Texture-modified foods preparation techniques and equipment

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Goals of the lesson

The aim of this lesson is to learn about texture-modified foods preparation techniques and equipment

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Learning outcomes

- To choose the best cooking methods to achieve the necessary texture;
- To apply equipment for the production of modified food;
- To know new advanced food production methods.

(Source: https://www.istockphoto.com)

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Ice Breaker

Did you know that babies and toddlers usually reject textures difficult to manipulate such as slippery or sticky food?

(Source: https://www.istockphoto.com)

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Texture modified foods

- Texture-modified foods are culinary preparations that modify the characteristics of foods in order to make them safe, effective, nutritious and organoleptically and visually appealing to people with chewing and swallowing problems.
- They must meet five characteristics: safety, efficacy, nutritious, organoleptically adequate and attractive presentation.

The texture modified food should be as similar as possible to the original preparation.

Fig 1. Texture modified food (right) and conventional food (left).
Source: CADIS- ASPACE (Huesca)

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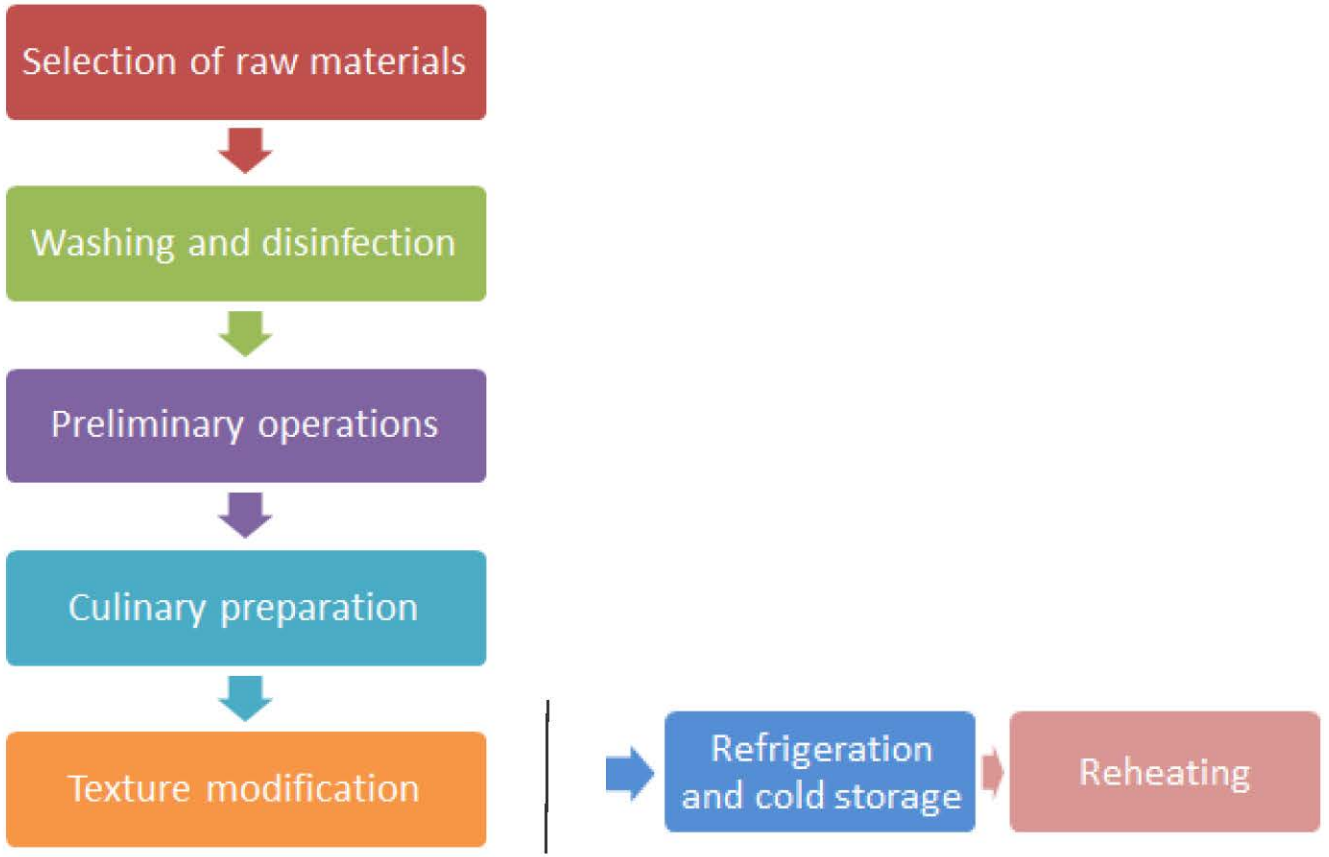
Texture modified foods_ Preparation procedure

It is necessary to establish protocols for the elaboration and adaptation of the texture of the different dishes. There is no standardized protocol, but the following stages are recommended:



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Texture modified foods

Selection of raw ingredients

Foods present a series of characteristics that determine their nutritional composition and behavior during culinary processes.

Foods should be chosen as fresh as possible and in an optimal state of maturation.

Selection of certain portions or cuts from food avoiding dangerous, hard or undesirable parts in meats, vegetables, fruits and legumes.

Selection of foods and parts with high nutritional value (Review Unit 3.1. for more information about nutrition and nutritive values of different ingredients).

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Texture modified foods

Washing and disinfection

This stage is especially important in the case of foods that are not going to be subjected to heat treatment.

See Unit 4.5. for more information about Food hygiene

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Texture modified foods

Handling _ Preliminary operations

Cleaning and sorting

Elimination of inedible or dangerous parts and selection of those to be subjected to further culinary processing.

Cutting

Reduction of the size of the food, which will condition the cooking conditions and the interactions of the food with the heating medium.

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Texture modified foods

Culinary preparation

Culinary techniques are procedures that involve heat treatment or other types of treatment, which allow their characteristics to be modified. It determines the texture of the food, but also the flavor, color, aroma and nutritional value.

Different techniques can be applied such as baking, braising, frying, sautéing or grilling, which can favor the appearance of crusts on the surface.

Stews, confit, steaming, papillote or vacuum cooking maintain the flavor and give rise to soft and smooth textures.

Boiling and poaching diminish flavor and aroma, but result in soft and tender textures.

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Texture modified foods

Texture modification

The reduction of the particle size of the elaborations is necessary when the characteristics obtained after the application of the culinary technique are not adequate to guarantee the safety and efficacy of the swallowing process.

The use of professional machines with high chopping and mixing power may be necessary.

During this process, the following aspects should be controlled:

- If addition of liquids is needed
- If addition of thickeners is needed
-Minimize the modification of the nutritive value, avoiding dilutions or increases in caloric density.
- Minimize the loss of organoleptic characteristics

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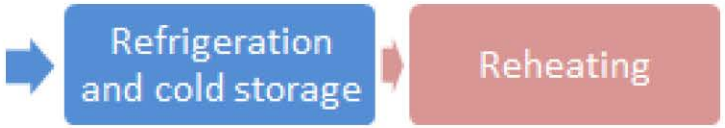
Texture modified foods

Refrigeration and cold storage

Temperature should be lowered using a blast chiller or cooler unit.
Cold storage should be at 5ºC

Reheating

Microwaves, stem ovens or ovens may be used to reheat the food



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Points for cooking (cooking adaptations)

- Many ingredients that are hard when raw become softer after cooking. They should be cut up across the grain, and cooked until they are sufficiently soft.
- Dry ingredients can have liquid or fat added to make them softer and smoother.
- Potatoes and eggs may have a binder added to soften them and make them hold together more easily.
- The savory taste of protein foods is drawn out when they are cooked at a low temperature for a long time, and this method also enables them to be cooked without excessive loss of water content.
- Raw vegetables are difficult to eat, and thus should be cooked. Salads should consist of steamed or dressed dishes.

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Preparation

Adding liquid: A too low water content makes food difficult to swallow, but when too high, it can cause choking.

The right amount of liquid should be added in preparing food so that it is soft and easily taken in.

Liquid should be added to chopped boiled green vegetables, and they should be boiled until soft.

For example, bread can be made into French toast, and steamed fish substituted for grilled fish.

Adding a binder: Make mince into meatballs (with added egg) or hamburgers.

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Preparation

Ways of cutting food: If the first one or two bites are difficult, rather than chopping food up finely, score it or make cuts at narrow intervals most of the way through. Thin foods are difficult to perceive in the mouth, so it is better to cut food to a thickness of 5–10 mm and cook it until soft. Check the direction in which the fibers run and cut them up across the grain, as this makes the cooked food easier to chew

Adding fat

Adding fat (salad oil, mayonnaise, butter, cream, oil, etc.) to food makes it smoother and easier to swallow. Generally speaking, fish or meat with a high fat content does not harden after cooking, and is easy to eat.

For example, mashed potatoes or sweet potato cakes should be served rather than steamed potatoes.

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Preparation

- When preparing meals with more than one component (e.g. meat, potatoes and carrots), purée the foods separately and arrange them on the plate separately. This means that the flavour and the colour of the individual foods are maintained much as they are in a normal meal.
- Foods and drinks thickened can be chilled, frozen and reheated. Many people find it easy to make batches of food they eat relatively often and freeze the extra portions for later use (if you freeze the food in ice cube trays, it allows easy control of portions as you need only defrost and reheat as many cubes as you need for each meal).
- Bread and other foods made with grain, such as biscuits and cakes, are a particular problem for patients with dysphagia. The granular structure of these foods means that they are extremely hard to swallow. Using soaking solutions can help you achieve a smooth texture with these foods.

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Bread In Texture Modifed Diets

- Gelled soaked breads and cakes are listed in the standards as suitable for Level 7 **Regular Easy To Chew**, Level 6 **Soft Bite-Sized** and Level 5 **Minced & Moist diets**.
- The bread sandwich recommendations are to use the soaked bread methods or gelled bread methods (using the Shape It product with soaked whole bread but also with bread processed into fine crumbs for safety). The method on the IDDSI website is to finely chop the bread, add an equal amount of water and margarine or butter; mix, making it into a shape and serving. This saves the worry that the soaking is not complete, as any thickening products used, thicken quite quickly, but can leave dry sections which are not soaked.
- Top with a finely chopped or blended egg/mayonnaise or tinned fish/tartare sauce, paté or cream/feta cheese mix. The fillings can be adjusted to suit the diet requirement. The combination of water and fat reduces the stickiness of the bread and improves bolus cohesion. It can be eaten with a fork or spoon unless served as a finger food.
- Always test for suitable textures having a focus on dryness and or stickiness.

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Choice of cooking methods and equipment

- Carefully consider the best cooking methods to achieve the necessary texture. For example, poaching or simmering will soften ingredients, making them easier to purée.
- You can add flavor by browning and roasting ingredients prior to poaching and simmering.
- The products can be heat-treated using conventional food production equipment: ovens, boiling pans or cookers, but specialized professional equipment is more suitable for this.

(Source: https://www.iddsi.org)

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Cooking Centers

- SelfCooking Center makes healthy cooking quick and easy.
- SelfCooking Center has been developed not only to simplify the cooking procedure, but also to cook items more healthily and with less wastage than conventional cooking appliances. For example, at the touch of a button, the SelfCooking Center cooks vegetables in an ideal 'climate', with exactly the right combination of wet and dry heat, to retain vital vitamins and nutrients as well as full flavour and colour.

(Source: http://www.publicityworks.biz)

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For preparation puréed dysphagia food

- A food processor and a blender are essential for the preparation of a dysphagia diet.
- The type of device used is determined by the type of ingredient and its quantity.
- A food processor is frequently used for chopping and other basic preparation.
- It may be used to grind ingredients with a low water content, or when preparing foods of a paste consistency.
- A blender is used to blend ingredients or foods with a high water content.
- A hand blender is a useful household implement for blending small amounts.
- It can also be used as a food processor by removing the blade and fitting it to the container that comes as part of the set.
- Hot food breaks down more easily than cold food. So where possible, purée when it is still hot (but not boiling). Check your blender is suitable for hot food first.

Leave your food processer running for longer – the purée will become smoother and thicker the longer it is blended.

(Source: https://www.iddsi.org)

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Professional equipment

The innovative equipment for hospital, clinic, elderly care facility, rehabilitation center, or nursing home can reduce labor time and increase patient satisfaction. The solutions for a perfect texture include immersion blenders, turbo-liquidisers, bowl cutters and combi appliances (vegetable slicers + bowl cutters).

Vegetable slicers

Cutter-mixers & emulsifiers

Commercial immersion blenders

Turbo-liquidiser

(Source: https://www.sammic.com/a/sammic-healthcare-solutions)

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Professional equipment

- To properly prepare and puree food for dysphagia patients, having the right foodservice equipment is essential. Blixers, meat grinders, emulsifiers and mixers provide versatility and can help to create food and drinks for each IDDSI.

Food processor/
RobotCoupe

Meat grinder

Mixer

Emulsifier

(Source: https://www.iddsi.org)

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Home style equipment

Blender

Hand held mixer

Food processor

(Source: https://www.iddsi.org)

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Thermomix

- The thermomix is very suitable for the production of small quantities of pureed food.
- Thermomix is a multi-purpose kitchen appliance. He has a heating element, a motor for fast or slow blending and stirring, and a weighing scale.
- The functions can be accessed simultaneously to carry out steaming, emulsifying, blending, precise heating, mixing, milling, whipping, kneading, chopping, weighing, grinding and stirring.
- Thermomix also has a touchscreen with a guided mode which allows the user to follow recipes step by step.

(Source: https://www.thermomix.com)

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Paco-Jet

- Pacotizing meat, starch, vegetables or fruit produces a perfectly smooth texture with natural colours and intense flavours, which can then be formed into natural food shapes. The result is a delightful meal that looks and tastes just like a normal meal from the daily menu.
- **Your need:** Select and roughly chop ingredients; Top up with liquid to eliminate empty cavities and ensure a flat surface; Freeze at -22° C (-8° F) for at least 24 hours; Attach beaker to the Pacojet and pacotize the amount required; Complete recipe, Heat to required temperature and thicken.

(Source: http://www.pacojet-care.com)

http://www.pacojet-care.com/care-en/showcases/pacojetworkflow.php

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Sous Vide method

- Sous-vide solutions are ideal for low, to no touch cooking and bulk rethermalizing.
- Healthcare operations of all sizes implement sous-vide stations adjacent to cooking lines to better control the flow of food to decrease patient wait time.
- Sous vide, which means “under vacuum” in French, refers to the process of vacuum-sealing food in a bag, then cooking it to a very precise temperature in a water bath. This technique produces results that are impossible to achieve through any other cooking method.
- Equipment required: vacuum machine, circulation bath immersion circulators.

(Source: https://anovaculinary.com/what-is-sous-vide/)

https://anovaculinary.com/what-is-sous-vide/

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Freezing and reheating tips

- When freezing ensure the food is cooled to 8°C within 90 minutes before putting in the freezer.
- Freeze in small batches that are well wrapped.
- If using moulds, freeze and then decant from the moulds and store in sealed containers.
- Defrost fully before reheating.
- For best results steam to reheat — wrap in cling film to protect.

Source: designed by Canva Pro

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Alternative technologies

- Recently, alternative technologies, including those involving the use of high-pressure, hydrodynamic pressure, pulsed electric field (PEF), plasma, ultrasound, and irradiation, have been applied to modify the texture (for example, hardness, adhesiveness, cohesiveness), sensory characteristics (aroma and flavor), and to maintain the nutritional value and extend the shelf life of an array of food materials (Jin, Yu, & Gurtler, 2017; Yoshioka et al., 2016).
- Nonthermal technologies are of special interest for their ability to preserve color, texture, taste, nutrients, and nutritional density of foods.

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Alternative technologies

High-pressure treatment

HPP can be used to modify the texture of meat and meat products. HPP at ≥300 MPa could be an alternative to produce meat-based dysphagia foods. High hydrodynamic pressure (HDP) processing is a novel technology that allows high-pressure shockwave to pass through water to tenderize vacuum-packaged meat.

Pulsed electric field

PEF treatment is another interesting technology that can be used to modify the texture of food. PEF at higher frequencies and lower pulse numbers could lead to a decrease in the water loss, but to an increase in the water-holding capacity of meat upon cooking.

Ultrasound

US is another efficient technology that can be used to improve the texture of protein gel. US has been noted to be capable of reducing the hardness of starch-based foods to the lowest level (level 4) and is therefore a recommended technique to improve the texture of carbohydrate-based foods for dysphagic patients.

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3D printing technology

- Recently, three-dimensional (3D) printing technology has been used to produce foods with a variety of texture from various raw material sources
- 3D printing has been used in the past to help elderly patients with dysphagia—difficulty swallowing or chewing—by creating inks made from puréed food and extruding them into a shape that resembles the real dish, like carrots or chicken, to make it more visually appealing.
- Kouzani et al., used this method to 3D print a tuna fish consisting of tuna, pumpkin, and beetroot purees. The method reduced the design and fabrication time and cost, decreased the dependency on a skilled cook, and enhanced the visual appearance, consistency and repeatability of the foods produced that could potentially be enjoyed by people with dysphagia who require pureed food.

(Source: Pant et al., 2021)

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(3D) printing technology

- However, while the benefits include a shorter time to fabricate foods in a more appetizing texture and shape, these freeze-dried powders and dehydrated food inks often need to be stabilized with a lot of food additives, like hydrocolloids, to ensure a smooth print process.
- This can change the aroma, taste, and texture of 3D printed food, which makes it much less appetizing to dysphagia patients, as you can imagine, and can lead to issues like malnutrition.

https://www.youtube.com/watch?v=Bv03C58sSR4

(Source: https://www.creativemachineslab.com)

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Ready-to-eat texture modified food

- Foods specifically targeted to patients with dysphagia have undergone a great evolution in recent years.
- The food industry has developed a multitude of products for these patients, such as cereal-based breakfasts and snacks, dairy posters or fruit compotes and, above all, puree textured foods for main meals.

Source: Hormel Health Labs

Source: Nuticia Healthcare

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Ready-to-eat texture modified food

The purees, although similar in their nutritional characteristics, have different technical and preparation characteristics. In general, these products have a long shelf life, the preparation in the kitchen is faster and easier than the traditional elaboration of texturized products, they have a greater hygienic guarantee and the adequacy to the nutritional needs is greater. Their main disadvantage is the price.

They can be presented in various formats according to the technology used for their production.

- Dehydrated

They are reconstituted with water and incorporate modified starch as texturizers.

- Freeze-dried

They are reconstituted following the manufacturer's instructions and usually contain potato starch.

- Pasteurized

They should be kept refrigerated and after opening should be consumed within a few days. They have a high nutritional and sensory quality.

- Sterilized

They usually incorporate modified starch and maltodextrins. Due to the heat treatment of sterilization, some vitamins may be lost and the color and flavor may be affected.

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To Know More

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https://fliphtml5.com/vfrai/rdqf/basic

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Table for activity

- The activity take 30 minutes
- Goals of the activity – to apply texture-modified foods preparation techniques and equipment
- Theoretical lecture and practical activity
- We need food products and equipment
- Online or live

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Time for discussion

Any questions?

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Review

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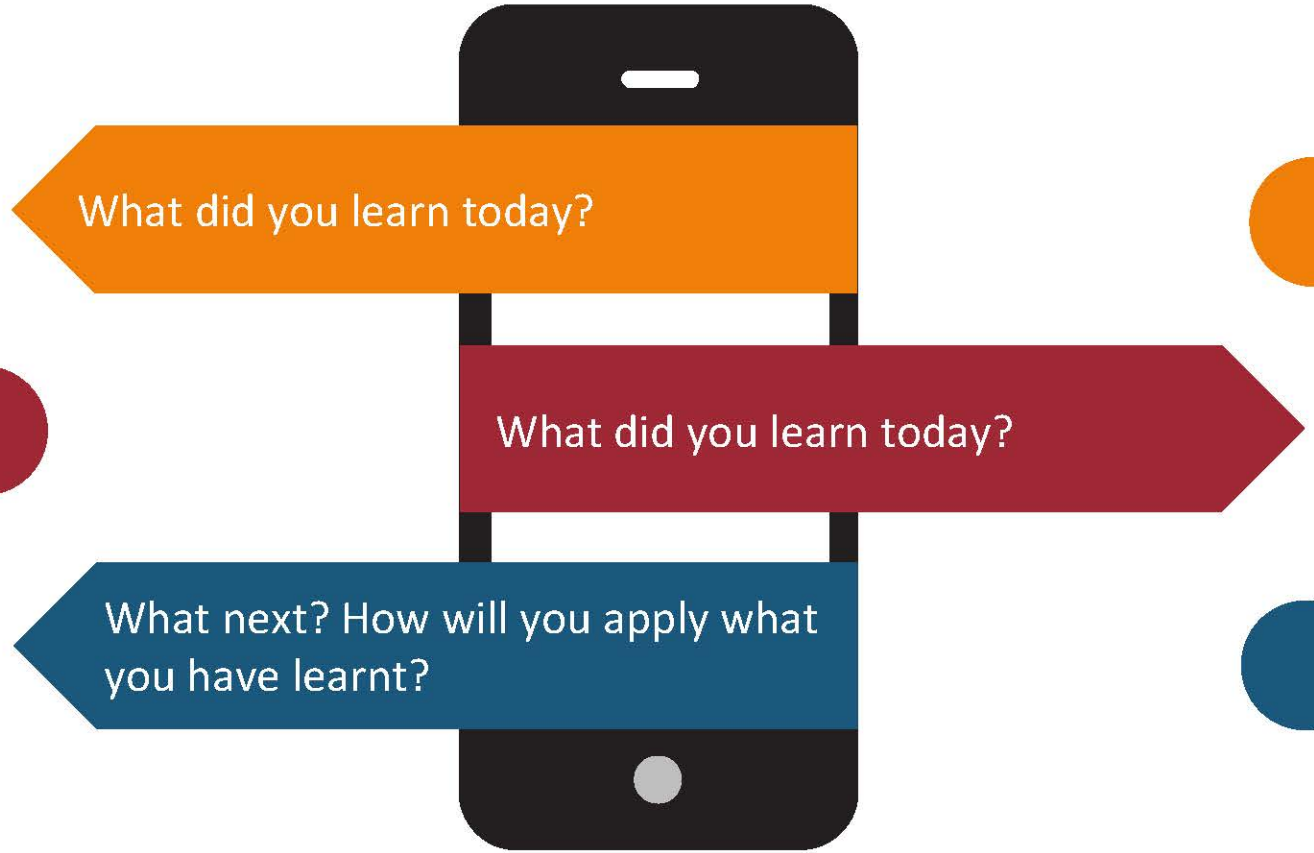
Reflect on the session



Lorem Ipsum Dolor Sit Amet, Sit Amet,

Lorem Ipsum Dolor Sit Amet, Sit Amet,

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Feedback

How many stars would you give this workshop (1 to 5)?

What reasonable change would you recommend?

What did you like the MOST?

What did you like the LEAST?

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Indeed partners

https://indeed-project.org/

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