

Introduction

The main idea of *CaptainCook* is to create an interactive cooking assistant which helps you to learn how to cook by doing practical cooking. It can also be seen as a digital cookbook, which extends the possibilities of written paper by multimedia components on the one hand, and on the other hand tries to teach the user how to cook.

As an overall set-up for our application we choose to build a system, which should run on a touch screen within the kitchen. The user needs guidance during the cooking process, so the application must be available in the kitchen. Secondly, while cooking the hands get often dirty and wet so we need a device which can be controlled without very clean hands. A touch screen, probably with an additional protective surface, seems to fit these requirements.

Looking for further usage of this device in the kitchen a lot of possible additional applications could be developed. In the prototype a navigational layer for this purpose is included, which provides the basic navigational structure for including e.g. an online food buying system.

Another general goal of the interactive cooking assistant is to make the cooking and learning process as comfortable as possible for the user. Interactive features and multimedia content should help to fulfill this general goal of the *CaptainCook* application.

What previous knowledge do you need to work with *CaptainCook*

CaptainCook is specifically designed for people who have no or little experience and knowledge in cooking. Cooking is a complex task which includes a lot of barriers for untrained cooks. At first, recipes often include difficult sub-procedures or special terms, which are probably not known our target group. Therefore an easy-to-use help system is integrated in *CaptainCook*, which provides help exactly where it is needed, without interrupting the cooking process (See Figure 1 on page 4).

Another difficulty of cooking is the parallelism of certain steps that you find in a lot of recipes. By providing a predefined sequence of steps and a built-in egg timer (See Figure 2 on page 5) which helps to deal with parallel operations the *CaptainCook* system tries to be “beginner-proof” concerning this aspect as well.

Technically our target group must be able use a touch screen. As a touch screen is a very intuitive interaction device by its nature and also because touch screens are already very often used in everyday life (e.g. for ATMs) the “technical fear” of using *CaptainCook* system should be pretty low. Additional to the device-immanent difficulty of using *CaptainCook*, also the application itself can make it difficult for the user to work with it. In order to make it easy to navigate and use *CaptainCook* the user-interface is kept very simple and consistent throughout the whole application (See also User Interface Design on page 5). In summary also regarding to the technical issues the system requires no or little previous knowledge.

Learning Objectives – What should the users learn from *CaptainCook*

By using *CaptainCook* the users should be able to cook various dishes that are included in the system and – at the same time – learn cooking.

“Learn cooking” is general phrase which includes several sub tasks which are needed to cook meals.

1. Learn how to do certain steps for recipes in a proper way (e.g. how to seed tomatoes)
2. Learn how to cook single dishes (e.g. how to make gazpacho)
3. Learn how to cook complete menus
4. Learn cooking terminology
5. Build an repertoire of dishes, meals and menus

The concept of *CaptainCook* – How should the users learn from *CaptainCook*

The *CaptainCook* system is supposed to guide to user through the process of cooking and at the same time support him/her in learning new things. The system provides all necessary information that the user might need. Also, it enables the user to cook with the application by trying it her-/himself. So the learning approach is a constructivist one – the system guides the learner through the cooking process and provides all necessary information, but the learner learns by cooking.

Learning how to cook is a process that have to done in a iterative form, accumulating knowledge and using previous knowledge in new cook experiences, thereby we decided to build our application based on the constructivism learning theory, since cooking is a process that is normally learned in a constructive way.

In order to enable the user to learn cooking, which is defined by the learning objectives, different methods are implemented in the system. In the following table the learning objectives and their respective learning methods are explained.

Learning Objective	Implemented Methods
Learn how to do certain steps for recipes in a proper way (e.g. how to seed tomatoes)	Help system using pop-up’s with texts and images. If appropriate animations or short clips could be integrated.
Learn how to cook single dishes	Providing recipes for single dishes. By using interactive and multimedia content the learning process is supported and the user is engaged.
Learn how to cook complete menus	Interactive multimedia recipes for predefined complete menus. Possibility to create custom menus by choosing the included dishes (Not yet implemented in the prototype). The recipes for the complete menus help the user to learn how to prepare different dishes simultaneously.
Learn cooking terminology	Special cooking terms are used in the recipes and

	explained on-demand using pop-up's.
Build an repertoire of dishes, meals and menus	<p>By a friendly and easy-to-use system the user is engaged to cook regularly and extend his/her repertoire.</p> <p>Also, the system provides a big set of dishes and menus which can be cooked. A recipe editor for making it possible for end-users to create and share recipes might be interesting as further development.</p>

Motivating the user

It is an important part of the concept to motivate the user in working with the application. The main focus of the engagement lies in making the system easy to use and making the process of cooking (and therefore learning as well) as comfortable as possible. Every single part of the application was developed with this idea in mind.

Usage of Interactivity and Multimedia

In the application a lot of multimedia content and interactive elements can be found. Both have the goal to engage and motivate the learner on the one hand and support the learning process on the other hand.

In general a good interaction and interface design is important to make it easy to work with the application.

Make it easy to find recipes

Recipes can be found quickly. By providing multiple ways of accessing the recipe database and by using dynamic and user friendly interfaces this goal should be accomplished.



Figure 3 - The user can search the recipes dynamically by name

Make it easy to check if all needed ingredients are available

The system provides help for the user to check if all needed ingredients for a certain recipe are available. This is done by an intuitive checklist feature. As an extra feature not covered in the prototype it might be an option for further developments to include a system which controls the available ingredients automatically.



Figure 4 - The user can tick what ingredients are available.

Explain cooking slang and provide hints for difficult steps

In the recipes special cooking terminology is introduced and explained in pop-up's. Similarly the system also explains difficult steps which should be learned by the user through in the same way. By choosing



Figure 5 - To help the user the system provides pop-up's to explain difficult steps.

pop-up's for that purpose the overall process is not disturbed.

Provide audio instructions to allow cooking on the fly

During cooking it should not be necessary to read the next instructions from the screen, as this disturbs the whole process strongly. Our system offer audio instructions as a solution to that (See Figure 6).

Another interactive cooking assistant system called Chefi (<http://chefi.net/>) also uses audio instructions to explain the actions which need to be done.

Built in Egg Timer functionality

In a lot of recipes certain steps need a timer, e.g. when boil something for a certain amount of time. In the *CaptainCook* system this timing is integrated, to provide everything needed within the application.



Figure 7 - See the Egg Timer in lower right corner

User Interface Design

The interface design of an application is very important for the success of a system: it is responsible if the user feels comfortable while using it, or not. Especially in eLearning contexts the user must be engaged in using the application by a well working interface design, because the motivation of the user in learning something is directly connected to success of the learning process.

The *CaptainCook* system pays attention to the most important user interface design guidelines.

Consistency

Important buttons like the back button or the home button stay at the same place, in order that they can be found easily.

Clickable buttons always look the same so they can be recognized as such.

Interaction metaphors are used in the same way during the whole application, e.g. triangles to the left always bring you back one step.

The "Play" symbol is always used to start a process e.g. the playback of audio or the cooking of a recipe.

Control

The user is always free in the way he wants to use the application. For example, the “Home” and the “Back” button always provide important navigation possibilities. Similarly the user can browse through the single steps of the recipe freely. It is also very important that the user can decide whether he wants to hear the audio recipes or not. So, the audio player (Figure 8) offers is the possibility to pause and to stop (Once the audio is stopped it won't start on its own again). The user can also restart the audio and adjust the volume.

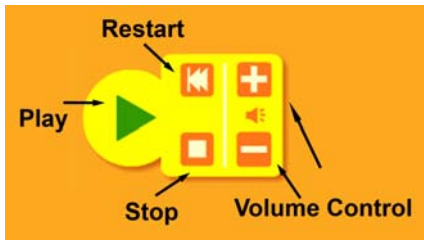


Figure 9 - The audio player.

Feedback

When clicking on buttons the system must show the user that it was clicked. In the *CaptainCook* System that is done optically by changing the colour of the button and acoustically by playing a click sound.

Help

At the top of screen a box with a hint is placed to inform the user with the current status and communicate what he can do next. To make this box more attractive it is combined with the logo to let Captain Cook act as a guiding character.



Figure 10 – The hint box.

Future Steps

There are several possibilities to improve the prototype and add further functionality. We thought about a few key steps, which might be important for further improvement of the application.

Firstly it should be possible to compose individual menus by the user. The user should be able to choose a starter, a main dish and an dessert on his/her own and the system generates a recipe which takes care about the right order of the certain steps of the recipe.

Another improvement would be to develop a back-end editor for the recipes which generates an XML-based recipe which then is used as an input for the system. For a system which emerges from a prototypical state such an editor would be definitely needed.

Another improvement would be to add the possibility of voice control, to give a bigger commodity to the user, if he/she can use certain command words to navigate through the system, that will make the whole process easier for him/her.

Finally the whole application could be embedded in an on-line platform as well. For already existent recipe databases such an interactive cooking assistant, as Captain Cook is, would be definitely an improvement.