

# Web Annotation System in Collaboration with Moodle

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**Abstract**— The use of annotation has been proven to be quite effective for e-Learning. In this paper, an Ajax-based web sticky-note system was developed. The system “PnoteIt” enables the users to attach their virtual sticky-notes at any place on the web page. The users of “PnoteIt” can share their sticky-notes with other users, or hide them from others. “PnoteIt” was also extended to collaborate with Moodle, the world famous open-source Learning Management System (LMS). This extension was done in order to implement the annotation function in the “Page” contents of Moodle. The practical evaluation of our system (PnoteIt for Moodle) is in progress.

*Keywords-annotation; Ajax; Moodle.*

## I. INTRODUCTION

Sometimes the fact that e-Learning contents are displayed on the computer monitor becomes problematic for learners. When the learners use paper-based textbooks, they can write their comments in the textbooks as they like. These written comments can help learners to understand the subjects. However, in the case of e-Learning, such comment-writing is not possible. This situation can be improved when the “annotation” tools are introduced into the e-Learning system. Moreover, the “annotation” tools are not only used for personal comment-writing, but also for collaboration between learners.

We have given lectures at Kanazawa Institute of Technology for nine years with Moodle [1], which is probably the most famous open-source LMS (Learning Management System) in the world. We faced the same problem discussed above, then searched for an annotation module for Moodle and found “A.nnotate” [2]. This module enables “Teacher” users of Moodle to add their comments and feedbacks to the Portable Document Format(PDF) and Word documents. However, the annotatable documents are restricted to the contents of “Assignment” of the “Student” users. In addition, “A.nnotate” cannot manage the collaboration between students. Hence, the “A.nnotate” is not suitable for our purpose.

In 2009, we developed a web annotation tool named “PnoteIt” [3] for the use of the management of “KIT Mathematic Navigation” [4], which is a math-education website for high-school, college and university students. Thus, we came to the idea of the collaboration between PnoteIt and Moodle.

In this paper, the annotation in e-Learning is briefly reviewed in Section II. Section III is dedicated to the explanation of “PnoteIt for Moodle” system which we

developed for this study. In section IV, we show the result of the usability evaluations for the proposed system. we summarize this study in Section V.

## II. ANNOTATION IN E-LEARNING

The use of annotation has been proven to be quite effective for the e-Learning. For example, Farzan and Brusilovsky [5] showed that their system “AnnoteEd” is quite effective for collaborative learning. This article also presents a comprehensive review for similar studies. The annotation of the “AnnoteEd” system does not seem to be located in the contents, but only beside the contents.

Nunes et al. [6] developed and examined their highlight annotation tool. The users of this system can add/share annotations by marking some sentences of the online textbook. However, they cannot write any memo or note in the textbook.

“Writable Web” developed by Kunimune et al. [7] is quite powerful annotation tool for learning materials. This system enables users to add/share their notes, marking and freehand drawing at any place on the contents. However, the possibility to realize the collaboration between “Writable Web” and Moodle is unknown.

Moodle is currently very popular in the world. If there is an annotation system which is adapted to Moodle, it will enhance the availability of the Moodle and also help Moodle users extensively. Therefore, we intended to adapt “PnoteIt” to Moodle. In the following section, we present a detailed explanation of the “PnoteIt” web sticky-note system and its collaboration with Moodle.

## III. PNOTEIT FOR MOODLE

“PnoteIt” originated from Perl-based Ajax/Common Gateway Interface(CGI) program “NoteIt” developed by Baba [8]. We rewrote “NoteIt” in PHP+MySQL manner which becomes more popular than Perl CGI currently and called “PnoteIt”. We also added multi-user function through the development of “PnoteIt”. This system has been used for the management of the “KIT Mathematic Navigation”.

The original “PnoteIt” has its own user registration/authentication function. The management of that function is available only for the administrator user. The users can use sticky-note function after they logged in the system unless the administrator permits the “Guest Access” at the configuration. The users can share their sticky-notes with other users, or hide them from others though the administrator user can completely see and manage all sticky-

notes attached by all users. In the process of the adaptation of "PnoteIt" to Moodle, we omitted the user registration function and integrated authentication with Moodle's. By checking the user's capability, the administrator function is automatically assigned if the user has a "Teacher" role of the course which includes "PnoteIt"-enabled contents.

To add the sticky-note function into the contents of the "PnoteIt"-installed website, the author must add the following one-line "PnoteIt code" to the "body" in the HTML source of the contents is needed:

```
<script type="text/javascript" src="/pnoteit/pnoteit.php"></script>
```

Here, we supposed that the "PnoteIt" system files are placed into "(webroot)/pnoteit/" directory. This modification must be iterated over the sources of all pages on which we intend to enable sticky-note function. These are similar for the case of "PnoteIt for Moodle" environment. Once the "PnoteIt code" is added in the source, the "PnoteIt Toolbar" appears in the webpage (Figure 1.).

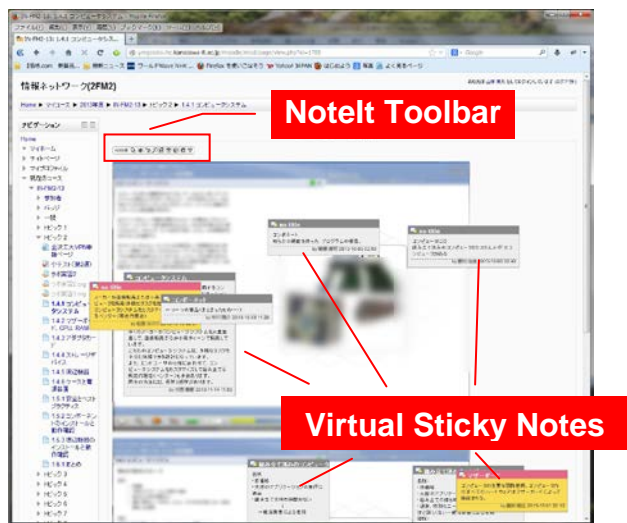


Figure 1. Example Screenshot of "PnoteIt for Moodle".

The draft sticky-note appears when the users double-click the place where they intend to attach their annotation in the contents. After the insertion of the title and text, the attachment of the sticky-note is completed by clicking the "OK" button. If the user double-clicks the existing note, he/she can edit the title or text of the note unless it is locked. The sticky-note can be moved to any place by drag-and-dropping, but the position is restored when the page is reloaded unless the sticky-note is "fixed". Usually, the name of the "owner"(who makes the note) and the date when the note was attached are shown in the individual sticky-notes, but the sticky-note management menu appears when the mouse pointer is on the note (Figure 2). The "owner" can resize, fix, delete, lock/unlock and change the color of the sticky-note with this menu. By default, the sticky-note is "Private" - only visible to the "owner" user, but the "owner" can toggle the accessibility of the sticky-note by clicking the icon at the upper-left corner of the note. If the "owner"

makes their unlocked note "Public", any user can edit it freely.

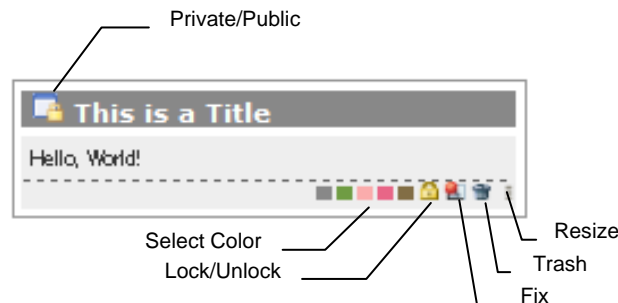


Figure 2. Sticky-Note Management Menu.

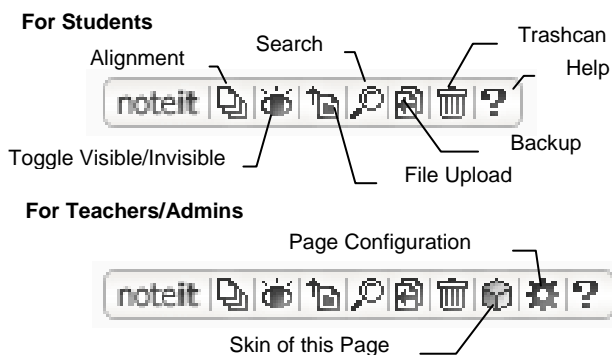


Figure 3. Notelt Toolbar.

The menu provided by "Notelt Toolbar" (Figure 3) includes "Alignment", "Toggle Visible/Invisible", "Search", "File Upload", "Backup" and "Trashcan". "Skin of this Page" and "Page Configuration" menu is added if the user has an "Administrator" or a "Teacher" role. When the user clicks the "Alignment" icon, all of the visible notes are aligned at the left-hand side and sorted by date. But they can go back to the original places by reloading the browser. All of the visible notes can be temporarily invisible if the user clicks the "Toggle Visible/Invisible" icon. The full-text search of all visible notes in the page is available with "Search" function. Image files uploaded by "File Upload" function can be also shown in the sticky-notes. When the collision (two or more users edit one shared note simultaneously) occurs, the users should check the history shown in the "Backup" window. The "owner" can restore the deleted notes from "Trashcan". The administrator/teacher can configure the "Skin" and inhibited word/host of the page with "Skin of this Page" and "Page Configuration" functions.

The install procedure of "PnoteIt for Moodle" is the following: 1. Create the directory named "pnoteit" in the Moodle's wwwroot directory and place all files of "PnoteIt for Moodle" in them; 2. Configure the place of the "config.php" of Moodle and directory permission correctly. The tables specific to the "PnoteIt for Moodle" are automatically created if they does not exist in the Moodle database. We have confirmed that my system works well with version 1.9.16 and 2.5.3 of Moodle.

#### IV. USABILITY EVALUATION

After the development of "PnoteIt for Moodle", we conducted the usability evaluation based on the WUS (Website Usability Scale) advocated by Nakagawa et al. [9]. 18 samples that are 4th year students of Kanazawa Institute of Technology and are also Moodle users answered the questionnaire after 3 hours trial use of "PnoteIt for Moodle". Each question is answered by 1 (negative) to 5 (positive) point scales. The results are shown in Table I.

TABLE I. RESULTS OF USABILITY EVALUATION

| Question   | Average Score |
|--|---------------|
| I think that I would like to use this system frequently: | 4.1           |
| I think this system is useful:                           | 4             |
| I think this system is reliable:                         | 3.4           |
| I think this system is easy to use:                      | 3.5           |
| I think this system can support the lecture:             | 3.7           |
| I think this system is readable:                         | 3.6           |
| I think this system is responsive:                       | 4.3           |

It is obvious that the evaluation scores of the reliability, operation and readability are relatively low. According to the oral communication with some sample students, we found that this result might be partially due to the sticky-note attachment method which requires slightly complicated steps (1.double-click the contents; 2. insert title and text; 3.press "OK"). This procedure should be simplified in order to improve the usability. Some sample students also claimed that the way to move the sticky-notes was confusing. A sticky-note can be moved to any place in the contents by drag-and-dropping, but when the user reloads the browser it goes back to the initial position unless it is not fixed. Such behavior is counter-intuitive. Therefore, the implementation of the automatic position fixing of a sticky-note seems to be necessary. Low readability score might be caused by the small fonts of the title/text in the sticky-note.

#### V. CONCLUSION AND FUTURE WORK

We developed an annotation tool named "PnoteIt" that can collaborate with Moodle, the world famous open-source

LMS. The user can attach their virtual sticky-notes at any place in the HTML based learning contents. The results of the usability evaluation suggested the improvement of some operation method and readability. Currently, we are planning to adapt "PnoteIt for Moodle" to the plug-in module of the Moodle in order to ease the installation.

"PnoteIt for Moodle" is currently used in our class "Information Networks" of the 2nd semester. 79 students enter the course and about half (not all, unfortunately) of them are attaching their sticky-notes on the learning contents. The educational effect of "PnoteIt for Moodle" will be evaluated after the end of the semester by comparison with other class of "Information Networks", which does not use "PnoteIt for Moodle".

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