe how their group has worked together, evaluate how that went (for example by performing a Group Member Evaluation) and what they are going to improve on the next time (on an individual level). Finally, the presentation of the final product to fellow students is an integral part of a project, preferably with the presence of external clients (the companies) or experts.

Framework and models used for problem based learning (source: [Applying Problem Based Learning \(PBL\) - Instructional Design Australia](#)):



An other didactical instrument for applied research in VET is the instructional system design based on the ADDIE model.

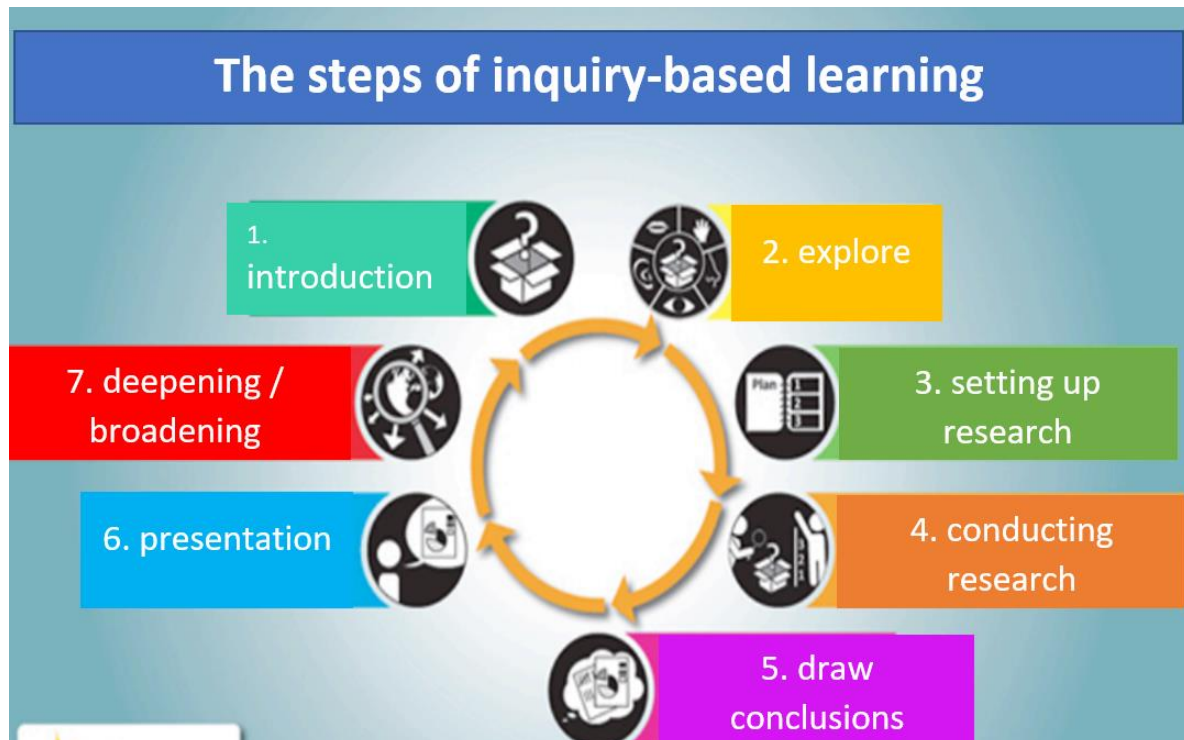
The ADDIE Model is an iterative instructional design process, where the results of the formative evaluation of each phase may lead the instructional designer back to any previous phase. The end product of one phase is the starting product of the next phase.



The last didactical model we have found is the system of **Inquiry-based learning**.

Inquiry-based learning is used mainly by practoraat 'soil and water' (Patrick A.) and by practoraat 'green livable cities' (Heidi K.). It is described in this publication: Research for practical people "Inquiry-based learning" (H.Kamerling).

In order to shape inquiry-based learning in education, the inquiry-learning cycle is a good guidance.



- 1) Introduction / Confrontation; Introduction or confrontation with a problem, phenomenon or object that is new, but connects to the students world. The wonder and curiosity of the students are stimulated by offering objects and phenomena that are just above their level of knowledge (zone of close development) and who thereby challenge them and motivate to explore.
- 2) Explore; To explore the phenomenon or problem as widely as possible, preferably guided by the let students themselves. In this run-on phase, the students retrieve prior knowledge and exchange experiences about what is offered material or phenomenon. This creative phase raises questions, ideas and predictions and is important for learning about each other's (pre-)concepts.
- 3) Setting up research; The students convert the researchable questions into a feasible study. They decide wihc research set-up they are choosing*. They make a plan about what they will look at or measure in the research, which materials and measuring instruments they need for this and who, what, when does. This is also the fase to formulate a hypothesisa.
- 4) Conducting research; The students carry out the research as they have planned in advance. They record their observations/data in a logbook and discuss their meaning in their group (possibly with the teacher). The observations/ data lead to results. They can use digital tools to do so.

- 5) Draw conclusions; Based on the results, the students draw conclusions, which lead to solutions and perhaps to follow-up questions, after which steps 1 to 4 will be performed again.
- 6) Presenting results; The students and their group process the set-up, results and conclusions into a presentation, containing drawings, photos, texts and tables or graphs. They make the outcome of the investigation, and thus the answer to the question, known to the client and to the rest of the group. Sharing experiences with peers is very important for the development of one's own knowledge and that of the other students and workers in the companies.
- 7) Deepening/ broadening; From the conversations and presentations, the teacher got an idea of the comprehension level of the students. In this phase, the teacher redeems this revenue by using the further conceptualize concepts. He or she does this by using the substantive proceeds broadening and giving meaning in other contexts, and by creating coherence with other concepts and/or other research.

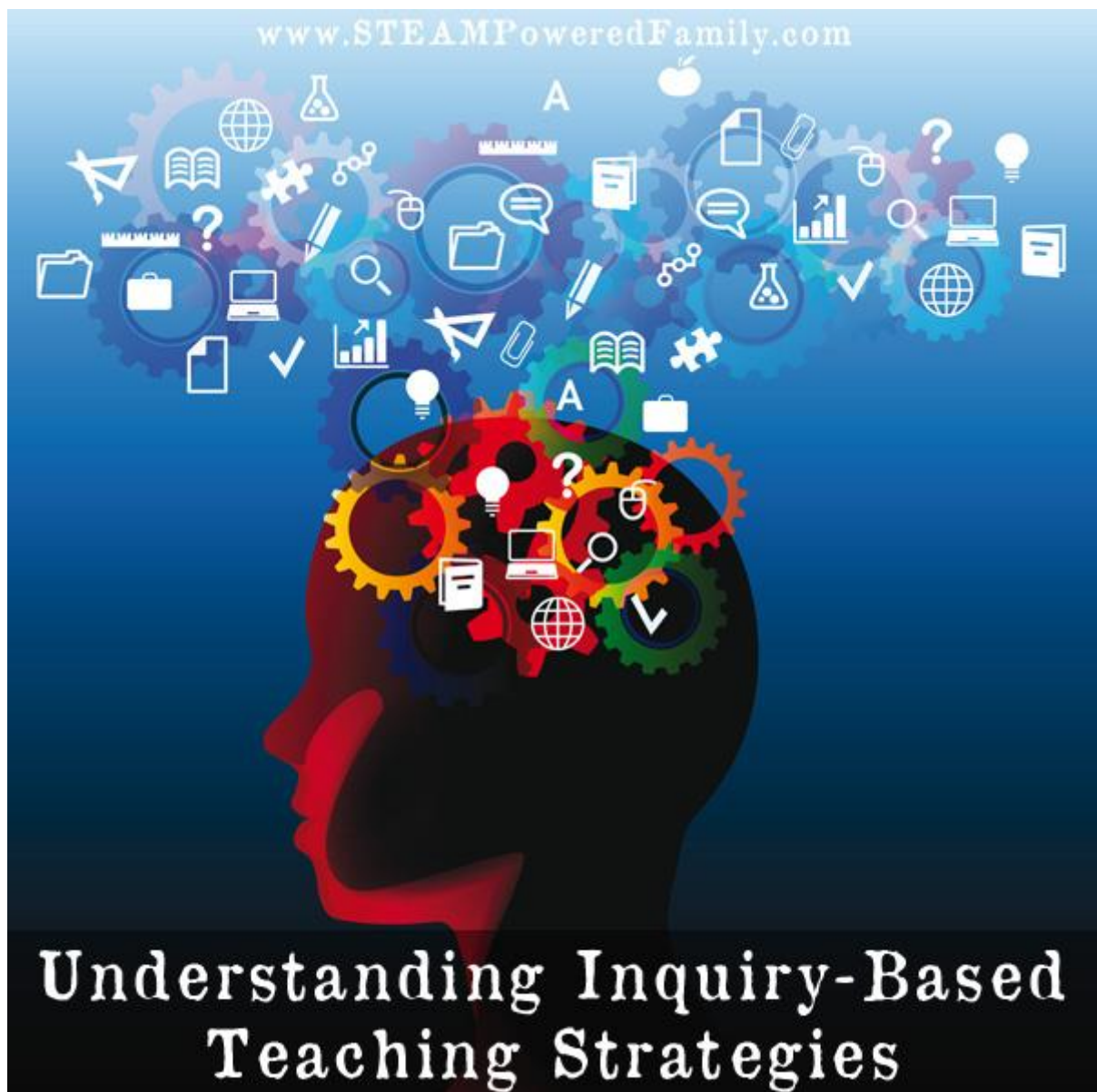
*This type of research is possible for inquiring based learning:

- **Experiments**, just see what happens when you test things. Doing experiments is a good example. Maybe you remember the experiment with cress from primary school. The research question then is: "What grows better cotton wool or potting soil?" That's an experiment, you see what happens.
- **Monitoring research**, it's all about collecting data in the field, do an analysis and give advice. An example of this is the vegetation monitoring for the municipality of IJsselmonde. Research question: "What about the development of native vegetation on areas where we manage ecologically?"



- **Literature research /deskresearch**, it's about checking articles, books, websites and other publications or newspaper articles on a certain topic. If you have found more than 10 of these types of articles on 1 topic, you can do an analysis on that. Geo-information systems (GIS) are an example of sources that are easy to use, often occurs in the field. Note: 1 source is not a source (too little), an article with only opinions does not count!
- **Action research**, in which you change something in the normal course of events at the request of people and then you look, for example, at how this is experienced; is therefore about the feeling and behavior of people in their daily lives or in organizations. So the person you are investigating is participating himself! This research often starts with conversations in the form of interviews.

For inquiry-based learning it is necessary to have commitment from the whole organization: companies, schoolboard/directors, managers, teachers and practoren. There must already be a good ecosystem of doing applied research to implement this. When you achieved that you need to train your teachers and students before you can start. It is mainly about getting the teacher in the position of coach and researcher than the person of knowledge. Also having enough funding is important. In the Netherlands there is funding for practoren from the national government since January 2023. They see the importance of applied research in VET.



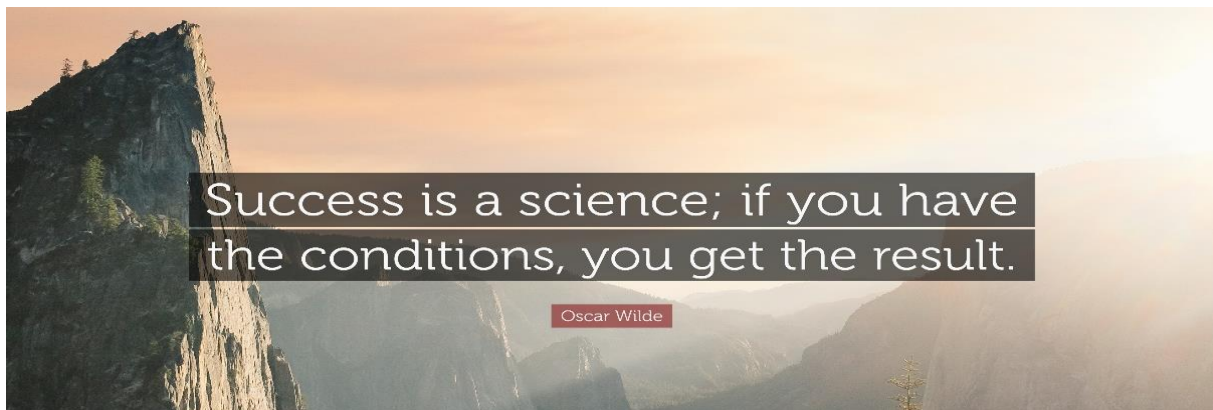
2.3.4 Lessons learned in several interesting practices

One of the most valuable takeaways from applied research on company-school cooperation in vocational education and training (VET) is the importance of developing strong partnerships between VET schools and companies. These partnerships should be based on mutual trust, respect, and a shared vision for the development of vocational education.

Practically, successful implementation of company-school cooperation can involve several key strategies, including:

1. Establishing clear objectives: Both the VET school and the company should have clear objectives for the cooperation. These objectives should be communicated clearly and regularly reviewed to ensure they remain relevant.
2. Developing a shared curriculum: The VET school and the company can work together to develop a shared curriculum that integrates theoretical knowledge and practical skills. This can involve joint planning of learning activities, such as internships or project work.
3. Providing ongoing support: The VET school and the company should provide ongoing support to students, including mentoring, coaching, and feedback. This support can help students develop the skills and knowledge they need to succeed in the workplace.
4. Facilitating communication: Regular communication between the VET school and the company is essential for successful cooperation. This can involve regular meetings, joint planning sessions, and ongoing feedback.
5. Building trust and respect: Both the VET school and the company should work to build trust and respect between each other. This can involve taking the time to get to know each other, acknowledging each other's strengths, and being open and honest in communication.

Overall, successful implementation of company-school cooperation requires a collaborative and proactive approach, with a focus on building strong partnerships between VET schools and companies.

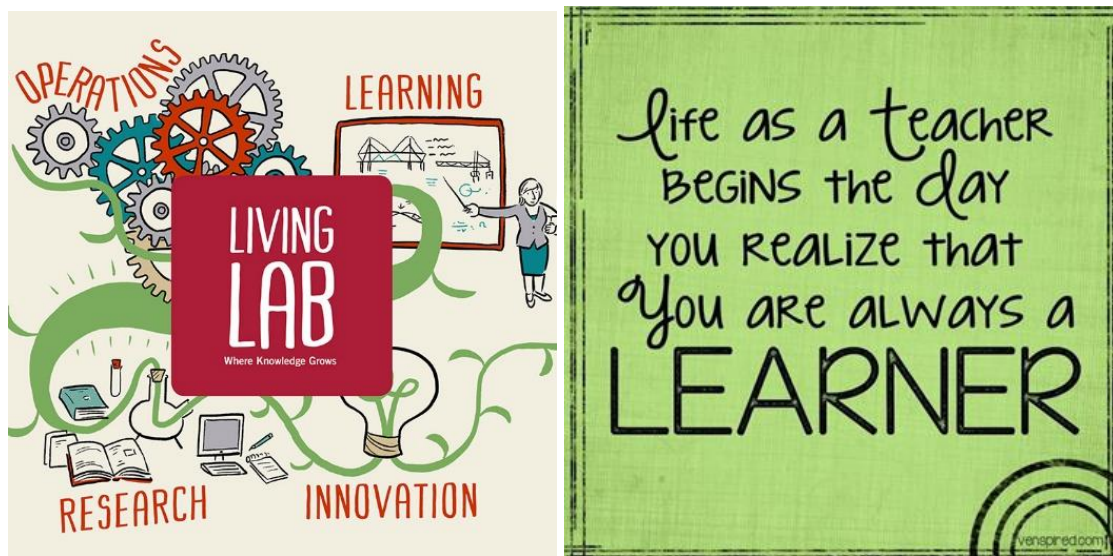


Applied research strengthen the investigative capacity of those directly involved: students, teachers, and the business community. By working together in professional learning communities, we learn from and with each other. This contributes to the research and quality culture of the organization. But what are the conditions for success and what are the obstructive conditions?

These conditions were mentions in several interesting practices and in at lot of interviews that has been done in work package 2. This is what we have read in all the reports and interviews that we can use for wp3, the Hackathon and wp 4, the Recipe book:

Preconditions for success:

- To have a physical place where applied research can take place. Examples are:
 1. Fieldlabs or living labs such as CIFEA, Tknika and CIV Water; here work the students and companies together on innovations in one physical place.
 2. Learning community such as a communities of vocational education (Cove) such as described in the European Platform of Urban Greening. Companies and schools operate in one learning community.
 3. Practorate knowledge circles. In this practoraat, such as the practoraat 'soil and water' of the practoraat 'green livable cities' students, all the stakeholders from the school, municipalities and companies come and work together based on a specific topic. Most of the time a practoraat operates from a fysical place do to the research together with the knowledge circle.
 4. Having a physical space within the school that can provide the necessary room for students/teachers/companies to apply research. To make innovation spaces available for companies to show what innovative solutions are being researched to clients / future investors outside school hours. Flexible schedules for companies.



- Create understanding about what is applied research.
- Create learning environments that work problem-based and thereby focus on applied research that can be used in companies when the students return
- To have a clear concept or a chosen didactical system, for example one who is described in 2.3.5. If you have so than student and teacher training within this system in important.
- Space to experiment. A change of the definition and system of education. It is no longer about right or wrong.
- Provide competences that make the students curious and want to experiment
- Acknowledge there is already a lot of applied research going in in your organization. It's not yet defined that way. Examples are experiments, doing test and several innovations. It works to make that explicit as accompany or/and as a school.
- Recognition, legislation and funding of the government or educational institutes.
- Getting on the same page: Alignment in the organization: from director till manager till teacher or supervisor till student or worker.
- Having time during the school year dedicated to devote and enjoy time to applied research
- Enthusiastic stakeholders

- The will to cooperate as schools and companies. You need to have enduring partnerships, developed over years of interaction.
- From the companies' perspective, there is a desire for closer cooperation, possibly as a practice by teachers from the school, so that there is greater and faster understanding between theory and what everyday life in the businesses is like.
- Training students to apply the PDCA-cycle or something related to that.
- Weekly interaction discussing progress and deliverables between students, teacher and company (in our case clients). A full commitment from all parties.
- Setting up a quality system for doing practical research, such as SOP's en Work Instructions. And attaining a kind of quality assurance.
- Mentors/teachers specialized in innovation and be the connection with students and companies throughout the whole year.
- Professional acknowledgement and economic valuation for teachers. It should not be voluntary work.
- Research results and conclusions can be applied not only in a laboratory, but also in operations or used in commercial products or services.
- To have thorough protocols that must be rigorously followed, statistical analyses, qualified and trained trainers/ mentors to undertake research, etc.
- To use the innovative spaces to disseminate knowledge among other professional sectors in masterclasses / education.



The graphic features a yellow background. On the left, there are two logos: a red and green circle partially overlapping a white square, and a diamond shape composed of concentric squares in green, blue, and red. To the right of these logos, the text 'Project Collaboration!' is written in a large, green, sans-serif font. Below this, the text 'Have you ever heard of VET applied research?' is written in a smaller, green, sans-serif font. Underneath that, a paragraph explains: 'It's a collaboration between vocational education and training (VET) institutions and industry partners to conduct research on real-life problems and create innovative solutions.' At the bottom of the graphic, the 'BARCOVE' logo is displayed in a stylized, colorful font, with the tagline 'BUILDING AN APPLIED RESEARCH FACILITY IN VET' written in a circular path around the letters.

Obstructive conditions:

- Getting the wrong idea of applied research in VET. It is not 'research light'. It is applied research which means you need to have a clear understanding and other rules. For example: there is no need to do a lot of scientific publications. The publications needs to be practical as well. See also: definition applied research in BARCOVE on page 1.
- Beyond the sector, the idea of VET as a research partner hardly surfaces.
- The delusion of the day. There seems to be always something more important to work on within the organization. Therefore applied research could be ending at the bottom of the prioritization list. This also applies for the companies, in our case the client or assignment giver. Sometimes they are only present at the start, during the intermediate presentation and at the end. They should be aware of the fact that they are dealing with students who need guidance from more experienced professionals.
- Teachers whom have the attitude to be the owner of knowledge. Within applied research it is important to have an open vision. Not having to answer yet is an important part of research.
- That the teachers have the courage to move away from blackboard teaching and give free rein to learning in the work with applied research. That is, give students the freedom to learn while working with problem cases.
- The close school-business collaboration is dependent on relationships between people and therefore requires a lot of resources to maintain.
- Students and teachers are not yet fully equipped with the understanding of the crucial part of planning.
- Students are hesitant about contacting the clients.
- Applying too much Why, How, What (in this order) to the students.
- Not letting the necessary time frame and space for students to experience failure and success naturally involved in innovative applied research. Both are part of the path.
- Lack of financial resources.
- Not letting students the freedom to choose the subjects of research which interest them the most. They might lose interest in the project.
- A public center does not have the economic capacity to dispose of the latest high-tech equipment or materials in its facilities.

