

SPARK Pilot Results Analysis

1. Introduction

This report presents the analysis of the SPARK Pilot Results. The SPARK framework consists of five dimensions: Self-Direction, Purpose, Awareness, Resilience, and Knowledge. The analysis includes descriptive statistics, reliability analysis, correlation analysis, and cluster analysis to identify student profiles.

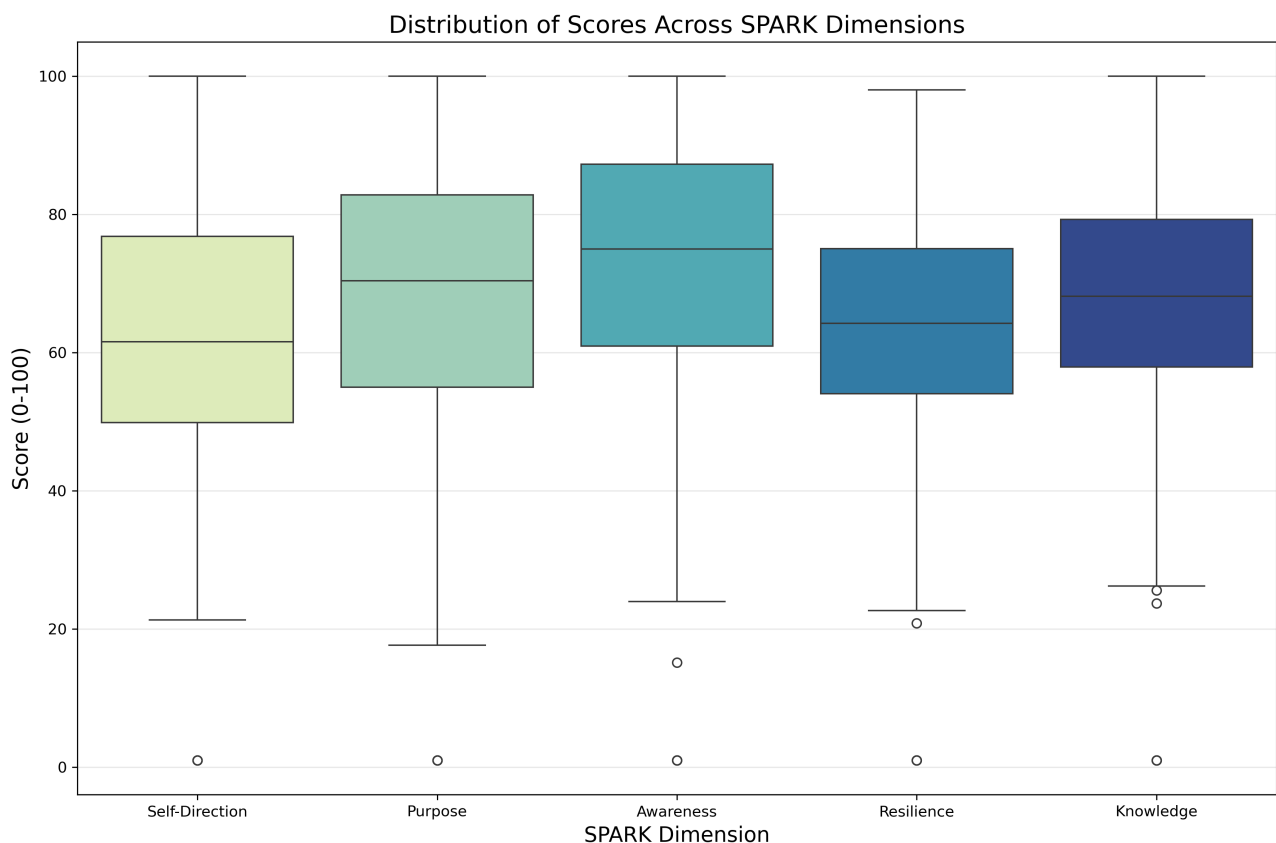
2. Methodology

The analysis was conducted on data collected from 178 students. The following analyses were performed:

- Descriptive statistics for each SPARK dimension
- Reliability analysis using Cronbach's alpha
- Correlation analysis between dimensions
- Cluster analysis to identify student profiles

3. Descriptive Statistics

The boxplot below shows the distribution of scores across the five SPARK dimensions:



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Awareness has the highest mean score (72.02), followed by Purpose (68.07), Knowledge (66.89), Resilience (63.35), and Self-Direction (62.53). The boxplot shows that all dimensions have a wide range of scores, indicating variability in student responses.

4. Reliability Analysis

Cronbach's alpha was calculated to assess the internal consistency reliability of each SPARK dimension:

Dimension	Cronbach's Alpha	Interpretation
Awareness	0.89	Good
Purpose	0.84	Good
Knowledge	0.85	Good
Resilience	0.81	Good
Self-Direction	0.82	Good

All dimensions demonstrate good to excellent reliability, with Awareness showing the highest internal consistency. These results confirm that the questions within each dimension consistently measure the same underlying construct.

5. Correlation Analysis

The heatmap below shows the correlations between the five SPARK dimensions:

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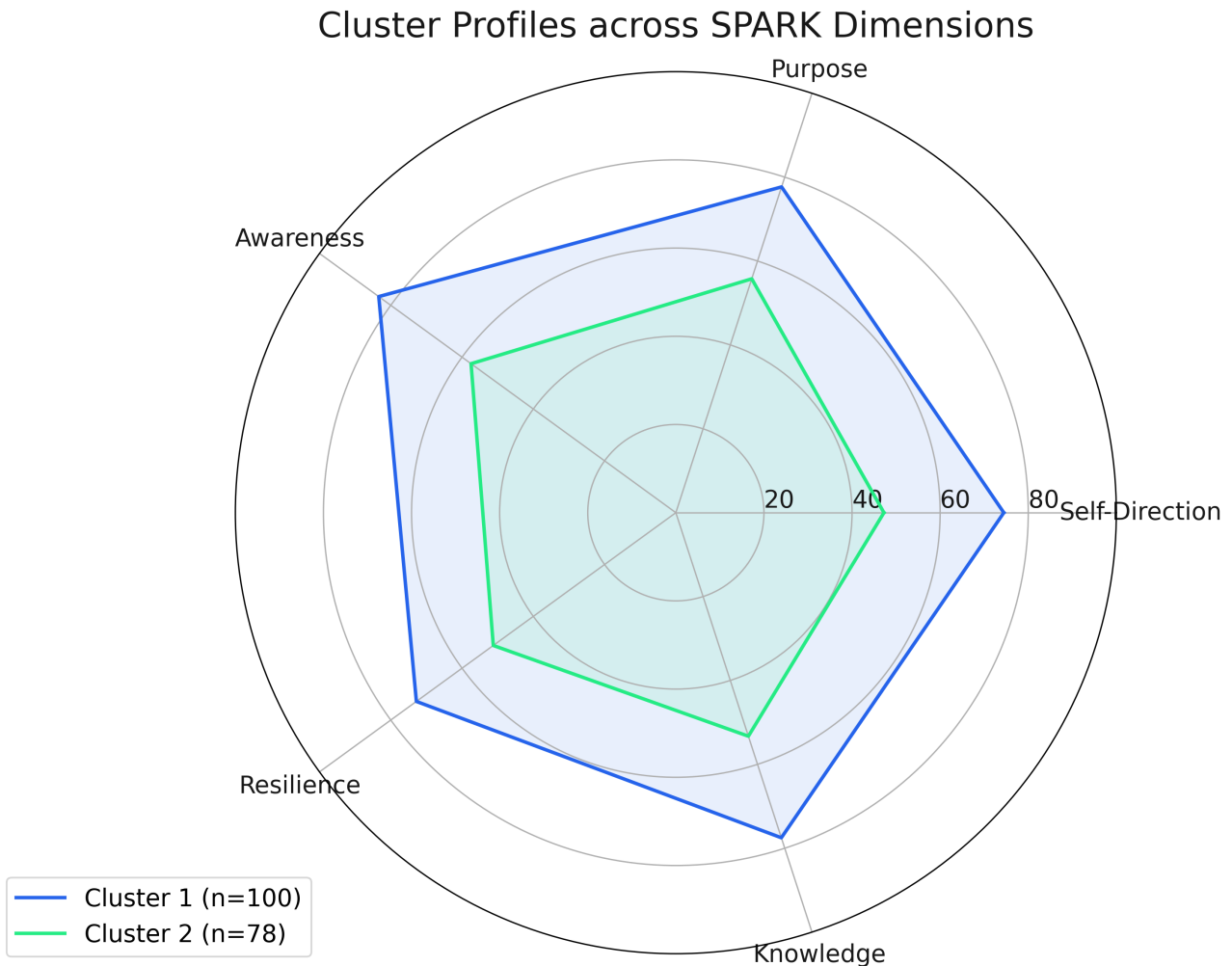


All dimensions are positively correlated with each other, indicating that they measure related but distinct aspects of student development. The strongest correlation is between Purpose and Awareness, suggesting that students with a clear sense of purpose also tend to be more aware of others' needs and feelings. The weakest correlation is between Self-Direction and Resilience, suggesting these are the most distinct dimensions in the framework.

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6. Cluster Analysis

K-means clustering was used to identify distinct student profiles based on their SPARK dimension scores. The optimal number of clusters was determined to be 2 based on silhouette score analysis. The radar chart below shows the profiles of the two clusters:



Two distinct student profiles were identified. Cluster 1 (n=100) consists of students with higher scores across all SPARK dimensions, while Cluster 2 (n=78) consists of students with lower scores. The silhouette score of 0.3643 indicates a reasonable separation between the clusters.

Dimension	Cluster 1 Mean	Cluster 2 Mean	Difference
Awareness	83.37	57.47	25.90
Purpose	77.67	55.76	21.91
Knowledge	77.50	53.29	24.21
Resilience	72.81	51.23	21.58
Self-Direction	74.46	47.24	27.22

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The largest difference between clusters is in the Awareness dimension, suggesting this dimension most strongly differentiates the two student profiles.

7. Conclusion and Recommendations

The analysis of the SPARK Pilot Results provides valuable insights into student development across the five dimensions. The key findings are:

1. All SPARK dimensions demonstrate good reliability, confirming the internal consistency of the measurement instrument.
2. Awareness has the highest mean score, while Self-Direction has the lowest, suggesting areas of strength and potential improvement in the student population.
3. All dimensions are positively correlated, indicating they measure related aspects of student development.
4. Two distinct student profiles were identified, with one group consistently scoring higher across all dimensions.

Based on these findings, the following recommendations are proposed:

1. Develop targeted interventions to strengthen Self-Direction and Resilience, as these dimensions showed the lowest overall scores.
2. Provide additional support for students in Cluster 2, who consistently scored lower across all dimensions.
3. Leverage the strong correlation between Purpose and Awareness in program design, as improvements in one dimension may positively impact the other.
4. Continue to monitor and evaluate the SPARK dimensions over time to track student development and the effectiveness of interventions.