AC 2007-499: MYSPACE IN THE CLASSROOM: CLASSROOM NOTE TAKING COLLABORATION VIA A SOCIAL NETWORKING MODEL

Jeff Ringenberg, University of Michigan

David Chesney, University of Michigan

mySpace in the Classroom: Classroom Note Taking Collaboration Via a Social Networking Model

Abstract

With the recent surge in next-generation internet technologies becoming available to both students and instructors, it is undeniable that technology will soon become an integral part of everyday classroom life. Social networking sites, instant messaging programs, and online collaboration tools may be beneficial to student learning provided that they are utilized properly. However, if these technologies are used inappropriately, they can severely hinder the effectiveness of a lecture. Therefore, it is important that these tools are studied in a suitable context in order to understand how they can be used properly in the classroom.

Considering this need to study the impact of emerging internet technologies on learning, this paper will explore how social networking and online collaboration tools can be used to both strengthen note-taking skills and also provide instructors with feedback regarding the effectiveness of their teaching. To do this, we have made use of two free, online applications, mynoteIT[1] and Gliffy[2], that provide a framework for students to publish online notes for each of their classes, to share their notes with their classmates, and to make comments on each other's notes. Using these applications, students are able to create a powerful learning toolset accessible from any computer that has a capable web browser.

Our results have shown that there is a great deal of potential in using these tools, however, much care must be taken for them to be used effectively. In particular, we tested the usefulness of the tools with respect to collaborative note taking and exposed several strengths and weaknesses. We also observed that social networking effects and behaviors can impact the way that students take notes. Finally, we discovered that it is possible to use the tools to help prepare more effective lecture material based on the notes that were taken.

1.0 Introduction

Students of the 21st century are spending ever increasing amounts of their time and lives online. One of the main reasons is there are rapidly increasing numbers of opportunities for them to interact with each other in online social environments. From Webkinz[3] to wikis, children are being introduced to social networking sites such as mySpace[4] at a very early age, and personal safety concerns aside, this style of interaction will be present in the classroom.

Another set of technologies that is changing the way that students work is the increasing availability of free, web-based utilities. Applications such as Google Docs and Spreadsheets[5] enable students who have access to an internet connection and a web browser to do work from anywhere and store their documents remotely. This allows them to transition from school to home and not have to worry about losing their work or remembering to take it with them. They simply log on to the application and their work is in the same state that they previously left it.

In addition, student access to computers in the classroom is increasing along with wireless internet coverage at most colleges and universities. In the near future, high speed wireless internet access will be available almost everywhere and will dramatically change the landscape of the classroom. This access to technology, if properly utilized, can create an environment that will greatly enhance student learning.

By leveraging these technologies, this paper will show the results of our study of a new learning environment. We will show that while the tools can be very useful and can provide students with opportunity to greatly increase the impact of their notes, there must be a certain level of functionality provided in order for them to be effective. We will also show that some traditional social behaviors were exhibited by the students in the study and that this affected their use of the tools. Finally, we will show that by observing the notes that were taken, it is possible to obtain feedback on the delivery of the current lecture material.

2.0 Methodology

This paper relied on a set of tools that enabled real-time note taking in the classroom including the creation of fairly complex diagrams. The tools, mynoteIT and Gliffy, are both freely available and store the notes that the students take in an online, password-protected location. The mynoteIT tool was used for taking text-based notes in an environment that is very similar to Microsoft Word. It also allowed for embedding images, but lacked the ability to upload certain file types such as pdf documents. Alternatively, the Gliffy tool was used for making diagrams that could not be drawn using mynoteIT. These diagrams were saved as images and linked into the notes that were taken using mynoteIT. Figure 1 shows an example of a typical Gliffy session and Figure 2 shows a mynoteIT session that uses an embedded Gliffy diagram.

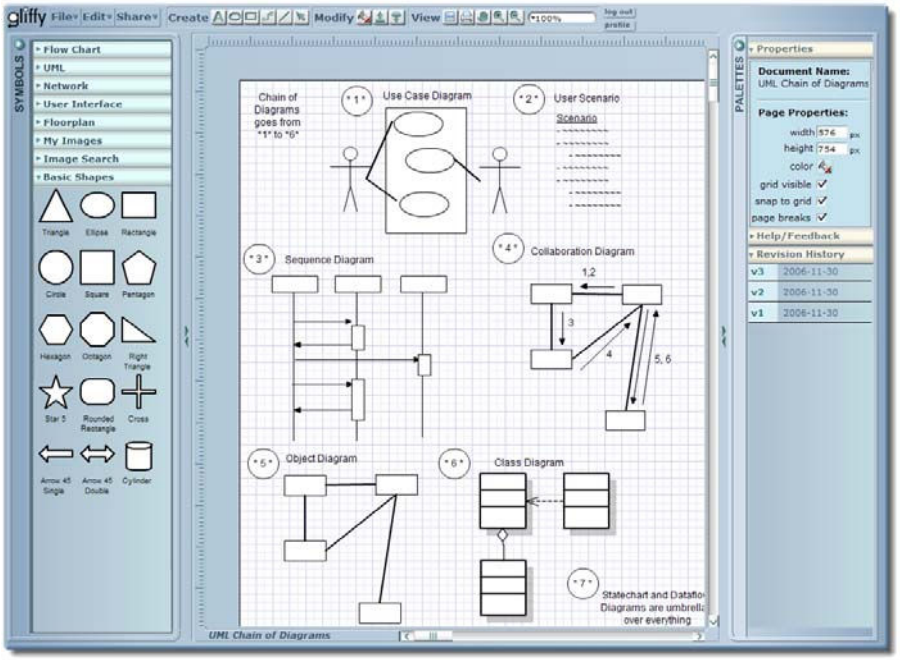

Figure 1: Screenshot of Gliffy tool in use

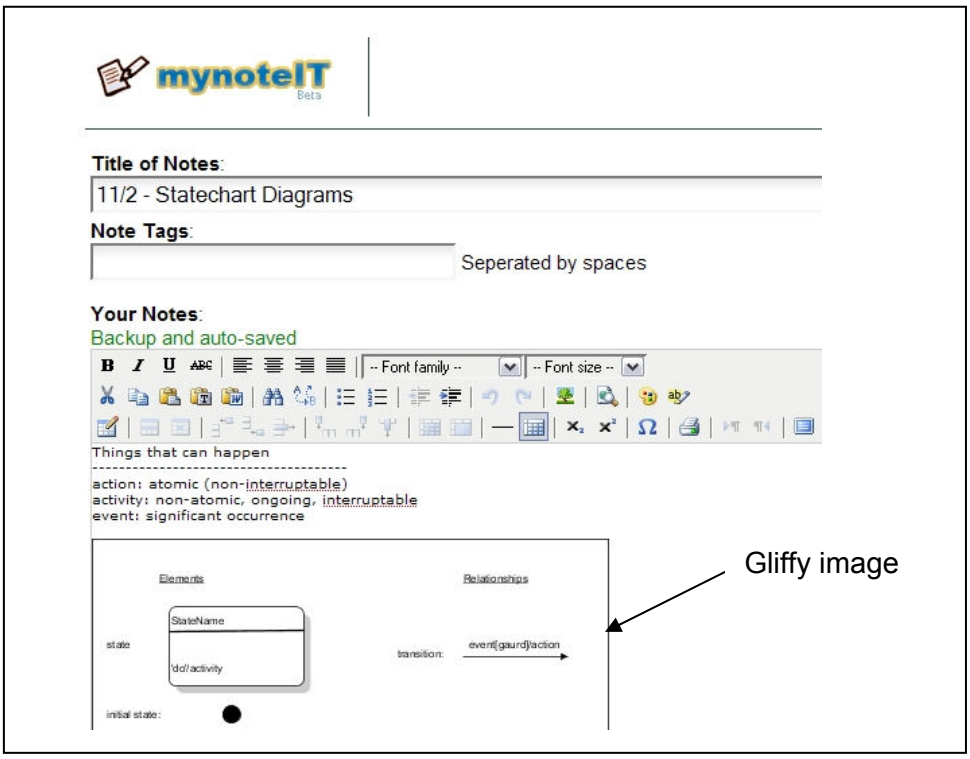

Figure 2: Screenshot of Gliffy image embedded in a mynoteIT note

Each of these tools had many advanced features that enabled the students to create content-rich notes. MynoteIT was able to highlight text, change font style and color, create tables, insert hyperlinks and images, and add many other elements to a set of notes that simple paper-based notes could not. Gliffy also had an impressive set of features. For example, students were able to insert many different standardized objects into their diagrams that could be linked together with connecting lines. If these objects were later moved in the diagram, the lines that connected them would automatically move in the diagram so that the objects would remain connected and the lines did not need to be redrawn. This feature allowed for diagrams that could be easily moved and changed if it became necessary to modify their content.

Since the applications were hosted online, they only required that the students possessed an internet connected computer with a web browser installed. Given that wireless internet access is available throughout the University of Michigan campus and that most students had their own laptops, the students were able to start using the tools immediately. For those students who did not have their own laptops, they were provided with university-owed laptops that they could use during the lecture.

The course that was used to study these tools was one semester of a senior-level Software Engineering class. Of the 29 students who were enrolled, 12 student volunteers participated throughout the entire term. In order to provide an incentive for the students to participate, they were given "Points" for the various activities that they needed to perform. The Points were used at the end of the term in exchange for various computer accessories and parts.

For the study, students took their notes online, posted their notes to be reviewed by their peers at the end of each class, and then rated each others notes after they had been posted. The online note taking activity required the students to log on to the mynoteIT and Gliffy websites at the beginning of class. If for some reason the online tools were unavailable at the start of class, the students were able to take notes with third party applications such as Microsoft OneNote without having to log onto the sites. After taking notes in these applications, they could then upload the notes to mynoteIT at a later time.

For organizational purposes, the students were partitioned into four groups of three students. These four Note Groups each agreed on one set of notes from their three members to post to a larger Review Group. Each student then only had to review and rate the notes that were in the Review Group which consisted of at most four sets per day. This approach was chosen since it effectively reduced the number of note sets that would need to be reviewed by all the participants while still providing the ability to have each set of generated notes analyzed by someone other than the original author.

Once the notes where placed in the Review group, each student had to pick which set was his/her favorite and then vote for this set on a class wiki. Once the votes were tabulated, the group that provided the set of notes with the highest rating received bonus Points for each member in the group. In order to place a greater incentive on taking the highest quality notes, this bonus was larger than the Points that each student received for simply taking notes and rating them. Figure 3 illustrates the flow of notes through the entire process.

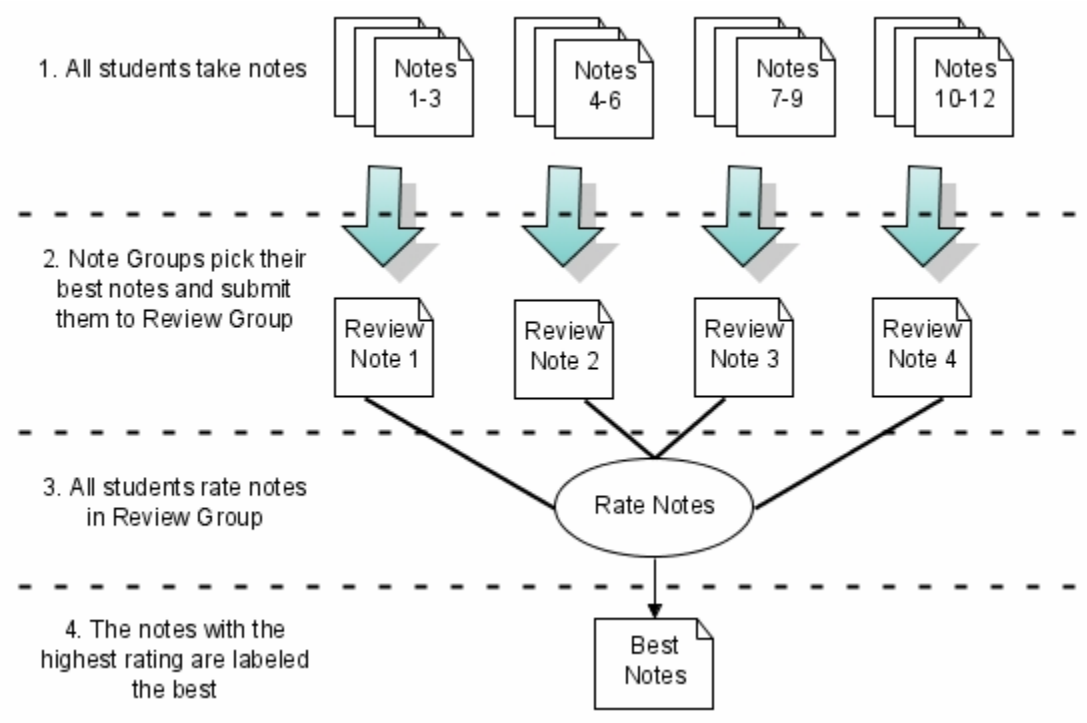

Figure 3: The steps involved in finding the best notes

At the end of the term, the students were given a survey (Figure 4) that asked for their opinions about the tools and also about some of their usage statistics. A five-point Likert Scale was used to gauge their opinions on the effectiveness of the tools and their surrounding computing environment. In order to measure their usage statistics, the students were able to choose a range of hour values to indicate how much time they used the tools both inside and outside of class.

Statements	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**	**Not Applicable**
The mynoteIT tool was useful…….....	5	4	3	2	1	N
The mynoteIT tool was easy to use…….....	5	4	3	2	1	N
I would recommend mynoteIT to others…….....	5	4	3	2	1	N
I would use mynoteIT in the future…….....	5	4	3	2	1	N
The Gliffy tool was useful……...	5	4	3	2	1	N
The Gliffy tool was easy to use……...	5	4	3	2	1	N
I would recommend Gliffy to others……...	5	4	3	2	1	N
I would use Gliffy in the future……..…….....	5	4	3	2	1	N
Wireless internet access was readily available…….....	5	4	3	2	1	N
Internet access was necessary for the tools to be effective…….	5	4	3	2	1	N
Enough time was given in class to effectively use the tools……	5	4	3	2	1	N
Overall, the tools made me more confident with the material....	5	4	3	2	1	N
Overall, the tools were effective…….	5	4	3	2	1	N
Questions	**Hours**					
How many hours did you use mynoteIT per week outside class?	0	< 1	1-2	2-3	3-4	4+
How many hours did you use mynoteIT per week inside class?	0	< 1	1-2	2-3	3-4	4+
How many hours did you use Gliffy per week outside class?	0	< 1	1-2	2-3	3-4	4+
How many hours did you use Gliffy per week inside class?	0	< 1	1-2	2-3	3-4	4+
How many hours per week do you use social networking sites such as mySpace, Facebook, etc…?	0	< 1	1-2	2-3	3-4	4+
How many hours per week did you look at your notes online?	0	< 1	1-2	2-3	3-4	4+

Figure 4: End User Survey

3.0 Results

In order to study the usefulness of the tools and their ability to aid in student learning, we examined various student usage patterns, the quantity and quality of notes, and the results of the study. It was discovered that: the tools provided both positive and negative features; typical social networking behaviors had been exhibited by the students; and the tools could be used to give feedback on the lecture material. Each of these observations will be expanded upon below in its own section.

3.1 Strengths and weaknesses of the tools

Both mynoteIT and Gliffy had strengths and weaknesses that became apparent as they were used throughout the semester. One of the main strengths of the tools was that they enabled students to access their notes at any time from any internet-connected computer using a web browser. This feature was very useful for students who left their notes at home and needed to use them at school. In addition, students were able to insert content into their notes that was obtained during lecture from the internet. In one case, a student was able to insert an alternate definition from wikipedia for several terms that were presented that day. This helped to broaden that particular student's notes with additional material and to give another perspective to the topic that was being taught. Another useful feature of the tools was that students were able to look at each others notes. Therefore, if anyone missed a class or was not able to take enough notes, s/he could simply log on and look at their peers notes. Several students mentioned this in their written comments, saying:

"I often found other's notes on mynoteIT useful when I did the homework."

"I did find it helpful to look back at other people's notes and compare them to mine."

Despites the many advantages of the tools, they were not without their shortcomings. The first and most obvious weakness of the tools was the fact that diagrams were not easy to insert into notes. In order to do this, a student would have to make a diagram in Gliffy, save it as an image file, and then embed or link it into a mynoteIT set of notes. This often took more time than was available during lecture, and many students resorted to simply drawing the diagrams on paper. This limitation of the tools was brought up consistently in the written comments on the tools with one student vehemently stating:

"It is impossible to take notes with Gliffy because it takes too long."

While this weakness hindered some students from including diagrams in their notes, it could have been fixed by adding basic drawing capabilities to the mynoteIT application. Another solution that a few students offered was to make use of tablet PCs for taking the notes. In fact, one student in the study had access to a tablet PC and his notes consistently had complete and effective diagrams. Either way, the tools must address this weakness in order for students to generate a complete and useful set of notes.

In addition to the problem with diagrams, students also ran into issues with the wireless internet connection during lecture. While the survey results showed that, on average, wireless access was readily available, some students had consistent issues with getting a connection during class. Several mentioned that it hindered them from finishing a diagram or that it caused them to lose notes altogether in mynoteIT. Therefore, it is clear that an internet connection is essential to using the tools. The survey agrees with this since the students rated the statement regarding the necessity of internet access as 4.7 out of 5.

Overall, the survey indicated that the students felt the tools were marginally useful with an overall effectiveness score of 3.4 out of 5. Gliffy's received a higher individual score of 4.5 out

of 5 on the statement regarding its usefulness as opposed to mynoteIT's score of 3.6 out of 5. This is most likely due to the fact that the students could use Gliffy outside of class to generate diagrams for their homework and also that mynoteIT was more difficult to use. The fact that mynoteIT was more difficult to use was shown by looking at the survey statement that addressed ease of use where mynoteIT scored 3.1 compared to Gliffy which scored 4.2. The results for the entire survey are summarized in Figure 5.

Statements	**Average Score**
The mynoteIT tool was useful…….....	3.6
The mynoteIT tool was easy to use…….....	3.1
I would recommend mynoteIT to others…….....	3.5
I would use mynoteIT in the future…….....	3.1
The Gliffy tool was useful……...	4.5
The Gliffy tool was easy to use……...	4.2
I would recommend Gliffy to others……...	4.1
I would use Gliffy in the future……..…….....	3.8
Wireless internet access was readily available…….....	4.0
Internet access was necessary for the tools to be effective…….	4.7
Enough time was given in class to effectively use the tools……...	3.6
Overall, the tools made me more confident with the material…...	3.4
Overall, the tools were effective…….	3.4
Questions	**Average Hours**
How many hours did you use mynoteIT per week outside class?	< 1
How many hours did you use mynoteIT per week inside class?	1-2
How many hours did you use Gliffy per week outside class?	< 1
How many hours did you use Gliffy per week inside class?	< 1
How many hours per week do you use social networking sites such as mySpace, Facebook, etc…?	1-2
How many hours per week did you look at your notes online?	< 1

Figure 5: Survey results

3.2 Social networking behaviors

Several social networking behaviors were observed during this study. In addition to the opportunity for students to look at each other's notes that was discussed in the previous section, we noticed that the students in the study exhibited the behaviors of several different social types that have been previously identified[6]. These three social types were:

- Leaders: students who actively participated and posted large amounts of notes
- Posters: students who participated sporadically and posted small amounts of notes
- Lurkers: students who read other's notes and posted little or no notes at all

As the previous work in this area has shown, each of these social types is necessary to the success of an information community. Leaders are needed to provide the bulk of the information

that is used and they are often the source of important and meaningful material. Posters contribute to the group, but usually to a much lesser extent that the leaders. In general, they are newer users and still need to learn how the community is run. Posters also alert leaders that there are others who are posting information. This prevents the leaders from feeling that they are the only people doing any work. The last group, lurkers, is necessary to the community's existence since they are the real consumers of the information. If they did not exist, the popularity of the community would dwindle and would not receive much use.

Another behavior that was initially observed was the discussion between students regarding how they were going to post notes from their Note Groups and the subsequent rating of the notes in the Review Group. When the project began, students actively tried to choose whose notes from their Note Group would make it into the Review Group. In addition, they rated each other's notes and it appeared that this would continue throughout the term. However, as the semester progressed, less and less voting was occurring and the students no longer appeared to discuss who would post to the review group. Instead, random students from each Note Group would simply post their notes to the Review Group without discussing it first.

It is unclear as to why this increasing lack of communication and interactivity occurred, but it is possible that the deficiency of the tools was, again, a large contributor to the failure of this part of the project. The problem with the tools was that there was no simple or elegant way for students to discuss and rate their notes. The mynoteIT developers stated that their site would have a very easy way for students to rate each other's notes, but this feature was never implemented. In addition, the feature that allowed students to discuss each other's notes stopped working near the beginning of the semester, thus preventing students from discussing their notes. Development of the tool also appeared to stop at this time and the students were then forced to work with an incomplete tool. These shortcomings were addressed by allowing the students to vote for each other on a class wiki, however, it turned out to be a very cumbersome process and was eventually abandoned by the students.

Regardless of the failure of the voting part of the project, the results of the survey with respect to social networking were very interesting. The most interesting observation was the correlation between the tools' contributions to the students' confidence and the three different social types. The study showed that leaders, i.e. those who posted nine to eleven sets of notes, *did not* feel that the tools contributed to their confidence in the material. However, the posters who contributed two to five sets of notes and the lurkers who contributed little or no notes felt that the tools *did* contribute to their confidence. The details of this survey statement can be seen in Figure 6.

	Leader	Poster	Lurker
Overall, the tools made me more confident with the material	2.333333	3.6	4

Figure 6: The Effects of Social Type on the Tools' Contribution to User Confidence

This result shows that the leaders in the study were already confident with the material since they had been actively contributing to the community and were already well-versed in the content. On the other hand, the posters and lurkers used the information that the leaders posted as a means to better learn the material themselves, thus gaining a higher level of confidence from the tools.

This behavior, however, did not go unnoticed as one leader said in a written comment:

> *"Considering that I was almost the only one to add notes, for me, the tools weren't all that useful. There needs to be some way to moderate who can see your notes by adding meaningful notes that will be helpful to other people who contributed."*

It is unfortunate that this person had to experience this and it shows that a greater reward system needed to be implemented to give an incentive to those who where actively participating. However, since this study was not mandatory and was not allowed to affect anything substantial such as grades, such a reward system will have to be implemented in future work.

3.3 Using student notes as feedback

Not only did mynoteIT and Gliffy provide the students with useful tools for taking good notes, but they also allowed the instructors for the course to monitor the quality and the quantity of the notes that were being taken. This information could then be used to determine if the lecture material was being presented effectively. Previous studies such as those done by Berdanier have also shown this[7].

The first observation showed that sometimes students were not able to finish their notes before the lecture moved on to another topic. This was mentioned previously as a weakness of the tools; however, the results from the survey showed that the students felt that this may not be the only reason. The statement gauging if they were given enough time to effectively use the tools was scored a 3.5 indicating that they slightly agreed. In looking at the notes from the beginning of the term to the end, it was seen that those in the beginning were oftentimes more incomplete. Additionally, verbal student feedback early in the term indicated that the students were having difficulty with the pace of the lecture in general. Therefore, as the semester progressed, the length of time in lecture dedicated to taking notes was increased.

Another observation showed that the majority of the notes early in the semester consisted only of what was being written on the board or filled in on previously incomplete presentation slides. Students were not adding in their own thoughts and comments and thus their notes were very unoriginal. Later lectures were then set up to include more amounts of student input particularly in the form of student solutions to in-class examples. These solutions were seen in the student's notes and, therefore, the notes gained a greater level of originality. This helped the participants in the study since they had a larger pool of notes to draw upon. In addition, it allowed the instructors to check if the students' solutions varied from the expected results and correct them if necessary.

A final observation showed that there is a possible correlation between the student's social type and the overall grade the student received in the course. The overall grade for the course relied heavily on the ability of each student to work in a team and this was reflected using the results of peer evaluations. These evaluations are an indicator of how team-oriented a student is and also how much s/he contributes in a social situation. However, homework and exam grades were the sole responsibility of each student and these grades were not affected by his/her ability to work

in a group. Since the overall course grade relied on the ability of the student to interact in a socially effective way, it is possible that there would be a correlation between the student's social type and the overall grade that s/he received. As Figure 7 shows, this is the case.

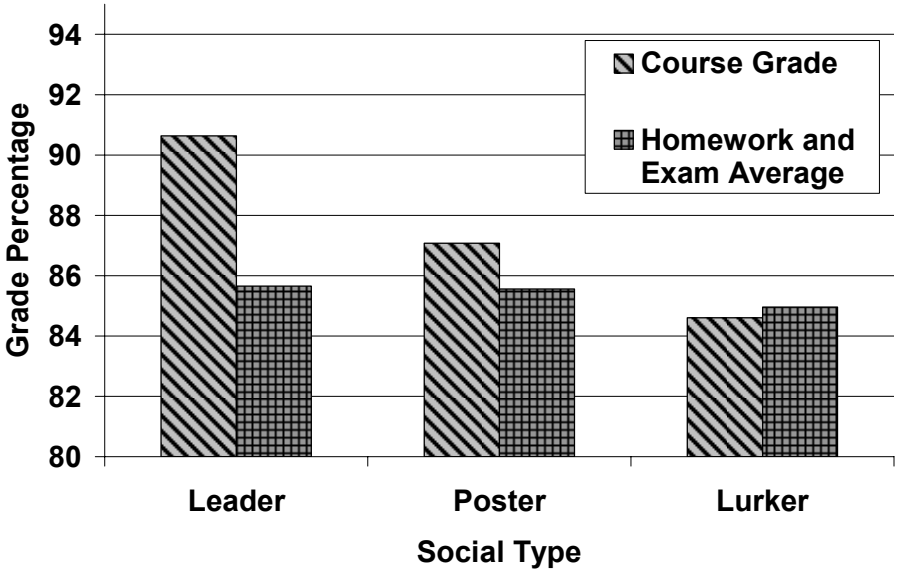

Figure 7: Comparing overall course grade with social type

When looking at the overall grade in Figure 7, leaders received the highest course grades on average and lurkers the lowest. However, when looking at the average of the homework and exam grades, there appears to be no correlation. Since the sample size is so small, these results are not entirely conclusive; however, it is interesting that a general trend is observable with respect to the overall course grade.

4.0 Conclusion

Next-generation internet technologies have the ability to revolutionize the way that students learn, study, and interact both with their instructors and their peers. Students will be able to access their notes and coursework from many different locations and not have to worry about losing or forgetting their materials. In addition, the collaborative nature of many of the new tools will create new avenues of communication that were not available in the past. Instructors will be able to see how students in the course are interacting and if they are learning the material at an acceptable rate. This project has shown that by using several of these new technologies, students were given a useful set of tools to take more effective notes and to share them with their peers. Overall, these applications, and the functionality that they provide, will ultimately strengthen the students' abilities to learn and better prepare them for their experiences upon leaving the classroom.

5.0 Future Work

There is a great deal of potential with using the power of social networking in the classroom. It is already clear that it is a large portion of future students' lives. The challenge now becomes how the teaching community is going to leverage this technology to the students' advantage. There are many areas that still need to be explored and the first of these is testing them in a larger classroom. This study was limited to only 12 students and while there were interesting results, it is possible that some observations will need to be modified due to the small statistical sample. In addition, the reward system that was used did not provide effective incentives to the students to keep them actively involved in the project. Future studies could incorporate posting notes as a part of a student's participation grade and these posted notes could be used as an alternative for other types of class participation. A final study might be to create a better voting and ranking system for the notes that have been posted. A great deal of work has been completed using public response systems, i.e. "clickers", to get real-time student feedback[8]. These tools could also be used to vote on a set of finalists in a larger class setting to decide which student has the best set of notes. This would not only increase the interactivity and competitive spirit of the students in the course, but would also instill a sense of pride into those students who are rated as the best note-takers for the day.

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