Show a Little Style

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ABSTRACT
A short segment on Alice has been used in introductory programming classes. The intent was to introduce objects in an easily accessible way. In the third iteration of this approach a presentation was made on quality issues in dramatics. The students were instructed on how to make the video more entertaining.

Although this may be accomplished in a class hour or less, the results were encouraging. The quality and length of the projects increased. This suggests that students are expending more time and energy on the projects which implies an increase in learning.

Categories and Subject Descriptors
K.3.2 [Computers and Education]: **Computer and Information Science Education** – ***curriculum.***

General Terms
Human factors.

Keywords
CS Educational research, Alice programming language, non-majors, drama.

1. INTRODUCTION
Alice is a compelling platform for introducing the fundamental concepts of programming. Describing the basic form of programming on this system is not always enough to energize students. Of course, they need to know how to tell a story, but they also need to know what constitutes a good story. Knowing the technical details of how to animate their characters does not guarantee that they will be creative enough to produce an interesting project.

This paper discusses the use of a presentation on the characteristics of good drama. This presentation should take less than one hour and was inserted into a three week Alice segment of an introductory Java class. Although objective results cannot be proven, this seemed to increase both the size and quality of the projects. This suggests that the students were spending more time on their projects and hence increasing their learning.

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2. PREVIOUS AND CURRENT ALICE USE
In the Spring of 2009, the CSci 127, (Programming in Java) class was perceived to have a larger than normal number of Mathematics Education majors. This class is an exposure to programming. It has no prerequisites but satisfies a requirement for Computer Information Systems students as well as Mathematics majors. This is not the CS 1 class which is the gateway to the rest of the Computer Science curriculum. Students who show promise in this class are routinely encouraged to enter the CS 1 class, which is a C++ class.

In the small high schools of rural North Dakota a teacher often needs to assume several roles. The mathematics teacher is often the only one who would make a suitable programming instructor. Therefore, at the last minute it seemed a good idea to teach a short segment on Alice in this class for the benefit of these future teachers.

The intent was to teach just three weeks of Alice to the class in order to accomplish two purposes. The aforementioned Mathematics Education students were instructed that they should tell their future principals that an expert had said that most of the conventional programming languages were not suitable for a first language in the high or middle school curriculum. All of the students were told that besides being fun, Alice would be painless introduction to objects, with methods and properties, flow of control and several other elements that would be later investigated in Java. They may not have believed the usefulness argument, but they were hopeful that the fun argument had merit.

This was not the first time such a course of action had been taken. In the Spring of 2006 a similar short segment preceded this same course[3] and in the Fall of 2007 a similar segment had started the CS 1 course, CSci 160. In both of these a video to be displayed in class culminated the Alice portion.

3. THE PROBLEM
Alice is generally effective because it engages the students in creating a video which is generally much more entertaining than the typical Java program produced in such a course. This promotes the students spending more time on the task, which has a very solid correlation with learning[1]. However, there is also the issue of storytelling that needs to be considered. The CSci 127

class has two typical student types. The first of these is the Mathematics Education major, the second is the Computer Information Systems (a business major) and then a smattering of other majors. These first two majors have this as a requirement rather than an elective. Although it is always a risk to categorize students by their major, in most cases the Mathematics and Computer students are not well known for their storytelling abilities, especially when compared with a Literature or Theater major. If the students do not believe in their ability to tell an interesting story, their motivation plummets as does the likelihood of significant learning. In the past the only advice that had been given to students consisted of two pieces. First, the main characters of Alice programs generally possess large numbers of sub-objects. More joints generally produce more realistic actions for the main character. Lesser characters may have fewer components without detracting from the story. Second, interesting stories generally have some type of conflict. Both of these are good general statements, but they hardly go far enough.

In order to boost their understanding and thus self-confidence of the students in the area of good dramatics a guest lecturer (the second author) was invited to participate in the class. As it happened, he was teaching a class on the development of modern drama at the same time and we were able to join the two classes for this one presentation. This faculty member will retire elsewhere at the end of this term, but that will not prevent the first author from using this material again. The next section summarizes the contents of such a presentation for the benefit of others who may choose to adopt something similar.

4. PRESENTATION TOPICS

The two most common majors in this class typically have little or no experience in telling a story in a video format. Unfortunately, those who teach this class are often from a similar pool. Therefore, for those who feel theatrically-challenged this section describes the material used in the presentation as well as some similar approaches. This material should be enough for a suitable presentation.

4.1 The GOTE acronym

GOTE stands for Goal, Other, Tactics and Expectation and was developed by Robert Cohen[2]. (A previous version by Cohen was known as VOTE, where the V is for Victory instead of Goal.) These were devised for acting students, but for the most part apply towards Alice-style videos as well. Each of these specifies a particular object that the writer needs to cover to give the story an entertaining form.

The first object is the Goal. Each significant character in a story needs a goal. This is important for the actor portraying the character, but must be in the mind of the author and director as well. There must be something that the character desires to reach. This goal may be an object or a position. This pursuit of the goal and the complications encountered on the way is the tension that gives interest to the plot.

The Other stands for the other characters who relate to the main characters. There can be helpers and/or obstacles. The helpers are encouraged to be sympathetic, helping a major character to achieve his or her goal. Just as frequently there are opposing characters. They may be threatened, because they want the object for themselves or want to frustrate another major character. Although the main character may be opposed by circumstances or other impersonal forces, it is usually more engaging to encounter a protagonist and antagonist working against each other.

Tactics are the mechanisms by which a character works to achieve goals or sub-goals. Such a character may induce or threaten others to help or at least not hinder. The form or intensity of the tactics greatly affects how we perceive the character. An antagonist generally uses threats and fear to achieve the goal, and this often creates animosity in the audience towards that character.

The last object is the Expectation or Energy of the character. When the character demonstrates that he or she really expects to achieve the goal they will show energy or anticipation. This will often vary as the plot ebbs and flow. The emotions of the audience often follow the lead character's energy.

4.2 Aristotle's Theory of Tragedy

The study of the dramatic form extends back at least to Aristotle in the fourth century BC. Aristotle is likely one of those few people who knew everything there was to know in his day. His surviving work *Poetics* describes the six elements that should be found in a tragic play[4]. Unfortunately, his work on comedy seems to have been lost in antiquity. For those unfamiliar with ancient theater, a tragedy and a comedy were more similar than different. The Greek or classic comedy is not a funny play as we might assume today, but only one that ends well for the main character. Thus most contemporary movies are comedies, at least in this sense.

Aristotle's first and most important requirement was that a tragedy should have a suitable plot. There must be a story to tell. The plot is an arrangement of incidents that is self contained. The plot should have a beginning, middle and end, and the incidents must be guided by cause and effect. Each decision of the characters cause later incidents. Plot complications will add depth to the play. The antithesis to this is known as deus ex machina, literally "god from the machine." In its most egregious form, the main character finds himself in a hopeless situation and a god or other previously unknown character or mechanism appears and extricates the protagonist from an inevitable doom. Instead, the important actions later in a play should always have their antecedents from earlier decisions and actions.

The second important characteristic is character. This is the unique combination of virtue and vice which defines the protagonist. What is in their heart? By "character," Aristotle meant what we mean when we say a person *has* character. It is not synonymous with a character as a person. Character strikes a chord in the audience and determines if they are empathetic or hostile to the character. In the better plays the character supports the plot by the decisions the players make determining the outcome. Even in short Alice videos, character may be displayed and cause feelings in the audience.

Aristotle also believed that a play should have an overriding theme or message. In its simplest form it is the moral of the story. Today we are likely see drama as entertainment, void of message to learn, but great dramatic works in theater or film, even today, often display an important theme.

The contribution of the language also makes an impact on the quality of the piece. The words used should be appropriate for the character portrayed. The country bumpkin and the lawyer should

speak in a way consistent with their environments and background.

The fifth characteristic is, perhaps surprisingly, rhythm. Although the term is most often associated with music, dialog and action should have rhythm as well. To be sure it may be less precise than that of music, but it exists none the less. Greek and Shakespearean tragedies alike have a meter and this meter may be changed for dramatic effect. However, even a play or movie fully in prose has an ebb and flow of dialog that is crafted for effect.

The last element is spectacle. This is the design of the set, including lighting and props, that appeals to hunger for color, entertainment and special effect in any audience. The circus is all spectacle, while many action movies have spectacle dominate the other features. The spectacle of Alice programs is sometimes just the accomplishment of such a product, but one should never underestimate the spectacle of out-of-the-ordinary creative works. That Alice characters do not have to obey the laws of physics is an asset in this area.

4.3 Freytag's Pyramid

Gustav Freytag was a nineteenth century German philogist, playwright and novelist[5]. He postulated that a dramatic work had five portions. There was an exposition, rising action, climax, falling action and the ending. This model has been extremely influential. Figure 1 illustrates Freytag's pyramid or triangle.

The exposition is "the setting of the stage." The audience starts knowing nothing about the characters or situation which is the basis of the story. The main characters are introduced, sometimes in the gossip of minor characters, as well as the conflict that is the basis of the story. The end of the exposition usually introduces the inciting event. This is the trigger for the rest of the story. This is a key incident and when done well, causes the audience to frame a "what happens next" excitement.

The rising action follows the main character as various complications and conflicts arise. This may include the introduction of secondary antagonists or problems.

The climax is the turning point of the story. The fortunes of the leading characters generally change in this segment. In a comedy the protagonist has his fortunes improve, while in a tragedy the complications intensify to the point that the building of the crisis must be resolved in a dramatic climax.

The time of falling action sees the resolution of the action. The final conclusion comes to pass during this period. A common word for this is the French term "denouement."

The ending can be the denouement in a comedy or just after the catastrophe of a tragedy. In comedy the main character is in a better state than when the action started. In tragedy a protagonist achieves enlightenment but suffers the results of his or her choices in a clearly dramatic way. The protagonist now understands something important or has reached some goal. Consider *Hamlet* as an example. Hamlet succeeds at his goal of removing the evil king Claudius from the throne as well as naming his successor. However, he does so at great personal loss – his own death. Similarly, the deaths of Romeo and Juliet end the animosity of their families.

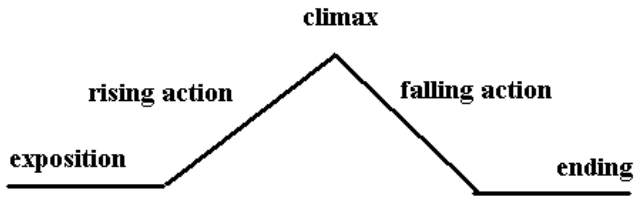

Figure 1. Freytag's Pyramid

Although the five parts of Freytag's pyramid are usually drawn in a symmetrical way, there is no requirement for the pieces to be of anywhere near equal length. Generally, the climax occurs near the end of the action.

It should be noted that Freytag's contribution to plot was not shown in this presentation, yet it will be in the future. His elaboration on plot, Aristotle's most important element, is very helpful. Most students today have seen enough movies to recognize the truth that it represents.

5. IMPLEMENTATION

This version of the class was similar to previous editions. The institution is a laptop university, so each student has a laptop in class. Each classroom has a projector for both presentations and demonstrations. The pattern of presentation was consistent. First a presentation was given that demonstrated an Alice feature. These typically took about fifteen to twenty minutes. This was immediately followed by a demonstration of that same feature. During the demonstration the students did what the instructor did, so they usually had a good feel for the process immediately.

The basic background of creating a world, animating the characters, loops and methods were first presented. The presentation on creating an interesting video followed. The Alice portion of class was then concluded with presentations on decisions, events, miscellaneous features (such as vehicle use) and then summary presentation that pointed out the similarities with Java. Although this occupied three weeks, it actually only took seven class days, since the first two weeks of the semester were each missing a day. Table 1 summarizes order and content of the presentations.

Each demonstration was an exercise as well. Most of the time, the students did the exercise during class time. The culminating assignment was somewhat general; it was simply to tell a story with an Alice program. There were two additional requirements, one on length and the other to define at least one method with parameters. In addition to normal program grading, the programs were to be demonstrated by the author in class. The class would then vote on the best show and the winner would receive extra credit points. This was similar to previous assignments in Alice in these classes.

Table 1. Presentations

Day	Presentation
1	Course overview
1	Alice overview
2	Creating a world
2	Animating characters
3	Using methods
3	Defining methods
4	Loops
5	Quality dramatics
6	Misc 1 (Properties, vehicles, variables, preferences)
6	Decisions
7	Events
7	Misc 2 (Random functions, exports)
7	Alice and Java

It was also stressed that the short video could not be reasonably compared to any commercial production, or even what might be expected in a theater class. The students were not expected to incorporate all the ideas presented on what a good play should contain. What was desired was something that they could show in class or to family and friends. The fun aspect was important, so that they would not feel undue pressure to make a project that was beyond their abilities or time.

The assignment itself was given after the presentation on quality dramatics. Since the students were to create a video and not an interactive game, they received the assignment after all the needed information had been presented. It was important for the Java objectives that they see the Alice topics that followed this, but not for the video itself.

6. RESULTS

The results were quite pleasing, if not objectively better than previous classes. This was the third instance of similar assignments in similar classes for which the programs were retained. The programs show a trend of increasing in size and quality. Table 2 shows some of the numbers for comparison.

Table 2. Comparison of Alice assignments

Year	Course	Average (MB)	Largest (MB)	Count	Average (largest excluded)
2006	Java	2.87	4.76	11	2.68
2007	C++	4.53	10.48	7	3.53
2009	Java	10.25	36.2	8	6.54

Numbers are objective, but objectivity is only of value if the numbers measure an important feature. In these three classes the largest program has never been the best program. Rather there is no correlation between program size and the quality of the program. In Alice, as well as many other languages, large and elegant are not necessarily found in the same program.

The increasing sizes may indicate more student effort towards the programs, better coverage of the material or a variety of other things. For instance the C++ class corresponds to the CS 1 class, while the Java class is an elective and not required by the CS degree. It appears that at this institution a better grade of student enrolls in the C++ class than in the Java class. However, this fails to explain why the most recent Java class did so well. In the most recent batch of programs, every one of the programs met all the minimum requirements, (would that all the Java programs should do the same!)

The evaluation of the quality of a program is much more subjective. Especially in this assignment the specifications do not allow an objective evaluation such as would occur if the program were to process numerical input into numerical output. Contrary to the normal program grading process the grader becomes the drama critic rather than the acceptance tester.

What was gratifying in this set of Alice programs was that almost all of the programs had some inherent entertainment value. This has not been the case in previous years. Any of the top four or five programs would have done no worse than second in any other year.

It may seem like that there was more material on drama than needed or usable, and this is likely the case. This presentation could have been abbreviated to a much smaller time frame. However, it would also appear that at least some of the students caught the intent. Contrary to past experience there was some genuine character development in more than one project. It is impossible to say whether this is the result of the quality dramatics presentation, the prior experience of the students or some combination of the two. Despite these uncertainties the intent is to keep and enhance this presentation.

Does an entertaining Alice program suggest that the student learned more than a dull one? The argument revolves around the likelihood of a student expending significant effort on a project. Students who believe that they will fail will not expend the time needed. Student who believe that they possess all that they need to successfully transact the project are much more likely to be enthusiastic about the program. Those students with such a belief are much more likely to spend more time on the program. If the student spends more time on the task, there is reason to believe that more learning occurs[1]. This is one of the precepts for Alice in the first place. Alice is supposed to be fun so that students will spend more time using it.

7. CONCLUSIONS

Strictly speaking, no conclusions are warranted. The numeric results are too small to statistically imply any findings. Subjective results may be criticized by the small numbers as well. The controls on this experiment do not allow us to rule out gains from other areas.

Despite this disclaimer, the authors have no intention of leaving out this instruction on quality from future teaching of Alice. It did not unduly prolong this segment of the course. It certainly seemed

to increase student enthusiasm. In the past, some of the projects had been painfully dull. With this presentation the percentage of those that were genuinely entertaining increased, while the boring percentage decreased. We would characterize it as a winning strategy.

8. REFERENCES

[1] Chickering, Arthur and Stephen C. Ehrmann. "Implementing the Seven Principles: Technology as Lever," AAHE Bulletin, October 1996, pp. 3-6.

[2] Cohen, Robert. *Acting One*. McGraw-Hill. New York, NY, 2008.

[3] Hill, Curt. The Importance of Alice. Proceedings of the Midwest Instructional Computing Symposium, Mt. Pleasant, Iowa. April 7 - 8, 2006.

[4] McManus, Barbara F. (1999) Outline of Aristotle's Theory of Tragedy in the POETICS. http://www2.cnr.edu/home/bmcmanus/poetics.html Date accessed 5 March 2009.

[5] Wikipedia, 2009. Dramatic Structure. http://en.wikipedia.org/wiki/Dramatic_structure. Date accessed 3 March 2009.