Untitled1

March 6, 2025

[54]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
```

[55]:
```
df = pd.read_csv("Swipe Data RSF - Sheet1 (1).csv")
pd.set_option('display.max_columns', None)
df
```

[55]:

	SemesterYearNameConcat	TermTotalUnitsAttemptedNo	UngradGradCd	ReportingCollegeSchoolNmFirstMaj	HomeLocnDesc	EducNonExamLevelCd	FirstGenCollegeGradDesc	UcFeewaiverCategoryNm
0	2024 Spring	15.0	U	College of Letters and Science	San Mateo County	4	First Generation College	FeeWaiver
1	2024 Fall	4.0	U	College of Computing, Data Science & Society	Los Angeles County			
2	2024 Spring	15.0	U	College of Computing, Data Science & Society	Los Angeles County			
3	2024 Summer	NaN	U	College of Computing, Data Science & Society	Los Angeles County			
4	2024 Fall	13.0	G	College of Environmental Design	Contra Costa County			
…	…	…	…	…	…			
53625	2024 Spring	16.0	U	College of Letters and Science	Sacramento County			
53626	2024 Summer	NaN	U	College of Letters and Science	Sacramento County			
53627	2024 Spring	15.0	U	College of Computing, Data Science & Society	Massachusetts			
53628	2024 Spring	12.0	G	College of Letters and Science	Georgia			
53629	2024 Summer	NaN	G	College of Letters and Science	Georgia			

```
1                     4  Not First Generation College                    NaN
2                     4  Not First Generation College                    NaN
3                     4                           NaN                    NaN
4                     5                           NaN                    NaN
…                   …                             …                      …
53625                 3      First Generation College                    NaN
53626                 4                           NaN                    NaN
53627                 3  Not First Generation College                    NaN
53628                 7                           NaN                    NaN
53629                 7                           NaN                    NaN

       StudentInternationalCnt  StudIpedsAfricanAmernCnt  \
0                            0                         0
1                            0                         0
2                            0                         0
3                            0                         0
4                            0                         0
…                          …                           …
53625                        0                         0
53626                        0                         0
53627                        0                         0
53628                        0                         0
53629                        0                         0

       StudentIpedsAmernIndianCnt  StudentIpedsAsianCnt  \
0                               0                     1
1                               0                     0
2                               0                     0
3                               0                     0
4                               0                     1
…                             …                       …
53625                           0                     0
53626                           0                     0
53627                           0                     1
53628                           0                     0
53629                           0                     0

       StudentIpedsHispanicCnt  StudentIpedsPacIslandCnt  \
0                            0                         0
1                            0                         0
2                            0                         0
3                            0                         0
4                            0                         0
…                          …                           …
53625                        1                         0
53626                        1                         0
53627                        0                         0
```

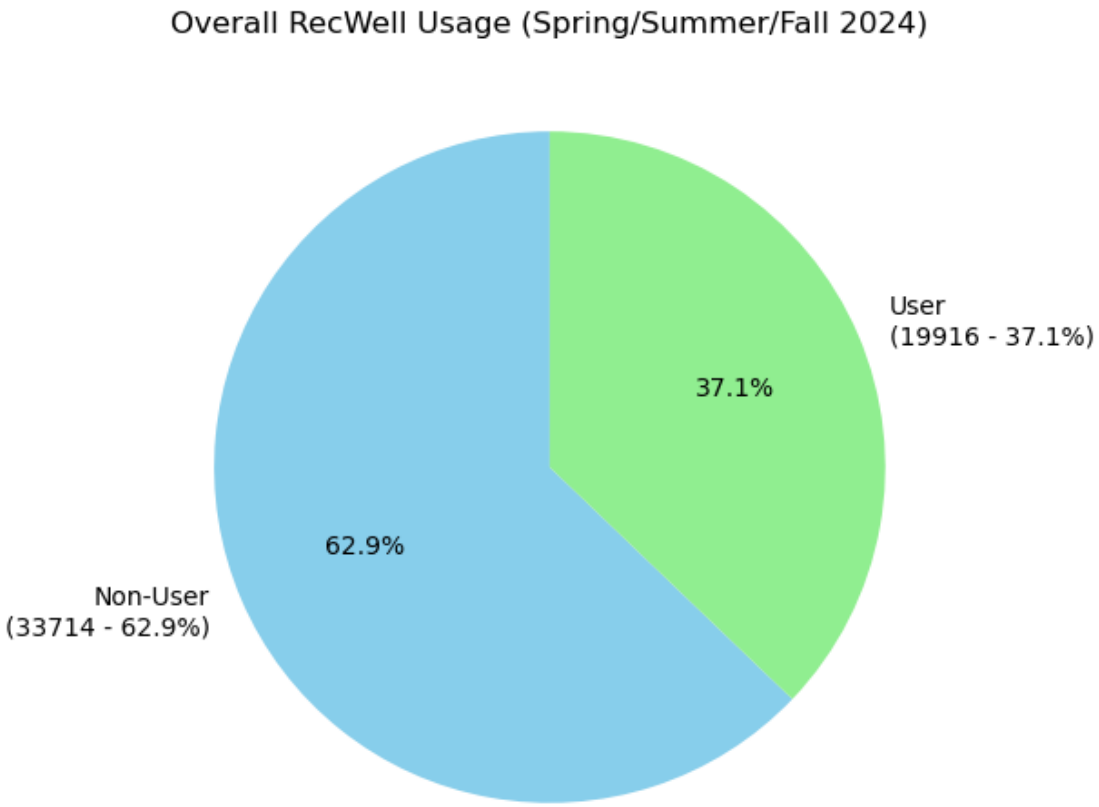
```
53628                        0                        0
53629                        0                        0

       StudentIpedsWhiteCnt  PersonGenderDesc   DerivedResidencyDesc  \
0                         0             Woman            CA Resident
1                         1             Woman            CA Resident
2                         1             Woman            CA Resident
3                         1             Woman            CA Resident
4                         1             Woman            CA Resident
…                       …               …                  …
53625                     1               Man            CA Resident
53626                     1               Man            CA Resident
53627                     0  Decline to State  Out of State Domestic
53628                     1  Decline to State            CA Resident
53629                     1  Decline to State            CA Resident

             EntryStatusDesc  ACyear    term  NewID  RSF_use  RSF_try  \
0               NEW FRESHMEN     NaN     NaN      1        0        0
1               NEW FRESHMEN     NaN     NaN      2        0        0
2               NEW FRESHMEN     NaN     NaN      2        0        0
3               NEW FRESHMEN     NaN     NaN      2        0        0
4      FIRST TIME IN PROGRAM     NaN     NaN      3        0        0
…                        …     …       …      …      …        …
53625           NEW FRESHMEN  2023.0  Spring  24094       30       36
53626           NEW FRESHMEN     NaN     NaN  24094        0        0
53627           NEW FRESHMEN  2023.0  Spring  24095       68       68
53628  FIRST TIME IN PROGRAM     NaN     NaN  24096        0        0
53629  FIRST TIME IN PROGRAM     NaN     NaN  24096        0        0

         Mode_Time  everuse  evertry
0              NaN        0        0
1              NaN        0        0
2              NaN        0        0
3              NaN        0        0
4              NaN        0        0
…            …      …       …
53625   2pm-4:59pm        1        1
53626          NaN        0        0
53627  8pm-10:59pm        1        1
53628          NaN        0        0
53629          NaN        0        0

[53630 rows x 26 columns]
```

[56]:
```
df.columns
```

[56]:
```
Index(['SemesterYearNameConcat', 'TermTotalUnitsAttemptedNo', 'UngradGradCd',
       'ReportingCollegeSchoolNmFirstMaj', 'HomeLocnDesc',
       'EducNonExamLevelCd', 'FirstGenCollegeGradDesc',
       'UcFeewaiverCategoryNm', 'StudentInternationalCnt',
       'StudIpedsAfricanAmernCnt', 'StudentIpedsAmernIndianCnt',
       'StudentIpedsAsianCnt', 'StudentIpedsHispanicCnt',
       'StudentIpedsPacIslandCnt', 'StudentIpedsWhiteCnt', 'PersonGenderDesc',
       'DerivedResidencyDesc', 'EntryStatusDesc', 'ACyear', 'term', 'NewID',
       'RSF_use', 'RSF_try', 'Mode_Time', 'everuse', 'evertry'],
      dtype='object')
```

[57]:
```
df['RecWellUsageCategory'] = df['RSF_use'].apply(
    lambda x: "User" if x > 0 else "Non-User"
)
usage_counts = df['RecWellUsageCategory'].value_counts().reset_index()
usage_counts.columns = ['RecWellUsageCategory', 'Count']
total_students = usage_counts['Count'].sum()

labels = usage_counts.apply(
    lambda row: f"{row['RecWellUsageCategory']}\n({row['Count']} -␣
 ↪{row['Count']/total_students:.1%})",
    axis=1
)
```

[58]:
```
plt.figure(figsize=(6,6))
plt.pie(
    usage_counts['Count'],
    labels=labels,
    autopct='%.1f%%',
    startangle=90,
    colors=["skyblue", "lightgreen"]
)
plt.title("Overall RecWell Usage (Spring/Summer/Fall 2024)")
plt.show()
```

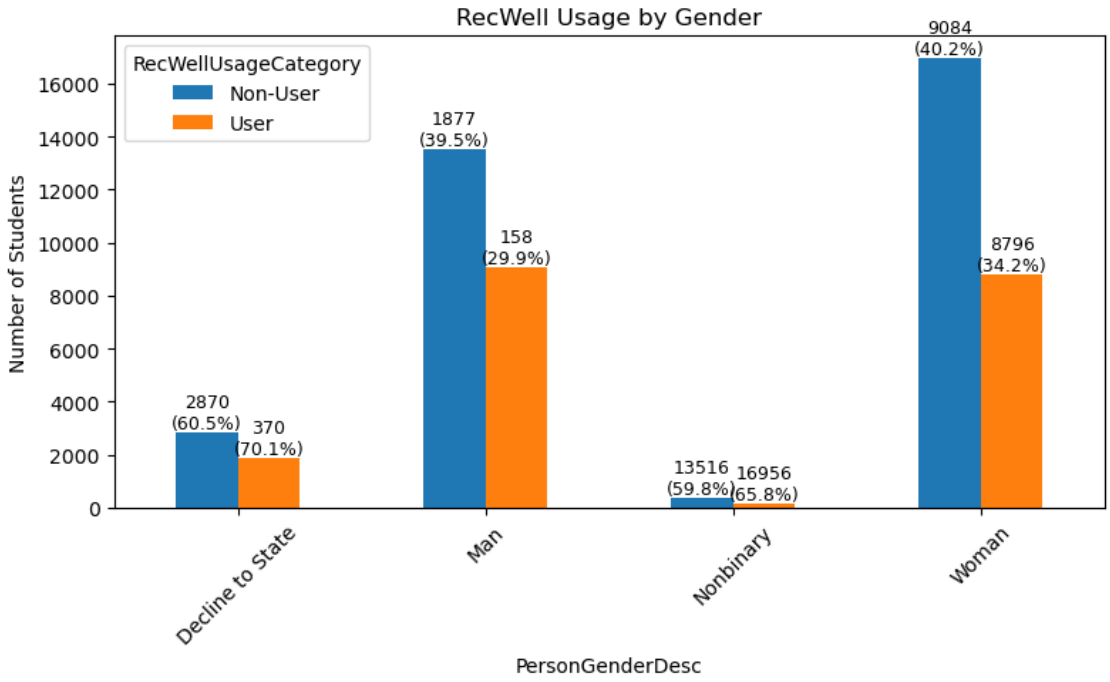


[59]:
```
def demographic_bar_chart(data, demo_col, title):
    """
    For a given demographic variable (demo_col), this function:
      - Groups data at the student level.
      - Creates a pivot table with counts of "User" and "Non-User".
      - Plots a grouped bar chart.
      - Annotates each bar with the count and the percentage within that␣
↪demographic group.
    """

    student_data = data.copy()

    # Create pivot table: rows = demo_col, columns = RecWellUsageCategory,␣
↪values = count of students
    pivot = student_data.groupby([demo_col, 'RecWellUsageCategory'])['NewID'].
↪count().reset_index(name='Count')
    # total count per demographic group for percentage calculation
```

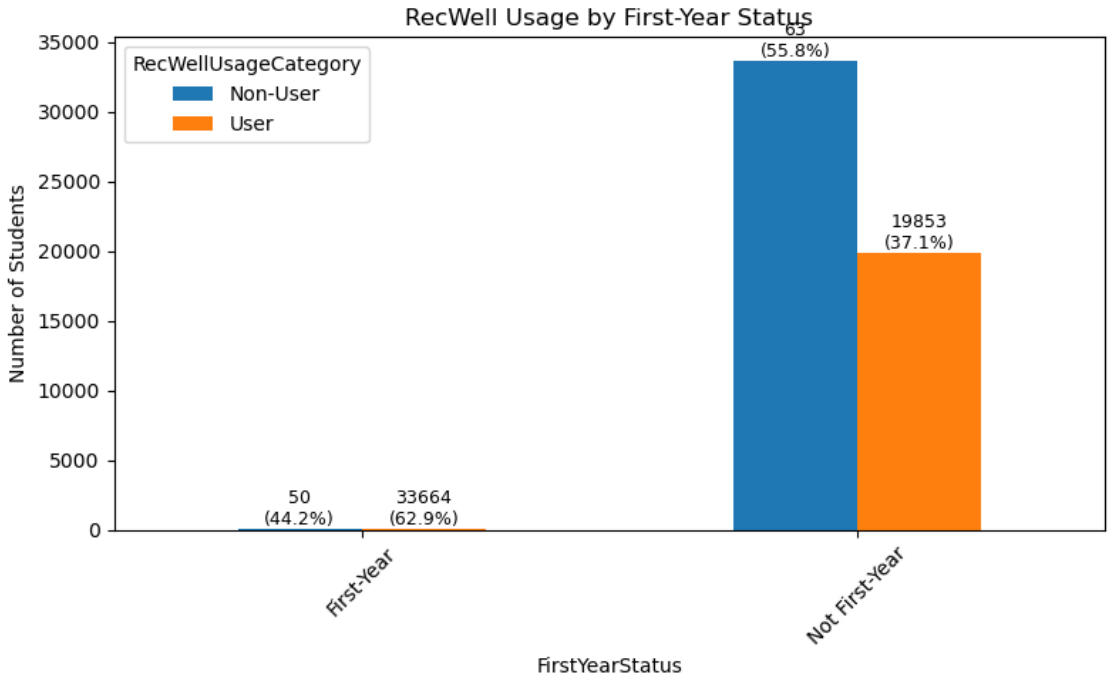
```
    totals = student_data.groupby(demo_col)['NewID'].count().
↪reset_index(name='Total')

    # Merge totals into pivot table
    pivot = pivot.merge(totals, on=demo_col)
    pivot['Percentage'] = pivot['Count'] / pivot['Total']

    # Reshape the data so that rows = demo_col and columns = ["User",␣
↪"Non-User"]
    pivot_table = pivot.pivot(index=demo_col, columns='RecWellUsageCategory',␣
↪values='Count').fillna(0)
    pivot_pct   = pivot.pivot(index=demo_col, columns='RecWellUsageCategory',␣
↪values='Percentage').fillna(0)
    # For consistent ordering, sort by index (or customize as needed)
    pivot_table = pivot_table.sort_index()
    pivot_pct   = pivot_pct.sort_index()

    # Plot grouped bar chart
    ax = pivot_table.plot(kind='bar', figsize=(8,5), rot=45)
    plt.title(title)
    plt.ylabel("Number of Students")
    plt.xlabel(demo_col)

    # Get list of demographic groups and categories (assumed to be 2: "User"␣
↪and "Non-User")
    groups = pivot_table.index.tolist()
    categories = pivot_table.columns.tolist()

    # Annotate with count and percentage.
    n_categories = len(categories)
    for i, group in enumerate(groups):
        # Find total students in this demographic group.
        total = totals.loc[totals[demo_col] == group, 'Total'].values[0]
        for j, cat in enumerate(categories):
            # Calculate the index of the patch: patches are ordered by group.
            patch_index = i * n_categories + j
            count_val = pivot_table.loc[group, cat]
            pct_val = pivot_pct.loc[group, cat]
            # Get the bar's x position and height
            patch = ax.patches[patch_index]
            x = patch.get_x() + patch.get_width()/2
            y = patch.get_height()
            # Annotate: show count and percentage (of that group)
            ax.text(x, y, f"{int(count_val)}\n({pct_val:.1%})", ha='center',␣
↪va='bottom', fontsize=9)
```

```
    plt.tight_layout()
    plt.show()
```

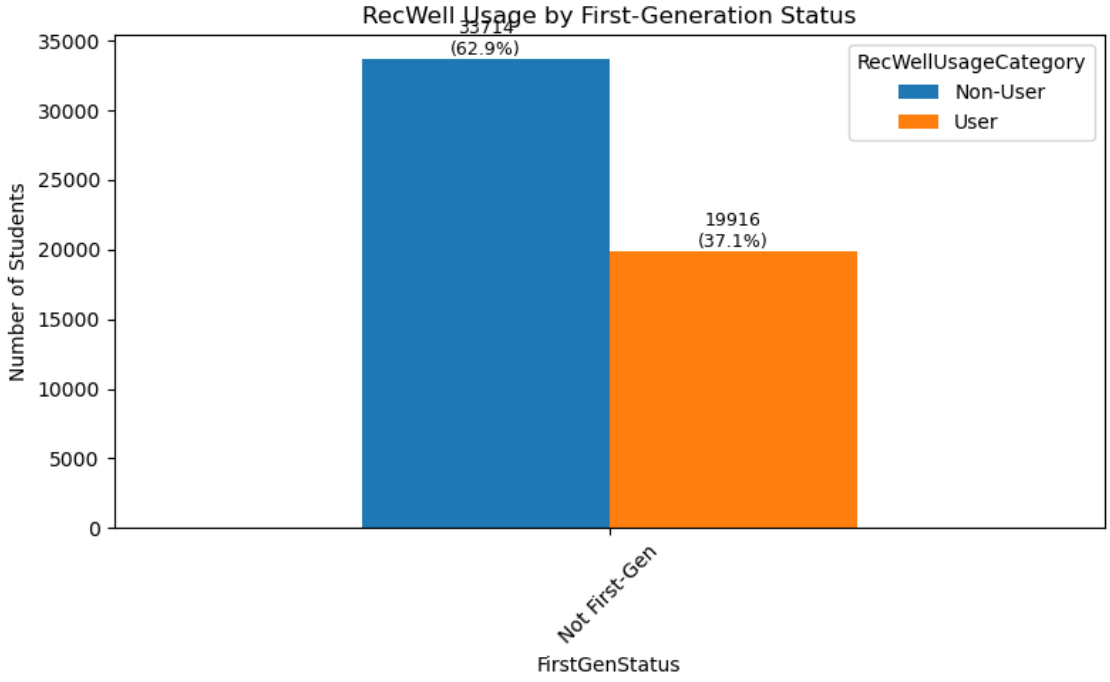
[60]:
```
demographic_bar_chart(df, "PersonGenderDesc", "RecWell Usage by Gender")
```



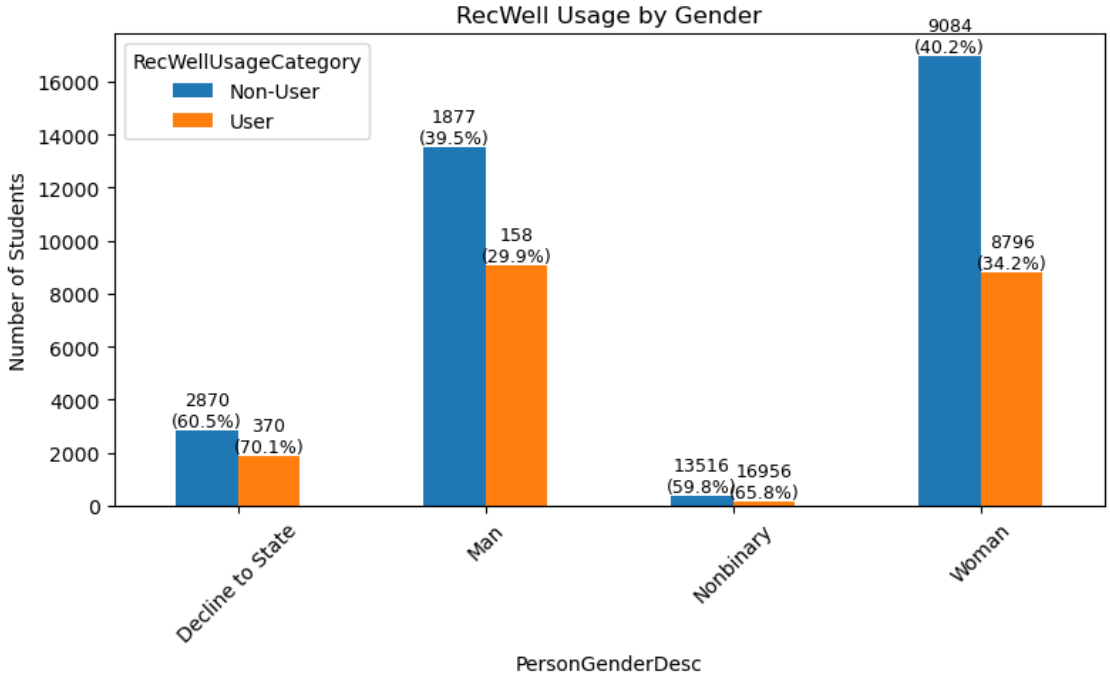
[61]:
```
df["FirstYearStatus"] = df["EducNonExamLevelCd"].apply(lambda x: "First-Year"␣
 ↪if str(x).strip() == "1" else "Not First-Year")
demographic_bar_chart(df, "FirstYearStatus", "RecWell Usage by First-Year␣
 ↪Status")
```



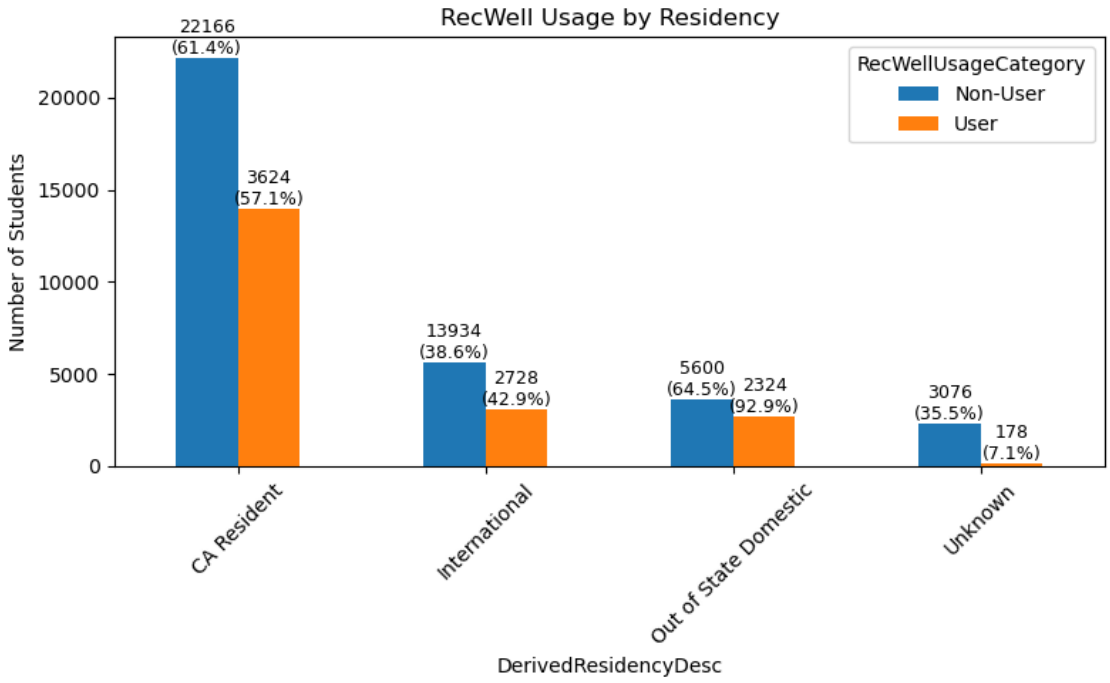
[62]:
```
df["FirstGenStatus"] = df["FirstGenCollegeGradDesc"].apply(lambda x:␣
↪"First-Gen" if str(x).strip().lower() in ["yes", "1"] else "Not First-Gen")
demographic_bar_chart(df, "FirstGenStatus", "RecWell Usage by First-Generation␣
↪Status")
```



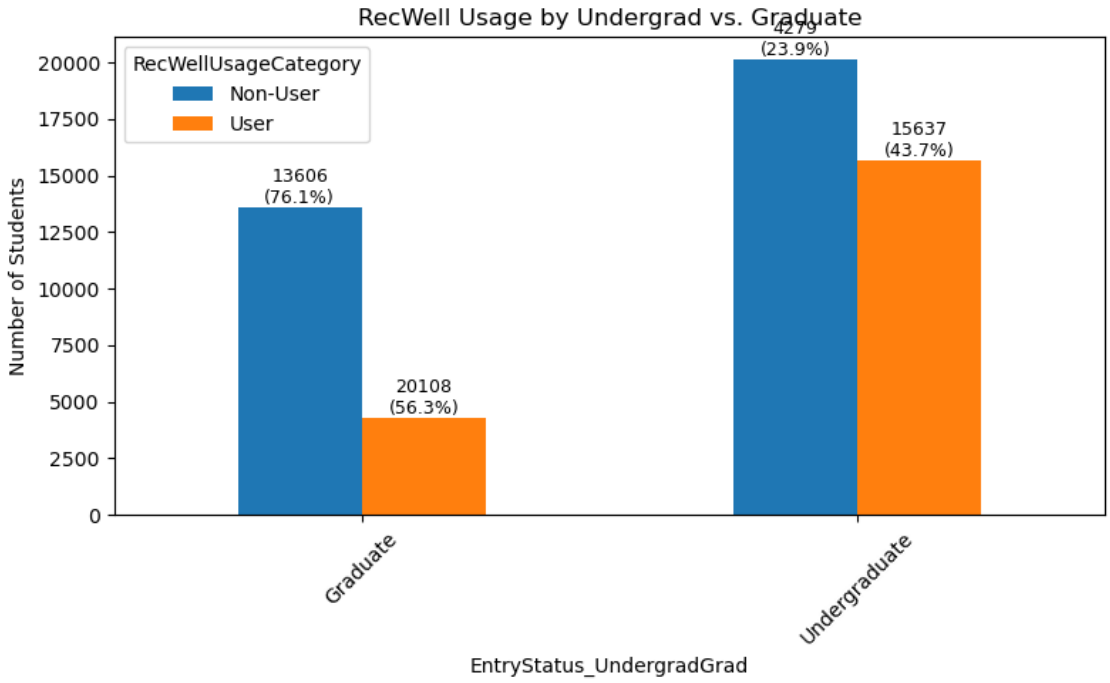
[63]:
```
demographic_bar_chart(df, "PersonGenderDesc", "RecWell Usage by Gender")
```



[64]:
```
demographic_bar_chart(df, "DerivedResidencyDesc", "RecWell Usage by Residency")
```

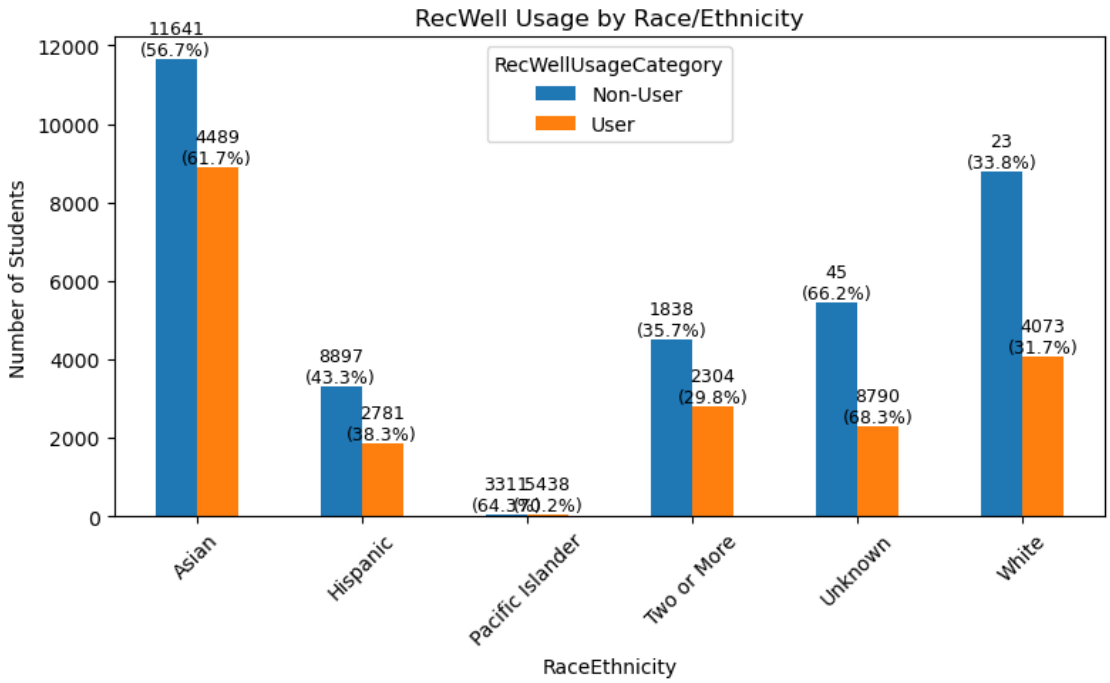


[65]:
```
df['EntryStatus_UndergradGrad'] = df['EntryStatusDesc'].apply(
    lambda x: 'Undergraduate' if x in ['NEW FRESHMEN', 'ADVANCED STANDING']␣
 ↪else 'Graduate'
)

demographic_bar_chart(
    data=df,
    demo_col='EntryStatus_UndergradGrad',
    title="RecWell Usage by Undergrad vs. Graduate"
)
```



[67]:
```
def combine_race(row):
    races = []
    if row.get('StudentIpedsAfricanAmernCnt', 0) == 1:
        races.append("African American")
    if row.get('StudentIpedsAsianCnt', 0) == 1:
        races.append("Asian")
    if row.get('StudentIpedsHispanicCnt', 0) == 1:
        races.append("Hispanic")
    if row.get('StudentIpedsPacIslandCnt', 0) == 1:
        races.append("Pacific Islander")
    if row.get('StudentIpedsWhiteCnt', 0) == 1:
        races.append("White")
    if row.get('StudentIpedsAmericanIndianCnt', 0) == 1:
        races.append("American Indian/Alaska Native")

    if len(races) == 0:
        return "Unknown"
    elif len(races) == 1:
        return races[0]
    else:
        return "Two or More"

df["RaceEthnicity"] = df.apply(combine_race, axis=1)

demographic_bar_chart(
```

```
    data=df,
    demo_col="RaceEthnicity",
    title="RecWell Usage by Race/Ethnicity"
)
```



[ ]:

[ ]: