# ON-DEMAND HELP SYSTEMS BASED ON WEBBLE TECHNOLOGY

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Abstract: As many researchers pointed out, conventional help systems are not used or useless. In this paper, we introduce new functionality into the conventional on-demand help systems to create an effective help system. Proposed functionality is based on Webble technology. In the Webble technology, every part of application or compound documents can be reusable components. We use this feature positively in the composition of help documents to enrich functionality of help systems. By using this feature, the contents in help documents can be highly interactive as well as reusable by users for other purposes. We have shown deferent types of help systems and its usage in the Webble-based e-learning environment. Users can extract a part of the help documents and reuse it on their own environment.



## 1 INTRODUCTION

Conventional help systems tend to be provided as a document-based system contains texts and images. Owing to the development of hyper media or Web technology, sometimes help documents systems contain audio, videos, and even interactive tools.

However, as many researchers pointed out, conventional help systems are not used or useless. The reasons for less-usefulness of help systems vary from contents quality to users' psychological problems, but one main reason might be that current help systems could not help users in reality. When a user opens a help document, the user has to read or watch the document, translate it, and understand it by the user self. All these activities need to be done by users with their motivation. Otherwise, help documents are just waiting and do nothing.

A question here is how we could change this situation by new technologies. If help systems support users in the activities, they could be really helpful. What functionalities could make uses' help-seeking behavior more effective?

We have tried to apply the Meme Media idea (Tanaka, 2003) to e-learning domain. Meme Media is an approach for realizing media on computers, which works as Meme (Dawkins, 1976). The Webble technology (Kuwahara and Tanaka, 2009) is the latest Meme Media platform. In the Meme Media platform, all computing resources such as texts, images, videos, or tools are represented as visual components called meme media objects. We have developed a Web-based learning playground based on Webble technology called the Solar Biker Laboratory (Fujima et al., 2010). It is an educational playground which has a construction kit. Users can construct a solar biker powered by a solar cell by assembling a set of given components in the laboratory.

In this paper, we introduce new functionality into the conventional on-demand help systems. First, we survey current research on help systems to find out what the conventional approach for help systems is and what kinds of help systems can be effective. Second, based on the survey, we introduce prototypical implementation of the help system in the Solar Biker Laboratory. In the Webble technology, every part of applications or compound documents can be reusable components, which means the parts are decomposable and reusable by users in any situations. We use this feature positively in the composition of help documents to enrich functionality of help systems. Proposed features allow help documents to contain highly interactive contents such as working examples. Users can not only interact with the embedded examples but also extract a part of the help documents and reuse it on their own environment for applying given examples to the real solution.

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## 2 ELABORATION ON HELP SYSTEMS

Help systems are commonly used to assist users in the use of software programs. The research studies on which deals with the design of assistance systems show that many computer programs have a help function. Some of them demonstrate a certain correlation between help-seeking and learning effect of learners, which is effective help use is related to better learning outcome (see (Aleven et al., 2003)). However, some evidence suggests that help feature is often not used appropriately.

Aleven et al. (2003) pointed out the many reasons for the lack of effective help use separately in system-related factors and learner-related factors. They denoted one of the reasons is that the user assumes to get fewer points to a solution even if the user uses the help function. In addition, as a learner-related factor, they also suggested that some users might be afraid to look stupid from other people, because they could not solve some tasks without a help. Bartholomé et al. (2004) indicated also a clear tendency of the using behavior that users with higher prior knowledge are more likely to use a help than users with lower prior knowledge.

Delisle and Moulin (2002) also described the implementation of further research in the design of help systems. Even in their opinion, help functions in various software programs do not be helpful. They mainly dealt with the human-computer interaction problems and perceived the computer as a supporter of users in solving tasks. In their opinion, major functions of help systems are providing answers to the questions of the user and information about the functionality of the software. Certainly, they also come to the conclusion that few little studies have been conducted especially for how to detect users' questions to respond appropriately and how to motivate users to use help systems.

In the studies of Aleven et al. (2003), different help systems are closer looked. They come to the conclusion that on-demand help can lead to better learning results. Their system encourages the user to ask some questions to the system at any time when the system can respond with hints for finding a solution. They state that abstract hints get the best effect for users with high-cognitive development while concrete hints lead to the greatest effect for users with low-cognitive development. They also pointed out that overuse of hints brings low outcome in learning. In the paper, it is pointed out repeatedly that most approaches to help systems are still too little explored, and only guesses could be established.

However Bartholomé et al. (2004) proposed a context-sensitive help and a glossary function for a computer-based interactive learning environment. This help provides the user a possibility for using the help whenever any decision must be taken. The help is also linked to a glossary which contains definitions of terms and procedures. An advantage of this approach is that the user is always made aware of access to help if he cannot solve a task alone. However, some users might feel disturbed by this if they have ever received the same hint or if they do not need any help. Moreover, even with the aid of the glossary, some specific questions of users would not be answered but be only obtained definitions and declarations. Nevertheless, they recommended the context-sensitive help as a support in the process of decision-making tasks, although it does not contribute to a deeper learning.

The analysis of various studies and papers shows that still no general solution has been found for developing a help system. All mentioned approaches have their advantages and disadvantages. However, we could also indicate that, for general interactive learning environments, a combination of an on-demand help and a glossary function could be a valuable help system. Presumably the main problem is that there are still no results, how to animate user for using a help function more effectively. To enhance users' motivation for using helps, help systems should be highly useful, and users should have no disadvantages in using help functions. There are still some open problems such as how to detect appropriate timing for effective help use.

## 3 HELP SYSTEM IN THE SOLAR BIKER LABORATORY

The Solar Biker Laboratory has multiple panels including a workspace and a repository. Users can instantiate a component by picking up an icon from the repository and dropping it at the workspace. In the workspace, users can freely operate components like moving, copying, deleting, and combining components for contracting a solar biker.

Based on the discussion on section 2, we decided to implement an on-demand help system in the Solar Biker Laboratory. We introduce the help system implemented in the Solar Biker Laboratory. In the early work (Fujima et al., 2010), we showed a basic idea of help documents using Webble technology. In (Jantke and Fujima, 2010), we discussed advanced use and possible variance of help documents' settings. Following those ideas, we implemented multiple types of help documents. Users can access each help docu-

ment through a help search panel where users can enter a keyword to retrieve a necessary help document.

## 3.1 Basic Idea of Help Documents

The basic idea of help documents in the solar biker laboratory is based on the structure and reusability of components on the Webble technology. In a Webble-based system, all parts can be reusable at runtime just by copying, dragging and dropping objects. Even help documents may be operational by users or learners.

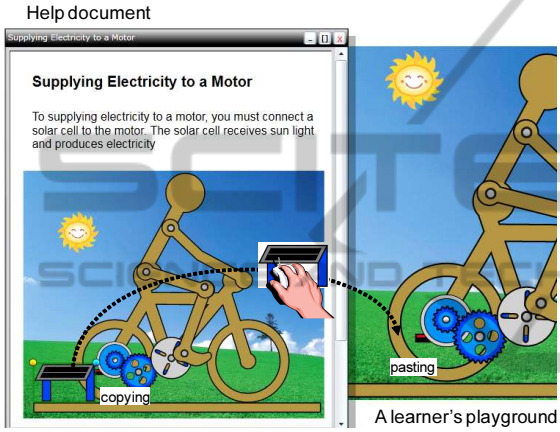


Figure 1: The basic idea of help documents in the Solar Biker Laboratory.

Figure 1 shows the basic concept of users' interaction with help documents. Besides some instruction descriptions, the help document contains a working construction of a solar biker. The user can copy a part of the construction, and drag-and-drop it on his workplace for combining his construction.

## 3.2 Help for Each Component

Figure 2 shows examples of glossary-type help documents. Each document consists of a name of a component, its description, and an actual component. A description explains only about the corresponding component, what the component is or what kinds of slots the component has. Since users can take the embedded component and use it in their workplace, these documents work not only as help documents but also as cabinets for taking out a component.

## 3.3 Instructional Help

Figure 3 shows a help document contains an instruction about how to use a Cloud component. It includes an experimental construction that users can

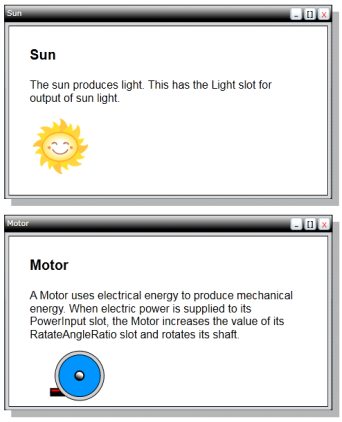


Figure 2: Help documents for Sun and Motor.

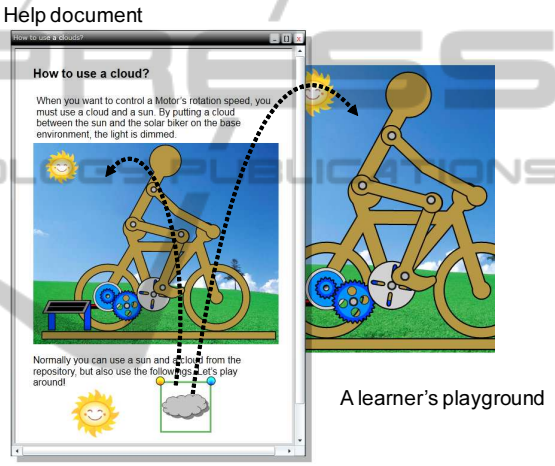


Figure 3: The instructional help document.

play around in the help document. A user can put the cloud component on the experimental construction to see how it works. In addition, the user can also put the cloud on his or her playground to apply it on his intermediate construction.

In section 2, it is pointed out that some users might overuse help systems and then learning effect would be restrictive. In the instructional help case, it also would occur if uses always reuse composite parts without considering. As discussed in (Jantke and Fujima, 2010), we can consider setting up some constraints for user operations in help documents to realize different types of user guidance. This type of help documents is considered having much possibility to user guidance or user assistance applicable for different learning styles or didactic methods.

### 3.4 Context-sensitive Help

Novice users tend to lost what to do next because the lack of the domain knowledge or the lack of skills. To help such users in the construction process of a solar biker, we established a context-sensitive help system.

When a user need a help, the user may click the "help" button on the workplace. Then, the system automatically detects the structure of the user's intermediate construction, compare it with the structure of the complete solar biker, and finally pop up some instruction messages


Figure 4: The solar biker laboratory snapshot.

Figure 4 shows a snapshot of a displayed instructional message. Because the user's construction has no sun and clouds, the system tells the user to add a sun and a cloud on the environment.

Current implementation of instructional help only supports text-based messages. However, to make it more effective for the novice users, it would be possible to utilize compound documents containing working constructions.

## 4 CONCLUSIONS

In this paper, first, we elaborated the current research on help systems and pointed out that this domain of development of effective help systems is still worth tackled. There are lots of remaining research questions in both didactically and technologically.

Then, we introduced the current implementation of help systems in the Solar Biker Laboratory. By applying the Webble technologically to the help systems, uses can reuse contents in help documents with their functionality. Contents providers or teachers can easily provide users help documents with working examples.

This is still ongoing work, so we need lots of empirical studies for evaluating the effectiveness and usefulness. In addition, we would like to explore how those new features effects or changes users help-seeking behavior.

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