A Novel Multidisciplinary Service Learning Program with a Computer Science Foundation

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The Goal
Promote an interest in computer science and other sciences among teens and children by creating a theatrical "magic school" summer science camp experience.

The Concept
1. University faculty and students teach teens about the sciences, theatre and magic performance.
2. Teens combine what they have learned to craft a Harry Potter inspired magic school performance.
3. Busloads of children from other summer programs come for a day of science, magic and fun at the magic school.

The Disciplines

- Biology
- Computer Science
- Chemistry
- Physics
- Theatre
- Math
- More

The Partnership

The PIVOTS Initiative: Peer Interdisciplinary Volunteer Outreach with Theatre & Science

The 3 Week Design

Weeks 1 & 2
Teens Create the Magic School

Learning
- Science, Math, Theatre, Computer Science, Computer literacy
- Magical illusion workshops
- Trip to Academy of Natural Sciences
- Scanning Electron Microscope
- Library tour - rare books & technology

Practice
- Devise skits, plan magic lessons
- Plan magic lessons
- Develop magic school story
- Create characters, props, costumes, music
- Create magic school web pages

Week 3: Performing & Teaching for Young Visitors

- Collaboration with City of Philadelphia Department of Recreation
- Adventure begins at 30th St Station, Philadelphia
- Apprentices ride the train to Villanova
- Scholars perform as teachers and other school "personnel"

Goals for Faculty
Multidisciplinary collaboration
- Artists, engineers, scientists
- University, school, community educators
- Academia, government, corporate, non-profit
- Villanova University
- Philadelphia schools:
- Academy of Natural Sciences
- Pennsylvania Higher Education Assistance Agency (PHEAA)
- Delaware Valley Industrial Resource Center

Goals for Teenagers
Engaged STEM learning
- Focus on creativity
- Study in university labs
- Faculty mentors
- Team project w/ great appeal
- Social aspect is central
- Learning by teaching
- Community service

Goals for Young Visitors
Positive images of STEM careers and professionals
- Visit university campus
- Positive role models
- A compelling, memorable activity
- Encourage natural curiosity

Computer Science Foundations
- Artificial Intelligence, programming a ChatBot with AIML & ProgramD
- Engaging example presentation of Graph Theory & Euler Circuits
- Internet literacy, use of technology as communication medium
- Internet programming, HTML coding, web design using software tools
- Graphical design using Photoshop
- Setting up and using a blog to evaluate and analyze results
- Using a message board as a planning and communications tool
- More elements planned for 2007

Elements of Computer Science and related technology provided examples of "magical science," provided the fundamental organization, planning and communication media for faculty, students and teens, and gave teens experience with the latest ideas and tools of the computer scientist.

The Premise
Create a multidisciplinary service learning summer program for teenagers involving:
- Science/math/technology instruction
- Improvisational theatre & Writing
- Magical illusion
- Outreach to younger children from Philadelphia
- Debunk the myth of "nerdy" scientists
- Connect with underrepresented populations
- Repair the misconception of a dichotomy between creativity in the sciences and arts
- Explore the use of storytelling and re-enactment in the teaching of science
**Reactions of Teens**

<table>
<thead>
<tr>
<th>How did you feel about . . .</th>
<th>Overall Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>The counselors</td>
<td>Increase in Interest</td>
</tr>
<tr>
<td>Theatre</td>
<td>Increased</td>
</tr>
<tr>
<td>Physics</td>
<td>About the same</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Decreased</td>
</tr>
<tr>
<td>Magical Illusion</td>
<td>A Great Deal</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Somewhat</td>
</tr>
<tr>
<td>Computer Science</td>
<td>Not At All</td>
</tr>
<tr>
<td>Designing the Magic School</td>
<td></td>
</tr>
<tr>
<td>Performing for students</td>
<td></td>
</tr>
</tbody>
</table>

*Note: The image contains a pie chart showing the distribution of responses.*

**Science**

“I am more interested in science, especially since I’ll be taking chemistry in the fall. Before I was scared to take it, but now I think it will be alright.”

“I always thought that scientists were kind of nerds, and that they always wear white coats and mix chemicals. Now they are not. There are a lot of different kinds of scientists, and some of them are really cool.”

“I was just so intrigued. I never felt that way about science before.”

“This camp made me feel like science isn’t as complicated as it’s made out to be.”

**Theatre**

“I realized that you don’t have to choose to be one thing. You can be both a scientist and an actor.”

“Performing helped my speech. I’m mumbling less and talking slower.”

“Theatre helped to focus me in presenting and speaking with others.”

**Overall experience**

“It has been awesome here. At first, I was a little hesitant to come, but by the first day, everyone was such great friends. I couldn’t wait to come the next day.”

“We had to make stuff up off the tops of our heads.”

“It’s surprising how inquisitive little kids can be.”

**Mary-Angela Papalaskari**
Computing Sciences

**David A. Cregan, O.S.A.**
Theater

**Anthony Lagalante**
Chemistry

**Sue McFarland Metzger**
Information Systems

**Alain Phares**
Physics

**Najib Nadi**
Computing Sciences

**Karen Hess**
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[link: magicschool.villanova.edu]