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Improving Educational Content: A Web- based Intelligent Tutoring System with Support for Teacher Collaboration

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Improving Educational Content:
A Web-based Intelligent Tutoring System with Support for Teacher Collaboration

by

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A Thesis

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Abstract

Collaboration among teachers in some shape or form is becoming increasing popular among the educational system. The goal of this thesis is to determine whether teachers find value in collaboratively working in a Web environment and if we can use collaboration to improve educational content. We took a Web-based intelligent tutoring system, called ASSISTments, and incorporated a collaboration feature allowing teachers from around the Web to work together to create content for their students. The previous ASSISTments model did not allow for any form of collaboration; teachers using ASSISTments were not able to modify each other's content. By creating the opportunity for teachers to work together, we hypothesized that the educational content within ASSISTments would improve. To help improve education content among ASSISTments, we also deemed it necessary to improve the tool that teachers used to create problems for their students. Using surveys and interviews, we obtained feedback from teachers supporting our changes of the ASSISTments system and validating our claims that they found value in collaboratively working in a Web-based environment.

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1.Introduction

ASSISTments[1] – contrived from the combination of the words "Assistance" and "Assessments"— is a Web-based intelligent tutoring system that enables teachers to create problem sets for assessing their students' knowledge. The system provides "Assistance" by means of immediate feedback provided to the student on each question that they answer and providing hints or step-by-step explanations upon request. The system also provides "Assessment" through a wide array of reports available to the teacher, describing the students' performance of a given problem set.

ASSISTments is already widely regarded as an effective education tool and is being used by thousands of middle school teachers and students. We hope to improve upon the tutor by incorporating the ability for teachers to collaborate while creating or finding content for their students. Much like Japan's lesson study [5], where teachers study and develop lesson plans and student data to improve teaching, we hope to create a system where teachers can collaborate on lessons and take advantage of ASSISTments' already existing reports to create a better overall quality of content for students to learn from.

The benefits of working collaboratively as teachers allows for each party to learn different ways of teaching or presenting a problem. After teaching the same way for many years you can get stuck in your own ways[2]. Working online also provides its own benefit of thinking spontaneously and having records of your thoughts—since everything must be typed and discussions do not have to be scheduled during meetings [4].

1.1. ASSISTments' Previous Model

Before our steps to incorporate collaboration, ASSISTments only provided a locked down model. Meaning, when a teacher created a problem set, they were the only ones allowed to edit that content. This model, while protecting a teacher's content, did not allow for robust or reliable content. For example, if another teacher wants to improve upon a problem set, either by fixing a mistake or creating hints, they would have to first create a new copy of the problem set and then create a new copy of the specific problem that they are improving. Then, inside of ASSISTments we have two problem sets, both identical, except one has improved content and the other has possibly a critical flaw that is still available for teachers and students to use. To improve the overall content of ASSISTments, we believe that we should move away from this type of model and move to a more collaboratively driven content model. In this sense, the users would have much more control over content. This is similar to a wiki, which allows for constant improvement of content.

1.2. Our Goal

The goal of this project is to improve the educational content of ASSISTments. In order to accomplish this, we believe that ASSISTments should move more towards an overall community driven website. Our users should be able to work together to create and improve content for their students. Currently, this is difficult to do in ASSISTments. We hope towards the end of our endeavors that teachers will have the power to create more robust content and work together to further improve the problem sets that are used to assess students.

1.3. Our Steps

Our first step —which inspired further movement into changing ASSISTments to be more collaborative— was to add a way for teachers to add feedback to an incorrect answer via the reports page. In this way, when a teacher assesses their students with either a problem set that they have created or another user has created, they can quickly modify the problem set to improve the immediate feedback given based on common wrong answers. By doing this, as teachers use these problem sets more and more, students are receiving immediate feedback based on their incorrect message which will help the student arrive at the correct answer. In this sense, we found great value in this feature and believe its use will help improve the educational content of the system.

Our second step to improving content had to deal with improving the way teachers input questions into the system. We felt that the current tool for quickly creating problem sets was unintuitive and didn't provide enough features to create a good problem set. By improving this tool, we hypothesized that teachers would be more likely to create content and more likely to create better quality content.

In our final step we worked towards making collaboration possible in ASSISTments. To accomplish this, we created a way for teachers to add users that they trust to have edit privileges for their content. If a user is a non-trusted user, they will be given the option to suggest changes to another user's content. We also added the ability for authors to revert changes that have been made to a problem.

1.4. Evaluation

Our evaluation is based on surveys and interviews aimed at determining if our changes to ASSISTments are useful. Since this is a vast change to the ASSISTments' model, we are mostly looking for whether our changes impact teachers in a positive or negative way, setting up for more research into actual gains in the future. We also look at ASSISTment data to determine if this feature improves the amount of content created by teachers. We plan to distribute surveys to teachers that are part of our grant. They will be questioned on whether they have worked collaboratively before, if they have created a problem set before, and how often they use ASSISTments to create content. Through questions like these, we aim to get an understanding if collaboration through ASSISTments is plausible, if teachers would find it valuable, and if they think that content is improved by a collaborative revision scheme versus just one person creating a problem set.

2.Collaboration of Feedback

Our first notion of improving content was to allow teachers to add an incorrect message while viewing their student's data on a particular problem set via ASSISTments' reporting feature. An incorrect message is associated with a specific incorrect answer and is displayed as a message to students when they answer the problem with that incorrect answer. With one of ASSISTments' strengths being the ability to provide immediate feedback, it seemed natural that we provide a convenient and fast alternative for teachers to input incorrect messages for their students to view. Rather than the slow and tedious process of navigating through problems to add incorrect messages, we added a link named "+feedback", as shown in Figure 2, placed underneath the common wrong answer and the percentage of students who provided that incorrect answer.

Feedback has been proven to increase a student's average gain score by half a letter grade [8]. By creating a convenient way to supply feedback, teachers will be more apt to add a message based on the incorrect answer. As more teachers create feedback, we can obtain gains such as reported by papers *Comparing classroom problem-solving with no feedback to Web-based homework assistance*[10] and *Increasing K-12 Homework Effectiveness with Immediate Feedback* [8]. By increasing the amount of feedback towards incorrect answers, we can help show students what they may have done wrong. Compared to doing their work on paper, where a student could do a whole worksheet incorrectly without any feedback, we can improve their learning by immediately giving them feedback for the first time they make a mistake.

2.1. Design

Our general design goal with this new feature was to create a way for teachers to easily improve content on the fly. The most logical way to accomplish this goal was with the already existing reports that ASSISTments provides to teachers. One item that these reports provide to teachers is the common wrong answers row.

As depicted in the flow chart of Figure 1, our design was to create a link that when clicked would create a form for the user to input a message for a specific common wrong answer that multiple students have provided. The common wrong answer itself appears when a majority of students have provided the same incorrect answer— the percentage will be highlighted in red if 50% or more students provided that answer, as seen in Figure 2. As shown in the flow chart, we check for three criteria to determine if a teacher may provide an incorrect message. The first criterion is that there is a common wrong answer of that problem. If there is no common wrong answer, they may not create one for some arbitrary answer. The second criterion is that the teacher who is viewing the report has more than 10
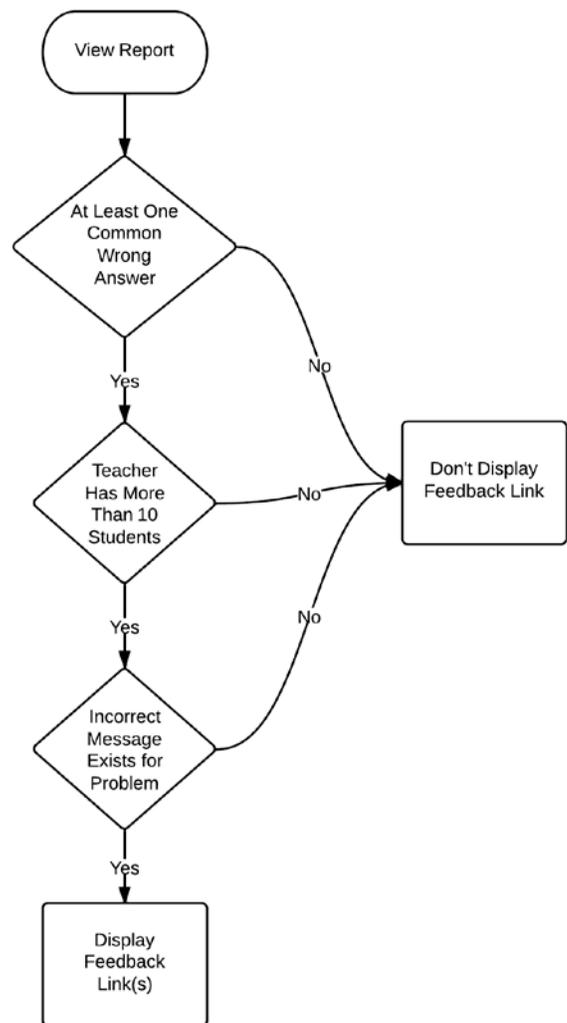

Figure 1: Basic flow of the incorrect message feature for reports

students. We created the check as a security measure to try and prevent malicious accounts from creating unwanted content. The final criterion that must be met is that there does not already

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exist an incorrect message for this answer— since an answer may only have one incorrect message to be displayed to the student. If these criteria are all met, then a "+feedback" link is displayed, as shown in Figure 2.

Problem Average	82%	94%	84%	67%	98%	80%	72%	89%	89%
Common Wrong Answers			-46,**90%** +feedback	2/3,33% +feedback -1/3,19% +feedback		2p-6,30% +feedback	2p+6,**72%** +feedback		
Correct Answer(s)		43	26	-2/3	0	5c+8 , 8+5c	2p-6 , 2p+-6 , -6+2p	-9y-6 , -6-9y , -6+-9y , -9y+-6	-4
XXXXX *	80%	✔ 43	✘ -46	✔ -2/3	✔ 0	✔ 5c+8	✔ 2p-6	✔ -9y-6	✔ -4

(tooltip: Add an incorrect message for the above common wrong answer.)

Figure 2: Adding feedback via reports

When a user clicks on the "+feedback" link, a simple form appears below the row of common wrong answers, as shown in Figure 3. This form consists of the incorrect answer in which you are creating the message for and a text area in which you can input the message that you wish appear when a student answers the problem incorrectly with this answer. After the user saves the incorrect message, the "+feedback" link will disappear from that common wrong answers, as show in Figure 4.

Problem Average	82%	94%	84%	67%	98%	80%	72%	89%
Common Wrong Answers			-46,90% +feedback	2/3,33% +feedback -1/3,19% +feedback		2p-6,30% +feedback	2p+6,72% +feedback	
Correct Answer(s)		43						-9y-6 , -6-9y , -6+-9y , -9y+-6
Barton, Nick W *	95%	✔ 43						✔ -9y-6
Bellerive, Michelle A *	75%	✖ Scaffold						✔ -9y-6

Incorrect Answer:
-46
Incorrect Message:

Don't forget that multiplication and division come before addition and subtraction in order of operations.

✔ Save Answer or Cancel

Figure 3: Creating an incorrect message

Problem Average	82%	94%	84%	67%	98%	80%	72%	89%
Common Wrong Answers			-46,90%	2/3,33% +feedback -1/3,19% +feedback		2p-6,30% +feedback	2p+6,72% +feedback	

Figure 4: After an incorrect message has been added

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2.2. Usage

Our general use case for this feature, as shown in Figure 5, follows the process of a content creator first creating education content and then, at some point, a teacher comes along and creates an incorrect message for a particular incorrect answer. By having the "+feedback" link available on the report page of the problem set, the teacher has all of the data readily available to them to make an accurate decision on a message that would best help the students whom are struggling.
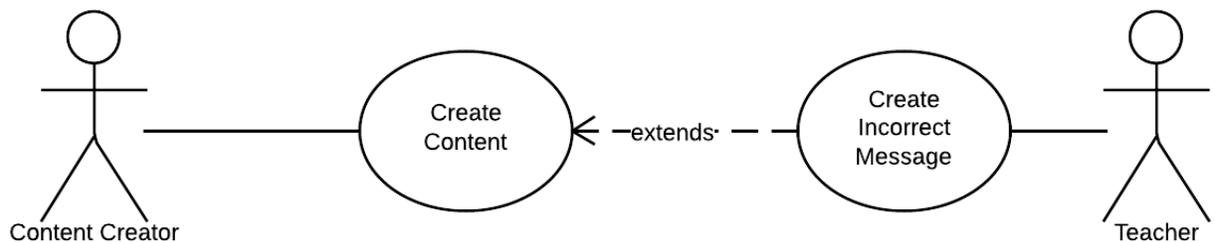

Figure 5: Use case of feedback feature

Once the incorrect message has been added to the common wrong answer, if the answer is then given as an answer to the problem by another student, a message will appear with the helpful hint of what they may have done wrong, as shown in Figure 6.

Figure 6: Running a problem with the newly added incorrect message

Once teachers were able to use the feature, we learned of an unexpected way to use this feature. As shown in Figure 7, instead of a teacher solely creating the incorrect answer, the teacher would have a discussion with their students to create an incorrect message. We thought that this was a fantastic way to use the feature. The following is a quote from a teacher using the feature in this manner,

> "My students used ASSISTments for nightly homework because I loved the immediate correctness feedback it provided. However, adding hints to every question was very time consuming. This is why I loved the feature that allowed me to enter a message for a common wrong answer. It was a quick and easy way to enhance the feedback provided for future classes. As a class we would discuss what message would have been helpful when they entered a common wrong answer and my students actually wrote the messages. It was a great meta-cognitive exercise that forced students to think about what mistake they made and how to correct it without just giving the answer." – Kim Kelly, Grafton Middle School
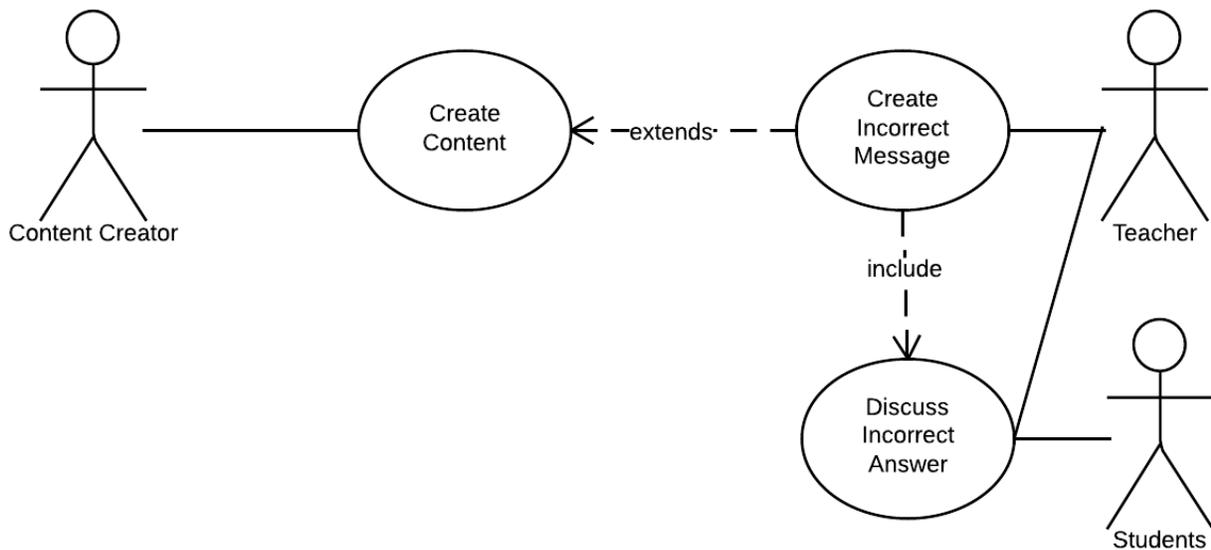

Figure 7: Unexpected use case of feature

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3.Improving Content Creation

For our second step of improving education content within ASSISTments we decided to redo the Quick Builder, a tool used to quickly create problems for a problem set. The original Quick Builder— now called the Old Quick Builder— had a lot of faults that made it unintuitive for new users and did not do a lot of the things that we felt the Quick Builder should do.

The importance of redoing the Quick Builder is that we strongly feel that to improve content for students, the teachers need a tool that is both easy to use and has the features that they are looking for when creating a problem set. If the teachers do not have an intuitive tool that makes their lives easier, then they will not want to create content and there will be no content to improve. By streamlining the process of creating problem sets and adding more features we believe that teachers will both create more problem sets and create better problem sets.

With the New Quick Builder, we set out to resolve the shortcomings of the Old Quick Builder and embrace the simplicity and quickness that the Old Quick Builder tried to accomplish. As displayed in Figure 8, the Old Quick Builder contained three text areas for data input. While simple, if you start to think about creating a problem with this builder, you may start to question a few things; for example, how exactly do you insert answers and what does 'Answer is accessible-B' mean?

Figure 8: Old Quick Builder

Figure 9: New Quick Builder

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3.1. Design

With the design of the New Quick Builder, we tried to make a tool that was aimed at making the teachers life easier. By discussing the flaws of the Old Quick Builder with users, we came up with ways to change the Quick Builder for the better. By making the tool more intuitive and adding quality of life changes, we hope both new users and existing users will be able to create problems with ease and without confusion.
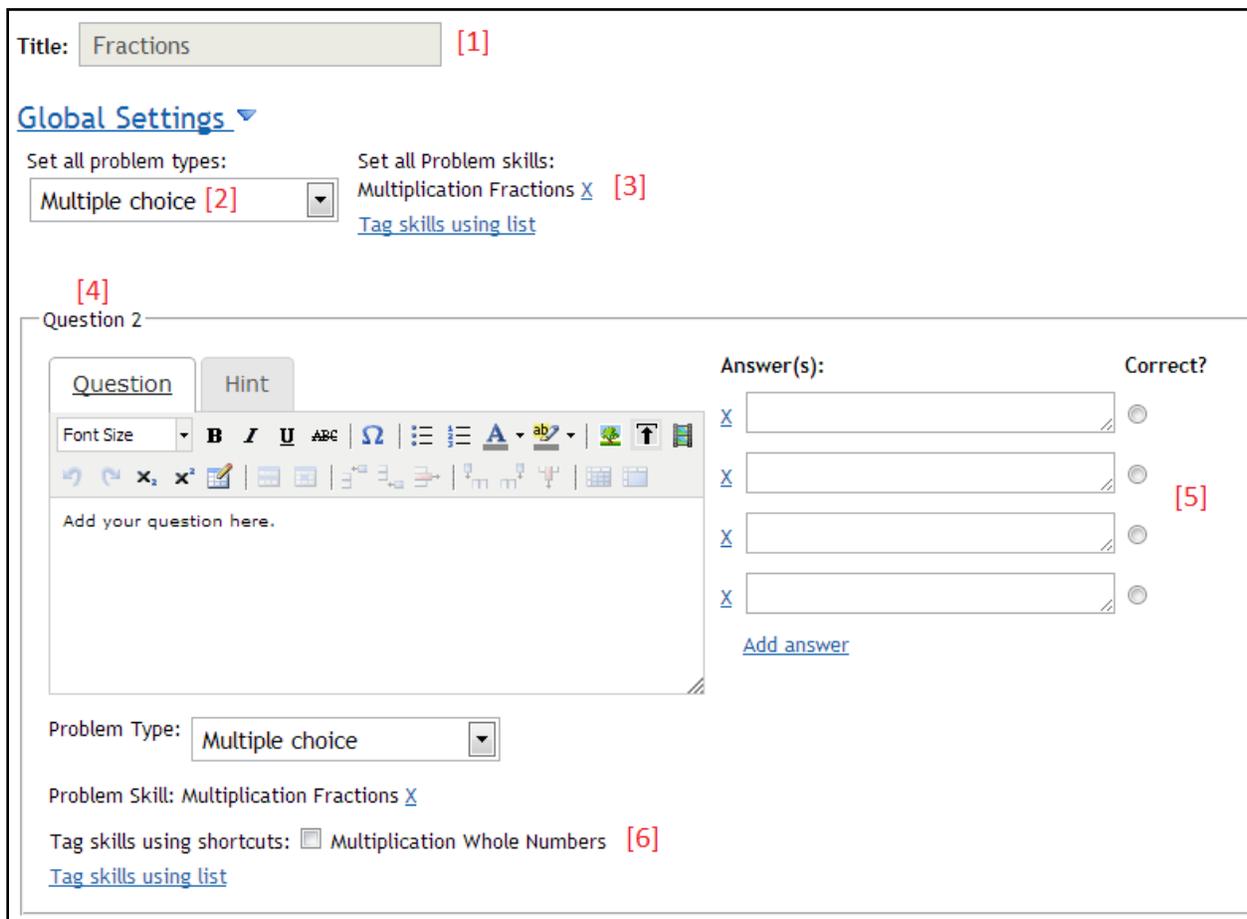

Figure 10: New Quick Builder with points of interest

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Figure 10 displays the New Quick Builder after the continuation of a problem set. I will be referencing the numbers in the figure to point out the changes of the New Quick Builder:

[1] We moved the title to the top of the page. This was more of a quality of life change and seemed the obvious place for the title rather than the placement under settings in the Old Quick Builder. We also fixed the title such that it remembers the title of the problem set when creating more questions. The image displays the New Quick Builder in a continuation of a problem set named 'Fractions', so accordingly, the title displays the name.

[2] To cut down on the time it took to create problem sets, we added the ability for the New Quick Builder to remember previous settings. In this case, the New Quick Builder is continuing a problem set of multiple choice problem types; the default problem type is algebra, as shown in Figure 9.

[3] The problem skill is also a setting that gets saved. We believe this is a huge time saver because it can be difficult to remember all of the skills you have tagged for a problem set if you want to keep the skills the same. If not, you can simply click the 'x' to delete the skill.

[4] Another quality of life change is that the New Quick Builder remembers what question number you ended with. In this case, a problem set was created with one question and we are continuing on the second question.

[5] One of the major improvements to the New Quick Builder is the new editor for inserting questions and the individual answer boxes. The editor now allows are users to format their questions and media such as images and videos to a question. This opens up new opportunities for teachers when creating a problem set. The new way to insert answers is more intuitive than the Old Quick Builders method of a text area in which the user had to guess that

each line of the text area corresponded to an answer, with the first line being the correct answer. The answer field is also more dynamic by changing to radio buttons for multiple choice answers.

[6] To help teachers improve content by tagging problems with skills, the New Quick Builder remembers currently used skills and allows the teacher to quickly select the shortcut to tag the problem. This saves the teacher time and makes the process of tagging problems less tedious.

As shown in Figure 11, to fix the issue of problem options that nobody understood, such as 'Answer is accessible-B', we simplified the options. We changed the options from four choices —that needed explanation on what they meant— to two choices. The first option provides the default tutoring strategy that we recommend to all teachers. This option allows students to have an unlimited number of attempts on a problem with the ability to obtain the answer by selecting to read through hints. The second option allows the teacher to define a number of attempts that a student will be given with the option of either giving the student the correct answer or not after the student has exhausted their attempts.

Figure 11: New Quick Builder optional settings

3.2. Usage

The general usage of this tool is to allow teachers to quickly create problem sets. With this tool, teachers can create questions to assess their students. For each question they can choose which type of answer they require: algebra, multiple choice, fill in, and open response. Teachers can now create a hint, which students have the option of viewing if they cannot answer the question correctly. For the problem set as a whole or for each individual question, teachers have the option of tagging with a skill to get some more detailed data about their students per skill.

With the addition of our changes, we believe that the New Quick Builder will live up to its name more so than the Old Quick Builder. The following testimonials from teachers provide some great feedback about the usage of this tool.

> "Thank you so much for making the building process easier and more efficient. I think users will be less frustrated with building now that the process is more streamlined." – Anonymous survey participant

> "Uploading images is very important for geometry questions and graphs. In the past I used to just type in the dimensions for example, which takes away from the problem. So now, I can actually use an image!"– Anonymous survey participant

4. Collaboration of Content

For our third step of improving education content within ASSISTments we wanted to create a way for teachers to collaboratively create and modify content. With the increase in popularity of working collaboratively in classrooms, we felt it was time that ASSISTments tried to incorporate collaboration in creating content. By allowing multiple teachers have control over a problem set, instead of just one, we believe that content over time will become better.

4.1. Multiple Authors

The simplest form of collaboration is the ability for multiple teachers to work towards one goal. Inside of ASSISTments, the most logical form of a goal is a problem set. By allowing teachers to work together to create problem sets we hope that the educational content of ASSISTments will become better over time.

4.1.1. Design

This feature consists of three different types of user states. The first state is an owner. The owner is the first person to initially create a problem set. The second state is an author. The owner can set as many authors as they would like. An author is a trusted user that has permission to make changes freely. An owner, in a sense, is also an author. The third state is a general user. A general user is a teacher account from ASSISTments that is most likely unknown to the owner or authors. The general user may provide any assistance to improving the problem set, but any changes made by this user must be accepted or rejected by an author. A basic outline of the flow/interaction between users can be seen in Figure 12.

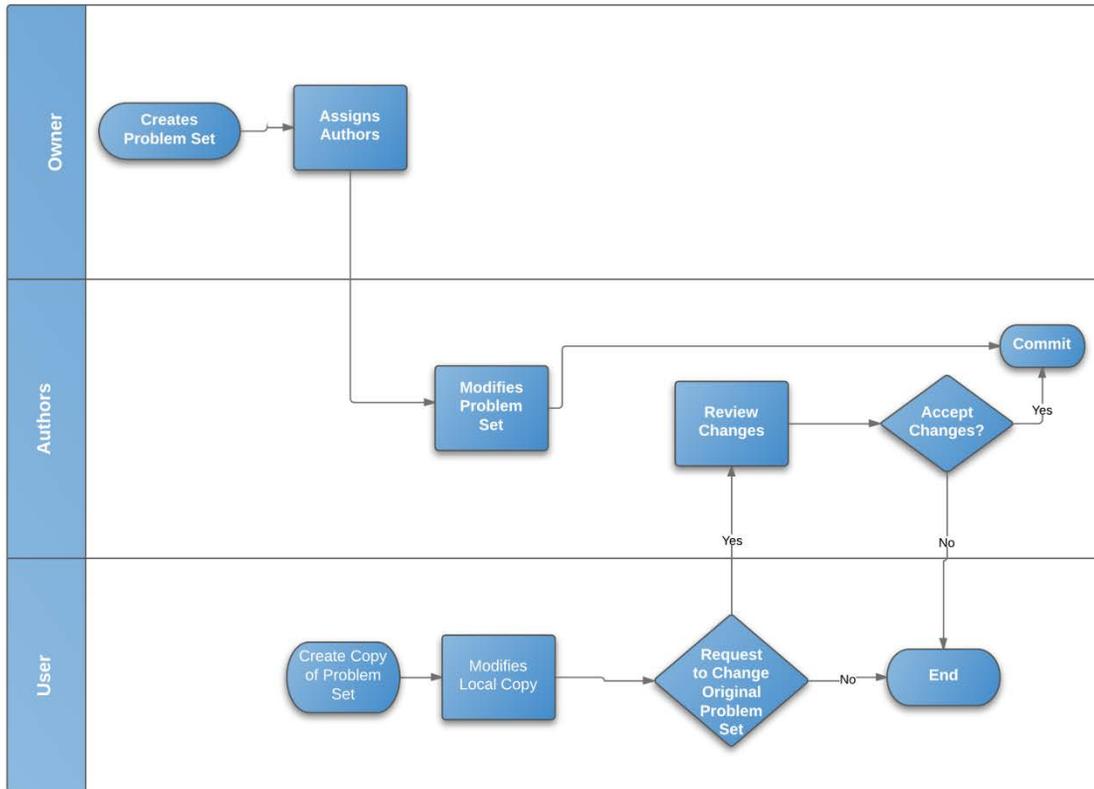# Basic Interaction of Problem Set Creation

Figure 12: Interaction between user states and flow of modifying a problem set

4.1.2. Usage

Using this feature, teachers are now able to work collaboratively with other teachers to create a problem set. If a teacher wants to allow another teacher to edit their content freely, they can add their username as an author to their content. Otherwise, another teacher could choose to make changes to content and inform the owner requesting to change the original content. In this manner, the owner receives the changes that a user is requesting to be changes and can either accept or deny those changes, allowing the owner of the content to remain in control of the content but open to changes and fixes.

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4.2. Content Revisions

While there are benefits to allowing multiple teachers to work on the same content, it can quickly become confusing for the authors if information is constantly changing and there is no record of anything that has been changed. Since we are moving towards allowing multiple teachers to edit the same content, we thought it would be important to provide a summary of changes for each problem set with the ability to revert changes that have been made.

4.2.1. Design

The general design for this feature is much like that of a wiki. When a teacher makes a change to content we then store that change in our database as a revision to the problem set. Authors are then able to review those changes, as shown in Figure 13, giving them a complete history of the problem set and allowing them to revert to an older version at any point.

4.2.2. Usage

The general purpose of this feature is to allow authors to keep track of what is being changed within a problem set and by whom. Since we are trying to implement collaboration in an online setting, we feel it is important to communicate changes made to the content ourselves. This will save a lot of time for the authors, and will reduce confusion if something has been changed. With this feature they will have complete knowledge of what another author is working on and what exactly they have changed in that process along with which author made the changes.

Main Problem 1

Lucy put 27 stickers in her notebook.
She put 3 stickers on each page.
Which number sentence can be used to find how many pages Lucy put stickers on?

Changes:

These are all the changes to Main Problem 1.

Problem type changed to Open Response, User: bhobbs -- Monday April 15 2013
Problem body changed, User: bhobbs -- Monday April 15 2013

Problem Body

Current

Lucy put 2̶37 stickers in her notebook.
She put 3 stickers on each page.
Which n̶e̶q̶u̶m̶b̶e̶r̶ ̶s̶e̶n̶a̶t̶e̶i̶o̶n̶c̶e̶ can be used to find how many pages Lucy put stickers on?

Old

Lucy put 27 stickers in her notebook.
She put 3 stickers on each page.
Which number sentence can be used to find how many pages Lucy put stickers on?

[Revert to old problem body]

Figure 13: Content revision

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5. Evaluation

Our evaluation process consisted of surveys and interviews with teachers. Since most of our changes were aimed towards improving tools and adding aspects of collaboration, we wanted to obtain some feedback about the New Quick Builder and whether or not teachers thought it was plausible to bring collaboration to an online Web-tutor.
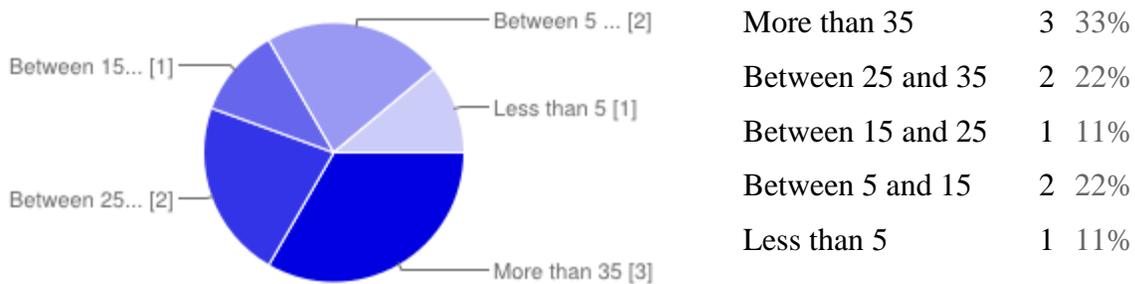
5.1. Participants

All of our participants for our surveys were Partnership In Math and Science Education (PIMSE) teachers. These are teachers that are part of our grant that allows us to participate in their classrooms to help students and use ASSISTments. We choose to use these teachers as our sample group because we know that they have been successfully using ASSISTments in their classrooms. The type of feedback that we tried to obtain was aimed at an experienced user of ASSISTments so we felt that these teachers were our main target group of the changes. We hope to learn how they received the changes, if they believe our changes will help improve content, and if they think collaboration within a Web-tutor is something that they would use and value.
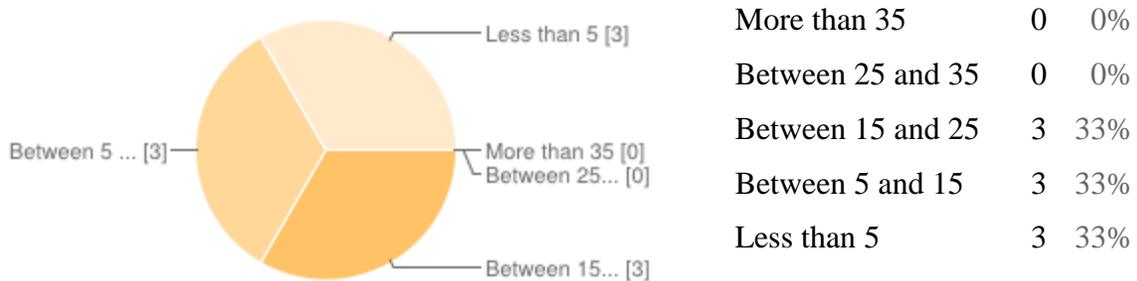
5.2. Survey Results

5.2.1. New Quick Builder versus Old Quick Builder

The following two questions were used to get a sense of how much the participant used the two versions of the Quick Builder. We obtained a good mix of results in response to the Old Quick Builder of users that have created many problem sets and users that have created few problem sets.

**About how many problem sets have you created using the Old Quick Builder?**

More than 35	3	33%
Between 25 and 35	2	22%
Between 15 and 25	1	11%
Between 5 and 15	2	22%
Less than 5	1	11%

About how many problem sets have you created using the New Quick Builder?

More than 35	0	0%
Between 25 and 35	0	0%
Between 15 and 25	3	33%
Between 5 and 15	3	33%
Less than 5	3	33%

The next two questions asked the participant about the improvement of the New Quick Builder over the Old Quick Builder. 100% of participants believed the New Quick Builder was a vast improvement and 78% reported saving over 5 minutes using the New Quick Builder. After following up with a few teachers about this question, we learned that teachers thought the Old Quick Builder was too tedious to work with, while the New Quick Builder was intuitive and helpful.

How would you rate the New Quick Builder compared to the Old Quick Builder?
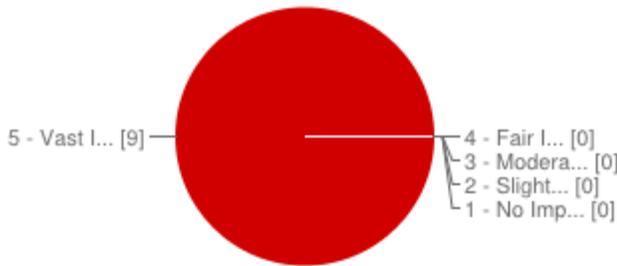
5 - Vast Improvement	9	100%
4 - Fair Improvement	0	0%
3 - Moderate Improvement	0	0%
2 - Slight Improvement	0	0%
1 - No Improvement	0	0%

How much time do you save creating one problem set with the New Quick Builder versus the Old Quick Builder?
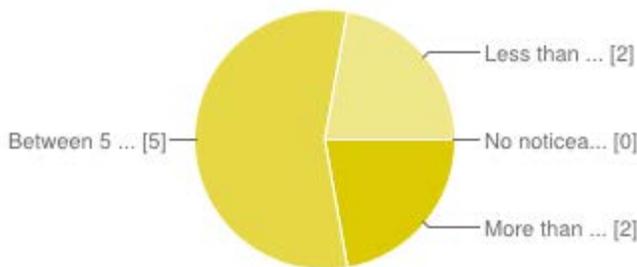
|		
More than 15 minutes	2	22%
Between 5 and 10 minutes	5	56%
Less than 5 minutes	2	22%
No noticeable difference	0	0%

The following two questions were created to help us gauge whether by improving the Quick Builder if teachers were more apt to create better overall content. The majority of participants agreed that the ease of the New Quick builder would allow them to create better content.

How likely are you to increase the amount of content you produce because of the New Quick Builder?
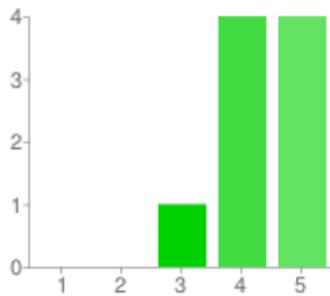
1	0	0%
2	0	0%
3	1	11%
4	4	44%
5	4	44%

How likely are you to create better quality content because of the New Quick Builder?
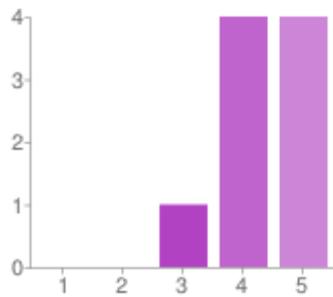
1	0	0%
2	0	0%
3	1	11%
4	4	44%
5	4	44%

5.2.2. Collaboration Survey

The following questions were presented to the participant to try and learn about their use of collaboration as a baseline. The first question was to figure out if the teachers used collaboration at school and the second was to determine if they, in some manner, use ASSISTments collaboratively with other teachers. 100% of participants admitted to working collaboratively in their school environment while 0% reported to working collaboratively with ASSISTments.

Do you currently participate in any form of collaboration as a teacher?

Yes [9] ——————— No [0]

Yes 9   100%
No   0   0%
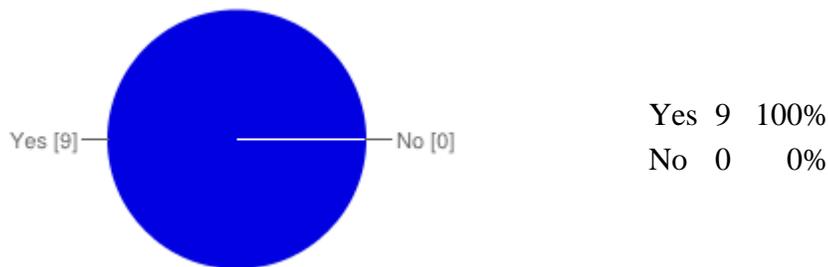
Do you currently use ASSISTments collaboratively with another teacher?

No [9] ——————— Yes [0]

Yes 0   0%
No   9   100%
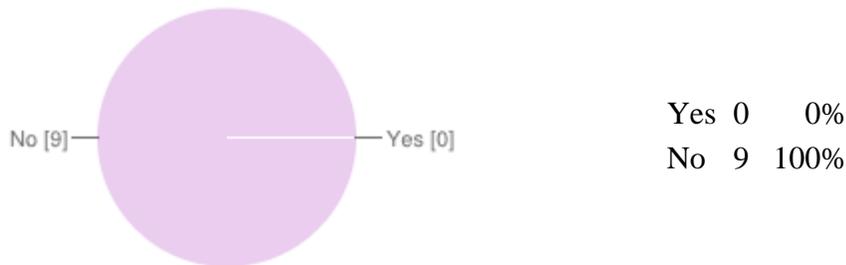
With the following two questions we tried to get a sense of whether or not teachers would use collaboration through ASSISTments.

Scenario 1: You are working with other teachers to create a great problem set. You would like these teachers to have full control over one of your problem sets, so you add them as authors. Now, you and the teachers added are able to modify the same problem set.

Scenario 2: You have created a problem set for your students. Another teacher thinks that your problem set is great and would like to use it with their students as well. While this teacher is using the problem set with their students, they notice that the answer to a problem is incorrect or a question was not understood by students. The teacher then improves the problem set and you are notified by email, or in ASSISTments, of the changes and are given the option to either accept or deny the changes into your original problem set.

According to the description above, how likely would you be to use Scenario 1 above?

1	0	0%
2	1	11%
3	2	22%
4	4	44%
5	2	22%

According to the description above, how likely would you be to use Scenario 2 above?
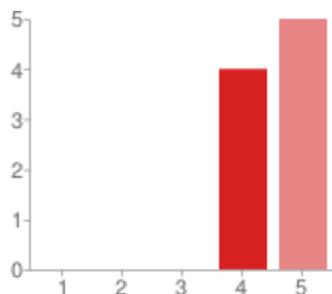
|		
1	0	0%
2	0	0%
3	0	0%
4	4	44%
5	5	56%

The follow two questions asked the participants how they would value others modifying their content. According to the first question below and the first question on the previous page(Scenario 1) its seems as if teachers are less interested in working with other teachers to create content and more interested in allowing users to request changes or fixes to their content.

How would you value the ability to allow other teachers to edit your content?
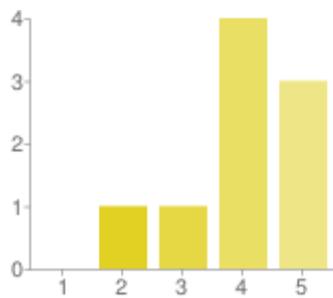
1 0   0%
2 1   11%
3 1   11%
4 4   44%
5 3   33%

How would you value the ability for ASSISTment's users to request changes or fixes to your content?
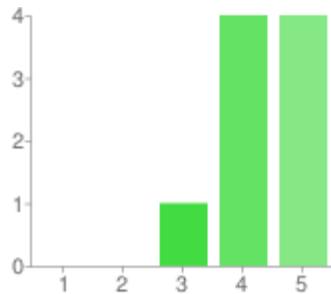
1 0   0%
2 0   0%
3 1   11%
4 4   44%
5 4   44%

6.Conclusion

After reviewing the surveys and talking with teachers, everyone loved the ability to add feedback on the reports page and loved the changes to the Quick Builder. They felt that changes such as these—that made their lives easier—resulted in their ability to enhance content and make it better without much effort. In the surveys 88% of participants admitted that they were more likely to produce more content and better quality content because on the New Quick Builder. Talking with teachers, most noted that the New Quick Builder was more intuitive and provided great features.

Out of the survey participants, 100% answered that they practiced collaboration at their schools and most worked with other teachers to plan lessons. However, after reviewing surveys and talking with teachers, most teachers seemed less interested in co-authoring problem sets and more interested with allowing other users to review their problem sets and request changes. A lot of participants also noted that having easier ways to share content was of great importance.

With this project, we set out to test the waters of online collaboration using the ASSISTments system. We learned that teachers took value in small changes that made their lives easier and led to improvement of content. We learned that collaboration was plausible but that teachers were slightly more interested in allowing users to request changes to their content rather than working with other teachers to create problem sets together.

APPENDIX A: Surveys

1. Quick Builder Survey

1.1. Survey
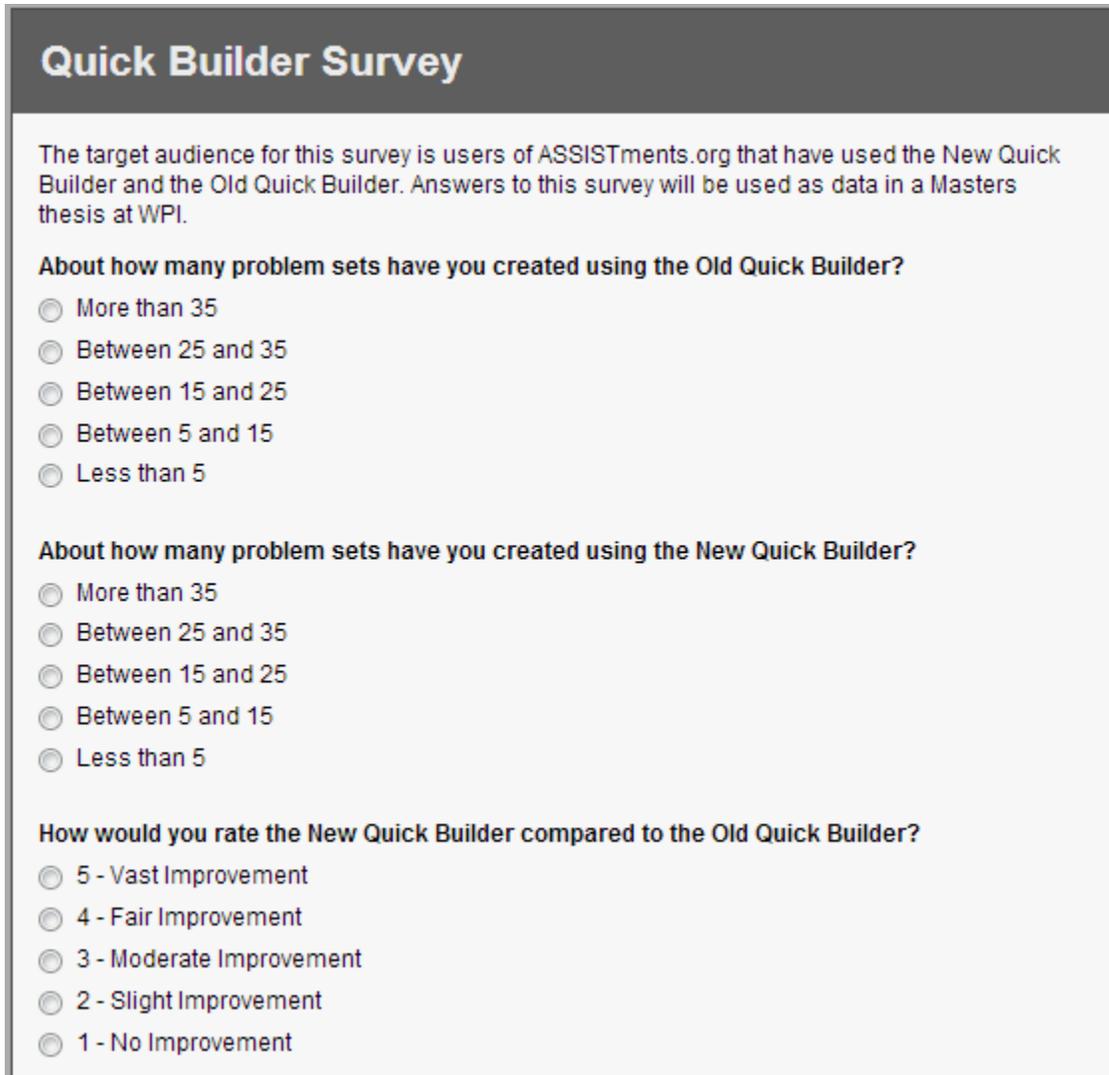
Quick Builder Survey

The target audience for this survey is users of ASSISTments.org that have used the New Quick Builder and the Old Quick Builder. Answers to this survey will be used as data in a Masters thesis at WPI.

About how many problem sets have you created using the Old Quick Builder?
- More than 35
- Between 25 and 35
- Between 15 and 25
- Between 5 and 15
- Less than 5

About how many problem sets have you created using the New Quick Builder?
- More than 35
- Between 25 and 35
- Between 15 and 25
- Between 5 and 15
- Less than 5

How would you rate the New Quick Builder compared to the Old Quick Builder?
- 5 - Vast Improvement
- 4 - Fair Improvement
- 3 - Moderate Improvement
- 2 - Slight Improvement
- 1 - No Improvement

Figure 14: Page 1 of Quick Builder Survey

How would you rate the New Quick Builder compared to the Old Quick Builder?

○ 5 - Vast Improvement

○ 4 - Fair Improvement

○ 3 - Moderate Improvement

○ 2 - Slight Improvement

○ 1 - No Improvement

How much time do you save creating one problem set with the New Quick Builder versus the Old Quick Builder?

○ More than 15 minutes

○ Between 5 and 10 minutes

○ Less than 5 minutes

○ No noticeable difference

How likely are you to increase the amount of content you produce because of the New Quick Builder?

　　　1　2　3　4　5

Not likely ○ ○ ○ ○ ○ Extremely likely

How likely are you to create better quality content because of the New Quick Builder?

　　　1　2　3　4　5

Not likely ○ ○ ○ ○ ○ Extremely likely

In the New Quick Builder you can quickly write a hint. If you use this feature can you explain how?

Figure 15: Page 1 of Quick Builder Survey(cont.)

In the New Quick builder you can format the question and upload images. If you use this new feature can you explain how.

The New Quick Builder will remember your settings, such as test mode or multiple choice. If you use the new feature can you explain how.

The New Quick Builder allows you to add a wrong answer or two right answers and order your multiple choice answers. If you use this new feature can you explain how.

Are there any other New Quick Builder Features you use and would like to comment on? If so do so here.

Continue »

Figure 16: Page 1 of Quick Builder Survey(cont.)

Figure 17: Page 2 of Quick Builder Survey

2. Collaboration Survey

2.1. Design

The design of this survey is not linear as in the Quick Builder survey. As shown in Figure 18, based on the answers to a few questions, the flow of the survey changes. If the participant answers that they have use collaboration as a teacher, we then follow up with a question asking them to explain their expierence such that we can get some more background. If a user answers that they have used collaboration with ASSISTments before, we also ask them some more follow-up questions.

Figure 18: Flow of Collaboration Survey

2.2. Survey

Figure 19: Page 1 of Collaboration Survey

Figure 20: Page 2 of Collaboration Survey

Collaboration

Collaboration inside of ASSISTments
Imagine two scenarios,

Scenario 1: You are working with other teachers to create a great problem set. You would like these teachers to have full control over one of your problem sets, so you add them as authors. Now, you and the teachers added are able to modify the same problem set.

Scenario 2: You have created a problem set for your students. Another teacher thinks that your problem set is great and would like to use it with their students as well. While this teacher is using the problem set with their students, they notice that the answer to a problem is incorrect or a question was not understood by students. The teacher then improves the problem set and you are notified by email, or in ASSISTments, of the changes and are given the option to either accept or deny the changes into your original problem set.

According to the description above, how likely would you be to use Scenario 1 above?

1 2 3 4 5

Not Likely ◎ ◎ ◎ ◎ ◎ Extremely Likely

According to the description above, how likely would you be to use Scenario 2 above?

1 2 3 4 5

Not Likely ◎ ◎ ◎ ◎ ◎ Extremely Likely

Can you describe why you would or wouldn't use Scenario 1?

Can you describe why you would or wouldn't use Scenario 2?

Figure 21: Page 3 of Collaboration Survey

Figure 22: Page 3 of Collaboration Survey(cont.)

Figure 23: Page 4 of Collaboration Survey

Figure 24: Page 5 of Collaboration Survey

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