Abstract

KADANJOTH, REEJESH. Workflow Management and Administrative Support for Large Collaborative Projects. (Under the direction of Dr. Edward F. Gehringer).

In a class where all the students are assigned the same task and have same deadlines can be managed easily by existing peer-review systems. But this is not the case with large assignments, where students are required to perform different tasks and have different deadlines. There are many administrative overheads the instructors have to face when setting up such large assignments. This thesis considers student-authored wiki textbook as a representation of such a large assignment. It describes the pedagogical benefits of wiki textbooks, and several features implemented to reduce the burden on instructors while setting up large assignments. As the wiki textbook consist of different chapters, the instructor has to come up with different topics for the students. The students can then sign up for a topic to work on. The electronic signup system allows them do this. Sometimes in a large class, the instructor may not be able to come up with enough topics for all the students in the class. In such a case students can suggest topics on which they want to work on. The “suggest and approve” feature has been implemented to achieve this. The chapters in a textbook must be written in a precedence order. The staggered-deadline feature sets deadlines for the chapters of a textbook based upon deadlines assigned to a prototypical chapter. Thus our work provides software support for large projects so that instructors can devote their time to improving the learning experience of the students without getting distracted by administrative tasks for large projects.
Workflow Management and Administrative Support for Large Collaborative Projects

by
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Dedication

To my family and friends.
Biography

Reejesh Kadanjoth did most of his schooling in Bangalore, a city in Karnataka state, India. He received his Bachelor of Engineering in Computer Science degree from the Dr. Ambedkar Institute of technology at Bangalore. He worked for two years as software engineer with Accenture, India before arriving at North Carolina State University, where he is currently pursuing a Master of Science degree in Computer Science. His interests lie in application development and object-oriented programming.
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Chapter 1

Introduction

Traditionally, a class assignment involves an instructor setting up an assignment for students to apply the concepts learned in their course. The instructor chooses a common task for all students, or different tasks for different students in the class, setting a deadline by which the students have to submit their work. Students, of course, must be informed of that deadline. Someone or something needs to keep track of when the students submit.

The administrative overhead associated with the assignment increases with larger classes. If all students do the same assignment and have the same deadline, the instructor should be able to manage with the help of teaching assistants. But in classes where the instructor would like to have students do different tasks with different deadlines, the administrative overhead may be too overwhelming even with TAs’ help.

In this thesis we consider a student-authored wiki textbook assignment as a representation of such a large assignment. And, my work is providing software support and reduce administrative burden on instructors for setting up large assignments.

1.1 Wiki Textbooks

Wikis are a major component of Web 2.0. The first wiki was developed by Howard G. ’Ward’ Cunningham, an American computer programmer. Wiki is described as a “freely expandable collection of interlinked Web pages, a hypertext system for storing and modifying information – a database, where
each page is easily edited by any user with a forms capable Web browser client” [1]. Wikis can serve as the medium for submitting classwork, especially if it is collaborative. In this thesis, we investigate collaborative writing of textbooks and other large works using a wiki. In doing this work, students are playing the role of co-producers of knowledge [5]. In fact, research [6] has shown students can collaborate with their peers in writing textbooks for their courses. A wiki textbook is an “open-content textbook,” which is written using any wiki. Wiki textbooks are free and can be freely distributed for any purpose. Some instructors assign students such a wiki textbook assignment as a semester-long project. The instructor comes up with a set of topics for the book; these topics basically form the chapters of the book. Students can choose their topics and start working on them. This approach motivates them to learn the concepts in detail, and helps them apply their knowledge effectively. This also helps them take ownership of their learning [6]. They decide what topics to learn and they work on them, rather than someone else telling them what to learn.

1.2 Advantages of Using a Wiki

A wiki is a web-based application that can be accessed from anywhere. Wikis are editable, which facilitates peer editing as well. When a small group of students plan on creating such a knowledge base, they might consider emailing documents to each other. But when there is a larger group, this often becomes difficult. A wiki provides a single location, accessible to all, that can store the portions of the document that each group member creates[4]. A wiki document can be changed fast and can be published instantly. A wiki’s revision-tracking ability is another property that makes it an apt medium for student-authored textbooks. Because a wiki can maintain revisions, it can be reverted if the need arises.

1.3 Wikibooks

Wikibooks are basically books written using wiki technology. The Wikibooks site (www.wikibooks.org) is considered to be a sister project of Wikipedia. Wikibooks are revolutionary, because they tap the knowledge of a community to create content on various subjects. Because many people are involved, and because they collectively possess vast knowledge, quality content can be produced. But the “knowledge” of community members can sometimes be incorrect. Peer review helps fix errors and refine the contents
of wiki textbooks.

1.4 Expertiza

“The Expertiza platform is a divide-and-conquer approach to producing reusable learning objects through active-learning exercises.” [6] It is a web application which is used by instructors to set up peer-reviewed assignments for students. Students can submit their work; the instructor can assign students to review their peers and give them feedback. Currently, Expertiza supports assignments in which students are assigned common tasks and the students have a common deadline. As part of this thesis we are working on extending Expertiza to support assignments like wiki textbooks where the some parts of the textbook material depend on other parts textbook material. This would require the system to support different deadlines for students based on the chapters they choose to work on. Students would also be assigned to review at different times, depending on when their authors submit their respective textbook parts.

1.5 Thesis Organization

This thesis is organized into several chapters. The next chapter covers related work of wiki researchers. In later chapters, we will describe features for providing software support for workflow management in large projects. These are designed to reduce the administrative burden on instructors. They include—

- Signup system
- Suggest and approve
- Staggered deadlines for assignments.

Chapter 3, Chapter 4 and Chapter 5 describe the above three features in detail with screenshots. Chapter 7 presents some results from the first use of this wiki textbook software in a class. This thesis is concluded in Chapter 8, along with future work.
Chapter 2

Related Work

2.1 Overview

Wikis have been used as an online documentation system for various purposes. A wiki is an appropriate choice when it comes to creating a knowledge base, because wiki documents are easily editable. This is very important in various fields where information changes very often. So wikis are well adapted to the task. By creating this knowledge base, students are actively involved in the learning process. Contrast this with the usual approach, in which students simply read textbooks authored by some “experts,” thereby becoming passive information recipients. Active involvement in the learning process by authoring their own textbooks could lead to a better understanding of concepts. In this chapter we discuss the related work and its relevance to this thesis.

2.2 Student-authored Wiki Textbook

Bennet [8] describes an experimental use of wiki textbook in an introductory computer science course. In this experiment the students were the primary authors and editors of the textbook who did their work based on their research and their notes. The instructor was responsible for the site and administrative tasks. The motivation for such an experiment were to have an introductory textbook in computer science which was targeted at specific audience. And, this would lead to students being active learners and provide students with an opportunity for writing and group work. This experiment led the author
to conclude that students’ response was favorable towards such an assignment and was improving from semester to semester. The quality of the textbook also seemed to improve as the assignment was done by students every semester as they refined the contents of the textbook.

Kidd [11] uses a wiki textbook platform for the students of the Social and Cultural Foundations of American Education (ECI 301) course at Old Dominion University. Her research shows that students benefit by authoring their own textbooks and are more engaged in the class. She picks topics for her class, and the students write on these topics using a wiki. The best chapters from the previous semester are used as a model for the present semester. Also, students are allowed to edit and improve the best work from the previous semester.

2.3 Visible Effort: A Technology for Measuring Contributions to Wiki Documents

Visible Effort (VE) is a knowledge management and learning feedback tool suite for wiki sites, built by Dr. Sorin Adam Matei of Purdue University. It is used to measure interactions between groups. VE can measure and monitor the unevenness of Computer-Mediated Collaboration (CMC) [13] and group structure and displays it on a wiki page using tabular data, charts and through background color as shown in Fig 2.1.
Basically, the VE plugin serves two purposes. It’s a monitoring tool which can be used to understand how the collaboration is structured as well as adjust collaboration parameters as desired by the instructor. This wiki is great for collaboration because it has a “talk” area where people can interact with other members of the group. Also, as this plugin is built around MediaWiki any user can edit it and the changes made are permanently stored and also instantaneously accessible. Changes are stored regardless of whether they are part of the current version or not.

To tell how even or structured the collaboration is, the word count of the user’s contribution to the article is considered. The word counts are of two types: the count of words the user contributed (gross) and the count of words that were actually incorporated into the article (net). And based on these counts, for each revision of the article, the user’s score is determined.

The author achieved this by retrieving the wiki-markup pages for two consecutive revisions, converting them to plain text and comparing them word by word. The difference is calculated for each revision for every contributor of the article. Using this data, entropy value (a degree of equality, evenness and diversity in collaboration in a given system) is calculated. As the collaboration becomes more even, the background color changes and the graphs show who has done more work on the wiki so far.
2.4 WikiTrust

The fact that wiki documents are freely editable has a drawback. If anybody can edit the wiki, how can the reader trust the contents of the document? Adler et al. [14] propose an algorithm that can compute quantitative values of trust for the text in the Wikipedia articles. This value provides an indication of how much the document can be trusted. The inputs to the system are the revision history of the article and the reputation of the contributing authors by any reputation system. Their algorithm calculates trust value for each word. Trust of a word is calculated by considering the reputation of the author of the word, and the reputation of the authors who edited surrounding words. The resulting trust value is displayed via text’s background color which indicates whether the piece of article is trustworthy or not.

2.5 PeerWise

Peerwise [15] is an online tool, in which students create assessment questions, and answer questions created by peers. This tool is used in classes where students develop multiple-choice questions with explanations. These questions are then available to other students in the course. The developers of this tool claim that submitting effective multiple-choice questions requires thorough understanding of concepts, and reinforces what the students have studied in the course. This tool is helpful to both the instructor and the students. The questions tell the instructors how well the students understand the course material and help students compare their understanding of the material with their peers’. Questions in the PeerWise repository may also be used as to review material for formal examinations. Denny et al. [15] also showed that the students who actively used PeerWise performed better than students with equivalent ability who did not use PeerWise.

2.6 CeLS: Collaborative e-Learning Structures

CeLS (Collaborative e-Learning Structures) is a web-based system for creating and conducting structured asynchronous collaborative activities [17]. In this system, an assignment is comprised of different stages and each stage can be comprised of any combination of four distinct object types.

- Presentation object: The presentation object is used to present any kind of information like text
or hyperlinks. This information is provided by the instructor or the students.

- **Input object:** The system uses the input object to submit new data like text, hyperlink, or file.

- **Interaction object:** As there are different stages the participants may want to interact with submissions created in previous stages and this is achieved by the interaction object.

- **Communication object:** The participants can interact with each other using the communication object.

An activity stage can consist of any combination of these objects. Each object or stage has properties that can be adjusted by the author. The functionality of these stages is based on the properties assigned to the objects or the stages. The assignment’s advancement through the stages is based on the properties of these stages. This could be different for different groups of participants.

The activity structure basically helps the instructors to build a content-free skeleton for their assignment. The CeLS application has a GUI where the instructors can manage the activity structures. They can access their own activities (preview or participate), to manipulate them (edit or duplicate), or to view students’ contributions and follow their actions without interfering. This system also has a “Sample Activities” section where the instructor can browse through activities implemented by instructors at other institutions. All the activities are tagged with metadata this design facilitates sharing and reusing of Activity Structures. A “New Structure” section helps the instructors to create a new activity structure by using the four object types already discussed.

The students’ view of the system is also quite simple. The students are presented with the necessary instructions and information about the assignment at every stage to help them complete the tasks pertaining to that stage. In some stages like a review stage the contents submitted by students in the submission stages are presented to the students who review the work.

This application was used to set up an assignment in a photography course[18]. In the first stage the students were asked to submit photographs which had interpretive meaning. After the students submitted their work they were assigned three anonymous peer products and were asked to analyze them according to certain criteria. This formed the second stage of the assignment. In the following stages the analyses of the photos were presented, compared and discussed.

The authors claim that the system built using these objects helped instructors to incorporate online collaborative activities in their class that were very difficult or impossible to handle before.
All of these research works are related to our work because they are all software that can be used to manage collaborative work on a wiki in classes.
Chapter 3

Signup System

When an instructor decides to assign his students a wiki textbook assignment he/she would have to come up with a list of topics or chapters. Now each student or a set of students would have to be assigned certain chapters to work with. Most often than not, the instructor would like his/her students to pick which chapter they want to work on. To achieve this the instructor would have to post the topics somewhere where the students can have a look and based on their interest inform the instructor or the teaching assistant what they would like to work on. This is where a signup sheet comes into the picture.

Traditionally, the instructor could post the list of chapters on the course website and give students a couple of days to decide what they want to work on. During class a sheet would be passed around the class in which the students can write down what they would like to work on. There may be other approaches like posting all the topics on the message board and asking students to put down their name under their favorite topic. These approaches may work but there are disadvantages to it.

Firstly, in the case of passing around a paper in class, this approach may not work very efficiently as some of the students may not be present. So the same signup sheet has to be passed around during the next class. Also, passing around a piece of paper will not work if the class has distance-education students. The instructor and the teaching assistants have to do the extra work of sorting out which student has signed up for what topic and see to it that they stick to their plan. Using message board is slightly easier but still it has disadvantages—there is no way to prevent “too many” students from signing up for a topic, and students can see (and copy) the list of people who have already signed up.

Secondly, a common difficulty in both approaches is that it’s difficult to incorporate a waitlist in
the signup sheet. If a student would like to work on a particular chapter that’s already taken, then the student does not have the option of choosing the topic and waiting to see if the other student who has a confirmed reservation decides not to continue with the topic.

Thirdly, if there are multiple choosers who sign up for the same topic, some of them waitlisted, and if a student who has a confirmed reservation drops the course or decides not to proceed with the topic then it would not be an easy task for the TAs to update the sheet with the first student on the waitlist. To manage these kinds of different scenarios we need software support for maintaining a signup sheets.

3.1 Signup Sheets in Expertiza

In Expertiza any assignment can have a signup sheet. After creating an assignment the instructor can add a signup sheet from the action menu of the assignment, as shown in Fig 3.1. When “Add signup sheet” is clicked the user is taken to a page as shown in Fig 3.2. On this page one can see two links “New topic” and “Import topic”. “New topic” is used for uploading one topic/chapter at a time, whereas “Import topic” is used to upload many topics/chapters using csv files. When the “New topic” link is clicked the user is taken to a page as shown in Fig 3.3. To add a new topic we need to enter the topic id, topic name, topic category and the maximum number of students (or teams) allowed to choose the topic.
Figure 3.1: Adding new signup sheet

Figure 3.2: Empty signup sheet
Figure 3.3: Add new topic

- **Topic id** – Topic id is to identify the topic uniquely (e.g. E1, E2, J1, J2 etc)

- **Topic name** – Topic name is the name of the topic/chapter.

- **Topic category** – Topic category is the category to which the topic/chapter belongs to.

- **Max choosers** – If there are more students than the available number of topics the instructor can decide how many students or teams to allow to work on a topic.

Topics can be added using the import method as well. One can import the topics by importing a csv file of the topics as shown in Fig 3.4.
Once the topics have been uploaded the instructor's view of the signup sheet is as shown in Fig 3.5. From this page the instructor can edit or delete the topics. The signup sheet gives information about current choosers as well as waitlisted users.

Clicking on the topic tells the instructor which student(s) or team(s) have signed up for the topics, and who is waiting, as shown in Fig 3.6. It would also indicate if there are no choosers for topics or if
the chooser is waitlisted for a topic.

![Signup sheet for Wiki Text book assignment](image)

**Figure 3.6: Signup sheet after students begin to sign up**

### 3.2 Signup by Individual

The student’s view of the signup sheet is slightly different and is as shown in Fig 3.7. In the actions column initially they see a green check mark for all the topics. They can now go through the topics and select a topic by clicking on the green check mark. If there are slots remaining the student would have the topic confirmed. But if the slots are full the student is placed on waitlist. This is indicated above the signup sheet table in Fig 3.7. Once the student selects a topic the green check mark changes to a red cross mark. Clicking this would delete his/her reservation from the signup sheet. When a student deletes a reservation for a topic then the first student on waitlist for the topic would be moved from waitlist to reserved status for his topic.
3.3 Signup by Team

We can have teams working on topics. Ideally, the team members can decide on which topic to work on, and one of the team members can sign up for the topic. In a team assignment, when a student tries to sign up for a topic the system checks whether this student is associated with a team in the assignment. If the student is not part of a team a new team is created and the reservation for the topic is made. This member can invite other team members to join his team by invitations as shown in Fig 3.8.
Here “jsyman” has invited “mgrabo” to join his team. Now “mgrabo” could accept or reject jsyman’s request. If “mgrabo” accepts this invitation both students would be on the same team. This way the students could create their own teams. Or the instructor could create teams for the students. In case of teams, whatever actions (signup or cancel reservation) any member of the team performs will be reflected for the entire team.

A problem faced in team assignment is that when a student joins another team and if he/she has reserved a topic then this topic needs to be released into the pool of topic for other students to choose. If there are students on waitlist they should be able to select the topic. Our signup sheet handles this too. When a student joins another team the system checks whether there are any other members in this student’s team. If there are no other members on the team his/her topic is released back to the signup sheet and other students will be able to choose the same. If there are students on the waitlist for this topic then the topic is assigned to the first student on the waitlist.
3.4 Editing a Signup Sheet

The instructor can edit the signup sheet at any point. He/she can add new topics delete topics or edit the topics which include changing the topic name and the max choosers. But there is a catch here. After students start to sign up for the topics the instructor should not be allowed to decrease the max choosers to less than the number of students who have signed up. This would cause students who have signed up for topics to lose their slots. To avoid this there is a check in the code which checks whether decreasing the max choosers is safe or not and only then allows a change in max choosers. When the instructor increases the slot for a particular topic then the first $n$ students (where $n$ is the difference between the old value and the new value of max choosers) who are on waitlist would be confirmed a reservation.
Chapter 4

Suggest and Approve

In the previous chapter, we have seen how the instructors come up with topics for the wiki textbook and the students sign up for topics using the electronic signup system. In a large class, however, the instructor may not be able to come up with topics for all the students or teams. In such a situation the instructor may decide to ask the students to suggest topics on which they would want to work on. Students can sometimes come up with better topics if the assignment concerns diverse new technologies. The course staff (instructor or teaching assistants) can then go over the suggested topics and decide whether to approve the topic or not. If the instructor wants the students to suggest topics this should be indicated by the instructor while creating the assignment by checking ‘Students can suggest topics for this assignment’ as shown in Fig 4.1.

This is important from a student’s perspective because different students have different backgrounds (courses, work, hobby, etc.) and will know about different technologies. This encourages each student to think more deeply about the technologies he/she knows about, to the benefit of the class, because it broadens their horizons. In the process, they might also try to read articles from other sources to come up with a good topic. Letting students suggest their own topic is a good way to motivate them further as it gives them a feel of autonomy in the learning process.
4.1 Suggest a Topic

The students would be able to see “Suggest a topic” when they navigate to the assignment page. This link will take them to the page where they can suggest a topic as shown in Fig 4.2. The students can fill out this form and also specify whether they would like to work on this topic or not. They can also suggest topics anonymously.
4.2 Approve a Topic

The instructor can view the suggestions from the actions menu of the assignment and then decide whether to approve the topic or not. The instructor’s view of a suggestion is as shown in Fig 4.3. The instructor can ask the TAs to go over these topics and let them enter their comments about the topic. They can indicate whether the topic can be approved/rejected/revised from the dropdown menu next to “Vote”. Then the instructor can make his decision based on or independent of the TAs’ views. If the instructor decides to approve a topic, this topic would be automatically added to the signup sheet as shown in Fig 4.4.
To summarize, the “suggest and approve” feature allows students to suggest topics for their assign-
ment. All the suggested topics are displayed to the course staff in one place, which makes it easier to
manage the suggestions. The instructor can ask his/her TAs to comment on the suggestions. When the
instructor decides to go through the topics to approve/reject them, all these comments are at one place
which helps the instructor to take a decision faster. The overhead of manually entering approved topics
in the signup sheet is also avoided, as this is taken care of by the system.
Chapter 5

Staggered Deadlines

When authoring a wiki textbook generally the instructor comes up with a list of topics that can be used as chapters for the textbook. Using the electronic signup system the instructor can post it on Expertiza. But usually there is a precedence relation among the chapters. For example, chapter 3 cannot be started unless chapter 1 is completed. So we have to support staggered deadlines for assignments.

5.1 Creating Staggered-deadline Assignments

When creating a new assignment the instructor has an option to make the assignment a “staggered-deadline assignment” as shown in Fig 5.1. As soon as the instructor sets the staggered-deadline assignment option to “yes”, the new assignment creation form updates itself. At the end of the form the label for deadlines changes to “Deadlines for first piece of work”. The way this works is that the instructor needs to choose the deadline for the first chapter (or whatever is to be done first), and the system generates the deadlines for the rest of the chapters. Besides the deadlines, the instructor can also specify a time offset between chapters. The time offset is basically the time between the submission of one chapter and the submission of the next chapter. This is indicated in Fig 5.1.
The instructor needs to set the dependence between the chapters and there is no other appropriate place other than the signup sheet. For a staggered-deadline assignment, when the signup sheet is newly created, there is no dependence set for the topics as shown in Fig 5.2. The deadlines for all the topics are same as the first chapter.
The dependence column on the signup sheet has dropdown menus for each topic. This dropdown menu contains a list of checkboxes with the topic identifier as shown in Fig 5.3.

5.2 Setting Chapter Precedence

The instructor can set the dependence between chapters using the dropdown menu. Our system supports multiple dependences as well. When all the dependences have been set the instructor can click on “Save dependence” to save the dependences. Before saving the dependency the system checks whether there are any deadlocks in the dependence. The way this is done is by creating a graph where the topics are the vertices and the dependences are represented by edges of the graph. This graph is represented as a pert chart as shown in Fig 5.4. The pert chart is created by first converting the representation of graph into a DOT language [12]. Then the Ruby graph library provides commands to convert DOT files to jpg files.
After the graph is created, we check if there are any loops in this graph. Loops can create deadlock in the assignment. So the instructor is notified and the system does not proceed further. If the graph
does not have any loops then the deadlines are auto-assigned as shown in Fig 5.5.

![Auto-assigned deadlines for the chapters](image)

Figure 5.5: Auto-assigned deadlines for the chapters
Chapter 6

Auto-assignment of Reviews

Contribution to wiki textbook involves expressing a student’s understanding of a topic. Evaluation of such work requires more time and effort of the instructor and the teaching assistants. But in a large class the course staff do not have enough time to give elaborate feedback to all the students in the class. In such a situation, peer review can offer a solution. Students can review their peers’ work and provide feedback. Instead of the course staff having to review 100 articles, it is better for students to review a few (usually not more than four) [6]. This helps students to participate actively in the learning process, because as reviewers they get to read other’s work and have to spend time reviewing it and giving feedback. As students have only a few articles to review, they can give more elaborate feedback than the instructors or the teaching assistants.

A manual peer-review process in class is difficult to manage. Students have to be assigned reviewers and the reviewers have to be informed of whom they have to review. The reviewer should also be shown the reviewee’s work. Managing the reviews is another big task; an even bigger task is to send feedback from the reviewers to students who worked on the articles. An electronic peer-review system can handle all of these tasks.

Expertiza includes an electronic peer-review system. The instructor can assign reviewers to all the participants of the assignment by using the “add reviewer” link as shown in 6.1.
Manual review assignment by the instructor is impractical. The complexity of this task keeps increasing as the number of students in the class increases. The instructor should keep in mind various constraints while assigning reviewers. The reviewer should not be assigned to review his/her own work. Sometimes more than one student or team is working on the same topic. In such a scenario, it may be undesirable to assign a student to review on the same topic that he/she is writing on, so that the reviewer cannot “steal” ideas from the reviewee. Students should also do approximately the same number of reviews.

Most of these constraints can be addressed by automating this process. For example, the instructor could just specify how many reviews each student should do, and the system could take care of all the constraints, reducing the burden on the instructor. Once reviewers are auto-assigned by the system, the instructor could edit these mappings as well.

Apart from this, we are working on improving auto-assignment of reviews by assigning reviewers under certain constraints. Students should not be required to review topics during the round in which they are working on their own topic. Further, students can be allowed to indicate their preference as to when they want to review. When reviewers are assigned their preferences can be incorporated if possible.

Some instructors want the students to pick the work they want to review. In this case students would
have access to others’ work in a form similar to a signup sheet; they could sign up for the topics they want to review. The only constraint here would be that the students have to do a particular number of reviews.
Chapter 7

Experimental Results

In spring 2010, Dr. Gehringer assigned his students of ECE/CSC 506 (Architecture of Parallel Computers) an assignment to create a wiki textbook. The assignment was to read the chapters from the textbook and write a supplement for the textbook on several topics related to the chapter. According to Dr. Gehringer, the students did a good job on this assignment.

At the end of the semester a twelve-question Web survey was sent out to 15 students who finished the class, 9 of whom responded. Most of their responses were favorable. Of the students who responded, on a scale of 5 (where 5 is strongly agree and 1 is strongly disagree), students’ responses averaged 4.22, to a question which asked them whether they had put a lot of effort in writing articles for the wiki textbook. They rated at 4.22 a question that asked them whether the material they read in order to write their chapter gave them new insight into the topic they were writing on. Also, when they were asked whether they were proud of their contribution, students rated it a 4.11. Students used the electronic signup sheet for selecting their topic. So they were asked whether they had any trouble using it; students rated this question at 2.44, which means most of them were comfortable using the system.
Table 7.1: Results from student survey

<table>
<thead>
<tr>
<th>Question</th>
<th>Student response</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>I had trouble understanding what was expected of me in writing a textbook chapter.</td>
<td>4 3 2 4 2 1 1 4 4</td>
<td>2.78</td>
</tr>
<tr>
<td>I put a lot of effort into writing my articles for the wiki textbook.</td>
<td>3 5 5 4 5 4 5 3 4</td>
<td>4.22</td>
</tr>
<tr>
<td>The material I read in order to write my chapter gave me new insight into the topic I was writing on.</td>
<td>4 4 4 4 5 4 5 4</td>
<td>4.22</td>
</tr>
<tr>
<td>The textbook articles I wrote are credible entries for a graduate textbook</td>
<td>2 4 4 4 5 3 4 4 3</td>
<td>3.78</td>
</tr>
<tr>
<td>I am proud of my contributions to the wiki textbook.</td>
<td>3 5 5 5 4 4 4 2 4</td>
<td>4.11</td>
</tr>
<tr>
<td>Having students write a textbook supplement for a course like ECE/CSC 506 is a good idea.</td>
<td>4 2 4 5 4 5 4 4 2</td>
<td>3.78</td>
</tr>
<tr>
<td>I clearly understood what was expected of me in reviewing a textbook chapter.</td>
<td>3 4 3 3 4 5 4 4 3</td>
<td>3.67</td>
</tr>
<tr>
<td>The chapters I read that were authored by other students gave me new insight into the material they covered.</td>
<td>2 3 3 3 4 5 3 4 4</td>
<td>3.44</td>
</tr>
<tr>
<td>The reviews I received helped me to improve my work.</td>
<td>2 4 4 4 5 3 4 2 2</td>
<td>3.33</td>
</tr>
<tr>
<td>The scores assigned by the reviewers were fair.</td>
<td>2 4 3 4 4 4 2 4 4</td>
<td>3.44</td>
</tr>
<tr>
<td>There was too much rating required for this class.</td>
<td>3 5 3 3 3 2 4 3 2</td>
<td>3.11</td>
</tr>
<tr>
<td>I had trouble determining how to carry out the assigned activities in Expertiza.</td>
<td>3 3 1 3 2 2 1 4 3</td>
<td>2.44</td>
</tr>
</tbody>
</table>
Chapter 8

Conclusions and Future Work

8.1 Conclusions

When instructors set up large assignments with multiple tasks with multiple deadlines, it’s usually a lot of work for the instructor and the TAs. This is because of the extra administrative overheads involved in setting up large assignments. It should not require a PhD to handle the administrative tasks of setting up assignments. If these overheads were delegated to a machine, life would be much simpler, for the instructor and other course staff. The instructor will be able to dedicate more time towards developing course content for his/her students.

Assignments which involve student-authored textbook are of great pedagogical value. The students can decide what their learning environment should be. It encourages students to have their own viewpoint and decide what is relevant about the course. In short, students get to compile their research on several topics into a textbook and can share them with their peers. The best way to achieve this is by using a suitable medium like the wiki where students can create and edit articles easily.

In this thesis, we have described some of the software features to reduce the overhead on instructors while setting up large projects like a wiki textbook assignment. In the related work section, we have discussed some research work with a special focus on wiki; how wiki is used to author textbooks, a monitoring tool which measure interactions between users and an algorithm which can compute quantitative values of trust for the text in the Wikipedia articles.

For large projects, the students have to sign up for the topics they want to work on. This can be
achieved using the electronic signup system. Students can suggest topics using the “New Suggestion” form and the instructor can approve topics which are reasonable. If the topics need to be done in a particular order the instructor can set the precedence and the system would set the deadlines appropriately for the topics. The system would also see to it that the students are notified of their deadlines in accordance with the topic they selected.

8.2 Future work

Many other features can be built into the system to ease/improve the administration of large projects in a class. Only some of them have been addressed in this thesis. Some of the ideas that we are continuing to work on are:

8.2.1 Improvements in reviewer assignment

Automatic assignment of reviewers is done randomly. This can be improved by assigning reviewers under certain constraints. Students should not be required to review topics during the round in which they are working on their own topic. Further, students can be allowed to indicate their preference as to when they want to review. So that when reviewers are assigned their preferences can be incorporated if possible.

8.2.2 Student-written questions

When students write chapters for wiki textbook, they also come up with their own quiz questions. These questions may be fully or partially be used on exams by the instructor. These quiz questions should easily be imported into the system using some standard format.

8.2.3 Customized review forms

A review form is the means by which the instructor can tell the reviewers what to look for in an article while reviewing them. Some instructors want this form to be a set of simple questions and the reviewer can rate the article based on these questions. But some instructors want their reviewers to do a more thorough job and like their review forms to have custom elements like textboxes, checkboxes etc. in their review forms. At present these kinds of forms cannot be created without a lot of custom coding.
So, a framework can be built and using such a framework, instructors will be able to build their custom review forms.

8.3 Summary

Electronic peer-review systems have been widely used to review student work, but never before, to our knowledge, have they been applied to assignments consisting of multiple interrelated parts with precedence constraints. The growing interest in large collaborative projects, such as wiki textbooks, has led to a need for electronic support for the process, lest the administrative burden on instructor and TA grow too large. This thesis has presented several components of that support, and suggested ways in which the support can be extended in the future.
Bibliography


