Capstone Introduction Draft
Notre Dame Risk Management and Safety

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Introduction:

Our capstone group is working with the Notre Dame Risk Management and Safety team to evaluate some of their preexisting data in various Google Sheets files and create a more useful and user-friendly interactive tool for them to navigate and analyze laboratory data. Our goal for this project and the Risk Management team is for our data management and analysis skills to help strengthen their current system and knowledge.

Problem Statement:

Currently, The University of Notre Dame's Risk Management and Safety team stores data related to their laboratories in two locations: Google Sheets and an Environmental Health and Safety (EHS) Insight program. The Google Sheets stores data up till this past year and has limited function in terms of manipulating data and generating reports compared to the EHS system. With these two data sources, the team is unsure how similar the data is in both locations and wants to create a method for connecting the historical data in Google Sheets with the new data in EHS to gain a more complete picture of each laboratory on campus.

Furthermore, the team wants a macro and micro visualization view of their laboratories' data. For example, when the team is analyzing lab inspection results and identifiers of risk, are there any specific correlations or themes between the overall risk of the laboratory and how they resolve required action items.

Methodology:

The University of Notre Dame's Risk Management and Safety team faces the challenge of identifying potential biohazard risks in various areas and laboratories on campus. To address this issue, we are developing a project that leverages the power of data visualization and analytics using Tableau.

Our project aims to provide an interactive map of the campus with a focus on identifying the locations that pose the highest biohazard risks. Tableau's data visualization and analytics capabilities will allow the team to identify patterns and trends in biohazard incidents across

different areas of the campus. By analyzing this data, we hope the team will be able to determine the root causes of these incidents and develop appropriate measures to mitigate the risks.
The interactive map will provide a live feed of data that can be used to monitor potential threats and alert the team of any problematic areas. This will enable the team to take immediate action to prevent biohazard incidents. The use of a Tableau dashboard can also enable the team to perform predictive analysis. By analyzing historical data on biohazard incidents, the team can predict where future incidents are likely to occur and take preemptive measures to prevent them. In addition, if the University decides to build new laboratories, then the team can provide an effective framework for creating safe laboratory environments.

Overall, the project will provide the Risk Management team with a powerful tool to monitor and mitigate biohazard risks on campus. With Tableau's data visualization and analytics capabilities, the team will be able to identify high-risk areas, perform real-time monitoring, and perform predictive analyses to prevent biohazard incidents.

Preliminary Results & Findings:

Among the laboratories that Notre Dame Risk Management and Safety oversees, staff routinely inspects each space using a Laboratory Integrated Safety Plan (LISP) Assessment. This comprehensive list of questions provides detailed information on how well each laboratory is following required standards and what action items need to be resolved. From this assessment, ND Risk Management and Safety computes a LISP Assessment Score, which ranges from 0 to 1 and highlights how well a lab meets safety guidelines. Higher LISP Assessment Score values indicate better overall safety. In addition, each lab is also assigned a Risk Assessment Score that analyzes what the hazards are in the scope of the space. ND Risk Management and Safety categorizes labs with a Risk Assessment Score greater than 5.5 as a high risk lab. From these two metrics, a Risk Matrix Tier can be assigned that governs how often a laboratory should be routinely inspected. Labs in Risk Tier Matrix 1 should be inspected every 3-5 years, every two years for labs in Tier 2, and annually for those in Tier 3. Figure A plots the LISP and Risk Assessment Scores for all labs in the dataset and are segmented by color for each Risk Matrix Tier. The scatter plot characterizes labs in Tier 1 with high LISP and low Risk Assessment

scores, Tier 2 with high LISP and Risk Assessment Scores, and Tier 3 with low LISP and high Risk Assessment Scores.

In addition to analyzing the overall lab safety of individual laboratories, we also inspected the action items of BSL-2 and LISP laboratories. If a laboratory is not compliant with all necessary requirements, then ND Risk Management and Safety creates an action item to remedy the problem. In the original Excel Workbook, there is one sheet with all action items for BSL-2 labs and another sheet for LISP labs. Figures B-E visualize the number of action items by department, category, question number, and project statuses for a given BSL-2 laboratory. Figures F-I show the same information as the previous set of figures with LISP laboratories.

Finally, to build an interactive dashboard in Tableau, we have acquired shape files of the University of Notre Dame campus' map from the University Facilities Information (UFI) department. Then, we were able to bind all of the shape files together and load the combined shape file into Tableau to get a map view of Notre Dame's campus. Eventually, we will combine the spatial data with the data provided by ND Risk Management and Safety to create an interactive map within our dashboard.

Conclusion:

Overall, we hope that our utilization of the different data platforms will produce a well-thought out and organized analysis of the labs across the University of Notre Dame's campus. We strive that we will bring sufficient insight and information to the Risk Management team to contribute to their more efficient data management.

Appendix: (Timeline Attached Separately)

Figure A:

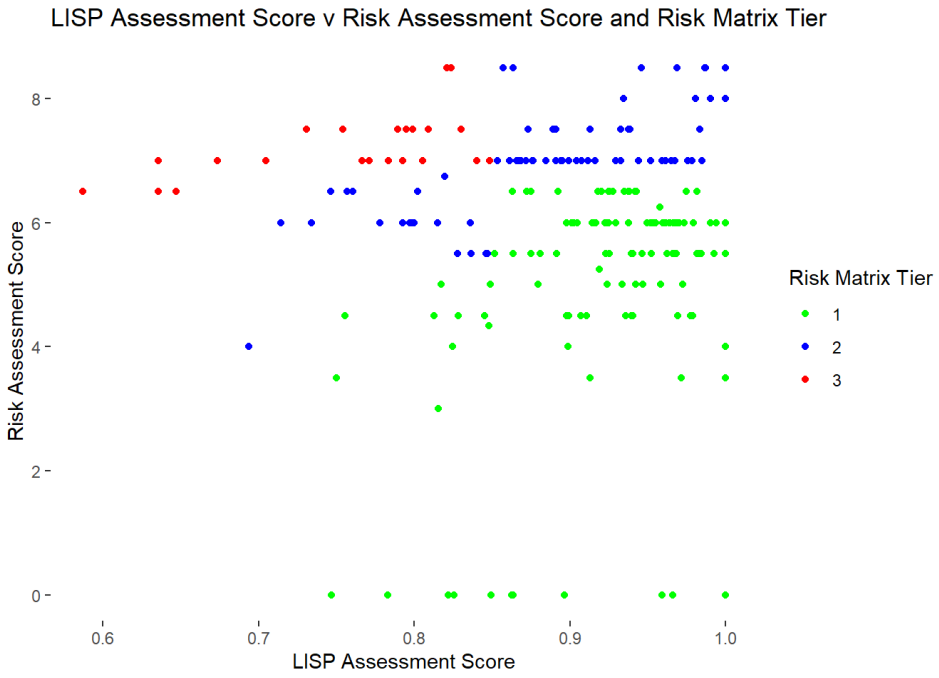
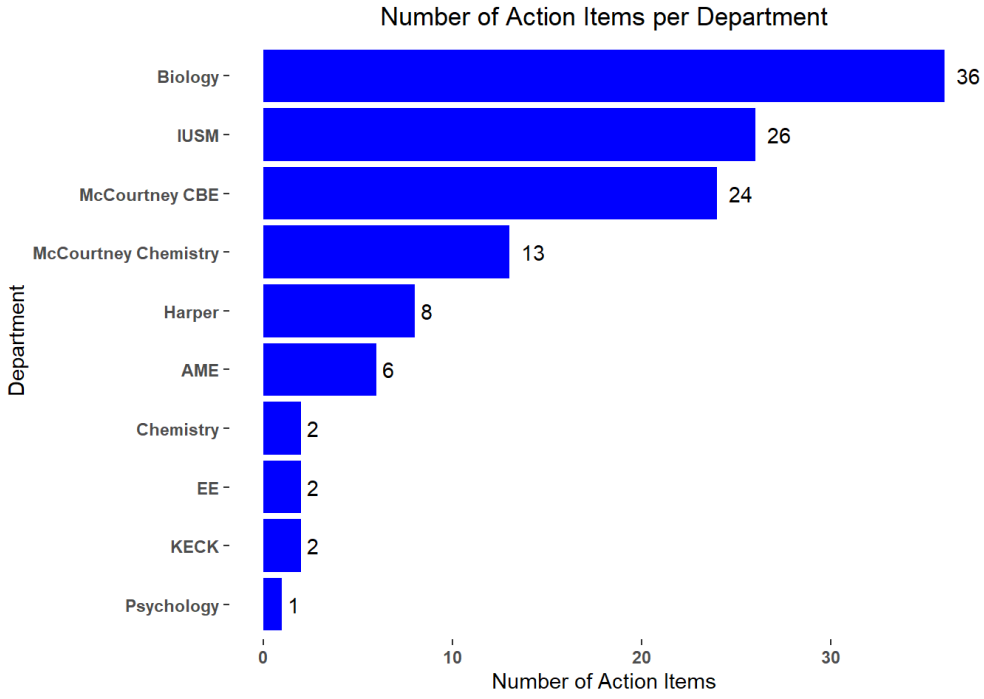


Figure B:



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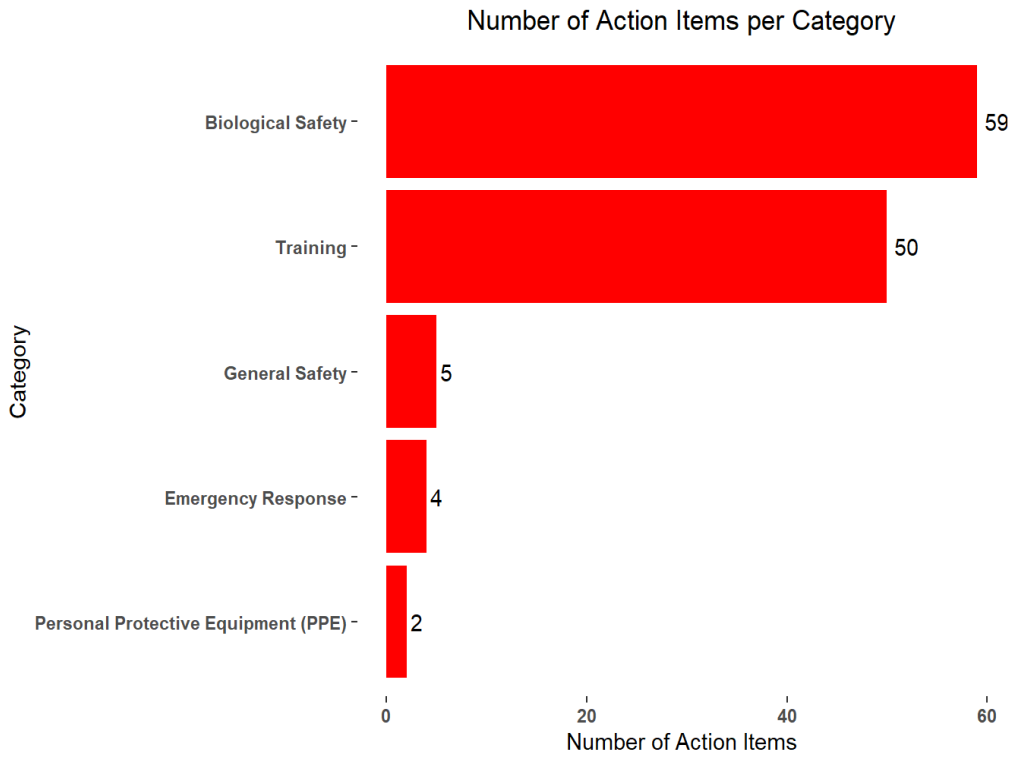

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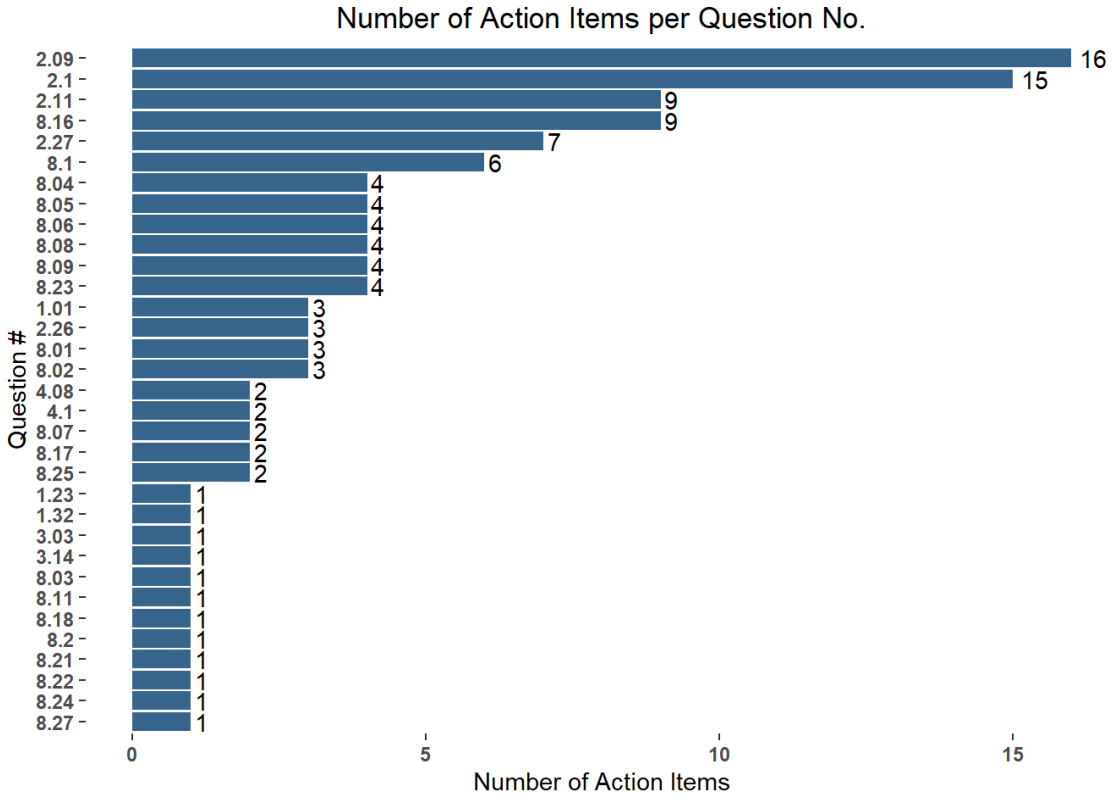

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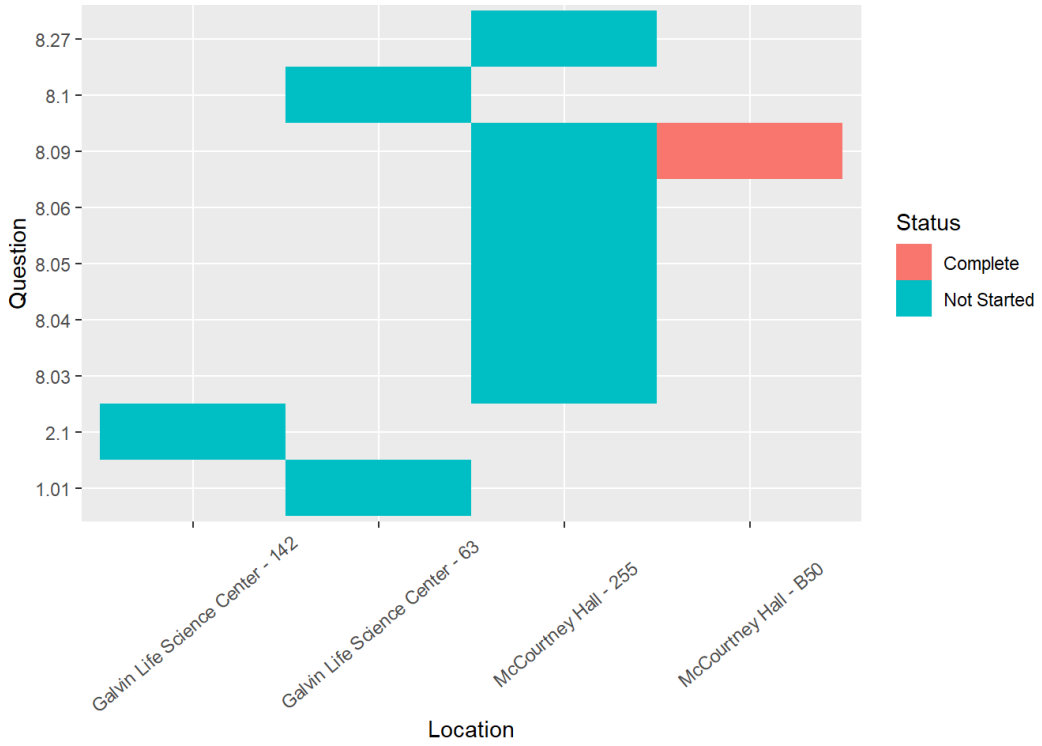
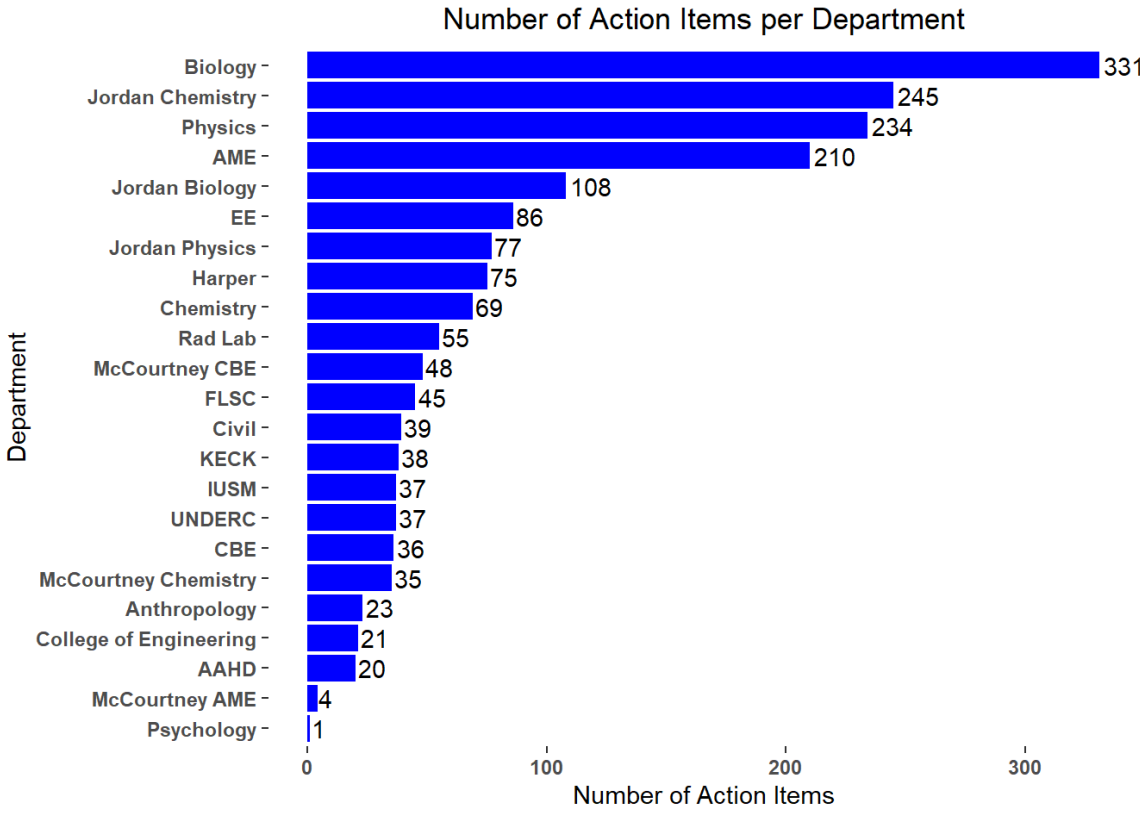


Figure F:



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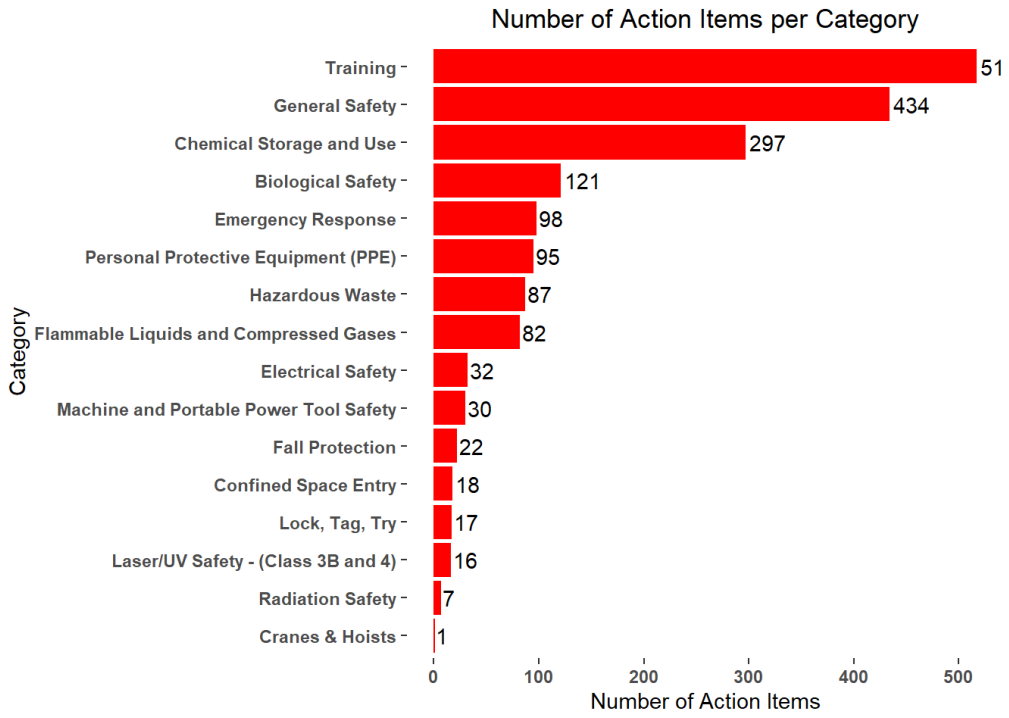

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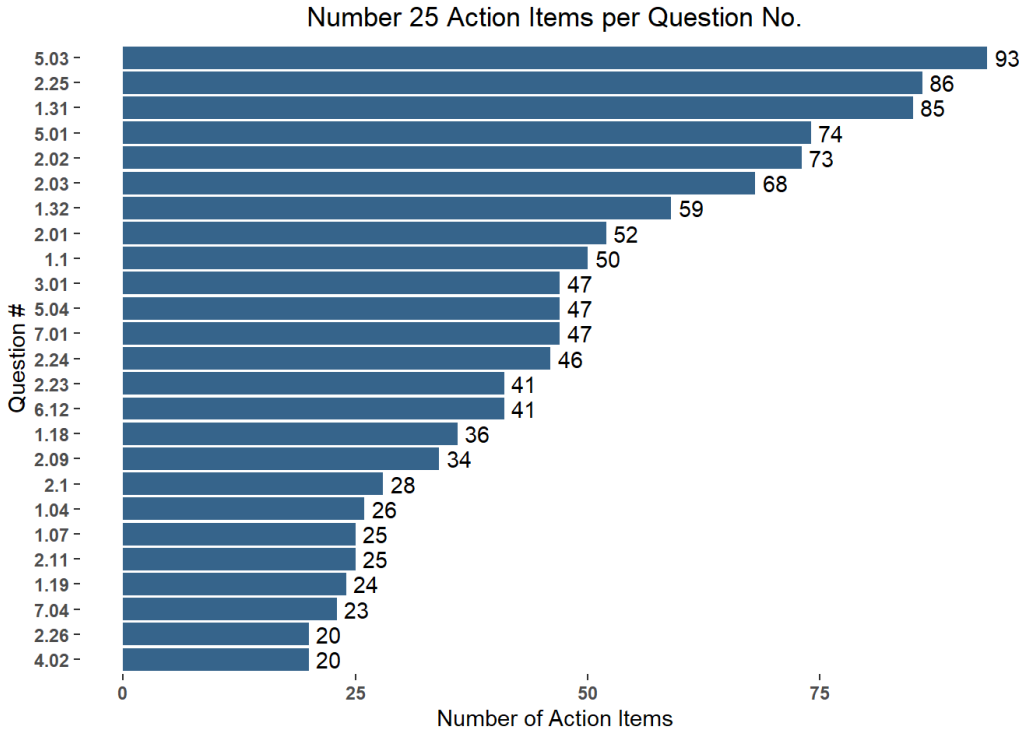
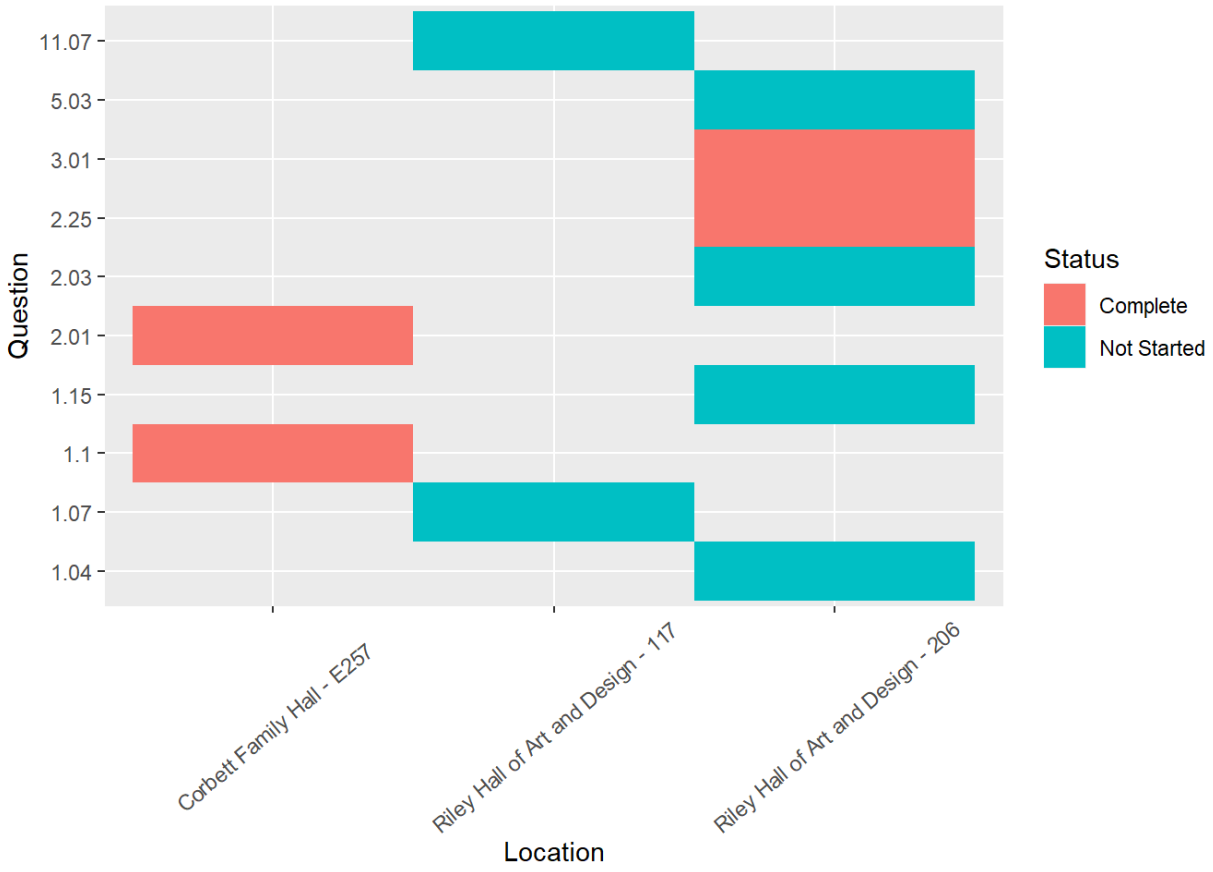


Figure I: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Question
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Riley Hall of Art and Design - 117
Riley Hall of Art and Design - 206
Location
Status
Complete
Not Started