“Who needs PowerPoint? I’ve got Alice!”

By
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I. Background of My Experience in Programming

II. Experience with Alice
   A. Changes in Languages and Student Population
   B. Introducing Alice
   C. Enrollment Data

III. History Lesson: Significant People in Computing
   A. Paper
   B. PowerPoint
   C. Alice
      1. Lesson Plan
      2. Grading Rubric

IV. Sample Projects: Screenshots and descriptions of Student Work
I. Background

I started my study of Computer Science in 1982 as a high school senior when I enrolled in a one semester course titled “Computer Programming.” It was taught by my math teacher and at first seemed like a very mystifying idea. We wrote programs in BASIC by “bubbling in” punch cards. After completing the program, we took the stack of cards to the back of the room handing them to our teacher. He was the only one allowed to insert the cards into the card reader. The PDP-11 interpreted our program and if it ran successfully, the dot matrix printer printed a table of the whole numbers from one to ten and their squares. It was amazing.

The strange thing about this description is that it brings back such fond memories for me. It was during this brief exposure to programming that I was hooked for life. This is what drives me on a daily basis to do the best I can to expose students to the fascinating world of programming. I graduated from UW-Whitewater in 1986 with a Major in Mathematics and a Minor in Computer Science. I am a WI certified 7-12 teacher in Mathematics and Computer Science. In college, my coursework included BASIC, Fortran, PL/1, Assembly and Pascal. I started teaching in 1986 at the Oconto Unified School District in WI. There, I taught BASIC and Apple Pascal on Apple IIe’s. After three years, I moved to Fort Atkinson, WI, where I have been teaching math and computer science at Fort Atkinson High School for the past 20 years.

II. Experience with Languages, Students and the Introduction of Alice

Languages

Teaching computer programming for the last 23 years has provided me the ability to reflect on the changes that have occurred in both the languages and the student population. Each has gone though dramatic changes. In 1986, I started teaching students BASIC. The “art” of programming became more evident as programs got more complex. The programmer needed to be creative in order to write programs that were more advanced. The concept of “spaghetti code” was referred to many times. In 1987, I introduced a course in Apple Pascal. This was the 2nd course in the sequence and lent itself to writing the more complex programs that I was referring to above. In 1990, I started teaching Turbo Pascal on PC’s. In 1999, I went back to school and learned C++. This was a shift in complexity that was a little difficult for the students to learn. In 2007, I went back to school again and learned Java. Next year will be the first year of AP Computer Science at our High School. In 2007, I was exposed to Alice at a Wisconsin Mathematics Council Workshop. Alice is the introductory language presently taught in my Computer Science 1 course.
Students
In the early 1980’s and 1990’s, my computer programming course tended to fill up on its own. There wasn’t a significant difference in the course make-up either. The usual ratio of boys to girls was roughly 40:60. The other interesting observation is that most of the students in class were upper classman who were also high-achieving with mathematical ability.

Starting in the early 2000’s, there was a significant change in the clientele. Student enrollment began to decline and the interest in console programming began to decrease. Fewer and fewer high achieving students enrolled in the computer programming course and the general make-up of the computer programming courses were “video game kids” who liked playing games on their home computers.

Introducing Alice
It was during the 2006-2007 school year that I sought out a new way of programming. I knew that I needed to have a language that was more graphical but yet still taught the same core concepts of programming. When I attended the Wisconsin Mathematics Council Conference at Green Lake, I went to a session called Alice Programming. This was the answer! That summer I attended an Alice Workshop in California. It gave me the confidence to teach Alice to my Computer Science 1 class. There were nine students in the class and my hope was that I would retain enough of them to offer the Computer Science 2 course.

What happened after that was never expected! The following year, enrollment in my CS1 course had jumped from nine to 43! Not only that, there were 35 students (two sections!) enrolled in my CS2 course. I have never had more than one section of computer programming in a semester; ever!

As evident by the data in the table, the number of students increased dramatically after the introduction of Alice. This table shows the enrollment figures in the computer programming courses at Fort Atkinson High School, Fort Atkinson WI from 2003-2009.

<table>
<thead>
<tr>
<th>Year</th>
<th>CS1 (Semester)</th>
<th>CS2 (Semester)</th>
<th>AP CS A (Year-long)</th>
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<tbody>
<tr>
<td>2003 - 2004</td>
<td>9 (Pascal)</td>
<td>0 (C++)</td>
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<td>11 (Pascal)</td>
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<td>2006 - 2007</td>
<td>14 (Pascal)</td>
<td>0 (C++)</td>
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<tr>
<td>2007 - 2008</td>
<td>9 (Alice)</td>
<td>16 (Java)</td>
<td>Not Offered</td>
</tr>
<tr>
<td>2008 - 2009</td>
<td>43 (Alice)</td>
<td>35 (Java)</td>
<td>Not Offered</td>
</tr>
<tr>
<td>2009 - 2010</td>
<td>25 (Alice)</td>
<td>20 (Java)</td>
<td>17 (AP CS)</td>
</tr>
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</table>
III. History Lesson: Significant People in Computing

As a computer science teacher, I have always felt that it is important for the students to learn about the creative and talented people who have come before them in the field of computing. I believe that it can be an inspiration to my students to see that the advances made in the world have come from the minds of these hard working geniuses. For this reason, one of the lessons that all students are required to do in my Computer Science 1 course is a study of a significant person in the history of computing and present it to the rest of the class.

In the 1990’s this assignment was carried out as a small research paper. The students were to create a word-processed document that demonstrated their learned knowledge of their assigned person. They were then asked to give a speech in front of the room.

In the early 2000’s this assignment was changed to a PowerPoint presentation. The students did research on the internet and then created a PowerPoint presentation that they gave to the class.

This year, I decided to take a risk and turn this assignment into an Alice project. To be completely honest, I did not know how my students would react. Would they view it as too difficult? Would they view it as too open-ended? I had no idea what was about to happen.

Well, to my great surprise, the students did as exactly as we hope, as teachers, that they would do. Their creativity was as scattered much as a bag of marbles being dropped on a gym floor. There were so many different and imaginative projects. I think the reason why this project turned out so well was that it was so open-ended. Also, I think that it was important that I waited to assign this project until after the students had learned how to program using Alice. This way, the student’s could apply any knowledge that they gained to their project.
Computer Science 1:

**Historical People in Computing**

You will be assigned a person from the list of noteworthy people in the field of Computer Science. Your assignment is to create a presentation on this person using Alice to share with the rest of the class. Your Alice presentation must include the following:

- Picture of the person
- Background information such as when the person was born, how old was the person when they made their contribution, who did the person work for, etc.
- What was their contribution?
- What was the impact of their contribution?
- Why is their contribution noteworthy?

As part of your grade, you are required to present your project to the rest of the class. You must elaborate on your historical person and you will be graded by the rubric attached to this sheet.

1. Ada, the Countess of Lovelace
2. Charles Babbage
3. Dan Bricklin
4. Alan Coombs
5. Seymour Cray
6. J. Presper Eckert
7. Doug Engelbart
8. Jay Forrester
9. Bill Gates
10. Jack Good
11. William Hewlett
12. Grace Murray Hopper
13. Joseph Marie Jacquard
14. Steve Jobs
15. Steve Wozniak
16. Alan Kay
17. Jack Kilby
18. Leonard Kleinrock
19. John Napier
20. Herman Hollerith
21. Ken Olsen
22. James Russell
23. Alan Turing
24. John von Neumann
25. Niklaus Wirth
26. Betty Holberton
27. Jean Sammet
28. Thelma Estrin
29. Randy Pausch
30. Alan Kay
31. David Bradley
32. Fred Cohen
33. Gordon Moore
34. Larry Page
35. Linus Torvalds
36. Paul Allen
37. Robert Metcalfe
38. Sergey Brin
39. Tim Berners-Lee
40. Emile Baudot
41. Robert Berner

* Grading Rubrics: Project, Presentation, On-time (12 points)
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<th>On-time: Respect for a deadline</th>
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IV. Sample Student Work

Student 1
This student introduced Alan Kay as a guest on a late night talk show. The information was disseminated by the host asking his guest questions and having the guest respond.

Student 2
This student wrote a script for his project and had the computer-generated voice give the presentation by pretending that Herman Hollerith was talking throughout the presentation.
Student 3
This student showed the path that Thelma Estrin took throughout her career by having Thelma walk in front of several billboards that described her work. He told the story verbally as the project ran by itself.

Student 4
This student presented his project as though a student was watching a movie on his computer. As you can see on the screen shot on the left, the movie starts with a picture of Seymour Cray on the screen. The project continues by having the camera zoom in towards the computer monitor, and then shows the presentation in full screen (as shown on the right). When the presentation ended, the camera zoomed out to show the student in front of his computer again.
**Student 5**
This student’s project allowed the user to click on billboards to learn more about Ken Olsen. It was based more like a hyper-link where the user was in charge of deciding what he wanted to view next.

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**Student 6**
This student dressed Gordon Moore as Socrates and had Mr. Moore guide user through his career highlights.
**Student 7**
This student wrote a script of an interview with Steven Jobs. He verbally asked questions and then pressed keys to have the Mr. Jobs’ appropriate responses. He “moved” Mr. Job’s mouth as the computer spoke the response.

**Student 8**
This student created a classroom where a teacher walked around as information on Jacquard was displayed on the screen. He wrote a script and recorded his voice for the project. He then inserted these sound clips as event-driven methods. As the teacher spoke, a student worked continuously on a loom in the front of the classroom.