BIMplement

Towards a learning building sector by setting up a large-scale and flexible qualification methodology integrating technical, cross-craft and BIM related skills and competences.

www.bimplement-project.eu

Report:	**D2.2 Five national results of usability testing**
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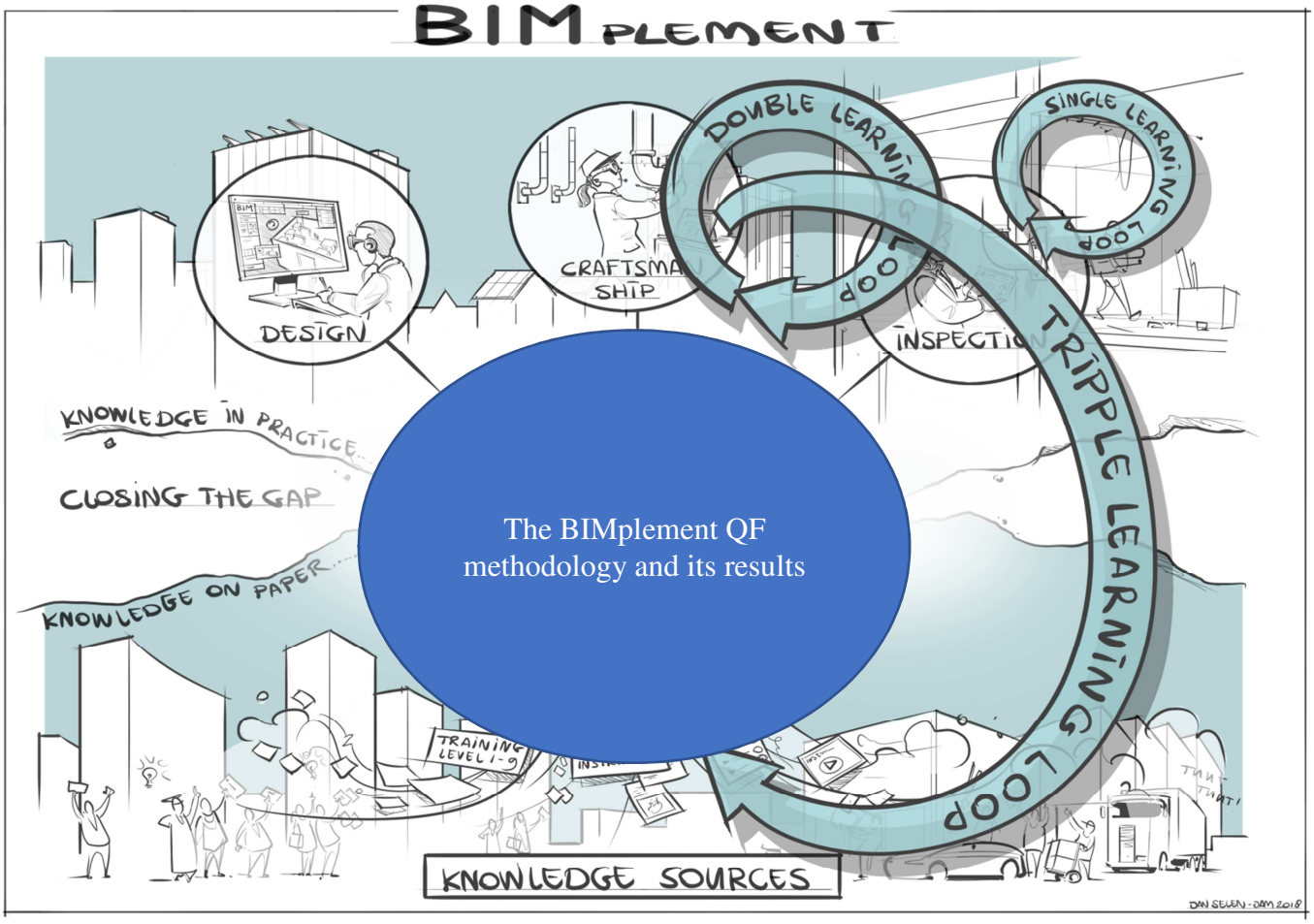
Version 1	January 31, 2018	First version
Version 1.1	February 7, 2020	Added: - an overall summary of the interviews and conclusions - For each country a list of stakeholders involved - Numbers and captions for illustrations and tables

1. Introduction

Objective of BIMplement workpackage 2 was to develop a BIM-enhanced Qualification Framework (QF) empowering nZEB construction and renovation. This as the engine needed to led relevant instruction and inspection content flow to the right person, on the right time and on the right spot.

The method is also in order to enable and facilitate several 'learning loops.



01 Placement of the BIMplement QF methodology within BIMplement

An initial version of the methodology was developed in three iterations during workpackage 2 task 2.1 'Drafting the methodology'. During implementation in workpackage 3 within the consortium four additional improvement iterations have been made. As last step in task 2.3 the methodology is finalized and a Qualification database is developed in co-production with H2020 NEWCOM and documented in an easy to use userguide.

Goal of this deliverable is to document the validation of the methodology in an iterative dialog with National stakeholders in Poland, France, the Netherlands, Lithuania and Spain. Because the iterative character of the development process it was decided to postphone the dialogue with national stakeholders. As a result not only the drafted methodology the methodology and the results of the iterations in T2.1 are discussed with national stakeholders, but also the results of WP3 iterations.

Attached to this deliverable are the slides of the presenation used for these discussions.

2. Executive summary

As preparation for the stakeholder interviews a Powerpoint presentation has been developed that addresses visually the goal of BIMplement, iterations in the development process and the to be expected results. In each BIMplement country at least one stakeholder interview has been done.

In general it can be stated that the methodology is clear a few improvements especially around addressing a complete project life-cycle have been suggested.

Questions arise mainly on the process and way of implementation.
Points of attention are for example:

- Who will be responsible for adding needed data to the BIM model?
- What kind of tools will really empower the blue collar workers?
- How to address social aspects of the implementation, such as responsibilities.
- How to come to a basic level of understanding in the network of stakeholders needed to be succesfull.

Country	Summary & conclusions
Spain	Methodology is clear, please add demolition stage as BIM can provide a lot of valuable input in this stage. Targeting blue collars can have an added value Blue collars need very simple tools such as viewers, check lists, etc. Training for professionals should be focused on the advantages that BIM offers to each stakeholders in each stage
France	Methodology is clear and logical Interdisciplinary approach is valuable as each craft has to take care of what other crafts are doing A qualification is fine, but trainings contents have to be adapted (« contextualised ») to each workplace in order to be effective Important challenge will be addressing the competencies of involved architects and engineers, as well as of the clients. These competencies have to be taken into account by BIMPlement, in order to reach the blue collar workers
The Netherlands	The methodology fits in the next step in creating better (nZEB) buildings Making use of BIM by blue collar workers is for many companies quite new. It will focus mainly on quality control A good qualification will surely help to get the 'right man/woman for the job' and also help the industry to develop a good supply and demand in BIM training and education There is special interest in how the flow of information (during the life cycle of the building) can be linked to the qualification framework in practice
Poland	Methodology is clear

	Question is: who will be responsible for adding required data enrichments to the BIM-model (and to what extent automation is possible) Training for all stakeholders about using basic BIM tools can have a positive impact Implementation of BIM technology on construction site requires changes in the current style of work. The social aspect of adopting new solutions is very important
Lithuania	Willingness to apply the methodology They are well aware of issues related to BIM and involvement of different types of employees into the process Further exploration in the form of a real implementation is needed to 'really taste the added value'

Table 1 : Summary of the most important elements from the interviews

3. Overview of interviewed stakeholders

Country	Interviewed stakeholders
Spain	INNOVACIÓN TECNOLÓGICA BIM Group – BIM Consultant
France	CONSTRUCTYS – Educational fund
The Netherlands	Root BV (high end BIM modelling company) Solidu (consultancy on BIM use on the construction site) Based (consultancy on BIM implementation) BIMpuls (consultancy and training in BIM for installation companies) Anno1809 (training technical and social BIM skills) BuildingChanges (BIM consultancy) BIR (national Building Information Council)
Poland	Several meetings at construction sites
Lithuania	YIT Lietuva and the Lithuanian Builders association

Table 2 : Overview of interviewed stakeholders

4. Followed approach for the stakeholder interviews

As a preparation for the stakeholder interviews a Powerpoint presentation has been developed that addresses visually the goal of BIMplement, iterations in the development process and the to be expected results.

In each BIMplement country at least one stakeholder interview has to be done.
These interviews are countrywise documented in the reminder of this deliverable.

The elements of the interviews are structured in the following indicative agenda:

1. Introduction of BIMplement (using the BIMplement presentation) 15 minutes
2. A step-by-step presentation of the developed aspects within the methodology Using the D2.2 presentation 30 minutes

   Some indicative questions that can be answered:

   a. Do you understand the presented elements of the methodology?
   b. Are there elements missing?
   c. How do you estimate the chance of connecting the QF to the BIM-model?
   d. Do you have suggestions for connecting the QF with the BIM-model?
   e. How do you think a methodology that involves blue collars will improve the final quality of buildings?
   f. Ventilation and air tightness are key for nZEB buildings. What are the most common mistakes that you find in the construction of buildings regarding these topics? Do you think that presented methodology of the BIMplement can help solve these problems?
   g. Feel free to add more questions!

3. Looking forward to implementation of the methodology 15 minutes

	For more background information take with you a copy of D2.3 and when stakeholders are also interested in the technical content a copy of D3.1.

5. Results from Spain

Meeting with representative on INNOVACIÓN TECNOLÓGICA BIM Group.
This group is working on the level of implementation of BIM in the Valencian Community, specifically on how to implement this technology in public procurement.

02 Stakeholder interview in Spain

Main conclusions:

- Methodology is clear enough. The approach is good since skills and competences required are different depending on the professional activity and the stage in the construction process. For instance: public procurers don't need to know how to model a project in BIM, but they need to understand the model, use viewers, understand how to include BIM criteria in public procurement, etc.
- BIM training for blue collars is something that is not happening in Spain and could have an added value. Training for them, as well as tools, should be simple in order to get them involved (viewers, check lists, etc.)
- In the Valencian Community, training for professionals should be focused on the advantages that BIM offers to each stakeholders in each stage. There are many courses for BIM modelling. This will depend on the level of BIM implementation in each country.
- RIBA workplan doesn't include demolition as one of the stages in the construction process. It would be good to consider also this stage in the methodology. Even though it is not directly related to nZEB, it is useful to consider effective construction and demolition waste management practices to favour a circular economy. Quantitative waste predicition is crucial for waste management. BIM can support the collection and management of information of materials thorugh smart processing of data in the pre-demolition stage. It can be also used for drafting waste audits, for instance, actual waste streams that will be produced depending on the processes planned (disassembly, removal, demolition) for the different elements in the building.

6. Results from France

Stakeholder interview on developed methodology for BIM-enhanced Qualification Frame work empowering nZEB construction and renovation

Meeting with representatives of CONSTRUCTYS

The french organisation which, among other missions finances the trainings of SME's white and blue collar workers in the building sector & analyses the training needs

They Provide information and advice on training schemes

03 Stakeholder interview and Constructys

Main outcomes

- The methodology is clear and logic.
- Airtightness is a cultural issue, that has to be shared by all the crafts.
- Each craft has to take care of what other crafts are doing
- The use of new materials contributing to airtightness requires specific skills.
- What competencies are needed to use BIM at the workplace ? This is a key point.
- The trainings contents have to be adapted (« contextualised ») to each workplace : this means that «fils rouges » (a script ?) have to be written for each of them.
- BIMplement has to take into account the fact that the cultures of white and blue collar workers are not the same in the « latin » countries and in the « nordic » countries.
- The workplace trainers have to be flexible and pragmatic – not « academics ».
- The QF should not be « set in the marble », but take into account the outcomes from the workplaces.
- One important problem is linked with the competencies of involved architects and engineers, as well as of the clients. These competencies have to be taken into account by BIMPlement.
- BIM can/should be a tool that helps the crafts/workers to better cooperate/collaborate at the workplace

7. Results from The Netherlands

The Netherlands have a lot of specialized organizations who are working on improving BIM use, information quality and worker skills. With several front runners on BIM there have been meetings to assess the needs of the industry and if the BIMplement methodology and results would fit these needs. Amongst others, these companies are:

- Root BV (high end BIM modelling company)
- Solidu (consultancy on BIM use on the construction site)
- Based (consultancy on BIM implementation in construction and engineering companies)
- BIMpuls (consultancy and training in BIM for installation companies)
- Anno1809 (training technical and social BIM skills)
- BuildingChanges (BIM consultancy on cooperative knowledge transfer)
- BIR (national Building Information Council)

In general, BIM maturity in the Dutch construction sector is high, but mainly focusses on white collar workers. Only a few companies have taken steps thus far, to make BIM usable for blue collar workers. This is mainly due to cultural difference between white and blue collar workers and the focus on technical skills, rather than digital skills. However, more and more companies are turning their sights to using BIM based tools for quality control and transferability and reuse of information (by creating a 'digital twin' of the building).

There is a growing need for professional education and training. But right now, BIM training and education is structured, nor fully mature and (lack of) funding is a serious issue. Aside from software vendors (who train technical, software skills mostly), there are only a handful of trainers and educators. For clients (contractors, engineers, etc) it is not easy to discern between suppliers of training and education. However, both clients and suppliers feel they will benefit if there were a structured qualification framework. Clients will be helped with educating their workers structurally and can choose the best form to help them, and suppliers will be helped to create the best content and develop new and better training materials.If such a qualification framework was to be integrated in IFC models, it would surely help to get the 'right man/woman for the job' and also help the industry to develop a good supply and demand in BIM training and education.

Sustainability in The Netherlands is a rapidly evolving business in the built environment. The governement is implementing more and more strict laws on energy efficiency, used materials and reusability. Every new building from 2020 on needs to be nZEB and the industry is working hard to meet these demands. With BIM (almost always) being the norm in every project, software vendors and front runners are developing solutions to integrate nZEB with BIM.

All consulted companies applaud the BIMplement approach as they see it as a great help in taking the next step in creating better (nZEB) buildings. They are especially interested in how the flow of information (during the life cycle of the building) can be linked to a qualification framework, so every organization that is involved can benefit.

The main riscs that are identified are related to culture (how do we get blue collar workers in a proactive mode?), to finance (who is willing to pay for this?) and to flexibility (how do we make the results usable in every project and for every person).

8. Results from Poland

Results from meetings organized at construction sites:

- Methodology is clear enough. However there is a fear on who will introduce the necessary data to the BIM models and whether that person will do it in the correct way.
- BIM training for blue collars is something that is not happening in Poland. Construction companies that do their work using own craftsmen may have bigger interest in training of employees compare to the General Contractors that subcontract companies. However training for all stakeholders about using basic BIM tools can have a positive impact.
- White and Blue collar workers do not have enough trust to BIM models and information insert.
- To convince construction workers to use BIM tools we must show clearly what benefits it will bring in their daily work.
- Implementation of BIM technology on construction site requires changes in the current style of work. The social aspect of adopting new solutions is very important and should be taken into account before start trainings.
- The big challenge is to show how the money invested in BIM tools will provide benefits at a later stage.
- BIM tools should be presented as something that will bring benefits for construction workers and not as a next additional tasks for which they will have to spend more time. Whether the BIM tasks replace some of their previous traditional tasks?
- In Poland there is still no formal regulations regarding the BIM, so all stakeholders still need to work using 2D documentation according to the present regulations.
- Lack of knowledge on how to include BIM aspects in the contracts with subcontractors leads to the problem with the enforcement of using the BIM methodology.
- Presenting works using 4D BIM models can bring benefits in better understanding of the sequence of work by construction workers.

9. Results from Lithuania

For the BIMplement implementation in experimental sites, at the end of 2018 (December) Regional Innovation Management Centre and Lithuanian Builders association started a round of contacts to find place for pilot projects that could fulfill the BIMPlement team developed initial criterions for the selection of projects. Main priority for selection of contractors for Experimental sites in Lithuania was selection from Lithuanian companies that already have initial experience within NZEB and BIM related projects. Also, as priority for selection there were included some contractors that have started their journey within some real BIM projects now and are planning to finish them till the beginning of 2020. (Remark: Energy efficiency improvement requirements, NZEB (A++ and higher) are compulsory from the government for all new buildings from 2019 in Lithuania). The Initial list of potential contractors for BIMPlement experimental sites was taken from WEB page www.digitalconstruction.lt, from the "BIM awards" and "Companies creating BIM" in Lithuania lists https://skaitmeninestatyba.lt/imones/. First contacts and initial "go for the BIMPlement experimental site" were agreed with YIT Lietuva.

During the conversations with YIT Lietuva the BIMplement aims and methodology is presented to have an initial reflection of possible needs of the company as well as they willingness to test the methodology at real construction sites. As an example, during the meeting YIT Lietuva expressed their intention to apply methodology at their construction site, while indicating the need to use BIM for quality control of the work of the subcontractors including those operating in Ventilation and air tightness areas. The company already has good examples of the use of BIM and building of NZEB buildings, and, therefore, is very well aware of issues related to BIM and involvement of different types of employees into the process. It also uses a specialized software, thus, there will be a need to use suggested methodology, while tailoring it to the company's needs and the technology base that they already have. Futher exploration of methodology will only be possible when real implementation steps will be started.

04 Meeting with YIT Lietuva

COLOFON

BIMplement

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The information in this publication does not necessarily represent the view of the European Commission.