A Proposal on Collaborative Publishing Design System

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Summary
This paper proposes a collaborative publishing design system using networks. In the proposed system, all publishing participants including clients, editors, designers and publishers can observe publishing design workflows and share or exchange their knowledge and information to one another on the web. Furthermore, they can work together in real-time on the same cyber-space even though they are in different places. It can be shown that using our proposed system not only can enhance the quality of collaborative work but also efficiently manage publishing workflow.

Key words:
Computer supported cooperative work, Publishing design support system.

1. Introduction

It is commonly recognized that computer is used to improve work efficiency. Most publishing industry has been using computers systems such as DTP (Desk Top Publishing) and CTS (Computerized Typesetting System) in manufacturing processes for about 20 years. This includes editing, designing and printing. As a result, the quality of individual work is increased and definitely cost of publishing is reduced. However, the workflow qualities of entire publishing processes are not increased as we have been expecting.

One of the main causes is invisible and closed editorial design workflow and its system, because the ambiguity of design process makes it difficult to manage design works and to understand. Thus, in order to enhance and maximize quality of publishing work processes, the integration of all publishing processes and the use computer or machines to support and control entire circulation of the process as a collaborative system is needed.

This paper proposes a new collaborative publishing design system, called CPDS (Collaborative Publishing Design System). The proposed system aims to develop an open editorial design environment for cooperative work by utilizing networks and knowledge-base. CPDS enables all publishing participants to grasp and observe the progress of the entire manufacturing process, from planning to designing and printing document.

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2. The Proposed Collaborative Publishing Design System (CPDS)

2.1 The structure of CPDS

As the development environment of the proposed system, J Builder Foundation and Macromedia Flash MX were used. And for the data communication between JAVA and Flash, Macromedia Flash Remoting MX as Gateway. Table1 shows the development environment of this system.

Table 1: Development environment

Type	Name
OS	Microsoft Windows XP Professional Version 2002
CPU	Intel(R) Pentium(R) M processor 1300MHz
Main Memory	768MB
Database	My SQL 4.1
Web Application Server	Tomcat 5.0
Real time Communication Server	Macromedia Flash Communication Server MX 1.5
Remoting Gateway	Macromedia Flash Remoting 1.0
Programming language	Action Script, Java
Interface	Macromedia Flash MX 2004

CPDS is created by flash application (SWF format) and Java. CPDS is also integrated with Flash Communication Server, Web application server, contents database and knowledge-base of layout design, as shown in Fig.1. Therefore, to use CPDS, it is not required to install any program if users are connected to the Internet.

In CPDS, Flash player is connected with Flash Communication Server, which plays the role of the hub by using the RTMP (Real-Time Messaging Protocol). When the server and the client are connected, RTMP processes every action on the servers or the client side as an event. Therefore, real time collaborative work is possible. Furthermore, in CPDS, Flash Communication Server is

connected with content databases and Design knowledge Base through Web application server.

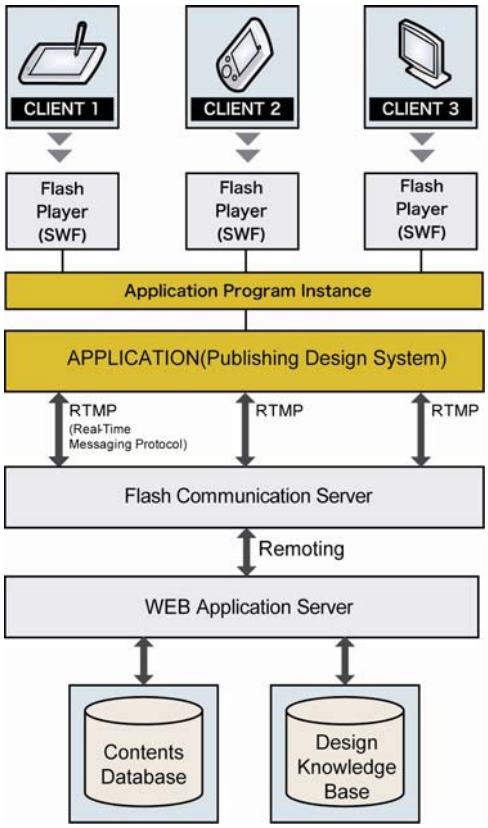

Fig. 1 The Structure of CPDS

2.2 The use of knowledge-base of layout design

In order to support the creation of new knowledge from established knowledge, CPDS provides Knowledge-base of layout design, which is based on grid system. The research of the method of constructing knowledge-base is presented at previous paper [1]. Layout creating process is shown as Fig.2.

User will choose their preferred layout samples provided by knowledge-base in the system, and the document will be separated to pages by considering the quantity of objects. Subsequently, layout of all documents will be automatically created based on the design knowledge of selected layout samples.

By using knowledge-base of CPDS, computer or design novices can effectively and effortlessly perform good design works. In addition, effective collaborative works in contents production such as making agreement among designers can be efficiently performed, because designer's knowledge can be easily and lucidly explained to other people.

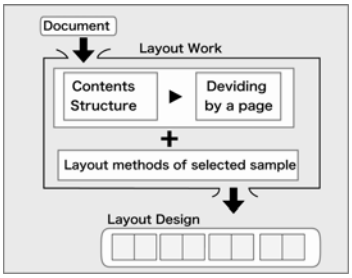

Fig.2 Layout creating process by knowledge-base [1]

2.3. Screen Design and Workflow on the CPDS

The screen of the CPDS is divided into 3 parts. First is Menu Bar space. Second is called Meeting Space, which is for user activities such as chatting space and message board and schedule. The final part is Work Space, which the construction and substance of this space are relied on each work process as shown in Fig.3. Users can record and observe all work processes based on their desire. Furthermore, they can exchange knowledge, opinion and information with other participants in meeting space.

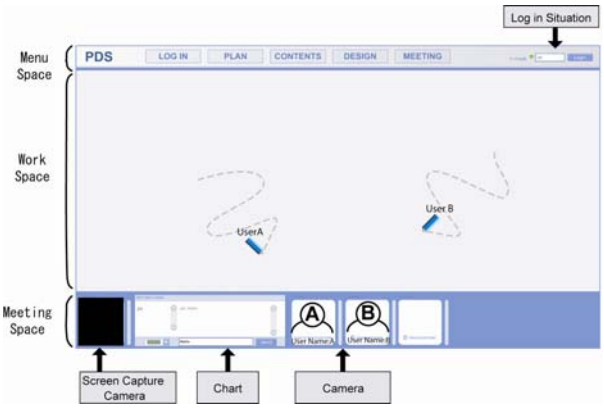

Fig.3 The Screen design of CPDS

In CPDS, work process is divided into 3 main areas: planning; collecting and editing contents; designing and printing documents. The 3 main areas are shown in Fig.4. All participants can also participate in a publishing work processes by only doing log in to CPDS. In addition, the work situation of each process is open and visible to all participants. For these reasons, all participants of a project can join in each work and observe other processes which are related to their work. Thus, the works can be efficiently performed because all processes can influence each other. The details of works and sub-menu in each work process are clarified as follow.

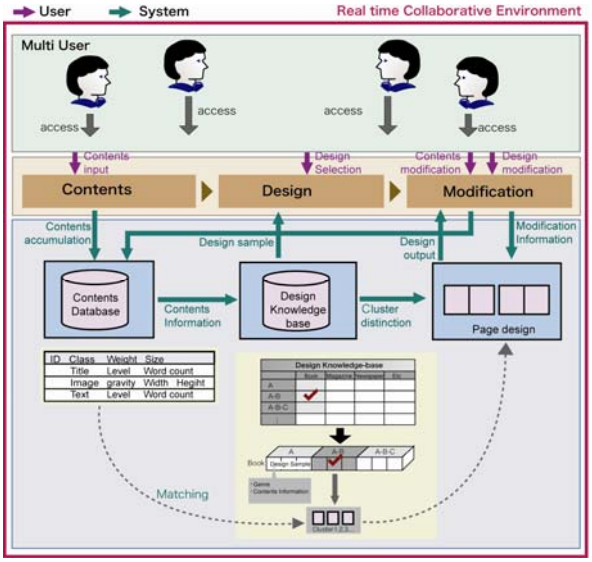

Fig.4 Work process of on CPDS

・Planning:

On the Work Space of planning process, CPDS provides the digital schedule sheet, estimation, and white board. In this process, users decide the concepts, allocate parts of work process, set the schedule and estimate work processes. The results of planning process will be saved as digital data for the purpose of reusing and verification by users in anytime.

・Contents collection and editing:

On the Work Space of Contents collection and editing process, CPDS provide digital index sheet, input or upload contents function and database contents. In this process, users decide index, input contents to database contents according to index and types of contents (title, text, and image). (Fig. 5)

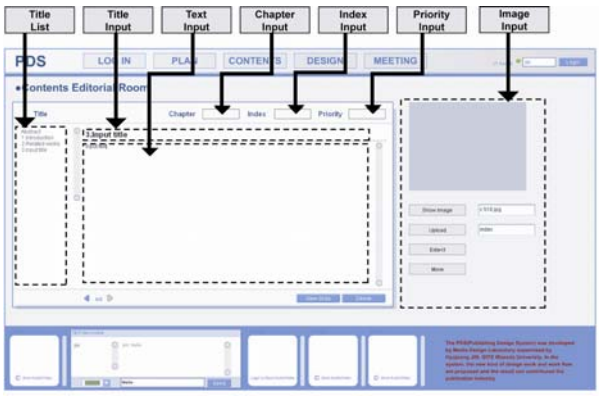

Fig.5 The Screen of Contents Editorial Room in CPDS

・Designing:

On the Work Space of Designing process(Fig. 6), CPDS provide knowledge-base of layout design and the printing formats. In this process, users set the document formats and select favorite samples of layout design from knowledge-base. Users can edit selected layout which is automatically designed by using methods provided by knowledge-base in CPDS, for example, font, size, position. Furthermore, user can modify content which are stored in the database too.

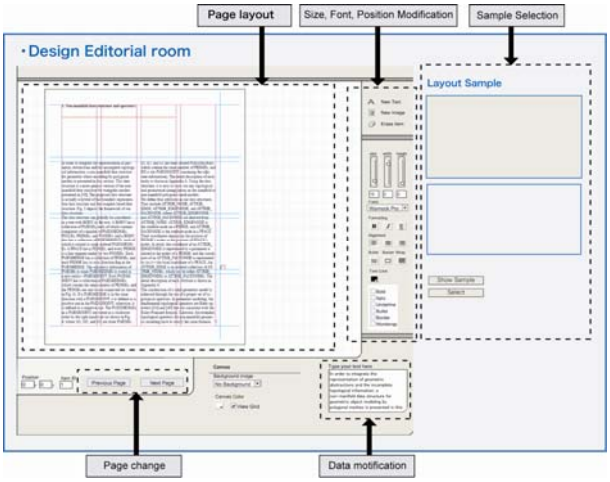

Fig.6 The Screen of Design Editorial Room in CPDS

For example, the layout sample of Fig. 7 is selected, proposed system edits as Fig. 8. And Fig. 9 is an example modified by users.

Fig.7 Selected sample（Subject：「Grid System」J.M.Brockman[2]）

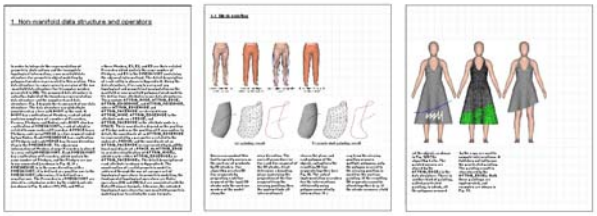

Fig.8 Design sample by CPDS

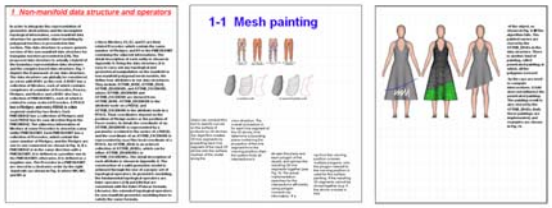

Fig.9 Design sample modified by participant

3. Evaluation of system

To verify the effectiveness of CPDS, we conducted an experiment by using CPDS to produce publishing design work and evaluated the system. Our experiment detail is clarified as below.

・Experiment Objective:
To verify the effectiveness of the proposed system by a subjective evaluation.

・Testee:
-Group1： 20 Waseda University students, who are familiar with Existing DTP system such as Adobe Indesign.
-Group2: 20 Waseda University students, who have no experience in existing DTP system.

・Workgroup organization and role assignments
There are 4 workgroups in our experiment and each workgroup is comprised of 10 testees. Each workgroup contains members from both Group1 and Group2. There are 4 different role assignments in each Workgroup. The detail of the role assignments is shown below:
-Designer part: 4 testees (2 testees from both Group1 and Group2)
-Contents creator part: 4 testees (2testees from both Group1 Group2)
-Subscriber part: 1 testee from Group2
-Project manager part: 1 testee from Group1

・Experimental method：
First, we explained to all testees on how to use and manipulate the proposed system and let them experience it. This process mainly includes 4 parts. The first part is how to access and use CPDS interface such as camera, microphone and message boards. The second part is how to make real-time collaborative design work in CPDS such as input method for images, text, and all necessary data. The third part is how to modify the contents and how to select design samples or patterns. The last part is how to modify the proposed design pattern or samples.

After testees are familiar with the system, they produce a publication by using CPDS.

・Experimental Material：
5 design knowledges are prepared in CPDS, and the experimental content is separated to 4 parts for the Content creator part as mentioned before. Note that, there are 4 testees in this Content creator part. The details of contents shown in Table 2 are prepared for our experiment.

Table 2: Prepared Contents

Type	*Size*
Text	words :4,528 Characters (no spaces):24,669 Characters (with spaces):29,193
Image	16 images

・Network Environment:
The experiment is conducted at inside 3 laboratories in Waseda Univeristy Honjo Campus. Three desktop computers and seven laptops are connected to the Internet by 100BASE/T and IEEE 802.11g, respectively.
The detail for computers location is illustrated in Fig. 10.

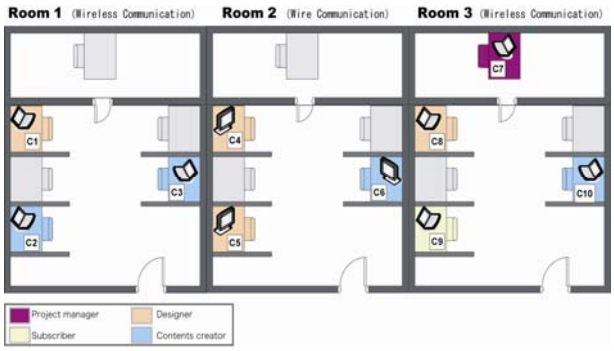

Fig.10 The location of Computers in the Experiment

・Experiment Tasks
The experiment tasks are conducted orderly as clarified below.

① Content creator part: Input and modify the content.
② Except Content creator part: Share their opinion and knowledge to content creator part.
③ Designer part: Select the knowledge base and modify the design samples or patterns provided by CPDS.
④ Except Design part: Share opinion and knowledge to modify contents.

・Evaluation Subjects:
In our experiment, the subjects for evaluation are clarified as below.

① Validity of CPDS.
There are 5 levels for validity evaluation which includes “Very useful”, “Useful”, ”Average”, “Not so be useful”, “Absolutely not useful”.

② Impression of using CPDS for real-time collaborative design work

・Experimental Results：
Almost 90% of testees responded "Useful" or "Very useful" to our questionnaires when using CPDS. According to this result, CPDS has validity to support collaborative design work. The detail of experimental result is shown as Fig. 11.

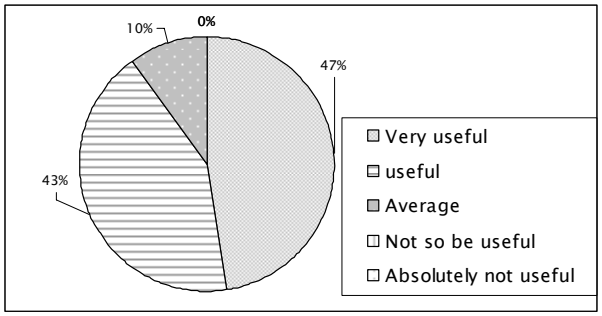

Fig.11 Experimental result

・Impression of using CPDS
We also gather the impression and opinion from testees after they used CPDS to produce a publication. The results can be summarized that “Testees were enjoyable to make collaborative work with the others”, “Testees can notice that they have difference viewpoints among themselves” and “Testees can produce a publication without using DTP Editing software”. Nevertheless, there are some drawbacks in CPDS such as “Testees were bewildered when the others move collaborative objects during work process” and “Consenting testees opinion were difficult”. Furthermore, there is also a requirement to improve the CPDS.

・ Consideration
Regarding to the evaluation, it can be considered that collaborative work can be performed in CPDS because video conference and common platform functions in CPDS can be remotely manipulated. Consequently, these can make remote collaborative design work be possible.

4. The Paradigm Shift of Workflow in Publishing Industry

4.1 Publishing Workflow using proposed system

Based on the CPDS, publishing companies or subscribers provide and store contents to database. Then clients select contents from the database according to their desire contents and classify them for their own document. After that, the subscribers select their preferred layout design sample. The system will design layout based on the selected sample and rules provided in knowledge-base. Finally, clients can also order printing formats. During the entire process, the participants can modify document which is designed by the system anytime they want on the cyberspace. (Fig.12)

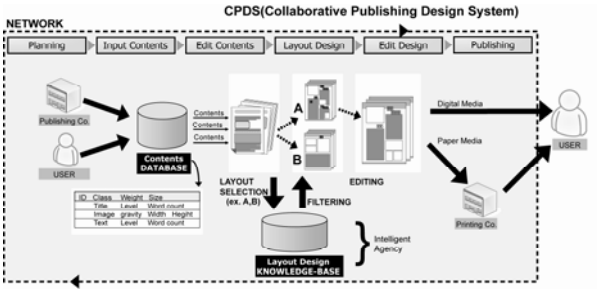

Fig.12 Publishing Workflow based on CPDS

4.2 Workflow Comparison with traditional publishing industry

In most of the existing system of publishing, the entire work processes are performed individually and it is inflexible. Therefore, outcomes from one process are frequently rejected by other processes, because of unsatisfied outcomes or errors.
By using CPDS, all individual work processes of publishing can be cooperatively performed. Therefore, it can reduce errors and mistakes for all processes and can effectively response to requirements from other processes. Fig.13 illustrates the comparison between traditional publishing workflow and the use of CPDS in publishing, the workflow on traditional publishing is shown in left side of this Fig.13, and the workflow which will be realized on the CPDS is shown in the right side of this Fig. 13. As shown as Fig.13, CPDS makes design process simpler and more efficient by reducing some steps from previous process to next process, such as a meeting for editing documents. The Workflows can be changed from orderly process to synchronous workflow.

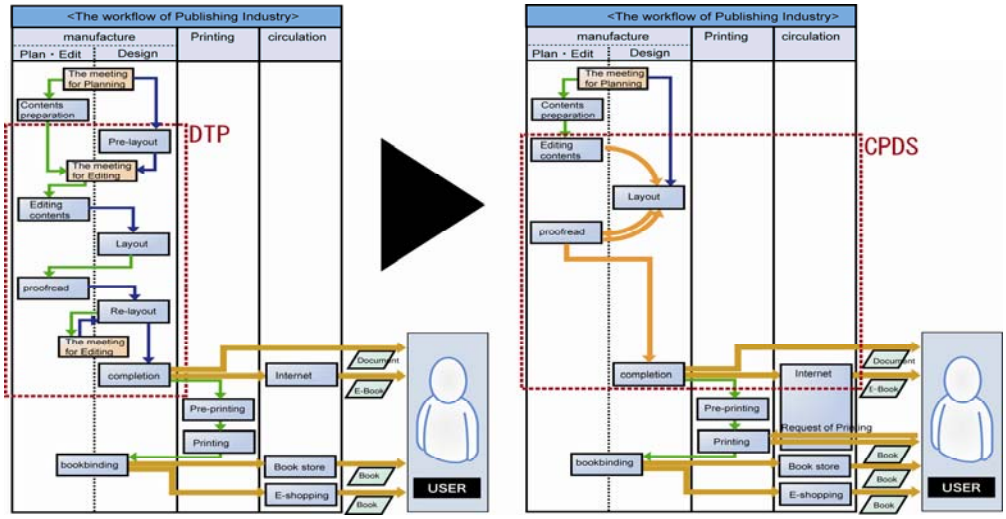

Fig.13 The change of workflow

In addition, users can take part in workflow partially or entirely whenever they want by using only computer and network. Furthermore, the entire work process will be more flexible and can deal with dynamic change in contents distribution. For instance, Fig.8 shows the correspondence of the change of contents distribution, E-shopping, On-Demand publishing, and providing various kinds of documents required by users (e-book, PDF, flash paper, flash movie, etc.).

5. Conclusion and future work

This paper introduces new collaborative publishing design system for developing open design environment. This paper also examines how this system copes with the rapid change of contents distribution in publishing industry. As a result, OSMP (One Source and Multi Product) and On-demand publishing can be effectively performed on the web with various types of final document format

In our future work, we plan to have full investigation and evaluation of this approach, especially, with respect the method of document representation including multimedia materials (movie, sound, moving typography) for e-document. Furthermore, we also plan to investigate new work flow model for publishing industry.

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