HOW TO CREATE SIMPLE INTERACTIVE DISTANCE COURSES: AN EXAMPLE IN LEAN MANUFACTURING

Training by doing and training on the go as effective approaches to lean manufacturing

ENGLISH

INDEX

1.
Digital-learning: from a good educational project to a strong e-learning product

This short introduction aims to give you a quick and practical guide of how to plan ahead for your online course. It aims to provide you with a few important guidelines to help you build an effective course.
We will commence with a model, which teaches general planning, and at each step you will be given a few practical tips specific to e-learning courses. An approach like the following can be applied to a single course or to a whole educational project, such as for the project that this manual makes up part of. The learning model we will look into is the ADDIE Model.
ADDIE is an acronym and stands for Analysis, Design, Development, Implementation and Evaluation.

ANALYSIS

In the analytic part, the course in general should be evaluated the target, the implementation, environment and timing should all be elements at the forefront of your considerations.
Start by asking yourself:
Which needs we need to address on this course?
Who is my audience? Who are my possible students? What are their levels of expertise, role, motivation and preparation?
In **e-learning**, it is important to be aware of the right tools that are available out there in the marketplace! They need to be chosen with the following things in mind: scalability, affordability, availability and time that our users have on their hands.
Some of these questions are part of the initial analysis; others will accompany you all the way to implementation and evaluation stages.
Focusing on **time and situations**: Are they students or managers? Are they required to follow this class or is this an optional activity? How many hours can you realistically expect from them? Where will your course be used? At home or in class? During working hours or spare time? Will students be in contact with each other or isolated? Do you want them to be in contact or isolated?
Thinking about **scalability**: will the tool and the activity need your supervision? If so, how many students can you assist? What happens if you want to distribute the course to more students or more teachers? Will it be easy for another tutor to teach that hasn't created the course her/himself?
Availability: will you use a widespread technology or will you need users to have modern computers and fast Internet access?
Budget: What's your budget? E-learning tools can vary quite widely in cost and your budget is a key element in some cases. Consider the cost of the license that you're going to need and evaluate it carefully if you plan to distribute the course to other teachers or institutions that will have to buy licenses too.

DESIGN

Setup objectives to try and make them practical, clear, solid, operative and realistic. Pick a learning tool that allows your target to remember, understand, use and analyze your topic connecting it with others. They should also be able to create something themselves, based on what they've learned and evaluate choices and decisions in that specific field.
Once you have clear objectives and tools, start to create your course with a modular approach. Break it up into smaller parts with some form of content autonomy but remember, it must have a coherent and evident logical connection to the whole course.

DEVELOPMENT

Here we go from creating a draft version through to testing it and elaborating the final product.
Since e-learning is a product that relies heavily on visual aspects, it's useful to draw up a storyboard and take a few notes on the content. If you're going to make a voice over recording, then it is maybe good ideas to pre-prepare some notes beforehand or write down some key words to help you, or you could even prepare a proper script.
If you choose to have a script, it is better not to read it literally during the final recording or you will risk creating a very flat sounding and un-captivating lesson.

IMPLEMENTATION AND DISTRIBUTION

Here we have an important step of e-learning. How is your content is going to be delivered? Will it reach students through the internet? Will it have its own player that needs to be downloaded or will it be browser-based? Will it work with all browsers? Is it going to be a free-access course or will you need to distribute credentials? How will you track progress and results?

EVALUATION

Have we reached our goals? Have we been effective? We need to measure through metrics and at the same time ask for feedback. We need to decide which tools to use to measure our results thus being able to evaluate both the satisfaction levels and the effectiveness of our product.

2.
A practical guide to Office Mix

1. Before starting

It's important to keep in mind, when reading this manual, that Office Mix is a Free Customer Preview (also known as Beta). It is new software, which you must bear in mind is still under a lot of development. Buttons, features, shortcuts and other elements may appear and disappear during and after updates. Core utilities like recording tools, quizzes and publishing options or the software should get better and more solid at each new release.

FOR IT EXPERTS · OFFICIAL DEDICATED PAGE

If you are an IT expert and/or you are responsible for the software deployment inside your organization you can refer to **https://mix.office.com/compass/en-us/ITInstall** for advanced instructions concerning Cmd usage, firewall and proxy settings.

FURTHER (OFFICIAL) READINGS

If you want to see which are the already known issues, which ideas are being proposed, evaluated and developed and read other articles about Office Mix you can visit the following page: **https://officemix.uservoice.com/knowledgebase**

2. An Introduction

Office Mix is an Add-in for Microsoft Power Point. In e-learning jargon, we say that it has a "ribbon approach" because it's not developed as a stand-alone application but it adds a ribbon, a label in the main menu of PowerPoint. Other software like Adobe Presenter, Articulate Studio or iSpring use the ribbon approach because they helps users in the transition from a traditional power-point presentation to an e-learning course. A user who has experience with Power Point doesn't then need to learn new software, just some new features inside the same environment.
As the website says, Office Mix allows you to transform your PowerPoint slides into an eLearning course with quizzes and recordings of your video, audio or screen. It allows you to deliver courses to desktops and tablets and to track learner performance with an online analytics system. Paired with a company account or organization, Office mix represents a powerful learning tool.
Office Mix has no additional costs beyond the regular one of an Office License.

Terminology:
- Ribbon or tab – A set of tools like "Home", "Insert", "Layout", "View" or "Mix" itself. It is the main menu of the modern Office Suite.

- Group – A set of functions grouped by themes under a ribbon. A single ribbon or tab can host several groups of tools.
- Contextual-ribbon or contextual-tab – One or more tabs that appear when a specific type of item or media is selected. They show up in the far right of the ribbon list at the top of the screen. E.g. The Format or Playback ribbon displayed when a Video or Audio is selected.

3. Installation requirements
- **A Windows operating system.**
  Office Mix doesn't work on Mac, Android, Windows Phone.
- **Microsoft PowerPoint 2013, version SP1 or later.**
- **A Microsoft account (private, school or business), a Facebook or a Google account.**
- **Administrative privileges to install and update.**
  Office Mix installation is per-machine: once installed, Office Mix is available for all users on the machine.

Installing Office Mix only requires a few minutes. The first and most important thing to do to avoid any problems during the process of installation is to close PowerPoint if it is open.

Visit **https://mix.office.com/** and click on the button "Get Office Mix".
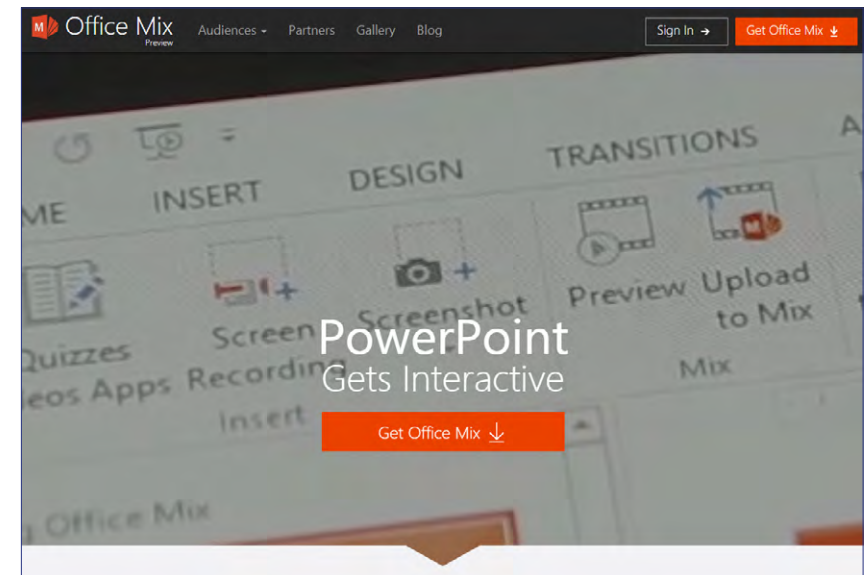
You'll be asked to Sign-in to download the software; to do this you can use a Microsoft account (private, business, school), a Facebook or a Google Account. Once Logged-in you'll be prompted with a download window right-away. OfficeMix.Setup is a lightweight executable file of only few MB (6-7) so it should take few seconds.
Once downloaded, click on the file and initiate the installation process.
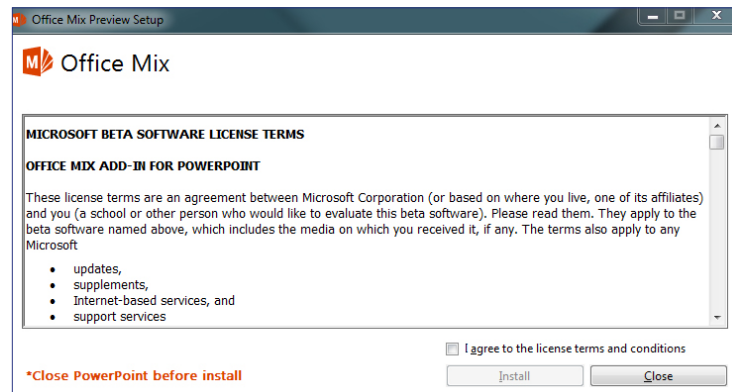
First of all, you'll need to **close any PowerPoint instances** open and accept the Terms and Conditions before clicking "Install". Once the process has begun you only have to wait few minutes and the Add-in will be installed. Close the Installation window and proceed to PowerPoint (it may have already been started by the installer).

4. Office Mix Welcome Screen
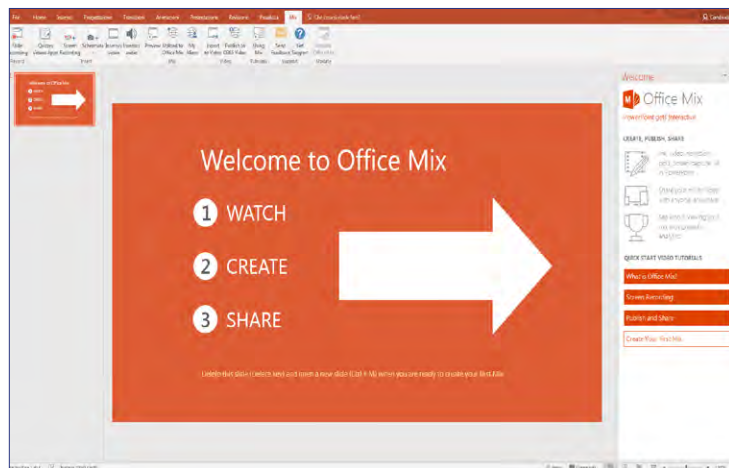
When you open PowerPoint for the first time after the installation process you will be greeted with a welcome slide which points out a new panel on the right which in turn introduces the features of the software, three video tutorials and the possibility to jump right into the creation of a Mix.
If we look up on the panel we have a new ribbon called "Mix" on the right side of the panel. It should be the last of the standard labels. Under the ribbon you will see a drawer with the new set of tools provided by Office Mix.
We'll come back to those buttons later, right now it is important to notice the "Using Mix" button.
On clicking it, it's possible to hide or show the right panel with the tutorial about Office Mix.

5. How to approach a Mix

Before diving into the core functions of Office Mix, the "recording studio", we'll have a look around the new drawer we've just installed.
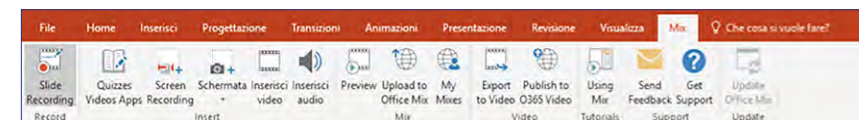
The tools available to us are:

- **Record**
  Slide recording

- **Insert**
  Quizzes Videos Apps
  Screen Recording
  Screenshot
  Insert video
  Insert audio

- **Mix**
  Preview
  Upload to Mix
  My Mixes

- **Video**
  Export to video
  Publish on O365 Video

5.1 The "insert" group

QUIZZES/VIDEOS/ APPS

Along with the "recording studio", this section is most certainly one of the most interesting. It opens up a repository of learning tools like, as the name suggests, quizzes, videos and apps in general.
For the purpose of this manual, we will only cover the installation process and a few applications, specifically: Free Response Quiz, Multiple Choice Quiz, True or False Quiz. Assuming you are already familiar with these tools in other contexts, we will just cover the setup to show you couple of examples.
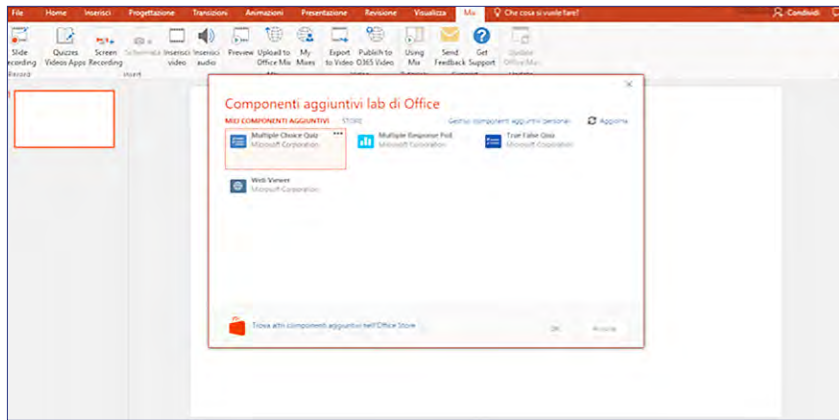
Once the add-ons window is open, you will be shown the app you've already installed or an empty label, in the case of a new installation. Hit the "Store" button to access the online repository of apps, select the app you want to install.
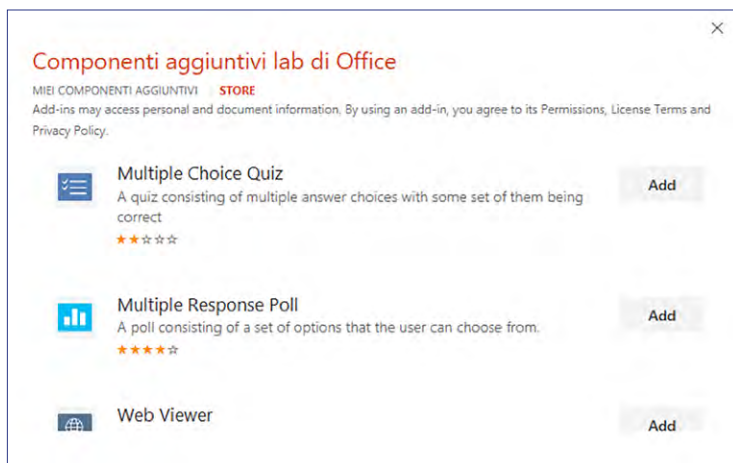
Fig. 06 Add-on store

The user interface of the store has changed over the last few months. From a category-based navigation and a few clicks of a Privacy Policy, Terms of Service and installation, we now have a straightforward list of apps and a simple "Add" button that embeds the element right away. This just demonstrates that the app is forever evolving, so expect some differences between this manual and what you will see on your screen.
Every app has a back-end and a front-end.
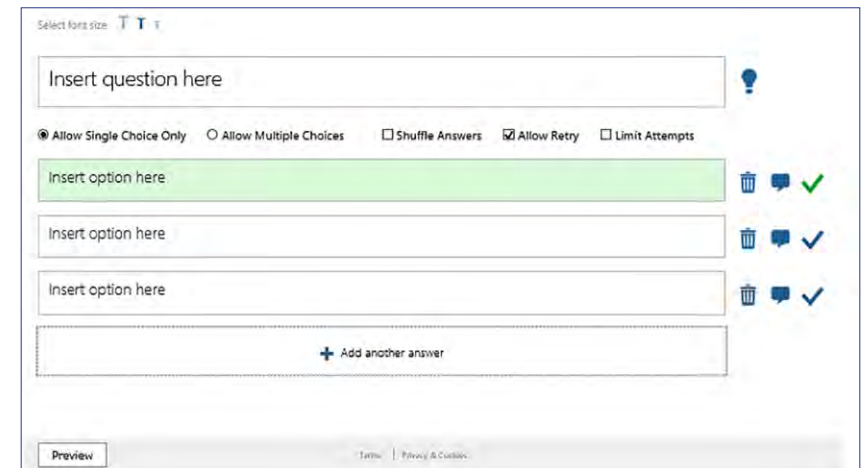
Back-end
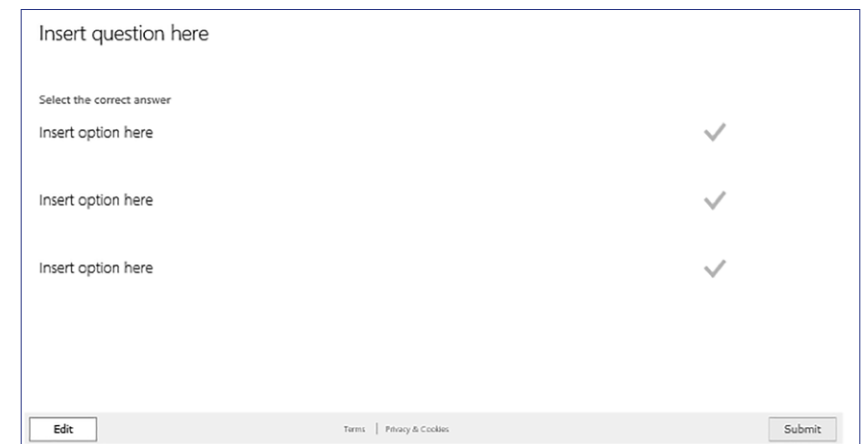
Front-end

In the back-end, speaking specifically of a quiz app, you can choose the question and, in the case of a multiple-choice quiz, you can see the answers below.

By clicking on "preview" you can see what the students will see.
These pieces of software are written in such a way that they communicate with the Office Mix platform when they are uploaded; this means that you will find the student's answers and results later when you check your mix online.

SCREEN RECORDING

This function gives a hint of what the Office Mix studio-mode can do. Clicking this button will hide the Office Mix window and show you the other windows on your computer. In this view, you can decide which part of the screen to make a recording of, if there is audio or only video and then you can start recording. When you are done recording, move your mouse to the top of the screen or use the keyboard shortcut displayed at the beginning of the recording. The video will then be processed and embedded with a start & stop player on your slide. The options for this video are the same that Power Point offers for any every other video and can be managed from the two dedicated Ribbons and the far right of the ribbon list "Format" and "Playback".
This screen recording option is, as a matter of fact, the same that can be found in "Insert">Screen recording.

INSERT AUDIO

Similar to the previous one, the "Insert audio" function enables us to import an audio file into our Office Mix course. Whereas for the video, we have all the options that PowerPoint usually offers for Audio in the two dedicated ribbons "Format" and "Playback".
For both audio and video, in the "Playback" ribbon we can see, simple editing tools at our disposition that are aimed at trimming multimedia products.

SCREEN SHOT CAPTURE TOOL

Lastly, it is possible to use the screen shot capture tool to grab content of a window on your computer. Clicking on the button you will be asked if you want to just grab a window from a list of thumbnails or crop a precise part of the window in the foreground.

5.2 Slide Recording

The first item on the Ribbon menu, Slide recording is maybe one of the most prominent features of Office Mix. Clicking on it triggers studio-mode and offers a view of PowerPoint that feels almost like being in a totally difference piece of software.
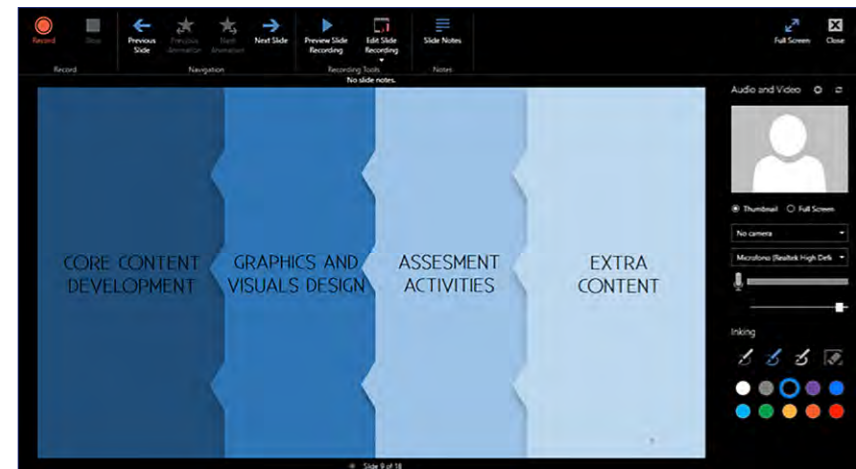
THE INTERFACE

At the top of the screen we can start and stop the recording, move to the next or the previous slide (or animation), preview the recording, edit the recording and show/hide slide notes.
On the right we have options and controls regarding "Audio and Video". We can check if our webcam and microphone are working correctly, pick a specific device and decide if our image will be a small window at the corner of the screen or in a full screen view.
Besides the "Audio and Video", panel we have the "Inking" panel. If you have a graphic tablet available, this really is an interesting tool because it allows you to underline and take notes during the live recording, focusing the attention of your students to certain particular elements of your slide. With the majority of graphic tablets, you'll need a bit of practice, since you don't see your slide on the tablet itself but you need to coordinate your hand on the device with what you see on the screen.

RECORDING

When you and your slides are ready, you can hit "Record" and start talking and taking notes on the screen.
The top part of the screen will give you all the controls you need to talk through slides and animations and stop and restart when needed. The video edit button will take you back to PowerPoint to a simple tool for shortening the video.
Once you're done with the recording, you can preview your Mix here. You may be asking, why here? The reason is, in the standard PowerPoint view, you will only see the audio output.

The recordings are automatically exported to your PowerPoint so you can just hit the X to close the studio-mode and go back to the main PP View.

FEW TIPS

A few tips about using this tool:
- **Use an external microphone. Not only for the poor hardware quality of the computer microphone but also because the microphone could be too far (nearby the webcam) far from the speaker or too close to the ventilation system.**
- **Use an external webcam. If you plan to record yourself speaking then it is a good idea to have a good quality image too.**
- **Set-up good lighting. Try to have good lighting of yourself speaking, do not speak with a strong light from behind (like a window) as it blinds the viewer and creates a strange aura around you.**
- **Check the video and audio before recording to avoid doing the same lesson twice.**
- **Wait 2 seconds before you start recording, so that you avoid your voice being cut due to a recording delay.**
- **Segment your content for an easier re-recording. If something goes wrong (an interruption or a slip of the tongue) it'll be faster to repeat and you won't have to start over from the beginning.**
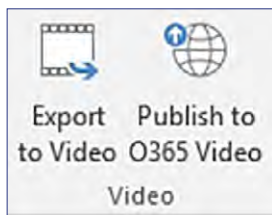- **Choose a quiet environment. Always try to avoid a room where a phone may ring or a colleague could interrupt you, loud noises can be heard in the background (cars passing by) and could ruin the audio.**
- **If you plan to use the writing tools, use a graphic tablet, it is the only way to produce a good and professional result.**

5.3 "Video" category

Before getting to the "online" part of Office Mix let's see the video group of tools. These two items let you convert your whole work into a video (MP4 format) and save it locally or upload it to your Office365 channel to share it. Obviously the conversion will turn your presentation into a simple video with no "Next" or "Previous" slide capability nor quizzes.

5.4 The "Mix" category

Skipping the "Preview" function that we've already covered in the previous chapter, we go straight to the Upload to Office Mix.

UPLOADING TO MIX

Once your Mix is ready you can head to the "Upload to Office Mix" button which will open up a panel on the right.
Here you will be asked to sign-in with one of the popular services like Microsoft itself, Facebook or Google.
Once you are signed-in you can choose to upload a new Mix or update an existing one. At this step, you can allow the creation of a video version of your course that will allow mobile devices to view the course.
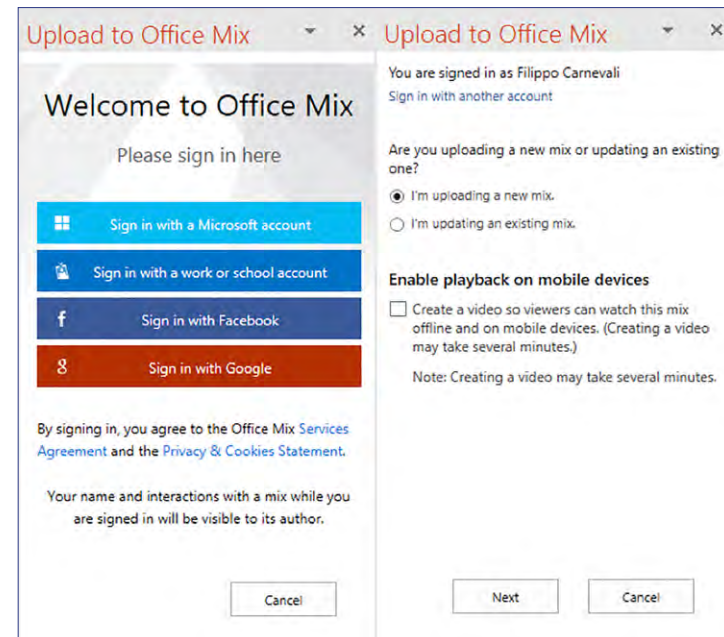
After clicking on "next", Office Mix will start the process of uploading and encoding your PowerPoint to a Mix product available online.
The duration of the process may vary depending on the dimension of the Mix you've created and if you've asked for the video version for mobile devices.
Please try to remember that every time you edit your Mix offline on your computer, you'll need to upload-it again selecting the option "Update an existing Mix".

6. Office Mix – The online platform

6.1 Main view

Once you've uploaded your course, you can head straight to the page "My mixes". Here you'll find a list of the uploaded mixes and a menu relative to each one of them.
From this general view you can visit the following pages:
Details – Where you can actually edit Mix details, viewing permission, tags, etc.
Analytics – Where you'll find data about users, slides and assessment activities
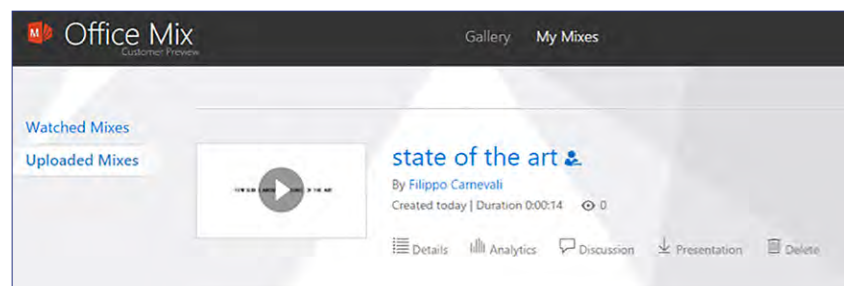Discussion – To see comments about your Mix
Delete – To delete your Mix.

6.2 Mix details

In this section, you can edit all metadatas of your course: title, description, categories and tabs but most importantly, you can act on Permission & Sharing, maybe the most important setting of your mix once online.
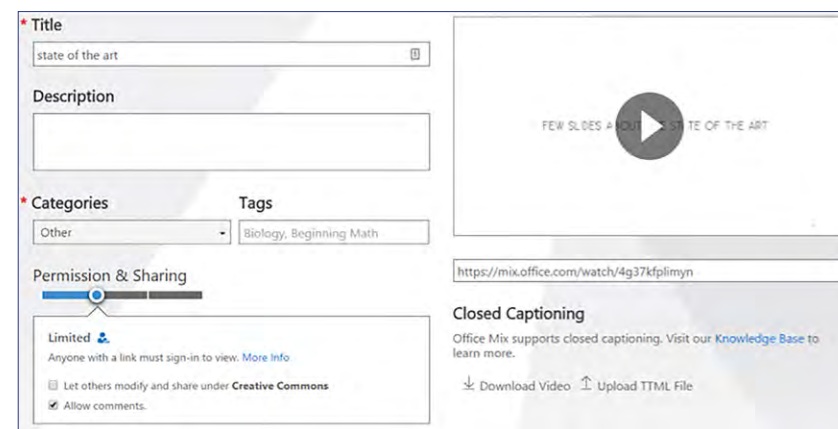
PERMISSION

The status bar of Permission & Sharing can have four positions: Private, Limited, Unlisted, Public. Let's now look into each of these options.

Private sharing
Only you can see this Mix. You can use this option if your Mix is a draft or you need to keep it hidden till a specific time and maybe hide it again after a period of time.

Limited sharing
You can distribute a link to this Mix and those who receive the link have to Sign-in to view the course.
This is a good solution to see who is participating on your course and what they are doing, although sometimes it may be difficult to see who is online if participants names and account names are different i.e. your student, John Smith may have an email account like macbeth06@outlook.com so you may need to check on account names and identities to understand who is doing what.
If you have a Microsoft account linked to your business, school or University, you can actually select to allow login only to your organization. This is actually the ideal scenario to know who's doing what on your course.

Unlisted sharing
Login is not required but the Mix is still not indexed in the Mix public gallery or search engines.

Public
Everyone can find and see your Mix via search engine and on the Gallery.
All these sharing options allow you to specify if your Mix is released under a Creative Commons License.

6.3 Analytics

Now your Mix is live and it is time to see how your students are doing.

Head to the "Analytics" page and check out the stats. Data is updated every 6-8 minutes and can be exported to Microsoft Excel.

Office Mix offers you three different views: by slide, user or activity. Each tab has a calendar and a course version filter.

By selecting each of those, you can view stats for every single slide such as: number of visitors, views, and average time spent and slide duration.

Users view gives you an insight into the progress of single visitors, telling you which percentage of the presentation has been completed.

The last one is a report about results on your Quizzes, Apps., views, time spent and answers.

In the upper right hand corner of the screen, you can check the last time the stats where updated, this way you know how recent they are and can update them accordingly.

7. Other E-learning software

Office Mix is one of many e-learning solutions on the market. It is a good product for school and businesses that often already have Microsoft licenses because it is basically free. The online platform allows the distribution of courses effortlessly to Computers and Tablets and even to (without quiz format options) mobile devices.

That said, you might be in need of more sophisticated solutions with more interactive activities or complex navigation. Here you can find a short list of other e-learning products.

Moodle: A completely different approach to Office Mix. It is a platform, which supports cooperative learning with tutoring activities by the teacher. Free, Open-source but requires technical guidance. It has a mobile app and can be used on a tablet.

Articulate Storyline and **Lectora** are e-learning software game-oriented. They have a wide variety of features and require a little bit of study and an extra budget.

Adobe Captivate is a similar product yet is whole different and new software with a steep learning curve.

Adobe Presenter, **iSpring** and **Articulate** offer a ribbon approach like Office Mix and since they have been long time players in this field, they offer more features, yet at higher cost. All of them have output compatible with tablets.

Adapt Learning is a new player and has a technical approach. It is still under heavy development and like Moodle aims to 'an in-browser experience'. It may or may not be the future; it really is just too soon to say.

3.
Office Mix
course
preparation

INTRODUCTION

Before you are ready to use Office Mix, you already spent a lot of time making all kind of preparations. These preparations can take more than 80% of the total time to make the course! Here's an overview.

POWERPOINT PRESENTATION

You start from an existing PowerPoint presentation you use today during your lectures or you have to create a new one. If you want to end up with an attractive Office Mix course, you should think in advance about using only a few words per slide together with clarifying pictures and diagrams and enlightening animations.

POINTER

You have to think about a replacement of the pointer you use during your lectures. When using a PowerPoint presentation during lectures, you point to the projection screen to focus the attention of your audience on certain words or parts of a picture or diagram. In Office Mix, live pointing is impossible so you have to replace it with something else. Therefore, you can:

Highlight words or parts of a picture or diagram
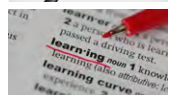
Underline words

Use a picture of a finger pointer

Use the inking feature of Office Mix

SLIDE NOTES

In order to make your Office Mix course very clear, you have to think in advance about the right words to formulate the ideas you want to express. So, in order to prepare slide recording you can do one of following alternatives:

1. **Write down in full text what you want to say when showing a slide. It is recommended that you write this text underneath each slide in the slide notes box. When doing so, your slide notes can be displayed on your screen during recording. It is a good idea to use in this text a prominent mark (like e.g. /////) to remember yourself that you have to click on the**

'next animation' button.
   a. Advantage: you can try to find in advance the best words to explain the topic clearly.
   b. Disadvantage: it takes a lot of time to do so.

2. **Only write down some keywords.**
   a. Advantage: it is less time consuming and narration will sound more natural.
   b. Disadvantage: since you may not always find the best words to explain something, you may need more time to explain it clearly.

3. **Don't write any slide notes in advance**
   a. Advantage: it doesn't take time at all.
   b. Disadvantage: if you miss some eloquence, the narration may end up in a mess!

PICTURES

Maybe, you want to illustrate your course with pictures you found on the internet or elsewhere. For educational use only, you can use pictures you copied from the internet without authorisation, provided that you refer to the site where you found it. So, when you collect the pictures you want to use, you should also save the link to the website where you found them.

QUIZ QUESTIONS

Quiz questions allow the student to test his/her knowledge about the subject. If you write down the questions, the alternative answer choices, the feedback and the hints in advance, then it is only a matter of copy and paste to include them in Office Mix.

- **Before making quiz questions, you should have a look at the aims of your course. You should create questions concerning the main learning points of the course.**

- **If there are known pitfalls about the course topic, you can formulate quiz questions based on these known pitfalls.**

- **Another group of questions should test whether the student is able to implement the learning points in his/her job or company.**

- **Everybody learns from feedback. So, it is important to write feedback for every possible answer.**

4.
Practical example of a distance course created with Office Mix

This part of the manual shows a practical example of an Office Mix distance course realized in the field of Lean Manufacturing. The course, prepared by Prof. Ignace Martens (KU Leuven Technologiecampus Gent) during the LEAN project, regards the "5S" which is a specific method of Lean Thinking, but it can be useful as example, nothwithstading the specific topic, to understand better how a distance course in Office Mix can look like once it's finished. The following images show the course both in the visual part and in the script prepared for voice recording: have a look, be inspired and then...try!

Other examples are available in the LEAN project website:
http://erasmus-lean.eu/

5S is a systematic method to rearrange a workplace step by step, making it more pleasant, safer and more efficient.
/// 'Systematic' means that we consistently apply a system, namely the completion of 5 consecutive steps.
/// 'Reorganise' indicates that the actions to be taken are actually quite simple: 5S is not rocket science and you do not need any advanced mathematics.
/// 'More pleasant' refers to neatness, structure and visual indications.
/// The workplace also becomes 'Safer' because the 5S method reduces the risk of stumbling and slipping and reduces injuries.
/// And work efficiency increases because the 5S method results in less time loss, lower costs and better product quality.

Welcome to this course on the 5S method. My name is Ignace Martens. At the end of this course you should be able to apply this method successfully in your own environment.
/// You can download this course to your computer, tablet or smartphone as /// mp4 file to use offline /// or you can download this course as Office Mix course from a Microsoft server to preserve all interactivity.

Often, after the course of time, you will encounter the following situation on the production floor:
An order arrives in a dirty disordered workstation and /// has to wait until the workstation is ready to perform an operation.
/// It is difficult for the workers to make a high quality product in such a dirty environment.
/// Unnecessary machines, installations, supplies and waste lying around, obstruct the product flow.
/// For employees, this is not a pleasant work environment.
/// And when potential customers come to the workplace, you may expect, deterred by what they see, they will not place an order.

/// Once I have explained the 5S method in essence, /// I'll show you some situations where the 5S method can be used to achieve improvement.
/// Then, in paragraph 4, we start a discussion of the 5 consecutive steps of this method.
/// To convince you of the usefulness of this relatively simple method, I put in paragraph 5 all the advantages of this method in a nutshell.
/// Although it is not difficult to learn the 5S method, yet the implementation requires some attention.
/// As an illustration, in a second part of this 5S course, the method is applied to a nursing cart.
/// And when you finally understand the method, you should definitely be able to correctly answer the quiz questions.

Often, the warehouse of the maintenance department is one of the last places where 5S is applied, and then you may encounter following situation, for example:
/// Tools necessary to a workstation are hard to find, so workers are losing valuable time.
/// The storage of spare parts and tools is not logically structured and labeled.
/// Tools are dirty and they thereby pollute the machine and the product.
/// Tool sets are incomplete. The parts are scattered or lost. Tools are unlogically grouped. The tools needed for a particular job are spread out instead of together.
/// The floor is littered with not stowed appliances, tools, stockpiles and waste and these things take up valuable space.

In an efficient office, any document can be found within 30s. /// But that's often not the case:
We often keep documents /// which became meanwhile irrelevant: reports from meetings long ago, announcements of past events, old versions of documents, advertisements, dated catalogs, old software manuals, ... often documents which are also available digitally. /// If there also is no visual and clear system used to classify documents, finding a document will be very difficult.
And finally: /// how should this office be cleaned?

The 5S method shows us that a situation of lasting order and cleanliness in a workplace can be achieved by going through five successive steps. Each of these steps is characterised by a verb that starts with the letter S.
/// First, we remove from a workstation everything that's not required at that workstation.
/// Then we give everything on the workstation a fixed place.
/// We clean the entire workstation.
/// and we set standards for the correct and periodic application of the first 3 steps
/// Finally, management must ensure that this improvement process is continued and the results achieved are guaranteed.
/// We now go deeper into each of these 5 steps.

The first step is called 'Sort'. How do you do this? Well, go to a workstation and ask the workers what is absolutely necessary on that workstation. Only keep on the workstation what's necessary and remove the rest.
The more frequent the workstation needs it, the closer to the operator it has to get a place and the faster it needs to be deployed.
 /// For this reason, place frequently used items (e.g. tools, commodities, documents, etc.) within reach, ready to use and grab.
 /// Whatever you occasionally need, keep it in a cabinet or on a shelf on the workstation.
 /// Rarely used items are best kept in a (central) warehouse. From all that you want to remove from the workplace, you have to ask if it still has any value for the company.
/// Bring valuable items to a central collection point, a red tag area, where these items are labeled and recorded in a database. For personal items, you should provide lockers at the entrance of the company.
/// What has no value, it is discarded as rubbish. Should it still has value for another company, you may sell or donate it. This avoids the cost of disposing of it as waste.

De reorganisatie van nodige items kan er bijvoorbeeld als volgt uitzien:
/// Frequent te gebruiken items binnen handbereik.
/// Af en toe te gebruiken items in een kast of rek.
/// Zelden benodigde items in een meer centraal magazijn.

For example, the reorganization of necessary items may look like this:
/// Frequently used items at your fingertips.
/// Items to be used in a cabinet or rack.
/// Rarely needed items in a more central warehouse.

The reorganization of necessary items might look as follows:
/// Frequent use items within reach.
/// Sometimes right to use items in a cabinet or rack.
/// rarely necessary items in a more central warehouse.

/// Here's an example of a red tag area.
The rack includes parts, tools, appliances coming from workstations where they were ever needed or where they were left for example by the maintenance team.
Provide these items /// with a red tag, a red label, and list them /// in the red tag area logbook or, more preferably, in a digital intranet version of it. As a result, these items are visible and available to other workstations. Therefore, a workstation that needs an additional tool will first check if the item is available in the red tag area before placing an order.
Although a red tag area is very useful, is it better to avoid leaving an item in a workstation where it is no longer needed. /// You should therefore look for the cause and derive preventive measures from it!

/// Items with no value are discarded as rubbish. In practice, it mainly concerns
/// packaging material: usually paper, cardboard, plastic foil, wood, and other materials
/// but also production waste such as chips (in metalworking), wood carvings (in a sawmill), and other waste streams.
/// further rejected products that do not meet the promised specifications.
/// and obsolete stock: this is stock that can not be sold anymore because it's out of date.

Once you have decided what should remain on the workstation, the next step is to assign a fixed place to each of those items. How you do this follows from following reasoning:
/// Suppose you decide that this is the best place where the oil barrel should stand.
/// If the oil barrel is not there, almost nobody knows that something is gone and when the oil barrel is returned it is not clear where to put it.
/// To do something about it, you can mark the considered place with lines on the floor.
/// If the oil barrel is not there, everyone sees that something is gone, but not everyone knows exactly what's gone.
/// This can be solved by putting a label next to the floor markings.
/// When the oil barrel is not there, everybody knows that that place is the fixed place of the oil barrel and whoever returns the oil barrel knows exactly where to put it.
So we can conclude that it must be visually apparent for any item where it can be found and also where it should be put back.

To visualise the fixed location of tools, a shadow board is often used. A shadow board is a (usually) wooden plate with hooks to support hanging tools. Behind the tool, the shadow of the tool is drawn, painted or glued to the plate. A shadow board should hang on a very visible location. Before employees start their shift, they can see at a glance whether their tool sets are complete. And if something is missing, they know immediately what is missing.

/// In drawers, a plastic, rubber or wooden plate is used to cut out the shape of the tools. Cutouts for fingers simplify grasping and indicate how the tool is best gripped.

Try to group similar things or tools that you need for a particular activity so that you don't have to search for them in different places. And, if in step 1 you didn't discover that some tools were missing, you will certainly see it now.
So, make use of this opportunity to complete the sets of tools now.

It is also important that frequently used tools can be taken easily and quickly. Don't put such tools in a drawer or cabinet and make sure that the movement to grab them is as easy as possible and that you can use each tool immediately after grabbing. This is called the "One Touch, One Motion" principle. /// To grab this hammer, you have to turn your wrist 180 ° counter-clockwise. To use the hammer, you should turn your wrist180 degrees clockwise after grasping. These are avoidable movements!

Often, every department or team has its own tools. To know which tool belongs to which group, you can mark the tool with coloured tape. In the example of this picture, a combination of blue and yellow tape is used.
If during work /// documentation must be consulted, it is important that you have the documentation available at the place where you expect to find it. Therefore, you can use the following system: Put your entire collection of documentation in the desired order on a shelf. Stick a striking coloured tape from the top left to the bottom right over the heads of the books and cut that tape between the books and the covers. The tape that sticks on the heads will make you clear
That a book or cover was put in reverse,
That a book or cover is missing,
And will also make you clear where to return a book after use.

If all necessary items on the workstation have been given a well-considered fixed place, we can further improve by thoroughly cleaning the entire workplace, including the tools and equipment. Cleaning has several advantages:
/// When equipment is clean, work becomes more enjoyable for operators /// and more attractive to potential customers and other visitors,
/// Removing spilled corrosive products, greases and oils also makes the workplace safer.
/// Clearing the floor creates more space for the operators.
/// During cleaning, defects such as e.g. oil leaks are detected, which makes it possible to repair the equipment quickly by renewing seals, for example.
/// If a next order arrives on a clean workstation, operators don't have to clean the machine first but they can start the operation immediately.
For all these reasons, cleaning must be built into the fixed routine of all employees.

To avoid that operators would postpone or skip cleaning, you can arrange the cleaning material so that it takes little effort to clean. /// Therefore, provide cleaning material at the place where pollution occurs. Hang it to visibly disposed shadow boards and /// organize the warehouse of the cleaning products according to the 5S principles so that everything is quickly retrieved, and the stock of cleaning products is replenished in time.

/// Cleaning is checking. During cleaning of workstation and its equipment, flaws and defects come to light which can then be repaired immediately. Some examples:
/// Loose floor tiles
/// Leaking faucets
/// Unreadable labels. Consider laminating labels to make them more durable and washable
/// Damage to equipment and products
/// Clogged plumbing
/// Torn, cracked or scratched items
And there are certainly other examples to consider.

Make cleaning more efficient by /// making equipment movable , where possible (work tables, appliances, racks and cabinets on wheels) to make it easier to clean. The cabinet in the picture also has the advantage that it can be closed in the evening or in case of absence so that its contents remain dust-free.
/// Removing mixed waste is expensive and sorting waste is time consuming and therefore also expensive. Waste containers by type of waste have the advantage that you have to manipulate each piece of waste only once and that it can be removed at a lower cost.
It is important to tackle pollution at the source so put trash cans in places where waste is generated and provide extraction systems, or better yet, avoid the creation of waste by choosing efficient processes.

/// If there are computers in the workplace, you should clean the keyboard regularly and expect from your employees that they never eat in front of their computer. Food residues are also food for the bacteria on and in the keyboard.
/// Avoid overheating the processor: don't block the vents during operation and clean the vents and the cooling vins at least once a year.
/// Also regularly clean the lighting fixtures. Dirty fixtures deliver lower light output.

Save time /// by covering difficult to clean things that you do not constantly need. If you have to clean your machines regularly, such as e.g. textile machines, you can apply this principle to parts in the machine. For this purpose, you can use foreclosures or capped bearings.

Make instructions and procedures workers have to follow to maintain order and cleanliness in the workplace. Only if there are standard procedures, a deviation for those agreed procedures can be considered undesirable.
/ / Also make employees aware that cleaning is part of their job. Therefore, you can use e.g. posters.

Employees performing the same task at different workstations, such as the measurement of currents and voltages, should be able to work at each of those workstations /// with the same tools and each workstation must be configured in the same way. Then, they can immediately start working at any workstation.
I give another situation every car driver will recognise . /// When you travel by car, you do not have to waste your time reading a fuel pump manual in a gas station because all fuel pumps are standardised. They all work the same way.

Also set job descriptions for all tasks in a workplace and add expectations concerning 5S.

A standardized workstation may then for example look as follows:
/// The 'correct' working method has been written out in a job instruction sheet with pictures and drawings and with a minimum of text. The sheet is laminated so that it is wash-able and lasts longer. It hangs on the machine at a place where it is readable to the operator. The job description provides time for performing the first three steps. As a result, the attention to 5S becomes a routine and avoids the return of workers and executives into their old habits.
/// Tools needed during production or when setting up the machine are hanging on the machine and are easy to grab. The set is complete, clean and in good condition. The shadow of the tools is drawn and coloured on the machine.
/// Near the machine is a teamboard with checklists, procedures, maintenance planning, KPI's, measured results, analyses, suggestions for improvement and possibly other relevant information for the team. The board ensures that the team remains focused on its objectives and continues to improve.
/// Pallets must be dropped off by the forklift driver at a fixed place marked on the floor and labeled. This increases safety for the operators who work there and it is also a way to control inventory at the workstation in a visual way.
/// The transport equipment of the workstation is also assigned a fixed place marked on the floor. Whoever needs a carrier knows where to find it and who has used it, knows where to put it back. The colours with which zones are marked for paths, stocks, transport means, etc. are internal-ly agreed and also included in an internal standard.

Maintaining the 5S results is a management responsibility. Therefore, you can use a checklist during your tour around the workplace. Here you see the first part of a checklist that you can use to know which actions are still needed to further implement 5S. Of course you have to adjust this checklist to the concrete situation on the workfloor in your department. You should also further supplement the questions so that all 5S goals you want to implement are checked.

And this is the second part of the checklist.

As a result of your workplace tour (also called gemba walk), you will be able to determine which 5S steps each workstation has completed and what steps they still have to take. You can visualise this progress /// on a board. With this centrally located board, you keep an overview of the pro-gress of 5S implementation and you give a blow to teams /// such as workstation 3 where employees have made rapid progress with the implementation of 5S. On the other hand, employees /// from, for example, workstation 4 will be faced with the fact that everyone can see on the board that they are lagging behind with their 5S deployment. That will hopefully motivate them to do an extra effort. The direct boss of workstation 4 should now take on the task of coaching his team more intensively.

Many 5S evaluation systems are available on the internet. For each 5S step they generate a score or a qualitative appreciation for the result achieved in a workplace. However, we must not lose sight of the essence. The important thing is not the evaluation, but the feedback that allows us to improve further.

We can thus conclude, that the 5S method, although very simple, is very useful: it leads to some interesting results that can be achieved in the short term
/// Increased productivity, /// shorter set-up times and /// shorter throughput times thanks to an efficiently organised workplace,
/// Improved safety because the workplace is clean and tidy,
/// A lower inventory cost because inventory will not be lost somewhere,
/// A lower overhead cost because valuable floor space becomes available again,
/// Further, every worker, manager, clerk, visitor, customer or supplier gets a more positive image of the company and it will be easier to promote the company and its products to potential customers.
/// and the workers will experience the change as something positive because it makes their concrete work situation more pleasant.
The 5S method also offers an enormous opportunity: the method allows for an improvement in the short term, where employees experience the beneficial effect in their daily work. Management is looking forward to using this momentum to launch a further improvement project. The 5S method is therefore a common way of initiating a lean culture in an organisation.

Due to the simplicity of the 5S method, you are easily tempted to work out the 5 steps of this method independently in a workplace without the input of the employees of that workplace. In that case, your solution, how rationally justified it may be, will not be accepted by the workers and you will not be able to implement it. /// So, do not work alone, but involve the employees in the entire improvement process!
If you involve the /// employees from the beginning and throughout the entire improvement process
You will get a better solution that meets all the needs and wishes of the employees,
You will get more satisfied employees who are proud that they themselves have contributed to the improvements on their workstation,
Through the positive experience with the 5S method, these employees will be more motivated to actively participate in a next improvement project,
Finally, you create a learning organization in which the full potential of employees is engaged: not only their skills but also their ability to solve problems. This is also an important condition for establishing a Lean culture in the company!

/// Once I have explained the 5S method in essence, /// I'll show you some situations where the 5S method can be used to achieve improvement.
/// Then, in paragraph 4, we start a discussion of the 5 consecutive steps of this method.
/// To convince you of the usefulness of this relatively simple method, I put in paragraph 5 all the advantages of this method in a nutshell.
/// Although it is not difficult to learn the 5S method, yet the implementation requires some attention.
/// As an illustration, in a second part of this 5S course, the method is applied to a nursing cart.
/// And when you finally understand the method, you should definitely be able to correctly answer the quiz questions.

To get a result that looks professional, commercially, a lot of tools are offered, especially through e-shops:
Marker tape
Labels and label printers
Red tags
Sorting systems with boxes, trays and drawers
Laminating foil and laminate devices
Self-adhesive icons
Shadow boards
Document holders for the workstation
Whiteboards with magnetic strips, icons and smileys
5S posters
5S audit checklists
5S training material
And much more

All this in different sizes, shapes, materials and colours.

Good luck with the introduction of the 5S method at work and at home!
You can now proceed to the second part of this 5S course.

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