Educational Lab

Experiments used as a method to transform practice in educational organisations

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The presenters are

- Dorrit Sørensen: Head of the project. Focusing on development of the experimental mind set and method, the quality of our work, and ensuring a strong connection between our research in the educational field, and development and practice in the project.

- Mathilde Jensen: Focus on co-developing the experimental mind set and method. In charge of the program on Vocational Innovation.

- Jan Bisgaard: Ph.D fellow at the Lab working with cooperation between companies and educational organizations. Focus in his Ph.D. study is the didactic approach in training.

- Hans Koch: Researching on Vocational Innovation, and developing tools and models to ensure the value of our method in practice.

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Structure in this workshop

- Introduction to the Educational Lab and Educational Experiments
- Results on Vocational Innovation
- Results on Dual Educations
- Interactive workshop process
- Final comments

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Mission of the Educational Lab

– Experiments in Educational Practice

- The Lab introduces experiments as a method to transform practice in order to improve educational organisations.
- Within three years (2012-14) the lab has been a main driver in establishing an experimental setting at Danish vocational and professional schools based on theoretical and practical experienced knowledge on the educational field.

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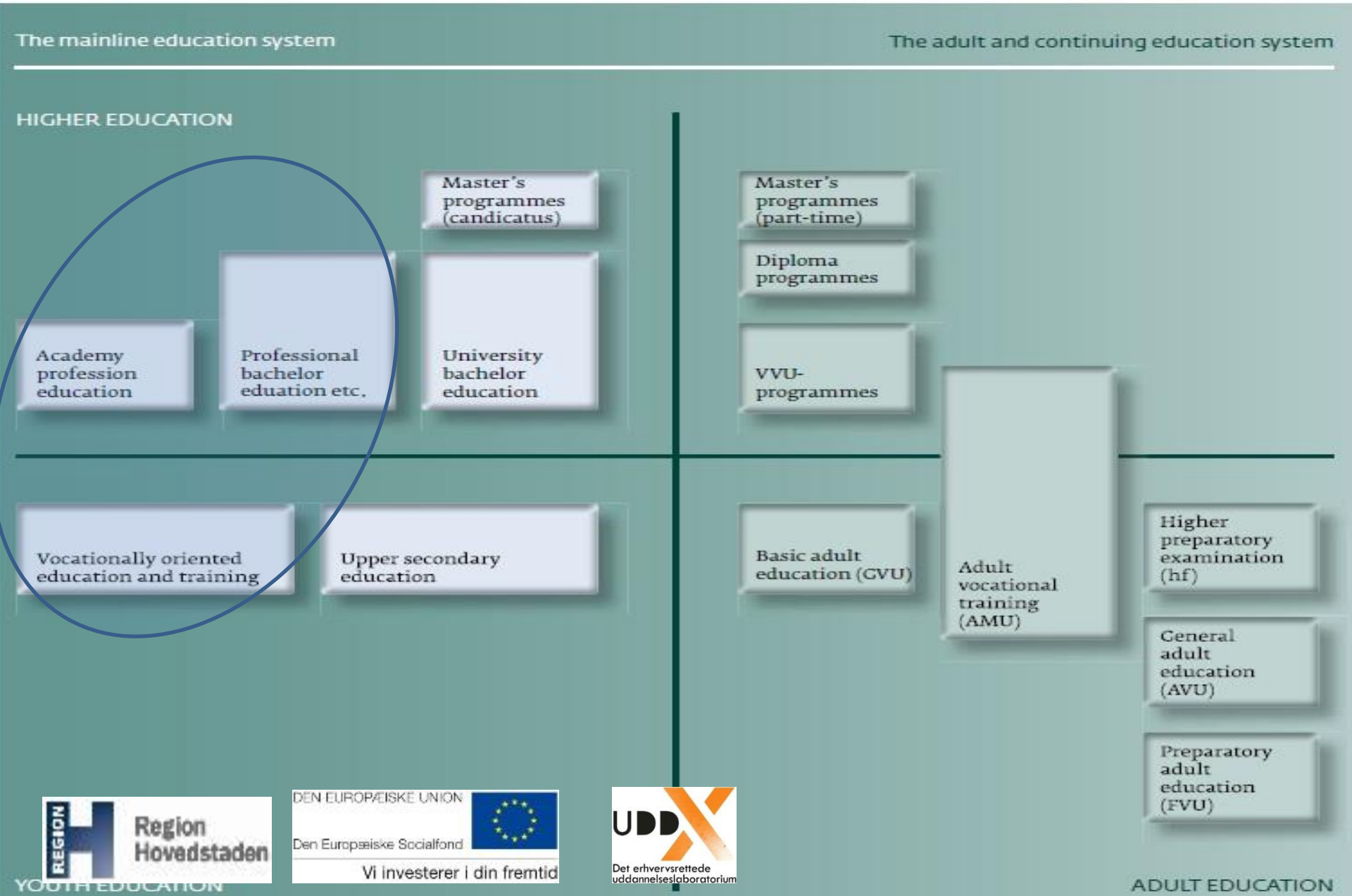
Field: The Danish Education System



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Dual educations are common in Denmark

- Students at different levels of the educational system take part in dual educations
- Dual educations are part time learning at schools and part time learning at apprenticeship or internship in private company or public institution
- Use of apprenticeships started in the beginning of the 18th century and use of dual educations started in the middle of the 1950th, thus it is tradition for most trades to have apprentices or students in internships

Introduction to the Education Lab

- The project involves 14 partners: 10 educational institutions and 4 research and development organisations that contribute with specific knowledge to the project.
- The project approaches different national educational challenges. For example we approach the challenge of ‘outdated’ skills not corresponding with actual needs.
- The partner organisations have worked with more than 120 experiments in the different Development Labs.

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Partner Organisations

4 VET-schools

TEC
CPH WEST
KTS
SOSU C

1 University College

Metropol

1 Academi of Higher Education

KEA

1 University

DTU

2 Education Oriented Institutions

HRU

Rigshospitalet

4 Partners of Science and Knowledge

NCE

DEA

CEFU

UCC

1 Educational Guidance

UU København

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Educational Experiment
- an Innovative Driver

- Educational experiments are intended as a method and a driver for making a culture of change in order to improve the educational practice.
- Therefore, in all educational experiments a theory of change is embedded, understood as a theory about what to do in order to change practice.
- We have created an Experimental Cycle including the Theory of Change to structure the work with educational experiments.

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Our aim is to establish a knowledge-based experimental setting by:

- Creating a unique experimental environment – VET to Ph.D. by building up capacity (creating experimental organisations)
- Providing conditions for sustainable transformations that make Vocational and Professional Educations able to address the present challenges and ensure that the educations are future-proof
- Connecting educational **practice**, **development** and **research** to ensure knowledge that works in new ways
- Creating sustainable and meaningful partnerships – between different institutions and between educations and employers

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Setting the Frame

- Our framework consists of five programmes.
- Our experiments are based on the needs and challenges identified in a baseline. Baseline is designed as a state of the art, and used as an innovative driver to share knowledge and ask the ‘right’ questions for the need of change.

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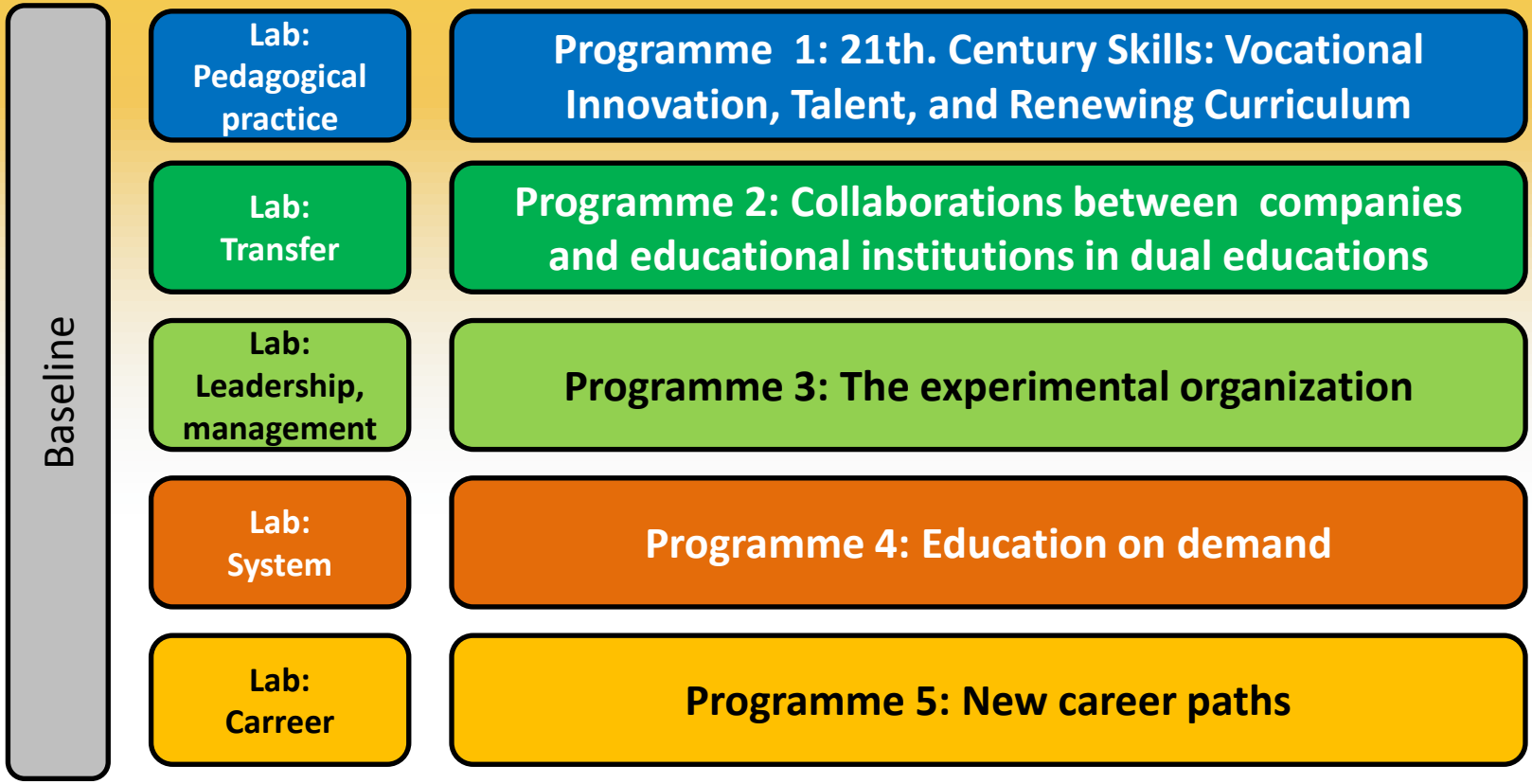
5 Development Labs



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Development labs

Lab: Pedagogical practice: 21. Century Skills (Programme 1)

- Motivation and talent
  Vocational innovation
  Renewing Curriculum, Profession and professionalism in new ways

- **Lab: Transfer: Collaboration between companies and educational institutions** (Program 2)
  - New form of collaborations between educational organizations and companies in dual educations
  - New kinds of didactic structures in both school and work based learning
- **Lab: Leadership and management: The experimental organization (**Programme 3)
  - Quality and evaluation in new ways
  - New forms of leadership and cooperation
- **Lab: System: Education on demand** (Programme 4)
- **Lab: Carreer: New Carreer paths** (Programme 5)
  - New forms of educational guidance
  - New forms of collaboration with companies

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Why do we need an Educational Lab?

- Despite many years massive research effort and numerous development projects the present issues continues and seems to be reinforced.
- Survey among the partner institutions shows that between 50 % and 70 % of the teachers expresses that haven´t changed their daily practice as a result of participating in a development project.
- The goal of the educational experiments is to change this in order to improve the system of educational practice.

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Transformative research – action research

- Research has the explicit ambition to change and improve social conditions.
- Research should be based on practical problems - problems that are problems for someone and needs solutions. And similarly measured on the practical effects - what were improved / changed?
- The researcher as a constructer, actively contributing to a reshaping of a societal institutions practice.
- Change as co-production and co-creation.

(Ravn 2010)

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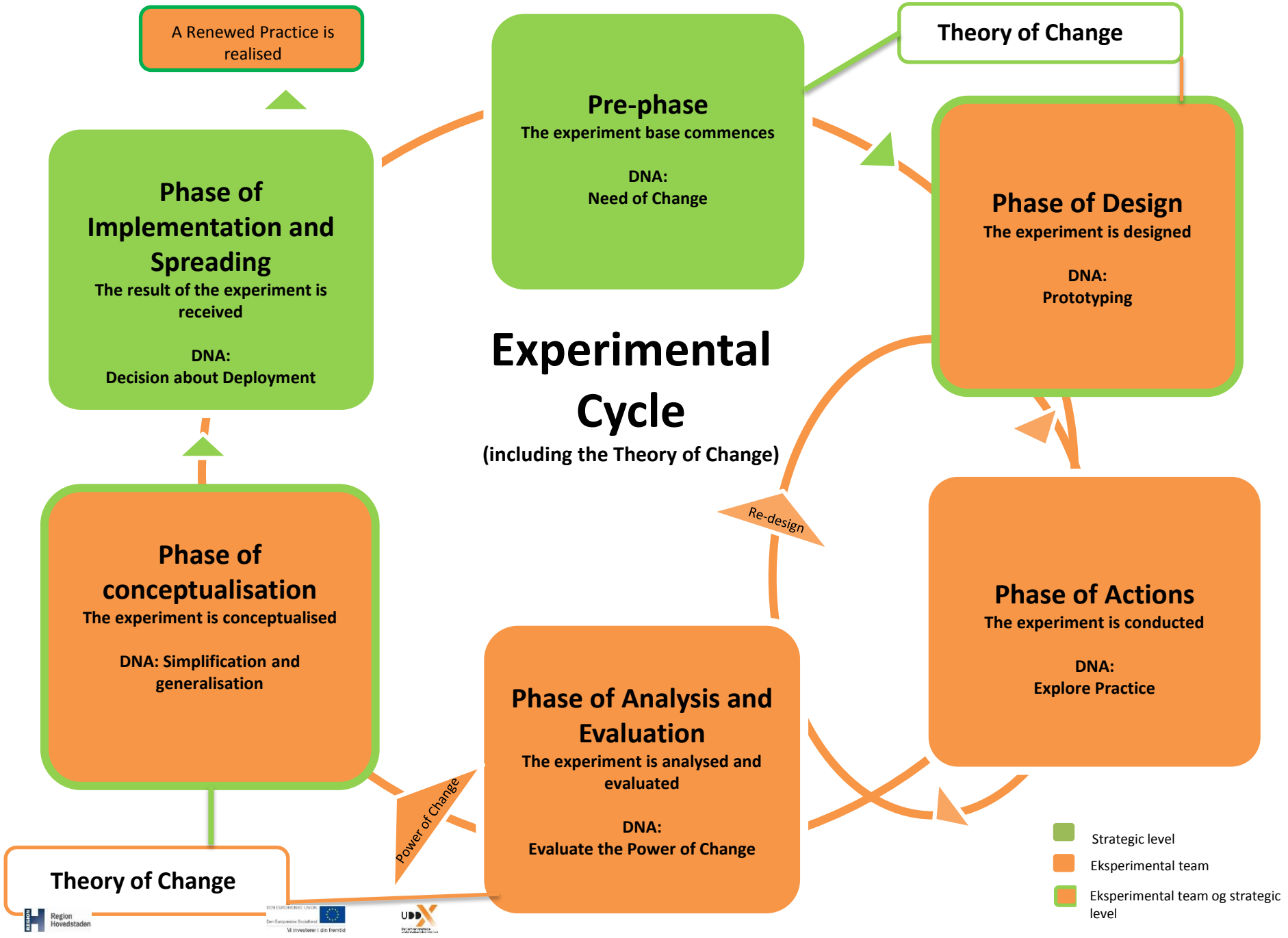
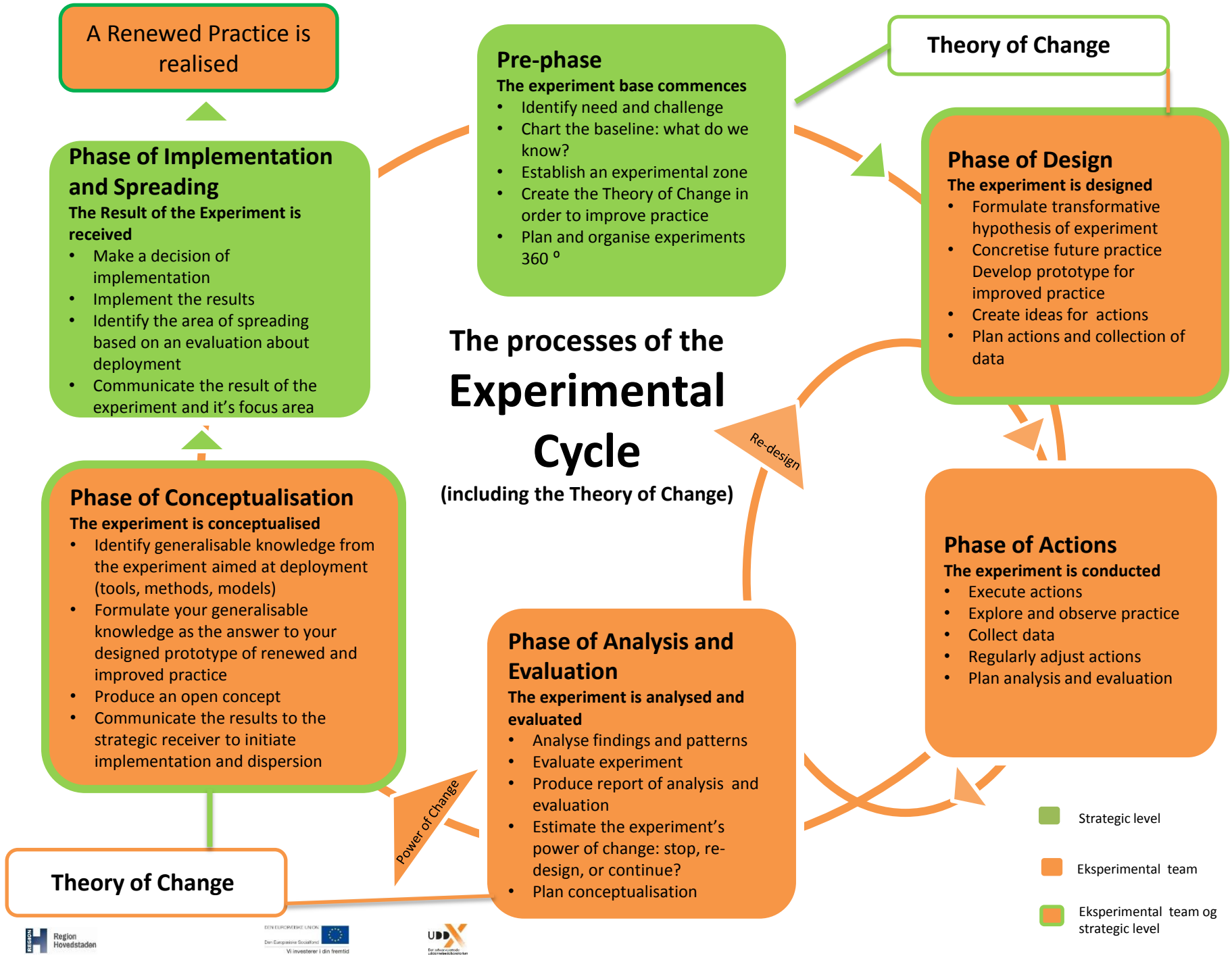

A Renewed Practice is realised
Pre-phase
The experiment base commences
DNA:
Need of Change
Theory of Change
Phase of Implementation and Spreading
The result of the experiment is received
DNA:
Decision about Deployment
Phase of Design
The experiment is designed
DNA:
Prototyping
Experimental Cycle
(including the Theory of Change)
Re-design
Phase of conceptualisation
The experiment is conceptualised
DNA: Simplification and generalisation
Phase of Actions
The experiment is conducted
DNA:
Explore Practice
Power of Change
Phase of Analysis and Evaluation
The experiment is analysed and evaluated
DNA:
Evaluate the Power of Change
Theory of Change
Strategic level
Eksperimental team
Eksperimental team og strategic level


A Renewed Practice is realised
Pre-phase
The experiment base commences
• Identify need and challenge
• Chart the baseline: what do we know?
• Establish an experimental zone
• Create the Theory of Change in order to improve practice
• Plan and organise experiments 360 º
Theory of Change
Phase of Implementation and Spreading
The Result of the Experiment is received
• Make a decision of implementation
• Implement the results
• Identify the area of spreading based on an evaluation about deployment
• Communicate the result of the experiment and it's focus area
Phase of Design
The experiment is designed
• Formulate transformative hypothesis of experiment
• Concretise future practice Develop prototype for improved practice
• Create ideas for actions
• Plan actions and collection of data
The processes of the
Experimental Cycle
(including the Theory of Change)
Re-design
Phase of Conceptualisation
The experiment is conceptualised
• Identify generalisable knowledge from the experiment aimed at deployment (tools, methods, models)
• Formulate your generalisable knowledge as the answer to your designed prototype of renewed and improved practice
• Produce an open concept
• Communicate the results to the strategic receiver to initiate implementation and dispersion
Phase of Actions
The experiment is conducted
• Execute actions
• Explore and observe practice
• Collect data
• Regularly adjust actions
• Plan analysis and evaluation
Power of Change
Phase of Analysis and Evaluation
The experiment is analysed and evaluated
• Analyse findings and patterns
• Evaluate experiment
• Produce report of analysis and evaluation
• Estimate the experiment's power of change: stop, re-design, or continue?
• Plan conceptualisation
Theory of Change
Strategic level
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The DNA of an Experiment

- Rapid
- Innovative
- Changes and improves practice
- Based on knowledge and experience and creates new knowledge
- Systematic

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The Research Methodology

The qualitative approach is inspired by the field of Anthropology where we encourage teachers and educational leaders to explore their educational field with curiosity and involvement.

The results of the lab unfold on two levels:

- Firstly, the lab itself has developed and adjusted a set of central **methods** for the experimental approach. The two substantial methods of the lab the Experimental Cycle and the Theory of Change for Educational Practice, are now being implemented in institutional strategies
  - Results: Research article, method guide serial (7 guides), and a tool box.

- Secondly, the institutional partners of the lab have delivered findings and patterns of the experiments, wherefrom elected patterns take form as concepts ready to use in other contexts
  - Results: Inspirational booklets with conceptualised elements (methods, tools, models) ready to use in other context, and an anthology with research articles.

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Empirical Data

- We have conducted 43 semi-structured interviews. The informants have been participants of experiments and leading representatives of experiments have been interviewed directly on the methods of the lab.
- Besides the interviews, participant observation has been carried out among the participants of experiments on various capacity-building courses offered by the lab
- In analysing the data a subject-specific knowledge co-worker has been coding the interviews relating to one's specific field of knowledge, e.g. Vocational Innovation.

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Programme 1:

21st. Century Skills:

Vocational Innovation, Talent and Renewing Curriculum

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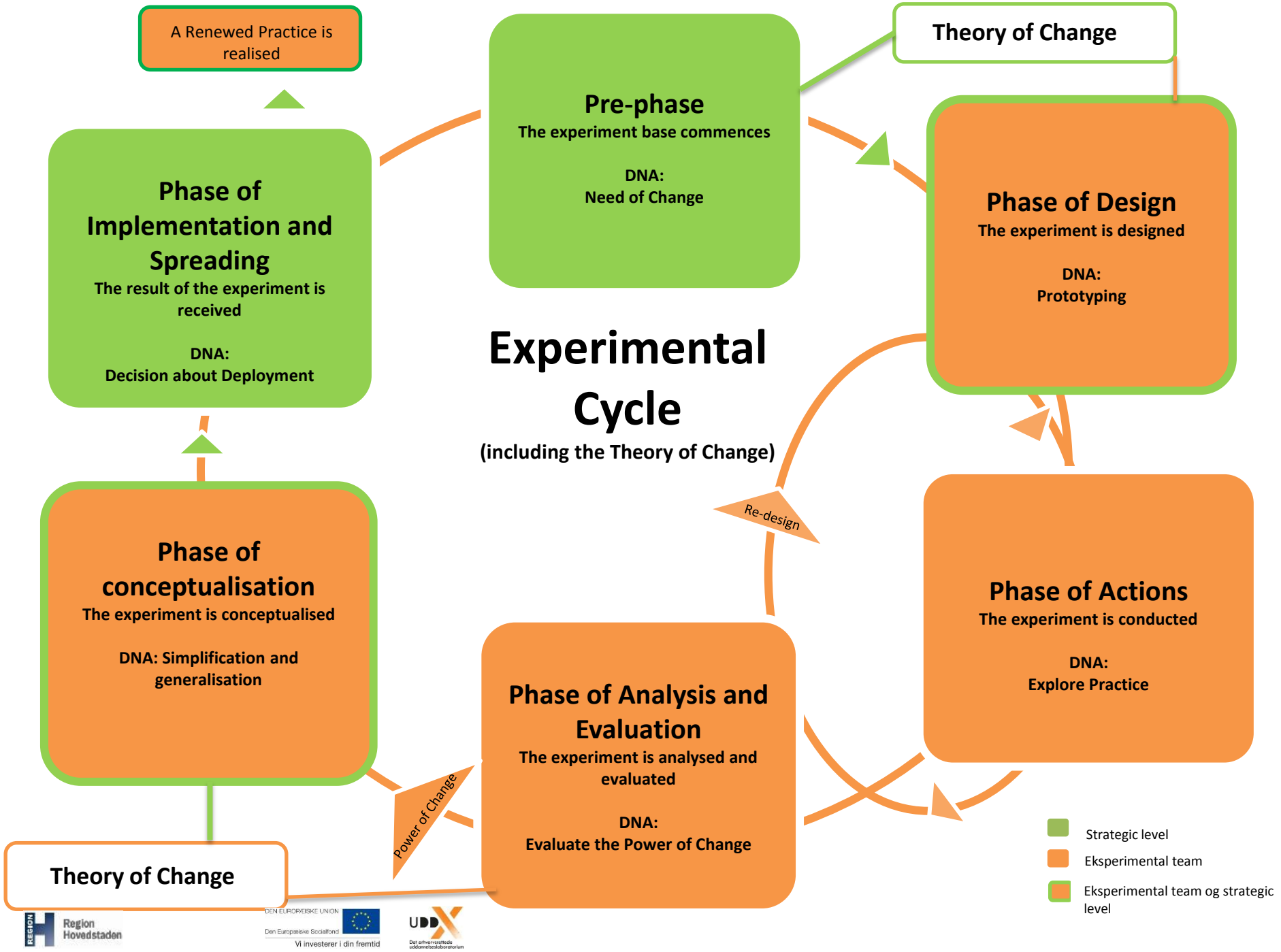
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Contexts

Present situation in Denmark:

- A decrease in unskilled manual labour work
- Decrease of apprenticeship and internship in companies
- Increasing demands on the skills of apprentices
- Increasing demands for innovative skills

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Challenges for the program on vocational innovation

- The students ability to innovate – their competences are not satisfactory

- Innovation becomes a teaching subject rather than a part of all other subjects

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4 Focus areas on Vocational innovation

1. Development of **coherent courses** that promote the students vocational innovative competencies – and work joint mono disciplinary and interdisciplinary with subjects

2. Development of **task types** that promotes vocational innovation and includes **authentic challenges** from practice

3. In order to evaluate and asses the students we need to develop **indicators** for vocational innovative competences

4. **Improve cooperation** between the educational institution and the practice to insure the students develop and train their vocational innovative competences

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Prototype - on renewed and improved practice

Vocaltional and professional educations programs that support innovative competences are recogniced by:

Teachers ability to develop coherent courses that promote innovation.

Focus is on real life testing of pedagogic and didactic methods, processes and roles that will strengthen and develop the students innovative competences

Both the core disciplinary and interdisciplinary aspect are in focus. Furthermore, there have been developed courses such as camps, events, conferences, etc.

Educators continuously integrating an industrial(authentic) focus in the educational and didactic planning of teaching, so students vocational innovation skills will be developed and enhanced

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Findings 1

1. Development of **coherent courses** that promote the students vocational innovative competencies – and work joint mono disciplinary and interdisciplinary with subjects

It is essential that:

- The students have options to create and practice vocational innovation in an authentic context and dealing with real problems (doing)
- The teachers also can act as a tutor and facilitator
- Dialog, communication (presenting as tools) are trained and used throughout the education
- The education Involve authentic cases from practice

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Findings 2

2. Development of **task types** that promotes vocational innovation and includes authentic challenges from practice

It is essential that:

- The students solutions can be used by others – create value
- The students as co-creators and in joint responsibility when choosing the task subject
- Cooperation and discussions and group work take place
- Student peer teaching is part of education
- Task types insure the students are seen and heard as major players
- We renewed practice of communication on project areas

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Findings 3

3. In order to **evaluate and asses** the students we need to develop indicators for vocational innovative competences

It is essential that:

- We develop a common platform for vocational innovation
- We achieve common language on vocational innovation
- We acknowledge and substantiate that acting, doing, dissemination, creativity are at stake – and we ongoing explore evidence of these
- Learning environment promote creativity
- We ensure conversations and reflection on innovation is part of the training
- We acknowledge and substantiate that cooperation between different disciplines fosters innovation

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Findings 4

4. Improve **cooperation between the educational institution and the practice** to insure the students develop and train their vocational innovative competences

It is essential that:

- Education is based on authentic challenges that will solve real problems
- We set up innovation advisory boards
- Students are invited to participate in company in-house innovation processes
- We set up interdisciplinary camps that promotes creativity and solutions (prototyping)
- We promotes tasks across industries - acknowledge options in other subjects
- We promote handling uncertainty in authentic challenges
- We promote teachers as resource persons in the learning environment where both education and business takes part

Programme 2:

Collaborations between companies and educational institutions in dual educations

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Contexts

Present situation in Denmark:

- Long tradition of using dual education in various educational programs.
- Still there is a mismatch in between the number of apprentices and the number of apprenticeships.
- In dual education students learn in different environments, but nobody else but the student is responsible for making coherence between these different learning environments.
- At the same time everybody knows that level of quality in the apprentice's work based learning could be better.
- But the missing apprenticeships is the reason why neither government or the social partners want to take care of the level of quality in the apprentice's work based learning.

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Challenges in the program focusing on transfer in dual education programs

- There is a culture and tradition of non interference and corporation in between schools and apprenticeships places

- It is the student/apprentice who individually is responsible for making coherence and transfer between the school based learning and the work based learning in their dual education programs.

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4 Focus areas in developing coherent dual education programs

1. Development of corporation between teachers, trainers, students and all the other actors involved in dual educations
2. Development of a more practice based teaching at the schools in the dual vocational and professional educations.
3. Development of structures and didactics in the work based training in dual vocational and professional educations.
4. Development of structures and didactics to help the students make connections between their school based and their work based learning.

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Prototype - on renewed and improved practice

- Dual educations are recognised by:
- Collaboration between apprenticeship places and schools makes sure that there are didactic structures in all parts of the dual education for the student to follow
- Practise in dual educations is that relevant companies and institutions are in a close relation with schools and that they use different kinds of possibilities to make flexible apprenticeships in dual educations.
- There is a specific awareness to make sure that there is a close coherence between school-based learning and work-based learning, and also coherence between theory and practice.
- Both teachers and supervisors know each other and know each other's teaching and training – some even collaborate in developing each other's teaching and training

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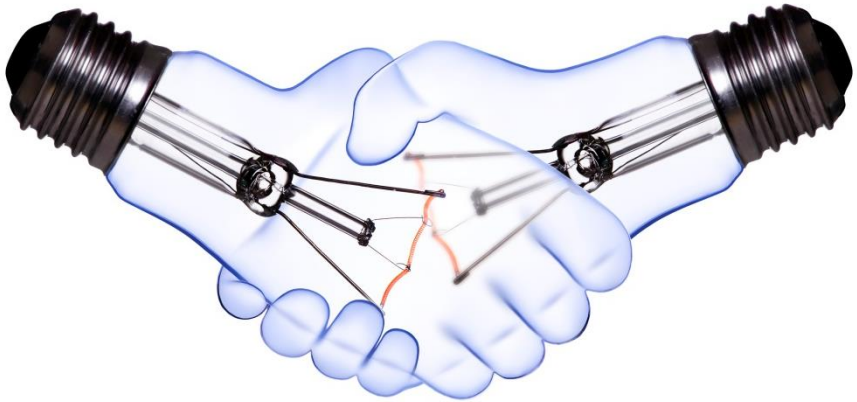
Findings 1

Development of **collaboration in between teachers, trainers, students** and all the other actors involved in dual educations

- The school has to take the initiatives to enhance collaboration and understandings between the teachers, trainers, and students in dual educations.
- There has to be a clear structure for collaboration and everyone has to know what kind of expectations they will meet.
- The collaboration between the different parties must have real tasks as a hub for the collaboration.



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Findings 2

Development of a more praxis based teaching at the schools in the dual vocational and profession educations.

- Authenticity in school based teaching makes the students more motivated in learning both at school and in their work based training
- Increasing the level of active participation in the teaching at school, also makes the students more motivated and promotes the learning process
- When the students systematically make coherence between school and practice, it increases the students' level of transfer
- The school must develop practice based teaching in collaboration with some of the apprenticeship places with authentic challenges as a hub for teaching at school
- The development of practice based teaching must not be left to individual teachers or teams, but must be a task that is supported by the entire organisation, because it might mean that the school has to change their teaching environment, renew the ways of teaching and make the school more open to the apprenticeship places and the students.

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Findings 3

Development of structure and didactics in the work based training in dual vocational and profession educations.

- It is essential that the supervisor takes the responsibility to make a clear structure in the work based learning, that the apprentice can work within.
- When the apprentice has the opportunity to work with trial tasks, simulations etc. the apprentice becomes more secure, and therefore takes more responsibility when he/she is working with real tasks.
- When the apprentices are given more responsibility, then in response they feel more obligated, takes more responsibility and feel more self confident.
- When apprentices work together when learning, they gain a more equal relation though being at different levels in their education, and therefore start learning from each others.

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Findings 4

Development of structures and didactics to help the students making connections between their school based and their work based learning.

- It is essential that the school takes the initiative at building didactic structures which the students follow.
- The students have to learn how to learn in the learning room between school based learning and work based learning, before entering this 3rd learning room.
- Supervisors from the apprenticeship and the teachers must learn how to do formative assessment, and give feedback in this 3rd learning room.

Concept for developing a new collaboration in between educational institutions and apprenticeship places in dual educations

Step 1: The school must analyse which local companies and institutions can be relevant to collaborate with.

Step 2: The school must start a collaboration where teachers and/or students visit relevant companies and institutions in order to build relations to those working there.

Step 3: The same relevant companies and institutions are invited in to the school to take part in teaching – events and workshops where students and teachers collaborate in solving challenges for the companies and institutions.

Step 4: The school invites the relevant companies and institutions to be a part of a cluster, where the school becomes a hub for development in the local area.

Concept for development of a more praxis based teaching at schools in the dual educations.

Step 1: Management, teachers and others at the school must develop a common understanding of the importance of practice based teaching.

Step 2: Management must give the possibility to create rooms, material and time to collaborate with relevant companies and institutions in developing practice based teaching.

Step 3: The teachers collaborate with employees from relevant companies and institutions in developing practice based teaching – events and workshops where students and teachers collaborate in solving challenges for the companies and institutions.

Step 4: The teachers makes sure that the students get a clear understanding of the relation between theory and practice in every lesson of these events or workshops, and the teacher make the students think of how to use their learning skills in other situations.

Concept for development of structure and didactics' in the work based training in dual vocational and profession educations.

Under construction

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Concept for developing a didactic structure in between school and work based learning

Step 1: The school must take the initiatives to create a didactic structure in between the school based and the work based learning – but the school must collaborate with the apprenticeship places in the development of both virtual and physical learning rooms.

Step 2: The school must make everybody involved aware about what is expected from them, both teachers, supervisors and students.

Step 3: Everybody have to learn how to act in the 3th learning room – students must learn how to do reflections – supervisors and teachers must learn how to do assessments and give feedback. Everybody have to train before going in to the 3rd. learning room

Step 4: Students work with reflections individual and together with peers – supervisors and teachers doing formative assessments and gives feedbacks

Step 5: Reflections and experiences must be used by both teachers and supervisors in the other learningrooms in the dual education

Interactive Activity

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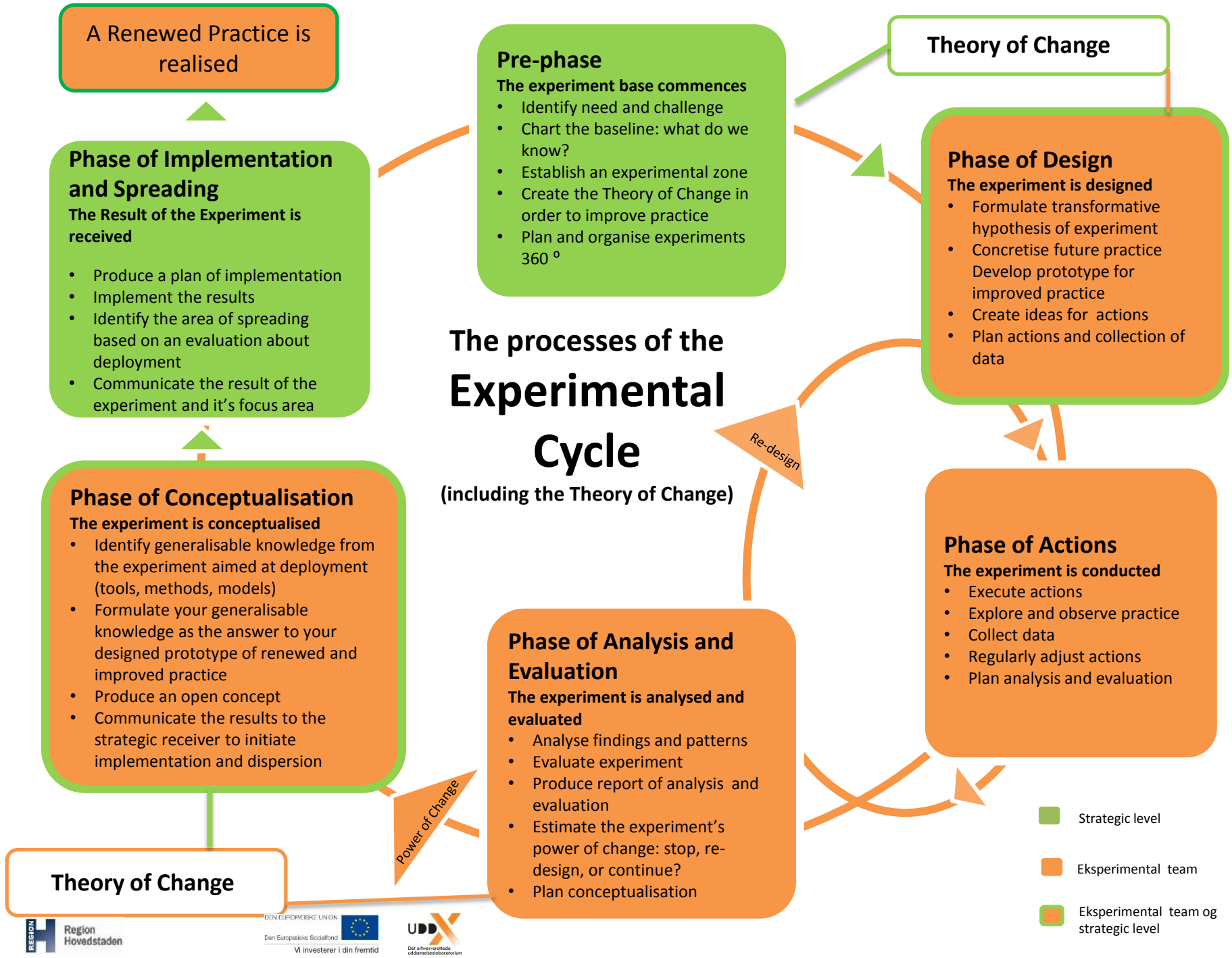
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• Identify need and challenge
• Chart the baseline: what do we know?
• Establish an experimental zone
• Create the Theory of Change in order to improve practice
• Plan and organise experiments 360 º
Theory of Change
Phase of Implementation and Spreading
The Result of the Experiment is received
• Produce a plan of implementation
• Implement the results
• Identify the area of spreading based on an evaluation about deployment
• Communicate the result of the experiment and it's focus area
Phase of Design
The experiment is designed
• Formulate transformative hypothesis of experiment
• Concretise future practice Develop prototype for improved practice
• Create ideas for actions
• Plan actions and collection of data
The processes of the
Experimental Cycle
(including the Theory of Change)
Re-design
Phase of Conceptualisation
The experiment is conceptualised
• Identify generalisable knowledge from the experiment aimed at deployment (tools, methods, models)
• Formulate your generalisable knowledge as the answer to your designed prototype of renewed and improved practice
• Produce an open concept
• Communicate the results to the strategic receiver to initiate implementation and dispersion
Phase of Actions
The experiment is conducted
• Execute actions
• Explore and observe practice
• Collect data
• Regularly adjust actions
• Plan analysis and evaluation
Phase of Analysis and Evaluation
The experiment is analysed and evaluated
• Analyse findings and patterns
• Evaluate experiment
• Produce report of analysis and evaluation
• Estimate the experiment's power of change: stop, re-design, or continue?
• Plan conceptualisation
Power of Change
Theory of Change
Strategic level
Eksperimental team
Eksperimental team og strategic level
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Prototype - on renewed and improved practice

Vocaltional and professional educations programs that support innovative competences are recogniced by:

Teachers ability to develop coherent courses that promote innovation.

Focus is on real life testing of pedagogic and didactic methods, processes and roles that will strengthen and develop the students innovative competences

both the core disciplinary and interdisciplinary aspect are in focus. Furthermore, there have been developed courses such as camps, events, conferences, etc.

When educators continuously integrates an industrial(authentic) focus in the educational and didactic planning of teaching, pupils and students vocational innovation skills will be developed and enhanced

Dual educations are recognised by:

Collaboration between apprenticeship places and schools makes sure that there are didactic structures in all parts of the dual education for the student to follow

There is a specific awareness to make sure that there is a close coherence between school-based learning and work-based learning, and also coherence between theory and practice.

Both teachers and supervisors know each other and know each other's teaching and training – some even collaborate in developing each other's teaching and training

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Challenge that define the Prototype – renewing practice

Innovative competencies

Students does not develop sufficient innovative competences in educational courses.

Innovation becomes a teaching subject rather than a part of all other subjects

Think prototypes

Coherences in dual educations

Students are left with the responsibility to make coherences in their learning processes in dual educations.

But students in dual educations often don't get the coherence between school based and work based learning, and also don't see the relation between practice and theory in dual programs.

Think prototypes

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Last points

Capacity-building in participating organizations

- Education of 60 local ambassadors who are trained to expand and promote the experimental thinking in their local organizations.

- Education and development of leadership in organizations with a focus on anthropological leadership and leadership based on knowledge rather than personal opinions where the task is the center of attention (boundary objectives)

- Educational workshops within the programs with participation by teachers and student counselors. Presentation of the newest scientific research and focus on the participants educational experiments.
  - Method Camps
  - Research Cycles
  - Design and Conceptualization Workshops

Creating experimental organisations

"It is an important objective that educational institutions themselves will be able to renew and change their practices and core services and the tasks they are responsible for solving. However, this requires new ways of working, new skills and new roles - both for teachers, head teachers and pupils / students".

(Statement of the Lab: 2013)

- Change requires breaking with existing routines and 'practice theory' - and the development of new ones.
- Requires 'transformative learning processes', in which it is possible to develope new understandings of 'good practice'
- Also requires change leadership. Including the competence to translate - paving the way - stay focused - personify the new - making sense (why?)

Educational Experiments

- 120+ experiments are finished in our partner organizations across the 5 programs. At the moment the organizations are working with implementation of the results.

Contact

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