

Evaluation reports

10 BIM GAME Experimentations

BIM GAME I.O. #7

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1 Introduction

In order to test our BIM GAME tool we organized 10 experimentations with students or professionals in 4 countries. A first experimentation (Experimentation #0) was held in Oldenburg (Jade Hochschule University) with a university teacher team in order to test the first BPMN approach. (Results in annex A).

We create a methodology to follow these 10 experimentations with several criteria before experimentation, during experimentation and after experimentation.



Figure 1 - Experimentation #0 - Oldenburg (Germany)

☞ Have a look on Annex A: Oldenburg test results

1.1 Skills and Learners Commitment

Before the experimentation, we build a BPMN diagram which precise the different phases of the scenario and what the learners have to do (list of actions). We plan also an interview plan. For some scenarios, we need to identify the aiming skills and to write a pre-test to evaluate them. At least, a questionnaire about perception (1 to 5 scale) can be made: appreciation of the collaborating work, different roles, new skills, scenario modification....)

During experimentation, time spent by phase has to be monitored (information, execution, debrief), time spent by action, identify actions close to skills, etc....

After experimentation, we can focus on the link between spent time and motivation. A student can criticize the choice of roles (balance of roles, interest and duration of tasks, cognitive overload for the learner, stress, ...). An interview of the scenario's catcher can be done. The teacher give a post-test on aiming skills, he also has got a justification of non-assured skills by tracing activities (missing actions for example). The learner can make new propositions about alternative validations methods. The credibility of the situations can be analysed as well.

1.2 Trainers satisfaction

Before experimentation, an pedagogical target list has to be written: collaboration, skills, integration in the degree course, timing,). We can plan also a trainers tasks list (observation, active role in evaluation,) and a assessment grid of the deliverable.

During experimentation, the teacher can add or modify fields in the assessment qtrid if necessary.



Figure 3 - "MUE" Experimentation - Besançon (France)

After experimentation, the teacher can be interviewed on his ergonomic point of view, give some suggestions about targets / scenario/ The role of the trainer (disponibility, total number, cognitive overload, place of the scenario, credibility of the situations) is also important. And of course, he can criticize the assessment grid of the deliverable.

1.3 Collaboration

Before the experimentation, important points of collaboration have to be underlighted in order to observe if those points are crossed during experimentation. After the session, we analysed several factors:

- Dependence to others to continue the process of the scenario
- To analyse and conclude the legitimacy of the collaboration
- To modify the scenario to include new rewards
- Form for learners: collaboration, with or without, what does it change for me ?
- To draw conclusions and eventually modifications of the scenario

2 Experimentations

2.1 List of experimentations

Here is the list of BIM GAME experimentations:

- Experimentation #0 - Oldenburg (Germany) - 11/2017 (Annex A)
- Experimentation #1 - Wuppertal (Germany) - 11/2017
- Experimentation #2 - Mouchard (France) - 01/2018
- Experimentation #3 - Liège (Belgium) - 03/2018
- Experimentation #4 - Wuppertal (Germany) - 09/2018
- Experimentation #5 - Besançon (France) - 11/2018
- Experimentation #6 - Oldenburg (Germany) - 02/2019
- Experimentation #7 - Brussels (Belgium) - 03/2019
- Experimentation #8 - Brussels (Belgium) - 04/2019
- Experimentation #9 - Valencia (Spain) - 05/2019
- Experimentation #10 - Besançon (France) - 06/2019

2.2 Organization

Each experimentation has been organized by the hosting BIM GAME partner. The four last experimentations has been linked with the 4 BIM GAME events in order to show to the participants how the BIM GAME works.

3 Experimentation #1

Professor Carla PÜTZ organized the first test of the BIM Game with students. On 23 and 24 November 2017, the BIM Game team was in Wuppertal for a test of the platform with the students of the University of Architecture. (<https://www.uni-wuppertal.de/>)

The first tests are very encouraging. The students were able to give their impressions on the realism and ergonomics of the BIM GAME. Thus, they were able to highlight the strengths and the parts to rework. Coming soon, the team will make improvements to the platform and the tested scenario. The user experience is important to implement an easy-to-use tool. Trainers and learners must be able to find their bearings quickly so that training is efficient. At mid-term, the BIM Game keeps its commitments and will facilitate the collaborative training of building professionals in Europe.

3.1 General information

Date: 11/2017

Location: Wuppertal

Website content : <https://bimgame.eu/en/test-with-students-from-the-university-of-wuppertal/>

Number of students : 15

Teacher: Carla Pütz

Title of the scenario: Finding errors in model

3.2 Pitch and roles

Architect and structural engineer have send their models for the clients building to the BIM Coordinator to combine and check them.

- Client
- BIM Coordinator
- Architect
- Structural Engineer

3.3 Feedbacks

All the feedbacks of the experimentation on the BIM GAME video channel:
<https://bimgame.eu/en/videos-en/>



Figure 4 - Preparation of experimentation #1 - Wuppertal (Germany)

4 Experimentation #2

On January 24 and 25, 2018, Mr. Sébastien Marmot, headmaster of the Mouchard Lycée du bois, welcomed members of the European project BIM GAME.

For the occasion, students in BTS SCBH were testing a scenario of the platform. Then they shared their experience so that the team could improve the training. To accompany the test, Professor Jesús Alfaro, from the University of Architecture of Cuenca, made the trip.

The presence of Mr. Hicham Bennani, director of the Institute of Companions, and Elie Bouche, architect at the Atelier des Montaines, have enriched the exchanges, with both European partners and students.

The test of the BIM GAME by the students of the high school of the wood made it possible to show, once more, that the work in transversal team is not obvious for all in the middle of the building. The vision of the team's professionals through the presentation of their respective projects has led everyone to evolve in their vision of the construction process.

4.1 General information

Date: 01/2018

Location: Mouchard (France)

Website content : <https://bimgame.eu/en/winter-is-coming-but-the-bim-game-has-a-burning-topicality/>

Number of students : 15

Teacher: Mickaël Langlet

Title of the scenario: Window scenario

4.2 Pitch and roles

It appears that a window is too close from a corner joint. The scenario consists to present three solutions in order to choose one which fits best to the project.

- Construction Staff 1
- Construction Staff 2
- Architect
- Economist
- Thermal Engineer
- Construction Manager (Teacher)

4.3 Feedbacks

All the feedbacks of the experimentation on the BIM GAME video channel:

<https://bimgame.eu/en/videos-en/>

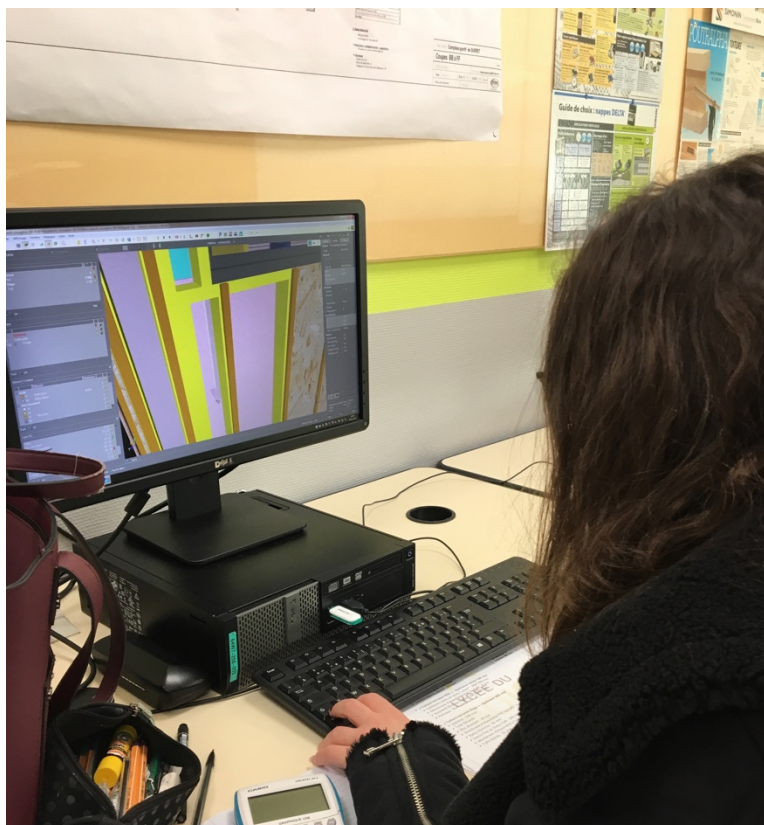


Figure 5 - Student at work on scenario - Mouchard (France)

5 Experimentation #3

The BIM GAME team was meeting at the Faculty of Architecture of Liège for a second test. Lucie JEANBAPTISTE and Abdelkader BOUTEMADJA organized this second test of the BIM Game on a new scenario. The feedback of the participants, professionals and students, will be of great help to change the project.

In a second time, Abdelkader BOUTEMADJA presented plugins integrable with a 3D architecture software.

Then, the various partners exchanged on the circular economy in the building following a presentation by Charlotte DAUTREMONT. <http://charlottedautremont.com/>

Finally, the evolution of BIM's professions will lead to consider the BIM Game as an adaptable tool to the context. Jesus ALFARO gave an overview of the various BIM professions and their level of skills. Thus, the platform will have to be able to work on these emerging businesses in a collaborative way.

5.1 General information

Date: 01/2018

Location: Liège (Belgium)

Website content : <https://bimgame.eu/en/a-new-test-for-the-bim-game-in-liege/>

Number of students : 15

Teacher: Abdelkader Boutemadja and Lucie Jeanbaptiste

Title of the scenario: Building permit issuance

5.2 Pitch and roles

Learning using the Sketchup software for the integration of BIM in an architectural process that takes the different stages since the meeting between the client and the architect until the 3ling of the planning permit.

- Client
- Architect
- Administration
- Engineer
- Construction Manager (Teacher)

5.3 Feedbacks

All the feedbacks of the experimentation on the BIM GAME video channel:

<https://bimgame.eu/en/videos-en/>



Figure 6 - Experimentation at ULG - Liège (Belgium)

6 Experimentation #4

Wuppertal University (<https://www.uni-wuppertal.de/>) hosted the BIM Game team on 4 and 5 September 2018.

To begin, students tested a new scenario designed by Professor Carla PÜTZ.

The teams had to make a 3D construction with 100 Duplo parts in accordance with precise specifications. Then, other teams received these 3D digital models and had to build them really. The heart of the scenario was the transmission of good information and interoperability. In fact, architects and builders did not use the same software. Some worked with Revit and others with "BIM vision".

Finally, the jury voted the winner the most audacious project.

During the experiment, a team from the University of Wuppertal was filming to realize soon an explanatory video of the BIM Game.

6.1 General information

Date: 09/2018

Location: Wuppertal (Germany)

Website content : <https://bimgame.eu/en/wuppertal-university-bim-game/>

Number of students : 15

Teacher: Carla Pütz

Title of the scenario: Duplo

6.2 Pitch and roles

Build a house for an individual thanks to the specifications provided at the beginning of the scenario. The expected deliverables are both a 3D model and a real model built in Duplo. Duplo parts include an RFID chip that links the virtual model to the real model.

- Client
- Architect
- Craftsmen
- Engineer
- Construction Manager (Teacher)

6.3 Feedbacks

All the feedbacks of the experimentation on the BIM GAME video channel:

<https://bimgame.eu/en/videos-en/>

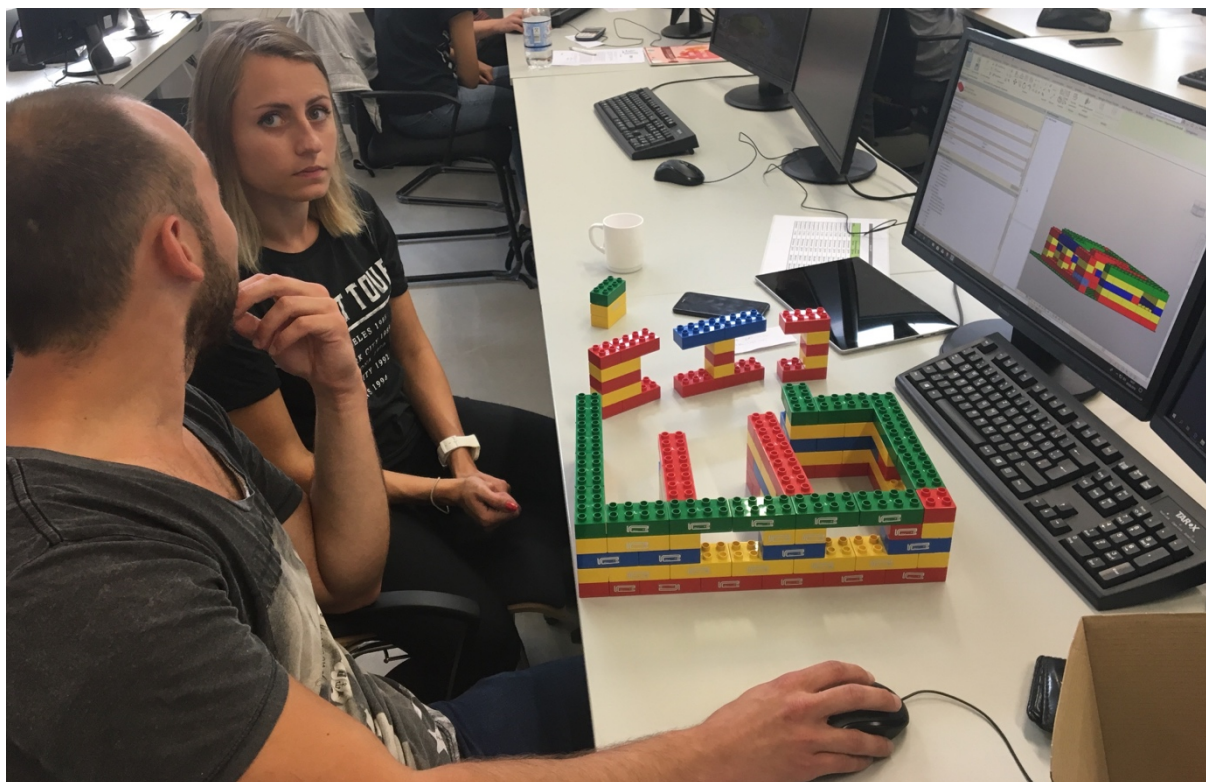


Figure 7 - Experimentation with duplos - Wuppertal (Germany)

7 Experimentation #5

40 participants, 6 countries represented: Spain, Italy, Poland, Belgium, Germany, France. The European meeting of the project "BIM GAME" has mobilized widely in partner universities. A challenge for four transnational teams: to design the "MUE pavilion" in two days! It is a mobile structure prefiguring what will be the University House of Education futures (building and mode of operation).

The GIP FTLV of the Besançon Academy is engaged since 2016 in the project "BIM Game". Building Information Modeling (BIM) technology is a process involving the creation and use of an intelligent 3D model. It is based on the collaboration between the different trades of a constructive project.

Students have imagined many avenues for use concerning this experimental space. In addition, they thought of the project MUE with a broad opening to the outside. The game principle is based on the dialogue between a real model built in "lego" bricks and a 3D digital model. The session is part of the educational experiments implemented in the project encouraging innovative devices for peer collaboration.

The competition took place on 14 and 15 November 2018 at the Arsenal site.

Prize list :

The jury awarded five prizes to the teams according to several themes:

- "Sustainable Materials": the sustainability of the building, the use of recyclable materials

- "Quality Parameters": the best BIM setting of the project
- "Cheapest Builder": the most economical building
- "Smartest Building": the ease of assembly / disassembly of the structure
- "BIMest Team": the most efficient team at the BIM process level

The next competitions will take place in the partner countries, and a larger closing event will take place in Besançon before the summer of 2019!

The "Pavillon MUE" is financially supported by the Greater Besançon Agglomeration Community.

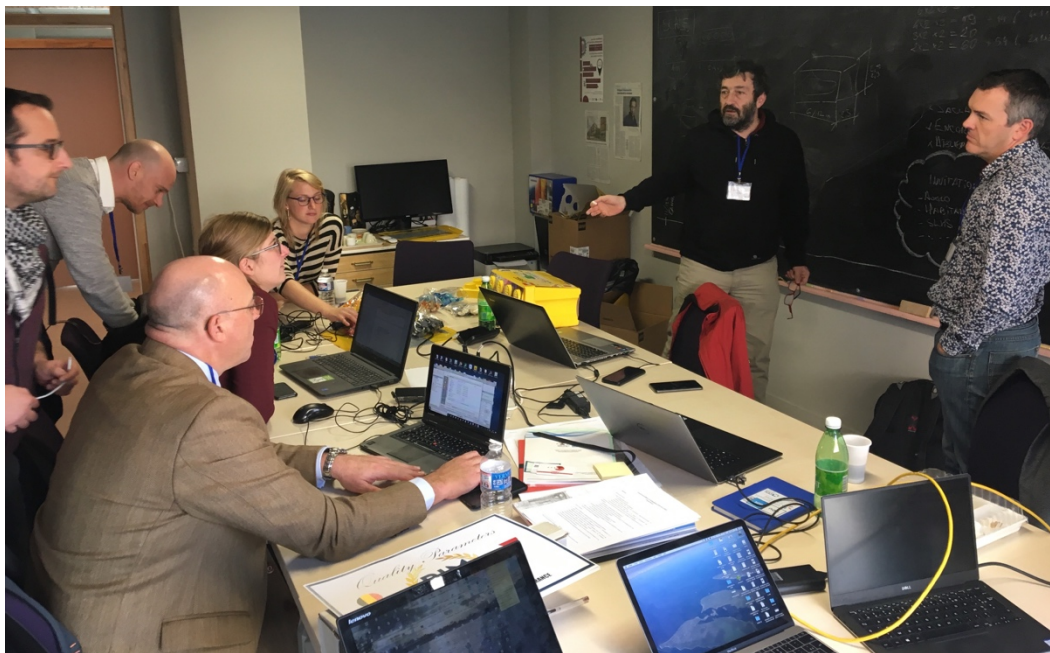


Figure 8 - Preparation of "MUE" scenario - Besançon (France)

7.1 General information

Date: 11/2018

Location: Besançon (France)

Website content : <https://bimgame.eu/en/international-contest-bimgame-besancon/>

Number of students : 40

Teacher: Mickaël Langlet

Title of the scenario: "Pavillon MUE"

7.2 Pitch and roles

Goal:

Design a pavillon for the university.

Use of lego brick to define cost and ecofriendly material use.

The Rectorat of the Academy of Besançon, the University of Franche-Comté and Canopé are engaged, in partnership with the city and the agglomeration community of Grand Besançon, in an ambitious and innovative project, part of the global project of Cité des savoirs and the innovation at the Arsenal site in Besançon. It is a project of "university house of education", pole of research and development of lifelong education, which brings together in one place three components: School for teachers, Canopé and Rectorate services involved in the initial and in-service training of teachers. This project has already been presented to the Ministry of National Education and the Ministry of Higher Education and Research.

So far, the client has planned conventionally, but wants to start working with the BIM method now. This project will serve as a pilot project. In a first step, 3D modeling in Revit and a connection of craftsmen to the digital working method via the BIM Viewer BIM Vision will be tested. In order to gain experience for the actual building process of the houses, models with real duplo bricks will be designed and built first. That way the possibilities and functions of the new digital tools will be tested.

For this purpose, gip commissioned four offices to create the models. Since the client is interested in closer cooperation between architects and civil engineers, the offices are positioned interdisciplinary. Based on the resulting models, the client will decide which project will be built for the University House of Education

The following chapters describe the object, a schedule and the goals of the client.

- Facility Manager
- BIM Manager
- Woord Constructor
- Architect
- Craftsmen
- Engineer
- Jury (Teacher)

7.3 Feedbacks

All the feedbacks of the experimentation on the BIM GAME video channel:

<https://bimgame.eu/en/videos-en/>

8 Experimentation #6

For its first big event, the BIM Game and BIMTag were doing common cause.

Prof.Dr.-Ing Jörg Härtel and M.Eng. Christian Heins organized these two days of work around the BIM. The BIM Game team accompanied by Spanish, Italian and Belgian students were able to interact with German professionals. Software companies, 3D scanning, augmented reality visualization and even virtual reality immersion were present. Students and teachers were able to test these new materials at the forefront of innovation. Interesting exchanges despite the language barrier!

If the BIM Game team is attentive to technological developments, it was especially present for its role as an innovative player in the field of BIM training. Indeed, the Prof. Jörg Härtel from Jade Hochschule, presented the BIM Game in front of a complete amphitheater. Then Carla Pütz, M.Eng. at the Bergische Universität Wuppertal, presented a new descriptive video. Then, she detailed the operation of the BIM Game thanks to the scenario tested in September 2019 in Wuppertal. Jesus Alfaro, from the University of Cuenca, closed the session. He presented the BIM methodology based on examples of stress tests conducted by his students in Turkey and Oldenburg in parallel with the BIMTag.

If BIM is perceived as a modern and efficient process, the training of students and professionals is sometimes forgotten. The BIM Game proposes to fill this gap. Learning to cooperate with BIM tools around fictional or real scenarios seems to prove itself with every stress test. The intervention of the BIM Game team was warmly welcomed by the professionals. Training will always be a major focus in the deployment of innovative tools and methods.



Figure 9 - BIM GAME presentation - Oldenburg (Germany)

8.1 General information

Date: 02/2019

Location: Oldenburg (Germany)

Website content : <https://bimgame.eu/en/bim-game-bim-tag-meet/>

Number of students : 15

Teacher: Christian Heins and Jörg Härtel

Title of the scenario: Finding errors in model

8.2 Pitch and roles

Architect and structural engineer have send their models for the clients building to the BIM Coordinator to combine and check them.

- Client
- BIM Coordinator
- Architect
- Structural Engineer

8.3 Feedbacks

All the feedbacks of the experimentation on the BIM GAME video channel:

<https://bimgame.eu/en/videos-en/>

9 Experimentation #7

Close to Brussels, the LIRL (Lycée Intégrale Roger Lallemand) is at the heart of an innovative educational project. A new method, close to the Freinet pedagogy, proposes activities mixing intellectual work and manual. Personal fulfillment, collective intelligence, benevolence and demand are at the heart of this project inspired by Jérôme Saltet's book "Changer le collège, c'est possible !".

Students participate in learning devices including active methods, creative workshops, tutoring and self-employment. New needs that require new architecture. Indeed, the current premises are of a rather rigid design dating from the 70s. For these reasons, the LIRL is a terrific field of experimentation for the BIM Game and the future stress test. The project team visited the site on January 17, 2019.

The Belgian partners of the BIM Game, Abdelkader Boutemadja, Sylvie Jancart and Charlotte Dautremont, were of course present. They were able to make a precise identification that will allow them to design the scenario for the April session. The readings will be finer as a part of the LIRL has been scanned in 3D. Indeed, Colin Bouriquet of the company Creation Conseil, who had already worked for the previous scenario, made the trip.



Figure 10 - Students at work in LIRL - Brussels (Belgium)

In addition, this scenario will have several peculiarities:

First, teachers and students will participate in the drafting of the specifications. The goal will be to develop new school spaces and the BIM process will allow a better consideration of uses. In addition, teachers will also be part of the jury. The point of view of the user will be essential to win the test !

Then, students will have to work according to the principles of eco-construction and include recycled materials. For the occasion, Victoria Van Kan of the ROTOR cooperative, participated in the exchanges. Integrating recycled materials into construction is a challenge for the future. Allowing students to be familiar through the stress test will be a real plus in their training.

Finally, the BIM Game project remains at the heart of the collaborative process both in substance and in form. The April session will be another opportunity to prove it. The LIRL, its director Mr. Pinxteren, his teaching team, the municipality of Saint Gilles and ROTOR will be valuable partners for this deadline.



Figure 11 - At ROTOR cooperative - Brussels (Belgium)

Of the four events that must end the adventure, Brussels will mark the second stage. It will be Charlotte Dautremont, from the University of Liège, who will develop the BIM Game scenario for this stress test.

What's more natural, for this recent recruit, to perform a crash-test of his scenario before the D-day .

A BIM Game scenario must anticipate the work processes in which the teams will commit themselves to anticipate their resource needs. A crash test tests the scenario to verify that it

is complete and functional. This is all the more imperative as the future scenario will include new features. First, the international teams will work in several places. A team will work on the scene of the scenario, at the Lycée Intégral Roger Lallemant (LIRL) of Saint Gilles. While another team, responsible for determining the resources and digitizing them, will work in the ROTOR association's depot. Collaboration and optimization of the data exchanged will therefore be essential to reach the end of the scenario in the allotted time. Then, the specificity of this scenario will revolve around the reuse of materials. The ROTOR association stores materials from deconstruction. Thus, it is impossible to determine in advance what will be available on the day of the event. It will be for the students to be agile and creative!

9.1 General information

Date: 03/2019

Location: Brussels (Belgium)

Website content : <https://bimgame.eu/en/the-lirl-experimental-ground-for-the-bim-game/>

Number of students : 15

Teacher: Charlotte Dautremont and Sylvie Jancart

Title of the scenario: BIM and Circularity: crash test

9.2 Pitch and roles

Collaboration between two distant sites in BIM Process with reuse elements

- Client
- BIM Coordinator
- Architect
- Structural Engineer

9.3 Feedbacks

All the feedbacks of the experimentation on the BIM GAME video channel:

<https://bimgame.eu/en/videos-en/>

10 Experimentation #8

Next week, in Brussels, will be held the next test stress BIM Game. On this occasion, the awards awarded by the jury will be in digital form: open-badges. Each team that wins one of the skills in play, will receive a digital skill certificate related to the BIM Game.

Eight skills, eight challenges proposed by the jury:

- Originality

- Sustainable development
- Brick pattern
- Architectural quality
- Re-use quality
- 3D Model quality
- Favorite
- Presentation

The teams will be able to build their project, each with a different purpose.

The Architect / Researcher Charlotte Dautremont and Prof. Sylvie Jancart from ULiège organized these two days in association with the ROTOR association.

First, the first day saw the unfolding international stress test. Teams composed of Belgian, Spanish, German, Italian and French students worked on the rehabilitation of the LIRL agora. Particular constraint to this work: to use a maximum of materials coming from the deconstruction. To do this, part of the teams were within ROTOR's warehouses while the other conceived the project at LIRL. Despite the language barrier, the network and interoperability problems, the students were able to find innovative solutions to carry out their project.

During the oral presentation (in English for everyone!), The students have made the best use of everyone's skills to expose their project to the public. Then, at the end of the presentation, Charlotte Dautremont made available to the public an application to award the teams the "awards" presented a few weeks ago. These open-badges awards will allow students to present their skills in the field of BIM and sustainable development. Finally, all the teams are distributed in their respective countries with the pocket, this little extra that will make the difference in their professional lives.



Figure 12 - BIM GAME Awards - Brussels (Belgium)

10.1 General information

Date: 04/2019

Location: Brussels (Belgium)

Website content : <https://bimgame.eu/en/the-lir1-experimental-ground-for-the-bim-game/>

Number of students : 15

Teacher: Charlotte Dautremont and Sylvie Jancart

Title of the scenario: BIM and Sustainability: how to introduce circularity and reuse elements in BIM process ?

10.2 Pitch and roles

Introduce non-standards reuse elements with modelisation and information in a BIM collaborative process. Innovativeness and creativeness based on resources of reused elements.

- Client
- BIM Coordinator
- Architect
- Structural Engineer

10.3 Feedbacks

All the feedbacks of the experimentation on the BIM GAME video channel:

<https://bimgame.eu/en/videos-en/>

11 Experimentation #9

The entire BIM GAME team met at the University Politècnica de València from 22 to 25 May 2019 to participate in the organization of the 8th International Congress EUBIM. This congress aims to promote a better understanding of the state of implementation of the BIM methodology in Spain and internationally, to disseminate the real experiences of professionals and companies that have already started their implementation as a methodology of work in project management. One of the essential objectives of these meetings is to create links and contacts between all those who are convinced (as the international panorama shows us) that new models of work and collaboration are needed by demonstrating their effectiveness and their effectiveness in all projects where they are implemented and tested.

The stress test experimented by our students took as a subject of study the patio of the university to motivate innovative proposals from the teams. This work made it possible to

link the field requirements with the training requirements necessary to start the BIM, while highlighting the relevance of the collaboration between the different trades mobilized in the scenario. This experiment was once again the occasion for a particularly rich cultural and professional exchange, in terms of languages, views-professions, information sharing and team involvement.

It was also an opportunity to disseminate the BIM GAME project among the professionals present at EUBIM, the pedagogical modalities defended in the experiments aroused a lot of interest and generated proposals to extend the project in other forms and in other forms contexts. The "BIM dice GAME" developed by our Spanish partner has attracted attention and highlighted our stand "BIM GAME" made inaccessible by success!



Figure 13 - Students at work during EUBIM - Valencia (Spain)

11.1 General information

Date: 05/2019

Location: Valencia (Spain)

Website content : <https://bimgame.eu/en/eubim-and-bim-game-towards-a-common-dynamic/>

Number of students : 15

Teacher: Jesus Alfaro

Title of the scenario: Finding errors in model

11.2 Pitch and roles

Architect and structural engineer have send their models for the clients building to the BIM Coordinator to combine and check them.

- Client
- BIM Coordinator
- Architect
- Structural Engineer

11.3 Feedbacks

All the feedbacks of the experimentation on the BIM GAME video channel:

<https://bimgame.eu/en/videos-en/>

12 Experimentation #10

After 3 years of work across Europe, the Erasmus + BIM Game project will be bowing out on 25 and 26 June 2019 in Besançon.

In the program :

- an international competition BIM Game with students but also professionals
- lectures on BIM and the circular economy
- workshops
- moments of conviviality to facilitate exchanges between professionals



Figure 14 - Model of a team for competition - Besançon (France)

The final event BIM Game took place for two days at the foot of the Citadel of Besançon. On the first day, German, Belgian, Spanish and Italian students participated in the last test session of the project. Mr. Mickael Langlet, professor at Le Lycée du Bois de Mouchard, had imagined for them a scenario that took place on the site of l'Arsenal in Besançon. The students had to imagine a construction allowing the entrance to the University and the connection with a second building.

Each international team included two architects, a 4D manager and a 5D manager. Added difficulty: each job worked in a different room. The use of digital communication tools and data exchange was therefore essential!

To recognize the skills of the different teams, the jury of professionals had an open-badge platform. Mickael Langlet had created three badges of skills that could be recognized in his scenario: BIM collaboration, Job site organization and Architectural quality. In addition, this scenario had another specificity: the teams had to build a cardboard model, integrable with a model of the site, in addition to their digital model.

Throughout the day, students showed how important collaboration is to a successful project. The quality of the work achieved was recognized by the issuance to all teams of the open-badge "Architectural quality". A remarkable work hailed by the general public!

12.1 General information

Date: 06/2019

Location: Besançon (France)

Website content : <https://bimgame.eu/en/final-sprint-for-the-bim-game-in-besancon/>

Number of students : 15

Teacher: Mickaël Langlet

Title of the scenario: Finding errors in model

12.2 Pitch and roles

Architect and structural engineer have send their models for the clients building to the BIM Coordinator to combine and check them.

- Client
- BIM Coordinator
- Architect
- Structural Engineer

12.3 Feedbacks

All the feedbacks of the experimentation on the BIM GAME video channel:

<https://bimgame.eu/en/videos-en/>

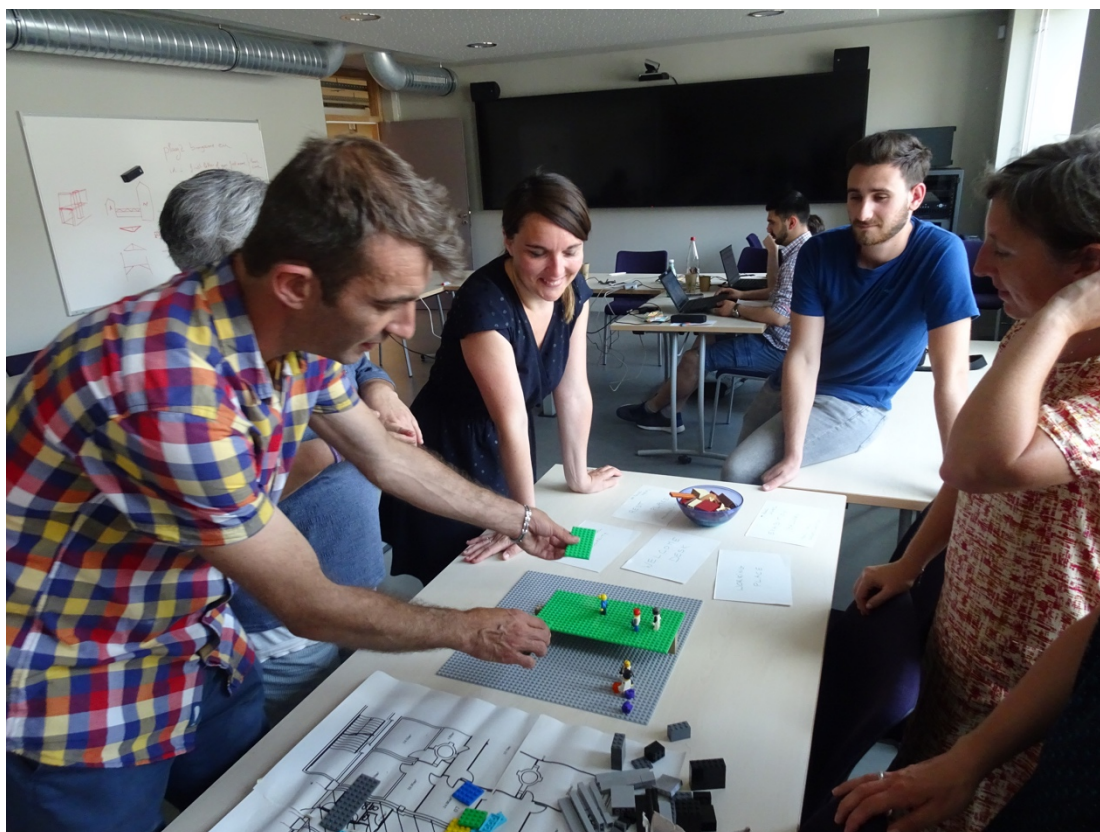


Figure 15 - Work for MUE Scenario - Besançon (France)

13 Annex A: Oldenburg test results



BIM GAME

- 1st test in Oldenburg -

Christian Heins

Bergische Universität Wuppertal, 23.11.2017



CONTENT



1. Description of the scenario
 - for trainer
 - for each role
2. Course of the game
 - processes
 - collaboration
 - results
3. Conclusion
 - positive und negative impressions
 - conclusion



SCENARIO JHS-01: PRIORITY FOR FACILITY MANAGER
\\ INVENTORY DOCUMENTATION OF A STORAGE TANK IS DIFFERENT



The BIM Game: 1st test

...worked in 2 groups!



Erasmus+



Pic. Peter Meyer: 1st BIM-Game-Test in Oldenburg, Germany
(from left: Markus Stange, Christian Heins, Jörg Härtel, Marc Huber, Michael Raps, Bernd Hobbie)

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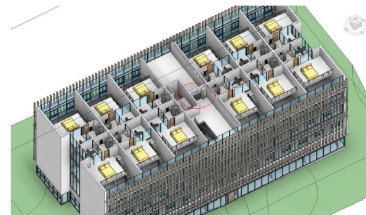


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\\ INVENTORY DOCUMENTATION OF A STORAGE TANK IS DIFFERENTThe BIM Game: 1st test
...introduction for the trainerScenario JHS-01: Priority for Facility Manager /
Inventory documentation of a storage tank is different

By Christian Heins

1 Introduction

In the upcoming simulation game, you as a trainer take over the role of the department head, in the company Oulium GmbH in the area of facility management. This scenario refers to a multi-functional building acc. BIM Execution Plan (BIM Game, JHS-01_BIM project, execution plan V1.01). The BIM processing took place without the TGA planning and was implemented in the sense of Closed BIM. One of your colleagues assisted in drawing up the BIM Execution Plan.



Picture 1: On the 5th floor an unscheduled storage tank is installed.

A construction meeting will be simulated, organized by the FM.

2 Problem

You, as a department manager at Oulium GmbH, receive a call from the responsible FM of the named building. He informs you that he has determined during the inventory documentation that the type designation of a storage tank is different from the execution plan.

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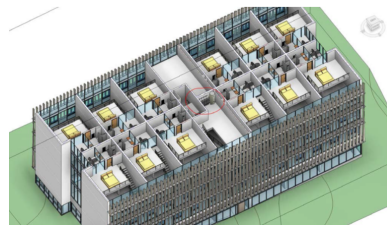
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The upcoming simulation game concerns Fa. Oulium GmbH in the area of Facility Management. This scenario refers to a multi-functional building acc. BIM Execution Plan (BIM Game, JHS-01_BIM project, execution plan V1.01). The BIM processing took place without the MEP planning and was implemented in the sense of Closed BIM. A former colleague of Oulium GmbH, in an international team, assisted in drawing up the BIM Execution Plan.



Picture 1: On the 5th floor an unscheduled storage tank is installed.

A meeting is simulated.

2 Problem

Your department manager of Oulium GmbH receives a call from the responsible FM of the named building. He informs him that he has determined during the inventory documentation that the type designation of a storage container differs from the execution plan. He will instruct you to handle this problem.

3 Task

Since you do not have time to tackle the problem, delegate the task to your employees. Your employees have the task of finding out:

- what the problem is,
- what effects this problem can have and
- what measures should be taken to solve the problem?

The results of the above items are to be documented by the participants. The primary goal should be to organize a construction meeting and perform it using digital methods. During the construction meeting, should be created collaboratively a strategy solutions. The solutions should be developed interdisciplinary. After a familiarization phase, the participants should discuss via telephone conference (Skype, TeamViewer) on the building model what measures are required.

4 Solutions

The aim of this simulation game is to develop joint solution strategies during a construction conference. For this at least the following milestones have to be worked out.

1. Statement that the problem cannot be solved without help.
2. Create an agenda to determine how serious the problem is.
The agenda must at least query the following points:
 - a. What problems could occur with a wrongly installed tank?
 - b. Is danger in default?
 - c. Who needs to be informed about this problem?
 - d. What information do I need to decide what action to take to resolve the problem?
3. Development of an internal solution strategy, depending on the discipline (FM, Engine).
4. Presentation of own results to the project participants (FM, Engine).
5. Collaborative development of solution strategies on the digital building model (documentation primarily using BIM Collaboration Format (BCF) or the building model).
6. Handover of the results to the Head of Department FM / Trainer.

Possible problems:

- a. The heater must not fail.
- b. The delivery of a new tank takes several days / weeks / months.
- c. The dead loads of the built-in tank are too high for the ceiling.
- d. The staircase must be partially blocked for the ceiling support.
- e. The fire protection is not given for the building, since escape stairs are not available during this period.

Possible solving strategies

- a. The water may only be drained when the new tank is on site.
- b. The ceiling is supported by rotary support,

Seite 1

page 2

- c. The areas of the staircase in which the rotary support stand are to be locked.
- d. When decommissioning one of the two staircases, room planning must re-work to ensure fire safety.
- e. The tenants of the apartments may need to be accommodated in hotels to ensure fire safety.

5 Appendix

5.1 Ressources

- PC or laptop with web access and the following software:
 - common MS Office programs (Outlook, Word, Excel) or equivalent
 - pdf-reader
 - TeamViewer
 - Tekla BIMsight
 - Ifc-viewer
 - for deeper checks
 - Autodesk Revit
 - Tekla Structures
 - Dubai R-FEM
- Overview drawings of all floors
- Product data sheet of the storage tank

5.2 Contacts

Role	Organization	Name	Contact
Client	Confidential plc	Mr A	email: christian.heins@jade-hs.de
Consulting	Consilium GmbH	Mr B	email: christian.heins@jade-hs.de
Architect	buildingplan GmbH	Mr C	email: christian.heins@jade-hs.de
Structural Engineer	Statikpro GmbH	Mr D	email: christian.heins@jade-hs.de
Craftsmen 1	Betonix eG	Mr E	email: christian.heins@jade-hs.de
Craftsmen 2	Ligna GmbH	Mr F	email: christian.heins@jade-hs.de
Head of FM	Oulium GmbH	Mr G	email: christian.heins@jade-hs.de

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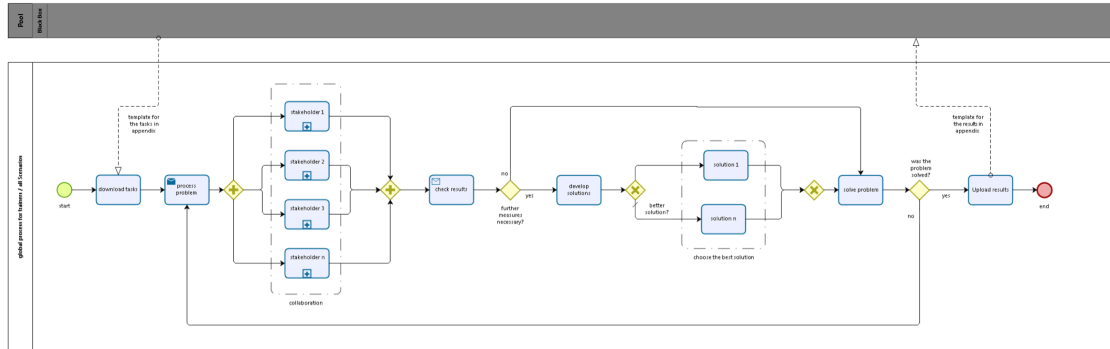
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\\ INVENTORY DOCUMENTATION OF A STORAGE TANK IS DIFFERENT Wilhelmshaven Oldenburg Eilsbeth

The BIM Game: 1st test
...introduction for the trainer



Pic. bizagi: global process for trainer

Powered by
bizagi

collaboratively develop solutions in a meeting

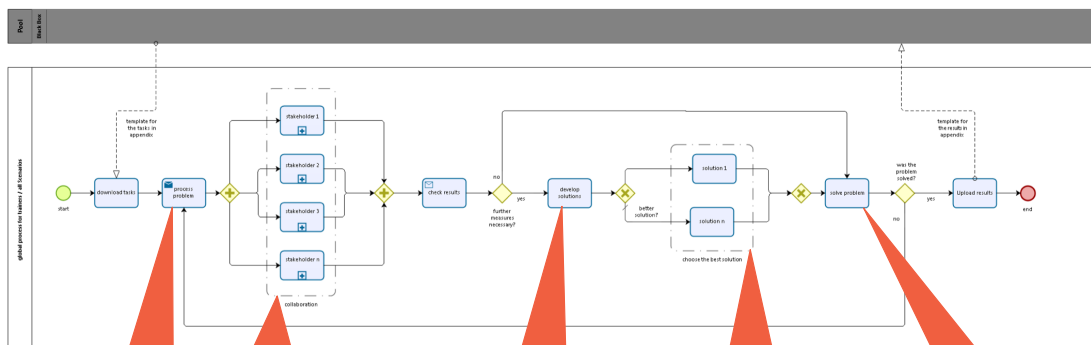
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The BIM Game: 1st test
...introduction for the trainer



process problem
Preparation time for the trainer to properly introduce the participants to the upcoming tasks

collaboration (internally)
Each stakeholder is working on the tasks alone to get an overview of the problem. The solution strategies should then be presented to the other stakeholders in an online meeting

develop solution
During the online meeting, joint solution strategies are to be developed.

choose the best solution
Together, measures are to be derived from the most suitable solution strategies so that the problem can be solved.

solve the problem
This step is presented to allow further work to be done. Here, the existing problem should be solved concretely. For this, the previously developed measures have to be implemented. The concrete implementation of the measures is usually only in individual feasible.

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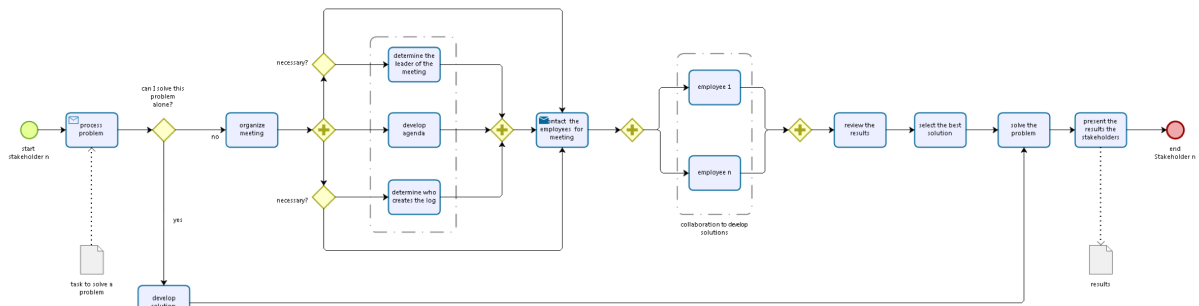


SCENARIO JHS-01: PRIORITY FOR FACILITY MANAGER

\\ INVENTORY DOCUMENTATION OF A STORAGE TANK IS DIFFERENT

The BIM Game: 1st test

...introduction for the trainer



Pic. bizagi: global process for stakeholders

organize and conduct meetings

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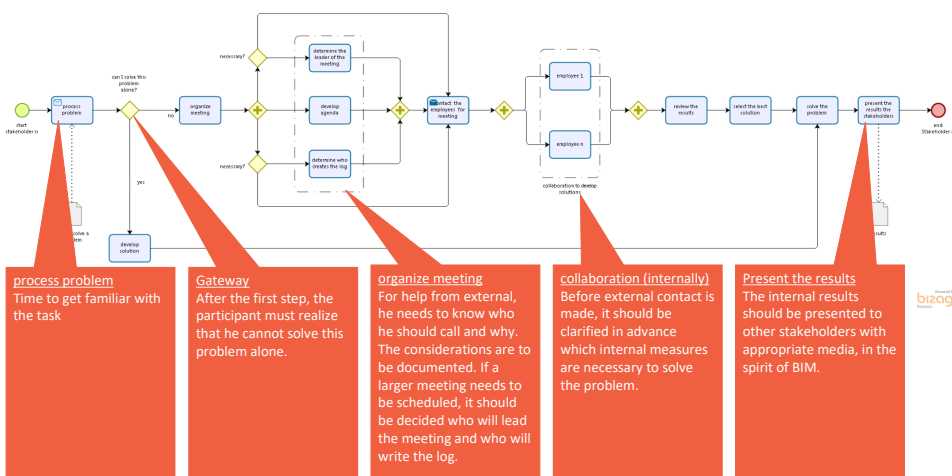
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The BIM Game: 1st test

...introduction for the trainer



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The BIM Game: 1st test ...introduction for the participant

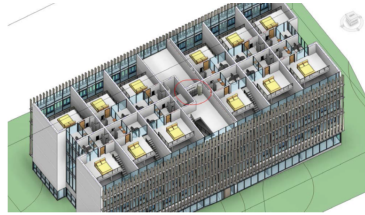


Scenario JHS-01: Priority for Facility Manager / Inventory documentation of a storage tank is different

By Christian Heins

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Picture 1: On the 5th floor an unscheduled storage tank is installed

A meeting is simulated.

2 Problem

Your department manager of Oulim GmbH receives a call from the responsible FM of the named building. He informs him that he has determined during the inventory documentation that the type designation of a storage container differs from the execution plan. He will instruct you to handle this problem.

Seite 1

3 Task

You will receive a call or an oral interview on this issue. Your job will be to find out

- what the problem is,
- what effects this problem can have and
- what measures are to be taken to solve the problem.

The results of the above mentioned outline points are to be documented and appropriately presented by you. As in real life, you have the opportunity to ask external as well as your colleagues to solve this problem for advice. Notice that does not require detailed elaboration. Use the up-to-date media for communication and presentation, if required.

4 Resources

The following resources are available to the company:

- PC or laptop with web access and the following software:
 - common MS Office programs (Outlook, Word, Excel) or equivalent
 - PDF reader
 - TeamViewer
 - Tekla BIMsight
 - ifc-viewer
- For further checks
 - Autodesk Revit
 - Tekla Structures
 - Dlubal R-STAB / R-FEM

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Craftsmen 1	Betonic eG	Mr E	email: christian.heins@jade-hs.de
Craftsmen 2	Ligna GmbH	Mr F	email: christian.heins@jade-hs.de
Head of FM	Oulim GmbH		
Structural Engineer	Oulim GmbH		

All contact details that are not available have to be obtained.

Good luck !!!

Seite 2

All necessary information they get from the trainer:

- ifc-modell
- Datasheet about the tank
- Information from MEP-Engineer
- Information from Architekt

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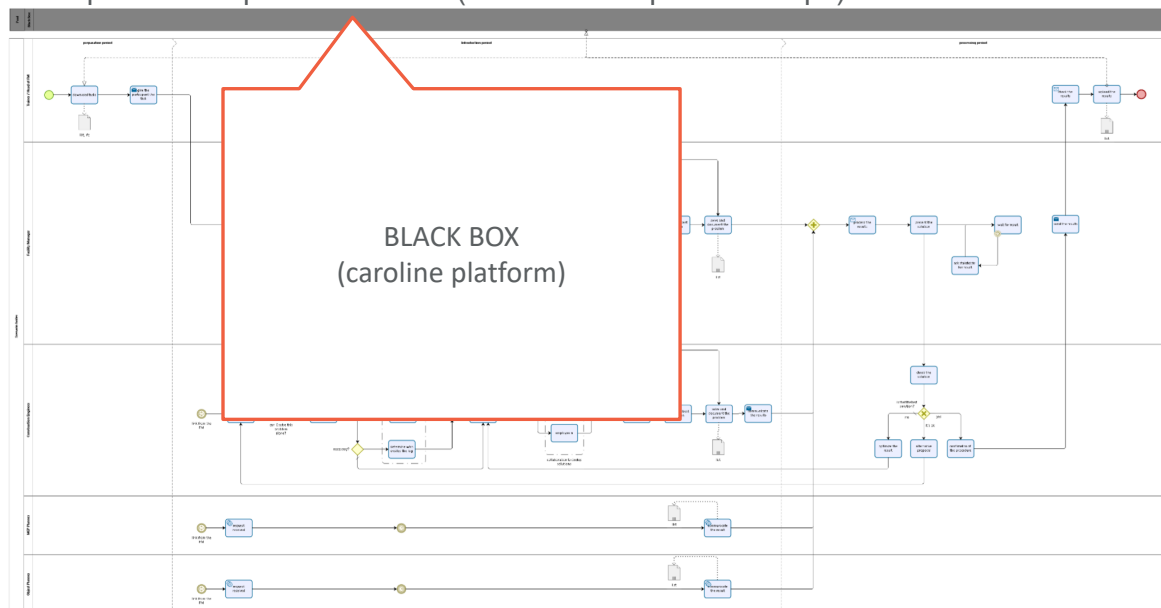
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SCENARIO JHS-01: PRIORITY FOR FACILITY MANAGER \\ INVENTORY DOCUMENTATION OF A STORAGE TANK IS DIFFERENT



The BIM Game: 1st test

...process map for the trainer (to control the process steps)



Pic. bizagi: process for the scenario JHS-01

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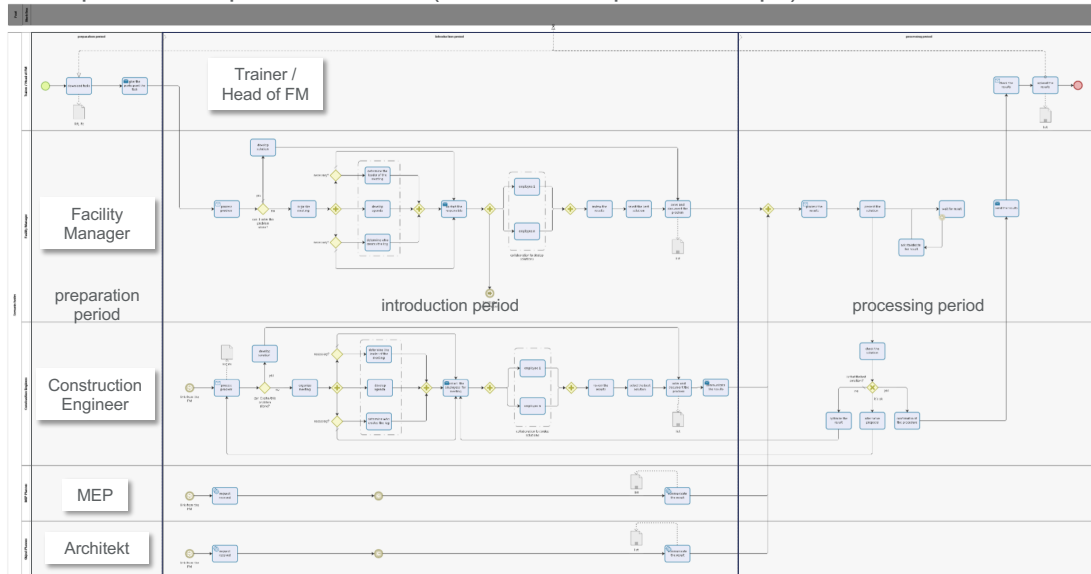


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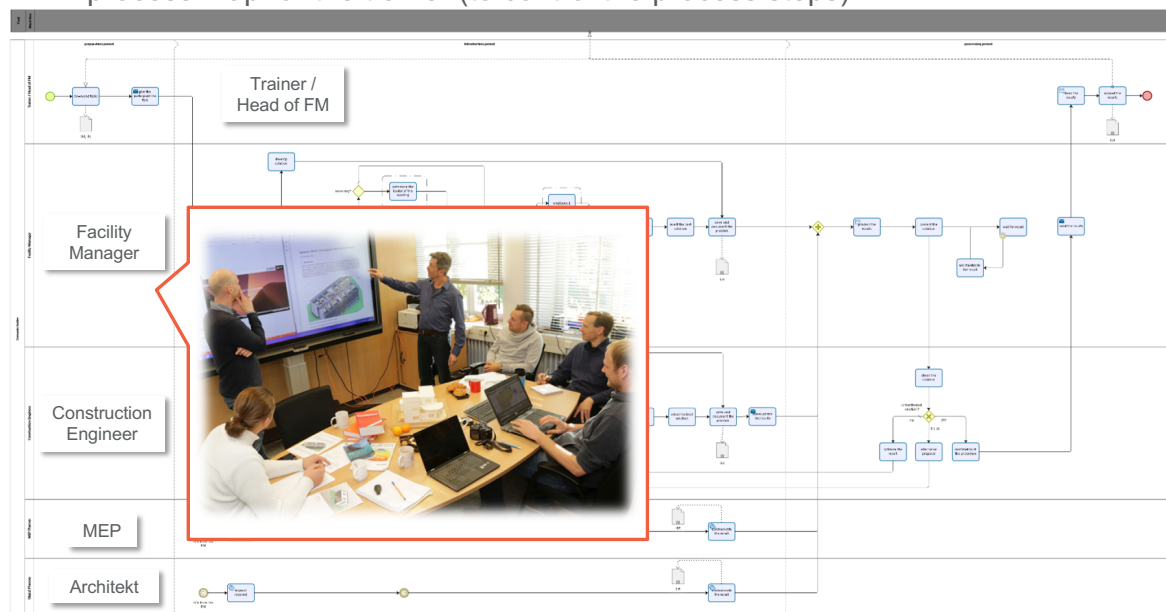
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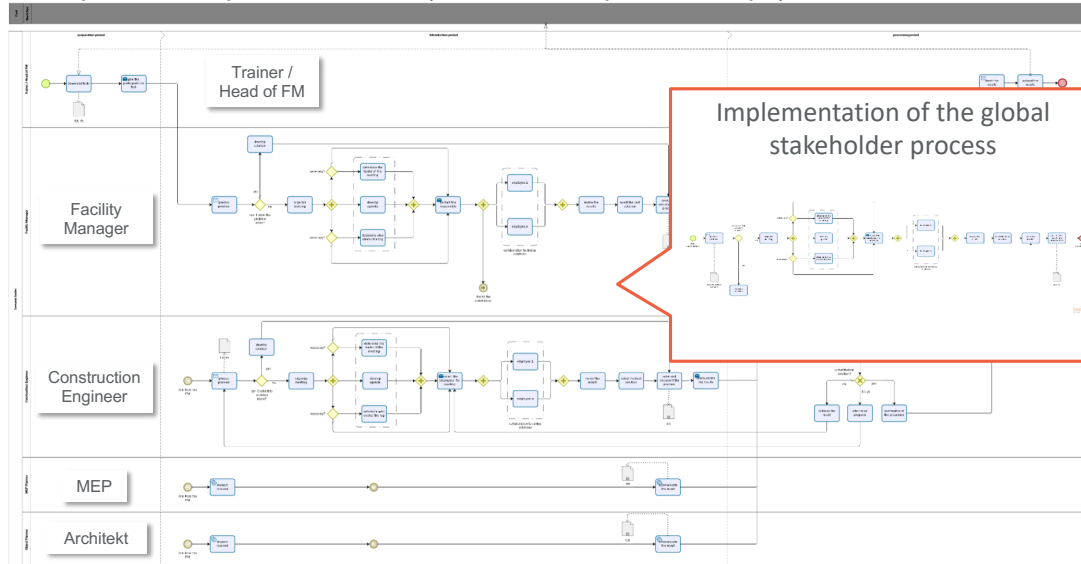
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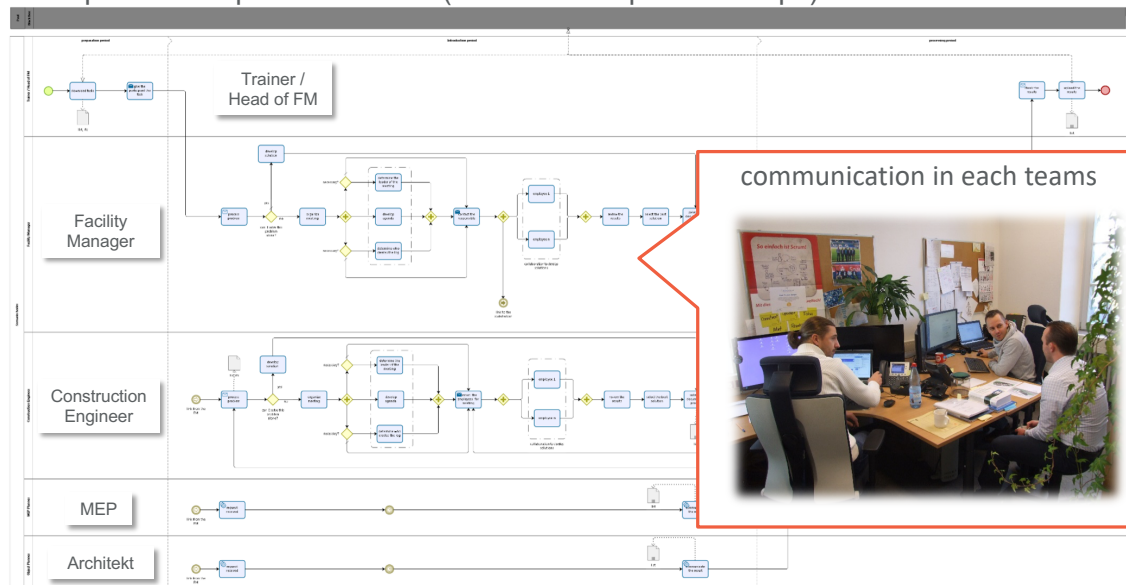
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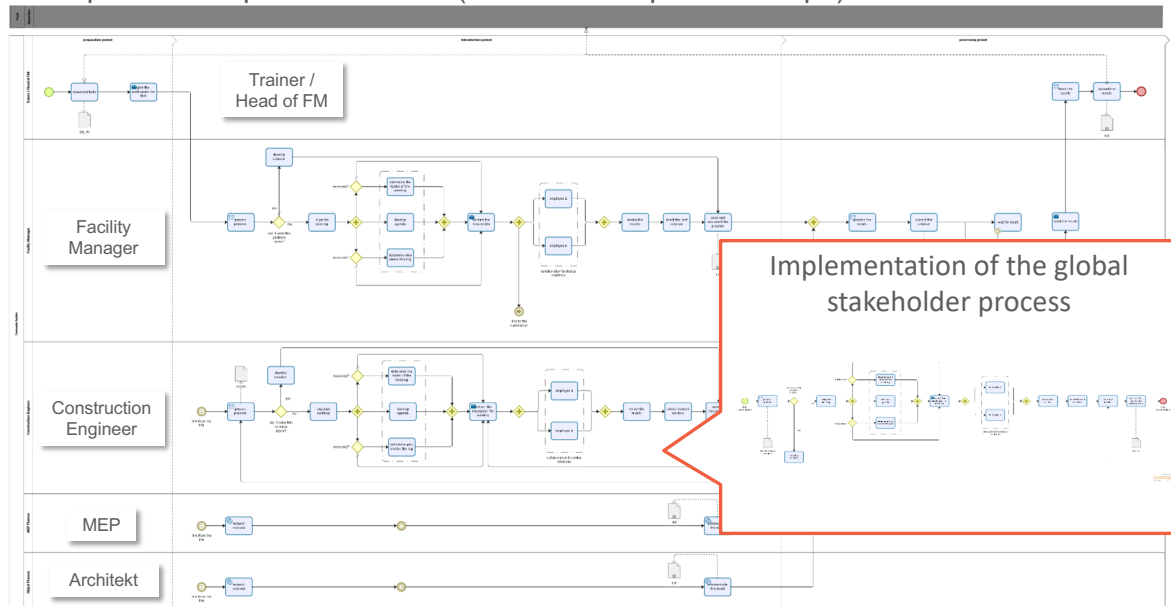
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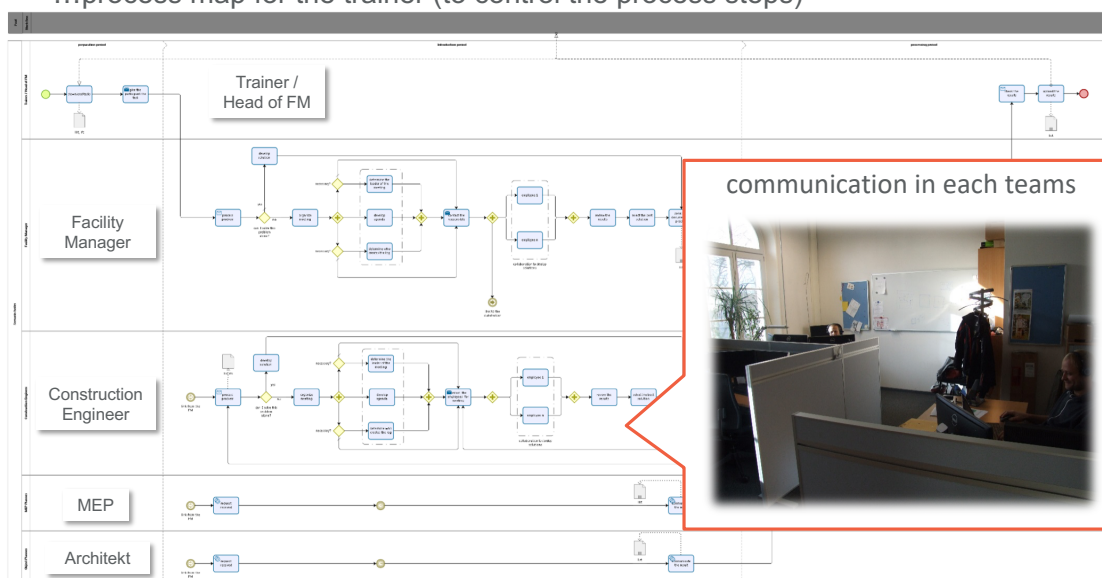
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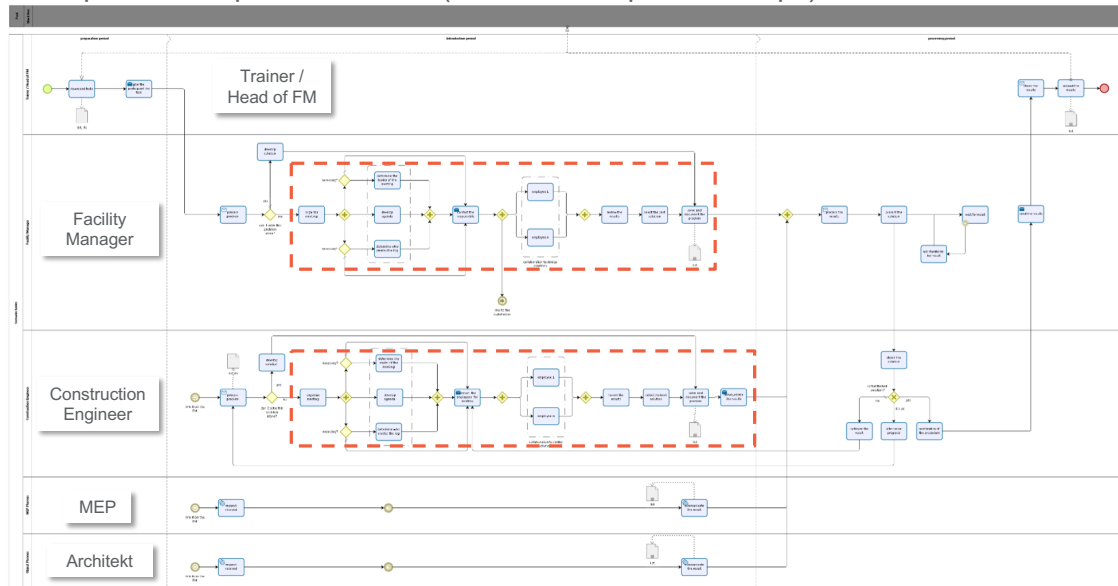


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The BIM Game: 1st test



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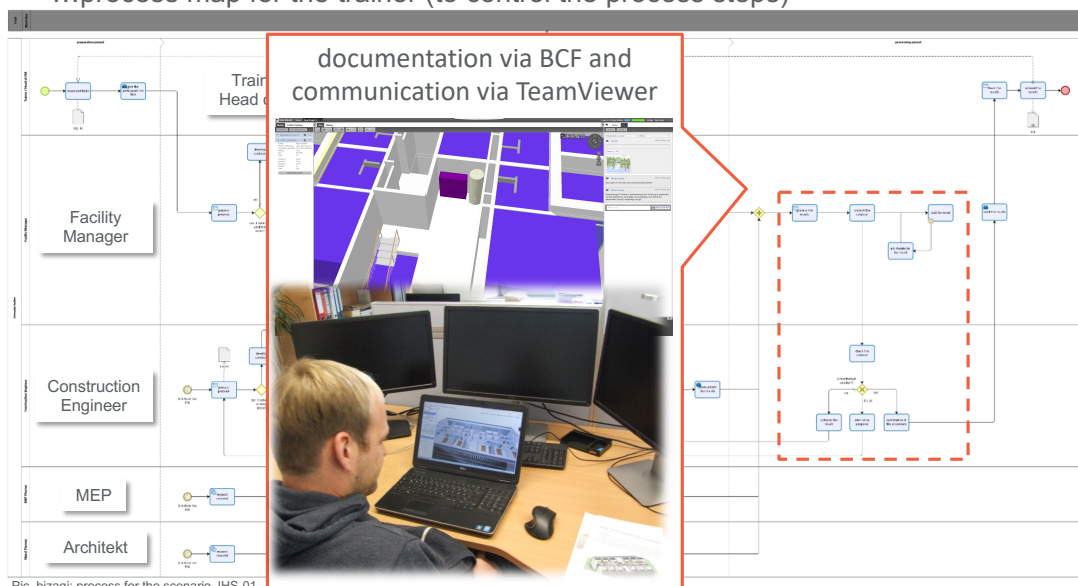
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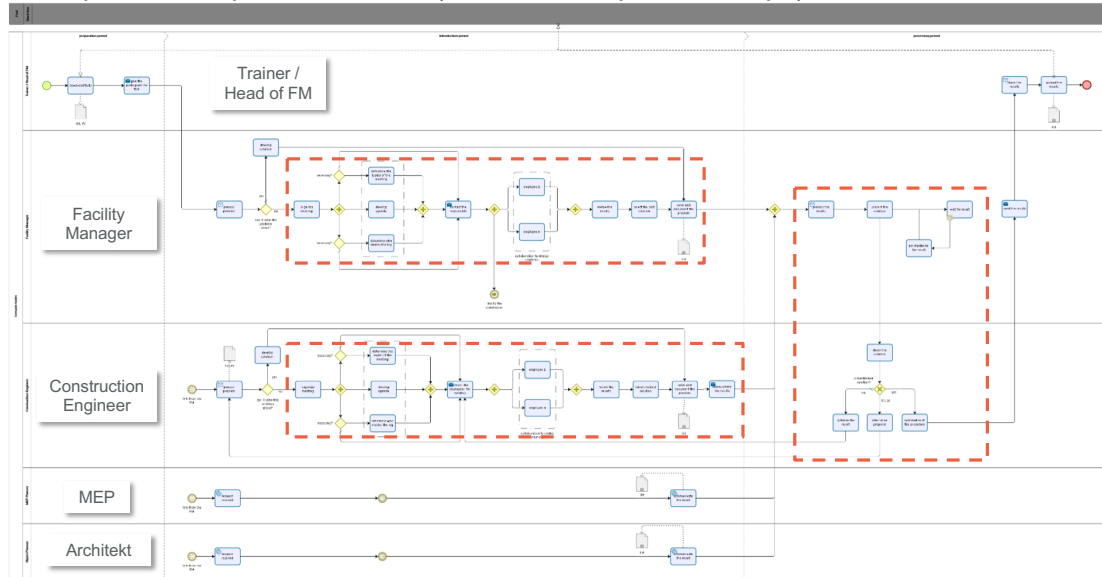


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SCENARIO JHS-01: PRIORITY FOR FACILITY MANAGER
\\ INVENTORY DOCUMENTATION OF A STORAGE TANK IS DIFFERENT

The BIM Game: 1st test



...possible problems and possible solving strategies

Possible problems:

- a. The heater must not fail.
- b. The delivery of a new tank takes several days / weeks / months.
- c. The dead loads of the built-in tank are too high for the ceiling.
- d. The staircase must be partially blocked for the ceiling support.
- e. The fire protection is not given for the building, since escape stairs are not available during this period.

Possible solving strategies

- a. The water may only be drained when the new tank is on site.
- b. The ceiling is supported by rotary support,
- c. The areas of the staircase in which the rotary support stand are to be locked.
- d. When decommissioning one of the two staircases, room planning must re-work to ensure fire safety.
- e. The tenants of the apartments may need to be accommodated in hotels to ensure fire safety.

Legend: recognized / not recognized

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The BIM Game: 1st test

...summary



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positiv	negativ
Gaining knowledge about the BCF workflow and the handling of TeamViewer	The ceiling collapses or takes an irreversible damage !!! Because ...
Improvement of the interdisciplinary understanding of roles	... research into causes was more important than identifying suitable measures to solve the problem.
Knowledge about the handling of digital building models	... no solution was developed interdisciplinary, because the responsible group did not ask for external advice.
Knowledge about working with a digital building model	... the cooperation was not optimal, both externally and internally.
Without moderation, the scenario would lead to no result.	
The players would do the negative things better in another test run.	

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SCENARIO JHS-01: PRIORITY FOR FACILITY MANAGER \\ INVENTORY DOCUMENTATION OF A STORAGE TANK IS DIFFERENT

The BIM Game: 1st test

...future construction of a BIMgame



Erasmus+

1. Upstream test run to query the software knowledge
2. Introduction to the problem and presentation of the goal
 1. Brief description of what BIM is.
 2. Job description for each role.
 3. Detailed task. Who has what, when to deliver.
 4. Installation instructions of the software packages and instructions on which software is for what to use.
 5. One person should have experienced with BIM so that they can help others.
3. Perform the scenario with an moderation
 1. Presentation of the results to the stakeholders.
 2. Discussion of the results and collaborative development of solution strategies.
 3. Upload the results.
4. Rating from the coach
 1. team
 2. individuals
5. Online test for each participant
(the online test should overlap with the trainer's assessment to avoid tampering)
6. debriefing
 1. Presentation of possible problems.
 2. Presentation of possible consequences.

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14Annex B : Interview plan

Architect :

1. Did you understand the task for your scenario ?

- ☐ yes, everything was clear
- ☐ I had a few problems understanding it
- ☐ no, I didn't understand the task

2. Did you find all ressources you needed for the scenario on claroline ?

- ☐ yes, I found everything I needed
- ☐ no, the following information was missing :

3. Was the introduction to the scenario clear to you ?

Everything was
clear

☐
☐
☐
☐

I didn't
understand the
task

☐

4. How do you asses the difficulty of the task ?

It was very
easy

☐
☐
☐
☐

It was far too
difficult

☐

5. How did you get along on claroline ? Did the application work well for you ?

Claroline was
very helpful
and easy to
work with

☐
☐
☐
☐

Claroline is not
helpful and
difficult to get
on with

☐

6. Were you able to contact the other players the way you needed to ?

- ☐ yes
- ☐ no, I would have liked to contact them in the following way :

7. Would you recommend playing the BIM Game to other students, colleagues etc. ?

☐ yes

☐ no, because

8. What did you like about the BIM Game ?

9. What did you NOT like about the BIM Game ?

10. What would you improve in the BiM Game ?
