Computational Math Science and Technology

Ninth Grade Risk Factors For Dropping Out Of High School

By:

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- For the Challenge Project, we decided to use agent sheets to simulate how certain risk factors lead to high school students dropping out of school. We first had to survey a group of ninth students to obtain data that could be used in the agent sheets simulation. For the survey we asked students if they had ever used any form of illegal drugs, did they have a child of their own to raise, had they ever been arrested by the police for any type of crime, which parents or guardians they lived with, and what the values their families had towards education. Once these topics were selected, the teachers researched to find information on the percentage of high school students that dropped out of school as a result of these risk factors.

◆ After the surveys were returned, the data was entered into excel. Each question asked was a header of a column and the data was tabulated and totaled. After the data was entered the students then used that data to construct a pie cart and a bar graph to display the results of the data. We realized that there were many different combinations of the data that would have to be entered into agent sheets as a separate agent. A decision was made at that point to only enter the data for the three risk factors of pregnancy, crime, and drug use to keep the program as a simple introduction level for the students.

- Entering characters into agent sheets was the next step for the group. We created a floor as large as we could for the agents to move on. We had survey results for 128 ninth grade students. When we examined the data there were 79 students that did not face any of the three risk factors we were examining. To allow for more space for agent movement, only 50 of the agents were placed on the floor. All of the students facing risk factors were placed on the floor. These students were the focus of the simulation. The teachers set up the agent characters and programmed their actions. The dropout percentages that were obtained through research were used to determine the chances of the students dropping out. Each different combination of risk factors had to be entered as a different agent with a different appearance and different actions in the programming.

- Once all agents were set up, the group was able to place the correct number of each agent randomly on the floor. Students then ran simulations of the experiment to see the results of how many students facing these factors ended up dropping out of high school. We then as a group realized that all of the students facing these risk factors ended up dropping out of high school. The teachers then asked, "Why are all of the at risk students dropping out?"

- As a group we discussed that in real life there are assistance programs to help these at risk students so that 100% of them do not drop out of school. Adding these assistance programs into agent sheets would give a more realistic simulation, but was beyond the programming knowledge of the teachers at this point. We were then able to reach a conclusion from the results of our simulation that if these assistance programs are not implemented, all of these at risk students will end up as high school dropouts.

Excel graphs of Data Collected from survey
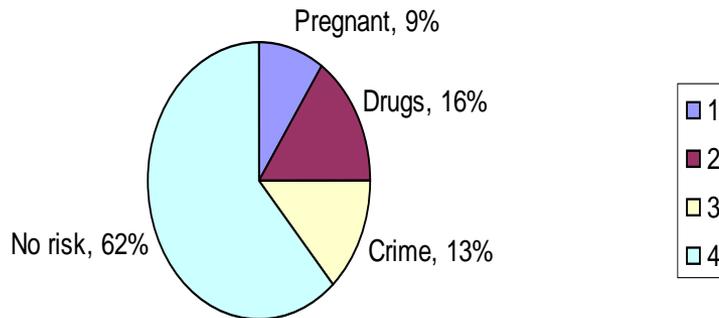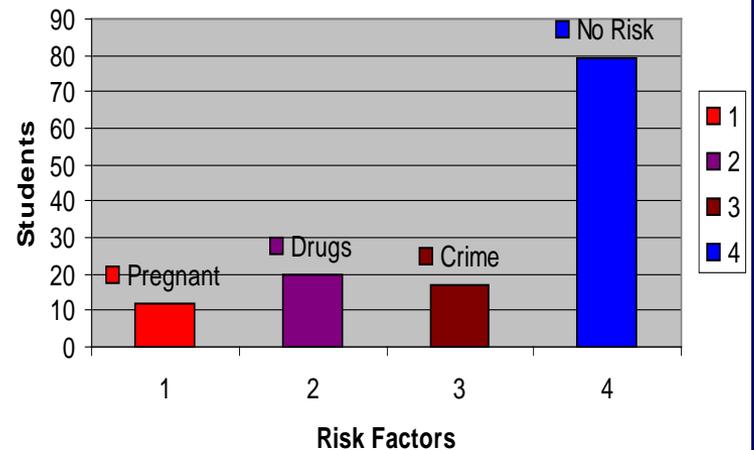
Mid-simulation of agent sheets floor

Agent characteristics Programming
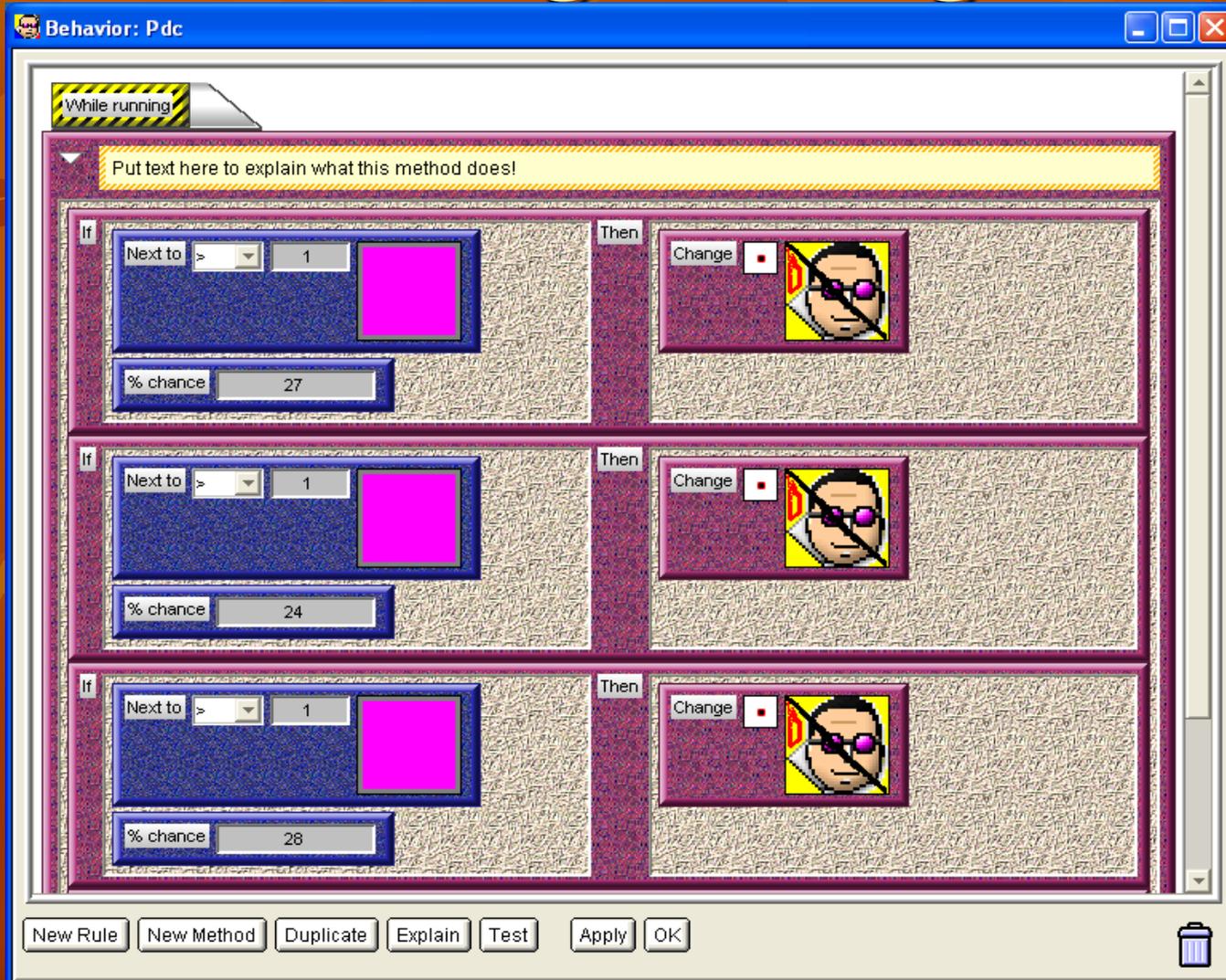
- The experiment showed a good result of how these at risk students need some sort of intervention in their lives or they definitely will end up dropping out of school. The students gained a positive experience in using computer software with their mathematics and science knowledge to examine a real world situation. They also were able to see just how real these problems are for students to face and try to remain in school and get a good education.

The End