Build Up Skills NL

Application of the Competence Quality Standard to specific sectors and technologies

TRAIN4 SUSTAIN

26-10-2023

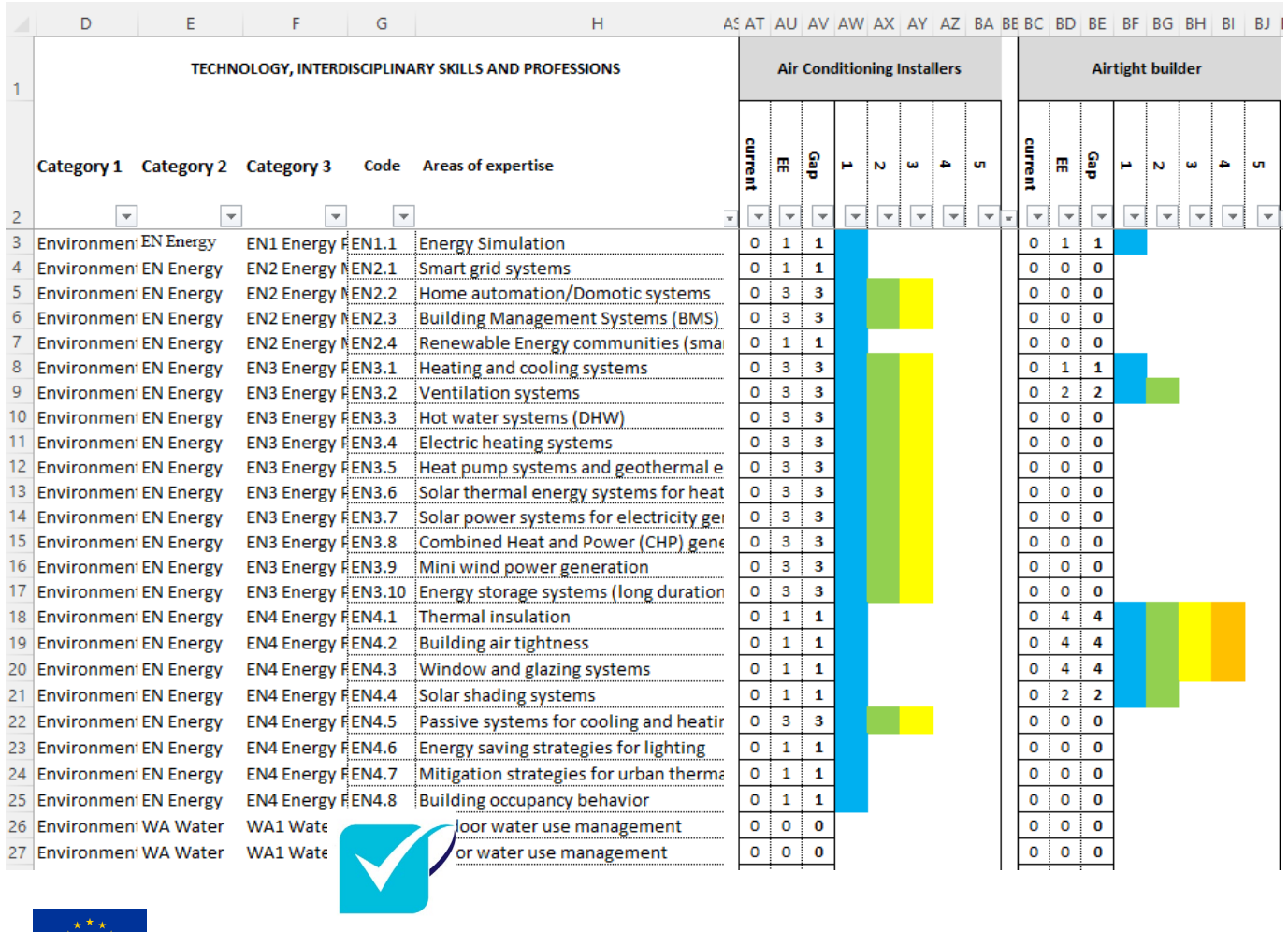
Jan Cromwijk - ISSO

Skill gap analysis

- ✓ Describe the methodology used to develop the skills gap analysis
  - ✓ BUS-NL applies the PROF/TRAC skills gap analysis in combination with the outputs of the Train4Sustain CEN workshop agreement.

This project has received funding from the European Union's LIFE programme under grant agreement No 101077358

Impression of the setup for SkillsMapping



	D	E	F	G	H	AT	AU	AV	AW	AX	AY	AZ	BA	BC	BD	BE	BF	BG	BH	BI	BJ
1	TECHNOLOGY, INTERDISCIPLINARY SKILLS AND PROFESSIONS					Air Conditioning Installers								Airtight builder							
2	Category 1	Category 2	Category 3	Code	Areas of expertise	current	EE	Gap	1	2	3	4	5	current	EE	Gap	1	2	3	4	5
3	Environment	EN Energy	EN1 Energy F	EN1.1	Energy Simulation	0	1	1						0	1	1					
4	Environment	EN Energy	EN2 Energy M	EN2.1	Smart grid systems	0	1	1						0	0	0					
5	Environment	EN Energy	EN2 Energy M	EN2.2	Home automation/Domotic systems	0	3	3						0	0	0					
6	Environment	EN Energy	EN2 Energy M	EN2.3	Building Management Systems (BMS)	0	3	3						0	0	0					
7	Environment	EN Energy	EN2 Energy M	EN2.4	Renewable Energy communities (sma	0	1	1						0	0	0					
8	Environment	EN Energy	EN3 Energy F	EN3.1	Heating and cooling systems	0	3	3						0	1	1					
9	Environment	EN Energy	EN3 Energy F	EN3.2	Ventilation systems	0	3	3						0	2	2					
10	Environment	EN Energy	EN3 Energy F	EN3.3	Hot water systems (DHW)	0	3	3						0	0	0					
11	Environment	EN Energy	EN3 Energy F	EN3.4	Electric heating systems	0	3	3						0	0	0					
12	Environment	EN Energy	EN3 Energy F	EN3.5	Heat pump systems and geothermal e	0	3	3						0	0	0					
13	Environment	EN Energy	EN3 Energy F	EN3.6	Solar thermal energy systems for heat	0	3	3						0	0	0					
14	Environment	EN Energy	EN3 Energy F	EN3.7	Solar power systems for electricity ge	0	3	3						0	0	0					
15	Environment	EN Energy	EN3 Energy F	EN3.8	Combined Heat and Power (CHP) gene	0	3	3						0	0	0					
16	Environment	EN Energy	EN3 Energy F	EN3.9	Mini wind power generation	0	3	3						0	0	0					
17	Environment	EN Energy	EN3 Energy F	EN3.10	Energy storage systems (long duration	0	3	3						0	0	0					
18	Environment	EN Energy	EN4 Energy F	EN4.1	Thermal insulation	0	1	1						0	4	4					
19	Environment	EN Energy	EN4 Energy F	EN4.2	Building air tightness	0	1	1						0	4	4					
20	Environment	EN Energy	EN4 Energy F	EN4.3	Window and glazing systems	0	1	1						0	4	4					
21	Environment	EN Energy	EN4 Energy F	EN4.4	Solar shading systems	0	1	1						0	2	2					
22	Environment	EN Energy	EN4 Energy F	EN4.5	Passive systems for cooling and heatir	0	3	3						0	0	0					
23	Environment	EN Energy	EN4 Energy F	EN4.6	Energy saving strategies for lighting	0	1	1						0	0	0					
24	Environment	EN Energy	EN4 Energy F	EN4.7	Mitigation strategies for urban therma	0	1	1						0	0	0					
25	Environment	EN Energy	EN4 Energy F	EN4.8	Building occupancy behavior	0	1	1						0	0	0					
26	Environment	WA Water	WA1 Wate		loor water use management	0	0	0						0	0	0					
27	Environment	WA Water	WA1 Wate		or water use management	0	0	0						0	0	0					

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Links with Train4Sustain CEN workshop agreement.

	Professions	Beroep (NL)	Fase	T4S nummer	Beroepsgroep
4	Architect	**Architect**	Ontwerp	1	Bouw & architectuur
5		Interieur architect	Ontwerp	1	Bouw & architectuur
6	Mechanical Engineer	Engineer W-installaties & GBS	Ontwerp	2	Installatie
7		Technisch Tekenaar installatie	Ontwerp	2	Installatie
8	Designer	Technisch Tekenaar bouw	Ontwerp	3	Bouw & architectuur
9	Architectural Technologist	Bouwkundig engineer	Ontwerp	3	Bouw & architectuur
10	Structural engineer	Constructeur	Ontwerp	3	Bouw & architectuur
11	Electrical Engineer	Engineer E-installaties & data inst.	Ontwerp	4	Installatie
12	Building Automation Engineer	Engineer gebouwautomatisering	Ontwerp	4	Installatie
13	Lighting specialist	Verlichtingsdeskundige	Ontwerp	4	Installatie
14		Engineer brandveiligheid	Ontwerp	4	Installatie
15	ICT Engineer	ICT Engineer & data analyse	Ontwerp	4	IT
16	Geologist	Geoloog & bodemdeskundige	Ontwerp	5	Omgeving (bodem, groen)
17		Landmeter	Ontwerp	5	Omgeving (bodem, groen)
18	Environmental Engineer	Milieudeskundige	Ontwerp	5	Omgeving (bodem, groen)
19	Landscape Architect	Landschapsarchitect & hovenier	Ontwerp	5	Omgeving (bodem, groen)
20	Landscaper facade	Specialist groene daken en gevels	Ontwerp	5	Omgeving (bodem, groen)
21	Building energy consultants	Energieprestatie adviseur U, W	Alle fasen	6	Energie engineering & advies
22	Energy Auditor	Energie Maatwerkadviseur	Exploitatie	6	Energie engineering & advies
23	Daylighting specialist	Daglichtspecialist	Ontwerp	6	Energie engineering & advies
24	Energy engineer	Energie engineer	Ontwerp	6	Energie engineering & advies
25	Simulation experts	Energiesimulatie expert	Ontwerp	6	Energie engineering & advies

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T4S-ID	TS4 Specialism_en		Specialisme_nl tbv BUS_NL
	SOCIETY		**WELZIJN (SOCIETY)**
AC	**AC Accessibility**		**Toegankelijkheid**
AC1	Barrier free accessibility		Inclusief ontwerpen & integrale toegankelijkheid
AD	**Adaptation and resilience to climate change**		**Klimaatadaptief bouwen**
AD1	Climate change resilient buildings		Klimaatbestendig bouwen (hitte, extreme neerslag)
CO	**Comfort and well being**		**Comfort en gezondheid**
CO2.1	Indoor Thermal Comfort		Binnenklimaat en binnenluchtkwaliteit
CO2.2	Outdoor Thermal Comfort		Buitenklimaat (thermisch comfort en luchtkwaliteit in de stad)
CO2.3	Building Physics		Bouwfysica
CO3.1	Daylighting		Daglicht toepassing (binnen)
CO3.2	Indoor lighting		Verlichting (binnen)
CO3.3	Outdoor lighting		Verlichting buiten, oriëntatie- & gevelverlichting
CO4.3	Indoor noise management		Beheersing geluid binnen / akoestische isolatie / akoestiek
CO4.4	Environmental noise management		Beheersing omgevingslawaai
CO6.1	Ergonomic and Active Furnishing		Ergonomie van de inrichting
SE	**Services for inhabitants**		**Services voor gebruikers**
SE1.1	Communication services		Communicatie diensten
SE2.2	Infrastructure and connectivity		Laadinfrastructuur EV
SE2.3	Internet Of Things		Internet of Things
MO	**Mobility**		**Duurzame mobiliteit**
MO1.1	Sustainable mobility strategies		Duurzame mobiliteitsoplossingen, EV

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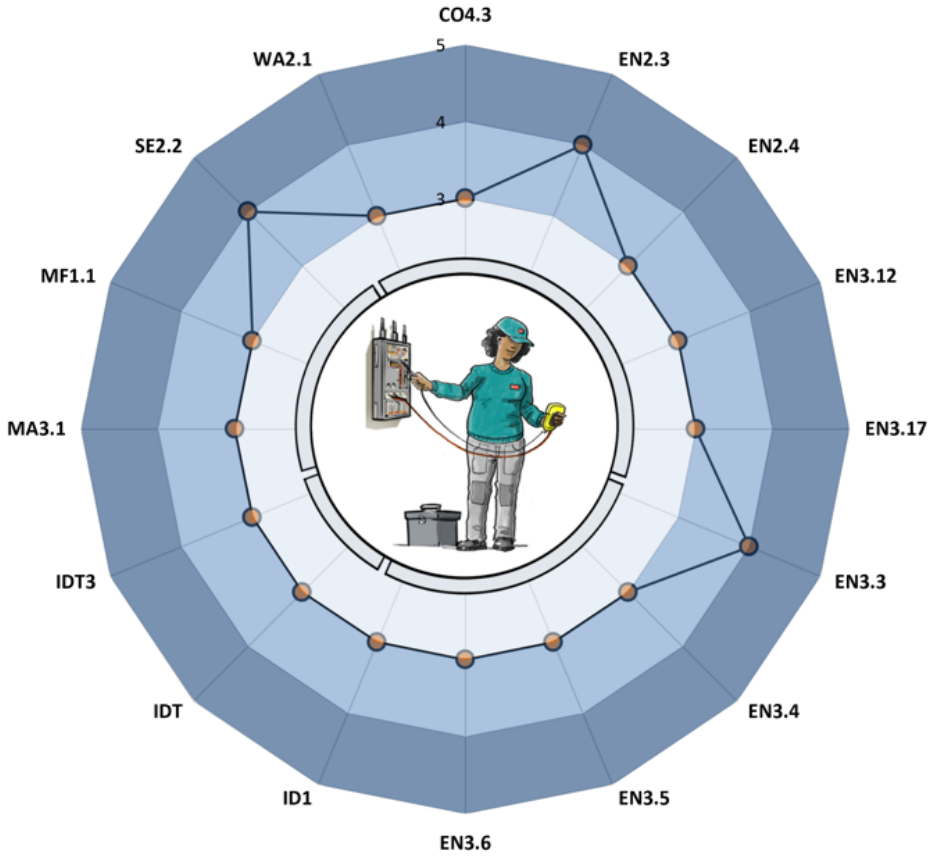
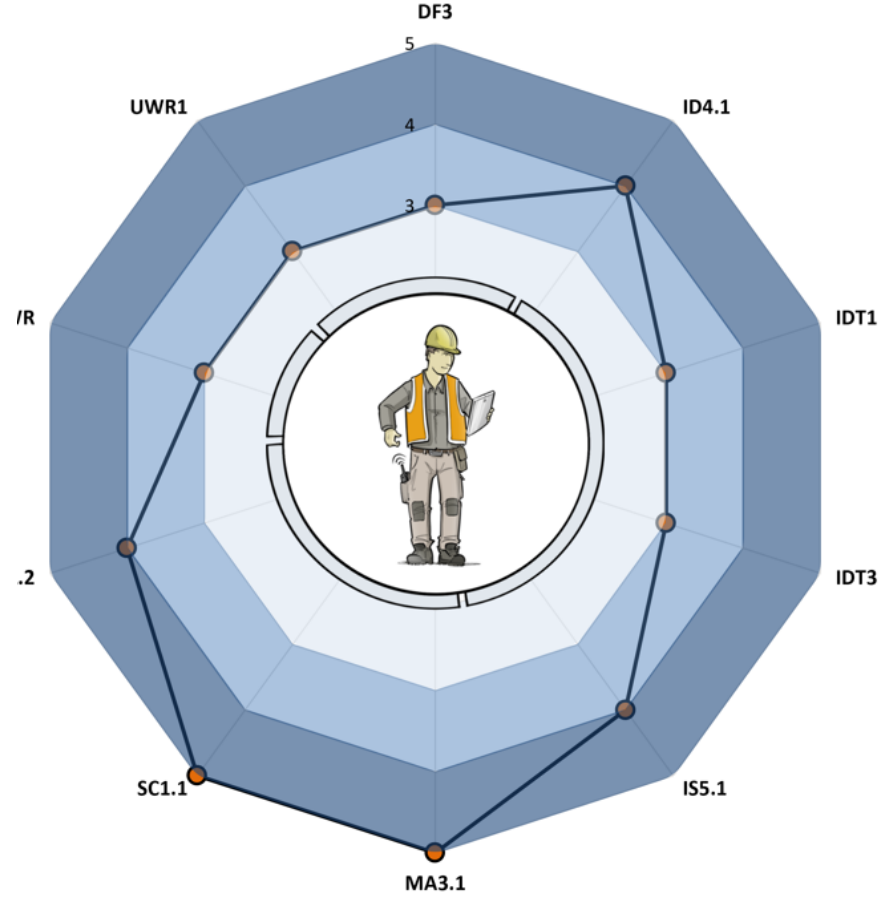
Result

Build Up Skills NL

Installateur W/E



Specialist Afval & logistiek bouwplaats



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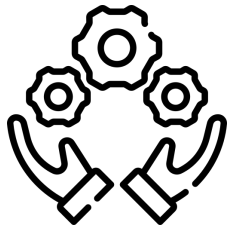
Link to Task-based qualifications



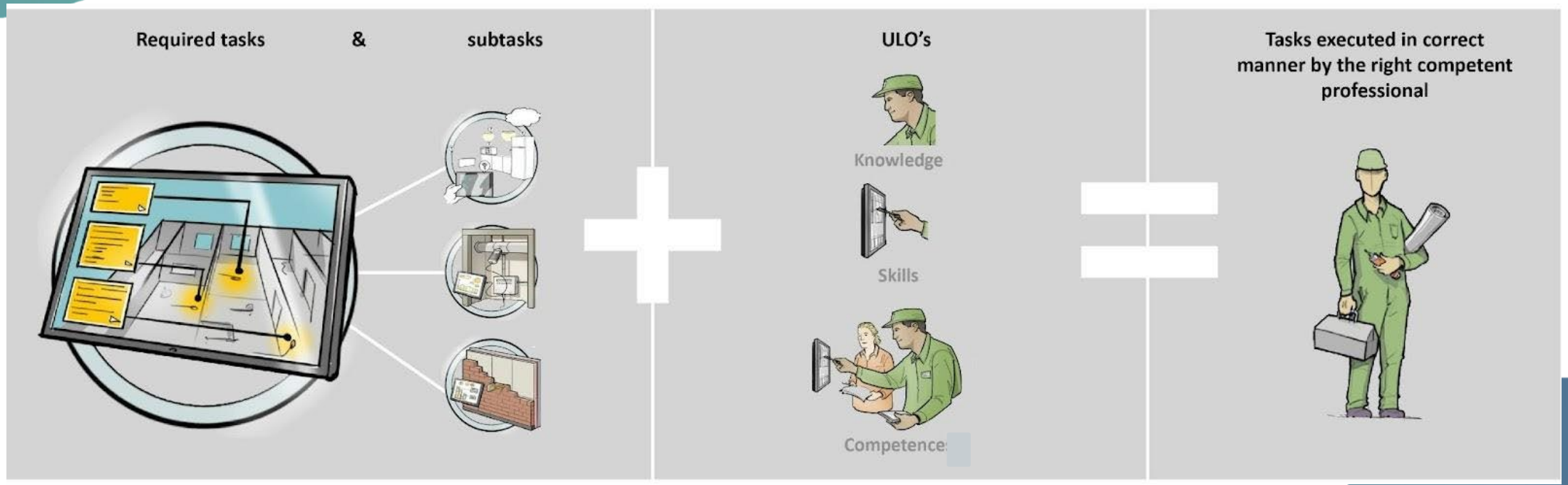
Practical perspective on required skills for circular construction

Increased recognition of learned skills

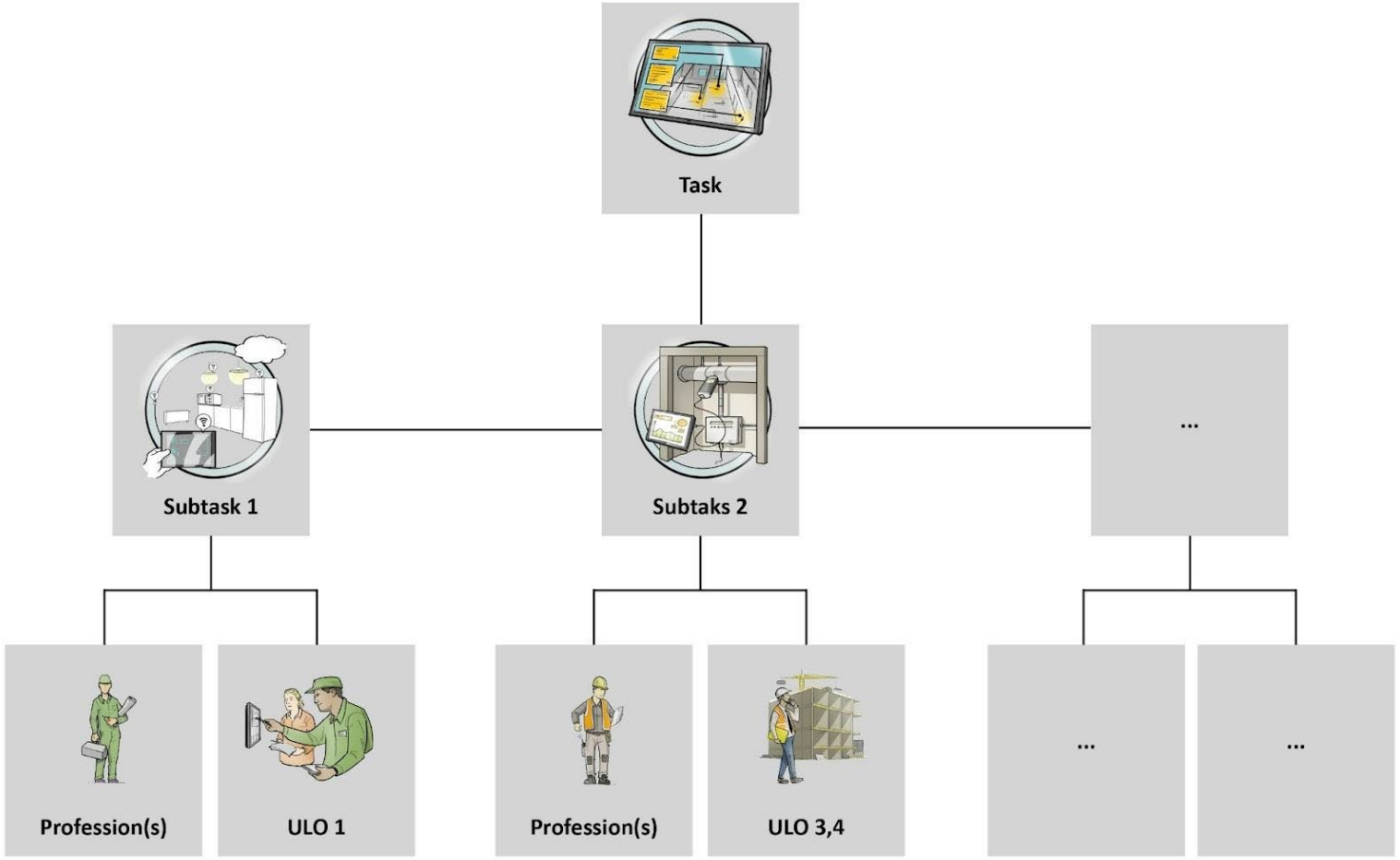
Learning outcomes for development of training

Circularity applied to different fields in construction

How does a Task based Qualification work?

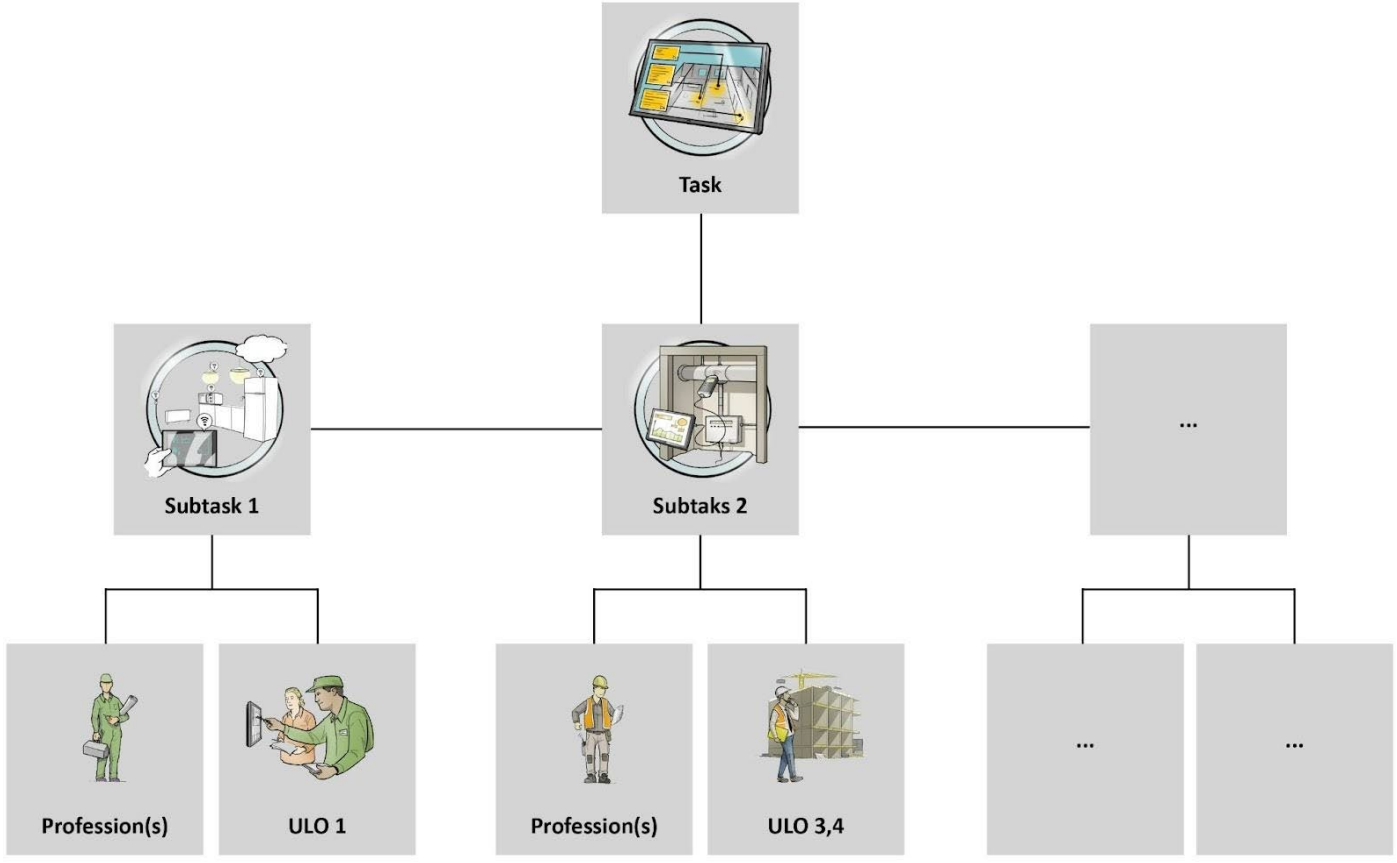


How does a Task based Qualification work?



What is a task based Qualification?

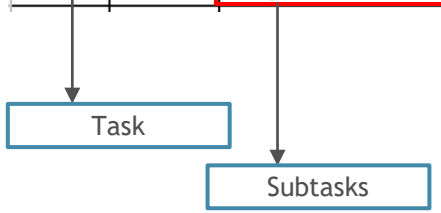
awakening | relevant | innovative | scalable | equitable



Task-based qualifications: How?

Tasks and subtasks

2	Design for the future		81	
2.1		Design to reduce waste during production and use	2, 26, 27, 28	ME, CE, EL, AR
2.2		Design with materials that enable multiple uses	5	ME, CE, EL, AR, BS, HS



Task-based qualifications: How?

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Unit of Learning Outcomes (ULOs)

Professions acronyms

ULOs are statements regarding what a learner **knows**, **understands** and is **able to do** (including responsibility) on completion of a learning process, which are defined in terms of **knowledge, skills and attitude/responsibility**

Task-based qualifications: How?

Unit of Learning Outcomes (ULOs)

ULO Nr.	Competence	Skills	Knowledge
1	Design with bio-based materials as an alternative for conventional construction materials	Select bio-based materials for the construction project at hand Consider the purpose of the building and the context of the entire building solution, as well as construction requirements When biobased materials are not an option, select proper low impact materials Integrate use of the Material Circularity Indicator (make sure it is not higher than X) Ensure use of materials that have little to no volatile organic compounds (VOC) emissions	Types of bio-based materials in construction such as hemp, seaweed, cork, bamboo, sustainably sourced wood, agricultural residues Advantages and disadvantages of biobased materials Seven functional requirements of building walls Alternative forms of concrete
2	Enact measures that optimise material use to strive for material efficacy	Apply measures that optimise material use to construction projects Combat underutilisation or surplus of materials by sharing products or assets and optimising their use	General knowledge about measures that optimise material use in construction, such as 3D printing or accurate structural design/industrialized prefabricated products

What competence does one need for performing the subtask?

Task-based qualifications: How?

Unit of Learning Outcomes (ULOs)

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What should one be able to **do** in order to gain competence?

Task-based qualifications: How?

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What competence does one need for performing the subtask?

What should one be able to **do** in order to gain competence?

What is prerequisite knowledge to become competent?

EEtheSkills
VISIBLE | VALIDATED | VALUABLE

"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101033743"

Technology based Qualification
With several levels of detail

"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101033743"

Example from SEEtheSkills

PV Installation		
Nr	**Tasks**	**Sub-tasks**
EN3.7.1	Understand the importance of solar power systems for electricity generation	
		Recall the main types of PV systems (e.g. grid tied, off gried, hybrid, w/o battery storage)
		Discuss the feasibility studies of solar power systems for electricity generation within a design team
		Understand the influence of external aspects on the performance (e.g. orientation, shadowing)
EN3.7.1	Understand the importance of solar power systems for electricity generation	
		Recognize or applies the main installation types and building integration
		Expound the solar radiation exposure and energy production
		Analyse the feasibility studies of solar power systems for electricity generation within a design team
		Comprehend the influence of external aspects on the performance (e.g. orientation, shadowing)

Example from BUS-NL network on heatpumps

Tasks	Sub-tasks	ULO Nr.
Advise about heat pump installation (first mechanic S&O)		
	Advise on the technical aspects of climate control systems	4;5
	Identify points for attention and risks surrounding the heat pump system	6
	Advise solutions around the heat pump system	6
Advise on the heat pump installation (work manager)		
	Advise on the operation and interaction of different types of heat pumps and their areas of application	1;2;7;8;9
	Advise on the technical aspects of climate control systems	10;4;62
	Advise on the technical feasibility of a heat pump system	1;2;3;11
	Identify points for attention and risks surrounding the heat pump system	6
	Advise solutions around the heat pump system	1;6;12;20;22;23;24
Advise on the heat pump installation - preconditions (work manager)		
	Apply the applicable legislation and regulations (soil energy systems)	13;14;25
	Applies the applicable laws and regulations (other)	15;13;26;27;28;29;30;31;32;33;34
	Determine energetic and economic feasibility of the heat pump system	16;35;36
	Determine and recommend about the energy performance and monitoring	17;21
	Determine and advise on the critical parameters (construction and comfort) of the home/object	1;18;23;37
Design and dimension the heat pump installation/ heat pump system (work manager)		
	Determine the structural situation and collects necessary data about the space required by the installation, the necessary measures regarding noise, ventilation and supply temperature	100;101;89;90;102;5;74;103;104;105;18;7;19;38;39;20
	Choose from the different system concepts	100;101;89;90;102;5;74;103;104;105;1;40;41;42;43;44;45

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Example of a qualification focussed on principles

Scope of circular construction skills qualifications

Included

- **Integrating circular principles** in existing work activities
- Focus on working as a member of the construction **value chain**
- Including **interdisciplinary skills**:
  - Collaboration
  - Research and evaluation
  - Education

Not included

- Detailed skills and knowledge
- Technology specific (e.g. details of installing heat pumps, specifics of designing pre-fabricated structures)

The main Tasks

1	Prioritise regenerative and efficient use of resources
2	Design for the future
3	Assemble/construct for the future
4	Rethink the business model
5	Stretch the lifetime
6	Use secondary resources
7	Incorporate digital technology
8	Collaborate to create joint value
9	Strengthen and advance knowledge

Task 1

1	Prioritise regenerative and efficient use of resources		81
1.1		Design with bio-based, non-toxic and/or non-critical materials	1, 2, 3, 4
1.2		Replace energy sources with less impactful alternatives	8
1.3		Apply suitable energy efficiency measures to the building design (taking into account building purpose and climate)	9
1.4		Generate energy from renewable sources - e.g. solar, sustainable biomass	10
1.5		Apply measures that replace freshwater with less impactful alternatives	6
1.6		Enact water efficiency measures	7, 15
1.7		Source bio-based, reusable, non-toxic and non-critical materials	1, 2, 3, 4, 5, 36
1.8		Source local and lightweight materials	74

Process targeted Qualification

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Step 1 – Define Main Specialisms

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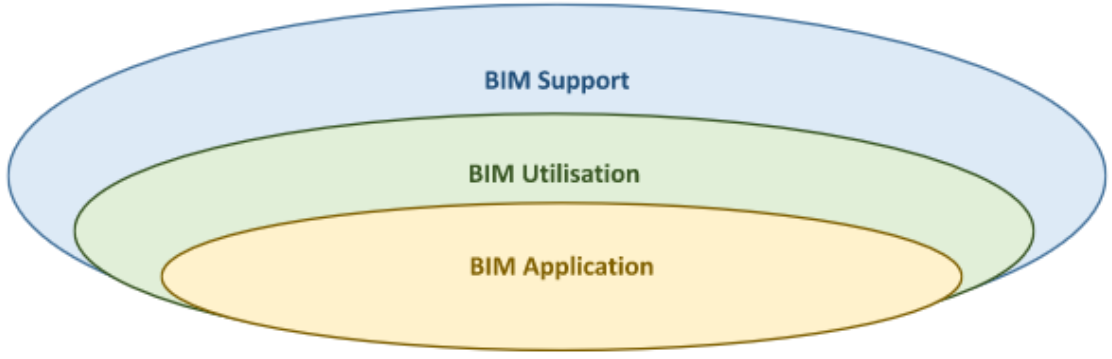
- BIM application – 6x
- BIM utilisation – 5x
- BIM support – 2x



- Differentiate between ‘making’ and ‘using’ BIM

ID	Specialism	Group
BA-1	BIM Management	BIM Application
BA-2	BIM Project Management	
BA-3	BIM Coordination	
BA-4	BIM Modelling	
BA-5	BIM Engineering	
BA-6	BIM Programming	
BU-1	Capturing and Representing	BIM Utilisation
BU-2	Planning and Conceptualizing	
BU-3	Simulating and Quantifying	
BU-4	Constructing and Fabricating	
BU-5	Operating and Maintaining	
BU-6	Monitoring and Controlling	
BU-7	Controlling and Extending	
BS-1	Project Data Management	BIM Support
BS-2	System Administration	

Step 2&3 – Define professions and Relate to specialisms

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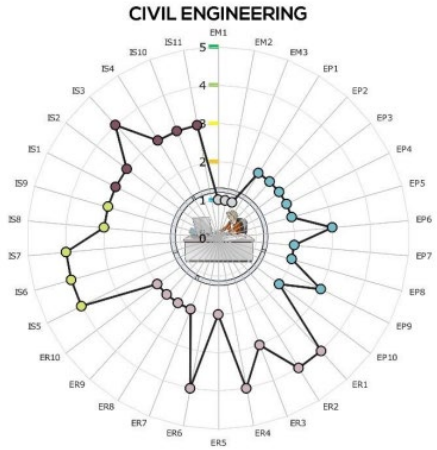
- To understand further development of professions using BIM
  - Designers: Architect
  - Contractors: Project Manager, Foreperson
  - Clients: Building Owner/Operator
  - Public Administration: Building Inspector



- Mapping current situation and future situation

Step 4 – Add tasks and subtasks

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- Each specialism gets their own set of tasks and subtasks
- Duplication of tasks is possible

Group	ID	Specialism	Task	Subtask
BIM Application	BA-1	BIM Management	BA-1 task 1	BA-1 task 1.1
				BA-1 task 1.2
			BA-1 task 2	
			BA-1 task 3	
			BA-1 task 4	BA-1 task 4.1
				BA-1 task 4.2
				BA-1 task 4.3
			BA-1 task 5	BA-1 task 5.1
				BA-1 task 5.2
			BA-1 task 6	
	BA-2	BIM Project Management	BA-2 task 1	BA-2 task 1.1
				BA-2 task 1.2
				BA-2 task 1.3
				BA-2 task 1.4
			BA-2 task 2	
	BA-3	BIM Coordination	tbd	tbd
	BA-4	BIM Modelling	tbd	tbd
	BA-5	BIM Engineering	tbd	tbd
	BA-6	BIM Programming	tbd	tbd
BIM Utilisation	BU-1	Capturing and Representing	tbd	tbd
	BU-2	Planning and Conceptualizing	tbd	tbd
	BU-3	Simulating and Quantifying	tbd	tbd
	BU-4	Constructing and Fabricating	tbd	tbd
	BU-5	Operating and Maintaining	BU-5 task 1	BU-5 task 1.1
				BU-5 task 1.2
				BU-5 task 1.3
				BU-5 task 1.4
				BU-5 task 1.5
				BU-5 task 1.6
			BU-5 task 2	BU-5 task 2.1
				BU-5 task 2.2
			BU-5 task 3	
			BU-5 task 4	
			BU-5 task 5	BU-5 task 5.1
				BU-5 task 5.2
	BU-6	Monitoring and Controlling	tbd	tbd
	BU-7	Controlling and Extending	tbd	tbd
BIM Support	BS-1	Project Data Management	tbd	tbd
	BS-2	System Administration	tbd	tbd

Step 5 & 6 – Define and add ULOs

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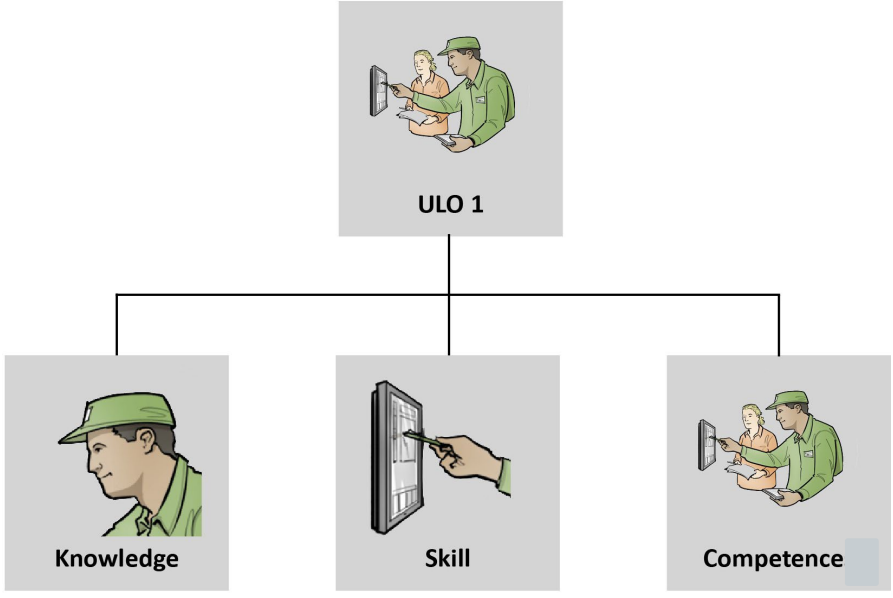
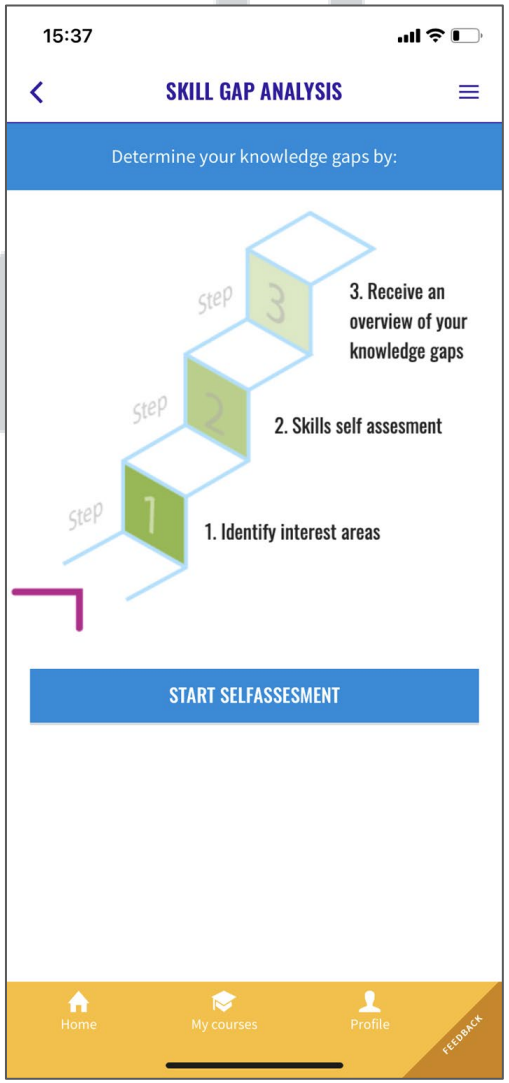
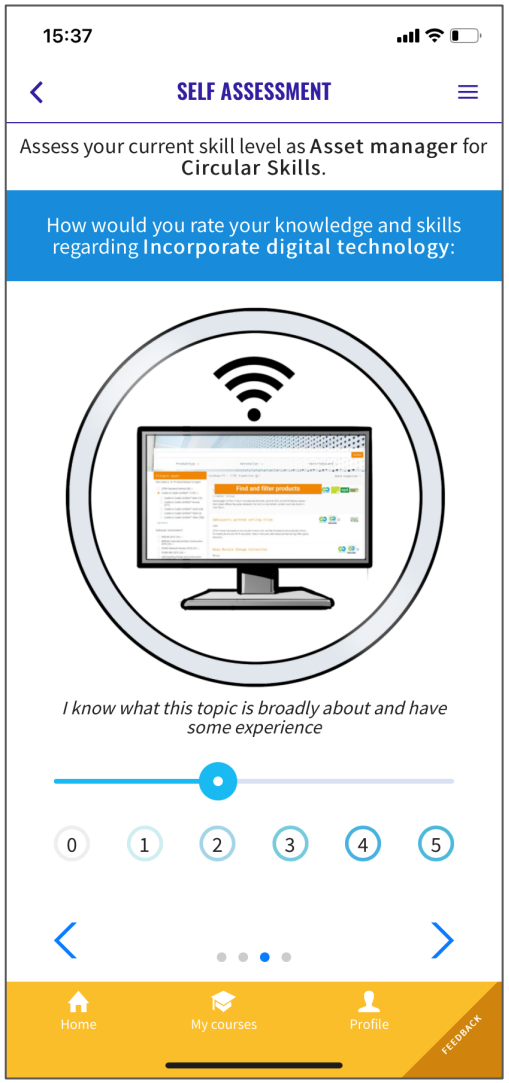


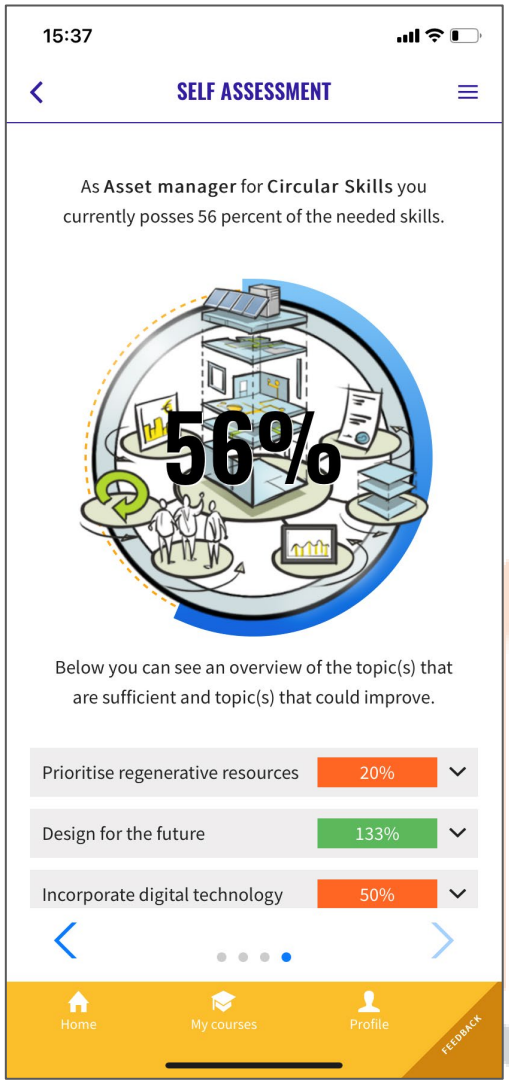
Result

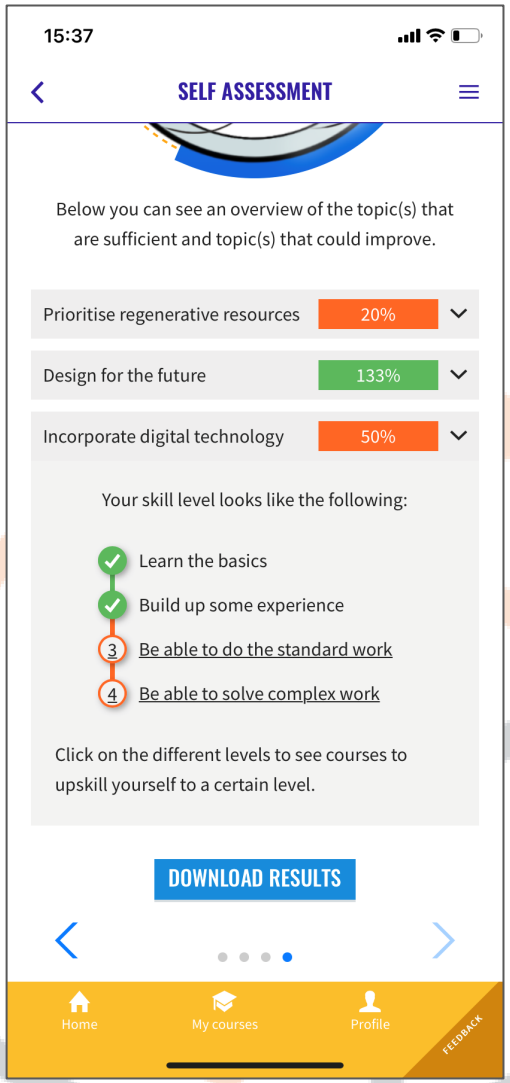
https://www.ariseproject.eu/d-3-3-qualification-framework-of-sustainable-energy-skills-leveraged-by-digitalisation-incl-bim/

Use of data in the BUILD UP Skills advisor-app

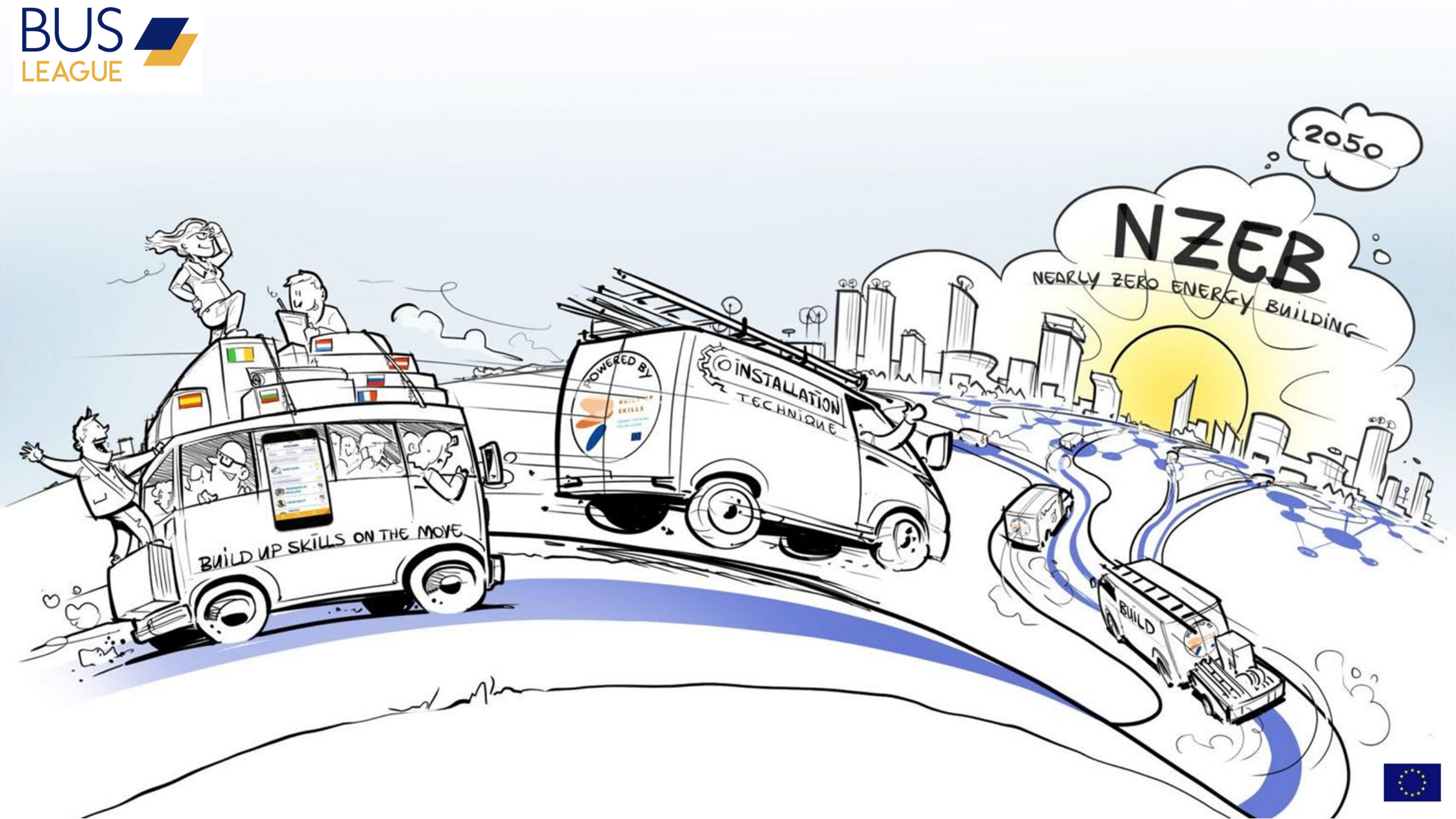








BUS LEAGUE


2050
NZEB
NEARLY ZERO ENERGY BUILDING
BUILD UP SKILLS ON THE MOVE
POWERED BY
INSTALLATION TECHNIQUE
BUILD

Colophon

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