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Using digitalisation to overcome vocational exclusions for training

ARISE WEBINAR at EVSW
18 May 2022
11:00 - 12:30 (CET)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101033864

AGENDA



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- 11:00 - 11:10** **Introduction–Revolutionising the learning process**
Paul McCormack | Belfast Met
- 11:10 - 11:20** **Digitalisation accelerating vocational engagement**
Barry McAuley | TUDublin
- 11:20 - 11:30** **Task Based learning**
Anna Moreno | IBIMI
- 11:30 - 11:40** **Beyond Blended–adaptive learning**
Andrew Hamilton | Belfast Met

- 11:40 - 11:50** **Micro Pathways modules, accreditation and certification**
Jan Cromwijk | ISSO
- 11:50 - 12:00** **Authentication–blockchain**
James Harty | KEA
- 12:00 - 12:10** **Measurable success**
Dijana Likar | IECE
- 12:10 - 12:20** **Summary–what success looks like**
Paul McCormack | Belfast Me
- 12:20 - 12:30** **Question and Answer session and Event closure**
Paul McCormack | Belfast Me



Introduction-Revolutionising the learning process

Paul McCormack | Belfast Met



Demand and Supply mismatch



- The skills supply mechanisms are not meeting demand
- This is resulting in skills shortages worldwide
- Energy efficiencies are not been addressed
- Opportunities are been missed
- We are not 'reaching' the vocationally excluded.
- Vocational mobility is being restricted because the workforce do not have the skills visas



Today's Skill Mechanism

Today's millennials and Generation Z require training and upskilling to go beyond taking notes and remembering information for important exams.

They will need education that is task based, enables them to think for themselves and solve problems in real time.

The skills delivery model must be dynamic not static



Why revolutionise the learning process?



Skills matter

We must

- Address the urgency of upskilling and reskilling enabling industry
- Transform the education interface
- Improve the core process of skills delivery and training
- Leverage data and technology processes to meet the twin goals of fulfilling customer expectations and meeting industry need
- Remove the friction from the skills interface



- Developing an open competency based qualification scheme based on maturity levels that empower micro-learning will be the basis for making learning transactions count.
- Creating a system for issuing, verifying and sharing micro-credentials for learning credits, creating a digital learning platform allowing learners to store credentials and enabling them to share them with educational institutions and employers.
- Revolutionising the learning process by monetizing the skills and learning exchange with a system based on skills recognition rather than accreditation

Digitalisation accelerating vocational engagement

Barry McAuley | TUDublin



Industry Concern



- A recent report by the McKinsey Global Institute highlights that the advance of digital technologies in the European Union and the United Kingdom presents enormous growth opportunities.
- The European Construction Sector Observatory report that 85% of all E.U. jobs need at least a basic digital skill level. The findings show a shortage of digital and technological skills to successfully and rapidly implement these initiatives, with a total of 8.6 million people across the EU-28 public sector is predicted not to have the necessary skills by 2023.
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- To meet these impending targets, new methods of upskilling, educating, and certifying professionals need to be exploited that cater to a diverse sector.
- The European Construction Sector Observatory report acknowledges that automation and the increasingly widespread utilisation of BIM are still not widely used in the construction sector. The report states the industry needs to develop new competencies and methods of working.
- This report outlines that by setting ambitious goals for Europe, the Energy Efficiency and Energy Performance of Building Directives have driven the need for additional green energy and energy-efficient construction skills. To achieve this, a total of 3 to 4 million construction workers in Europe will need to develop their energy efficiency-related skills in the building sector.

Barriers to Adoption



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Adoption Barriers

Change Resistance
Initial High Cost
Real Life Examples
Awareness
Communication Supports
Lack of Skilled Workers
Training
Client Demand
Collaboration
Legal

Educational Barriers

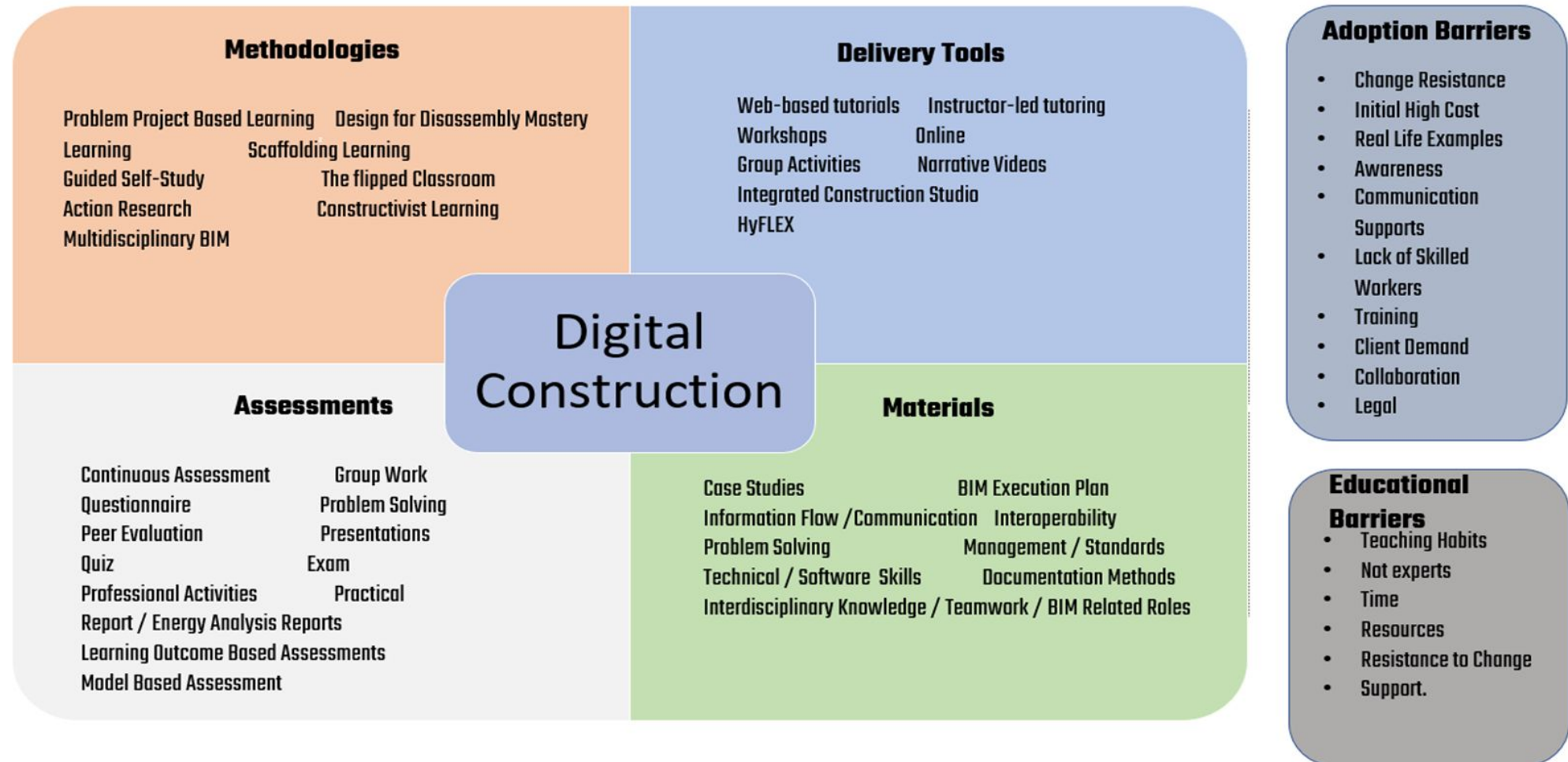
Teaching Habits
Not experts
Time
Resources
Resistance to Change
Support.



Digital Construction Learning Tools



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ARISE Part in Digital and Sustainable Learning



- ARISE will stimulate and inspiring the demand for sustainable energy skills from industry and individuals by redesigning the skills exchange, providing transparent upskilling transactions, and recognising upskilling performed.
- This will be achieved by delivering a 'portable' skills mechanism that provides the learner with access and vocational mobile flexibility.
- The ARISE digital Individual Learning Passport (ILA) will assist with the transition from paper-based to digital credentials in the European skills area and deliver digital credentialing solutions using Blockchain technology for verifiable transactions



Task Based learning

Anna Moreno | IBIMI





The Italian Chapter

A bridge between the international and national communities



IBIMI has two souls



Professional association
recognised by the Italian
ministry for development



Disseminate in Italy methods and
professionalism of digitization of the
construction industry



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Italian chapter of buildingSmart
international

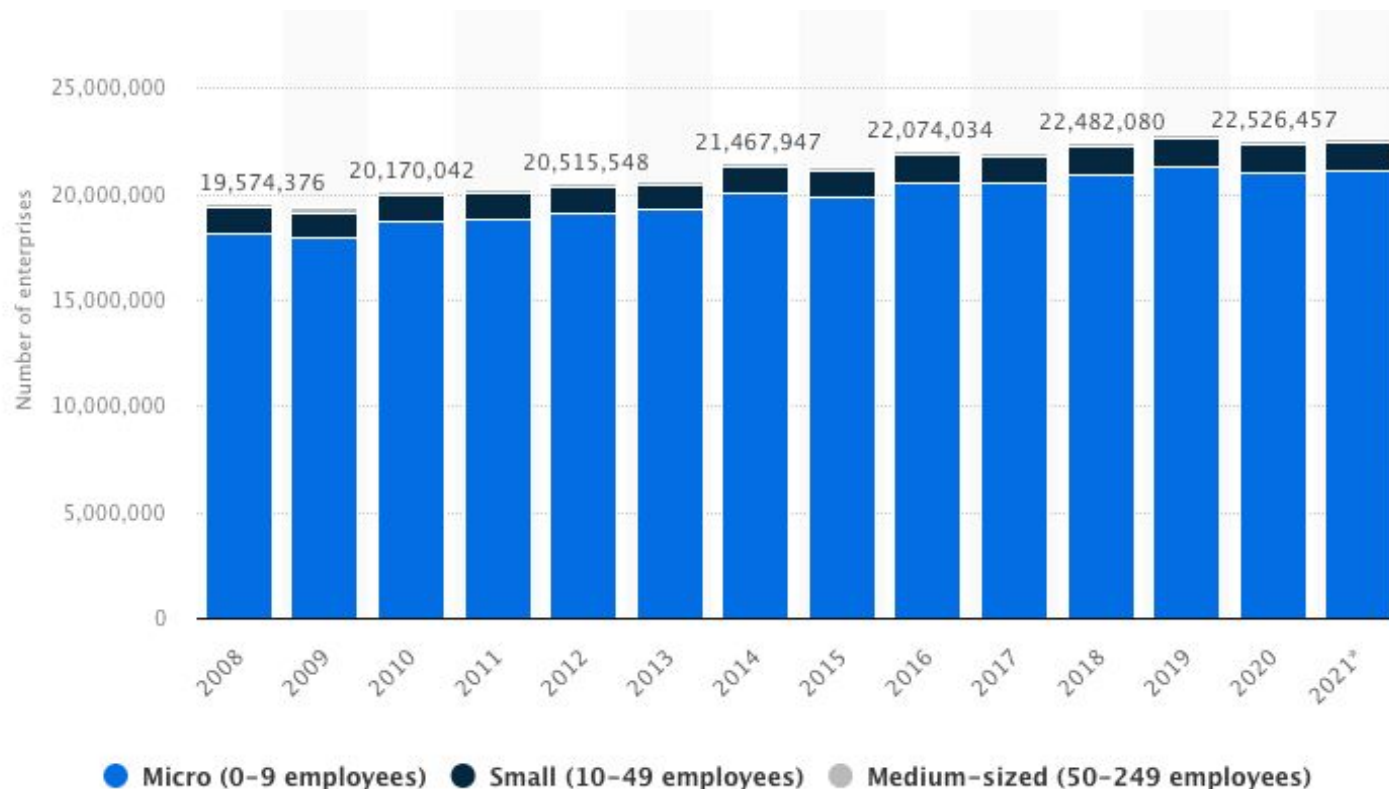


Contribute to the open BIM
standards development

New competences and the role of SMS's



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The majority of the European building enterprises are micro with 0-9 employees. It means that there are about 20 million of enterprises that would almost never afford the high level of competences needed to find the right technology for the energy performance and the extended use of digitalization



Collaboration: the way to overcome the need of new competences



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Use of renewable energies



Biomass energy



Wind energy

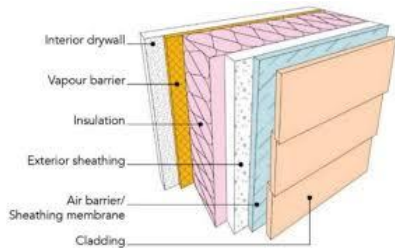


Geothermal energy

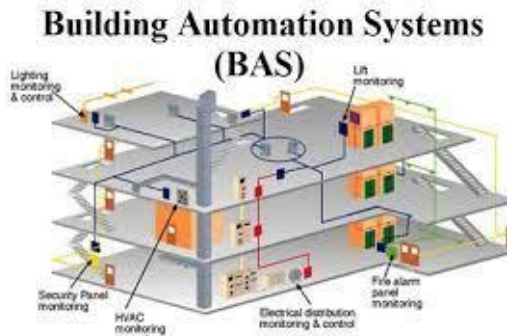


Solar energy

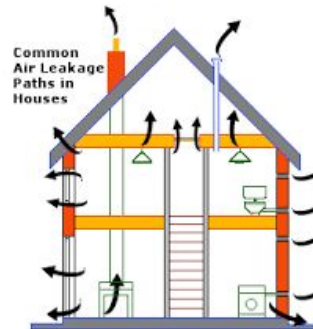
Energy efficient technologies



Building envelope



Building Automation Systems



Air tightness

Competences to:

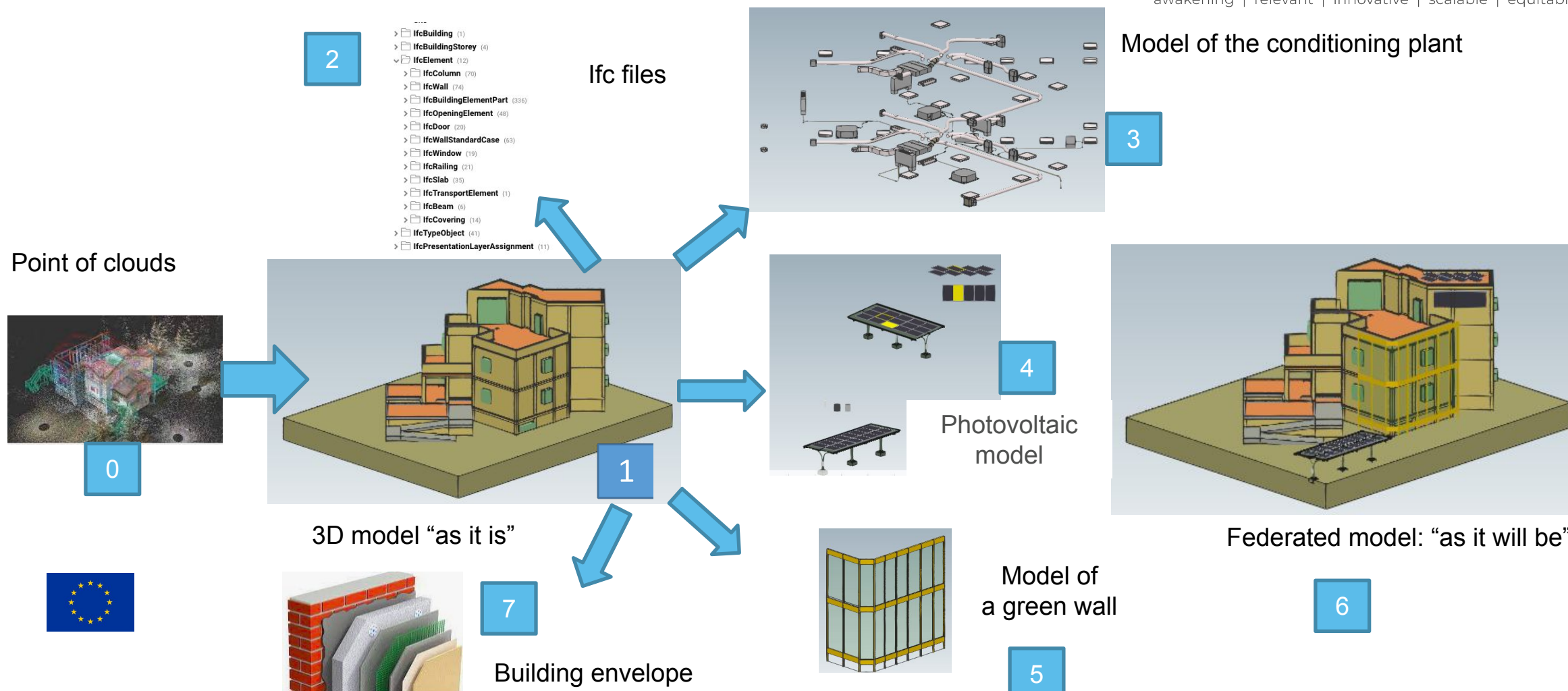
- Design
- Realize
- Install
- Manage
- Maintain
- Dispose
- Digital asset manage



How to promote collaboration among different experts: the example of BIM and CDE to integrate the design of a zero energy building



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Task based learning and competence recognition



- SMEs are not usually interested to qualification and/or certification as they consider it as an extra cost
- They are not happy to employ a very high qualified workforce as they are afraid they will leave for more remunerated jobs

But

- ... SMEs are interested in employing people or collaborate with other SMEs with proved capacity of solving specific tasks
- In a collaboration environment all the competences can integrate each other only if there is trust among the different professionals and workers
- The recognition of the competences based on tasks can be the only solution to use in a professional way all the existing technologies



The buildingSMART qualification on BIM and energy performance

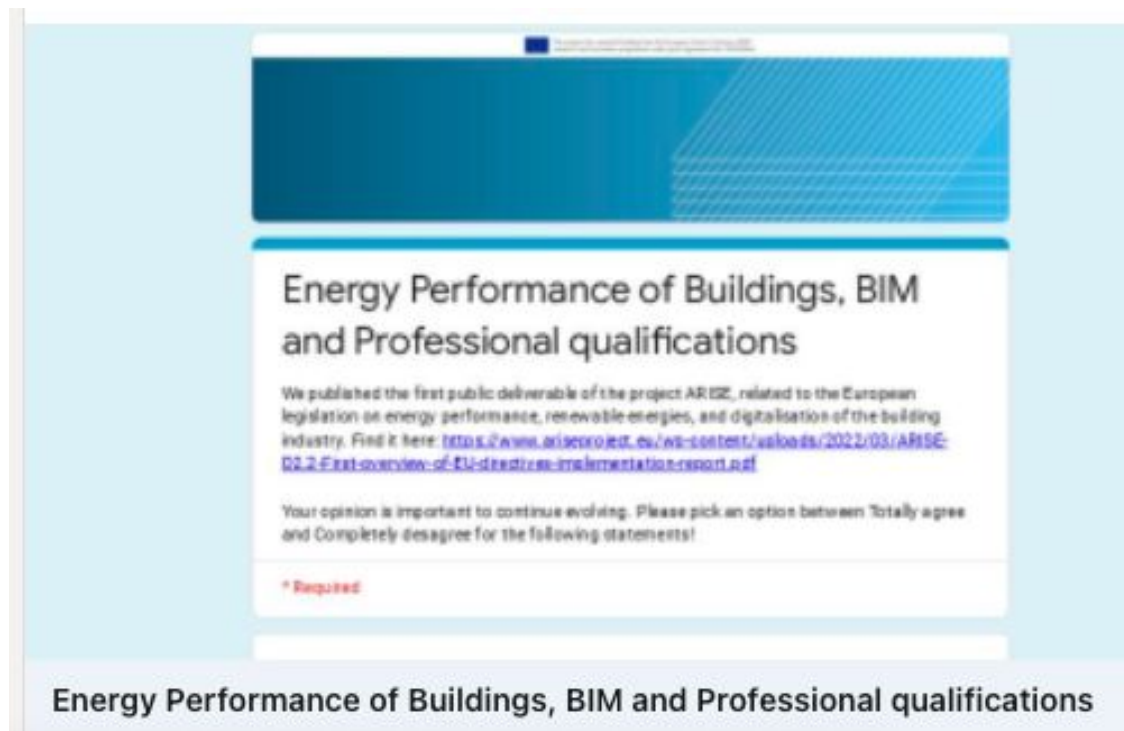


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- The bSI qualification on BIM and energy performance will be based on the identification of learning outcomes necessary to accomplish specific tasks
- ARISE partners are defining the learning outcome framework divided in the following 5 moduli
 - Define information management processes (e.g. specifying, producing, exchanging and maintaining information) to support condition analysis of new or existing facilities
 - Know the specific activities to enable BIM to improve energy performance during the preliminary design stage
 - Define information requirements (e.g. specification, production, exchange, and maintenance) for the technical design stage of energy efficient buildings
 - Define information requirements for the construction stage of energy efficient buildings – specification, production, exchange, and maintenance
 - Detail energy management at the operational stage of energy efficient buildings, enabled by BIM - principles, tools, and methods for smart energy management



Join the ARISE forum to contribute to the recognition of competences!!



<https://www.linkedin.com/groups/9090280/>



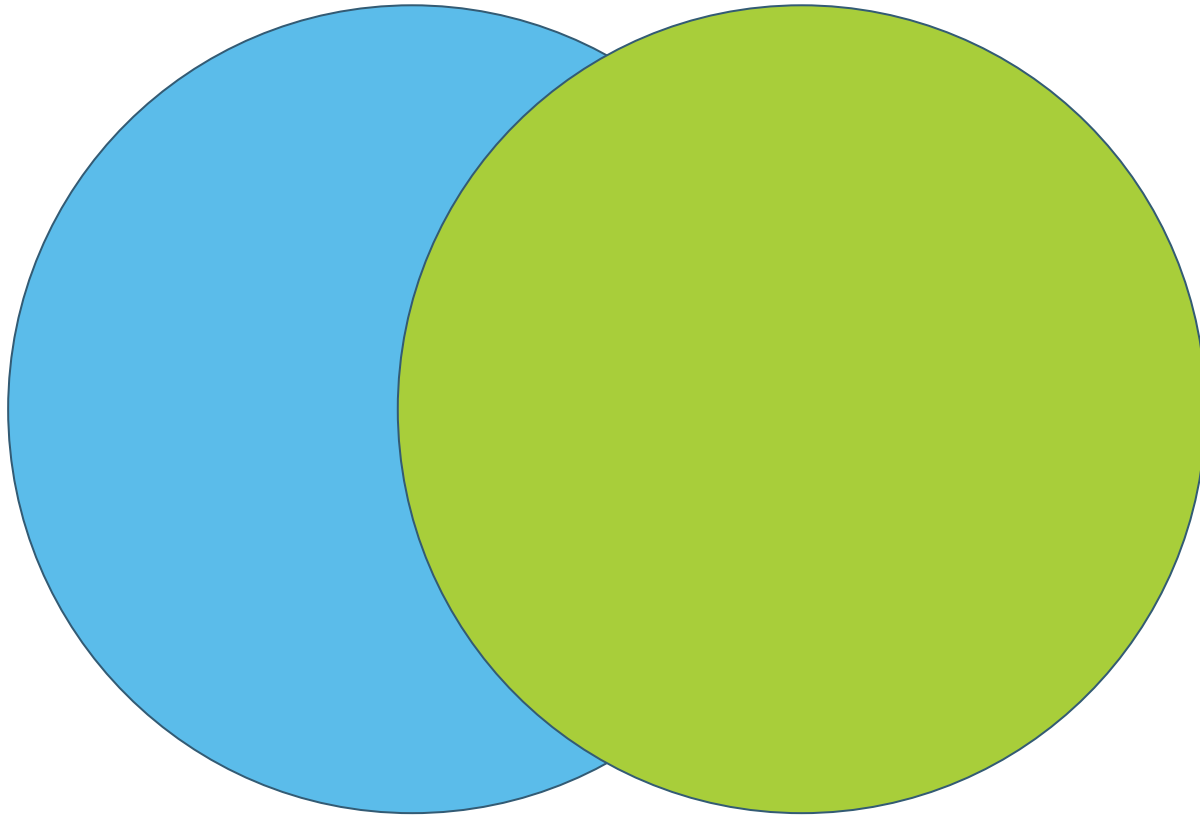
My contacts: Anna Moreno
e-mail presidenza@ibimi.it

Beyond Blended-adaptive learning

Andrew Hamilton | Belfast Met



Was does/should blended? What have we learnt?



Upskill Barriers – Time, Availability and Engagement



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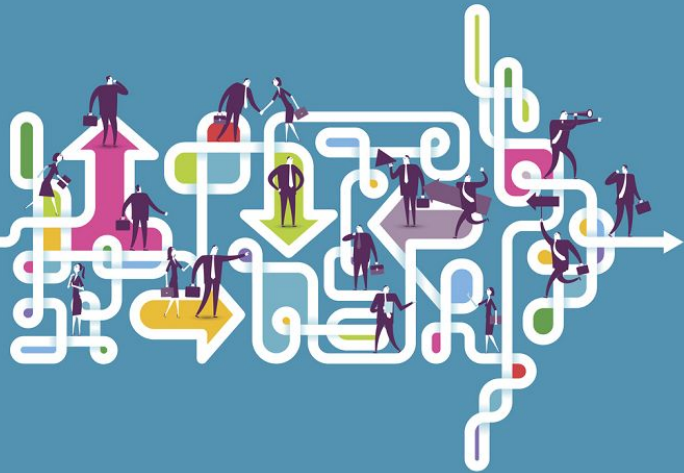
Create suitable pathways for learning



- Leveraging digital transformation to 'reach' the vocationally excluded.
 - Creating more access points
 - Additional opportunities
 - Shorter accessible pathways
 - Flexibility



Digital Transformation



Digital transformation is allowing us to change the paradigm of communication and skills delivery

Creating a new digital educational and skills model that align with the demands and needs of our audience and also of society



Learner directed progression

Non prescriptive learning enables the learner to “piece” their progress together in myriad ways to access, construct and complete individual learning pathways.

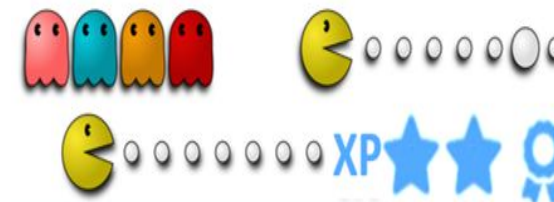
Digital Badges can be used to create such learning pathways, serving as markers or stepping stones that lead the learner forward towards various achievement goals, defining one’s progression and experience.



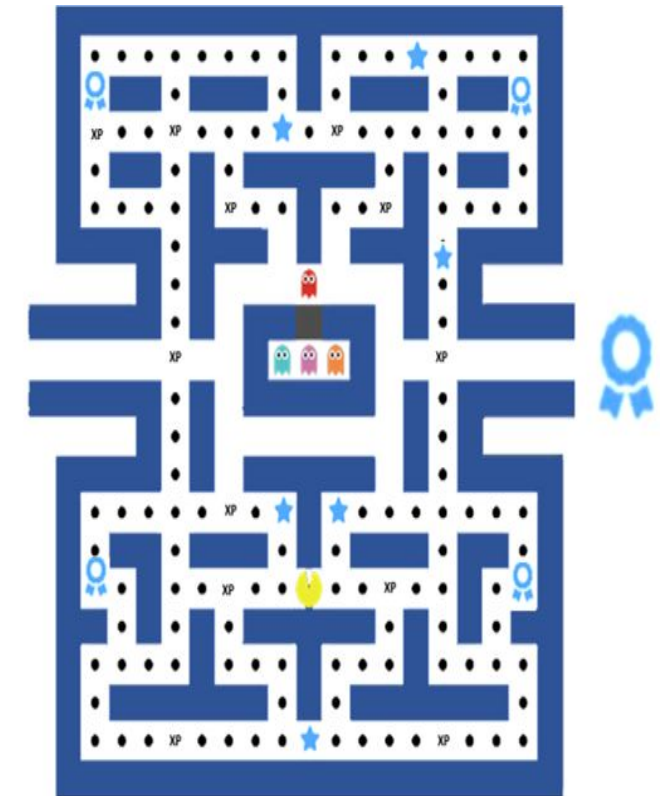
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Non linear progression

Bite sized micro accreditation



With “gamification” progression element



Unique Educational Models



Using adaptive learning – developing a unique educational model for personalised skills pathways - educational model based on personalized education

Gamification used to stimulate and engage – remove friction from the skills process

Bespoke adaptive learning resources and learning activities designed in a new model that is adjusted to the needs of the learner – not a retro fit



Digital Reach

Our audience is in an 'immediate' world therefore our delivery must meet this immediacy – create a comfortable learning environment

Use Mobile technology to connect with the learner – digital 'first' strategy



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Delivery designed to Engage



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Utilising adaptive learning to optimize the learning process of each student,

Utilising IT and adaptive techniques so the learner engages, sets the pace, is continually stimulated and remains on board –enabling an effective personalised teaching experience for every student.



Micro Pathways modules, accreditation and certification

Jan Cromwijk | ISSO

Why task based learning outcomes? ...for fast upskilling!



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Why task based learning outcomes? ...for easy Green Public Procurement!



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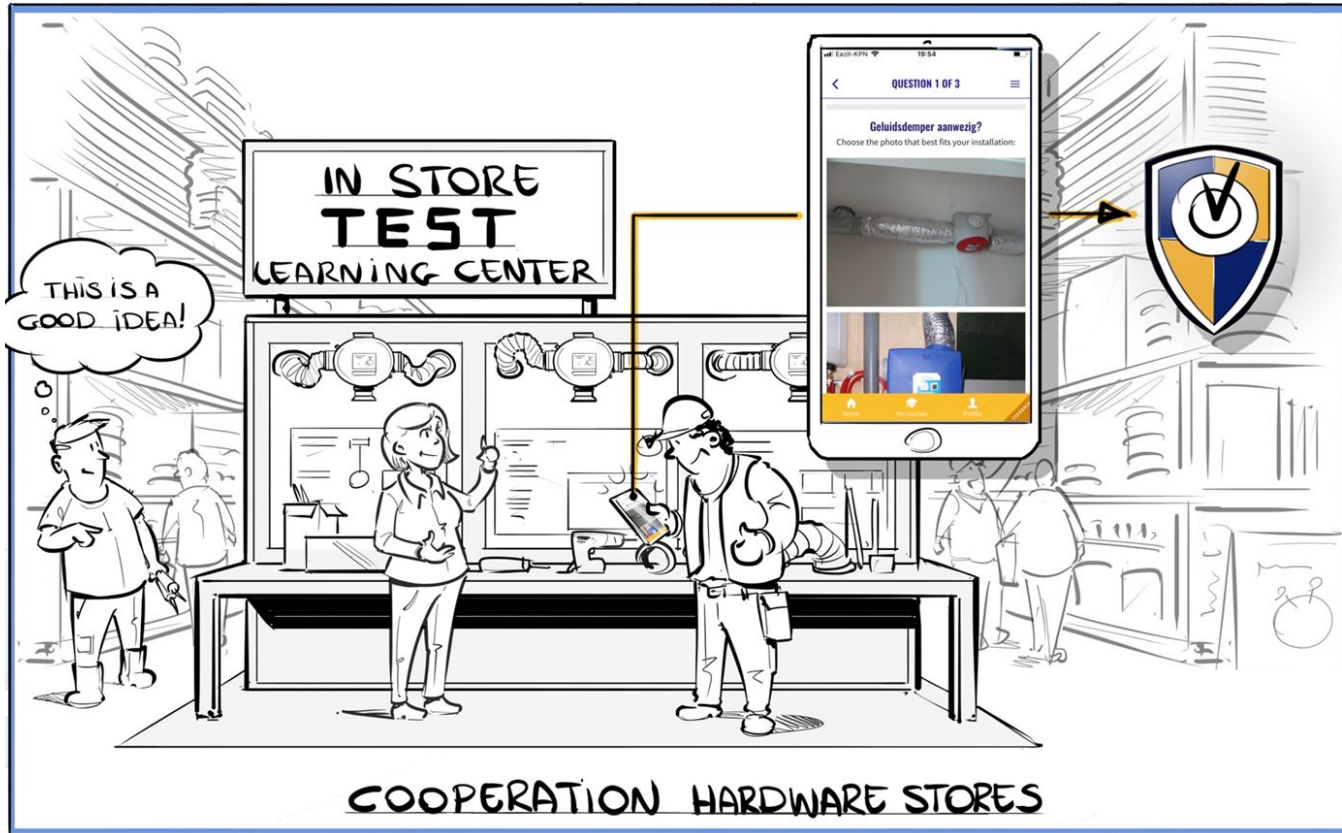
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Why task based learning outcomes? ...to enable microlearning!



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Why task based learning outcomes? ...to enable personal recognition!



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What are task based learning outcomes?



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ULO's 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 responsibility (attitude).



Practical perspective on required skills in the valuechain & required overlaps between actors



Increased recognition of learned skills



Clear Learning outcomes for development of training materials



Flexible for future improvements such as alternative refrigerants



How do task based Unit of Learning Outcomes work?



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Tasks and subtasks
addressing all phases in
construction covering the
whole valuechain

New task ?

ennl es de sk hu fr lt

Title

Advise about heat pump installation

Subtasks

☐

Advise on the technical aspects of climate control system

☐

Identify points for attention and risks surrounding the he

☐

Advise solutions around the heat pump system

Type here to search for a subtask or create a new one.



How do task based Unit of Learning Outcomes work?



Learning goals related to the subtask

New subtask ?

en nl es de sk hu fr it

Title

ULO

Type here to search for an ULO or create a new one.

Professions

Specialisms and technologies



How do task based Unit of Learning Outcomes work?



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What competence is expected for performing the subtask?

What skills does one need to be competent in the subtask?

What Knowledge does one need to apply skills for showing competence with regards to the subtask?

ULO ?

en nl es de sk hu fr it

Competence
Responsible for

Identify the main components of the heat pump in ord

Assessment


☐ Theoretical test


☐ Practical test

☐ Silhouetted by colleague

Skills
Able to

Explain the operation of the main components of the t







Type here to search for Skills or create a new one.

Knowledge
to know

Main components of the heat pump: compressor, con



The mutual and sequential functioning of the main cor





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How do task based Unit of Learning Outcomes work?



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New subtask ?

en nl es de sk hu fr It

⚠ This subtask is used in 2 tasks. Changes are applied to all tasks!

Title: Identify points for attention and risks surrounding the I

ULO: Identify the points for attention and risks, advise soluti

🔍

Type here to search for an ULO or create a new one.

ULO ?

en nl es de sk hu fr It

⚠ This ULO is used in 3 subtasks. Changes are applied to all subtasks!

Competence Responsible for: Identify the points for attention and risks, advise soluti

Assessment:
☐ Theoretical test
☐ Practical test
☐ Silhouetted by colleague

Skills Able to:
Dealing with points of attention and risks
Indicate how bottlenecks in heat pump systems can b

🔍

Type here to search for Skills or create a new one.

Knowledge to know:
Points of attention and risks in heat pump systems

🔍

Type here to search for Knowledge or create a new one.



How will they be used in ARISE



Your company is currently positioned on **level 3** regarding the implementation of BIM



To achieve level 4 the following upskill pathway is needed:

- ✓ Learn the basics of BIM ✓
- ✓ Learn how to apply BIM ✓
- ✓ Learn how to explain BIM ✓
- 4 Become an expert in BIM ✓



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Below the readiness of involved professions are shown



Level 0
Management



Level 0
Designers



Level 2
Labour



Level 5
Finance





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Authentication-blockchain

James Harty | KEA



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ARISE WEBINAR at EVSW, James Harty

Authentication



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Fake it till you make it!

an **aphorism** which suggests that by imitating confidence, competence, and an optimistic mindset, a person can realize those qualities in their real life and achieve the results they seek.



This means “untruths”...



VALIDATION



...and can only be **verified** or
exposed by **validation**.



Blockchain



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- Blockchain uses cryptography to create a **trusted framework of data**.
- This is called a **ledger**.
- Blockchain also means that the records are **decentralised, immutable and readily available**.
- Blockchain can be used to:
 - establish and verify identities,
 - record transactions,
 - register and track assets,
 - share information and more.



- An important benefit of blockchain is that it creates a **single version of the truth**, thereby eliminating redundancies, outdated records and conflicts.
- It also allows organisations to improve **trust**, efficiency and the user experience without replacing legacy systems or losing existing data.
- Most importantly, it can **validate**. This is a back-end feature, which allows employees and employers to remove a painful part of the hiring process where letters and paper versions of documents must be supplied and verified.



East Coast Polytechnic Institute University



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- East Coast Polytechnic Institute University alumni can now have their degrees issued and stored digitally using technology first associated with cryptocurrency.
- ECPI is one of the first to issue degrees via Blockchain technology, which provides secure, immediate verification.
- And it means that graduates no longer need to contact the registrar's office to have a verifiable degree sent to a prospective employer or for any other purpose.

<https://www.govtech.com/education/new-hed-university-in-north-carolina-issues-degrees-using-blockchain.html>



BLOCKCERTS

- Blockcerts is an open standard for building apps that issue and verify blockchain-based official records. These may include certificates for civic records, academic credentials, professional licenses, workforce development, and more.
- Blockcerts consists of open-source libraries, tools, and mobile apps enabling a decentralized, standards-based, recipient-centric ecosystem, enabling trustless verification through blockchain technologies.



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The Blockcerts logo consists of a green icon on the left, made of several horizontal lines of varying lengths, resembling a stylized 'B' or a blockchain structure. To the right of the icon, the word 'BLOCKCERTS' is written in a bold, white, uppercase, sans-serif font. Below this, the tagline 'The Open Standard For Blockchain Credentials' is written in a smaller, white, sans-serif font.


BLOCKCERTS
The Open Standard For Blockchain Credentials




BLOCKCERTS



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 **BLOCKCERTS**
The Open Standard For Blockchain Credentials

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Blockcerts Universal Verifier

[Verify](#)

[Choose JSON file](#) (you can also drag & drop your file).

 BLOCKCERTS



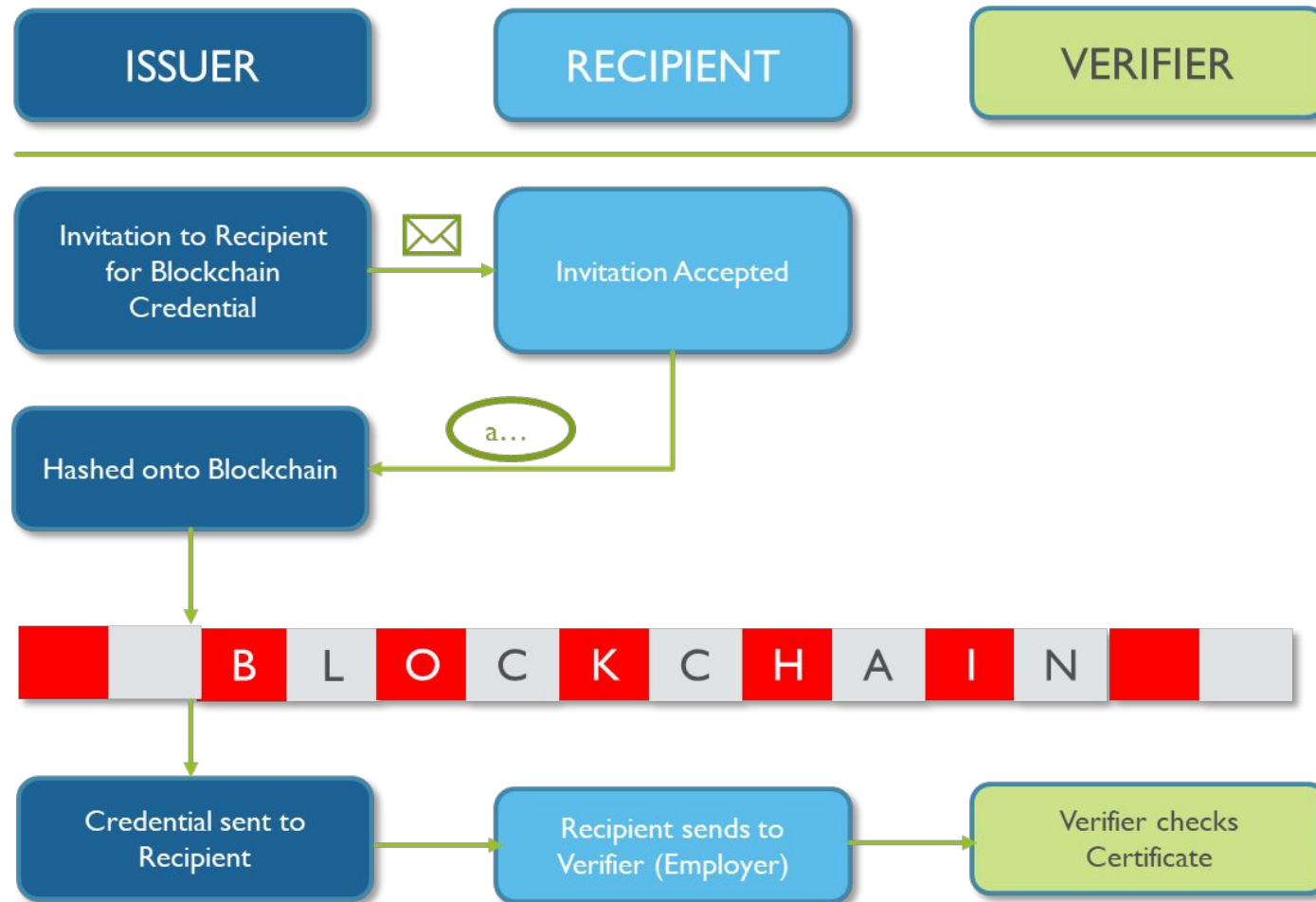
Open Standard

- Blockcerts uses and encourages consolidation on open standards. Blockcerts is committed to self-sovereign identity of all participants, and enabling recipient control of their claims through easy-to-use tools such as the certificate wallet (mobile app). Blockcerts is also committed to availability of credentials, without single points of failure.
- These open-source repos may be utilized by other research projects and commercial developers. It contains components for creating, issuing, viewing, and verifying certificates across any blockchain. These components form all the parts needed for a complete ecosystem.

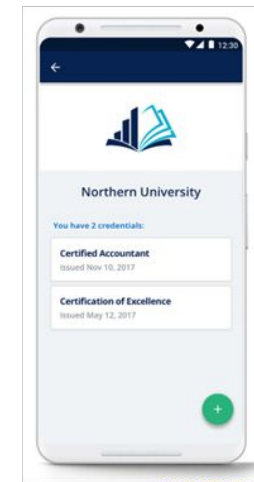


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Open Badges Validator Core

- Open Badges Validator Core is a python package designed to verify the validity of Open Badges based on a variety of input sources and present a useful interface for accessing their properties and validation information. HTTP, Python and command line APIs are provided.
- Badges can be collected and used to improve one's presentation both in Curriculum Vitae and Portfolios. Now then can be verified across borders and be have competences validated in other jurisdictions.



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```
Request URL: http://localhost:8000/results
Request Method: POST
Accept: application/json

-----WebKitFormBoundaryaBQaPAkvF3DXppQ7
Content-Disposition: form-data; name="data"

https://api.badgr.io/public/assertions/Ph_r3S6jTqqkHNRQUKbqQg?v=2_0
-----WebKitFormBoundaryaBQaPAkvF3DXppQ7
Content-Disposition: form-data; name="image"; filename=""
Content-Type: application/octet-stream

-----WebKitFormBoundaryaBQaPAkvF3DXppQ7
Content-Disposition: form-data; name="profile"

{"email": "nate@ottonomy.net"}
-----WebKitFormBoundaryaBQaPAkvF3DXppQ7--
```

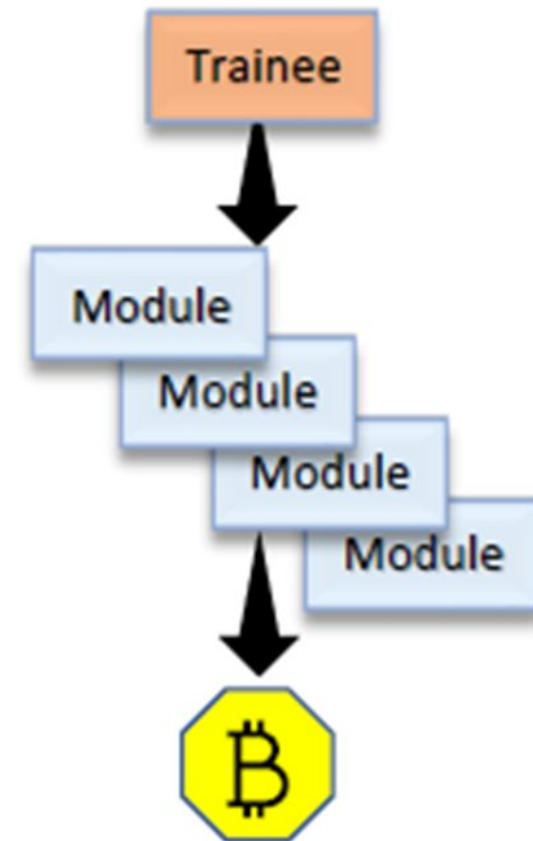


What is A CERTcoin (competences recognised through blockchain) added value to European CVs?

- Many companies succeed in offering **loyalty reward programmes** to enhance repurchase rate, for example, the mileage of airlines (Liao, Teng et al. 2019).
- Liao, Teng et al propose an architecture of Blockchain-Based Cross-Organizational Integrated Platform (BCOIP) for issuing and redeeming reward points. BCOIP integrates a number of companies (i.e. countries/regions/authorities) into a consortium and issues electronic reward points (**CERTcoins**), which are convenient to collect and can be circulated across companies.



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Measurable success

Dijana Likar | IECE



IMPACT OF SKILLS ON BUILDINGS' PERFORMANCE



Application of digital skills provides measurable effects on energy performance of buildings.

- As confirmed by the **ARISE team** previous research and demonstration through case studies:
 - at least **10% of the impacts** are due **to the digital skills improvement** and implementation for optimization of energy performance;
 - this goes up to **20% when renovation comes in place**.
- **Optimization** is based on a multi - scenarios analysis **of efficient energy consumption and costs** (capital and operational), by a two – criteria approach.
- A **reduction of performance gap** was identified of **minimum 20%**, assigned **to improvement of skills** of professionals engaged in construction and quality control.
- Improvement of operation schedule based on **skills for facility management and maintenance** optimization results in **at least 25% of reduced energy consumption** during the operation and usage of buildings.



SKILLS MEAN GWH and EUR – Design stage



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	EUI Min	EUI Mean	EUI Max	Cost Min	Cost Mean	Cost Max	Deviations from the amount of cost of the Basic model	Deviations from the amount of energy of the Basic model	Deviations from the amount of energy of the Baseline Scenario
Alternative	[kWh/ m ² /yr]	[kWh/ m ² /yr]	[kWh/ m ² /yr]	[EUR/ m ² /yr]	[EUR/ m ² /yr]	[EUR/ m ² /yr]	[EUR/m ² /yr]	[kWh/m ² /yr]	%
Base Run	215	220	227	40.1	41.5	43.2	0	0	0
1	144	213	320	22.3	29.5	44	-12,0	-7	3,3
2	138	205	308	21.2	28.1	42	-13,4	-15	6,8
3	189	204	201	21.9	23.2	24.9	-18,3	-16	7,8
4	130	194	292	19.6	26.2	39.3	-15,3	-26	13,4
5	130	193	291	19.5	26	39	-15,5	-27	14,0
6	128	191	288	19.1	25.6	38.4	-15,9	-19	15,2
7A	165	172	178	13.8	15.2	16.9	-26,3	-28	27,9
7B	137	143	150	11.7	13.1	14.2	-30,1	-77	52,8
8	110	110	110	9.63	9.63	9.63	-31,9	-110	100

Figure: Cost – energy efficiency optimization by implementation of BIM; Source: BIMcert research

Scenario analysis:

- Building envelope
- Building orientation
- Climate scenarios
- Occupancy schedule
- Interior arrangement and functionality

Optimization function:

$f(x) = \text{Final energy costs} + \text{CAPEX} + \text{OPEX of construction} = \min$
while preserving health, safety and comfort of occupants



SKILLS MEAN GWH and EUR – Operation stage

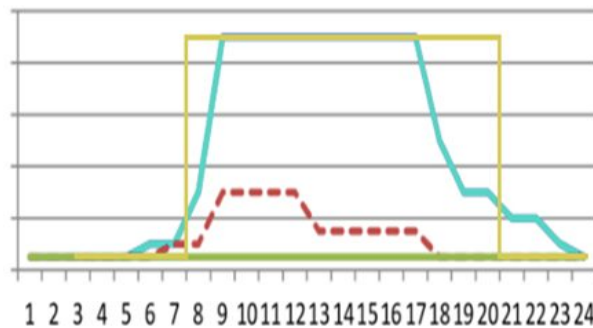


Figure: Optimization of energy consumption in a typical 24 hour operation regime, by simulation in a BIM energy model; **Source: BIMcert research**

Yellow line – Designed energy consumption,
Blue line – Optimized – effective energy consumption
Dashed line – Energy consumption during weekend

- Buildings are usually 'oversized' in the design stage
- Energy consumption is optimized in operation stage, using Building Energy Management system.
- Measurable effects: in GWh of saved energy and Euros of saved costs.

SKILLS HAVE A MEASURABLE VALUE, FOR THE LEARNER, THE EMPLOYER AND THE ASSET



- Improvement of **skills can be converted into measurable units of:**
 - **GWh of clean energy generation,**
 - **millions of kWh of reduced final energy consumption and**
 - **millions of Euros of savings,** transferred into **investments in clean, carbon - free energy.**
- **Investing in skills means investing in future, of individuals, professionals, organizations, sectors and environment.**
- **Digital environment** for information exchange provides not only **a higher efficiency** of construction processes and **lower costs** of project development and execution, but also **promotion of sustainability and smart indicators of buildings.**



SKILLS ARE NOT ONLY AN INVESTMENT



- **Improved** capacity and **competence** of upskilled professionals **brings three – fold benefit:**
 - improved performance value and employability of the worker,
 - improved performance of created products and services,
 - **Improved performance of buildings** – their energy effectiveness, climate resilience, carbon neutrality.
- **Return On Investment** in skills **is measurable in: GWh** of clean energy generation, **tonnes of GHG** reduction, **Euros of savings** of primary energy **and investments in carbon – free sources**, construction process savings.
- **It becomes effective immediately.**
- **Skills are an investment that returns to all.**
- **And provide a life - long revenue.**



ARISE MISSION: SKILLS AND IMPACTS THEREOF BECOME MORE RECOGNIZED BY DIGITAL DELIVERY



- Opportunities of today, for **availability and accessibility of knowledge and education**, provided **by digital learning delivery and transferability of learning records**, should be used by **younger and senior learners**, and supported by both academia and industry, **taking in consideration benefits it brings to the professionals, employers, industry and assets.**
- **ARISE concept** of improvement and recognition of skills **enhances the impacts on construction ecosystems and their environment.**



Summary-what success looks like

Paul McCormack | Belfast Me



Success is.....

A vocationally mobile workforce.

An agile well equipped workforce with the necessary quality skills to utilise and realise their true potential.



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21880128
Virtualista | Dreamstime.com



How do we measure success?



For too long success has been measured in financial terms.

We must harness the full potential of digitalisation to address the current obstacles in the training market, whilst delivering the future skill sets required by industry and addressing the realities of the current labour market.



Success in 2022 and beyond



- Success is personalised training, Non Linear pathways, Choice, A Work - life - training balance
- Skills intervention - not additionality
- Flexible, agile learning that makes intelligent utilising digital technology in a sustainable learning environment that stimulates, engages and gets the best out of people.



ARISE meeting Need



ARISE is developing and delivering an on-demand training scheme for digitalisation towards sustainable energy tools, housed and delivered in a user friendly methodology designed to stimulate and engage via the ARISE platform, aimed at SMEs, PAs, and other stakeholders.

Transforming the education interface seeks to improve the core process of skills delivery and training effectively leveraging data and technology processes to meet the twin goals of fulfilling customer expectations and meeting industry need.

Leveraging digital transformation ‘system value’ to stimulate, enhance and accelerate the skills process



Question and Answer session and Event closure

Paul McCormack | Belfast Me



Conclusion



Skills matter; we must look to foster a digital culture that encourages continuous learning, agile development, and innovation.

Digital transformation of skills and training delivery is well underway, but must be accelerated in order to reach all parts of society.

With enhanced skills across the workforce we can close the skills gaps, and empower industry to move ahead in Industry 4.0



Thank you!

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Partners



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