Introduction

- Critical reflection allows students to synthesize undergraduate research experiences and deepen their understanding of its impact (Ash & Clayton, 2009).
- Written essays are one method for student reflection.
- Student reflection essays also yield authentic data that can be used for program assessment (Anderson, Filer, & Lyon, 2012).
- Analyzing student essays can be difficult due to the time it takes to read and analyze qualitative data.
- We developed a system using NVivo that automatically analyzes hundreds of essays.

Method

- Sample: n=171 research reflection essays from 3 research programs at Roanoke College.
- We analyzed 49 representative essays manually to identify overarching themes.
- For each theme, we developed corresponding syntax, which was then used to automatically analyze the larger sample.
- The automatically coded essays were checked manually to assess and tweak the accuracy of the syntax.

Results

Example of syntax created to automatically code for one of the themes.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Definition</th>
<th>Example</th>
<th>Syntax</th>
<th>Frequency (Manual)</th>
<th>Frequency (Automated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship with faculty advisor</td>
<td>Student formed a relationship with professor. Professor served as a mentor or friend and provided guidance to the student.</td>
<td>&quot;In working closely with my professor, we were able to establish a stronger relationship as researchers and were better able to produce a testable questionnaire for the research project we have been working on over the past three years.&quot;</td>
<td>&quot;Dr. &amp; question&quot;~15 OR &quot;Dr. &amp; thanks&quot;~9 OR &quot;Dr. &amp; excellent&quot;~15 OR &quot;Dr. &amp; amazing&quot;~9 OR &quot;working &amp; closely&quot;~3 OR &quot;one-on-one&quot; OR &quot;worked &amp; closely&quot;~9 OR &quot;discussing &amp; Dr.&quot;~8 &quot;advisor &amp; explained&quot;~9 OR &quot;Dr. &amp; mentor&quot;~9 OR &quot;professor &amp; closely&quot;~5 OR &quot;Dr. &amp; collaboration&quot;~9 OR...</td>
<td>81 essays</td>
<td>Identified 97 essays as having this theme</td>
</tr>
</tbody>
</table>

Note that the automated analysis falsely identified 16 essays as having the theme when it was not present. This is because the system has been skewed to over-analyze for themes, as it is easier to remove falsely coded themes than it is to find themes that the system missed.

Discussion

- We developed a way to automatically code qualitative data from student reflection essays to inform program-level assessment.
- The accuracy of the automated analysis was quite high, especially when paired with manual checks for accuracy.
- Our method could be especially helpful to larger institutions.
- Our method will allow for more frequent program improvement and comparison.
- Our method can be used with other high impact practices. We have started analysis of student reflection essays from internship, service-learning, and short-term study abroad experiences.

References


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