Fostering STEM Interest in Elementary Schools Students Through Neuroscience: A Look at Community Outreach in Geneseo's Rkids After-school Program

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Abstract
As a way to encourage community service and application based learning, NEUR 215: Applications in Neuroscience connects students at Geneseo with underserved children in the surrounding community. As in previous semesters, children in 3rd-5th grade who participate in this enrichment program benefit from weekly tutoring sessions, but the goal of this course is to further engage them in interactive learning through neuroscience related activities. Additionally, the experience of being on campus and interacting within a college setting can be used to stimulate a positive association with higher education. Sessions are designed with the intention of creating an enjoyable learning environment while providing exposure to STEM based lessons. Some activities include learning the anatomy and function of the brain, exploring communication between the brain and the heart, and touring various research facilities on campus. By providing early exposure to these neuroscience related concepts the children are encouraged to see STEM as an interesting and viable career path.

Keywords
neuroscience, rkids, STEM

Disciplines
Neuroscience and Neurobiology

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Fostering STEM Interest in Elementary School Students Through Neuroscience: A Look at Community Outreach in Geneseo’s Rkids After-school Program
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Introduction
As a way to encourage community service and application-based learning, NEUR 215: Applications in Neuroscience connects students at Geneseo with underserved children in the surrounding community. As in previous semesters, children in 3rd-5th grade who participate in this enrichment program benefit from weekly tutoring sessions, but the goal of this course is to further engage them in interactive learning through neuroscience-related activities. Additionally, the experience of being on campus and interacting within a college setting can be used to stimulate a positive association with higher education. Sessions are designed with the intention of creating an enjoyable learning environment while providing exposure to STEM-based lessons. Some activities include learning the anatomy and function of the brain, exploring communication between the brain and the heart, and touring various research facilities on campus. By providing early exposure to these neuroscience-related concepts, the children are encouraged to see STEM as an interesting and viable career path.

Methods

February 14th: Hearts & Brains
- Lobe Coloring Activity
- Lobe Function Scavenger Hunt
- Heart Rate Hopscotch

February 28th: Laboratory Tours
- Where’s Waldo Eye Tracker
- Virtual Reality Block Building
- Mouse Lab/Vivarium Tour
- Integrated Science Center Tour

March 28th: The Nervous System
- Neuron Firing Relay
- Nervous System Race

Upcoming Plans:
April 4th: Brain Anatomy
- Gelatin Brain Dissection

April 25th: Substance
- Impairment Goggle Challenge

Results

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>Maybe / Kind of</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Want to attend college</td>
<td>8</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Like science</td>
<td>4</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Excited to learn during Rkids sessions</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

The children were assessed using a background questionnaire. The aim was to assess the level of interest in STEM subjects and futures in higher education. In addition to the table above, they were also asked about their favorite subjects in school (science: 0, math: 5, other: 7). With this data set, along with a post-questionnaire, we can see the impact these sessions might have.

Discussion
Introducing Rkids sessions into the neuroscience curriculum has proved beneficial for both parties. Students enjoy teaching children entertaining STEM topics while simultaneously seeing the benefit of community engagement. Likewise, the children gain early exposure to STEM while having fun learning. The use of hands-on and activity-based sessions is evidently better than a lesson-type. Room for improvement lies in time-management of activities, maintaining a low student-to-child ratio, and developing a better way of assessing interest pre- and post-sessions.