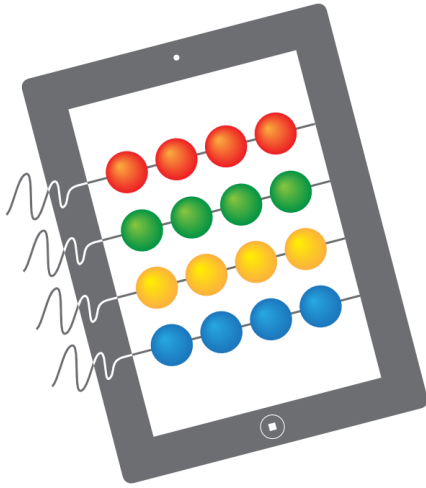




FP7 ICT STREP Project



LEARN PAD

Deliverable 8.2

Platform Prototype Early Validation Results

<http://www.learnpad.eu>



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Abstract

The main goal of this deliverable is to early collect end-users feedback about the platform implemented functionalities for the sake of the Learn PAd consortium. End-users needs and expectations are driving forces of the Learn PAd project, that is why a validation has been carried out to ensure that the early version of the Learn PAd platform properly addresses them. The early validation was carried out considering the running instance of the Learn PAd platform available (since 06 November 2015) at the address: <http://testbed.learnpad.eu/>. A group of users sampled from both the project demonstrators tested the Learn PAd platform and provided us with feedback and comments to improve it. Results from such validation are reported in the first part of this deliverable.

Moreover, even if not explicitly requested in the DoW, a further validation was also done to check the goodness of BPMN modelling understandability guidelines that we defined in WP4. This further validation involved a questionnaire and a focus group with the aim to guarantee that the defined BP modelling understandability guidelines actually contribute to improve BP model understandability. In the second part of this deliverable we report in detail the results of the modelling guidelines validation. From the guidelines validation, we can assert that models designed following BPMN modelling understandability guidelines indeed result to be better understandable than the ones generated by not following the guidelines. In fact, for such reason the BP models used in the deployed running instance of the Learn PAd platform involved in the user early validation are those conforming to the guidelines.

Keyword List

Business Process, European Project Budget Report, Learning Platform, Public Administration, Sportello Unico Attività Produttive, Validation, User Engagement

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Glossary, acronyms & abbreviations

Item	Description
BP	Business Process
BPMN	Business Process Model and Notation
CNR	Italian National Research Council
D4.2	Deliverable 4.2
DOW	Description of Work
EPBR	European Project Budget Reporting
EU	European Union
FHNW	University of Applied Sciences and Arts Northwestern Switzerland
ICT	Information and Communication Technology
PA	Public Administration
SESE	Single-Entry Single-Exit
SUAP	“Sportello Unico Attività Produttive”
UniCam	University of Camerino
WP8	Work Package 8

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1 Introduction

1.1. Purpose

In the context of Learn PAd, demonstrators (i) help the technical and research work-packages to better focus their activities; and (ii) they permit to assess the applicability, acceptance and effectiveness of the proposed solution within real working contexts. According to WP8 objectives we have to validate project results considering the platform effectiveness in supporting civil servants training and collaborative activities. To do that, a validation, organized in two main steps, has been planned. The first step, called early validation, permits in-time issues detection. In particular, such early validation allows to ensure that end-users needs will result being driving forces for the Learn PA project. Observed issues can be solved in prototyping the final version of the Learn PAd platform. The second step involves demonstrators for the Learn PAd platform assessment, which should take place before the end of the project. Here we report findings of the early validation we conducted.

The early validation was carried out considering the running instance of the Learn PAd platform available (since the 6th of November 2015) at the address: <http://testbed.learnpad.eu/>. The validation involved a first version of the Learn PAd platform including the following functionalities: the wiki browsing mode with recommendations, the possibility to give feedback to the modellers, and the simulator. Such early validation involved a total number of 14 end-users from both demonstrators (EPBR and SUAP). From a methodological point of view we considered a quantitative assessment and feedback from a focus group. The quantitative validation involved 7 of the 14 end-users who had no knowledge of the Learn PAd platform before the validation. The focus group was composed by the other 7 people from Regione Marche and UniCam that already knew about the project since they took part to some project activities. At the end, we collected 7 questionnaire answers and 80 feedback. They are reported in the first part of this deliverable, that aims at providing feedbacks from the final users to the consortium with respect to the implemented functionalities in the Learn PAd platform. From the Learn PAd platform validation results, we can anticipate (see in the following of this document more detailed reports) that the proposed solution is very promising even if some further development is needed. That is why, according to the early validation results, prototyping activities has been coordinated to ensure that the final version of the Learn PAd platform properly addresses the collected feedbacks.

Moreover, even if not explicitly requested in the DoW, a validation to check the goodness of BPMN modelling understandability guidelines, that we defined in WP4, has also been carried out. The guidelines validation activity involved 71 interviewees and a focus group with the aim to guarantee that the defined BP modelling guidelines actually contribute to improve BP model understandability. In the second part of this deliverable we report in detail the results of the modelling guidelines validation we conducted. From the guidelines validation results, we can assert that BP models designed by following the guidelines (that we proposed) are more understandable than the one designed without following them. For such reason the BP models used in the platform early validation were those reported in Deliverable 8.1 after a redesign activity to be conformed to the proposed guidelines.

1.2. Related Deliverables

The deliverable has been organized according to the first results of the Learn PAd project, documented in previous deliverables. More precisely, the following documents have been taken as reference points.

- D1.2. Requirements Assessment Report. This deliverable was considered as it reports on assessment of realization status of those requirements that have been collected, analysed, and reported in D1.1.
- D4.2. Formal Verification of Business Processes. The document identifies the quality assessment strategies for Business Process models related to the Learn PAd project. It also reports guidelines to model Business Processes in such a way that resulting model are understandable. This was referred in the second part of this document.
- D8.1. Demonstrators BP and Knowledge models. The document identifies the demonstrators related to the Learn PAd project within the two following scenarios: European Project Budget Reporting and “Sportello Unico Attività Produttive”.
- D8.1. (Addendum) User Perspective and Project Evaluation Strategies. This additional deliverable was triggered by the exigency of a deeper understanding of user needs is required. It is referred as it provided early insights and guidelines on how the evaluation of the implementation should be carried out.

Moreover, the validation used as a background the following deliverables whose nature is both Report and Software.

- D5.1 - Models for Setting the Wiki.
- D2.2 - Core Platform Implementation First Version.
- D6.2 - Learn PAd Simulation Environment: Refined Architecture and Prototype Implementation.

1.3. Structure of the Deliverable

Besides this brief introduction, this deliverable is structured in three parts respectively focusing on (i) prototype early validation (ii) BP modelling guidelines validation, and (iii) conclusions.

The first part of the deliverable includes Chapter 2 which describes the early validation of the first Learn PAd platform version. In particular, we explain how we conducted the validation describing: the methodology, the validation scenario (functionalities), and the developed questionnaire. Then, results obtained from the questionnaire are graphically presented, and the list of collected feedback is reported. Finally, some overall comments on the collected feedback are also discussed.

The second part of the deliverable includes Chapter 3 that describes the validation we performed on the BPMN modelling understandability guidelines. In particular, we present how the validation has been conducted describing the methodology and the defined questionnaire. Then results obtained from the questionnaire are graphically illustrated. Finally, some concluding discussions on the BPMN modelling guidelines validation and their application into practice are also provided.

The third and last part of the deliverable includes Chapter 4 that reports some conclusions and summarizes the work done during validation activities.

Part I

Learn PAd Platform - Early Validation

2 Prototype Early Validation

According to the Deliverable 8.1 addendum, the Learn PAd consortium carefully considered different strategies for the evaluation of project results and for getting indications that may help the analysis of impact for possible adopters. During the early validation we aimed to collect as much feedback as possible to properly address the prototyping activity of the final version of the Learn PAd platform. This chapter describes the early validation we carried out on the Learn PAd platform. As we already mentioned, the assessment has been done on the platform version deployed on <http://testbed.learnpad.eu/> (accessed 06.11.2015).

During the early validation, we decided to perform an assessment aiming at examining the overall status of the project according to: different learning paradigms, and the various aspects related to the activities that an employee has to carry out within a BP enactment. We focused on different scenarios according to the implemented functionalities. In particular, the platform early validation involved a quantitative assessment via questionnaire and the collection and analysis of feedback from a focus group.

The chapter is organized as following. In Section 2.1 we describe how we conducted the validation. In Section 2.2 we present the collected answers. Then in Section 2.3 we list all the feedback we collected during the validation. Finally, in Section 2.4 we closed the chapter providing some discussions.

2.1. Validation into Practice

In this section we describe in detail how we run the early validation of the Learn PAd platform into practice. We report the used methodology and then we describe a validation scenario supported by the available instance of the platform. Finally, we introduced the questionnaire we developed for the early validation (in the appendix we report the Italian version of the questionnaire).

2.1.1. Used Methodology

The early validation of the Learn PAd platform was based on two different strategies. We arranged a quantitative assessment with end users and one with a focus group. Taking into account issues related to logistics, context, and language, the validation was possible thanks to a couple of dry run we performed on the Learn PAd platform. The dry run coordinated by the project Technical Leader allowed to carry out a first internal assessment of the platform and to provide the WP8 leader with all the details necessary to perform the early validation with the end users. In the dry run xWiki, BoC, FHNW, and Linagora were involved. Some issues related to technical and methodological integration were discussed, and when possible solved, before the validation with the end users. Following, more details related to the organized quantitative assessment and focus group.

- The quantitative validation involved a group of end-users, who had no knowledge of the Learn PA platform before the validation. The group was composed by: 2 ICT experts from Regione Marche, 3 training experts from Regione Marche, and 2 SUAP experts. Such assessment was organized as follows: first the WP8 presented the state of the art of the platform, then the end

user navigated the available platform instance exploring the different functionalities, and finally an assessment questionnaire was provided to the end users.

- The focus group was composed by people from Regione Marche and UniCam that already knew about the project since they took part to some project activities mainly related to the cases modelling. The focus group, led by the WP8 leader, was composed as following: 1 ICT experts and 1 training experts from Regione Marche; 2 SUAP experts and 2 EPBR experts. During the discussion we aimed at gathering information about the following items: usability of the platform; innovative aspects in comparison with e-learning technologies; efficacy of the proposed learning model in relation to the end-users profile; multimedia solutions; gamification solutions; interactive solutions; general lay out of the interfaces and of the functionalities. First the WP8 leader presented the state of the art of the platform then the group had a long discussion on the emerging issues.

2.1.2. Validation Scenario

In order to effectively perform the early validation of the Learn PAd platform, during the dry run we agreed on two validation scenarios: one related to the EPBR and the other related to the SUAP. Both of them were developed based on several interviews with civil servants working in the Public Administration involved in the case. Following we report the considered scenarios for the SUAP cases. It is similar to the Carroll scenarios reported in the Deliverable 5.2. In particular, we considered Susan Brown. She is an entrepreneur who wants to realize a chalet, which will be located on the lake of Caccamo in the town of Serrapetrona (MC). Susan is from England and since 5 years lives in Serrapetrona with her Italian husband and their two children. All of them will be involved in the chalet business with different responsibilities and commitments (family business). Her husband will work as a cook in the internal restaurant that will belong to the chalet, while one of the two children will work as a matre within it. The second child will help them out on the weekend only, because she studies at the University of Macerata. Realizing the chalet is a dream of Susan and her husband, as it would also be a future resource for their children. Susan accesses the SUAP website from her laptop via internet connection, she downloads the digital form of the application, i.e. instance (Istanza) and fills it out. Next, Susan sends the filled form to the SUAP officer Barnaby Barnes and the process Titolo Unico starts.

Both the used scenario explores all the functionalities of the LearnPAd platform under validation that are:

- The Browsing Mode with Recommendations;
- The possibility to give feedback to the modelers;
- The simulator.

For what concerns the browsing mode with recommendation, after the logs in the system and the selection of a specific case (course) the end user can see the list of Business Processes with a button to browse and eventually simulate them. The end user can click on a model title to browse it and to view the model page of presentation including: (i) a list of tasks and roles of the model; (ii) a picture of the BP and (iii) a filtering system (see Figure 2.1). As soon as the end user filters and chooses a task to look at (the first one for example), several details on the task are available (see Figure 2.2). He can see the name and description of the task; the organization units involved in the task and connected elements in other models. In the same pages there are also back/next buttons to wiki pages representing other elements in the same model. This can also involve choices in case the wiki page refers to a gateway. On the right side the recommendation panel is also available. Up to now experts recommendations are provided. Clicking on the expert name the end user can view the e-mail address and send him an e-mail.

During browsing, the end user can also provide comments about the current task and they have the possibility to give feedback to the modellers, reporting critical errors.

Considering the simulator, we refer to the following basic steps (see Figure 2.3). The end user looks at a model and clicks on the simulate button, the simulator returns the available possibilities to simulate (6 possibility are available for the early validation). As soon as the end user correctly performs the tasks involved in the selected option the simulator returns an overall score.

The screenshot shows a Wiki page titled "List of models in Titolo Unico". The page header includes navigation links like "xwiki", "titolo-unico", and "WebHome", along with an "Add" button. Below the title, there are "Edit" and "More actions" buttons. The main content is a table with the following data:

ID	Model name	Type	Last update
mod.13916	BMM TitoloUnico	BMM	2015/11/06 09:37
mod.13899	Competency model TitoloUnico	Competency model	2015/11/06 09:37
mod.13948	Document and Knowledge model TitoloUnico	Document and Knowledge model	2015/11/06 09:38
mod.14007	Org Model Monti Azzurri	Organizational structure	2015/11/06 09:38
mod.14299	Org Model Sarnano Municipality	Organizational structure	2015/11/06 09:38
mod.14073	Org Model Senigallia Municipality	Organizational structure	2015/11/06 09:38
mod.13676	Titolo Unico - Monti Azzurri	BPMN 2.0	2015/11/06 09:37
mod.13868	Titolo Unico - Monti Azzurri - SubProcess (conference)	BPMN 2.0	2015/11/06 09:37
mod.13795	Titolo Unico - Monti Azzurri - SubProcess (restrictions)	BPMN 2.0	2015/11/06 09:37

Below the table, there are "Tags:" and "Created by superadmin on 2015/11/06 09:37". At the bottom, there are tabs for "Comments (0)", "Attachments (0)", "History", and "Information".

Figure 2.1: Browsing Mode - models detail

The screenshot shows a Wiki page titled "Send Authorization Document". The page header includes navigation links like "xwiki", "titolo-unico", and "obj.13707", along with an "Add" button. Below the title, there are "Edit" and "More actions" buttons. The main content is divided into several sections:

- Documentation:** In this activity the SUAP office sends to the entrepreneur the permission to start the manufacturing activity.
- Organization units:** A list of units including "Monti Azzurri Consortium", "Office SUAP", and "Entrepreneur".
- Previous steps:** A button labeled "inhibition of the application?".
- Next steps:** A button labeled "End Event-83081".
- Cross-model:** A section titled "Competency model" with the description "Competency model TitoloUnico" and the ability "Ability to draw up formal documents".

At the bottom, there are "Tags:" and "Created by superadmin on 2015/11/06 09:38". At the very bottom, there are tabs for "Comments (0)", "Attachments (0)", "History", and "Information".

Figure 2.2: Browsing Mode - task detail

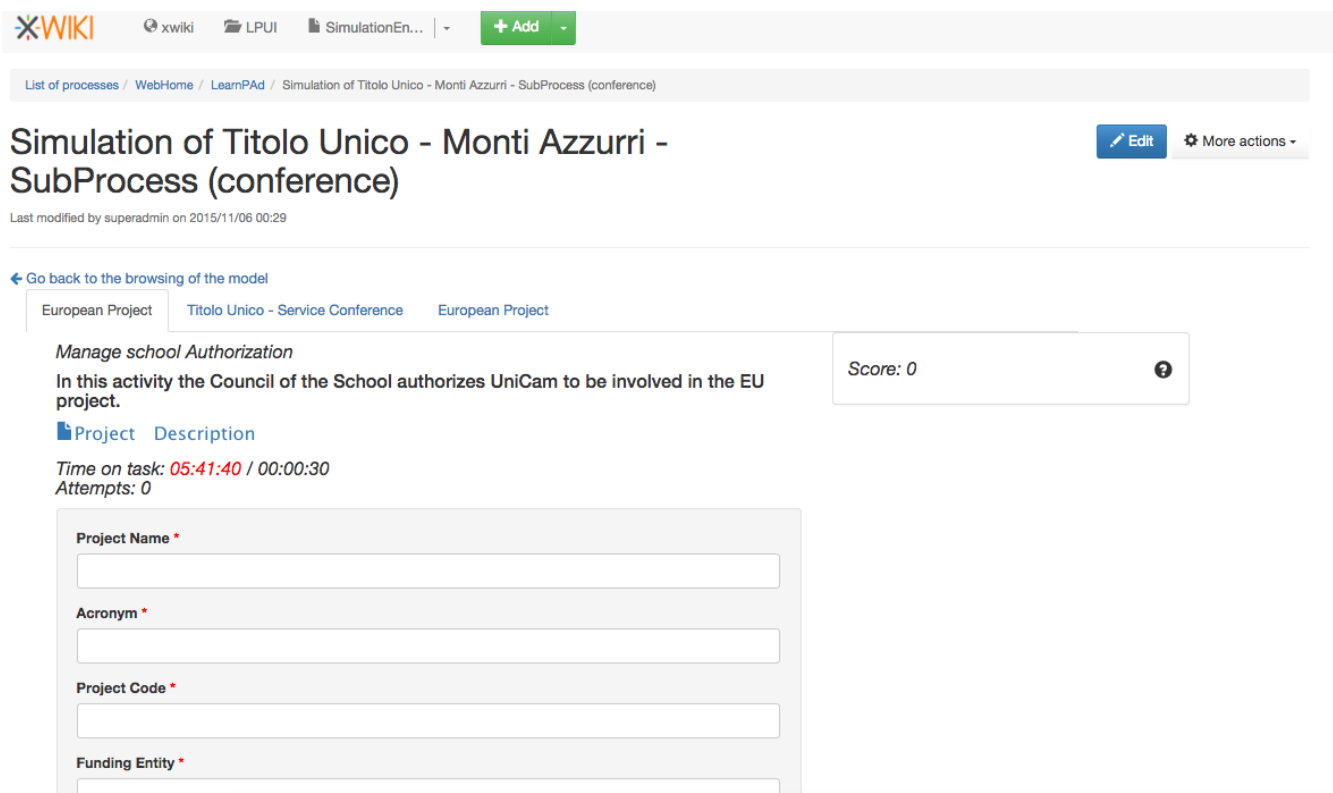


Figure 2.3: Simulation Mode

2.1.3. Questionnaire

Following, we present the questionnaire used during Learn PAd platform early validation with the end users. It was composed by 10 questions. It was introduced by a brief description following reported. The Italian version used during the validation is reported in the Appendix.

“The following questionnaire, composed by 10 questions, has to be filled after the testing activity is completed and it will be useful to gain feedback, for the LearnPAd project, about the learning platform usage experience. It will also be used to introduce enhancement in the following implementation activities. The questionnaire is anonymous and it doesn’t aim to an individual evaluation, therefore, we invite you to be objective to allow an effective deepening on the potential and the characteristics of the platform. Than you for your kind collaboration.”

1. In general, how much are you satisfied from the usage of the e-learning modality which you had access to? (Reference scale: 1=not satisfied; 5=totally satisfied)

1	2	3	4	5
---	---	---	---	---

2. How do you judge the effectiveness of the several functionalities made available by the platform? (Reference scale: 1 = not at all effective; 5 = very effective)

Browsing	1	2	3	4	5
Simulation	1	2	3	4	5
Collaboration	1	2	3	4	5
Recommendation	1	2	3	4	5

3. How do you judge the “accessibility” and the “usage experience” of the functionalities made available by the platform? (Reference scale: 1=hard; 5=easy)

1	2	3	4	5
---	---	---	---	---

4. How do you judge the “completeness” of the functionalities made available by the platform?
(Reference scale: 1=incomplete; 5=complete)

1	2	3	4	5
---	---	---	---	---

If you answered with a value lower than 3, please specify the missing elements to introduce or the ones that are weak.

5. How much effective do you think the integration of the presented learning environments is?
(Browsing, Simulation, Collaboration, Recommendation) (Reference scale: 1=not at all integrated;
5=very integrated)

1	2	3	4	5
---	---	---	---	---

6. How do you evaluate the innovation degree of the proposed solution, referring to the following elements: (Reference scale: 1=not at all innovative; 5=very innovative)

Possibility of learning based on successful process models	1	2	3	4	5
Availability of the competence model related to the professional profile objective of the learning	1	2	3	4	5
Availability of recommending functionalities (selection of deepening contents and personalized suggestions based on the context and on specific demands)	1	2	3	4	5
Other (specify)	1	2	3	4	5

7. How do you evaluate the utility of the proposed solution, in relation with the following elements:
(Reference scale: 1=not at all useful; 5=very useful)

Possibility of learning based on successful process models	1	2	3	4	5
Availability of the competence model related to the professional profile objective of the learning	1	2	3	4	5
Availability of recommending functionalities (selection of deepening contents and personalized suggestions based on the context and on specific demands)	1	2	3	4	5
Other (specify)	1	2	3	4	5

8. For a better platform effectiveness in terms of learning, do you think it is necessary to have a higher presence of the following aspects? (Reference scale: 1=not at all useful; 5=very useful referring to the learning effectiveness)

Structuring of the wiki contents	1	2	3	4	5
Gamification	1	2	3	4	5
Multimediality (audio, video, images,)	1	2	3	4	5
Interactivity between learner and contents	1	2	3	4	5
Multilingualism	1	2	3	4	5
Tutoring	1	2	3	4	5
Other (specify)	1	2	3	4	5

9. Positive aspects to highlight or other positive comments

10. Negative aspects to highlight or other critical comments

2.2. Results form Questionnaire

In this section we report results from the quantitative validation involving 7 end users. The WP8 leader presented the state of the art of the platform, in one hour, and the involved end users had the opportunity, for half an hour, to navigate the platform functionalities. After that, the presented questionnaire was submitted. Following, some illustrations and discussions are progressively introduced for each question from 1 to 8.

1. Question one asked how much the users were satisfied from the usage of the e-learning modality. The reference scale was: 1=not satisfied; 5=totally satisfied.

Six people answered 3, just once answered 4, the average was 3,14 which means the users were normally satisfied by the e-learning modality.

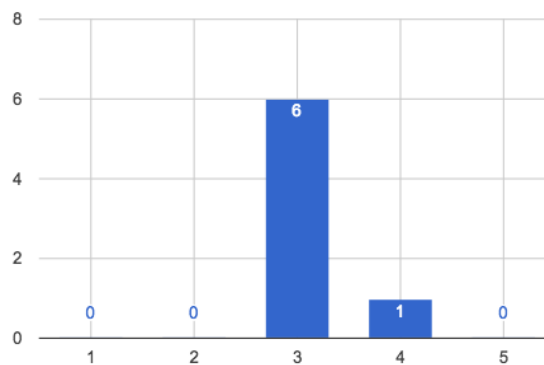


Figure 2.4: Answers to question 1.

2. Question two asked the users to judge the effectiveness of the functionalities made available by the platform. The functionalities were: browsing, simulation, collaboration and recommendation. The reference scale was: 1 = not at all effective; 5 = very effective.

For “browsing”, the average of answers was 2,85 which means the users evaluated the browsing functionality as a bit less than normally effective. For “simulation”, the average of answers was 3,28 which means the users evaluated a bit more than normally effective the simulation functionality. For “collaboration”, the average of answers was 3 which means the users evaluated normally effective the collaboration functionality. For “recommendation”, the average of answers was 4,14 which means the users evaluated more than normally effective the recommendation functionality.

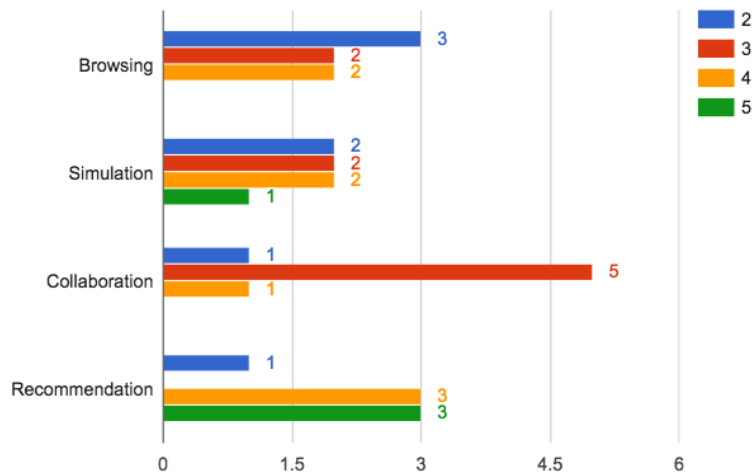


Figure 2.5: Answers to question 2.

3. Question three asked the users to judge the “accessibility” and the “usage experience” of the functionalities made available by the platform. The reference scale was: 1=hard; 5=easy.

Four people answered 2 while three people answered 3. The average was 2,42 which means the users judged “accessibility” and the “usage experience” to be a bit hard.

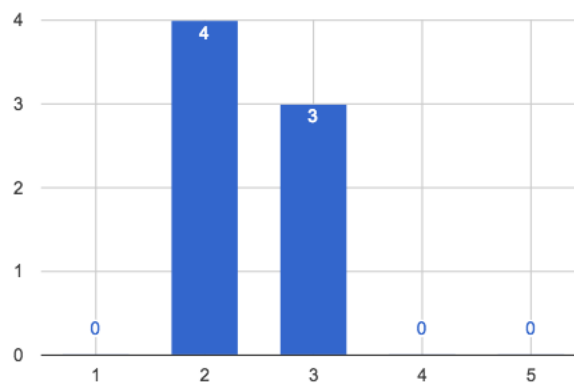


Figure 2.6: Answers to question 3.

4. Question four asked the users to judge the “completeness” of the functionalities made available by the platform. The reference scale was 1=incomplete; 5=complete.

Four people answered 4, two people answered 3 and one answered 2. The average was 3,42 which means the users judged the “completeness” of the functionalities as a bit more complete than incomplete.

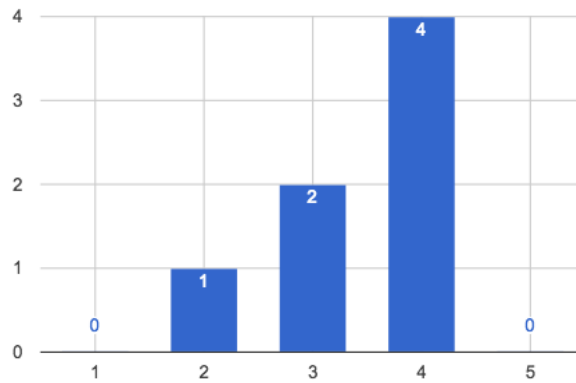


Figure 2.7: Answers to question 4.

5. Question five asked the users how much effective the integration of the presented learning environments was, referring to: browsing, simulation, collaboration and recommendation. The reference scale was 1=not at all integrated; 5=very integrated.

Three people answered 4 while four people answered 3. The average was 3,42 which means the users judged a bit more than effective the integration between the learning environments.

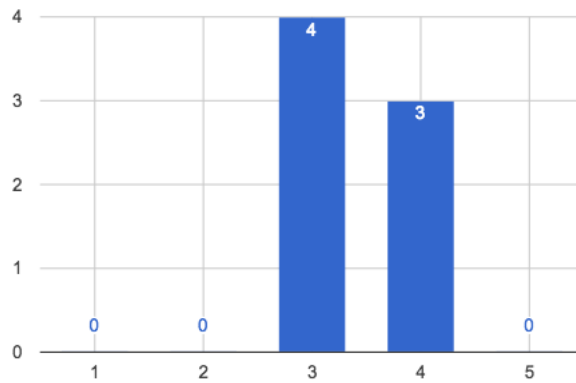


Figure 2.8: Answers to question 5.

6. Question six asked the users to evaluate the innovation degree of the proposed solution based on different aspects. The reference scale was 1=not at all innovative; 5=very innovative.

For the “Possibility of learning based on successful process models” the average of the answers was 4,42 which means the user judged pretty much innovative the possibility of learning based on successful models. For the “Availability of the competence model related to the professional profile objective of the learning” the average of the answers was 4,14 which means the users judge pretty much innovative the availability of the competence model related to the professional profile objective of the learning. For the “Availability of recommending functionalities (selection of deepening contents and personalized suggestions based on the context and on specific demands)” the average of the answers was 4,42 which means the users judged pretty much innovative the availability of recommending functionalities.

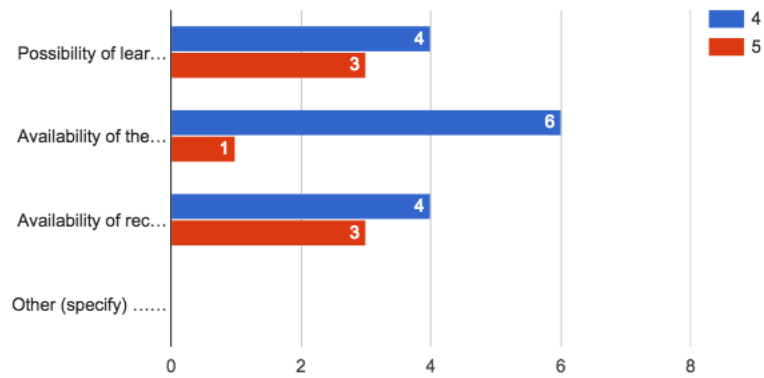


Figure 2.9: Answers to question 6.

7. Question seven asked the users to evaluate the utility of the proposed solution based on different aspects. The reference scale was 1=not at all useful; 5=very useful.

For the “Possibility of learning based on successful process models” the average of the answers was 4 which means the user judged pretty much useful the possibility of learning based on successful models. For the “Availability of the competence model related to the professional profile objective of the learning” the average of the answers was 3,42 which means the users judge a bit more than useful the availability of the competence model related to the professional profile objective of the learning. For the “Availability of recommending functionalities (selection of deepening contents and personalized suggestions based on the context and on specific demands)” the average of the answers was 4,57 which means the users judged pretty much useful the availability of recommending functionalities.

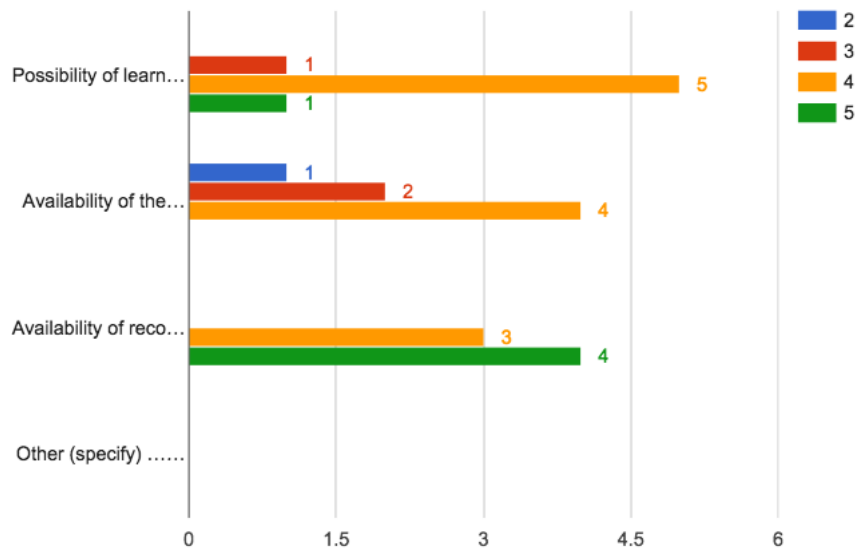


Figure 2.10: Answers to question 7.

8. Question eight asked the users to express if they think necessary to have a higher presence of particular platform aspects. The reference scale was 1=not at all useful; 5=very useful referring to the learning effectiveness.

For the “Structuring of the wiki contents” the average of the answers was 3,71 which means the users find a bit more than useful to have a higher structuring of the wiki contents. For the “Gamification” the average of the answers was 4,2 which means the users find pretty much useful to have a higher presence of “Gamification”. Note, only five people over seven expressed their opinion on the matter. For the “Multimediality (audio, video, images,)” the average of the answers was 4,71 which means the users find pretty much useful to have a higher presence of multimedia contents. For the “Interactivity

between learner and contents” the average of the answers was 4,5 which means the users find pretty much useful to have a higher presence of interactivity between learner and contents. Note, one of the users did not expressed his opinion on the matter. For the “Multilingualism” the average of the answers was 4,28 which means the users find pretty much useful to have a higher presence of “Multilingualism”. For the “Tutoring” the average of the answers was 4 which means the users find pretty much useful to have a higher presence of “Tutoring”. Note, one of the users did not expressed his opinion on the matter.

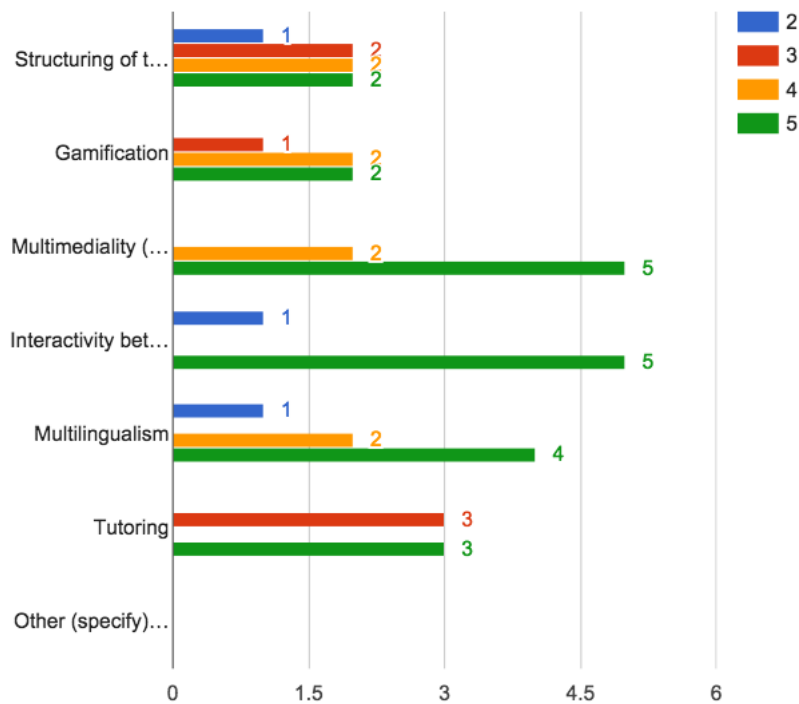


Figure 2.11: Answers to question 8.

2.3. Collected Feedback

In this section we provide the whole list of feedback we collected both from the questionnaire and the focus group. Overall we collect 80 feedback related to the functionalities of the Learn PAd platform under validation that are browsing mode, the recommendations, and the simulation.

2.3.1. Feedback from the Questionnaire

The users that provided an answer below the value 3 to the question number 4 also provided comments and suggestions for the addition of some elements. Those suggestions are following listed.

1. Addition of multimedia contents (2 users provided the same comment).
2. Make clickable the working phases linking them to models in the browsing (2 users provided the same comment).
3. The functionalities have to be more integrated between each other.
4. Always clarify, to the platform user, the contents objectives and the working phase.
5. Make clear to the user only the things he really needs for the learning activity.

6. The present functionalities cover a sufficient spectrum of useful activities for the “training on the job” and for the building of a “practical community” of users. However there is still much work to do to enhance each functionality (especially: browsing and collaboration).

Question 9 asked the users to provide positive comments on the platform. In the following, we list the reported comments.

1. The overall idea is pretty much innovative.
2. Simulation and recommender modules, look really promising.
3. The learning approach on processes is very interesting.
4. The use of process for simulation and learning is interesting.
5. The availability of learning object and model references is relevant.
6. The importance of recommendation for supporting the user is very interesting
7. The recommender functionality is very useful for the development of competences.

Question 10 asked the users to provide comments on the platform negative aspects. In the following, we list the reported comments.

1. Fill the platform with specific and contextual contents (especially if interactive, multimedia, coloured and pleasing) of the different environments of the platform.
2. The different environments need a better integration between each others (e.g. simulation with recommendation).
3. Some environments need to be further developed (e.g. it would be better to base browsing on clickable images; collaboration needs to be less traditional than simple POST/REPLY and then: contents approved by users must be searchable in a SMART and semantic way based on the searched activity).
4. Lack of gamification functionalities in the learning platform. Gamification must be fully developed (e.g. a maximal score and a comparison of users scores can be introduced).
5. The collaboration in the platform should be improved (possibility of sharing and of co-creation of documents between the platform users).
6. Lack of multimedia contents.
7. Lack of video-conference system.
8. Lack of “social” instruments for a better communication between operators.
9. The platform is not “user-friendly”.
10. Absence of a home page which clarifies modules and objectives.
11. Absence of assessment tools.
12. Absence of a user manual.
13. The platform functionalities and their objectives are not described and explicated (e.g. adding: texts, descriptions about single objects and about the formation goals).

2.3.2. Feedback from the Focus Group

After 3 hours discussion the Focus Group provided several comments. We did some analysis on the comments and we merged some of them and refined/homogenized all of them. At the end we collect 54 feedback. In the following we list all of them, categorized by the topic of the comment. We start listing general comments, than comment on the different pages describing the different artifacts. Comments on the models are also provided. Finally, some comment on the recommend and the simulation.

General comments are following listed.

1. In the home page general description should be introduced. This clarifies the scope of the platform. In the main page the project description should be included as well as a description of the learning material that is available. The learning approach should be described as well as the learning objective.
2. The title of the home page should be changed. The end users suggested “Learning materials/-courses” rather than “list of processes”.
3. It is not clear why there is a list of processes in the home page. The end users suggested to remove it. It is needed to introduce a new column (description) in the page containing the list of processes.
4. Users login does not affect the content of the pages. End users proposed to change the policy.
5. It is not clear how the users registration is done. The end users suggested to perform competences assessment during the registration. In such a way a profile is created for each end user.
6. The images of the models (i.e. process, organization, competences) should be included for each page. When multiple models are available they should be grouped in one page.
7. Collaboration is implemented mainly via comments. The end users would expect something more like co-creation of contents.
8. The text “documentation” should be replaced by “description of the activity”.
9. The language is an issue. Both Italian and English could be implemented. According to the target users we have to take a decision. For the SUAP case, it would be better to have it in Italian.
10. The web site graphics is important. Up to now it is not very attractive. The end users suggested to check the layout and the overall organization of the contents.
11. The tracking of the users is needed for learning purposes. We have to know what users did. This is really important to certify learning activities.
12. It is good to have a breadcrumb (the navigation tree displayed at the top of each page).
13. A user manual is missing. It would be very useful to have one.
14. The platform layout is not accessible according to the Italian accessibility law.
15. Multimedia aspects are missing. Video, animation and audio are not considered. This should be part of the learning material at least in the recommender part. Also browsing and simulation should be enriched with multimedia aspects.
16. The links available should be useful for the end user. There are some technical links/pages; those should be removed. This helps the user and avoids confusion.

17. Organizational learning aspects are limited. The end user believes that to be very important. Can the competences be improved? Is it possible to assess such improvements? It is not clear how the platform addresses them.

Comments on the page <http://testbed.learnpad.eu/xwiki/bin/view/Main/> are listed in the following.

18. At the top of the pages a general description about the content should be introduced.
19. The ID column can be removed. This comment is valid also for the other sections.
20. The column “name process” could be replaced by course name.
21. Add a column with the element description.
22. It is not clear if the column “last update” is needed. Is it referring to versioning of the models? If yes, can we include a description of the different versions?
23. The History and Information tab at the bottom of the pages are not useful for the end user. Can we remove or better motivate?
24. The “more action” button at the top of the page is not useful for the end user. Can we remove or better motivate it?

Comments on the page <http://testbed.learnpad.eu/xwiki/bin/view/epbr/> and on the respective SUAP page are listed in the following.

25. At the top of the page a general description on the content of the pages should be introduced.
26. An image representing the different models is useful.
27. Add a column with the models description.
28. Different types of model are presented in the same table. It makes confusion. The end users suggest to split the model in different section by type.
29. The sub-process should be removed by this page. It is needed a hierarchical presentation of the models to avoid confusion.
30. The end user is confused, it is not clear where to click. Is it possible to graphically represent the main model (starting point to browse)? Process model can be such entry point?

Comments on the page <http://testbed.learnpad.eu/xwiki/bin/view/titolo-unico/mod.13676#|t=lp-modellist&p=1&l=15&s=name&d=asc> are listed in the following.

31. At the top of the page a general description on the content of the pages should be introduced.
32. Some sub-processes are missing.
33. The elements order in the page is very important. If they can not be ordered.
34. The images should be interactive. The users should click on the image to access the wiki pages. Doing so the list of the elements could be removed and replaced by the interactive image. In such a way the ordering problem is also solved. This comment is valid for all the images.
35. The images should help to understand where the user is in the navigation. Highlighting the step in the image can be useful. This comment underlines the comment 34.

36. Start to browse is a very useful button. The end user suggest to maintain it.
37. Lane and Pool are not relevant. They refer to the organization model. They should be removed by the element list.
38. There are some elements with a name followed by a number. This is not a modelling issue. In the model such elements do not have a name. Please consider it during the transformation.

Comments on the page of the single artefacts (e.g. <http://testbed.learnpad.eu/xwiki/bin/view/titolo-unico/obj.13686>) are listed in the following.

39. The mange of feedback should be better organized. When the end user clicks the feedback button, some examples should be provided. It could be useful to introduce some examples or patterns guiding the feedback editing. The ID in the feedback is not useful for the end user. The name “artefact” on the return link could be generalized.
40. In the platform, the demo user is Barnaby. He is also one of the experts in the recommender. End users suppose that the user can not recommend himself.
41. The cross-model aspect is very interesting. However, it is not easy to understand what are the relevant information. This is too generic/technical. Can we provide such link in a more friendly manner? The title of the section should refer to the related objective rather than to models.

Comment on the models are following listed.

42. “SUAP aggregato” should be renamed with “sportello comprensoriale” and “SUAP Singola” with “sportello municipale”.

Comments on the Recommender are following listed.

43. The recommender section should have a title and a small description. All the sections in the recommender bar should have a name.
44. The recommender could be integrated also at the process/model level.
45. An integration between simulator and recommender should be provided. During the simulation the recommender could support the user to avoid mistakes and/or to better understand the mistakes. End-users suggested to introduce tips during the different step of the simulation after some users mistakes.

Comments on the simulation are following listed.

46. The simulation does not work in some regional PC. Make clear if there are any technical constraints. This could be reported in the home page or in the users manual.
47. The collaborative part of the simulation should be implemented.
48. The simulation cases can be better described/introduced with a name rather than a number. The complexity level should be also introduced with the case. The cases could be also customized on the users competences level.
49. Gamification is very limited. It is not clear how different roles can play. The end users expected some exercises introducing a competitive game. For example, they could expect to have some wrong cases and to pinpoint with the platform to understand where is the mistake. Something more friendly could be implemented. At least the ranking list should be available.
50. The end user should know for each step of the simulation the score. The score should be given in percentage or the max score should be reported.

51. During simulation, when filling a form, the end user can make some mistakes. When such errors occur all the field are deleted and an error is reported. A more specific mechanism to manage the error is needed. More in general some exit strategies (what happens after several errors) should be defined.
52. Considering collaboration in the simulation, co-creation should be introduced. It is needed when filling the report during simulation. At the same time controls on the quality of the report should be introduced.
53. EPBR simulation is very simple, maybe too simple. SUAP simulation is fine although too limited. Be careful, in the SUAP case the simulated model does not fit, with the overall sub-process, in the wiki.
54. Competence and simulation seems to be not combined. Does the simulation help to improve the competences? Is it possible to assess the competences before and after the simulation?

2.4. Feedback Discussion

We can observe that the end users involved in the questionnaires and in the focus group overall provided similar feedback. In the following we concentrate mostly on the comments resulting from the focus group since they represent a superset of the others.

Considering general comments, we received feedback to improve: the home page, the user registration and login, the website graphics, the display of the models, the collaborative and the organizational aspects of the platform. Moreover, the Focus Group suggested to insert multimedia contents, to work on establishing whether to provide the platform both in Italian and English language, to provide a user manual of the platform, and to keep track of the user profile.

Considering comments on the different wiki pages we can observe the following remarks.

Comments on page <http://testbed.learnpad.eu/xwiki/bin/view/Main/> focused on improving how the list of processes is displayed, on removing or changing some columns, and on modifying the tabs and buttons that are displayed. Also a description of the page should be provided.

Comments on page <http://testbed.learnpad.eu/xwiki/bin/view/epbr/> concerned improving the displayed list of models, e.g., by removing sub-processes from the list, adding a model description column, and introducing a model image. Also a description of the page should be provided.

Comments on page <http://testbed.learnpad.eu/xwiki/bin/view/titolo-unico/mod.13676#|t=lp-modellist&p=1&l=15&s=name&d=asc> displaying an example of BP model, ask for improving the model in such a way to improve the interaction with it, allowing the user to click on models elements to access their wiki pages. They also ask for an improvement of the elements list since, some elements are missing and the list is not ordered. The Focus Group also pointed out that the Lane and Pool are not relevant elements for this page. The Start to browse button has been found useful instead.

Comments on the page of single artefacts (e.g. <http://testbed.learnpad.eu/xwiki/bin/view/titolo-unico/obj.13686>) focused on improving the management of feedback (e.g. preventing that a user may recommend him/herself), and improving cross-model aspects.

Minor remarks are also reported on the models. Indeed just a suggestion for model renaming has been provided for the “SUAP aggregato” model.

Comments on the Recommender asked for providing a title and a description to the different recommendation sections, for integrating the Recommender at process/model level, and for providing an integration with the simulator to suggest possible solutions during simulation.

The Focus Group pointed out that the simulation did not work on some PCs or Regional employees. General and specific comments have been provided to improve several aspects of the simulation such as: the collaborative part, the gamification aspect, and the error management. The Focus Group also noticed that Competence and Simulation seem to be not combined.

Table 2.1: Feedback priorities

Priority	Feedback ID
1	1. 4. 5. 11. 13. 18. 21. 26. 27. 29. 30. 31. 33. 34. 39. 40. 43. 46. 47. 48. 49.
2	3. 6. 10. 12. 15. 17. 23. 25. 35. 37. 41. 42. 44. 50. 53. 54.
3	2. 8. 9. 16. 20. 32. 45. 52.
4	7. 19. 24. 28. 36. 38.
4	14. 22.

In order to address such feedbacks, UniCam and Marche Region discussed and assigned priorities from one to five (1=high, 5=low). The resulting prioritized list of priorities is reported in Table 2.1. Indeed some of the comments can immediately be solved, while others require either a huge amount of work or they are not well-defined. The proposal is to discuss them in depth during face to face meetings and/or a conference-call (depending on the problem) to define the actions that have to be taken from now on, until the end of the project.

Part II

Modelling Guidelines for Understandable BP Models - Validation

3 Gathering Understandable Models

The Learn PAd platform validation was anticipated by a more general validation on the modelling understandability guidelines presented in Deliverable 4.1. We consider understandability as a relevant quality requirement which impacts on the learnability of Business Processes for Public Administrations, that is why we defined a list of modelling guidelines which helps a modeller to design understandable BP models. The results, given by the guidelines validation, convinced us to re-design the models presented in Deliverable 8.1. The re-designed models were used as “enhanced version of the models”, to populate the Learn PAd platform before the platform validation presented in chapter 2.

The chapter is organized as following. In Section 3.1 we describe the models validation methodology. In Section 3.2 we present the designed questionnaire then in Section 3.3 we present the collected answers. Finally in 3.4 we report some discussions.

3.1. Applied Methodology

Understandability guidelines validation was carried out starting from the guidelines we presented in Section 4.1 of the Deliverable 4.1. Those guidelines have been collected from the literature and they have been enhanced with our experience in BP modelling. The goal was to provide a modeller with BP modelling guidelines which would help him in the design of understandable BP models.

In order to validate these guidelines a task force involving members of UniCam and CNR, developed the questionnaire presented in section 3.2. Several meetings have been necessary to agree on the questions to include in the questionnaire. The main idea was to improve the guidelines based on the questionnaire answers as shown in Figure 3.1.

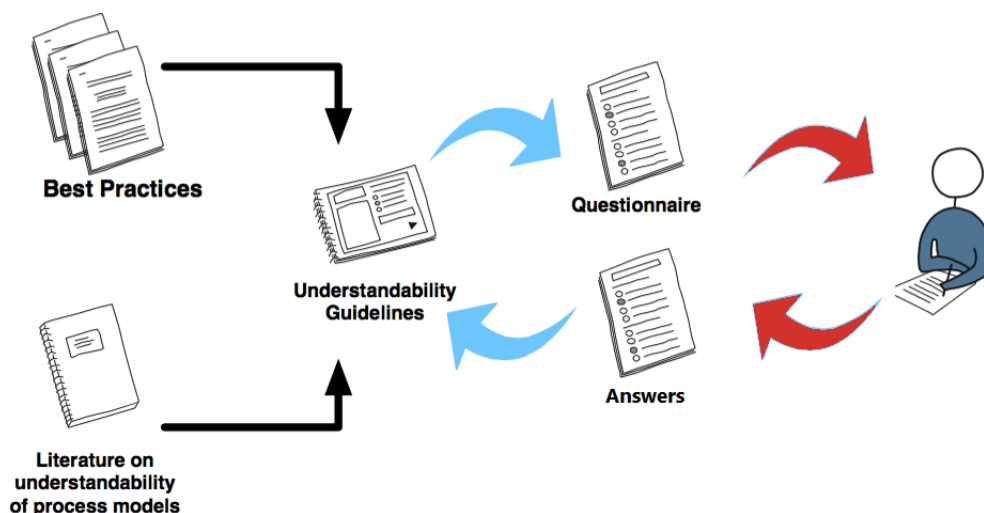


Figure 3.1: Applied methodology

The questionnaire has been submitted to Public Administrations personnel (targeting employees and managers) and to people within an academic context (targeting students, researchers and professors). In particular we took into account those people who declared knowing the BPMN notation. We gave

them a month of time to fill the questionnaire. Provided answers were directly saved in a spreadsheet by the google form technology. After 40 days, to account for possible delays, a group of people with members belonging to CNR and Unicam analysed the answers. The total number of filled questionnaire was 71.

3.2. Questionnaire Related Understandability Guidelines

In this section we report the questionnaire that we defined. As we already state, with these questions we want to investigate the importance of the modelling guidelines for the design of understandable BP models.

3.2.1. User Profile

The following questions have been defined in order to identify the profile of the person answering the questionnaire, and then to hijack him to the successive set of questions relevant for the specific profile.

1) What is your occupation (profession)?

- Employee
- Student
- Researcher
- Professor
- Manager

2) What is your knowledge level of BPMN notation?

- I don't know the BPMN notation
- I can intuitively understand the BPMN notation, and I know the basic elements of the notation
- I know most of the elements of the BPMN notation, but I never used the notation to create models
- I know most of the elements of the BPMN notation, and I can create simple models
- I am an expert of the BPMN notation, and I can create complex models with the notation

3) Have you ever attended a Business Process modelling course?

- Yes, I have.
- No, I haven't.

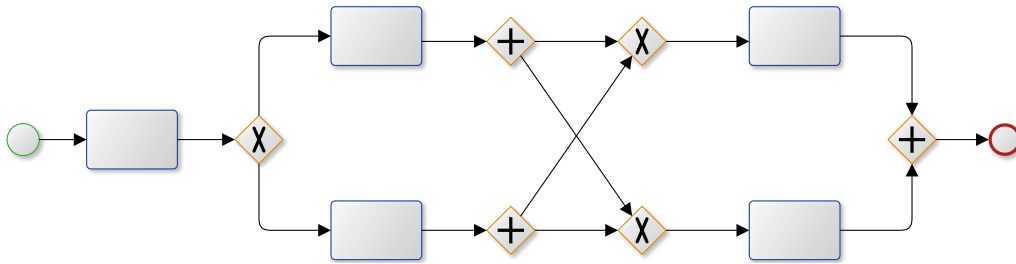
3.2.2. Notation Usage

The following questions concern the use of specific BPMN elements.

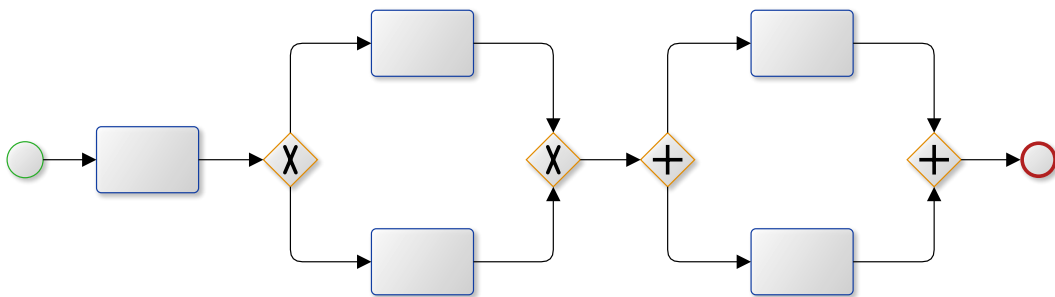
4) Which of the following BP model layouts do you find easier to understand?

Please, look at the images before answering the question.

- Process A.
- Process B.



Process A

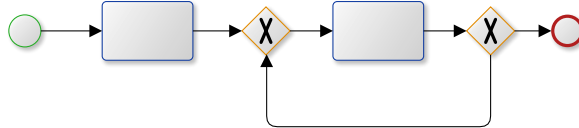


Process B

5) Which of the following BP model layouts do you find easier to understand?

Please, look at the images before answering the question.

- Process A with explicit modeling of the loop.
- Process B with task with the loop marker.



Process A



Process B

6) Do you know the meaning of the following BPMN element?

Please, look at the images before answering the question.

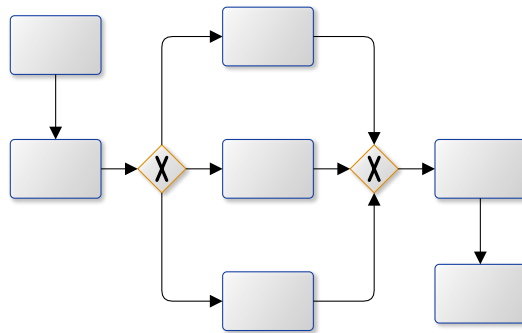
- Yes, it is Terminate End Event. This Event terminates only the branch where it's attached
- Yes, it is Terminate End Event. This Event terminates all the branches of the BP model.
- No, I don't.



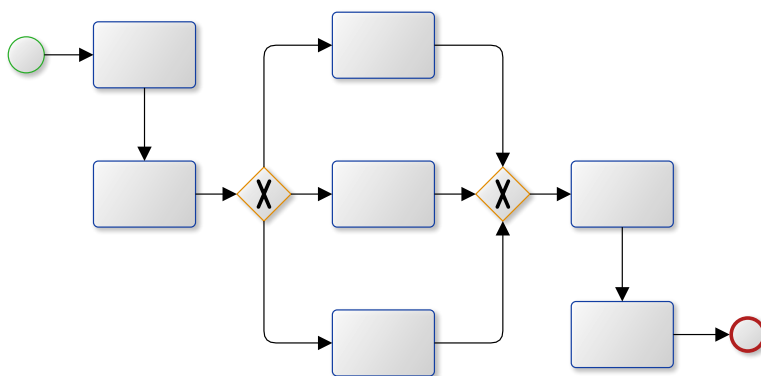
7) Observing the follow models, do you think that the explicit use of Start and End events improve the understandability of the model?

Please, look at the images before answering the question.

- No, Process A is more understandable than Process B
- Yes, Process B is more understandable than Process A



Process A



Process B

8) In order to make model easier to understand, if in a subprocess you have more than one message flow in the same direction, how many message flows do you show in the toplevel process?

- Only one message flow, which synthesize the multiple message flows that I have at the subprocess level
- All message flows

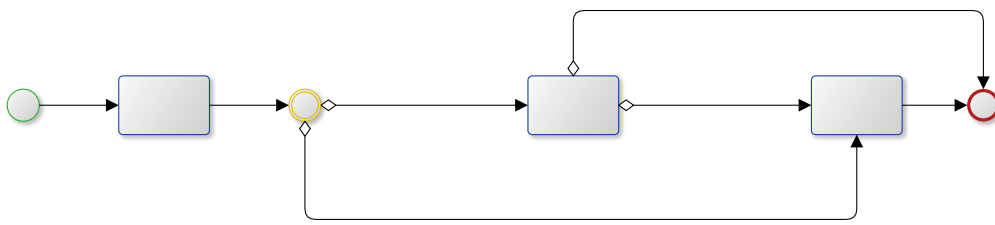
9) After an exclusive or inclusive gateway, do you think that the use the Default Flow improves the understandability of the model?

- Yes, the use of the Default Flow improve the understandability of the model
- No, the use of the Default Flow doesn't improve the understandability of the model

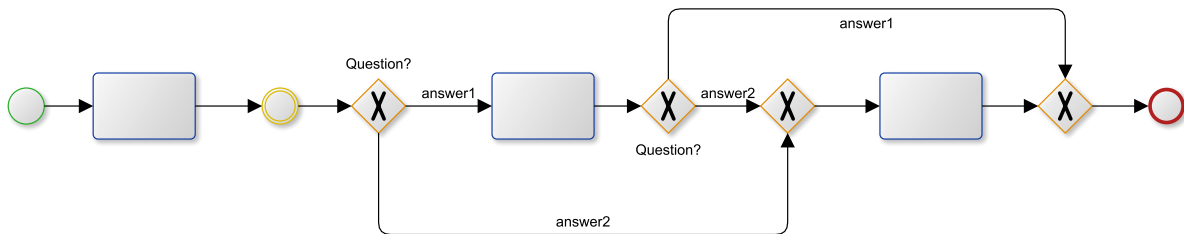
10) Which of the following BP model layouts do you find easier to understand?

Please, look at the images before answering the question.

- Process A with implicit use of gateways, and no labels
- Process B with explicit use of the gateways, and explicit labels



Process A

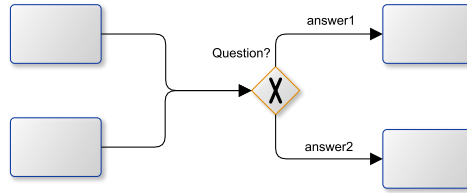


Process B

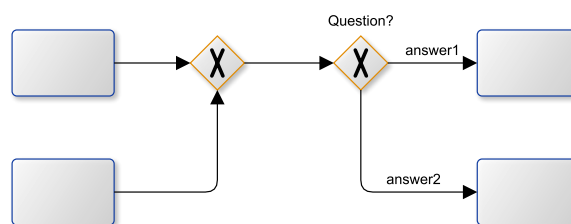
11) Which of the following BP model layouts do you find easier to understand?

Please, look at the images before answering the question.

- A - a gateway can be used for both splitting AND joining different flows.
- B - a gateway can be used for splitting OR for joining different flows



A



B

12) Observing the following Exclusive Gateway, do you think that the marker improves the understandability of the model?

Please, look at the images before answering the question.

- No, A I prefer the Exclusive Gateway without marker
- Yes, B I prefer the Exclusive Gateway with marker



A



B

13) Do you know the meaning of the following BPMN element?

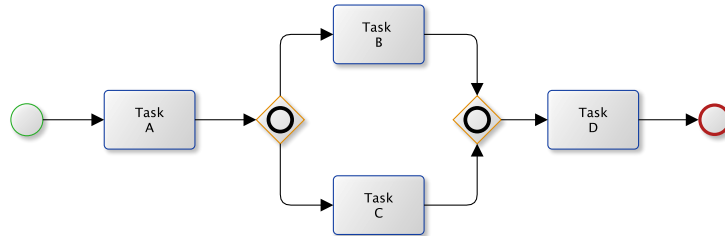
Please, look at the images before answering the question.

- Yes, I do. It is Inclusive OR Gateway
- Yes, I do. It is Exclusive XOR Gateway
- No, I don't.



14) Which is the execution order of the activities in the model below?
Please, look at the images before answering the question.

- 1) Task A Task B Task C Task D
- 2) Task A Task B Task D
- 3) Task A Task C Task D
- 4) Task A Task C Task B Task D
- 5) All the previous answers (1,2,3,4) are possible executions
- 6) I don't know



3.2.3. Labeling

- 15) **In order to make models easier to understand, do you think that an Activity Description should be associated with each Activity?**

The description is not directly shown in the model but it can be accessed to get more information about the activity itself.

- Yes, I do agree with it. The Description improve the understandability of the model.
- No, I don't.

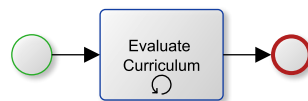
- 16) **In order to make models easier to understand, matching the label of a subprocess end state with the label of a gateway immediately following the subprocess, do you think that allows to have a clear vision on how subprocess and process are linked together?**

- Yes , I do agree with it. This improve the understandability of the model.
- No, I don't.
- I don't know.

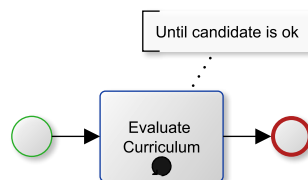
- 17) **Which of the following BP model layouts do you find easier to understand?**

Please, look at the images before answering the question.

- Process A is easier to understand
- Process B with Annotation is easier to understand



Process A



Process B

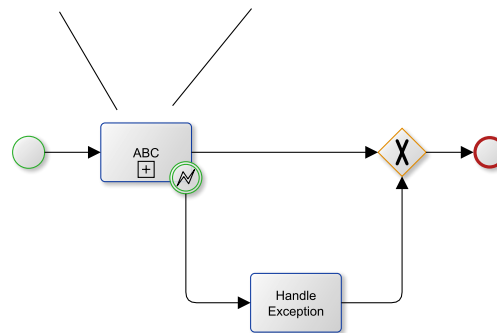
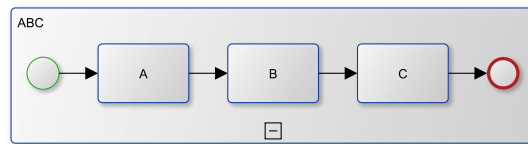
3.2.4. Patterns

The following questions concern the use of patterns in the modelling phase.

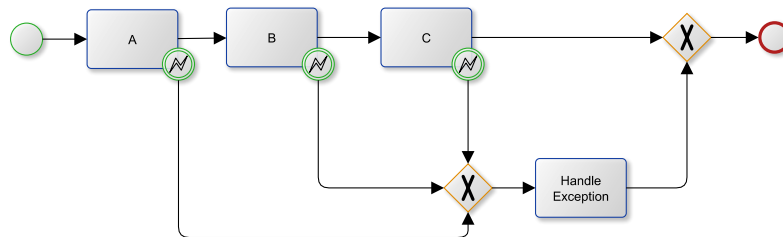
18) **Which of the following BP model layouts do you find easier to understand?**

Please, look at the images before answering the question.

- Process A with a subprocesses and a single boundary event is easier to understand
- Process B, with a boundary event for each activity is easier to understand



Process A



Process B

3.2.5. Appearance

19) Which of the following BP model layouts do you find easier to understand?

Please, look at the images before answering the question.

- Figure A with edge overlay
- Figure B without edge overlay

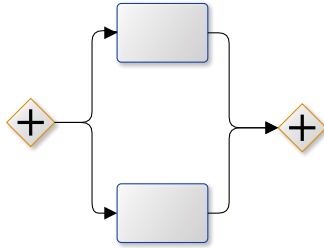


Figure A

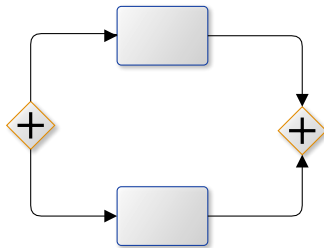


Figure B

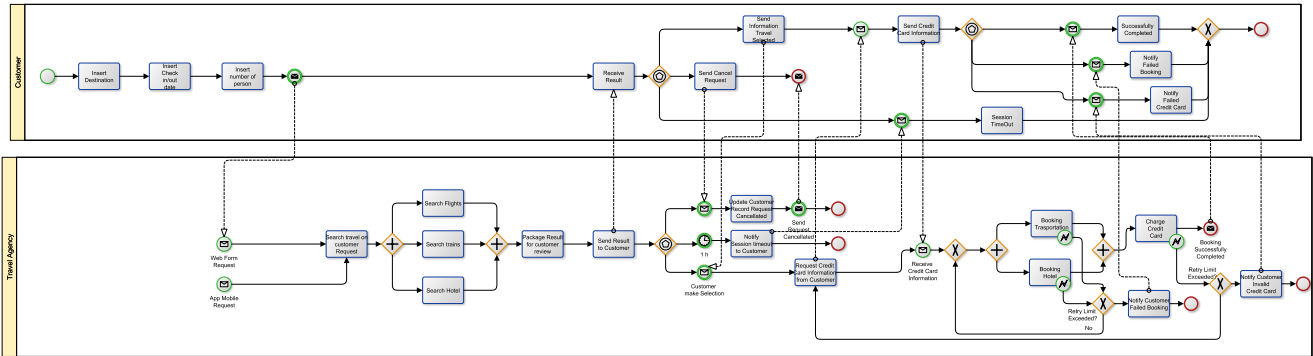
3.2.6. Overall Models

The following are questions on complete Business Process Model and Notation (BPMN) models concerning a Travel Agency.

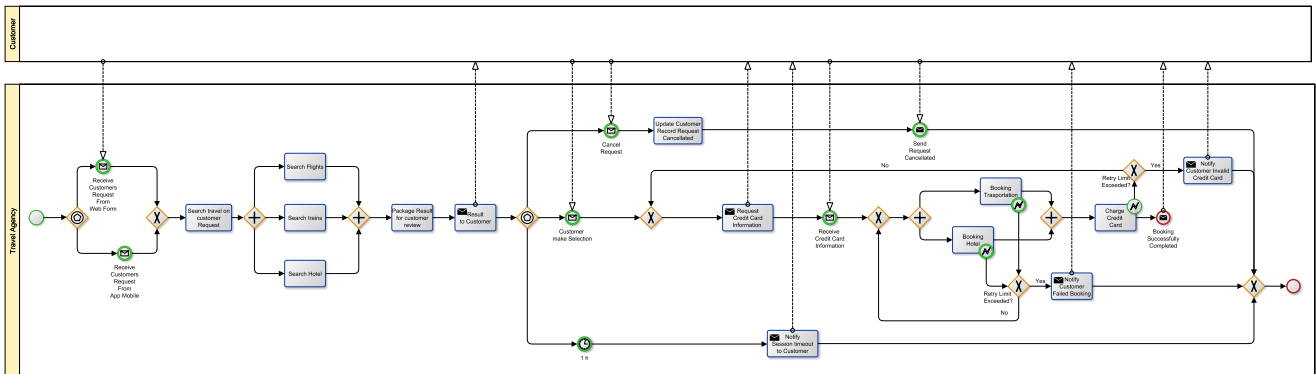
20) Which of the following BP model layouts do you find easier to understand?

The model describes a process of a travel agency. Please, focus only on the travel agency Pool. Both models contain the same tasks. Use the following links to zoom the models.

- Model A <https://goo.gl/eHdpDI>
- Model B <https://goo.gl/ywOvLe>



Model A

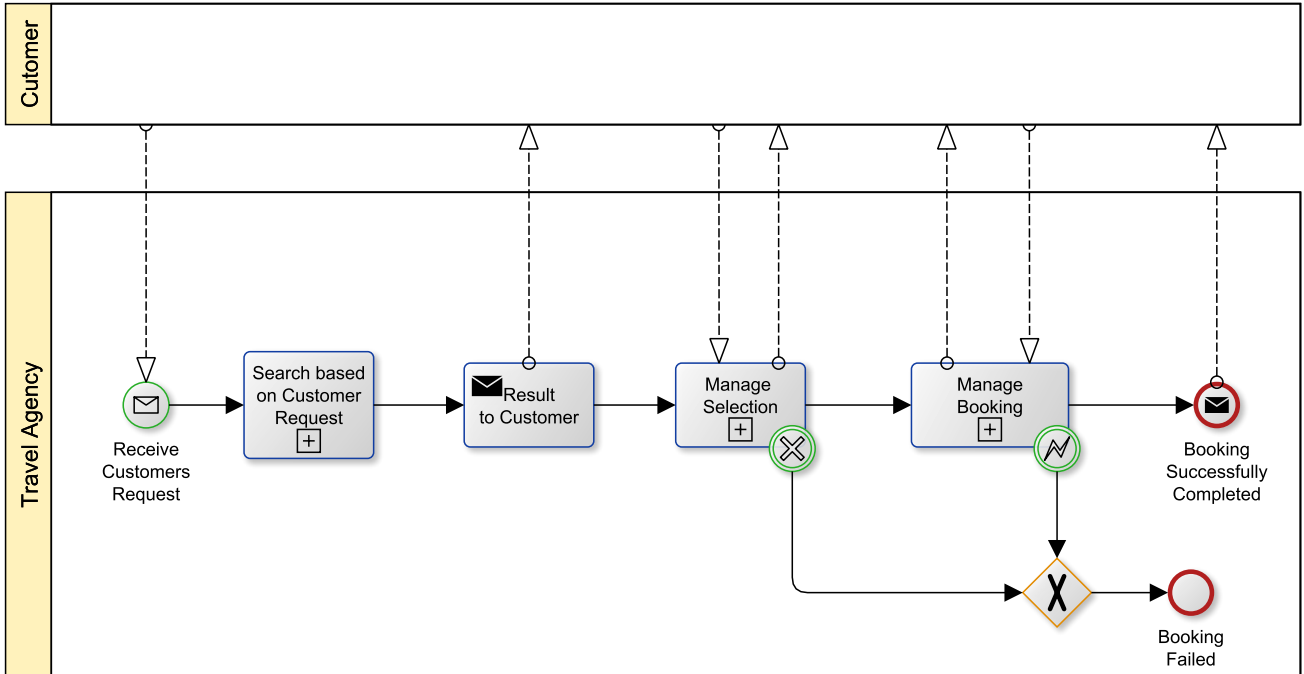


Model B

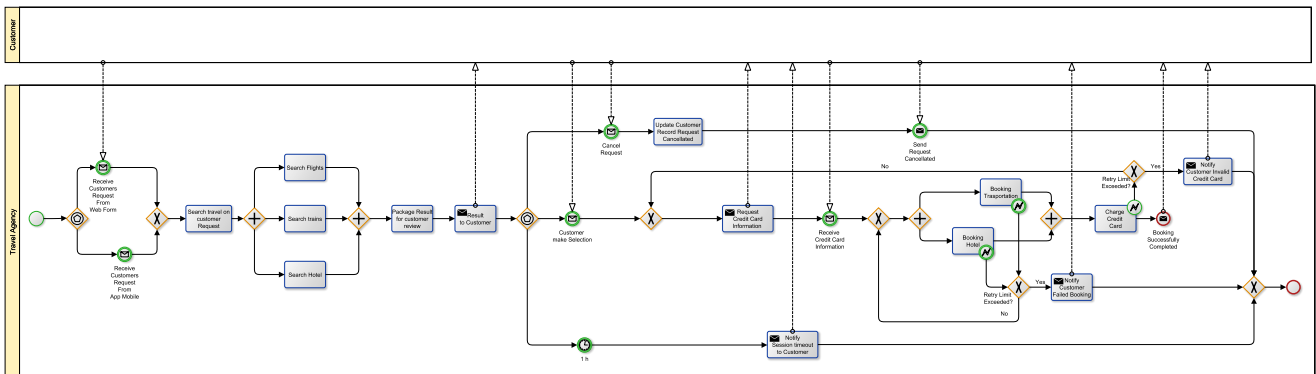
21) Which of the following BP model layouts do you find easier to understand?

These models describe a process of a travel agency. Use following links to zoom the models.

- Model A, with hierarchical subprocesses is easier to understand <https://goo.gl/KXO0po>
- Model B, without subprocesses is easier to understand <https://goo.gl/ywOvLe>



Model A



Model B

3.3. Results

In this section we report some illustrations and discussions about the 75 answers to the questionnaires. In particular, we report below the categorization of answers related to the user profile with some overall comment. Answers considering the guidelines are progressively introduced. To access the entire list of answers we refer to https://docs.google.com/spreadsheets/d/1ckjaq44z2P9s-4hL0wk_AoKigO8N3kDTVoJ14orS9xk/edit#gid=1028432167.

3.3.1. Users Profile

The 75 interviewees are divided as follows: 25.3% Employee, 48% Students, 16% Researchers, 4% Professors and 6,7% Managers (see Figure 3.2).

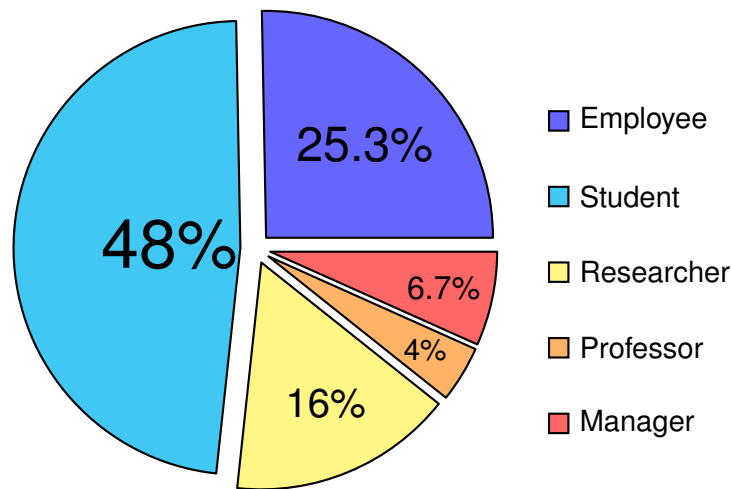


Figure 3.2: Occupation (profession) of the interviewees

Figure 3.3 shows the knowledge level of the interviewees on the BPMN notation, in particular the 14,7% of the interviewees is an expert of the notation, the 57,4% of the interviewees has created models, the 36% of the interviewees has a low/intuitively understand of the BPMN notation and only the 6,7% of the interviewees don't know the BPMN notation, this last interviewees cannot go any further in the questionnaire.

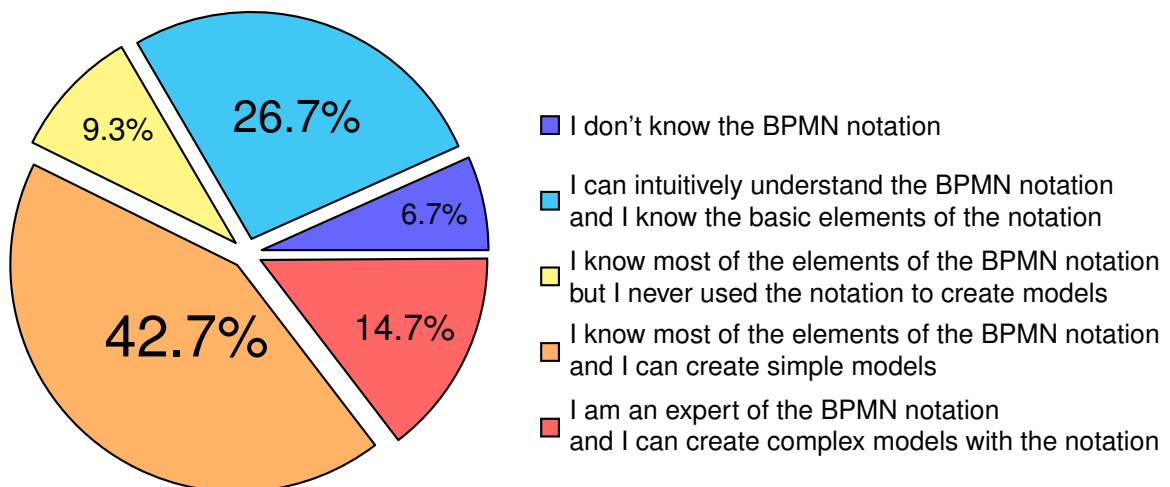


Figure 3.3: Knowledge level of BPMN notation of the interviewees

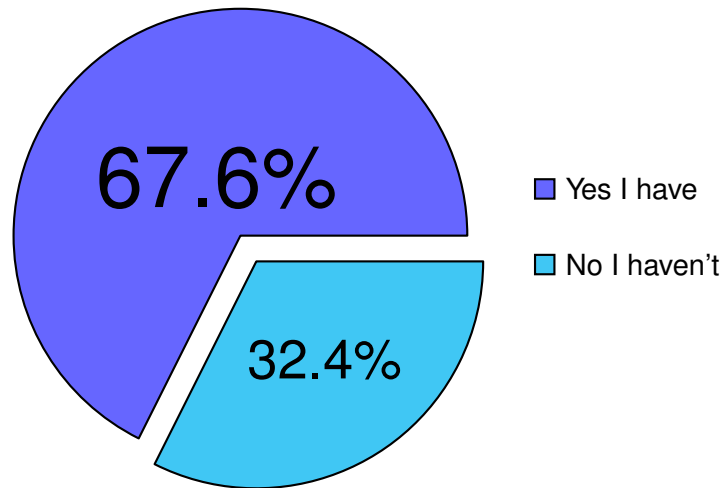


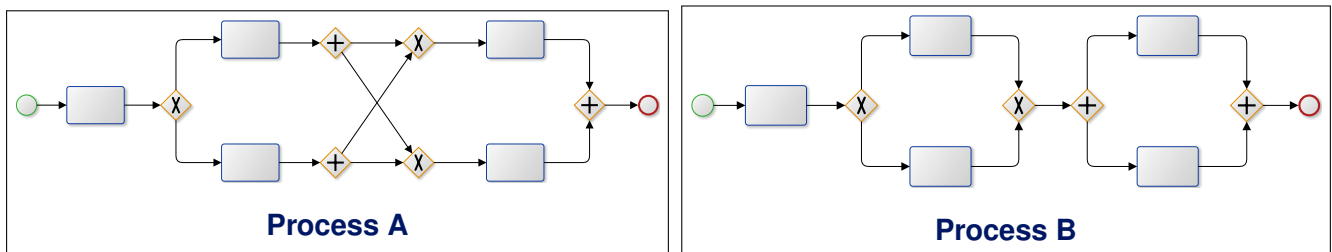
Figure 3.4: Interviewees that have attended a BP modelling course

Figure 3.4 shows the interviewees that have attended a Business Process modelling course they are more than 2/3 of the interviewees.

3.3.2. Guidelines

Following we show the answers to the questionnaire considering guidelines in detail, for each question has been associated a pie summarizing the answers.

4) Which of the following BP model layouts do you find easier to understand?



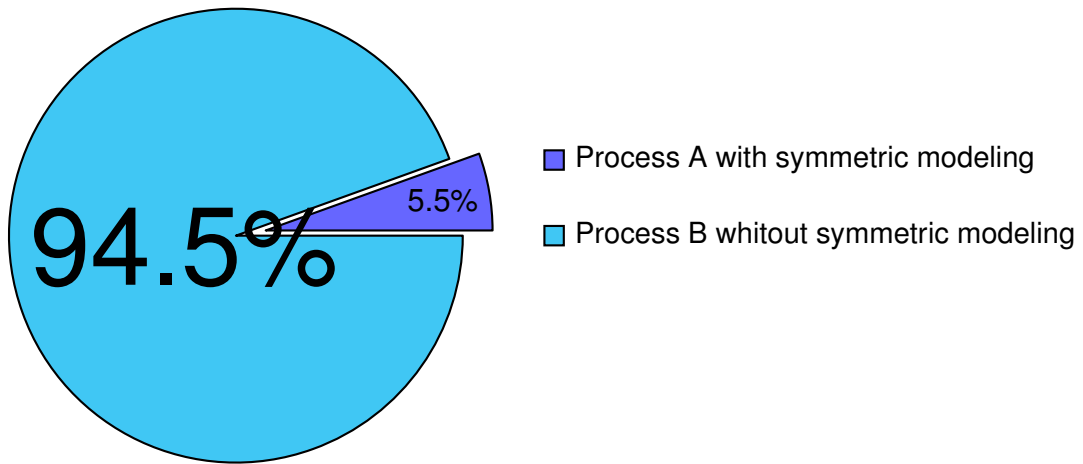


Figure 3.5: Answers to question 4)

5) Which of the following BP model layouts do you find easier to understand?

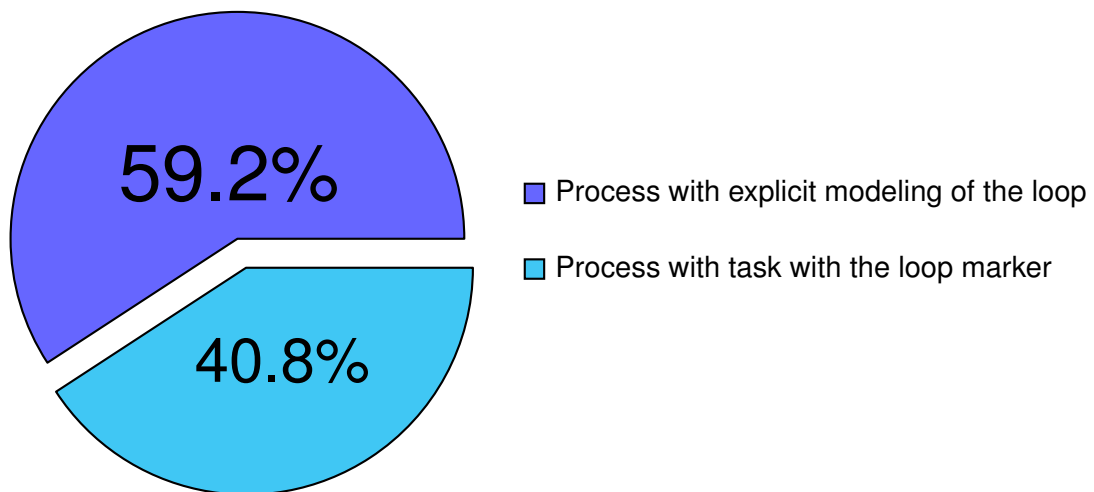


Figure 3.6: Answers to question 5)

6) Do you know the meaning of the following BPMN element?



BPMN Element

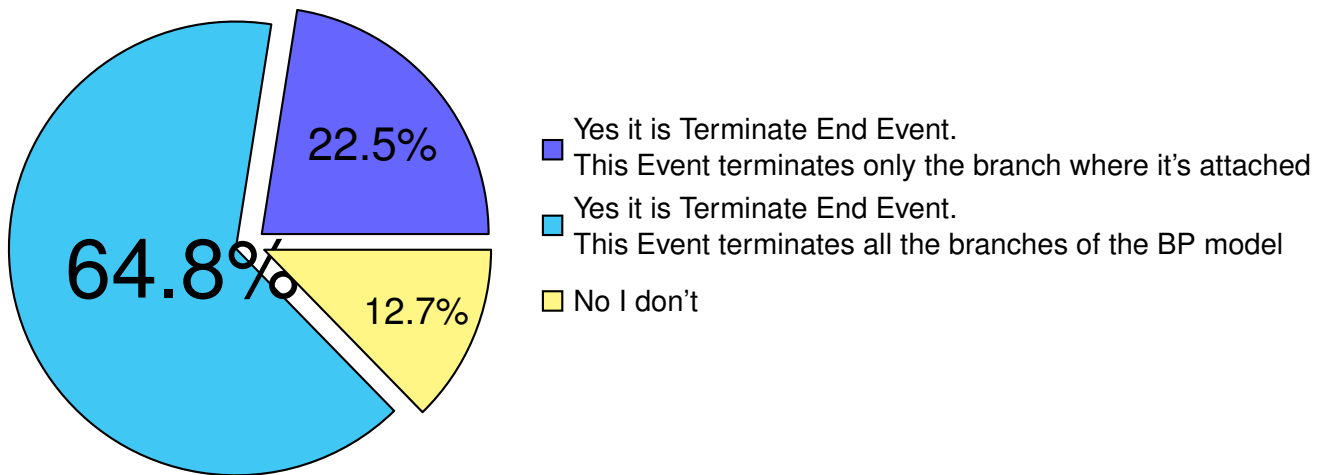
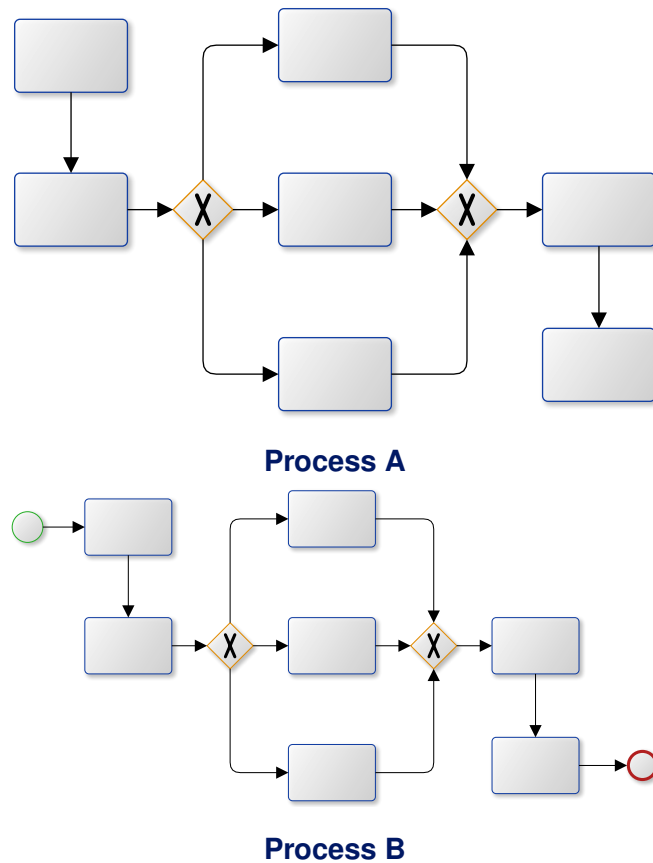


Figure 3.7: Answers to question 6)

7) Observing the follow models, do you think that the explicit use of Start and End events improve the understandability of the model?



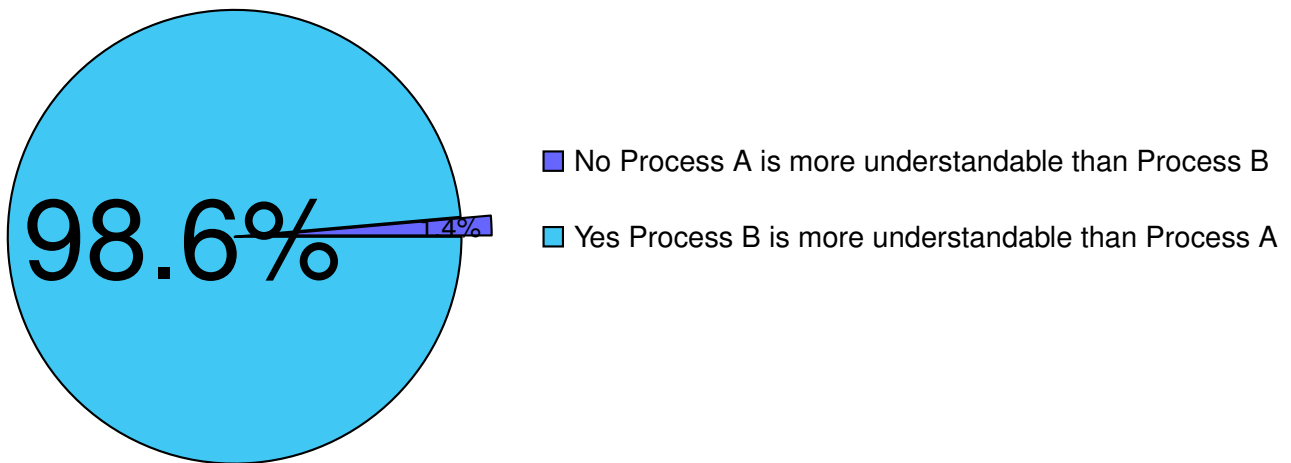


Figure 3.8: Answers to question 7)

8) In order to make model easier to understand, if in a subprocess you have more than one message flow in the same direction, how many message flows do you show in the top-level process?

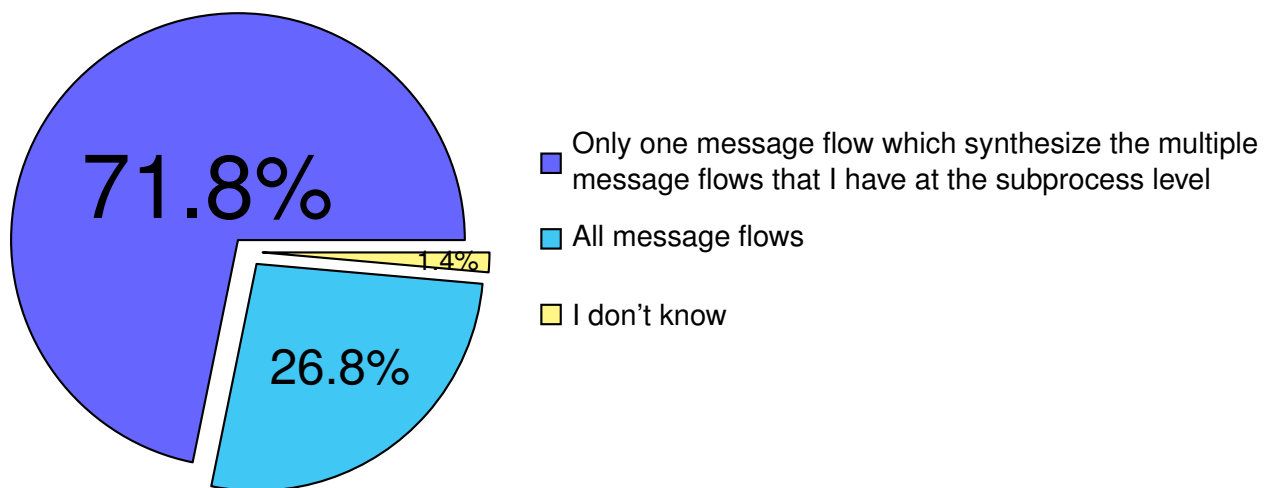


Figure 3.9: Answers to question 8)

9) After an exclusive or inclusive gateway, do you think that the use the Default Flow improves the understandability of the model?

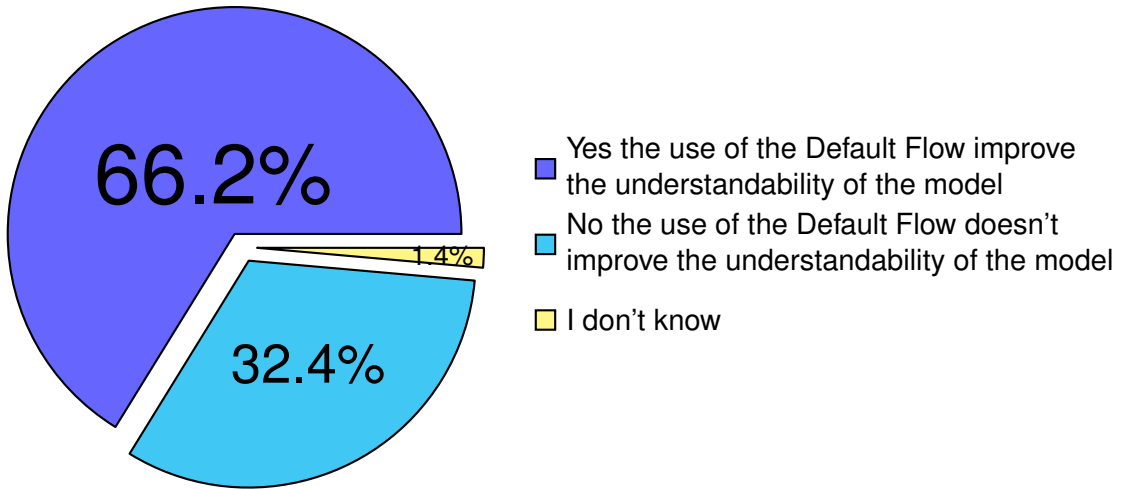
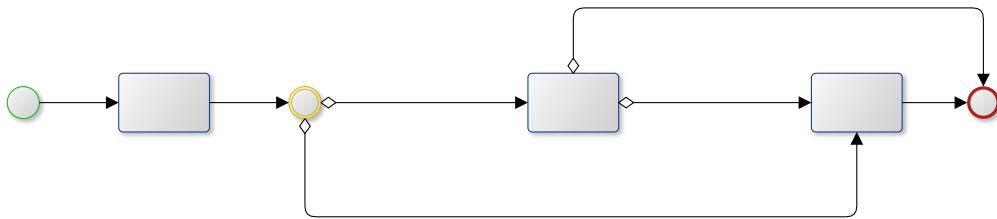
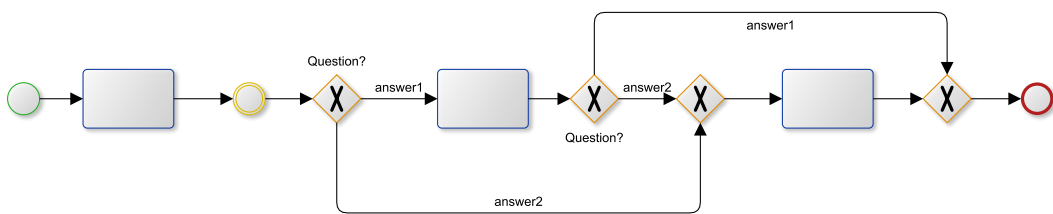


Figure 3.10: Answers to question 9)

10) Which of the following BP model layouts do you find easier to understand?



Process A



Process B

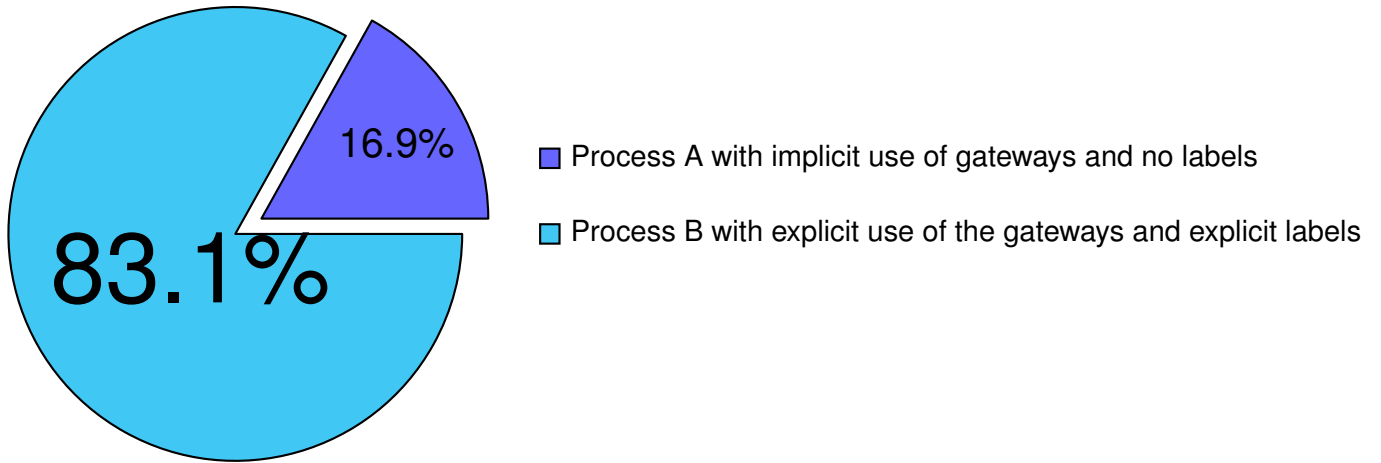


Figure 3.11: Answers to question 10)

11) Which of the following BP model layouts do you find easier to understand?

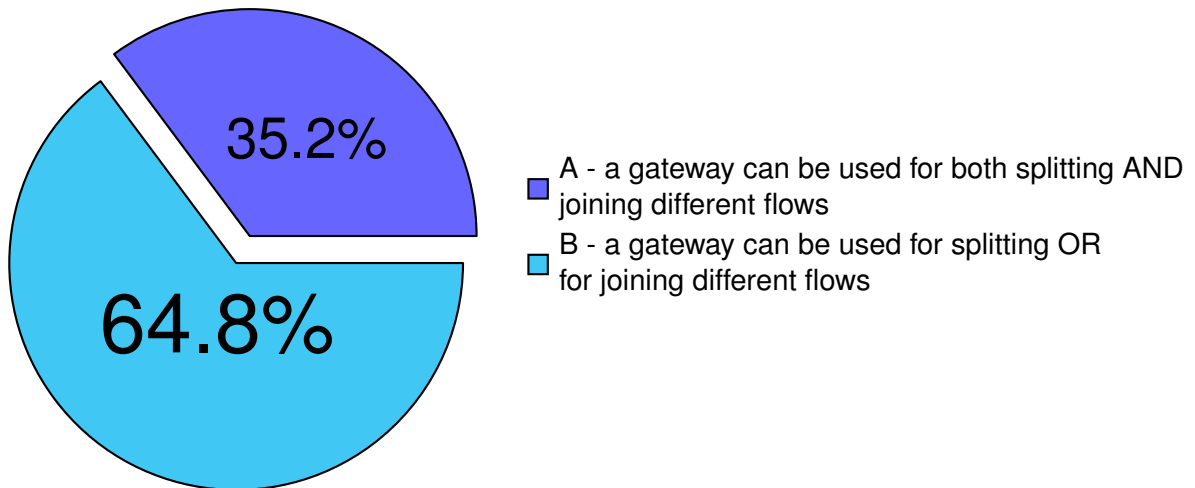
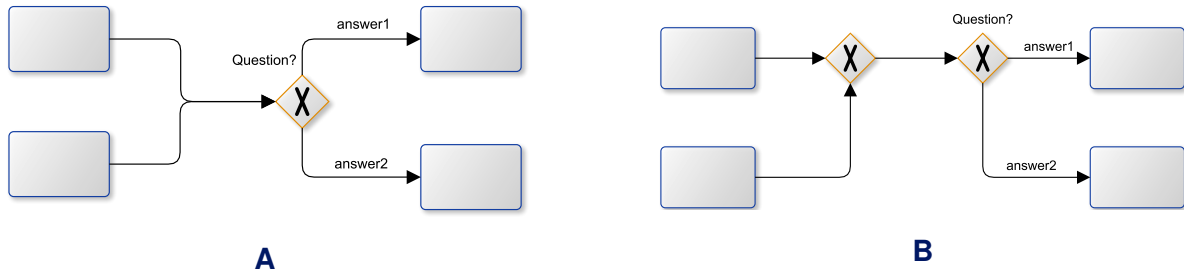


Figure 3.12: Answers to question 11)

12) Observing the following Exclusive Gateway, do you think that the marker improves the understandability of the model?



A



B

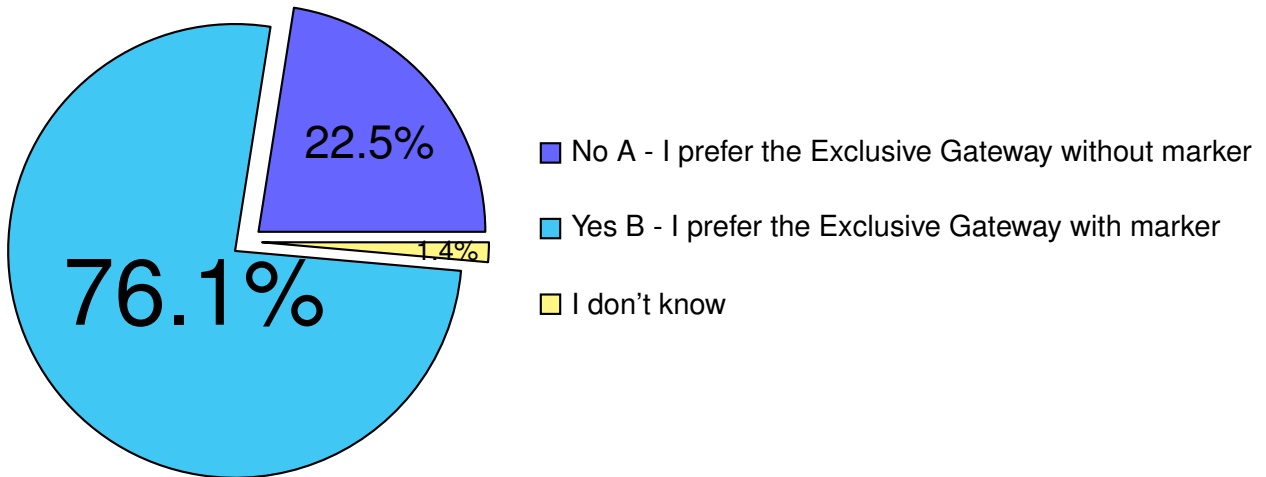


Figure 3.13: Answers to question 12)

13) Do you know the meaning of the following BPMN element?



Gateway

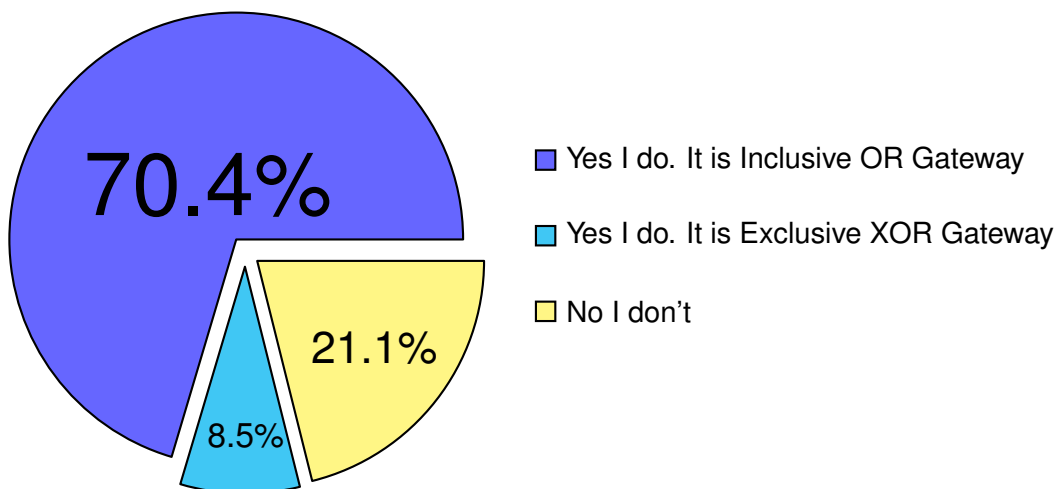


Figure 3.14: Answers to question 13)

14) Which is the execution order of the activities in the model below?

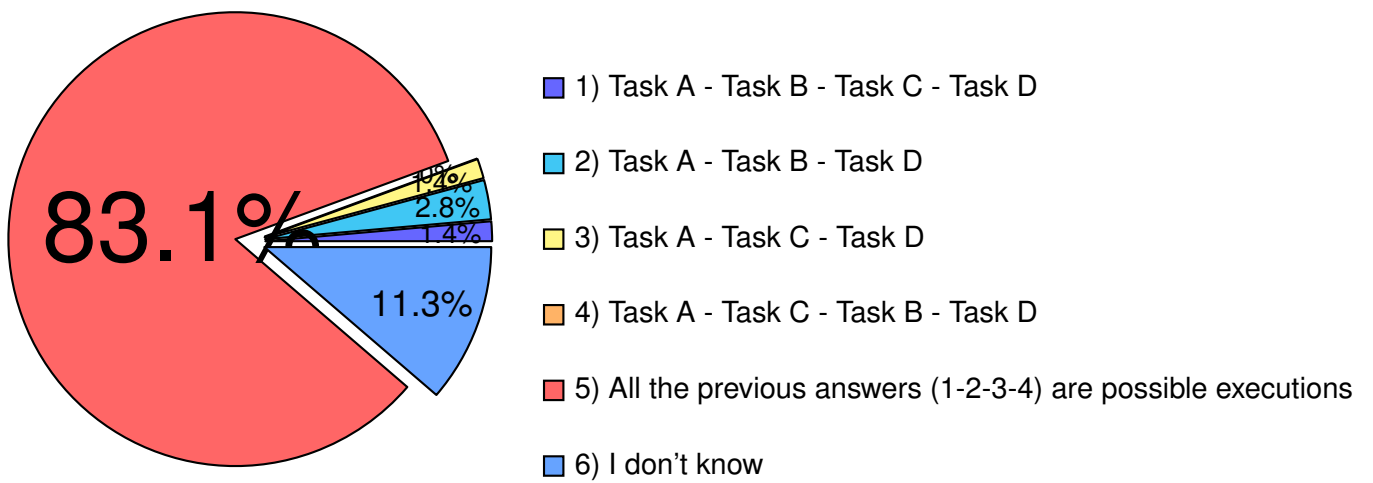
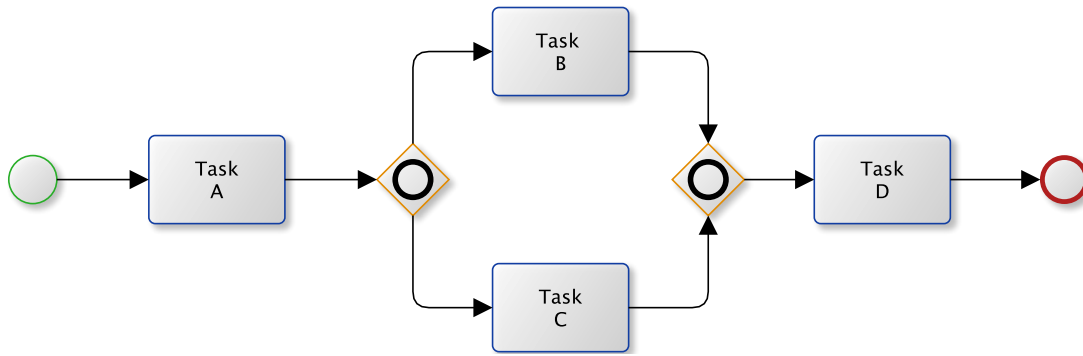


Figure 3.15: Answers to question 14)

15) In order to make models easier to understand, do you think that an Activity Description should be associated with each Activity?

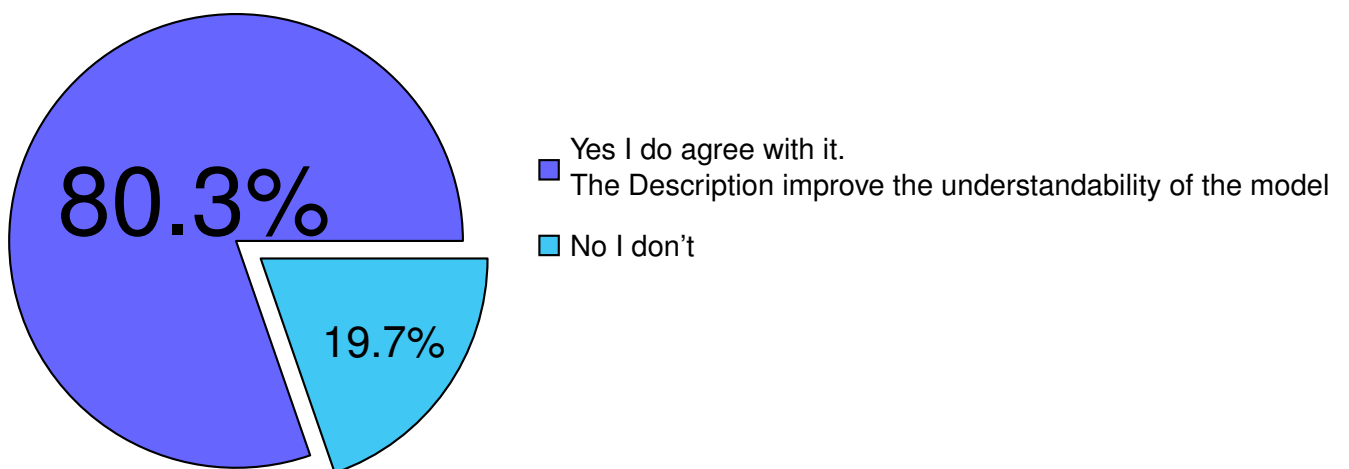


Figure 3.16: Answers to question 15)

16) In order to make models easier to understand, matching the label of a subprocess end state with the label of a gateway immediately following the subprocess, do you think that allows to have a clear vision on how subprocess and process are linked together?

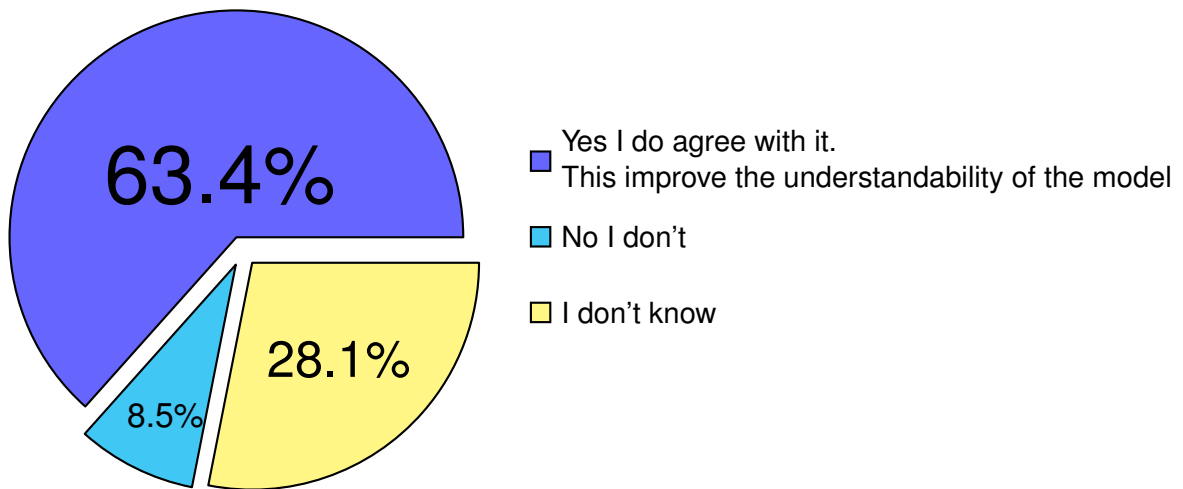


Figure 3.17: Answers to question 16)

17) Which of the following BP model layouts do you find easier to understand?

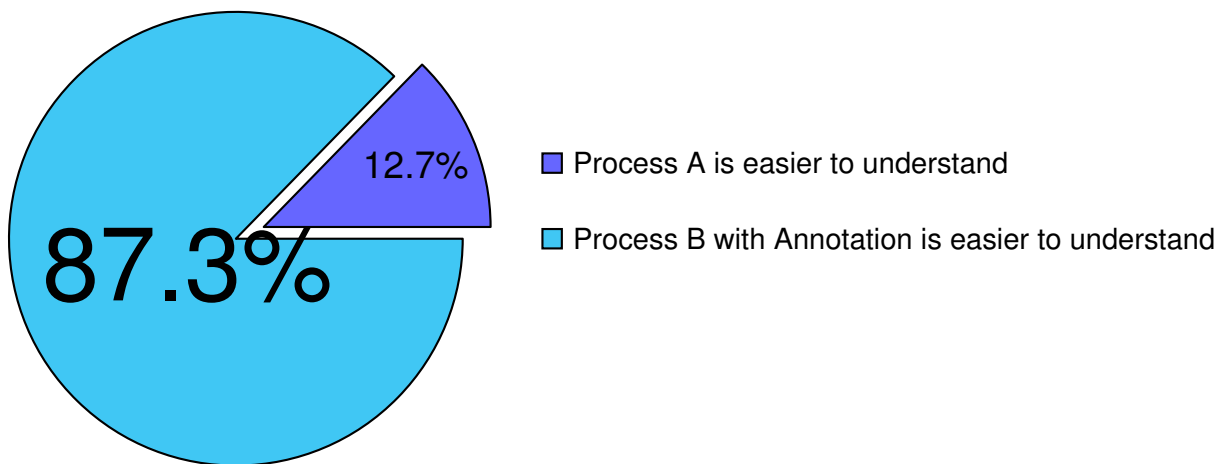
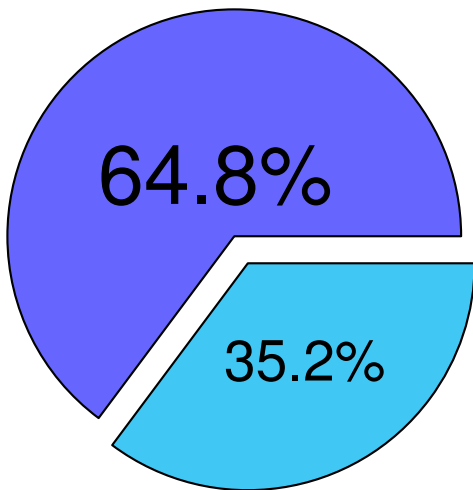
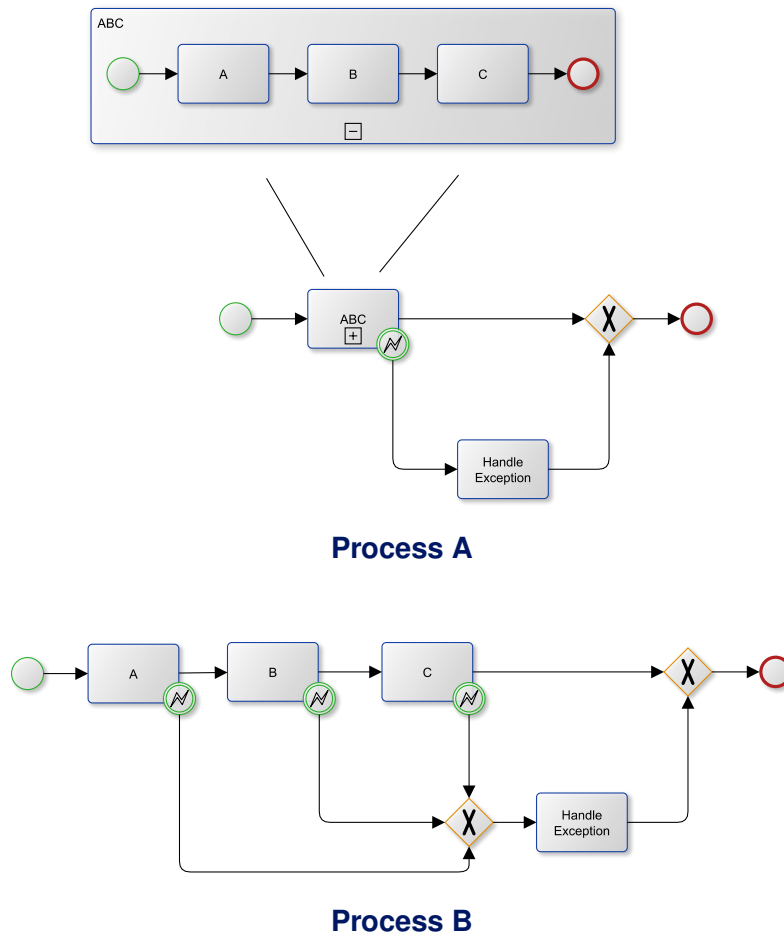


Figure 3.18: Answers to question 17)

18) Which of the following BP model layouts do you find easier to understand?



- Process A with a subprocesses and a single boundary event is easier to understand
- Process B with a boundary event for each activity is easier to understand

Figure 3.19: Answers to question 18)

19) Which of the following BP model layouts do you find easier to understand?

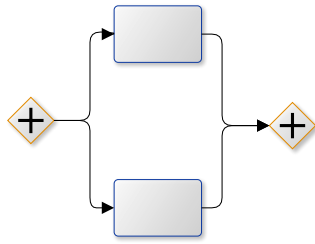


Figure A

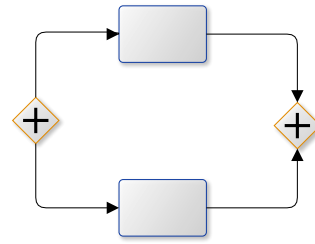


Figure B

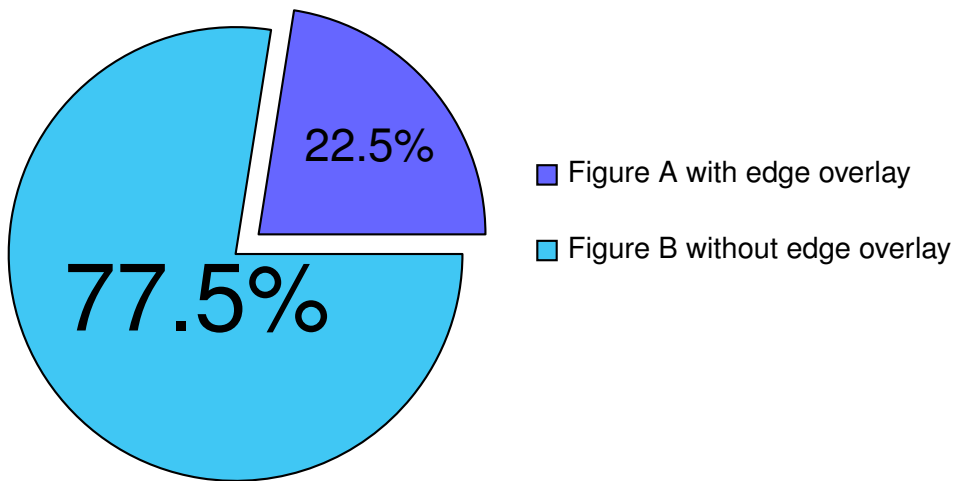
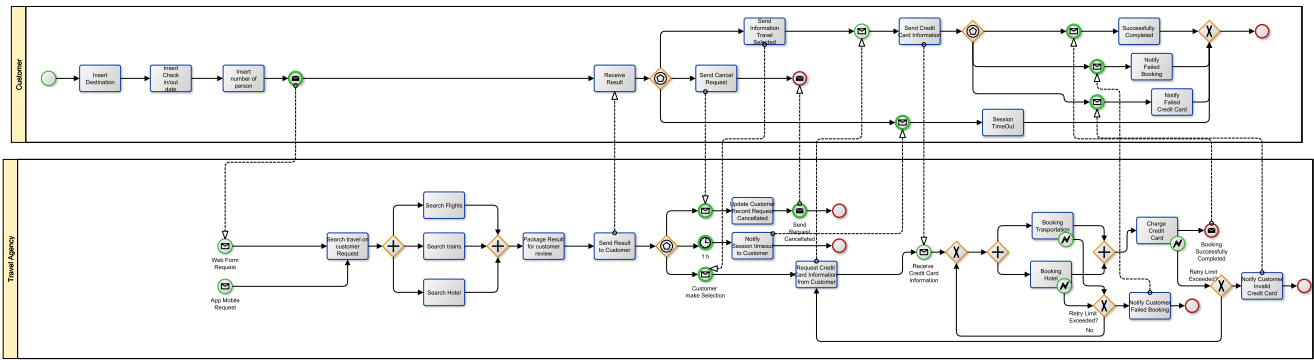
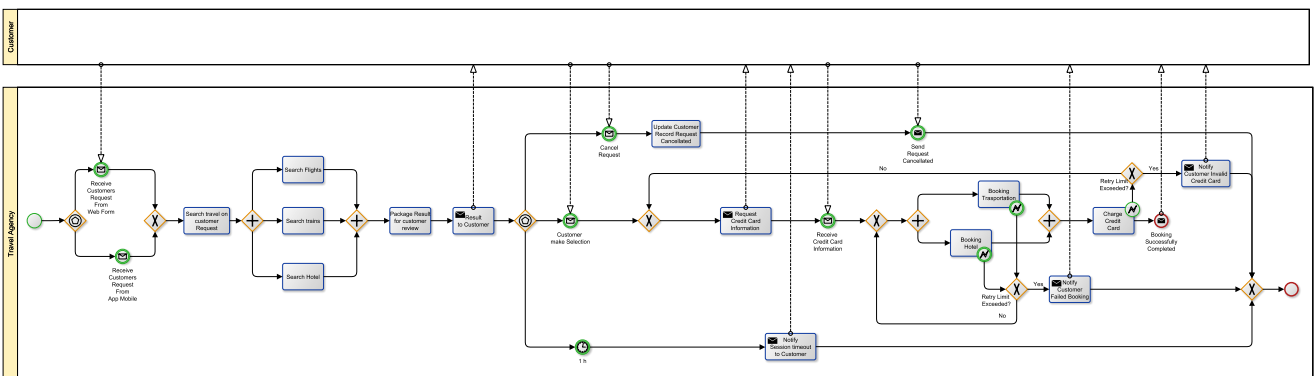


Figure 3.20: Answers to question 19)

20) Which of the following BP model layouts do you find easier to understand?



Model A



Model B

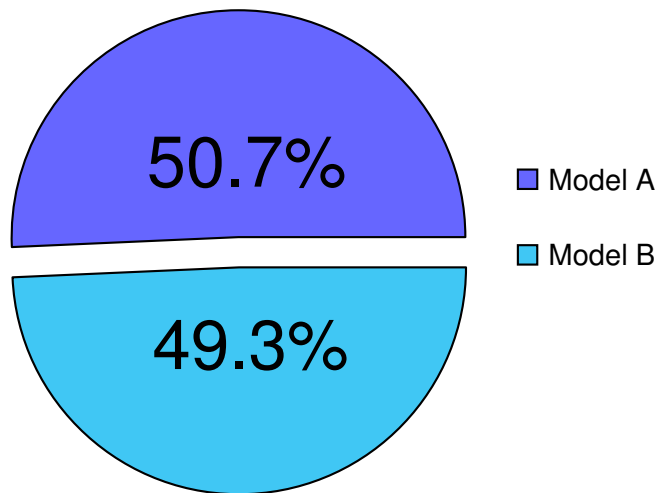
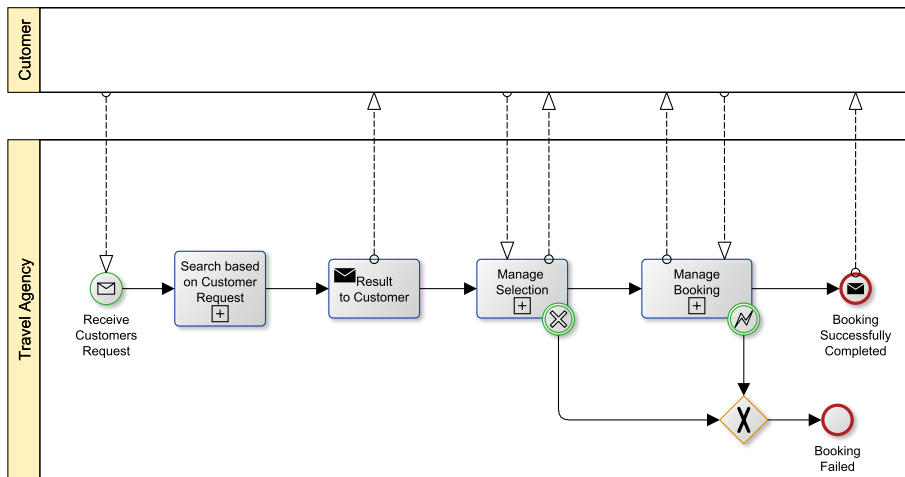
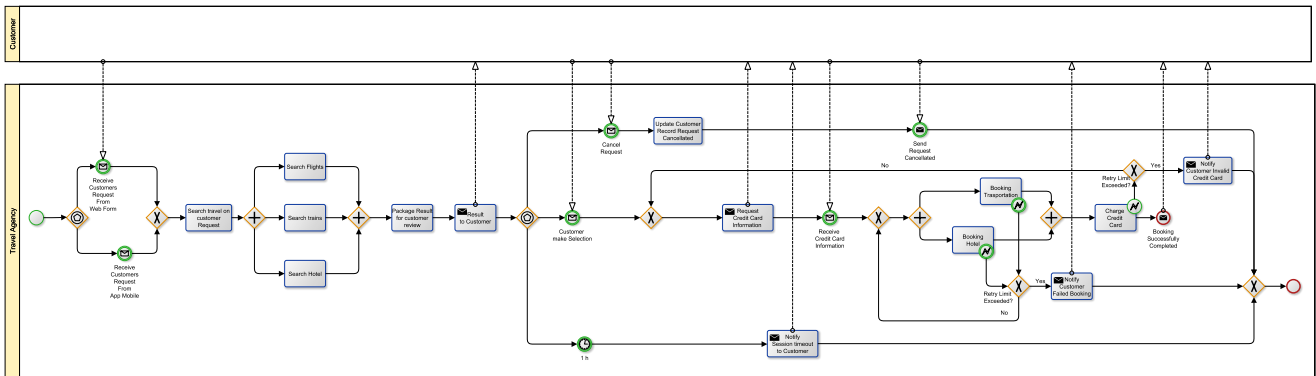


Figure 3.21: Answers to question 20)

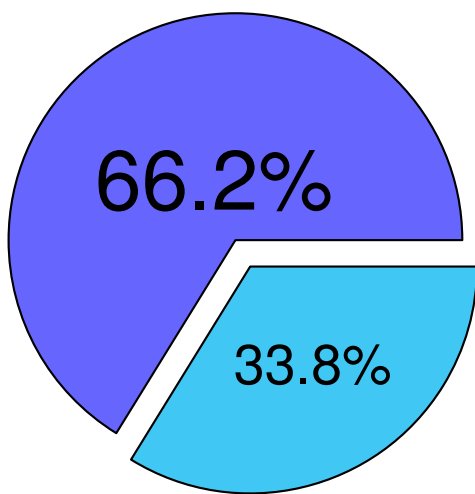
21) Which of the following BP model layouts do you find easier to understand?



Model A



Model B



- Model A with hierarchical subprocesses is easier to understand
- Model B without subprocesses is easier to understand

Figure 3.22: Answers to question 21)

3.3.3. Summary

We analysed the overall answers to the questionnaire and we came to the conclusion that the answers by different profiles are quite similar. Then we can assert that the user profile is not an indicator for the questionnaire answers. Moreover, the answers to the questionnaire comply with the vision that led us to the definition of the BPMN modelling understandability guidelines. We consider this as a positive fact since the platform targets different users with different skills and knowledge. As a result we do not need to revise models depending on the platform target users. This result can be seen in the questions about the “Overall Models” (question 20 and 21).

Referring to the answers of question 20, we were expecting the interviewees to prefer Model B (after the application of some of our defined guidelines) over Model A (the original model) because of its reduced number of elements (Model A hides the process associated to the other pool). However we obtained nearly a fifty-fifty result which probably means that neither one or the other model is considered more understandable. This can be due to the fact that both the models are quite complex. This can be also due to the fact that during learning be aware of what is the internal behaviour of all the participant can be useful for some of the target end-users.

A better result can be seen with the answers to question 21. Here in fact the interviewees preferred Model A over Model B (as we expected). Model A is the result of guidelines application and it is probably considered more understandable than Model B because of its reduced size. In particular, Model A highlights the usage of sub-processes to reduce the model size, which improves model understandability.

After this questionnaire we can confirm that the usage of the defined modelling guidelines leads to the design of understandable BPMN models.

3.4. Guidelines Validation into Practice

According to the result of the validated guidelines, we decided to re-design the Business Process models introduced in Deliverable 8.1 for being used in the Learn PAd platform early validation. Considering the SUAP case study, we reference what is already shown in Deliverable 4.1 about the application of guidelines. We did the same re-design of models for the EPBR case study. Following we report guidelines application results on the EPBR.

According to Deliverable 8.1 we started from the Grant Management BP since it has been selected as reference point. Then we re-designed all the included sub-processes: Periodic Report, Final Report, Manage Payment and Manage Amendment. Following we show the resulting models focusing on the Coordinator perspective.

Taking the Grant Management process and related sub-processes into account, we went through all the models and we verified which guidelines were not met. After doing so, we re-modelled the business process of the Grant Management in order to meet all the guidelines. The result of this activity is reported in Table 3.1, which describes the state of the guidelines after re-modelling. As Table 3.1 shows, only guideline 21 “Use of inclusive gateways” is not met; this is because of the use of Inclusive Gateways (that the guideline suggests to not use). Finally, guideline 50 “Keep a standard format” is partially met; this is because the used BPMN elements maintain the same sizes along the all models except for task elements presenting long labels.

In the following we present some guidelines application examples from the Grant Management process model and related sub-processes, before and after the re-modelling. Images with dashed rectangles refer to models before the re-modelling, while images with ellipses refer to models after the re-modelling; the number displayed in the images correspond to the guideline ID.

During the re-modelling phase, we added a description for each activity in such a way to meet guideline n. 8: “Activity Description” which tells the modeller to associate a brief description to each activity in the model. As show in Fig. 3.24 we also added annotations for looping activities respecting guideline n.

ID	NAME	Verified?	Notes
2	Minimize model size (≤ 31).	Yes	We added another subprocess to reduce model's size.
4	Apply symmetric modelling.	Yes	Some unstructured processes have been modified into structured.
8	Activity Description.	Yes	Each activity has a description.
10	Consistent use of pools.	Yes	We added pools and message flows.
14	Consistent use of end events.	Yes	We merged those end events representing the same end state through a join gateway and only one end state.
17	Exclusive Gateway Marking (0).	Yes	We only represent Exclusive Gateways without the marker.
19	Balance gateways.	Yes	We added the missing Xor join gateway.
21	Use of inclusive gateways (0,5).	No	The threshold is not met but use of Inclusive Gateways is limited to a small subprocess
22	Use of default flows.	Yes	We added default flows.
24	Use of message flows.	Yes	We added the needed message flows.
26	Document minor details.	Yes	We modified complex and too detailed labels.
27	Labeling convention.	Yes	We applied proper labels.
30	Labeling Activities.	Yes	We followed the convention verb + object.
32	Labeling Start and End Events.	Yes	We merged the end events so no label is required.
34	Labeling XOR Gateway.	Yes	We added a label for each Xor split gateway.
37	Labeling Data Object.	Yes	We reported in square brackets the data object state.
39	Loop Marker Annotation.	Yes	We added an annotation which describes the loop condition.
48	Artifacts flows.	Yes	We grouped artifacts flows.
50	Keep a standard format.	Partially	Where possible we gave the same size to different tasks. Some tasks are still bigger than other because of their label's length.

Table 3.1: Guidelines check after re-modelling.

39: “Loop Marker Annotation” which tells the modeller to indicate, since it is hidden, the loop condition in a text annotation.

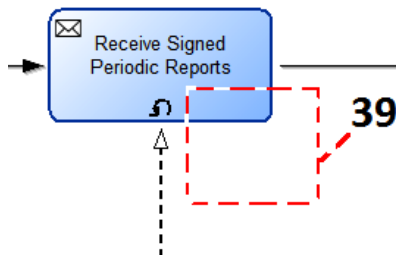


Figure 3.23: Loop Activity - Before re-modelling.

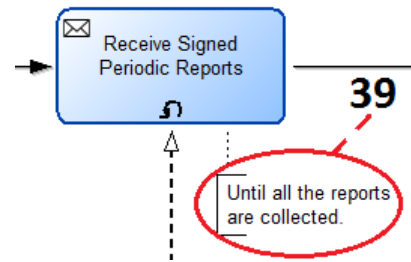


Figure 3.24: Loop Activity with annotation - After re-modelling.

In Fig. 3.25 we notice a group of activities referring to the same topic (Periodic Reports). Those activities can be aggregated, to reduce model’s size, using a subprocess. In Fig. 3.26 we show a more compact version after the introduction of a new subprocess named “Finalize Ok Periodic Reports”. Thanks to this update, the overall model now meets also guideline n. 2 : “Minimize model size” which tells the modeller to keep models as small as possible for example by using Subprocesses or Call Activities to allow their re-use.

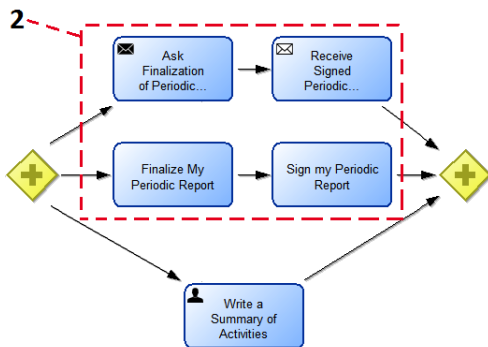


Figure 3.25: Group of activities targeting Periodic Reports - Before re-modelling.

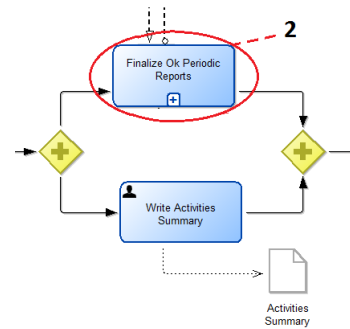


Figure 3.26: Definition of a subprocess “Finalize Ok Periodic Reports” - After re-modelling.

In Fig. 3.27 we show data objects which do not meet the guidelines. We modified those data objects during the re-modelling and we obtained the result shown in Fig. 3.28 which meets guidelines 37 “Labeling Data Object” and 48 “Artifacts flows”, which respectively tells the modeller to label BPMN elements using a qualified name representing the data object state in square brackets, and to group multiple data objects flows.

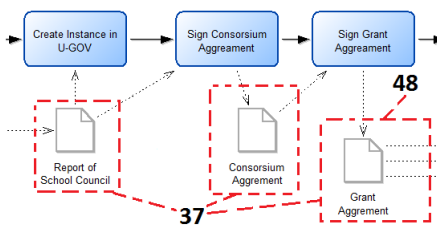


Figure 3.27: Data objects representation - Before re-modelling.

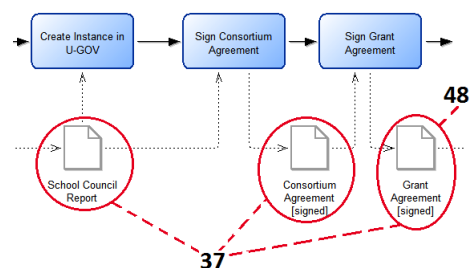


Figure 3.28: Data objects representation - After re-modelling.

In Fig. 3.29 (top) we highlight the guidelines that are not met in the “Manage Amendment” subprocess. We re-designed the model obtaining the one shown in Fig. 3.29 (bottom); this model now meets also the following guidelines:

- ID 4 “Apply symmetric modelling” tells the modeller to model as structured as possible. Well-structuredness, means that for every node with multiple outgoing arcs (a split) there is a corresponding node with multiple incoming arcs (a join), such that the set of nodes between the split and the join form a single-entry-single-exit (SESE) region.
- ID 10 “Consistent use of pools” tells the modeller to define as many pools as processes (or participants), to use black-box pools to represent external processes and to link pools with each other through message exchanges.
- ID 14 “Consistent use of end events” tells the modeller to distinguish success and failure end states in a process or a sub-process with separate end events but also to merge multiple end events in a single one if they do not represent distinct end states.
- ID 17 “Exclusive Gateway Marking” tells the modeller to use the Exclusive Gateway with the marker X instead of using it without.
- ID 19 “Balance gateways” tells the modeller to use the same type of gateway both for splitting and joining the flows. For example, when a flow is divided with a parallel gateway, the resulting parallel flows should be consolidated via another parallel gateway.
- ID 22 “Use of default flows” tells the modeller to express the default flow after exclusive and inclusive gateways. The default sequence flow will always evaluate to true if all the other sequence flow conditions turn out to be false.
- ID 24 “Use of message flow” tells the modeller to represent message flows with all message events and send/receive tasks.
- ID 26 “Document minor details” tells the modeller to leave details to documentation keeping labels simple and limiting the use of text annotations.
- ID 30 “Labeling Activities” tells the modeller to label activities with one verb, and one object. The verb used should use the present tense and be familiar to the organization. The object has to be qualified and also of meaning to the business.
- ID 32 “Labeling Start and End Events” tells the modeller to not label start none and end none events if there is only one instance of them. The modeller should use labeling when multiple start and end events are used.
- ID 34 “Labeling XOR Gateway” tells the modeller to label XOR gateways with an interrogative phrase and the outgoing sequence flow using their associated conditions stated as outcomes.”
- ID 50 “Keep a standard format.” tells the modeller to keep a unique format along diagrams avoiding the use of different font sizes, colors and boxes sizes, which make the diagrams reading a challenge.

Summing up, proper labels are now associated to activities; each activity presents a description; loop activities present a text annotation describing the loop exit condition; data objects have a proper label with states represented in square brackets; the model is structured; gateways are balanced and they have a default flow associated with; exclusive gateways have a marker and a proper label; multiple end states have been merged in a single one (because they referred to the same state); pools and message flows are properly represented and finally the models size has been reduced.

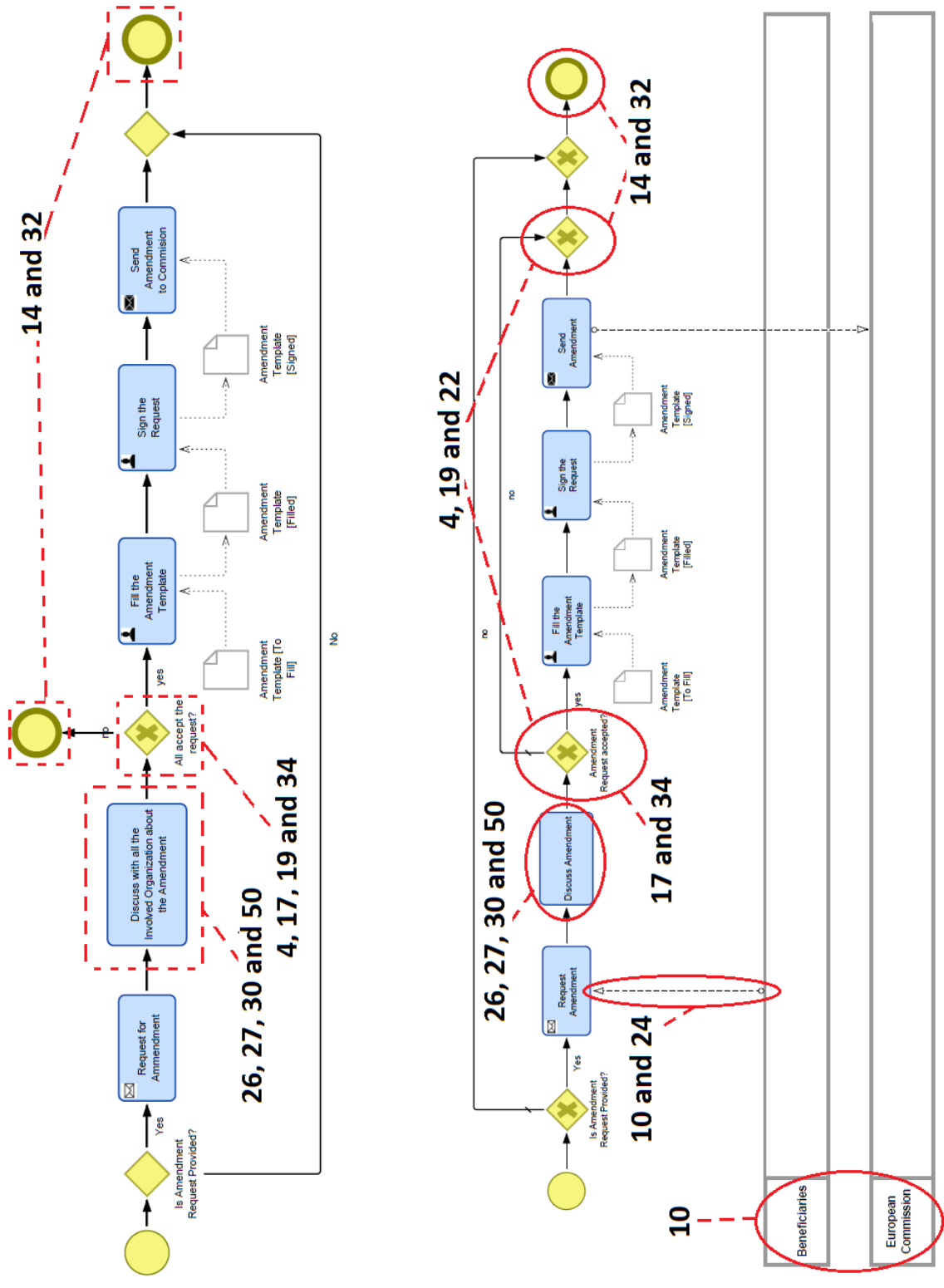


Figure 3.29: “Manage Amendment” - Before re-modelling and “Manage Amendment” - After re-modelling with met guidelines

After the guidelines application examples shown before, we report the complete BP models resulting from the guidelines application starting from the Grant Management Main Process.

The main changings in “**Grant Management Main Process**” are following reported. The resulting model can be seen in Fig. 3.30.

- Its name, changed in “EU Project Grant Management”.
- The addition of pools and message flows (representing interaction with other participants).
- The refinement of activity labels.

The main changings in “**Amendment Sub-Process**” are following reported. The resulting model can be seen in Fig. 3.31.

- Its name, changed in “Manage Amendment Request”.
- The addition of pools and message flows.
- The addition of gateways to balance them and to have a structured model.
- The association of default flow with each gateway.
- The representation of a single end state.
- The refinement of activity labels.

The main changings in “**Periodic Report Sub-Process**” are following reported. The resulting model can be seen in Fig. 3.32.

- Its name, changed in “Provide Periodic Report”.
- The addition of pools and message flows.
- The addition of gateways to balance them and to have a structured model.
- The association of default flow with each gateway.
- The aggregation of activities inside subprocesses (with the addition of the subprocess “Finalize Ok Periodic Reports” Fig. 3.33 and the modification of “Manage Periodic Report Sub-Process”);
- the refinement of activity labels.

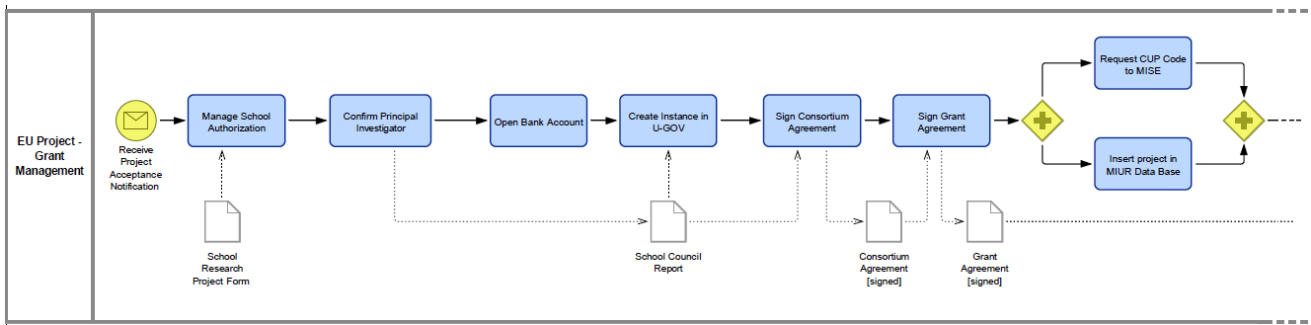
The subprocess “**Manage Scientific Activity**” Fig. 3.34 has not been changed.

The main changings in “**Manage Periodic Report Sub-Process**” are following reported. The resulting model can be seen in Fig. 3.35.

- Its name, changed in “Manage Periodic Report”.
- The addition of pools and message flows.
- The addition of gateways to balance them and to have a structured model.
- The association of default flow with each gateway.
- The addition of activities resulting from the previous activity aggregation.
- The refinement of activity labels.

The main changings in “**Final Report Sub-Process**” are following reported. The resulting model can be seen in Fig. 3.36.

- Its name, changed in “Provide Final Report”.
- The addition of pools and message flows.
- The addition of “Sending Final Report” activity.



Beneficiaries	
European Commission	
Third Parties	

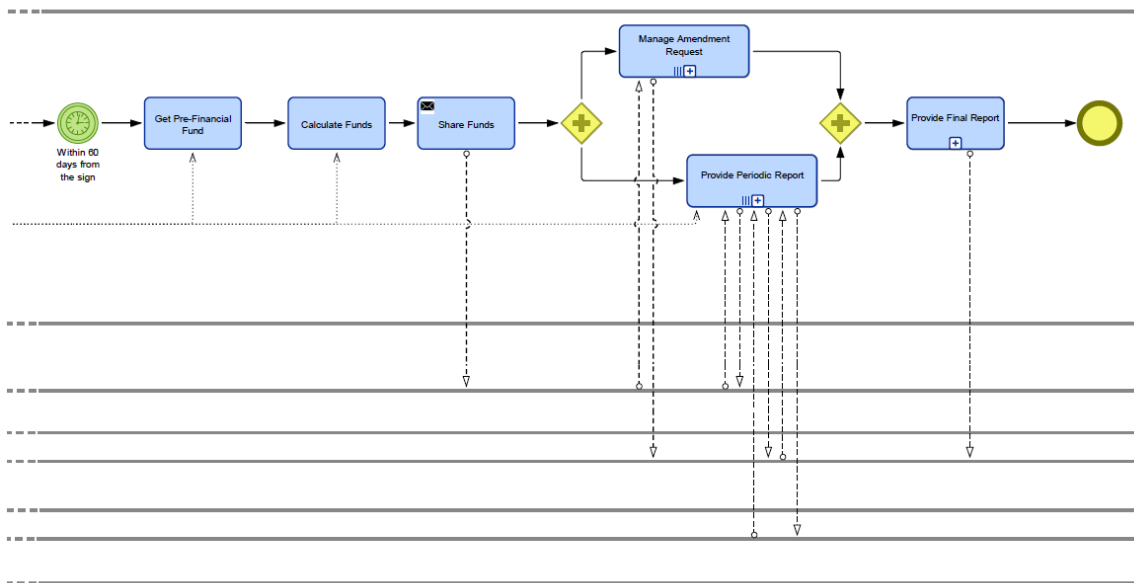


Figure 3.30: Grant Management Main Process - guidelines application.

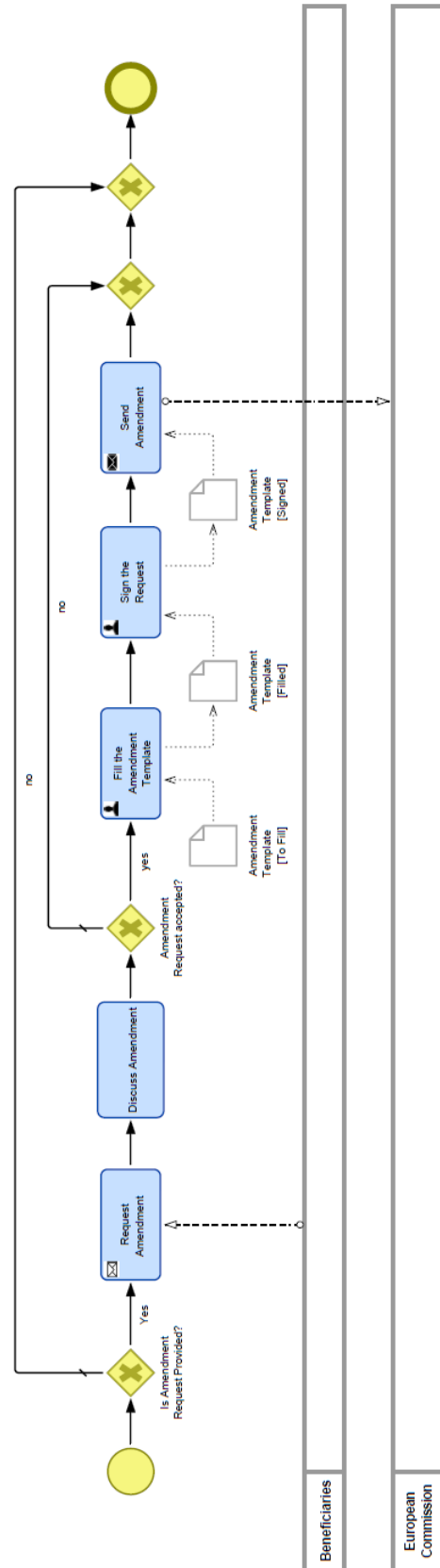


Figure 3.31: Amendment Sub-Process - After guidelines application.

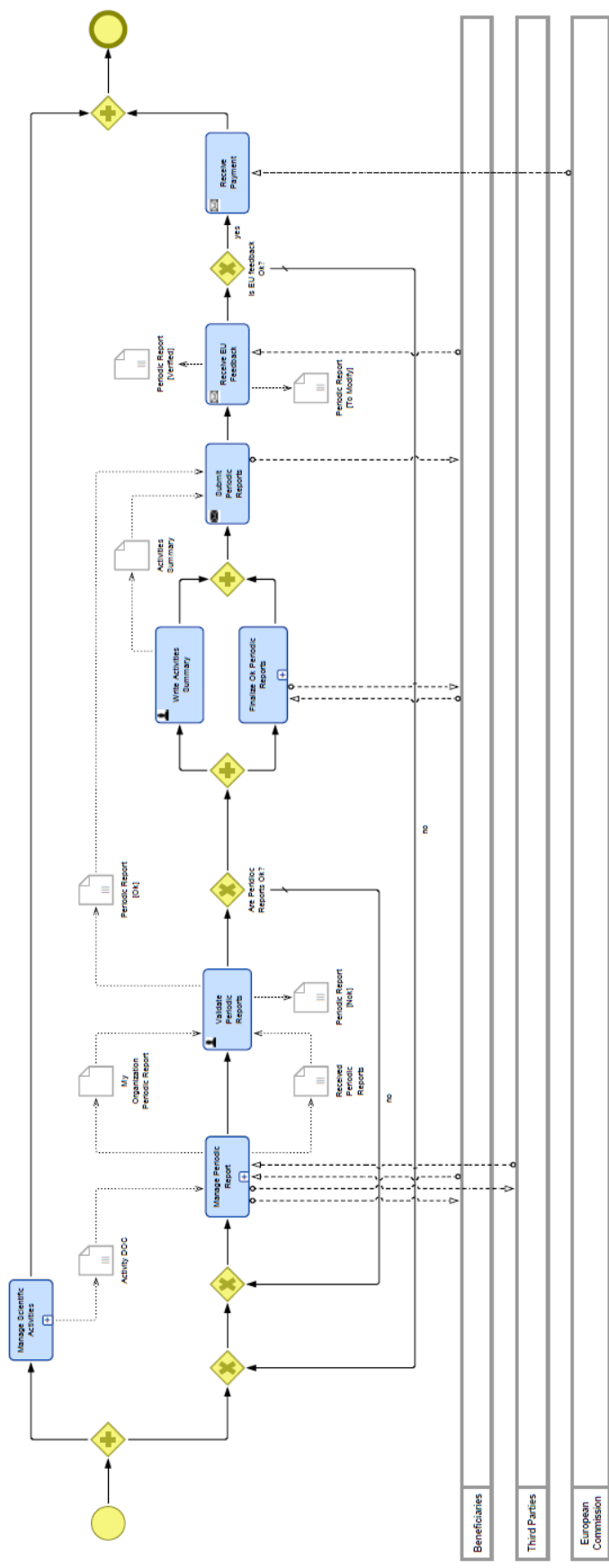


Figure 3.32: Periodic Report Sub-Process - After guidelines application.

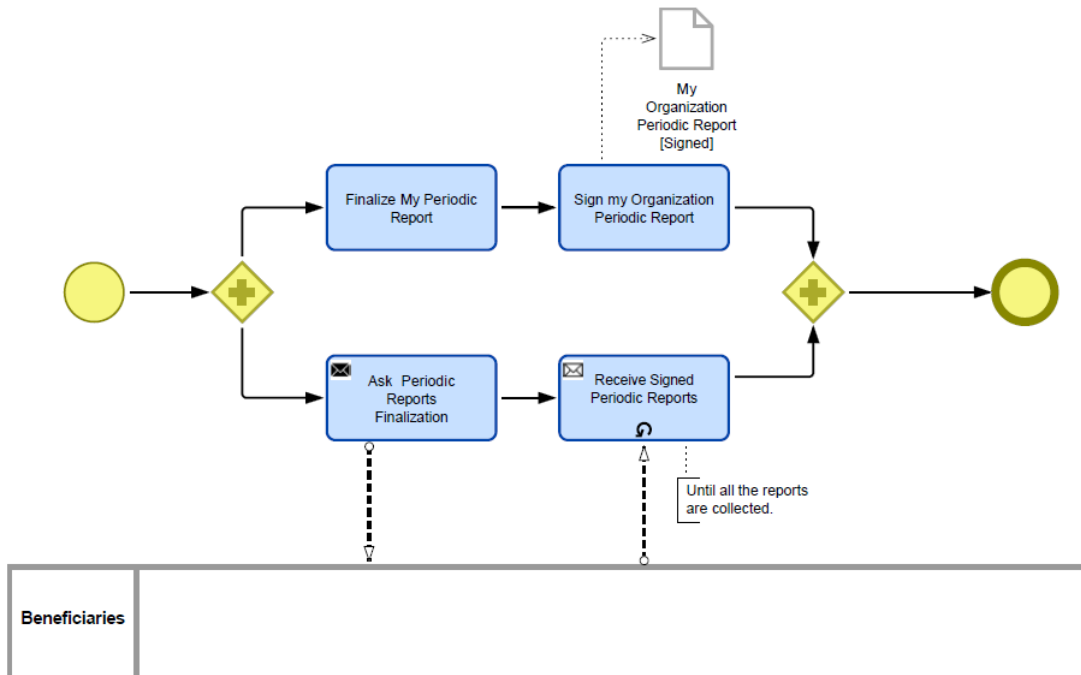


Figure 3.33: Finalize Ok Periodic Reports - After guidelines application.

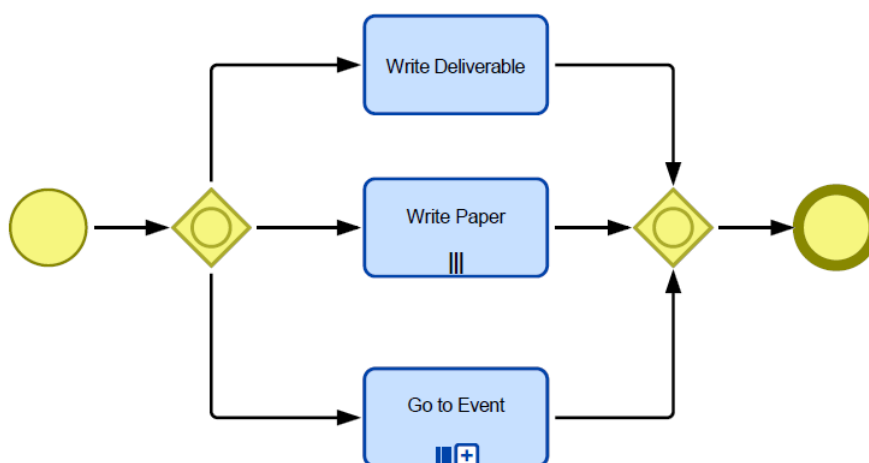


Figure 3.34: Manage Scientific Activity - After guidelines application.

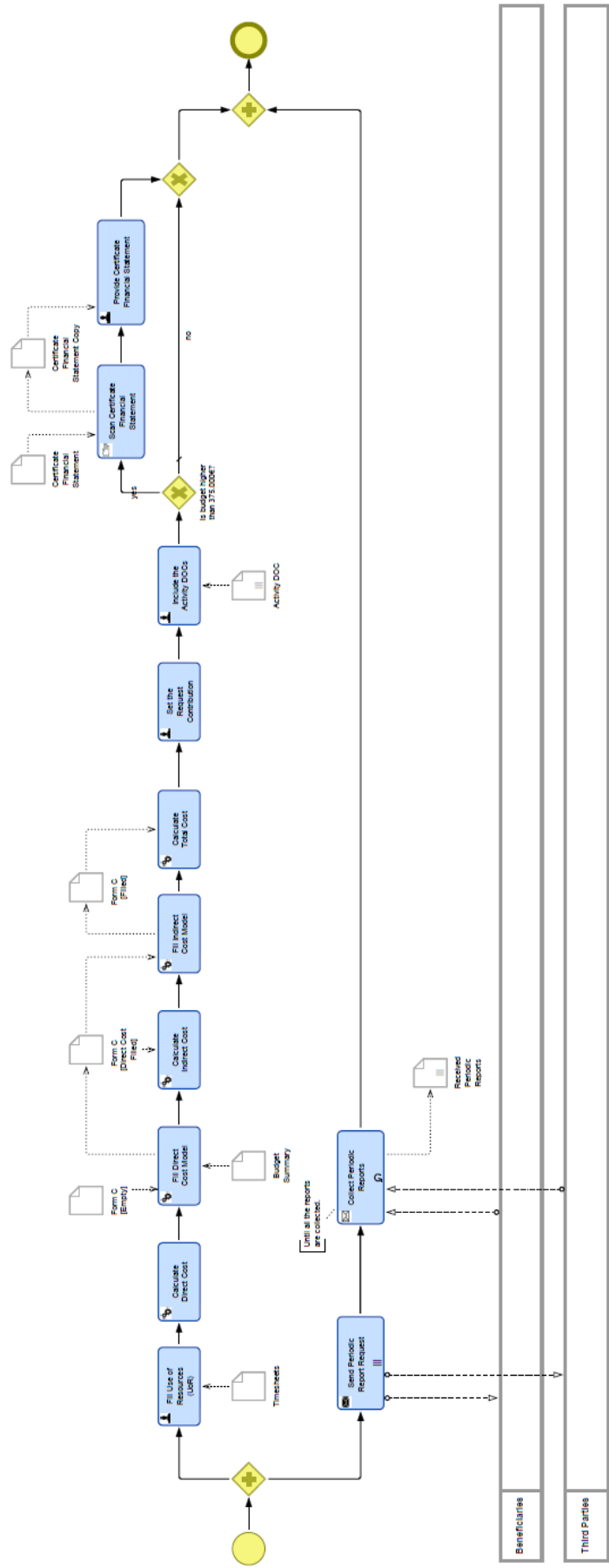


Figure 3.35: Manage Periodic Report Sub-Process - After guidelines application.

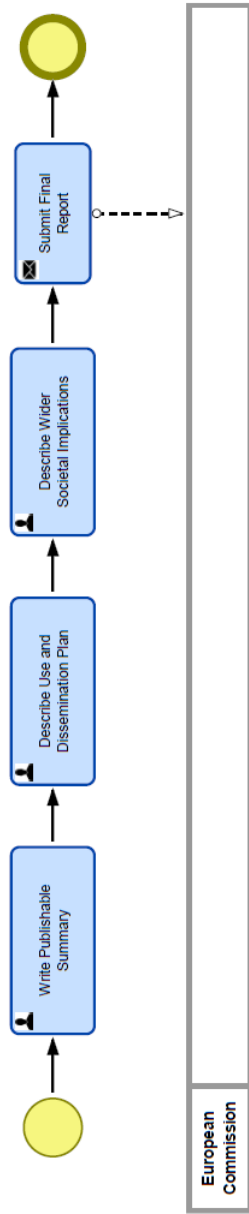


Figure 3.36: Final Report Sub-Process - After guidelines application.

Part III

Learn PAd Early Validation Conclusions

4 Conclusions

This document reported the results of the activities carried out by the consortium in order to answer to the requests contained in the DoW with reference to the platform early validation. In particular, issues related to the platform validation have been addressed by combining a questionnaire and a focus group discussion. Overall we involved 14 people. The questionnaire have been submitted to other 7 people after one hour of training and half an hour of use of the LearnPAd platform. The group of people that provided answers to the questionnaire was composed by: 2 ICT experts from Regione Marche, 3 training experts from Regione Marche; and 2 SUAP experts. The focus group was composed by: 1 ICT experts from Regione Marche, 1 training experts from Regione Marche; 2 EPBR expert and 2 SUAP experts. Results of the questionnaire and the focus group has been analysed in depth.

At the end of the early platform validation, the end users said that the platform is very innovative for them in particular in reference to the learning approach based on Business Process specifications. Recommender and Simulation functionalities resulted to be very promising and relevant functionalities. On the other side some functionalities need further development and many suggestions emerged that should be taken into account: the consortium has already started to elaborate many of them. In particular, a stricter integration between the different functionalities was requested. Most of the users asked for addition of multimedia contents and of a user manual. A wider description that can support end users during learning also emerged as a relevant need. This concerned the home page as well as the other wiki pages. The web site graphics should be improved in order to make the platform more user friendly (it must be considered that the validated platform was an early prototype). More detailed comments were also issued related to the overall wiki page structure and models browsing.

The validation was also extended to the BPMN guidelines listed in deliverable 4.1. We used them to improve understandability of the BP models used in generating the instance of the Learn PAd platform deployed for the early validation. Understandability guidelines validation confirmed our initial intuition that modelling BPs following the guidelines results in the design of more understandable models than the ones generated by not following the guidelines. The questionnaires used for guidelines validation have been submitted using the Google form technology and 75 questionnaires have been filled and successively analyzed. The questionnaire was submitted to Public Administrations personnel (targeting employees and managers) and to people within an academic context (targeting students, researchers and professors). In particular, we took into account those people who declared to be knowledgeable of the BPMN notation.

The consortium is now taking into account the validation results and an action plan is currently under development to address the issues emerged from the validation activity. Then a final assessment will be implemented according to the DoW and to the validation strategies reported in the Deliverable 8.1 addendum. In particular, considering the DoW we refer to the following tasks:

- Task 8.3: EPBR: Learning Platform Assessment
- Task 8.6: SUAP: Learning Platform Assessment

According to Deliverable 8.1 addendum the validation strategies that will be used in the final assessment will be based on the following pillars: (i) use of questionnaires to assess the various achievements in relation to the various objectives discussed above, and (ii) definition of precise KPIs and data collection

activities to analyse the performances of the learners. In future deliverables we will consider also learning impact that was out of scope for this early validation.

A Appendix - Early Validation Questionnaire in Italian

Il presente questionario, composto da 10 domande, va compilato a conclusione delle attività di testing e servirà al progetto LearnPAd per avere un feed-back sulla complessiva esperienza di utilizzo della piattaforma formativa nonché per introdurre i miglioramenti necessari nelle successive attività di implementazione. Le schede sono anonime e non mirano in alcun modo ad una valutazione individuale, pertanto, vi invitiamo ad essere obiettivi per consentire un approfondimento efficace sulle potenzialità e le caratteristiche di tale strumento.

Grazie per la gentile collaborazione.

1. In generale, quanto è soddisfatto della fruizione in modalità e-learning a cui ha avuto accesso?
(Scala di riferimento 1=insoddisfatto; 5=totalmente soddisfatto)

1	2	3	4	5
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2. Come giudica l'efficacia delle diverse funzionalità rese disponibili dalla piattaforma?
(Scala di riferimento: 1 = per niente efficaci; 5 = molto efficaci)

Browsing	1	2	3	4	5
Simulation	1	2	3	4	5
Collaboration	1	2	3	4	5
Recommendation	1	2	3	4	5

3. Come giudica "facilità d'uso ed "accessibilità delle funzionalità rese disponibili?
(Scala di riferimento 1=difficile; 5=facile)

1	2	3	4	5
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4. Come giudica la "completezza delle funzionalità rese disponibili?
(Scala di riferimento 1=incomplete; 5=complete)

1	2	3	4	5
---	---	---	---	---

In caso di punteggi sotto il 3 specificare gli elementi mancanti, da introdurre o carenti

5. Quanto valuta efficace l'integrazione degli ambienti didattici presenti (Browsing, Simulation, Collaboration, Recommendation)
(Scala di riferimento 1=per niente integrati; 5=molto integrati)

1	2	3	4	5
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6. Come valuta il grado di innovatività della soluzione proposta in relazione ai seguenti elementi:
(Scala di riferimento 1=per niente innovativo; 5=molto innovativo)

Possibilità di apprendimento basata su modelli di processo	1	2	3	4	5
Disponibilità del modello di competenze relativo al profilo professionale oggetto dell'apprendimento	1	2	3	4	5
Disponibilità di funzionalità di recommending (proposizione di contenuti di approfondimento e suggerimenti personalizzati in base al contesto e alle specifiche esigenze)	1	2	3	4	5
Altro (specificare)	1	2	3	4	5

7. Come valuta l'utilità della soluzione proposta in relazione ai seguenti elementi:
(Scala di riferimento 1=per niente utile; 5=molto utile)

Possibilità di apprendimento basata su modelli di processo	1	2	3	4	5
Disponibilità del modello di competenze relativo al profilo professionale oggetto dell'apprendimento	1	2	3	4	5
Disponibilità di funzionalità di recommending (proposizione di contenuti di approfondimento e suggerimenti personalizzati in base al contesto e alle specifiche esigenze)	1	2	3	4	5
Altro (specificare)	1	2	3	4	5

8. Ai fini di una maggiore efficacia della piattaforma in termini di apprendimento ritieni necessaria una maggiore presenza dei seguenti aspetti ?
(Scala di riferimento: 1 = per niente utile; 5 = molto utile ai fini dell'efficacia di apprendimento)

Strutturazione contenuti wiki	1	2	3	4	5
Gamification	1	2	3	4	5
Multimedialità (audio, video, immagini,)	1	2	3	4	5
Interattività tra discente e contenuti	1	2	3	4	5
Multilinguismo	1	2	3	4	5
Tutoring (animazione discenti, didattica)	1	2	3	4	5
Altro (specificare)	1	2	3	4	5

9. Aspetti positivi da evidenziare o altri commenti tendenzialmente favorevoli

10. Aspetti negativi da evidenziare o altri commenti generalmente più critici
