Topic

Analyzing the Impact of Special Needs on Academic Performance Trends in the HKDSE
This study aims to explore how various special needs influence trends in academic performance, specifically in the context of the Hong Kong Diploma of Secondary Education (HKDSE) results. By examining the relationship between different categories of special needs and grade outcomes, we can identify patterns and insights that may inform educational strategies and support mechanisms. Understanding these trends is crucial for fostering an inclusive educational environment that addresses the diverse requirements of students with special needs.

Data description

The dataset comprises numerical data related to HKDSE results, including various special needs demographics. To ensure accurate analysis, I will first clean and structure the data using the pandas library. This process will involve handling missing values, removing redundancy, and standardizing formats, allowing for a comprehensive examination of trends and patterns related to special needs students and their academic performance.
The source I used is the “2024 HKDSE Statistics on performance of candidates with special needs (English Version)” from data.gov.hk in which I used pandas to separate the it into 2 csv files, separating the type of datas that I am analyzing, one focused on the amount of people obtaining 5 of the same levels, one analyzing their scores more accurately based on their core subjects and electives.

Custom Column 1

Ratio of Neurodevelopmental Disabilities to Other Disabilities
Creates the ratio of autism, ADHD, and learning disabilities, to other disabilities.
This calculates the ratio of disabilities often considered "neurodevelopmental" (Specific Learning Disabilities, Autism Spectrum Disorder, and ADHD) to all other disability types. This could reveal if neurodevelopmental disabilities are more or less prevalent compared to other types within each level.

Custom Column 2

Predominant Disability Category
Identifies the *category* of disability that has the highest count. Categories are Physical/Sensory, Neurodevelopmental, and Other.
This groups the disabilities into broader categories and then determines which category has the highest count for each level. This simplifies the data into meaningful groupings. It accounts for ties and labels it as "Tie".

Visualization 1

Visualization 1 presents the average ratio of students with neurodevelopmental disabilities to their peers, segmented by academic level. A notable observation is the higher ratio of Neurodev students at lower academic levels ('Five level 2 or above' and 'Five level 3 or above') compared to higher levels. This could suggest several possibilities: 1) Students with neurodevelopmental disabilities may face greater challenges in early academic stages. 2) Interventions and support systems may become more effective as students progress, leading to improved academic outcomes and a lower observed ratio. 3) The identification and classification of neurodevelopmental disabilities may vary across academic levels. The plateauing of the ratio between 'Five level 5 or above' and 'Five level 4 or above' warrants further investigation to understand the factors influencing Neurodev prevalence at these advanced stages.

Visualization 2

Visualization 2 compares the prevalence of various disabilities across academic levels, examining potential impacts on academic performance. The decrease in Autism Spectrum Disorder (ASD), a neurodevelopmental disability, is more pronounced than the relatively stable trend observed in Aural Disabilities, a physical disability. This may suggest that neurodevelopmental conditions are more susceptible to academic interventions and targeted support. However, it's important to note that this comparison doesn't account for the potential interplay between different types of support, individual variations within disability categories, or the possibility that students with physical disabilities may face different barriers to academic progress not directly addressed by the academic level criteria used in this visualization.

Visualization 3

Visualization 3 shows the distribution of disability categories within the student population, highlighting their relative representation. Mental derangement is the largest category (25.65%). The distribution reveals that certain disabilities, such as Mental derangement and ADHD, are more prevalent than others, like Visual Disabilities (1.87%) and Physical Disabilities (1.4%).

Insight

The visualizations provide several valuable insights into the relationship between neurodevelopmental disabilities, other disabilities, and academic performance, specifically within the context of the HKDSE.

Visualization 1 suggests that students with neurodevelopmental disabilities (Neurodev) may face greater challenges in achieving higher academic levels in the early stages of education. The higher ratio of Neurodev students at lower academic levels ('Five level 2 or above' and 'Five level 3 or above') compared to higher levels indicates potential difficulties in accessing or benefiting from the standard curriculum. However, the plateauing of this ratio at the highest levels suggests that after a certain point, the factors influencing the prevalence of Neurodev disabilities may become more complex and require more nuanced investigation. This may involve differences in the learning capabilities or it may have more effective academic interventions.

Visualization 2 strengthens this understanding by demonstrating that certain neurodevelopmental conditions, such as Autism Spectrum Disorder (ASD), show a more pronounced decrease in prevalence as academic levels increase compared to physical disabilities like Aural Disabilities. This difference suggests that interventions and support systems tailored to neurodevelopmental disabilities might be effective in enabling students to progress academically. It also highlights that different types of disabilities may have varying impacts on academic performance. The decline of 'Mental derangement' needs to be taken into account, and it can be combined in the analysis.

Visualization 3 provides a population-level perspective, revealing that the distribution of disability categories is uneven. While conditions like Visual Disabilities and Physical Disabilities represent a smaller proportion of the student population, other conditions, like 'Mental derangement' and ADHD, are more prevalent. This highlights the need for targeted resources and support systems tailored to the specific needs of students with these more common disabilities. The large population in these areas needs more support and resources in order to allow for their capabilities to grow.

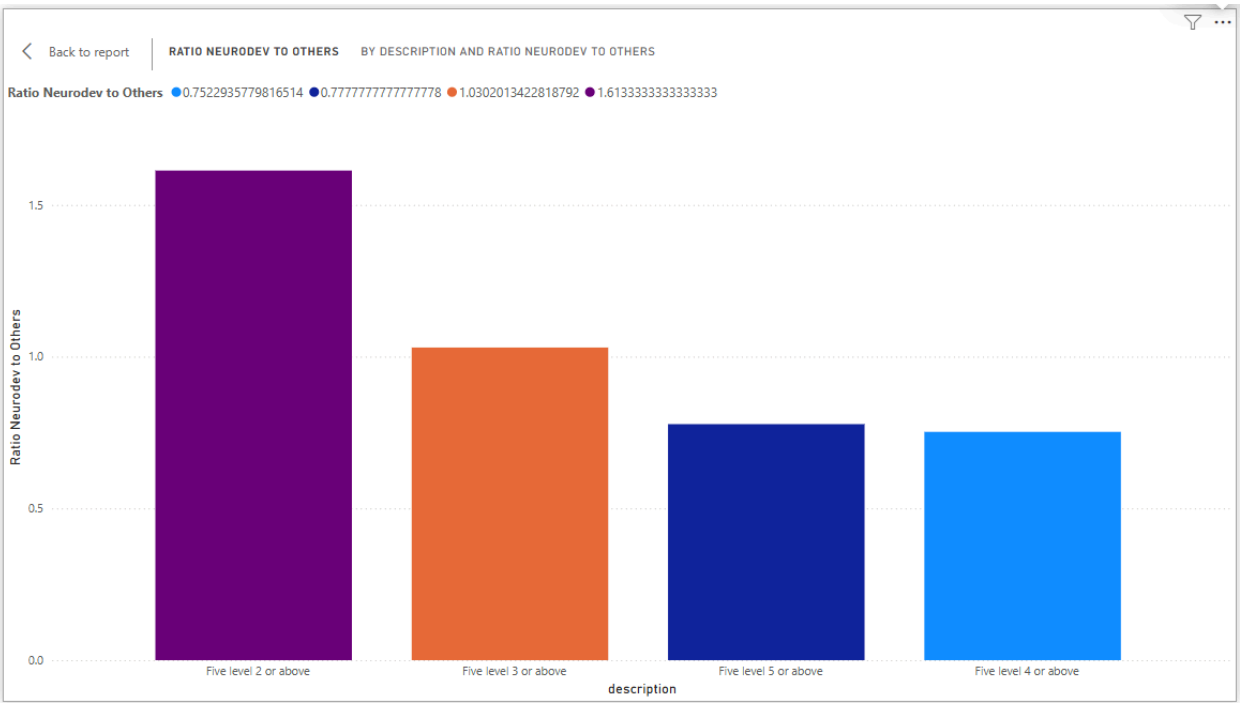
Reference

2024 HKDSE Results statistics - 2024 HKDSE Statistics on performance of candidates with special needs (English Version) | DATA.GOV.HK. (n.d.). https://data.gov.hk/en-data/dataset/hkeaa-hkdesstat-result-table3-2024/resource/3b9324c7-bfd8-4fa8-925a-55f24d5d74a5

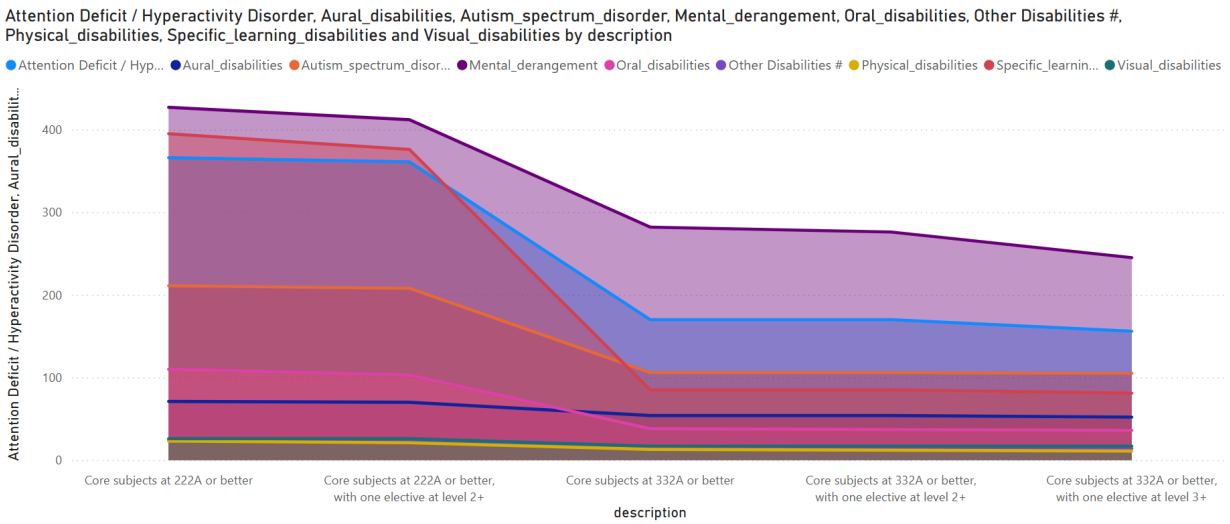
Hong Kong Examinations and Assessment Authority - Examination Report - Examination statistics. (n.d.). http://www.hkeaa.edu.hk/en/HKDSE/assessment/exam_reports/exam_stat/

Appendix

Visualization 1



Visualization 2



Visualization 3