BACHELOR THESIS

Creating a method which improves the implementation and content creation process within the ProductivityPerformer

UNIVERSITY OF TWENTE.

INVINITIV

PRODUCTIVITY PERFORMER

Bachelor thesis Industrial Engineering & Management

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Creating a method which improves the implementation and content creation process within the ProductivityPerformer

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Management summary

The research has been conducted for INVINITIV, which originates as a spin-off from the University of Twente and consists of four subsidiaries: PolderValley, ExplainIT, IT2IT and The Backbone. The main focus of the research is to gather knowledge and give advice on how to reach Business Process Standardization (BPS) with the use of work instructions.

This problem can be solved by creating a method, containing guidelines about how to create work instructions, to achieve BPS. The guidelines are based on assumptions that are made because of the use of the ProductivityPerformer (PP).

The ProductivityPerformer is a platform for effective application usage, with the main goals to support employees in being independent, complete and consistent while working and being in line with organisational policies. With the use of the ProductivityPerformer it is easy to create and maintain work instructions.

Thus, it is necessary to know how to use the ProductivityPerformer in such a way that Business Process Standardization can be achieved. This will be done in different steps.

To understand how Business Process Standardization can be achieved through the use of work instructions it is first important to know what BPS is and what work instructions are, and how they are linked. This is done by performing a literature study. The information gathered, functions as the base for the questions that are asked in the expert interviews.

The next step is to find out what the requirements are to reflect application related tasks with the use of work instructions and what is needed to design guidelines to achieve BPS. This has been done by doing semi-structured interviews with five experts. A lot of new insights and guidelines were found during these interviews.

Just a big list of guidelines is not good enough, editors are not able to work with this in an efficient way. A selection of the best guidelines and a method of presenting them needed to be defined. The next step was all about this.

The last step was all about creating the final deliverable. This has been done by using the new and smaller selection of guidelines, the selected method and a format that is common for documentation within INVINITIV.

Preface

This document contains my bachelor's thesis: *"Creating a method which improves the implementation and content creation process within the ProductivityPerformer"*. This is the final assignment that I need to complete in order to finish the educational program "*Industrial Engineering & Management (BSc)"* at the University of Twente. The thesis is conducted at INVINITIV, from February until December 2020. This research took more time, because of the COVID-19 pandemic. Luckily, this did not cause any problems for me, because I postponed the start of my master's until February 2021.

This preface is meant to thank the people that helped me to complete the research and finish my thesis. First of all, I want to thank my first supervisors and second supervisor of the University of Twente, Aldina Aldea, Maria Iacob and Ipek Seyran Topan respectively. Thanks to their feedback, guidance and insights, I was able to do my research. Without their guidance I would not have been able to finish my thesis.

I also want to thank everyone at INVINITIV, who helped me to complete this research. Especially Luuk IJland, who was my supervisor at INVINITIV. I had a great time, performing the research at INVINITIV.

I hope you enjoy reading this Bachelor's thesis and find it interesting and useful.

Willem Kienhuis
December 2020

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Glossary of terms

There are some constructs within this research and terms used within the ProductivityPerformer (PP), which might cause some confusion if these are not explained at the beginning. The following constructs are key within this research, and thus explained in the following table.

Construct	**Used in the PP?**	**Description**
ProductivityPerformer	Yes	The ProductivityPerformer is a platform for effective application usage, designed by PolderValley.
AWI	Yes	Application Work instruction.
Chapter	Yes	AWI's can be grouped into chapters, within the ProductivityPerformer.
User guide	Yes	An user guide is a combination of AWI's which have been structured and put together in one "guide".
Course	Yes	A course is a combination of AWI's within the ProductivityPerformer, with the main focus for users to learn.
Editor (role)	Yes	The editor is a role within the ProductivityPerformer and is responsible for the content creation and actualisation within the ProductivityPerformer.
User adoption	No	User adoption is the process of ensuring each user is successful in using a product to achieve their business goals.
Digital Performance	No	Going through a digital transformation in the best way possible and make sure that IT contributes to the business performance.
Step	Yes	A step is part of an AWI (work instruction). An AWI is built of one or more steps, which reflect a mouse click or some input from the keyboard.
Recorder	Yes	The recorder makes screenshots (steps), at every click of the mouse and when the ENTER or TAB button is pushed.
Editor	Yes	You can edit all steps within a work instruction. Add textual explanations, and screenshots are foreseen with a cursor of where the mouse click was or which button has been pushed.
PP-manager (role)	Yes	The PP-manager is a role within the ProductivityPerformer and functions as ambassador of the ProductivityPerformer within external organizations.
Native app	Yes	The native app is an app for a certain device. They are installed directly onto the device. This is needed to enable some functionalities within the ProductivityPerformer.

1. Introduction

1.1 General introduction

1.1.1 Introduction to INVINITIV

INVINITIV originates as a spin-off from the University of Twente and consists of four collaborating subsidiaries: PolderValley, ExplainiT, IT2IT and The Backbone. From the INVINITIV office in Hengelo, 100 committed employees are working within the "Digital Performance" domain. Since the founding in 2000, INVINITIV has always positioned itself as an innovative and reliable group of specialists. INVINITIV strives to obtain synergies and complementary benefits for national and international clients. The foundation of INVINITIV's services are deeply rooted within the following core values:

Customer centricity, Entrepreneurship, Added value, Excelling, and Professionalism.

Financial stability is a requirement for INVINITIV to be innovative and remain distinctive. INVINITIV substantially invests in research and development (R&D) and cooperates with the University of Twente as well as various commercial partners through knowledge exchange and co-creation of products. Each organization within INVINITIV has a balanced combination of products, markets, and technologies. An important challenge for them in the coming years is to optimally react to changes in their markets and technology.

INVINITIV reacts to the digitalisation which is happening everywhere. Organisations go through digital transformations in which technological developments are used instead of traditional methods. It is necessary for organisations to go through the digital transformation in the best way possible. This enables them to ensure that internal and external end-users are skilful, involved and positive at all times. Only then, the everyday business can perform optimally.

1.2.1 Introduction to the ProductivityPerformer

PolderValley created and developed the ProductivityPerformer (PP). The PP is a platform for effective application usage, with the main goals to support employees in being independent, complete and consistent while working and being in line with organisational policies.

With the use of the ProductivityPerformer it is possible to have one method of user adoption. This is done through the creation of application work instructions (AWI's), user guides and courses. All AWI's that are created, are in the same format. This implicates that there is one method of giving and receiving information regarding application usage. This enables users and editors of the ProductivityPerformer to learn and create in a uniform and structured way.

The ProductivityPerformer is a cloud-based software application which helps organisations to create, maintain and use information concerning their applications. AWI's are step-by-step descriptions of actions within applications. AWI's can be structured into user guides and courses. These user guides and courses are used by employees to improve their quality of work and adopt to (new) software.

1.2 Problem identification

After a development period of 2,5 years the ProductivityPerformer has been released. The goal within INVINITIV is to sell as many ProductivityPerformers as possible. Sales activities have been started and the first prospects and customers are approached. INVINITIV finds itself in a phase in which there is little information known about how the implementation process happens. The first customers are yet to be using the solution. But there is no experience about how an external organisation is going to implement and use the ProductivityPerformer.

So, within INVINITIV there is not enough insight in how organizations are going to use the ProductivityPerformer, which indicates that there is little information known about the implementation process. How many user guides will a customer create? How many chapters should a user guide have? How many application work instructions (AWI's) are in a chapter? How many steps does an average AWI contain? Answers to these questions will contribute to a successful implementation process of the ProductivityPerformer.

To summarize the questions above, there is no or little information available within INVINITIV about how editors within the ProductivityPerformer in an external organisation create content in a correct way. This led to the following action problem.

Action problem:

Editors are not able to create correct AWI's, chapters and user guides within the ProductivityPerformer, which leads to inefficient usage of the ProductivityPerformer.

1.2.1 Problem cluster and motivation of core problem

The following figure is the problem cluster for this research. As can be seen in the legend, the problem cluster exists of the following types of problems: "Core problem", "Action problem" & "Follow-up problem".

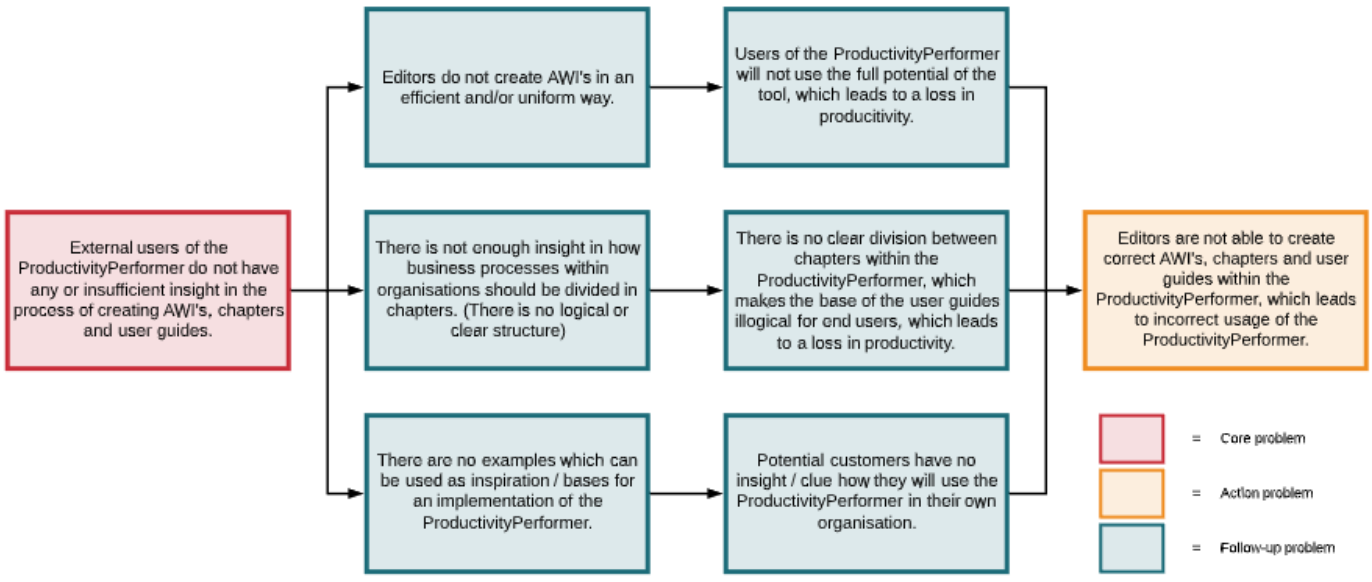


Figure 1 - Problem cluster

1.2.2 Core problem

External users of the ProductivityPerformer have insufficient insight in the process of creating AWI's, chapters and user guides.

1.2.3 Motivation core problem

As described in the problem cluster, insufficient insight in the process using the ProductivityPerformer is directly or indirectly linked to all parts of the problem cluster. It is logical that this is the core problem: How can one successfully use a software solution if there is not enough knowledge about how to implement it. If the editor creates AWI's in a wrong way, the full potential of the solution is not used, which subsequently leads to not achieve a productivity increase and less satisfied users when using the ProductivityPerformer. When there is not enough insight in the creation process of content, it's logical that "Editors cannot create AWI's in an efficient and/or uniform way.", "Editors cannot bring any logic or clear structure" & "There are no examples which can be used as inspiration or base for an implementation of the ProductivityPerformer".

Because of the situation that AWI's are not created in the most efficient and/or uniform way, it is logical that users of the ProductivityPerformer will not see the full potential of the platform. This will be the same if there is no structure within user guides. All these problems together link to the action problem, which states that incorrect use of the ProductivityPerformer leads to less productivity compared to a situation in which the content creation happens in a correct way.

The only thing that can cause the action problem, is the lack of information and insufficient insight in the process of building these AWI's, chapters and user guides. Because of the fact that working with the ProductivityPerformer is simple, an assumption has been made that all users who work as editor are capable enough to understand and work with the platform. At this moment an editor does not have access to guidelines about how to create these elements within the ProductivityPerformer.

To rewrite this problem in a broader perspective and have more scientific relevance, the following research goal was created: "How to design a method to help companies achieve Business Process Standardization while using work instruction software?". But how is this research goal related to the core problem "External users of the ProductivityPerformer do not have any or insufficient insight in the process of building AWI's, chapters and user guides."?

One of the main goals when creating content within the ProductivityPerformer is to reflect tasks in the best way possible. This means, creating an application work instruction which should reflect the actual task. This is quite the same for Business Process Standardization, where the goal is to identify "one" optimal way to perform a task. The goal in this research is to create a method, containing guidelines, which enables organizations to be better in reflecting actual tasks or processes within their organization, while using work instruction software (ProductivityPerformer).

1.2.4 Norm and reality

Formulating the norm and reality is not easy for this research. It is hard to give a value to something that cannot really be expressed with numbers. Because the main goal of this research is to be better in reflecting actual tasks or processes within an organization, while using work instruction software, which can be achieved by creating guidelines. The norm and reality will be based on the usability of these guidelines.

The reality is that there are no guidelines which support editors at creating content. Which indicates that the level at the start of this research is zero. Thus, the reality is zero.

The norm would be that editors are able to create correct content on their own, using the guidelines, without the help of others.

The gap between the norm and reality is that the creation process of correct content, cannot be done without any help of people who already have skills in the creation process within the ProductivityPerformer.

1.2.5 Deliverables

A method containing guidelines which enables editors within the ProductivityPerformer to independently and correctly create application work instructions (AWI's), chapters and user guides. Next to these guidelines and the method, the research that is performed and all the information which is gathered and analysed within this research will be available and seen as a deliverable.

To be more precise, the answer to the research goal: "How to design a method to help companies achieve Business Process Standardization while using work instruction software?". The information gathered to answer this question and its results will be usable by others.

1.2.6 Scope

The practical scope of this research is mainly focussed on the implementation part of the ProductivityPerformer. Implementation can be seen as the creation of AWI's, chapters and user guides. It is not about how roles within an organisation (governance) should be defined to optimally work with the solution. It is only about the creation, structuring and publishing of content within the ProductivityPerformer (procedural). Thus, it also only focusses on (external) editors who are working within the solution.

The scientific relevance of this research is based on the gap between how to reach Business Process Standardization, with the use of work instruction software. Thus, what actions need to be done within an organization to achieve standardization. With the focus on documenting processes / tasks with the use of work instructions to achieve this.

1.3 Problem solving approach

During this research, the Managerial Problem-Solving Method (MPSM) Heerkens & van Winden (2017) will be used. As shown in figure 2, some of the phases have been renamed.

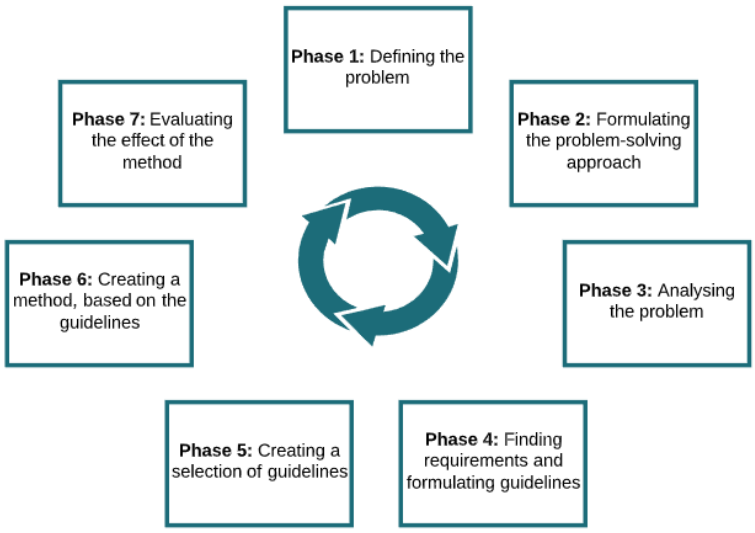


Figure 2 – Altered Managerial Problem-Solving Method (MPSM)

The idea behind this change is that by changing the names of the phases, it is easier to better relate to the research. For instance: **Phase 4:** Finding requirements and formulating guidelines. This gives someone a better idea about what needs to be done, when compared to: **Phase 4:** Formulating solutions. This change makes it easier to identify, analyse and resolve the action problem. The MPSM provides a step by step structure to tackle business related problems through research, the method consists of 7 steps. It is important for editors within the ProductivityPerformer to get the guidelines in an easy to use format. The research performed is mostly descriptive of nature, because the focus is on "what" needs to be done in order to create correct content. Each phase, in combination with the work needs to be done, will be explained below.

Phase 1 - Defining the problem

The problem identification has already been done, during the creation of this project plan. Chapter one of this project plan reflects describes the problem identification phase of the altered MPSM.

Phase 2 - Formulating the problem-solving approach

According to Heerkens & van Winden (2017 p.54) three topics need to be tackled. Which actions does one need to undertake (**Do**), which question should be answered (**Discover**), and which decisions must be made (**Decide**)?

Do - Which actions need to be performed?

The first thing that should be done is gathering information about the current situation at INVINITIV. What is already known about the implementation process? How do similar products conduct their implementation? Are there any prerequisites that need to be included in the implementation phase? Are there already some guidelines for creating (application) work instructions? These are questions that need to be answered in order to continue the project.

Discover - Which questions need to be answered?
The questions that need to be answered, form the base of the method and guidelines. The research questions will of course function as the core of the information that is needed, but there are also some sub research questions that need answering to get a better idea of the context in which the research must take place. All questions that will be answered by using the data collection and research methods described further in the project plan.

Decide - Which decisions need to be made?
There are two parts of decisions that need to be made. Decisions before the research and decisions during the research. Decisions before the research are e.g. "For which company will the research be done?", "Who will take part in this research?", and "Which problems will be solved?". The decisions that need to be answered during the research are unknown right now, these will be part of the final report.

Phase 3 - Analysing the problem

During this phase of the altered MPSM the research cycle (Heerkens & van Winden, 2017) will be used. The research cycle consists of 8 steps and will be used to solve knowledge problems. The cycle consists of the following phases: 1. Formulating the research goal, 2. Formulating the problem statement, 3. Formulating the research questions, 4. Formulating the research design, 5. Performing the operationalisation, 6. Performing the measurements (gathering data), 7. Processing the data, 8. Drawing conclusions.

During this phase it is necessary to solve the knowledge problems that contribute to my research. The following knowledge problems need answering, in order to gain more insight concerning the action problem.

1. **What are work instructions?**

This question should be seen in a broad way, it is descriptive of nature. It should give an image of what work instructions are and how it can be used. Are there different types of work instructions? Or are there already guidelines concerning the creation of work instructions?

This research question will give insight in what a work instruction is, how it is used and how it can be created. It is important to have this basic knowledge about work instructions, because it is a key element of this research. Fundamental assumptions and decisions are made based on the information that is gathered in this research question, for instance questions within the interview will be based on findings made in this question.

2. **What is the relationship between work instructions and business processes?**

It is important to get a better understanding of how work instructions represent actual processes that are executed within organisations. A work instruction represents something that must be done by a person. But how is this linked to the overlaying business processes, that are defined within an organisation? Do work instructions need to be changed whenever there is an alteration within the business process and vice versa?

Before one thinks about achieving BPS (Business Process Standardization), it is first important to know what the relationship between work instructions and business processes is. How would it else be possible to standardize business processes by using work instructions, when there is no knowledge about how they are linked.

All the information that must be gathered needs to be placed within a context and is not about numerical values, thus the nature of this research question is qualitative.

3. **What is Business Process Standardization (BPS)?**

The importance of this question is just like research question one. This question is also descriptive of nature. What does Business Process Standardization mean, what impact does it have on an organization, and how can it be achieved? These are all important aspects for this research. Information that is gathered from this question will be used as a base for other parts of this research. Thus, it is important to have a clear interpretation of this research question.

Phase 4 – Finding requirements and formulating guidelines

During phase 4 it is important to describe multiple solutions. Creating multiple sets of guidelines that enable editors to create content in a better way. One of the most important aspects to remember is that it is not possible to create one set of guidelines that tackle all problems. But before creating guidelines it is important to know what the requirements are.

4. **What are the requirements to reflect application related tasks / processes with the use of work instructions?**

This question gives insight in what is needed to reflect actual tasks or processes with work instructions. It is important to know how this should be done. When is it done in a sufficient way? Are there different quality levels when it comes to the replication of these tasks and processes? It is important to know what is needed, in order to do it.

To answer this question, there will be a combination of literature study and talking to experts when it comes to business processes. The answer to this research question should give a deeper insight in what is needed. Thus, this is a qualitative research.

5. **How to design guidelines to achieve Business Process Standardization (BPS)?**

The answer to this question should lead to the creation of guidelines. But how is this done? When do the guidelines match their requirements? How should the guidelines be created and in what form?

Because the method and guidelines are the most important deliverable of this research, it is important to create them in the best way possible. The results of this research are directly linked to the quality and use of the guidelines.

This research question will be tackled by combining literature study and talking to experts. There is a lot of information available about creating guidelines, but the combination with BPS makes it more difficult to find useful sources. Thus, interviewing experts might give a better image about how to answer this question.

Phase 5 – Creating a selection of guidelines

This phase mainly consists of deciding what selection of guidelines will give the best results. The best results are based on how editors experience the creation process. Are the guidelines an improvement? What changes when using the guidelines? All these questions and answers must be placed in context with the situation. Thus, qualitative research is the best choice for this knowledge question.

Phase 6 – Creating a method, based on the guidelines

After phase 4 and 5, the creation and selection of guidelines respectively, a method will be created. This method will be the format in which editors will use the guidelines. This phase is very important, because the main deliverable (the method) will be created here.

This research question will give insight in how and what is needed to create a method. In what format will the guidelines be presented? Will the method be general, or does it have some specific parts? What is the best method for this research? These are all important aspects when answering this research question.

6. **How to design a method based on the guidelines to reach Business Process Standardization (BPS)?**

Phase 7 - Evaluating the effect of the method

Phase 7 functions as a concluding part. This phase will give insight in what the difference is between using the method and not using the method. Has the use of the method a lot of impact on the creation process?

It is also important to reflect on how the created method will help INVINITIV and their implementation problem of the ProductivityPerformer. Does the method really help to achieve a more successful implementation process? It is important to reflect on what has been done during the research and how the deliverables help INVINITIV to tackle their problem.

1.4 Research design

The product which is created within this research is a method. According to Jones and Gregor (2007) a methodology can be seen as a design artifact. There are several ways to create such an artifact.

Within this research the "Design Science Research Methodology" of Peffers is used. This is a way for carrying out the design science for creating artifacts. The steps taken within this methodology will be used for the creation of the artifact, which is the deliverable of this research.

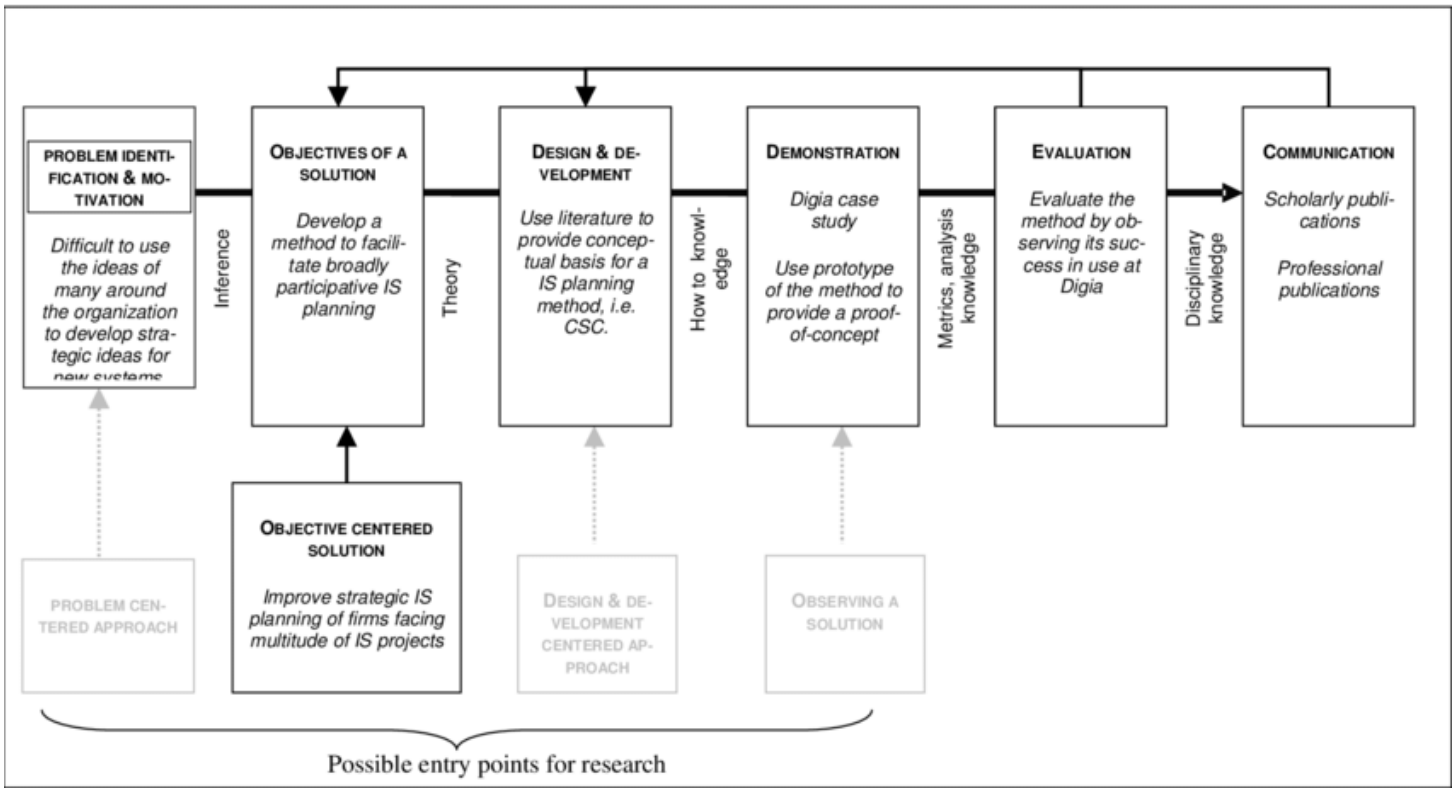


Figure 3 – Design Science Research Methodology

How to design a method to help companies achieve Business Process Standardization while using work instruction software?

Table 1 – Research design

Knowledge question	Type of research	Research strategy	Research population	Method of data gathering	Peffers phase	MPSM phase
1. What are work instructions?	Descriptive	Qualitative	-	Literature study	Objectives of a solution	3
2. What is the relationship between work instructions and business processes?	Descriptive	Qualitative	-	Literature study	Objectives of a solution	3
3. What is Business Process Standardization (BPS)?	Descriptive	Qualitative	-	Literature study	Objectives of a solution	3
4. What are the requirements to reflect application related tasks / processes with the use of work instructions?	Exploratory	Qualitative	Company's stakeholders and customers	Grade literature study and interviews	Design & development	4
5. How to design guidelines to achieve Business Process Standardization (BPS)?	Descriptive	Qualitative	Company's stakeholders and customers	Grade literature study and interviews	Design & development	4
6. How to design a method based on the guidelines to reach Business Process Standardization (BPS)?	Descriptive	Qualitative	Company's stakeholders and customers	Literature study and case study	Design & development	6

1.3.9 Assessment of validity and reliability

When conducting a research, validity and reliability are of great importance. Whenever a research is not valid, then either the numbers or relationships have been misinterpreted, which makes outcomes useless. A reliable research must account for the difference between measurement and reality. If the research is unreliable, the measurement will not always produce identical results, whenever you repeat it. Validity and reliability will be assessed as described below.

1.3.9.1 Internal validity

When creating content within the ProductivityPerformer prior knowledge can have a lot of effect. When an editor needs to create content for Microsoft Teams (example) it might be useful that the editor knows how Microsoft Teams functions and what the important processes and / or tasks are within this application. The prior knowledge might be something that enables an editor to create in a faster and more efficient way then compared to someone that does not have any prior knowledge of this application. This might influence the trustworthiness of the cause-and-effect relationship between the creation process and the outcome.

To be more precise: because of prior knowledge, some editors might experience the guidelines to be more intuitive than others, because of their prior knowledge of how to work with certain types of software.

1.3.9.2 External validity

Can the results from this research be applied on other cases? The research that is performed for INVINITIV is unique, because it is based on the creation process within their product the ProductivityPerformer. Thus, the framework and the guidelines that are created cannot be used plainly by other organisations. But all the information that is gathered and created concerning work instructions is something that can be used by people outside INVINITIV.

The only thing that needs to be considered are some assumptions that are made within the research. For example: the ProductivityPerformer uses picture-based work instructions, based on this, alterations were made to the guidelines. Would someone use this information, he / she would have to think about this.

Thus, most of the information that has been gathered during this research is usable of other organisations. But, the creation process within the ProductivityPerformer (framework and guidelines) is not something that will be usable for other organisations, because it is unique.

1.3.9.3 Reliability

The reliability of the research should show if working with the guidelines gives the same AWI's, chapters and user guides every time someone tries to create them on a certain process within an application. There are some implications for the research. Does every rule or guideline, which has been created always give the same result? Does every question answered give the same results when repeated? These aspects are very important when it comes to the research or delivering the framework.

An additional precaution is documenting all the steps performed in the research. Whenever someone would have to do a research in a similar context, they could reach the same results when following all the documented steps closely.

1. Theoretical perspective

The literature that is needed to answer the following research question has been required through Systematic Literature Review (SLR). The SLR and all its steps are added to the appendix. The following research questions will be answered in this chapter:

- **What are work instructions?**
- **What is the link between work instructions and business processes?**
- **What is Business Process Standardization (BPS)?**

2.1 What are work instructions?

A work instruction provides specific instructions to carry out an activity. Belusko, Hegedüs & Fedorko (2016, p.691) It is a step-by-step guide to perform a single task. It is a tool to help someone perform a job correctly. To have a good understanding of what a work instruction is, it is important to have a basic understanding of the hierarchy and relationship between processes, procedures and work instructions:

- A **process** states what needs to be done and why.
- A **procedure** states how the process needs to be done.
- A **work instruction** explains how to carry out the procedure.

The process is a high-level method of control, in some sort of way a summary of objectives, specifications and resources needed. A procedure includes more specifics such as responsibilities, methods, specific tools and measurement. The work instruction is a step-by-step guide to implement the process and procedure, focused on those who are performing the actual work. A good work instruction should contain a specific instruction or detailed steps to carry out tasks. According to Samopa, Astuti & Lestari (2017, p.598) a good work instruction needs a specific instruction or detailed steps to carry out a task and should contain the following elements:

- Aim;
- Scope;
- Related documents (if necessary);
- Terminology;
- PIC (Person In Charge);
- Instruction.

When creating a work instruction, it is important to mirror the specific task that is part of an operating procedure or process. This means you need to fully understand the specific steps of the procedure, its phases and its duties. The aim and scope of the work instruction are clear when this is done.

According to Johansson, Enofe, Schwarzkopf, Malmsköld, Fast-Berglund & Moestam (2017, p.2100), high quality work instructions decrease the level of complexity of work. Quality also means simplicity, because more information to be handled by operators means more decisions to be made, which can lead to errors in these decisions. Thus, work instructions need to be simple. It should contain only clear language, and if needed additional explanation of difficult terminology.

If the requirements are met it is also dependent on which type of work instruction is used. Table 1 underneath shows some the most common types of work instructions. The type of work instruction that is used in this research is "Picture based". This choice has been made because the work

instructions that can be created within the ProductivityPerformer are also picture based. They focus on screenshots that are made of every step within an application.

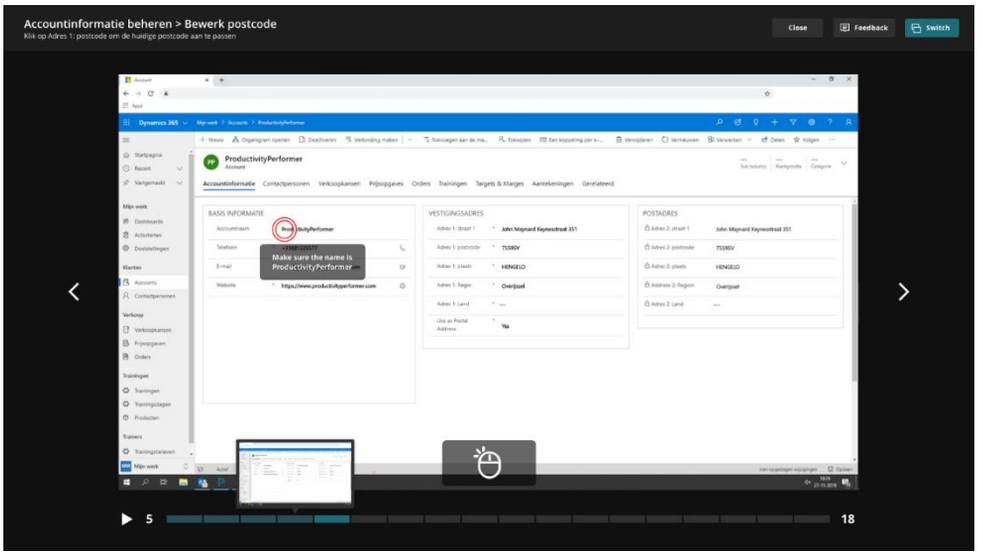


Figure 4 - A step of a work instruction within the ProductivityPerformer

Type	Description
Text-only	Paper-based or digital
Text-including-pictures	Paper-based or digital
Picture-based	Paper-based or digital
3d visual	Paper-based or digital
Video	Digital
Audio	Digital
Augmented reality	Digital

Table 2 – Types of work instructions

According to Kardos, Kemény, Kovács, Pataki & Váncza (2018, p.16) is maintaining process and product quality a key issue in organizations, having proper documentation of processes and work instruction is mandatory. The traditional—and still widely applied—form of work instructions is paper-based documentation which offers simple implementation; however, its static structure makes it difficult to maintain and update over time. Another disadvantage of paper-based instructions is that whenever the number of instructions increases, the accessibility for operators decreases.

Belusko, Hegedüs & Fedorko (2016, p.698) state that the best option for a short learning time are picture-based instructions instead of text-only instructions. They state that operator performance in terms of perceived cognitive workload can be improved, i.e. lowered cognitive workload, by including pictures as base to text-only instructions. One can even take it further into 3D animations and augmented reality, but it also said that it takes more time and investments to develop such instructions. They also state that picture-based work instructions are just as effective in processing time as video-based instructions, but it takes a lot more time to create video-based instructions, compared to picture-based instructions.

The final work instruction should be clear, intuitive, understandable, easy to produce or update and easy to remember. Within the ProductivityPerformer work instructions are digital and picture based. The recorder within the platform has been built in such a way that work instructions are easy to produce, structure and update. The clear, intuitive and understandable part of the work instruction will be tackled in this research by creating guidelines to improve the content creation process.

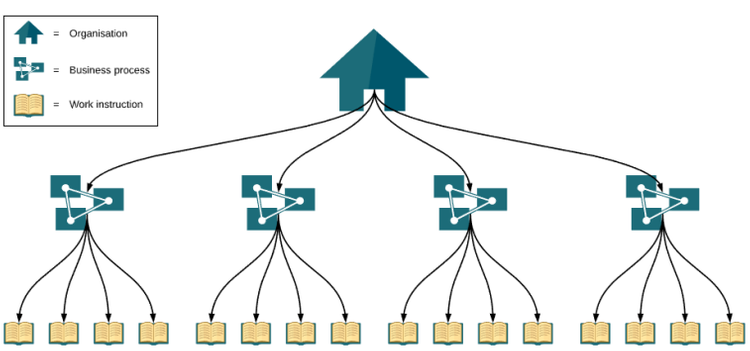
2.2 What is the relationship between work instructions and business processes?

All three papers Johansson et al. (2017), Pereira et al. (2016) & Husada et al. (2019) state that a business process within an organisation is leading, when compared to work instructions. This means that a work instruction is created according to the current business process. Whenever changes are made within a process, the work instructions should be altered in such a way that they represent the updated process.

This is not the case when it is the other way around. Whenever a work instruction needs to be changed it is not always necessary to change the business process. It can be the situation that there is a small difference between the updated and old work instruction, which has no implications whatsoever on the linked process. Pereira et al. (2016) state the following definition: *"Work instructions are created based on information and/or processes that are more important than the work instruction itself."*

The biggest difference in the papers is the perspective they have. In 'The effect of Procedure change,…' from Husada et al. (2019)' one of the topics is the creation process of work instructions. In 'Reconfigurable Standardized Work…' from Pereira et al. (2016) there is a different form of a work instruction called a Control and Fabrication Instruction (CFI), these CFI's have more attributes compared to work instructions and thus take more time to be created.

To conclude on the differences and similarities between the papers it is mostly the small details about the perspective of the paper that differs, they are all focussed and written for different situations. But they all state the same relationship between work instructions and business processes. A work instruction is important for a correct execution of business process and work instructions are always created to match the business process. The figure below is a representation of the relationship between an organisation, business processes and work instructions.



The lines from 'Organisation' to 'Business processes' indicate that business processes are aligned to the organisational view. Work, decisions and policies are implemented through these business processes. Business processes also change whenever the organisational view changes.

Figure 5 - Overview relationships

The lines between 'Business process' and 'Work instruction' mean that business processes are reflected by work instructions. By using work instructions, organisations are able to explain their processes to employees, in order for them to work according to these work instructions. Whenever a business process is changed, work instructions need to be altered in order to match the process again.

2.3 What is Business Process Standardization (BPS)?

According to Davenport (2005); Schäfermeyer et al. (2010) Business Process Standardization is defined as: "…the unification of business processes and the underlying actions within a company…". This is the standardization of existing variants of a process which ensures that activities are performed in the same way in all parts and branches of an organization.

Davenport and Short (1990) define a business process as a "set of logically related tasks performed to achieve a defined business outcome". Accordingly, a process standard can be defined as "the best, easiest and safest way to do an activity".

Business Process Standardization, as part of BPM activities, is an effective way to improve business process flexibility and performance. Flexibility is one of the most important non-financial goals of many firms, as stated by Muenstermann, Joachim & Beimborn (2009, p.1).

According to Wurm, Schmiedel, Mendling & Fleig (2018, p.2) the term process standardization refers to the alignment of different process variants towards a defined meta-process. Vice versa, process diversity refers to a range of variants that are generated from a standard – or meta-process in order to conform with local legislation or adapt products and services to different markets.

According to Romero, Dijkman, Weele & Grefen (2015, p.3) the extent to which business processes can be standardized is dependent on contextual factors in the organization and its environment. It is claimed that successful organizations choose structures and process characteristics that "fit" to the degree of uncertainty in their environment. It is also said that there is no single best way to manage an organization, and the optimal course of action is contingent upon the internal and external situation.

Romero et al. (2015, p.9) also state that the potential of a process to be successfully standardized also depends on personal differences that are introduced in the process by employees. These have also been operationalized in a different manner. Processes demanding employees with medium to high work experience or tacit knowledge, have less potential to be successfully standardized. Also, a strong difference in personal preference, in particular of managers, hampers standardization.

According to Romero & Grefen (2015, p.4) complete standardization should not be strived for, but rather that a trade-off should be struck between local standardization and global uniformity. The term 'harmonization' is also used to stress this trade-off.

The overall objective of BPS is to increase operational performance, realize cost synergies, ensure quality, and better meet planned budgets. Accordingly, several authors have empirically shown that BPS, or reduction of process variations, leads to higher process performance. Some ways this higher performance is reached include decreasing process errors, facilitating communication and reporting, achieving economies of scale, and using expert knowledge.

Rosenkranz et al. (2010, p.59) observed that organizations which perform better in their standardization initiatives, have at least a moderate level of process maturity. They conclude that maturity level has a positive correlation with standardization potential.

3. Finding requirements and formulating guidelines

In this chapter, which is phase 4 of the altered MPSM, requirements will be found, and guidelines will be formulated. The fourth and fifth research question, concerning the requirements of how to reflect application related tasks or processes with the use of work instructions and how to design guidelines to achieve Business Process Standardization will be elaborated respectively. A list containing the requirements will be created during this phase.

3.1 Data collection

3.1.1 How will this be done?

Research questions four and five will be answered through the combination of a literature study and expert interviews. The insights gained from the literature study helped to get a better overview of what was needed in order to give an answer to the research questions. These insights will be examined, confirmed or invalidated with an empirical study. For this purpose, qualitative research techniques are chosen and applied in order to collect material to answer the research questions. The focus of qualitative research is on meanings and has an explaining character instead of quantitative research which is based on numbers that are collected.

Semi-structured interviews were used for both research questions. Since semi-structured interviews contains open questions to which the experts answer in their own words and which can be adapted based on the course of the interview. Opinions and thoughts of the interviewees and deviations of the topic can be discussed in depth, generating new insights and conformation.

Oral interviews also provide much more information in a shorter time, compared to written questionnaires such as surveys. There are also disadvantages of such a method. For instance, it takes a lot of time to contact the right experts, conduct the interviews with them personally and transcribe them afterwards.

However, the advantages of gaining new and more in-depth insight outweigh the disadvantages, thus the method of semi-structured interviews is chosen.

3.1.2 Creating the base / questions of the interview

The questions for the interviews were defined based on the results of a (grade) literature review. As preparation before the interviews, a list of questions was discussed with the supervisor at INVINITIV and adjusted based on his feedback. The questions created before the interviews only served as an outline for guiding the conversation during the interview.

3.1.3 Conduction of the interviews

A total of five semi-structured interviews were conducted during the empirical study. The participants selected for this study are described in more detail in the following table. The participants are experts in their field. They all have experience in creating learning material, teaching, guiding organisations to improve their processes and improving performance.

Expert	Profession	Duration of interview (Min)
#1	Software trainer / consultant	00:43:00
#2	IT Trainer / consultant	00:36:00
#3	Microsoft Office 365 consultant	00:40:00
#4	IT Trainer / consultant	00:46:00
#5	IT Trainer / consultant	00:35:00

Table 3 – The conduction of the interviews

Due to the current situation and restrictions cause by the Covid-19 pandemic, it was not possible to perform all interviews in form of personal meetings. Instead, 4 out of 5 interviews were conducted through a Microsoft Teams videocall.

All participants were contacted by e-mail and telephone, requesting their participation in this study. The participants were also informed that all data and information gathered will not be linked to them, the results of the interview will be anonymised.

3.1.4 Analysis of the interviews

4 out of 5 interviews were recorded. One participant preferred if the interview would not be recorded, in this situation the answers were written down as complete as possible. The interviews that were recorded have been transcribed as literally as possible. The readability was improved by smoothing grammar and punctuation. The interviews were executed in Dutch, and transcripts are also in Dutch. However, English summaries were added to the appendix for reference purposes.

3.2 What are the requirements to reflect application related tasks / processes with the use of work instructions?

Through the use of literature study and the expert interviews, the following findings were made. Based on the interviews the following order has been created, which one should follow to reflect application related tasks and processes.

- ***'Top-down' vs 'bottom-up'***

The first thing that should be inspected is whether processes are defined and how these are defined (qualitative). This provides an indication from which perspective one should approach, 'top-down' or 'bottom-up'. According to Sabatier (1986 p.23) a 'top-down' can only be used if there are clear and consistent objectives. Which indicates a clear process description of what needs to be done. Sabatier (1986 p.30) also states that in situations where there are no clear and consistent objectives, thus no use for a 'top-down' approach. A 'bottom-up' approach is most suitable.

The type of perspective has implications on how work instructions will be brought to end users. 'Top-down' means that the editor starts with an overlaying process or task and starts to reason with this process or task as base. All work instructions that are created are some kind of derivative of the overlaying process or task.

Working 'bottom-up' is completely different. The general definition of a 'bottom-up' approach is the piecing together of systems to give rise to more complex systems. When adjusted to this research the definition would be: Creating work instructions, which will be pieced together to give rise to more complex systems, processes or tasks.

Choosing between a 'top-down' or 'bottom-up' approach is quite the same as deciding what content is going to be created. It has a lot of implications on what materials an end user is going to receive.

- ***What to create?***

The next aspect that comes up is deciding on what content to create. There are a lot of different things to think about and decide: "Is there some organizational view which should be held as standard?". Many organizations have their own standards, when it comes to performing certain tasks. Make sure that these are known before creating content. According to all of the five experts that are interviewed, this is very important to know. Especially if the process is not well-defined within this organization and all of the knowledge about how to do it is in the heads of employees. This is

normally tackled by consulting someone within the organization that has responsibility concerning the application or process of which content will be created.

What is the target audience for which the content needs to be created? What is their level? One should know this before creating the content. According Samopa, Astuti & Lestari (2017, p.598) the content should be made in such a way that it fits the level of the target audience, which increases productivity and reduces the amount of questions asked.

- ***How to create***

The last aspect that needs to be addressed is about how to create. The most important and difficult item to tackle is consistency, for example: language, pictures, format & distribution. Consistency within all the work instructions that are created and will be created. Just as mentioned at '***What to create***', clear and strict rules with all the editors is important. For instance, having a clear view of what the target audience is.

This to be sure that content will be created in a similar way. Rules need to be made of the following aspects (based on expert interviews and findings of research question 1):

- Language: How are editors going to write text which contributes to the work instructions? Is the language adapted to the level of the target audience (simple text or jargon)? Will texts be written in a formal or informal way? How much text will be added to each work instruction? These are all aspects of which decisions must be made, in order to achieve consistency.
- Title and description: In order to find a work instruction, a title and description are added. To improve findability and productivity, consistency must be achieved.
- Format: Consistency within the size of images, use of attributes, text boxes and way of presenting. This needs to be the same for end users, in order to consume content more effective and efficient.

3.3 How to design guidelines to achieve Business Process Standardization (BPS)?

To achieve Business Process Standardization, it does not come down to only setting some operational rules. Governance is one of the most important aspects. For instance: making sure that rules are followed, and employees see the use of the 'new' rules and why to use them. Based on the expert interviews and literature study the following findings were made.

- ***Find the process owner***

Find the person that is responsible for the process which is going to be standardized. Without this person, it is almost not possible to succeed with the standardization. According to Münstermann & Weitzel (2008 p.10) the person who is in charge of a process should be involved with its standardization. Somebody within the organization needs to be responsible for this process and its results. This person is also an expert when it comes to the technical details of the process. Within a further stage of the answer to this research question, the process owner is needed to make the actual improvement.

- ***Get to know the process***

It is important to know what the process is, what it does and what its goal is. Also consider the requirements that are made by the organization, these might deviate from the editor's interpretation of how to define the process. Münstermann & Weitzel also state that it is important to interview a

broad level of individuals within an organization, ranging from senior managers to line managers and experts, to get a better view of the organization and its processes.

There is also a common situation in which there is no real process defined. In this case, the process owner is more important than ever. He or she will work together with an editor to define the current process. Having a clear process definition is a must in order to have process standardization. This can be achieved with every type of BPM tool, as long as the basic principles of BPM are followed.

- ***Standardize / improve the process***

Now that the process is known and defined and the process owner is included, it is time to standardize the process. This happens in the same way as normal process standardization, there is nothing different during this research. After the process has been redesigned and standardized, while considering the requirements made by the organization, the process can be made final. The definition of process standardization, and all relevant aspects are given in part 4.2, the answer to research question 2.

- ***Create work instructions to reflect the process***

The next step is to create the work instructions, which reflect the processes that are created. This will be done as elaborated in the previous research question: *"What are the requirements to reflect application related tasks or processes with the use of work instructions?"*.

- ***Create awareness and purpose***

One of the most important aspects that needs to be dealt with is creating awareness and purpose of why the process has been changed. Make sure that employees within the organization are informed that the process has been changed, but especially why. If employees are told why, they normally see the practical use of the change, and because of this they will adopt the change faster. According to Gupta, Holladay & Mahoney (2000 p.29) it is obvious that employee enthusiasm and excitement contribute to the success of the implementation of a process or program.

For instance, by incorporating a communication or training system, the company ensures that both managers and workers understand the approach and that a new culture and attitude evolve that are appropriate for this new situation.

- ***Guard the standardized process***

Sometimes creating awareness and purpose is not enough. There are still some people that do not adapt to the changed way of working. It is important to guard the process, to be sure that everyone works the same way and people do not go back to the old way. This is done by keeping an eye on how people work, and actively give feedback. According to the expert interviews this is done by giving the process owner authority to address employees on their 'bad' behaviour.

3.4 Creating a selection of guidelines

Choosing the best selection of guidelines is phase 5 of the altered MPSM. Within this phase findings made within the interviews and from meetings with the supervisor from INVINITIV are summed up. The goal of this phase is to be more specific when it comes to finalising the guidelines.

All of the guidelines from the expert interviews, literature study, document and artefact collection and from talking with colleagues within INVINITIV are summed up in one big list. By going through this list and prioritising which guidelines were more relevant than others, a smaller list was created.

The new and smaller list containing guidelines was discussed with the supervisor at INVINITIV and some other stakeholders. After some alterations the list was ready. The complete list, containing all findings is added to the appendix.

3.5 Creating a method, based on the guidelines

The creation of guidelines has been done. But how will these guidelines be presented to the editor? What is the best way to present these guidelines? This is an important aspect that needs to be tackled. It would be a waste to create guidelines which are useful, but presenting them in the wrong way, by which the full potential is not achieved. Chapter 7 is part of the 'Design & development' phase of the "Design Science Research Process" of Peffers.

3.5.1 How to design a method based on the guidelines to reach Business Process Standardization (BPS)?

Is there a certain method which is better than the other? What would be the best format in which the guidelines for this research will be presented? According to M. P. Eccles and J. M. Grimshaw (2014) "Selecting, presenting and delivering clinical guidelines: are there any "magic bullets"?" it is probably reasonable to conclude that a range of presentations can be appropriate, although almost all of the evidence relates to overall effects on behaviour rather than the relative merits of different presentations. The study on which it was performed contained a range of guidelines, from lengthy documents to short summary texts. They found no difference in the effectiveness of either method for achieving uptake of guidelines.

Thus, there is not one method proven to be better than another one. To come up with a solution, this question was discussed with employees within INVINITIV. They agreed that the best way to present the guidelines will be in the same format as the other documents made for the ProductivityPerformer. Plain text with bullets and additional images. Easy to add as a document and easy to publish on the website of the ProductivityPerformer.

So, the method that will be used to present the guidelines to reach Business Process Standardization will be a document with plain text, bullets and additional images.

4. Methodology

The following pages represent a method, which contains the guidelines that will be presented to editors within the ProductivityPerformer. The guidelines are based on findings of a literature review, expert interviews and document and artefact collection within INVINITIV. Editors should be able to reach Business Process Standardization, by creating work instructions (independently). Chapter 8 is part of the 'Design & development' phase of the "Design Science Research Process" of Peffers.

Figure 6 is the overview of the method that is created during the research. It contains all steps that are followed, and the order in which they are followed. All steps are elaborated further below the figure.

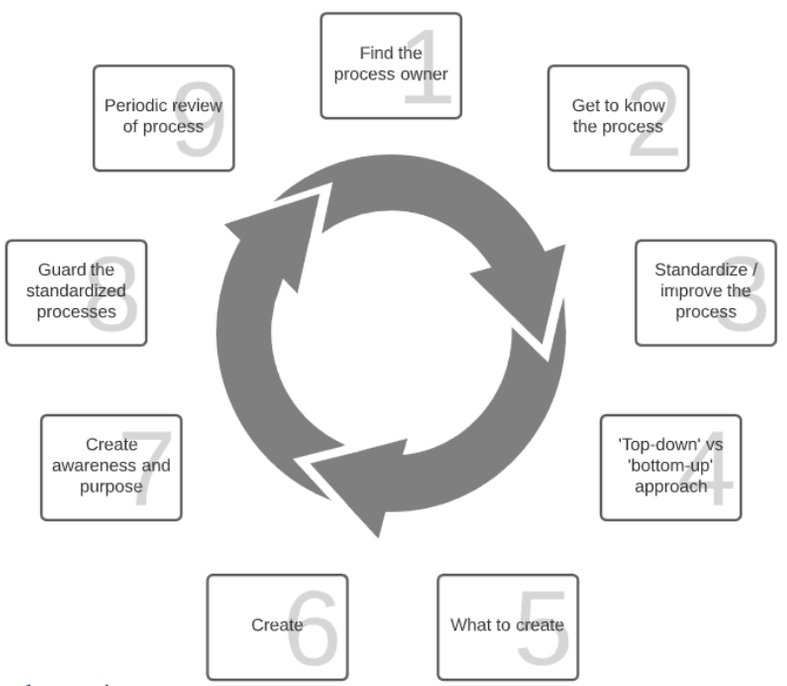


Figure 6 – The method overview

1. Find the process owner

Find the person that is responsible for the process which is going to be standardized. Without this person, it is hard to succeed with the standardization. According to Münstermann & Weitzel (2008 p.10) the person who is in charge and responsible of a process should be involved with its standardization. Somebody within the organization needs to be responsible for this process, the standardization and its results. This person is also an expert when it comes to the technical details of the process.

Input:	Activity:	Output:
• Employees • Job descriptions • Management • Meetings	• Map employees • Have meetings with management • Approach process owner	• View on employees and their tasks • View on the process owner(s) and his/her/their responsibilities • Contact with process owner(s)

2. Get to know the process

It is imp ortant to know what the process is, what it does and what its goal is. Also consider the requirements that are made within the organization, these might deviate from the editor's interpretation of how to define the process. Münstermann & Weitzel also state that it is important to interview a broad level of individuals within an organization, ranging from senior managers to line managers and experts, to get a better view of the organization and its processes.

There is also a common situation in which there is no real process defined. In this case, the process owner is more important than ever. He / she will work together with an editor to define the current process. Having a clear process definition is a must in order to have process standardization. This can be achieved with every type of BPM tool, as long as the basic principles of BPM are followed.

Input:	Activity:	Output:
• Employees • Management • Meetings • Process owners • Process description • BPM tool	• Have meetings with management and employees • Have/create clear process description • Map process in BPM tool	• Organizational preferences known • Defined process • Process description made within BPM tool

3. Standardize / improve the process

Now that the process is known and defined and the process owner(s) is/are included, it is time to standardize the process. This happens in the same way as normal process standardization, there is nothing different during this research. After the process has been redesigned, standardized and approved, while considering the requirements made by the organization, the process can be made final. The definition of process standardization, and all relevant aspects are given in part 4.2, the answer to research question 2.

Input:	Activity:	Output:
• Organizational preferences • Defined process • Process description made within BPM tool • Process owner(s)	• Process standardization	• Standardized process • Standardized description made within BPM tool

4. ‘Top-down’ vs ‘bottom-up’ approach

The next step is to choose a perspective on how to approach the content creation process, ‘top-down’ or ‘bottom-up’. According to Sabatier (1986 p.23) a ‘top-down’ can only be used if there are clear and consistent objectives, which indicates a clear process description of what needs to be done. Sabatier (1986 p.30) also states that in situations where there are no clear and consistent objectives there is no use for a ‘top-down’ approach. A ‘bottom-up’ approach is most suitable in that situation.

The type of perspective has implications on how work instructions will be brought to end users. ‘Top-down’ means that the editor starts with an overlaying process or task and starts to reason with this process or task as base. All work instructions that are created are some kind of derivative of the overlaying process or task.

Working ‘bottom-up’ is completely different. The general definition of a ‘bottom-up’ approach is the piecing together of systems to give rise to more complex systems. When adjusted to this research the definition would be: Creating work instructions, which will be pieced together to give rise to more complex systems, processes or tasks.

Because there is a clear process description in this stage of the method, the preferred perspective is ‘top-down’, but it is also possible to choose ‘bottom-up’.

Input:	**Activity:**	**Output:**
• Standardized process • Standardized description made within BPM tool • Process owner(s)	• Select ‘top-down’ or ‘bottom-up’ approach	• Decision to choose ‘top-down’ or ‘bottom-up’

5. What to create

After choosing the ‘top-down’ or ‘bottom-up’ approach, it is important to really define which work instructions need to be created. Ask yourself: “What work instructions need to be created, in order to reflect all application related steps within the process?”.

In addition to what work instructions need to be created, it is also important what needs to be included within the work instructions. There are some important aspects to consider:

- An organizational approach which should be held as standard within applications
- What is the target audience for which the content will be created? Content needs to be adapted to specifications of the group, in order to be effective. Think about the following properties:
    - Their educational level;
    - Their role within the organization;
    - Their experience with the process (new vs. existing process or onboarding);
    - Their dependability on the process.

As editor you should know this before creating the content. Based on this, the content can be made in such a way that it fits the level of the target audience, which increases productivity and reduces the amount of questions asked.

Input:	Activity:	Output:
• 'Top-down' or 'bottom-up' approach • Process owner(s)	• Defining what work instructions will be created • Defining what needs to be included within the work instructions	• Overview of what work instructions will be created

6. Create

The most important and difficult item to tackle is consistency within the created content, especially when there are multiple editors. To be sure that content will be created in a similar way, the following aspects need to be taken into account.

- Language:
    - Consistency within language is a must;
    - Write formal or informal;
    - Use imperatives;
    - Use simple terminology, do not use any jargon if the target audience does not know it.
- Title and description:
    - The title of the work instruction should be a short description of the task that is performed. For instance: "Add a table" instead of "Excel – Add a table" or "Add a table in Excel";
    - Give all steps within a work instruction a title;
    - Give a step a brief and concise description if needed;
    - Within the properties tab, add the following items:
        - The used application(s);
        - Tags that are applicable.
- Format:
    - When you start a recording and work with two or more displays, make sure that the ProductivityPerformer is opened on the screen you want to work on;
    - Close all other applications;
    - Do not click too fast. It might be that you click somewhere, a screenshot is made but the application has not been fully loaded;
    - Know what steps need to be included before you start the recording;
    - Hide steps that have no added value;
    - From a didactical view, use annotations instead of descriptions;
    - Censor all business sensitive information such as: Name of the editor, filenames, financials, etc...

Input:	Activity:	Output:
• Overview of what needs to be created • Overview of target audience • Process owner(s)	• Create work instructions • Link work instructions to the process	• Work instructions • Overview of the process and its work instructions

7. Create awareness and purpose

One of the most important aspects that needs to be dealt with is creating awareness and purpose of why the process has been changed. Make sure that employees within the organization are informed that the process has been changed, but especially why. If employees are told why, they normally see the practical use of the change, and because of this they will adopt the change faster. According to Gupta, Holladay & Mahoney (2000 p.29) it is obvious that employee enthusiasm and excitement contribute to the success of the implementation of a process or program.

For instance, by incorporating a communication or training system, the company ensures that both managers and workers understand the approach and that a new culture and attitude evolve that are appropriate for this new situation.

Input:	Activity:	Output:
• Employees • Overview of the process and its work instructions • Process owner(s) • Communication system	• Create awareness and purpose by telling why the process has changed	• Informed and motivated employees • Better adaption to the standardized process

8. Guard the standardized process

Sometimes creating awareness and purpose is not enough. There are still some people that do not adapt to the changed way of working. It is important to guard the process, to be sure that everyone works the same way and people do not go back to the old way. This is done by keeping an eye on how people work, and actively give feedback. According to the expert interviews this is done by giving the process owner authority to address employees on their 'bad' behaviour.

Input:	Activity:	Output:
• Employees • Process owner(s)	• Monitor employees • Guard processes	• All employees continue working with the standardized process

9. Periodic review of process

In order to keep the process up to date, a periodic review of the process is advised. Thus, by checking the process once every couple of weeks / months this can be achieved.

5. Demonstration and evaluation

5.1 Demonstration

Chapter 9 contains the 'Demonstration' part of phase 5 of Peffers. The created method will be used for a proof-of-concept.

INVINITIV consists of four subsidiaries: PolderValley, IT2IT, The Backbone and ExplainiT. This case study is done within ExplainiT. ExplainiT is an organization that provides training and consultancy. ExplainiT trains and coaches organizations, teams, and employees to achieve digital agility, adoption and assurance.

About one year ago ExplainiT implemented Moodle, a Learning Management System (LMS). A simple process description has been created for creating courses within Moodle, but this is not enough. This process description is not detailed enough. Employees at ExplainiT still perform tasks in different ways. Thus, the need for Business Process Standardization.

1. **Find the process owner(s)**

The first step, finding the process owner(s), is quite logical for ExplainiT. This has been done by talking to the director of ExplainiT. Roles within ExplainiT:

- Sales Coordinator (SC)
    - Plans and prepares courses
    - Communicates with customers about the execution and evaluation of the course
    - Has a lot of tasks to perform within Moodle
- Account manager (AC)
    - Is responsible for the management of sales and relationships with particular customers
    - Maintain the relationship with existing customers, so that they continue using ExplainiT
    - Has no tasks to perform within Moodle
- Trainer
    - Does the actual training
    - Has some small tasks within Moodle during the training
- Director
    - Responsible for financial and operational results within ExplainiT
    - No tasks within Moodle,
    - Is process owner and responsible for the usage of Moodle at ExplainiT

2. **Get to know the process**

The following process has been translated in English. The original, a Dutch version, has been created during the implementation phase of Moodle. The process consists of tasks that are performed within applications and tasks that can be performed without the use of applications (Moodle). This process represents the preparation that needs to be done before a training (with the use of Moodle). In this situation, there was already a defined process, which functions as base. Instead of having to create a process model, this model below could be used.

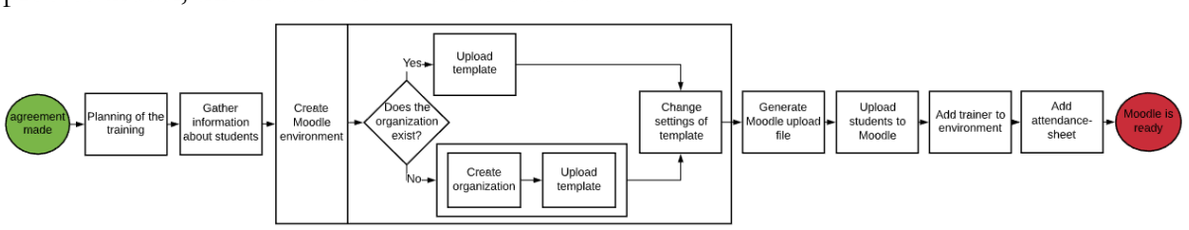


Figure 7 – The defined process

Figure 7 does not contain a standard BPM notation. This process model deviates from a normal notation. Because this process model was already created within ExplainiT, it has been used as a base (process) for the case study of this research.

3. Standardize / Improve the process

The parts of the process in figure 7 can be executed in multiple ways. To improve and standardize the process, decisions need to be made about how the parts need to be performed.

- ***Planning of the training***

The planning of the training is something which does not need to be done through an application. This can be done through the phone, email, website or texting. Thus, after some discussion, the conclusion was made that this part of the process does not need any standardization or improvement.

- ***Gather information about students***

In order to add students to Moodle, it is important to have the correct contact details. These details are acquired through a contact person at the customer. Because the task of adding students to Moodle needs to done in a consistent way, it is quiet logical that the gathering also needs to be done in a consistent and standardized way.

- ***Does the organization exist? / Create organization***

The process owner within ExplainiT prefers all data to be processed in the same way. This to be sure that there will be structure within Moodle, instead of chaos. Thus, creating a new organization or working with an existing organization within Moodle is a must. Because of this decision, the task needs to be standardized.

- ***Upload template***

ExplainiT has created one type of template per course. So, every type of course has its own template which needs to be uploaded. This needs to be done the same way, every time. Thus, standardizing these tasks is also a must. If this task is performed in a different order or way, the students are not able to experience the full potential of Moodle, because of some misconfiguration.

- ***Change settings of template***

There are some settings that need to be changed to ensure that some internal processes function. Examples of internal processes are evaluation and planning. Without the correct changes in the settings, these internal processes will fail. So, standardizing the way in which this is done is an absolute must.

- ***Generate Moodle upload file***

Just like some of the tasks before, the success or failing of this step depends on the correct configuration. Certain steps need to be taken in order to succeed. Thus, standardizing this process is also necessary. This also the same for the following tasks of the process:

- Upload students to Moodle;
- Add trainer to environment;
- Add attendance sheet.

There is another improvement which has been made to the process. A separation between three different topics within the process: 'Extract information', 'Create environment' and 'Add users & materials'. This came to light during the meeting with the process owner at ExplainiT. The following process was created, where the only visual differences can be seen through the separation of the three different topics.

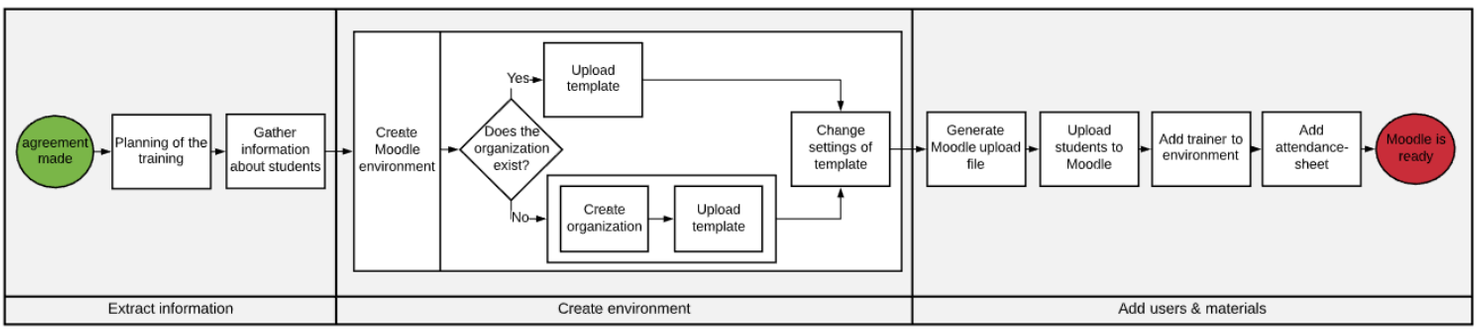


Figure 8 – The improved process

4. 'Top-down' vs 'bottom-up' approach

Just like stated in the method, according to Sabatier (1986 p.23) a 'top-down' can only be used if there are clear and consistent objectives, which indicates a clear process description of what needs to be done.

Because there is a clear process description for this situation, the 'top-down' perspective is selected.

5. What to create

"What work instructions need to be created, in order to reflect all application related steps within the process?". This is the question asked/given in the method.

After the selection of the 'top-down' approach and the identification of all parts within the process that need to be standardized, the following list of work instructions need to be created. This list has been created by going from the beginning of the process until the end, and by discussing with the process owner about what work instructions needed to be added.

The list consists of the following work instructions:

- Gather information about students;
- Does the organization exist + add;
- Upload template;
- Change settings of template;
- Create Moodle student upload file;
- Upload students;
- Add trainer to environment;
- Add attendance sheet.

Aspects that need to be taken into account when creating these work instructions are the organizational approach which needs to be held as standard within the work instructions; the target audience are the sales coordinators, they need to execute the process; Moodle has been implemented about a year ago, so there is sufficient knowledge about the goal and purpose of certain tasks; the application (Moodle) and the tasks that need to be performed within Moodle are of great importance for ExplainiT, their service level depends on it.

6. Create

According to the method there are some aspects which needed to be taken into account. Such as formal or informal writing, use of imperatives, simple terminology, being brief and using simple and clear titles.

The work instructions in the list from '5. What to create' have been created in the same style, which indicates that there is consistency in format, content and language. To map the work instructions to the process, the following figure has been created. The entities with a blueish border and the favicon of the ProductivityPerformer are the work instructions. These work instructions are linked to the parts which they refer to with an arrow.

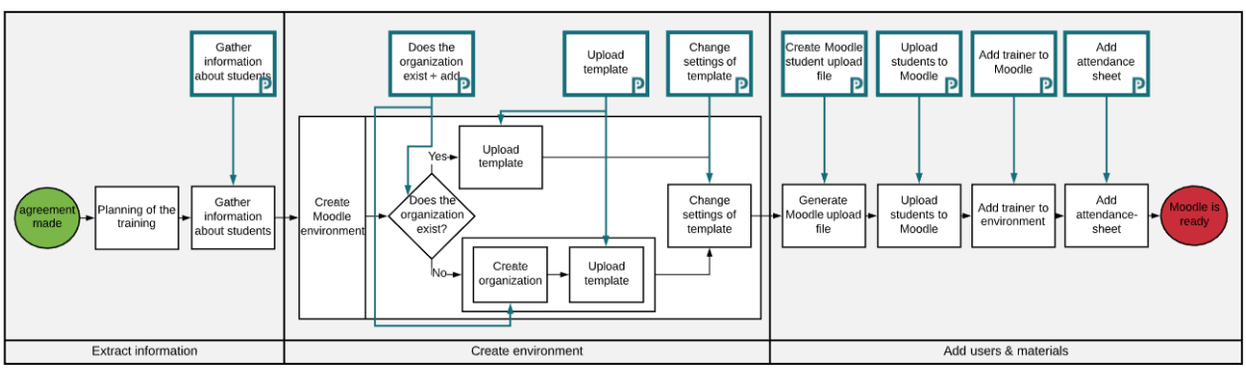


Figure 9 – The process, linked to work instructions

The work instructions and the user guide in which it has been structured can be found within the INVINITIV ProductivityPerformer tenant.

The following figure shows how figure 9 has been reflected by the work instructions. The work instructions: "Does the organization exist + add", "Upload template" and "Change settings of template" are created and added to the chapter "Create environment" within the ProductivityPerformer. The work instruction "Does the organization exist + add" has been added to the appendix to give an overview of the work instructions. All other work instructions are created within the INVINITIV tenant.

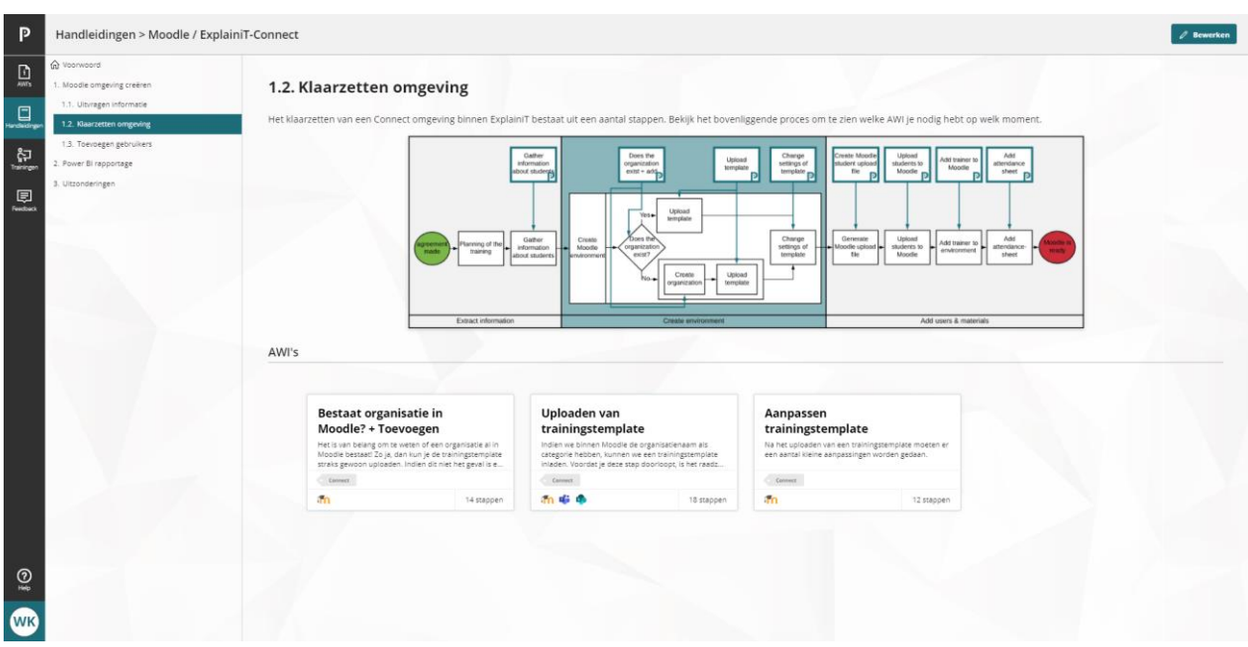


Figure 10 – Work instructions within the INVINITIV ProductivityPerformer tenant

7. Create awareness and purpose

Moodle has been implemented about a year ago at ExplainiT. With the use of Moodle, a lot of tasks which needed to be done manually by employees are automated. Because of this, the excitement for Moodle to be adapted was much higher. Employees experience Moodle as a tool which helps them to work better. This ensures the awareness about the added value of Moodle within ExplainiT.

Now that the process has been standardized and work instructions are linked to the process, employees are encouraged to work in this manner. Luckily Moodle functions only if the exact steps are taken as prescribed. Thus, executing the steps in a wrong way will always lead to a failure. Because of this, the use of the standardized process is a must to execute tasks.

8. Guard the standardized process

Moodle is being checked periodically. The students, courses and content which have been added will be evaluated. Has everything been done in the correct way? In addition to this, if something goes wrong within Moodle, ExplainiT will receive emails from students who are not able to work within Moodle.

9. Periodic review of process

In order to keep the process up to date, a periodic review of the process is advised. Thus, by checking the process once every couple of weeks / months this can be achieved. The process owner at ExplainiT will do this at the beginning of every month.

5.2 Evaluation

Chapter 10 contains the 'Evaluation' part of phase 5 of Peffers. The created method will be evaluated by employees within INVINITIV.

The method in chapter 8 has been evaluated by six employees within INVINITIV. All of them have different backgrounds and roles within the organization. But, all of them are familiar with the ProductivityPerformer and involved with its development.

The reason that these people have been chosen to evaluate the method, is because of the fact that they all have interest in a good implementation of the ProductivityPerformer. But all from a different perspective.

Employee	Task within INVINITIV	Why interest?
#1	IT Trainer/ consultant	Uses the PP to train at organizations. Needs good content to perform the training.
#2	Software developer	Responsible for quality of the PP. Gets information about what needs to be developed, through the operational use and implementation of the PP.
#3	UX developer	Responsible for quality of the PP. Gets information about what needs to be developed, through the operational use and implementation of the PP.
#4	ProductivityPerformer consultant	Is responsible for the implementation of the PP at customers. Uses the method to accomplish this.
#5	ProductivityPerformer consultant	Is responsible for the implementation of the PP at customers. Uses the method to accomplish this.
#6	Marketeer	Analyses how the PP is used within organizations. Makes business cases for marketing purposes.

Table 4 – Employees that evaluated the method

To evaluate the created method, the following evaluation criteria are selected, as can be seen in figure 10. These evaluation criteria have been created by the Organization for Economic Co-operation and Development (OECD).

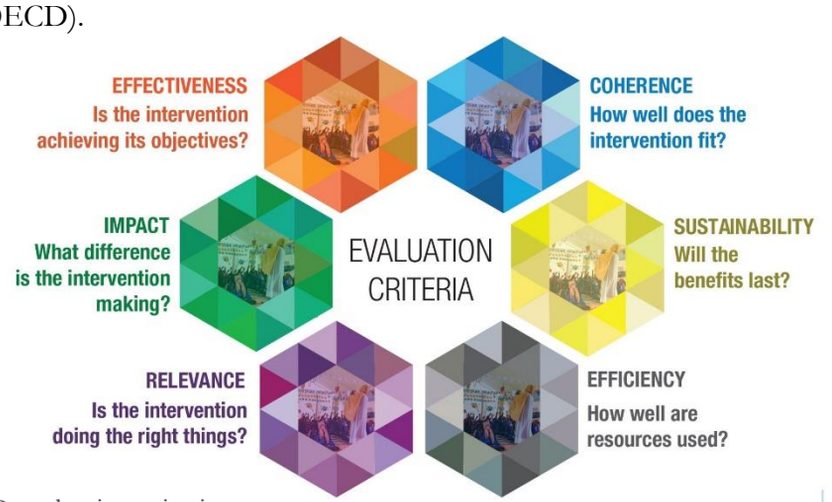


Figure 10 – OECD evaluation criteria

The purpose of the evaluation criteria is linked to the purpose of evaluation. Namely, to enable the determination of the merit, worth or significance of an intervention. The term "intervention" is used to mean the subject of the evaluation. Each criterion is a different lens or perspective through which the intervention can be viewed. Together, they provide a more comprehensive picture of the intervention, the process of implementation, and the results.

The criteria play a normative role. Together they describe the desired attributes of interventions: all interventions should be relevant to the context, coherent with other interventions, achieve their objectives, deliver results in an efficient way, and have positive impacts that last.

All of the criteria in figure 10 have been put into a form, which has been sent to all of the employees that were selected to evaluate the method. The criteria get a grade from 1 to 10, and require some motivation from the evaluator. In addition to the evaluation based on the six criteria, employees also give general feedback on the method.

Evaluation based on the six OECD criteria:

Criteria	EMP-1	EMP-2	EMP-3	EMP-4	EMP-5	EMP-6	Average
Effectiveness	8	8	9	8	7	8	8
Coherence	8	8	10	8	8	9	8,5
Sustainability	9	7	10	8	6	7	7,8
Efficiency	8	7	7	8	8	8	7,7
Relevance	8	9	10	8	10	8	8,8
Impact	9	9	9	8	8	9	8,7

Table 5 – Evaluation based on the six OECD criteria

Motivation on criteria:

- **Effectiveness**
  - The method is effective for most processes. In more complex processes, step three "standardize / improve" will require more iterations. The method does not describe how to tackle this situation.
  - The method forces you to structure your work for the purpose of a better imbedding of the ProductivityPerformer.
  - Logical steps have been defined to reach the goal of the method.
  - When seen from the perspective of a process owner, the process is clearly mapped, worked out and secured through the use of the method. By including and appointing the process owner to the process and its standardization it is much easier to monitor and actualise the process and the materials created within the ProductivityPerformer.
  - The method reaches its goal. Some situations might be hard to work out through this method, but the chosen approach seems the right one.
  - Clear method with a clear start and end point.
- **Coherence**
  - Steps seem logical and are in tune with each other.
  - The various steps connect needless, within a logical order. For including the process owner, till the mapping and securing of the processes. Including step 9 "Periodic review of the process" is a good addition to the method.
  - The method has a lot of overlap when it comes to the actual use of the ProductivityPerformer within organizations.
- **Sustainability**
  - The sustainability of the method is hard to determine right now. This becomes clear when more time passes.
  - There is no reason to think that the method will not be usable in a couple of years.
  - The main goal and its execution will stay the same. But there are some aspects which will change over time. This because of the fact that the ProductivityPerformer will also develop over time. Especially step six "Create" will require some updating periodically.

- **Efficiency**
    - The efficiency of the method does also rely on the amount of different stakeholders that are involved. If there are multiple process owners for a process, it might become complex to follow the method.
    - The number of steps (9) might seem a lot for some editors. Maybe combining some steps might be a solution to this.
    - If the number of processes per process owner are not too much to handle this method seems efficient.
    - Effectiveness and costs (time-wise) are in balance.
    - Because of the use of clear steps, you know what you should pay attention to, which increases the efficiency.
- **Relevance**
    - The method is very relevant, because all parts of the process are included. Every part of a process might be bottleneck if it does not get the right attention. Thus, by using the method and including all parts of the process, it seems a good way to secure knowledge and have better imbedding of the ProductivityPerformer within an organization.
    - The method is relevant and it seems that all needed aspects are discussed.
    - This is also very relevant when it comes to capturing process within the IT area. Because the technology develops really fast, it is hard for employees to keep up. In addition to this, the method also encourages an uniform way of working, which is good.
- **Impact**
    - When using the method in the correct way, you create a certain mindset where task and responsibilities are allocated, which is good.
    - Implementing the ProductivityPerformer is a project, which requires structure. This method can provide the required structure.
    - The impact of introducing the method is low, it is easy to use within organizations. But the impact on productivity is high. Onboarding becomes easier, because of the uniform way of working within the entire organization.
    - Because of the clarity within the process, work instructions will connect smoothly to the end users.

Summary of the general feedback:

- **Adding step 9: 'Periodic review of process' to the method.**

This step has been added in order to check if the process and its instructions are still up to date. If everything is still ok, there is no need for action. But, if the process or its work instructions are outdated, the method starts again in step 1.

- **Textual improvements**

There were several textual improvements suggested by the persons that evaluated the method. Almost all textual improvements were applied.

- **Improvement of underpinning**

Why does the method say certain things? What needs to happen at some parts of the method? Does it also work for onboarding? Etc… These are some of the question/remarks that were made by the reviewers. Most of these questions/remarks were used to improve the method.

- **Input –> Activity -> Output**

There were also some improvements that were suggested for the input - > activity -> output part. Some parts were to general or broad. These suggestions have been taken into account and were also used to improve the method.

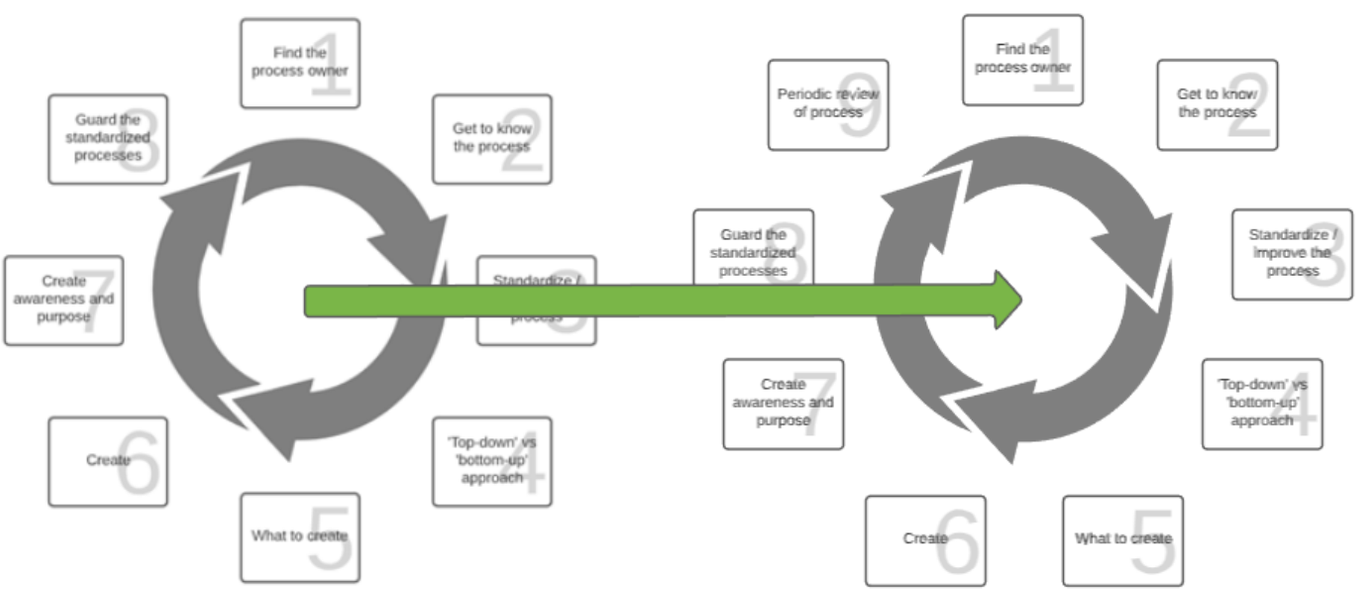


Figure 11 – Improvement of the method.

6. Conclusions and recommendations

6.1 Overview research questions

1. **What are work instructions?**

A work instruction provides specific instructions to carry out an activity. It is a step-by-step guide to perform a single task. It is a tool to help someone perform a job correctly. Work instructions are the base of the ProductivityPerformer and therefore the research.

This research question has been answered through a literature review and was part of the "Objectives of a solution" phase of Peffers.

2. **What is the relationship between work instructions and business processes?**

A work instruction is important for a correct execution of business processes and work instructions are always created to match the business process.

Business processes are always aligned to the organisational view. Work/decisions/policies are implemented through these business processes. Business processes change whenever the organisational view changes

These business processes can be reflected by work instructions. By using work instructions, organisations are able to explain their processes to employees. Whenever a business process is changed, work instructions need to be altered in order to match the process again.

This research question has been answered through a literature review and was part of the "Objectives of a solution" phase of Peffers.

3. **What is Business Process Standardization (BPS)?**

Business Process Standardization is defined as: "…the unification of business processes and the underlying actions within a company…". This is the standardization of existing variants of a process which ensures that activities are performed in the same way in all parts and branches of an organization.

This research question has been answered through a literature review and was part of the "Objectives of a solution" phase of Peffers.

4. **What are the requirements to reflect application related tasks / processes with the use of work instructions?**

Through the use of literature study and the expert interviews, the following findings were made. Based on the interviews the following order has been created, which one should follow to reflect application related tasks and processes.

- ***'Top-down' vs 'bottom-up***

The first thing that should be inspected is whether processes are defined and how these are defined (qualitative). This provides an indication from which perspective one should approach, 'top-down' or 'bottom-up'.

- ***What to create?***

The next aspect that comes up is deciding on what content to create. There are a lot of different things to think about and decide: "Is there some organizational view which should be held as

standard?". Many organizations have their own standards, when it comes to performing certain tasks. Make sure that these are known before creating content.

- ***How to create***

The last aspect that needs to be addressed is about how to create. The most important and difficult item to tackle is consistency, for example: language, pictures, format & distribution. Consistency within all the work instructions that are created and will be created.

This research question has been answered through a literature review and expert interviews and was part of the "Design & development" phase of Peffers.

5. **How to design guidelines to achieve Business Process Standardization (BPS)?**

To achieve Business Process Standardization, it does not come down to only setting some operational rules. Governance is one of the most important aspects.

- ***Find the process owner***

Find the person that is responsible for the process which is going to be standardized. Without this person, it is almost not possible to succeed with the standardization.

- ***Get to know the process***

It is important to know what the process is, what it does and what its goal is. Also consider the requirements that are made by the organization, these might deviate from the editor's interpretation of how to define the process.

- ***Standardize / improve the process***

Now that the process is known and defined and the process owner is included, it is time to standardize the process. This happens in the same way as normal process standardization, there is nothing different during this research.

- ***Create work instructions to reflect the process***

The next step is to create the work instructions, which reflect the processes that are created. This will be done as elaborated in the previous research question: *"What are the requirements to reflect application related tasks or processes with the use of work instructions?"*.

- ***Create awareness and purpose***

One of the most important aspects that needs to be dealt with is creating awareness and purpose of why the process has been changed. Make sure that employees within the organization are informed that the process has been changed, but especially why.

- ***Guard the standardized process***

Sometimes creating awareness and purpose is not enough. There are still some people that do not adapt to the changed way of working. It is important to guard the process, to be sure that everyone works the same way and people do not go back to the old way.

6. **How to design a method based on the guidelines to reach Business Process Standardization (BPS)?**

Thus, there is not one method proven to be better than another one. To come up with a solution, this question was discussed with employees within INVINITIV. They agreed that the best way to

present the guidelines will be in the same format as the other documents made for the ProductivityPerformer.

How to design a method to help companies achieve Business Process Standardization while using work instruction software?

In order for companies to achieve Business Process Standardization while using work instruction software, they should use the 'Method' which is also the deliverable of this research. This method is based on all of the research questions that are answered throughout this research. The use of these guidelines enables people within an organization to independently create content within work instruction software (ProductivityPerformer).

6.2. Limitations

There are some limitations when it comes to the research and its intended deliverables. The method that is created contains guidelines. It is not possible to create guidelines that are suitable for every situation. There will be some situations in which the guidelines will not be applicable or do not give the best result.

These limitations are something that should be considered when it comes to the research and its design. If one keeps looking for the best solution possible during the research, it will take too long. "Perfection is the enemy of all progress" (Winston Churchill). This is something that should be considered when performing the research. It is of course important that the quality of the research should be high, but it is impossible to come up with one solution for everything.

Thus, when doing the research, sometimes the decision that is not most optimal has to be made, to ensure the continuity of the research.

Something else that should be considered is that the guidelines and method that will be created during this research might only be applicable to this case. It could be possible that the created guidelines will not be usable for different situations or software solutions which perform a similar task.

6.3 Future work

How will this method be used within external organizations that use the ProductivityPerformer? Does the method require more steps or can it be made easier. In time, a lot of improvements can be made regarding the imbedding of the ProductivityPerformer within organizations. Thus, researching how the actual implementation process is taking place within organizations and improving this, is an important thing that has to be done.

6.4. Recommendations

To get useful feedback, it is recommended for INVINITIV to actively involve different experts in the field. They have their own view and approach when it comes to their expertise. Listening to these people, with all of their experience might generate insights which could improve the ProductivityPerformer more.

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Appendix

Systematic literature review

In the SLR part of the project plan, the following knowledge question will be answered.

What is the link between work instructions and business processes?

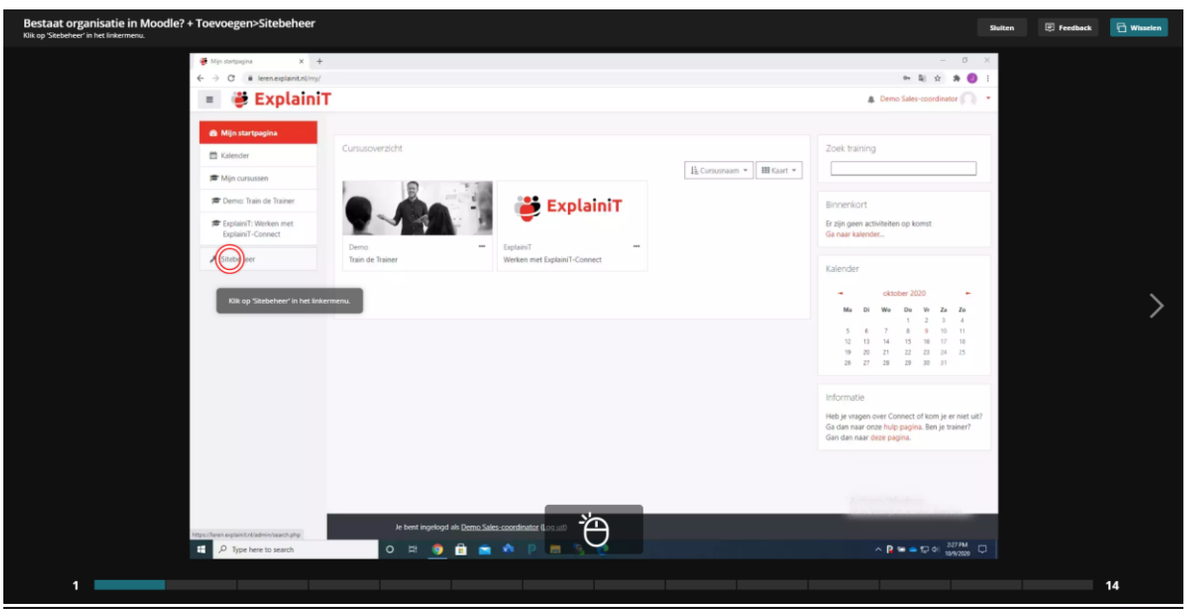
Search term:	Scope:	Date:	Period:	# Results:
Scropus:				
"work instruction" AND "business process"	Article title, abstract, keywords	11-5-2020	1990-present	37
"work instruction" AND bpm	Article title, abstract, keywords	11-5-2020	1990-present	10
"work instruction" AND process AND business	Article title, abstract, keywords	11-5-2020	1990-present	141
In total:				**188**
After exclusion:				38
After reading the title and abstract:				4
After reading articles:				3
Total selected:				**3**

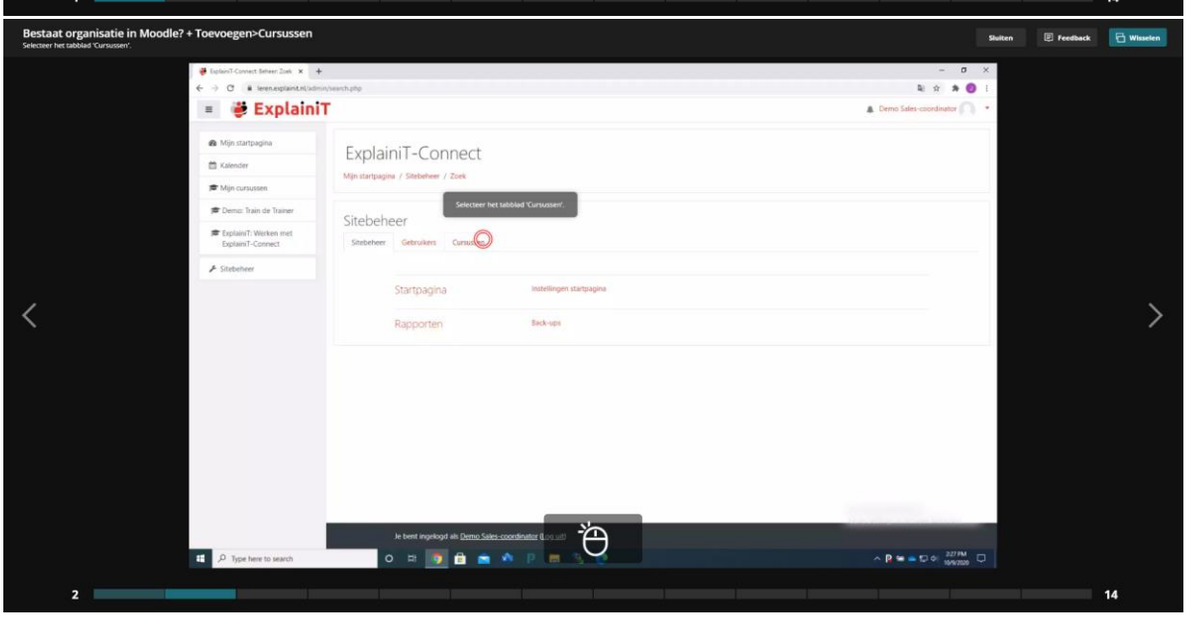
#	Criteria:	Reason for exclusion:
1	No open access	To use this article it needs to be purchased.
2	Wrong focus	Article only focuses on work instructions.
3	Too general	Article is too general, does not give any insight.

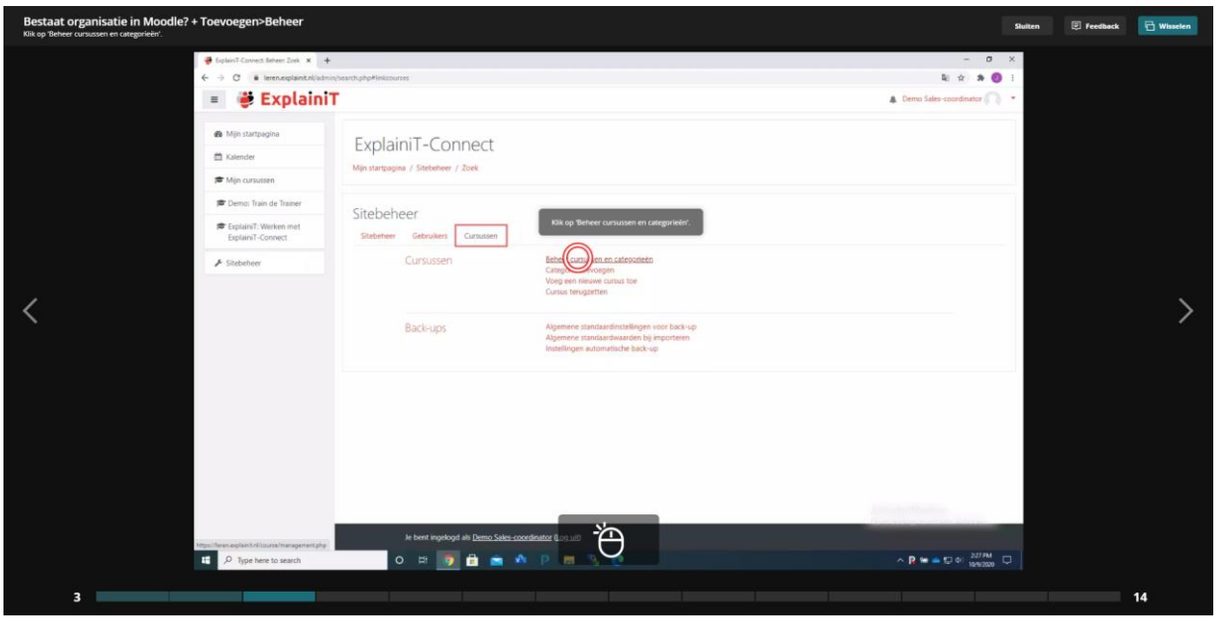
#	Source:	Author(s):	Year:	Subject:	Conclusion:	Findings:
1	Reconfigurable Standardized Work in a Lean company – a case study	Ana Pereira, M. Florentina Abreu, David Silva, Anabela C. Alves, José A. Oliviera, Isabel Lopez, Manual C. Figueiredo	2016	Nowadays, due to the high level of markets competitiveness, companies are seeking for improvement in their performance and their processes efficiency in order to remain competitive and meet the customer requirements.	Information provided by the business process helps the responsible team to create the best work instructions considering the the customer demands and resources available.	Work instructions are created based on information and/ or processes that are more important than the work instruction itself.
2	Data and Information Handling in Assembly Information Systems – A Current State Analysis	Pierre E. C. Johansson, Martin O. Enofe, Mortiz Schwarzkopf, Lennart Malmsköld, Åsa Fast-Berglund, Lena Moestam	2017	More complex products require adequate manufacturing systems and corresponding work instructions.	Work instructions are based on the current process and need to be changed whenever the complexity of the produced product increases.	Work instructions are changed according to the process whenever the process is updated.

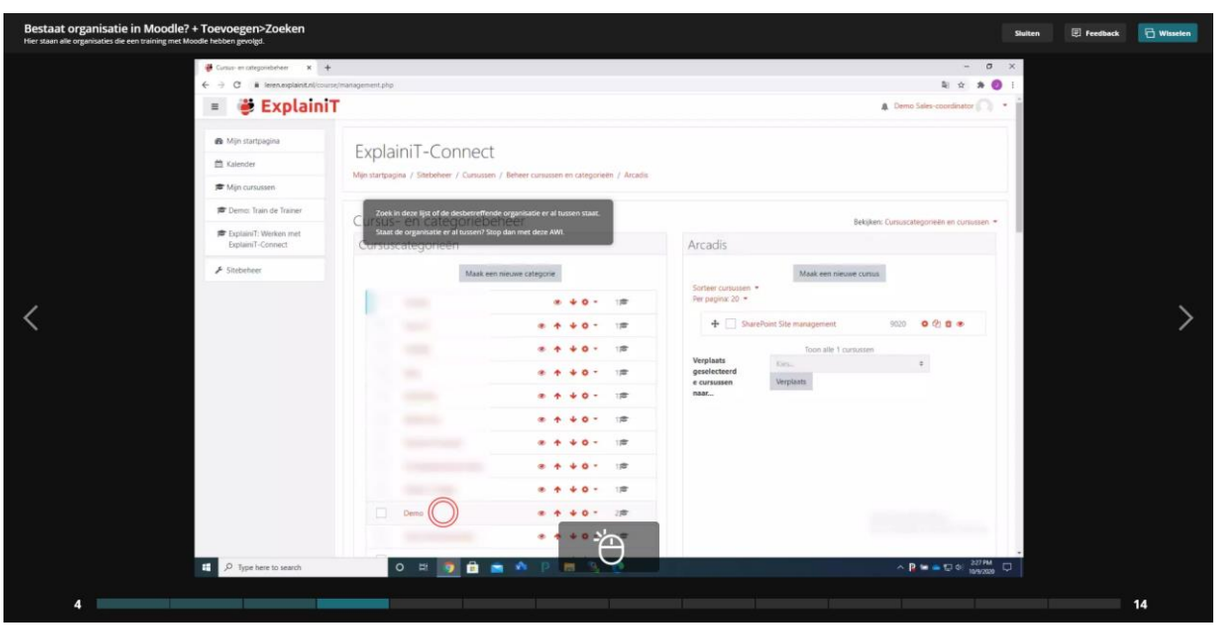
3	The Effect of Procedure Change, TQM and ERP Implementation to Company Performance on Manufacturing Industries	Zepla Jiwa Huasada Tarigan, Widjojo Suprapto, Sautma Ronni Basana	2018	The initial changes in standard procedures made by manufacturing companies when implementing ISO 9000 are establishing procedures related to the system in each department of the companies. These changes are related to the standard operating procedures, work instructions and forms.	BPR within a company will create customized product innovations that possess new standard operating procedures. The changes of the business process are usually conducted by altering procedures, work instructions, and forms.	Whenever a business process is changed, this will have effect on work instructions. Work instructions will be changed according to the process, not the other way around.

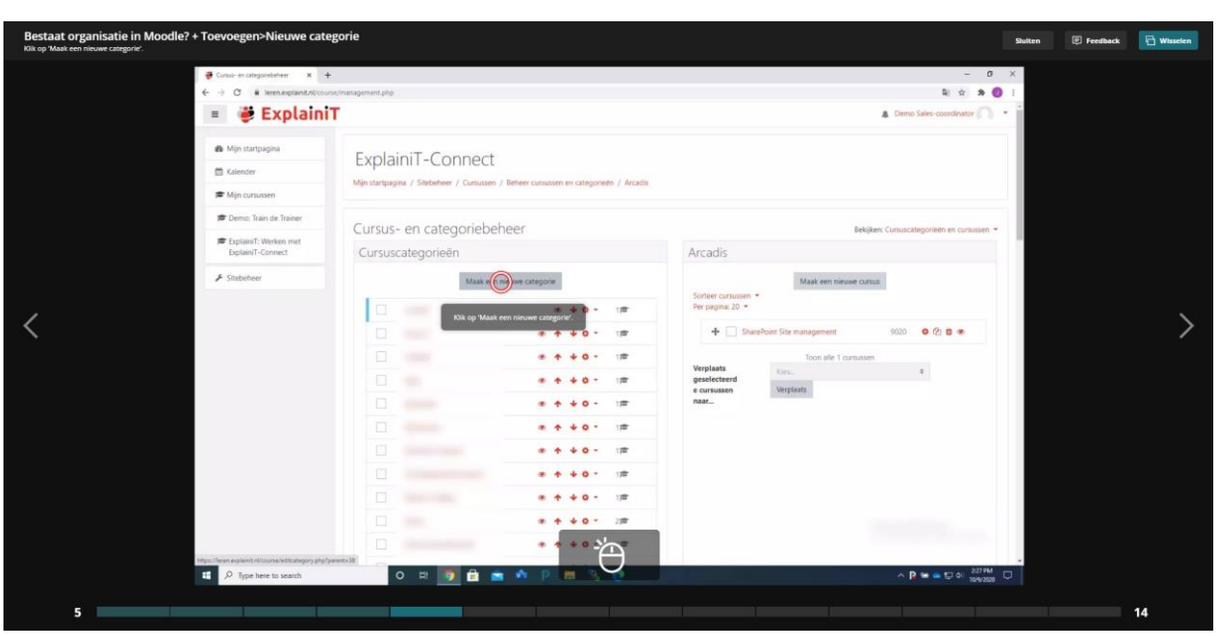
Work instruction: "Does the organization exist + add"

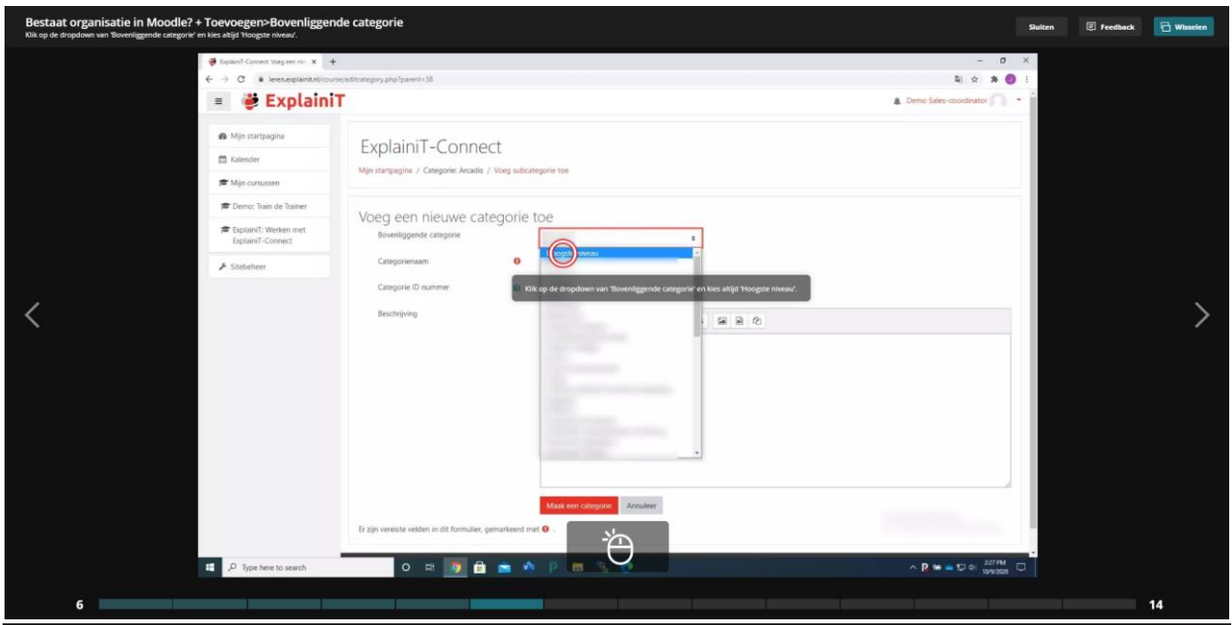


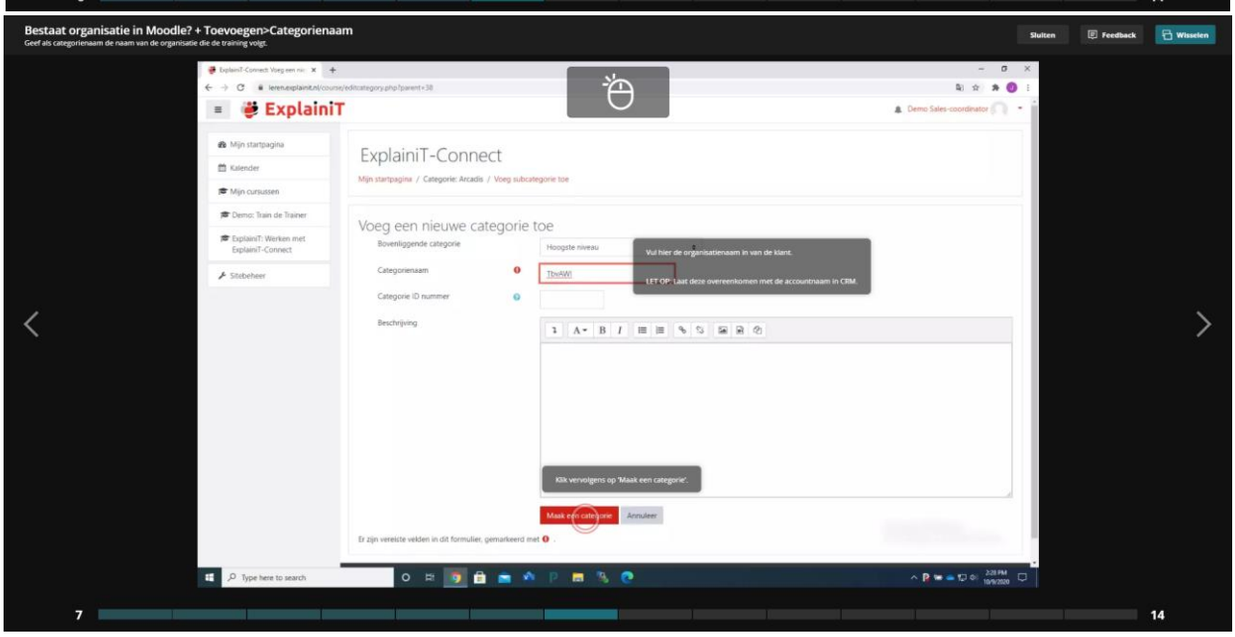


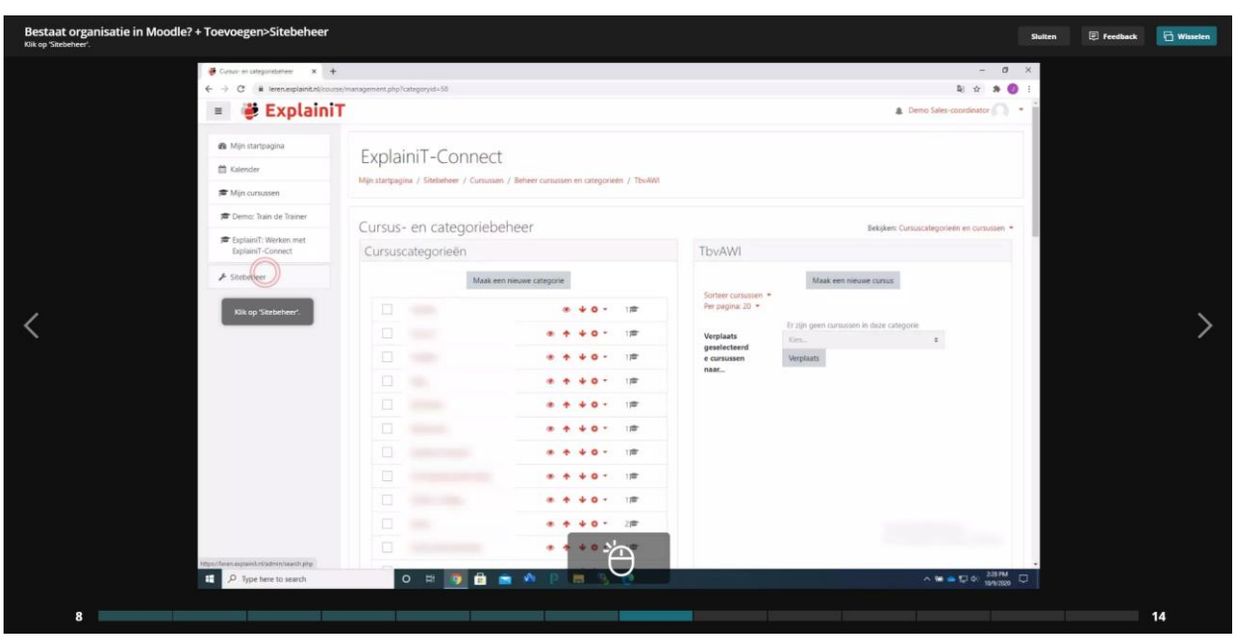

Bestaat organisatie in Moodle? + Toevoegen>Beheer
Klik op 'Beheer cursussen en categorieën'.
Sluiten
Feedback
Wisselen
ExplainiT
ExplainiT-Connect
Sitebeheer
Klik op 'Beheer cursussen en categorieën'.
Cursussen
Back-ups
3
14

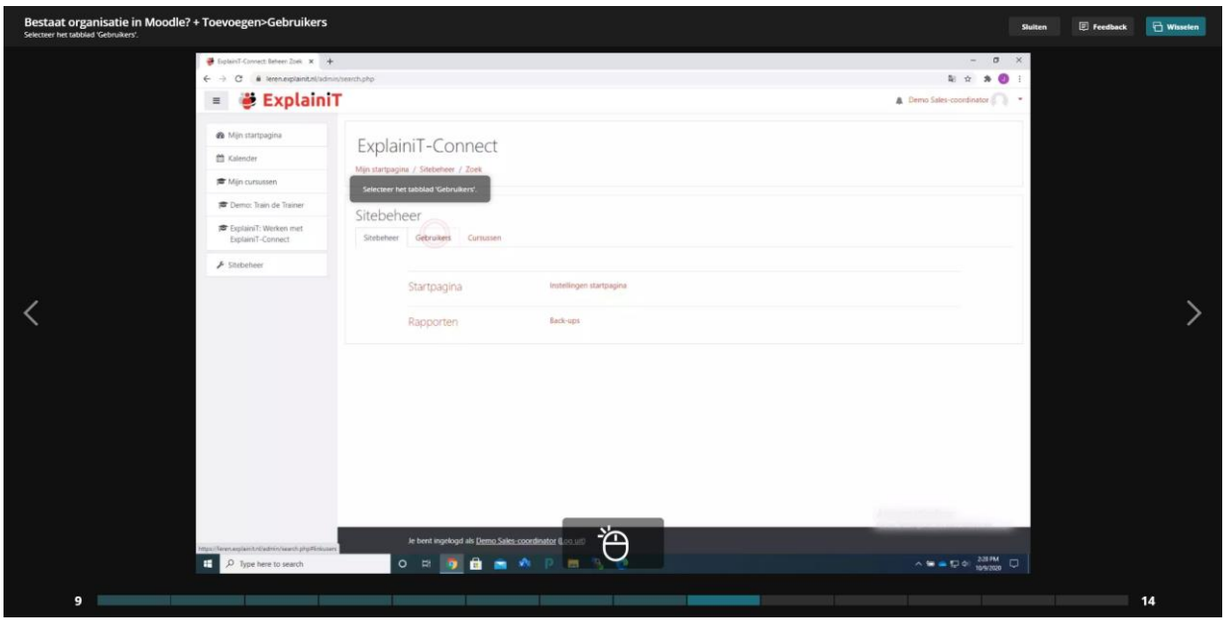

Bestaat organisatie in Moodle? + Toevoegen>Zoeken
Hier staan alle organisaties die een training met Moodle hebben gevolgd.
Sluiten
Feedback
Wisselen
ExplainiT
ExplainiT-Connect
Zoek in deze lijst of de desbetreffende organisatie er al tussen staat.
Staat de organisatie er al tussen? Stop dan met deze AWI.
Cursus- en categoriebeheer
Arcadis
4
14

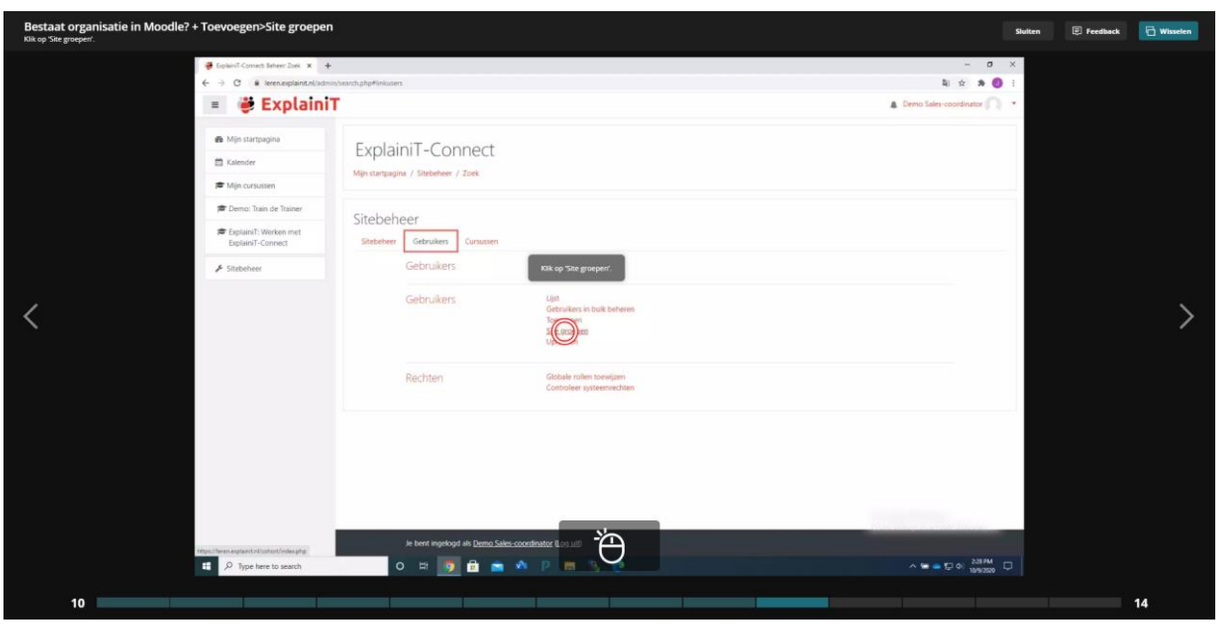

Bestaat organisatie in Moodle? + Toevoegen>Nieuwe categorie
Klik op 'Maak een nieuwe categorie'.
Sluiten
Feedback
Wisselen
ExplainiT
ExplainiT-Connect
Cursus- en categoriebeheer
Cursuscategorieën
Arcadis
Klik op 'Maak een nieuwe categorie'.
5
14

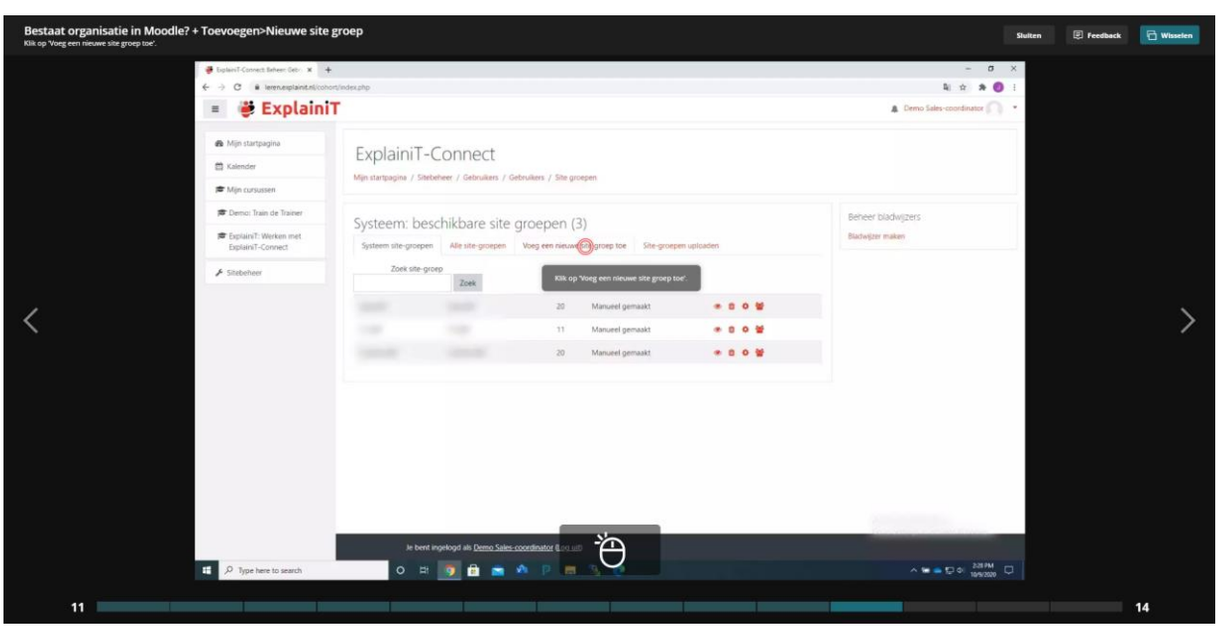

Bestaat organisatie in Moodle? + Toevoegen>Bovenliggende categorie
Klik op de dropdown van 'Bovenliggende categorie' en kies altijd 'Hoogste niveau'.
Sluiten
Feedback
Wisselen
ExplainiT
ExplainiT-Connect
Voeg een nieuwe categorie toe
Bovenliggende categorie
Categorienaam
Categorie ID nummer
Beschrijving
Klik op de dropdown van 'Bovenliggende categorie' en kies altijd 'Hoogste niveau'.
Maak een categorie
Annuleer
6
14

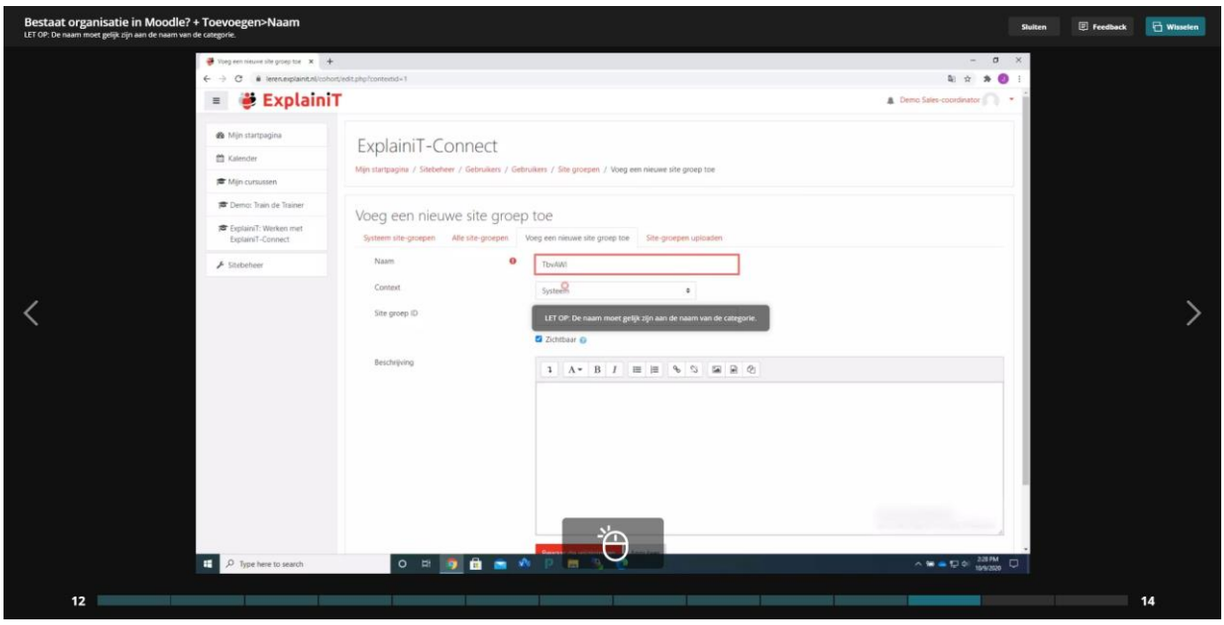

Bestaat organisatie in Moodle? + Toevoegen>Categorienaam
Geef als categorienaam de naam van de organisatie die de training volgt.
Sluiten
Feedback
Wisselen
ExplainiT
ExplainiT-Connect
Voeg een nieuwe categorie toe
Bovenliggende categorie
Hoogste niveau
Categorienaam
TbvAWI
Vul hier de organisatienaam in van de klant.
LET OP: Laat deze overeenkomen met de accountnaam in CRM.
Categorie ID nummer
Beschrijving
Klik vervolgens op 'Maak een categorie'.
Maak een categorie
Annuleer
7
14

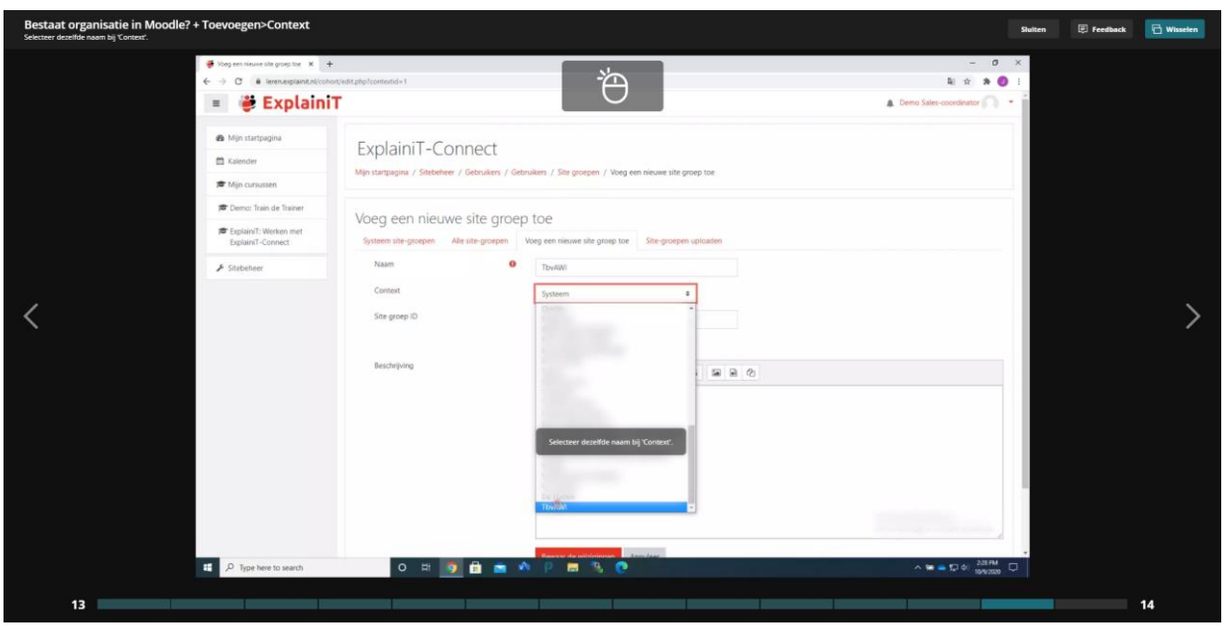

Bestaat organisatie in Moodle? + Toevoegen>Sitebeheer
Klik op 'Sitebeheer'.
Sluiten
Feedback
Wisselen
ExplainiT
ExplainiT-Connect
Sitebeheer
Klik op 'Sitebeheer'.
Cursus- en categoriebeheer
Cursuscategorieën
TbvAWI
Maak een nieuwe categorie
Maak een nieuwe cursus
8
14

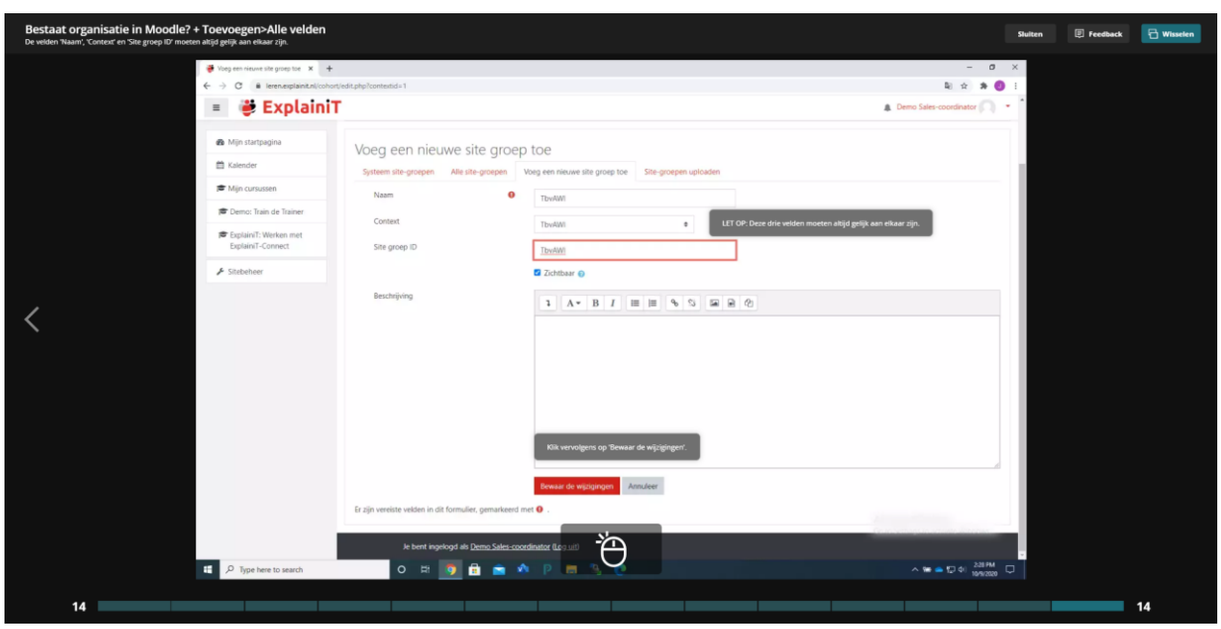

Bestaat organisatie in Moodle? + Toevoegen>Gebruikers
Selecteer het tabblad 'Gebruikers'.
Sluiten
Feedback
Wisselen
ExplainiT
ExplainiT-Connect
Mijn startpagina / Sitebeheer / Zoek
Selecteer het tabblad 'Gebruikers'.
Sitebeheer
Sitebeheer
Gebruikers
Cursussen
Startpagina
Instellingen startpagina
Rapporten
Back-ups
9
14


Bestaat organisatie in Moodle? + Toevoegen>Site groepen
Klik op 'Site groepen'.
Sluiten
Feedback
Wisselen
ExplainiT
ExplainiT-Connect
Mijn startpagina / Sitebeheer / Zoek
Sitebeheer
Sitebeheer
Gebruikers
Cursussen
Gebruikers
Klik op 'Site groepen'.
Gebruikers
Rechten
10
14


Bestaat organisatie in Moodle? + Toevoegen>Nieuwe site groep
Klik op 'Voeg een nieuwe site groep toe'.
Sluiten
Feedback
Wisselen
ExplainiT
ExplainiT-Connect
Mijn startpagina / Sitebeheer / Gebruikers / Gebruikers / Site groepen
Systeem: beschikbare site groepen (3)
Systeem site-groepen
Alle site-groepen
Voeg een nieuwe site groep toe
Site-groepen uploaden
Zoek site-groep
Zoek
Klik op 'Voeg een nieuwe site groep toe'.
Beheer bladwijzers
Bladwijzer maken
Manueel gemaakt
Manueel gemaakt
Manueel gemaakt
11
14


Bestaat organisatie in Moodle? + Toevoegen>Naam
LET OP: De naam moet gelijk zijn aan de naam van de categorie.
Sluiten
Feedback
Wisselen
ExplainiT
ExplainiT-Connect
Voeg een nieuwe site groep toe
Naam
Context
Site groep ID
Beschrijving
LET OP: De naam moet gelijk zijn aan de naam van de categorie.
12
14


Bestaat organisatie in Moodle? + Toevoegen>Context
Selecteer dezelfde naam bij 'Context'.
Sluiten
Feedback
Wisselen
ExplainiT
ExplainiT-Connect
Voeg een nieuwe site groep toe
Naam
Context
Site groep ID
Beschrijving
Selecteer dezelfde naam bij 'Context'.
13
14


Bestaat organisatie in Moodle? + Toevoegen>Alle velden
De velden 'Naam', 'Context' en 'Site groep ID' moeten altijd gelijk aan elkaar zijn.
Sluiten
Feedback
Wisselen
ExplainiT
Voeg een nieuwe site groep toe
Naam
Context
Site groep ID
Beschrijving
LET OP: Deze drie velden moeten altijd gelijk aan elkaar zijn.
Klik vervolgens op 'Bewaar de wijzigingen'.
Bewaar de wijzigingen
Annuleer
14
14

PRODUCTIVITY PERFORMER

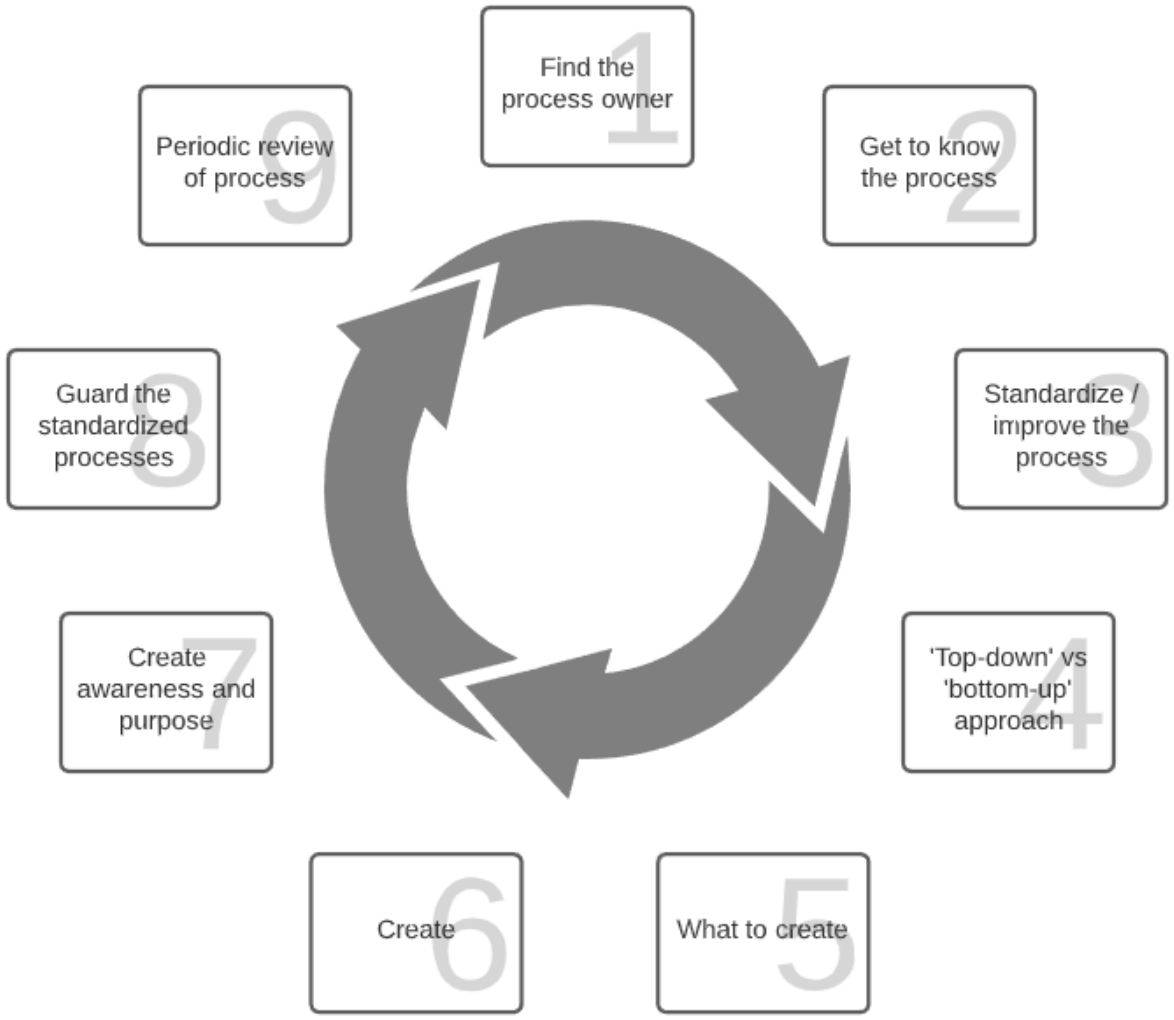
PRODUCTIVITYPERFORMER

EDITOR GUIDELINES

GUIDELINES

M The method

The following figure is the graphical overview of the created method, which contains the editor guidelines for the ProductivityPerformer. Working with this document will make it easier for editors within the ProductivityPerformer to create work instructions of high quality, work consistently with other editors and embed a new or altered process within the organization.



GUIDELINES

P Preparation (One time only)

The following things need to be done in order to create consistent picture-based instructions within the ProductivityPerformer. If you as editor do not follow these settings, images of different sizes will be used, and all editors will create work instructions in different formats.

- Download and install the 'Recorder' from the ProductivityPerformer website
- Go to the screen settings of your computer and set the following settings:
    - "Size of text, apps and other items" → 100%
    - "Screen resolution" → 1920 x 1080 (recommended)

1 Find the process owner

As an editor, your task is to find the person that is responsible for the process you are working on. Are you the editor and at the same time also the process owner? That makes it even easier. It is important to include the process owner, because someone within the organization needs to be responsible for this process, the standardization and its results. This person is also an expert when it comes to the technical details of the process.

2 Get to know the process

It is important to know what the process is, what it does and what its goal is. Also consider the requirements that are made within the organization, these might deviate from the editor's interpretation of how to define the process. It is advised to interview a broad level of individuals within the organization, ranging from senior managers to line managers and experts, to get a better view of the organizational preferences and the process.

There is also a common situation in which there is no real process defined. In this case, the process owner is more important than ever. He / she will work together with an editor to define the current process. Having a clear process definition is a must in order to have process standardization. This can be achieved with every type of Business Process Modelling (BPM) tool, as long as the basic principles of BPM are followed.

GUIDELINES

3 Standardize / improve the process

Now that the process is known and the process owner is included, it is time to standardize the process. This happens in the same way as normal process standardization, there is no different approach during this research. After the process has been redesigned and standardized, while considering the requirements made by the organization, the process can be made final.

4 'Top-down' vs 'bottom-up' approach

The next step is to choose a perspective on how to approach the content creation process, 'top-down' or 'bottom-up'. A 'top-down' approach can only be used if there are clear and consistent objectives. Which indicates a clear process description of what needs to be done. To be more precise: in situations where there are no clear and consistent objectives, there is no use for a 'top-down' approach. A 'bottom-up' approach is most suitable in that situation.

The type of perspective has implications on how work instructions will be brought to end users. 'Top-down' means that the editor starts with an overlaying process or task and starts to reason with this process or task as base. All work instructions that are created are some kind of derivative of the overlaying process or task.

Working 'bottom-up' is completely different. The general definition of a 'bottom-up' approach is the piecing together of systems to give rise to more complex systems. When adjusted to this method, the definition would be: Creating work instructions, which will be pieced together to give rise to more complex systems / processes / tasks.

- Use 'Top-down' if you want to take the process as starting point. This allows you to reason from the process as base. Ask yourself : "What is all part of this process?" & "What should be included to reflect this process?"
- Use 'Bottom-up' if you want to do some clustering. Start creating work instructions that are related to some topic. By combining all loose work instructions, you will work towards a better-defined process.

GUIDELINES

5 What to create

After choosing the 'top-down' or 'bottom-up' approach, it is important to really define which work instructions need to be created. Ask yourself: "What work instructions need to be created, in order to reflect all application related steps within the process?".

In addition to what work instructions need to be created, it is also important what needs to be included within the work instructions. There are some important aspects to consider:

- An organizational approach which should be held as standard within applications
- What is the target audience for which the content will be created? Content needs to be adapted to specifications of the group, in order to be effective. Think about the following properties:
    - Their educational level
    - Their role within the organization
    - Their experience with the process (new vs. existing process or onboarding)
    - Their dependability on the process

As editor you should know this before creating the content. Based on this, the content can be made in such a way that it fits the level of the target audience, which increases productivity and reduces the amount of questions asked.

6 Create

The most important and difficult item to tackle is consistency within the created content, especially when there are multiple editors. To be sure that content will be created in a similar way, the following aspects need to be taken into account.

- Language:
    - Consistency within language is a must
    - Write formal or informal
    - Use imperatives
    - Use simple terminology, do not use any jargon if the target audience does not know it
- Title and description:
    - The title of the work instruction should be a short description of the task that is performed. For instance: "Add a table" instead of "Excel – Add a table" or "Add a table in Excel"
    - Give all steps within a work instruction a title
    - Give a step a brief and concise description if needed
    - Within the properties tab, add the following items:
        - The used application(s)
        - Tags that are applicable

GUIDELINES

- Format:
    - When you start a recording and work with two or more displays, make sure that the ProductivityPerformer is opened on the screen you want to work on.
    - Close all other applications.
    - Do not click too fast. It might be that you click somewhere, a screenshot is made but the application has not been fully loaded.
    - Know what steps need to be included before you start the recording.
    - Hide steps that have no added value.
    - From a didactical view, use annotations instead of descriptions.
    - Censor all business sensitive information such as: Name of the editor, filenames, financials, etc...

7 Create awareness and purpose

One of the most important aspects that needs to be dealt with is creating awareness and purpose of why the process has been changed. Make sure that employees within the organization are informed that the process has been changed, but especially why. If employees are told why, they normally see the practical use of the change, and because of this they will adopt the change faster. It is obvious that employee enthusiasm and excitement contribute to the success of the implementation of a process/program.

For instance by incorporating a communication or training system, the company ensures that both managers and workers understand the approach and that a new culture and attitude evolve that are appropriate for this new situation.

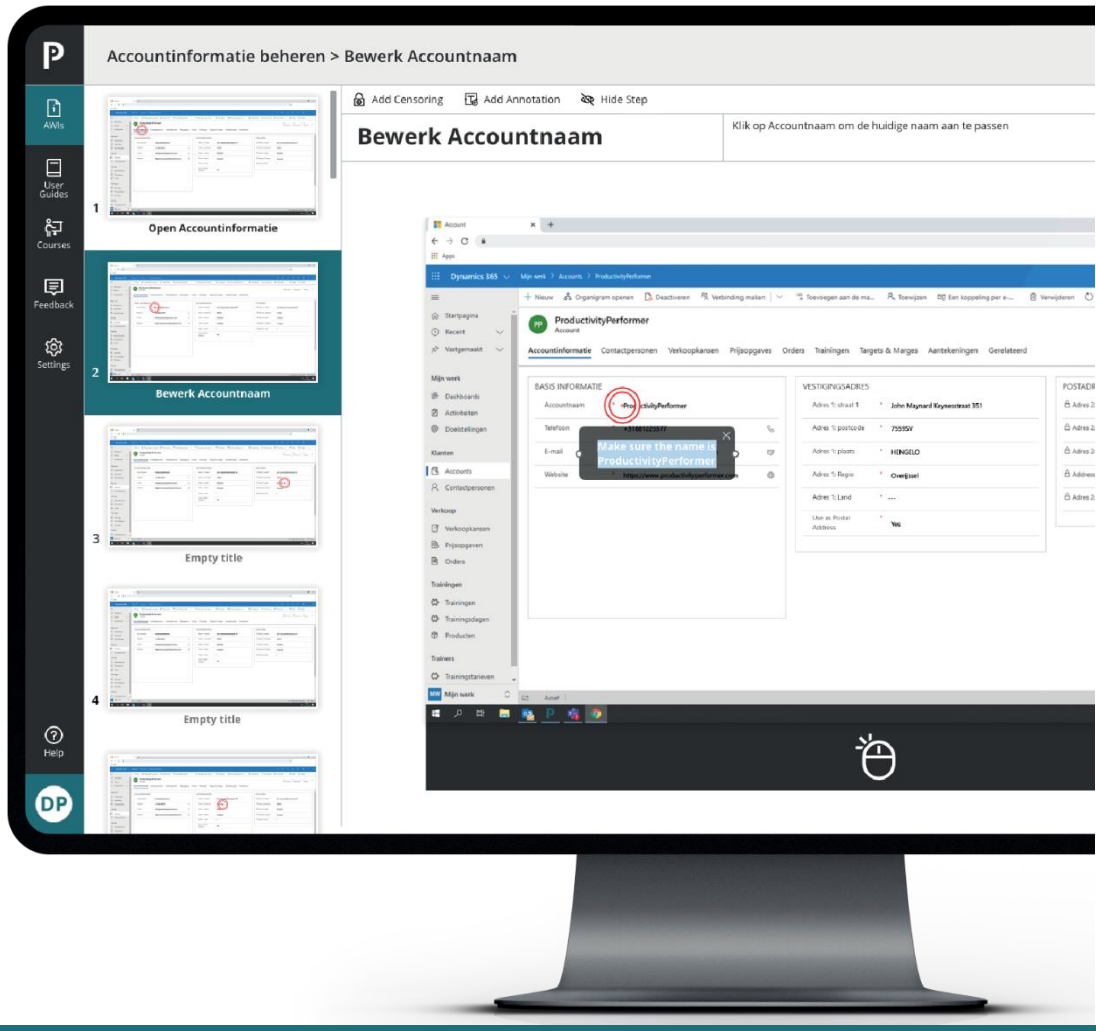
8 Guard the standardized process

Sometimes creating awareness and purpose is not enough. There are still some people that do not adapt to the changed way of working. It is important to guard the process, to be sure that everyone works the same way and people do not go back to the old way. This is done by keeping an eye on how people work, and actively give feedback. According to the expert interviews this is done by giving the process owner authority to address employees on their 'bad' behaviour.

GUIDELINES

9 Guard the standardized process

In order to keep the process up to date, a periodic review of the process is advised. Thus, by checking the process once every couple of weeks / months this can be achieved. Whenever the process needs to be changed, you start again in step 1 of this document.



The method (old)

The following pages represent a method, which contains the guidelines that will be presented to editors within the ProductivityPerformer. The guidelines are based on findings that were made during a literature review, expert interviews and document and artefact collection within INVINTIV. Editors should be able to reach Business Process Standardization, by creating work instructions (independently). Chapter 8 is part of the 'Design & development' phase of the "Design Science Research Process" of Peffers.

Figure X is the overview of the created method. It contains all steps that are followed, and the order in which they are followed. All steps are elaborated further below the figure.

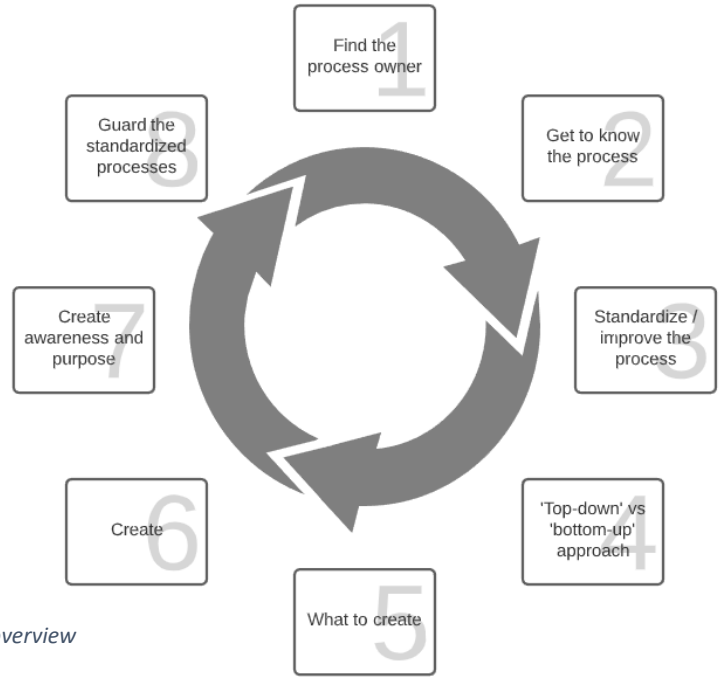


Figure X – The method overview

1. **Find the process owner**

Find the person that is responsible for the process which is going to be standardized. Without this person, it is almost impossible to succeed with the standardization. According to Münstermann & Weitzel (2008 p.10) the person who is in charge/responsible of a process should be involved with its standardization. Somebody within the organization needs to be responsible for this process, the standardization and its results. This person is also an expert when it comes to the technical details of the process.

Input:	**Activity:**	**Output:**
• Employees • Job descriptions • Management • Meetings	• Map employees • Have meetings with management • Approach process owner	• View on employees and their tasks • View on the process owner(s) and his/her/their responsibilities • Contact with process owner(s)

2. **Get to know the process**

It is important to know what the process is, what it does and what its goal is. Also consider the requirements that are made within the organization, these might deviate from the editor's interpretation of how to define the process. Münstermann & Weitzel also state that it is important to interview a broad level of individuals within an organization, ranging from senior managers to line managers and experts, to get a better view of the organization and its processes.

There is also a common situation in which there is no real process defined. In this case, the process owner is more important than ever. He / she will work together with an editor to define the current process. Having a clear process definition is a must in order to have process standardization. This can be achieved with every type of BPM tool, as long as the basic principles of BPM are followed.

Input:	**Activity:**	**Output:**
• Employees • Management • Meetings • Process owners • Process description • BPM tool	• Have meetings with management and employees • Have/create clear process description • Map process in BPM tool	• Organizational preferences known • Defined process • Process description made within BPM tool

3. **Standardize / improve the process**

Now that the process is known/defined and the process owner(s) is/are included, it is time to standardize the process. This happens in the same way as normal process standardization, there is nothing different during this research. After the process has been redesigned and standardized, while considering the requirements made by the organization, the process can be made final. The definition of process standardization, and all relevant aspects are given in part 4.2, the answer to research question 2.

Input:	**Activity:**	**Output:**
• Organizational preferences • Defined process • Process description made within BPM tool • Process owner(s)	• Process Standardization	• Standardized process • Standardized description made within BPM tool

4. 'Top-down' vs 'bottom-up' approach

The next step is to choose a perspective on how to approach the content creation process, 'top-down' or 'bottom-up'. According to Sabatier (1986 p.23) a 'top-down' can only be used if there are clear and consistent objectives. Which indicates a clear process description of what needs to be done. Sabatier (1986 p.30) also states that in situations where there are no clear and consistent objectives there is no use for a 'top-down' approach. A 'bottom-up' approach is most suitable in that situation.

The type of perspective has implications on how work instructions will be brought to end users. 'Top-down' means that the editor starts with an overlaying process or task and starts to reason with this process or task as base. All work instructions that are created are some kind of derivative of the overlaying process or task.

Working 'bottom-up' is completely different. The general definition of a 'bottom-up' approach is the piecing together of systems to give rise to more complex systems. When adjusted to this research the definition would be: Creating work instructions, which will be pieced together to give rise to more complex systems / processes / tasks.

Because there is a clear process description in this stage of the method, the preferred perspective is 'top-down', but it is also possible to choose 'bottom-up'.

Input:	**Activity:**	**Output:**
• Standardized process • Standardized description made within BPM tool • Process owner(s)	• Select 'top-down' or 'bottom-up' approach	• Decision to choose 'top-down' or 'bottom-up'

5. What to create

After choosing the 'top-down' or 'bottom-up' approach, it is important to really define which work instructions need to be created. Ask yourself: "What work instructions need to be created, in order to reflect all application related steps within the process?".

In addition to what work instructions need to be created, it is also important what needs to be included within the work instructions. There are some important aspects to consider:

- An organizational approach which should be held as standard within applications
- What is the target audience for which the content will be created? Content needs to be adapted to specifications of the group, in order to be effective. Think about the following properties:
    - Their educational level
    - Their role within the organization
    - Their experience with the process (new vs. existing process)
    - Their dependability on the process

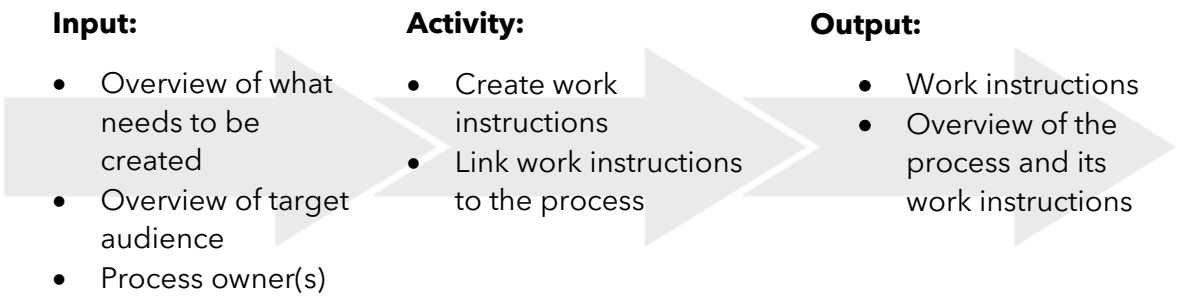
As editor you should know this before creating the content. Based on this, the content can be made in such a way that it fits the level of the target audience, which increases productivity and reduces the amount of questions asked.

Input:	**Activity:**	**Output:**
• 'Top-down' or 'bottom-up' approach • Process owner(s)	• Defining what work instructions will be created • Defining what needs to be included within the work instructions	• Overview of what work instructions will be created

6. Create

The most important and difficult item to tackle is consistency within the created content, especially when there are multiple editors. To be sure that content will be created in a similar way, the following aspects need to be taken into account.

- Language:
    - Consistency within language is a must
    - Write formal or informal
    - Use imperatives
    - Use simple terminology, do not use any jargon if the target audience does not know it
- Title and description:
    - The title of the work instruction should be a short description of the task that is performed. For instance: "Add a table" instead of "Excel – Add a table" or "Add a table in Excel"
    - Give all steps within a work instruction a title
    - Give a step a brief and concise description if needed
    - Within the properties tab, add the following items:
        - The used application(s)
        - Tags that are applicable
- Format:
    - When you start a recording and work with two or more displays, make sure that the ProductivityPerformer is opened on the screen you want to work on
    - Close all other applications
    - Do not click too fast. It might be that you click somewhere, a screenshot is made but the application has not been fully loaded
    - Know what steps need to be included before you start the recording
    - Hide steps that have no added value
    - From a didactical view, use annotations instead of descriptions
    - Censor all business sensitive information such as: Name of the editor, filenames, financials, etc...



7. Create awareness and purpose

One of the most important aspects that needs to be dealt with is creating awareness and purpose of why the process has been changed. Make sure that employees within the organization are informed that the process has been changed, but especially why. If employees are told why, they normally see the practical use of the change, and because of this they will adopt the change faster. According to Gupta, Holladay & Mahoney (2000 p.29) it is obvious that employee enthusiasm and excitement contribute to the success of the implementation of a process/program.

For instance by incorporating a communication or training system, the company ensures that both managers and workers understand the approach and that a new culture and attitude evolve that are appropriate for this new situation.

Input:	**Activity:**	**Output:**
• Employees • Overview of the process and its work instructions • Process owner(s) • Communication system	• Create awareness and purpose by telling why the process has changed	• Informed and motivated employees • Better adaption to the standardized process

8. Guard the standardized process

Sometimes creating awareness and purpose is not enough. There are still some people that do not adapt to the changed way of working. It is important to guard the process, to be sure that everyone works the same way and people do not go back to the old way. This is done by keeping an eye on how people work, and actively give feedback. According to the expert interviews this is done by giving the process owner authority to address employees on their 'bad' behaviour.

Input:	**Activity:**	**Output:**
• Employees • Process owner(s)	• Monitor employees • Guard processes	• All employees continue working with the standardized process