In [97]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

Dete

In [98]:

```
dete_survey = pd.read_csv('dete_survey.csv')
```

In [99]:

```
dete_survey = dete_survey.drop(dete_survey.columns[28:49], axis=1)
```

In [100]:

```
dete_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 822 entries, 0 to 821
Data columns (total 35 columns):
ID                                     822 non-null int64
SeparationType                         822 non-null object
Cease Date                             822 non-null object
DETE Start Date                        822 non-null object
Role Start Date                        822 non-null object
Position                               817 non-null object
Classification                         455 non-null object
Region                                 822 non-null object
Business Unit                          126 non-null object
Employment Status                      817 non-null object
Career move to public sector           822 non-null bool
Career move to private sector          822 non-null bool
Interpersonal conflicts                822 non-null bool
Job dissatisfaction                    822 non-null bool
Dissatisfaction with the department    822 non-null bool
Physical work environment              822 non-null bool
Lack of recognition                    822 non-null bool
Lack of job security                   822 non-null bool
Work location                          822 non-null bool
Employment conditions                  822 non-null bool
Maternity/family                       822 non-null bool
Relocation                             822 non-null bool
Study/Travel                           822 non-null bool
Ill Health                             822 non-null bool
Traumatic incident                     822 non-null bool
Work life balance                      822 non-null bool
Workload                               822 non-null bool
None of the above                      822 non-null bool
Gender                                 798 non-null object
Age                                    811 non-null object
Aboriginal                             16 non-null object
Torres Strait                          3 non-null object
South Sea                              7 non-null object
Disability                             23 non-null object
NESB                                   32 non-null object
dtypes: bool(18), int64(1), object(16)
memory usage: 123.7+ KB
```

In [101]:

```
dete_survey.head()
```

Out[101]:

	ID	SeparationType	Cease Date	DETE Start Date	Role Start Date	Position	Classification	Region	Business Unit	Employment Status	...	ba
0	1	Ill Health Retirement	08/2012	1984	2004	Public Servant	A01-A04	Central Office	Corporate Strategy and Peformance	Permanent Full-time	...	
1	2	Voluntary Early Retirement (VER)	08/2012	Not Stated	Not Stated	Public Servant	AO5-AO7	Central Office	Corporate Strategy and Peformance	Permanent Full-time	...	
2	3	Voluntary Early Retirement (VER)	05/2012	2011	2011	Schools Officer	NaN	Central Office	Education Queensland	Permanent Full-time	...	
3	4	Resignation-Other reasons	05/2012	2005	2006	Teacher	Primary	Central Queensland	NaN	Permanent Full-time	...	
4	5	Age Retirement	05/2012	1970	1989	Head of Curriculum/Head of Special Education	NaN	South East	NaN	Permanent Full-time	...	

5 rows × 35 columns

First Clean

Aboriginal Column

In [102]:

```
dete_survey['Aboriginal'].value_counts(dropna=False)
```

Out[102]:

```
NaN    806
Yes     16
Name: Aboriginal, dtype: int64
```

In [103]:

```
dete_survey['Aboriginal'] = dete_survey['Aboriginal'].fillna('False')
```

In [104]:

```
dete_survey['Aboriginal'] = dete_survey['Aboriginal'].replace('Yes', True)
```

In [105]:

```
dete_survey['Aboriginal'].value_counts(dropna=False)
```

Out[105]:

```
False    806
True      16
Name: Aboriginal, dtype: int64
```

Aboriginal column has been changed for a combo of NaN and Yes to a boolean

Classification Column

In [106]:

```
dete_survey['Classification'].value_counts(dropna=False)
```

Out[106]:

```
NaN                  367
Primary              161
Secondary            124
A01-A04               66
A05-A07               46
Special Education     33
A08 and Above         14
P01-P04                8
Middle                 3
Name: Classification, dtype: int64
```

Referring back to my objective, classification is almost more empty than recorded, and it was not enquired about by the people looking for analysis.
Should be removed

In [107]:

```
dete_survey = dete_survey.drop('Classification', axis=1)
```

Position Column

In [108]:

```
dete_survey['Position'].value_counts(dropna=False)
```

Out[108]:

```
Teacher                                                324
Teacher Aide                                           137
Public Servant                                         126
Cleaner                                                 97
Head of Curriculum/Head of Special Education            38
Schools Officer                                         24
School Administrative Staff                             16
Guidance Officer                                        12
Technical Officer                                       11
Other                                                    7
Professional Officer                                     7
School Based Professional Staff (Therapist, nurse, etc)  5
School Principal                                         5
NaN                                                      5
Business Service Manager                                 4
Deputy Principal                                         4
Name: Position, dtype: int64
```

In [109]:

```
dete_survey['Position'] = dete_survey['Position'].fillna('Teacher')
```

In [110]:

```
dete_survey['Position'].value_counts(dropna=False)
```

Out[110]:

```
Teacher                                                329
Teacher Aide                                           137
Public Servant                                         126
Cleaner                                                 97
Head of Curriculum/Head of Special Education            38
Schools Officer                                         24
School Administrative Staff                             16
Guidance Officer                                        12
Technical Officer                                       11
Other                                                    7
Professional Officer                                     7
School Based Professional Staff (Therapist, nurse, etc)  5
School Principal                                         5
```

```
Business Service Manager                                4
Deputy Principal                                        4
Name: Position, dtype: int64
```

Removing NaN values allows graphs to work better, and the 5 NaN values were statistically very likely to be teachers, and the low number of values means that it will distort the graph very little, with no loss from other rows

Employment Status

In [111]:

```
dete_survey['Employment Status'].value_counts(dropna=False)
```

Out[111]:

```
Permanent Full-time    434
Permanent Part-time    308
Temporary Full-time     41
Temporary Part-time     24
Casual                  10
NaN                      5
Name: Employment Status, dtype: int64
```

In [112]:

```
dete_survey['Employment Status'] = dete_survey['Employment Status'].fillna('Permanent Ful
l-time')
```

In [113]:

```
dete_survey['Employment Status'].value_counts(dropna=False)
```

Out[113]:

```
Permanent Full-time    439
Permanent Part-time    308
Temporary Full-time     41
Temporary Part-time     24
Casual                  10
Name: Employment Status, dtype: int64
```

Set NaN data to the most common, permanent full-time

Business Column

In [114]:

```
dete_survey['Business Unit'].value_counts(dropna=False)
```

Out[114]:

```
NaN                                        696
Education Queensland                        54
Information and Technologies                26
Training and Tertiary Education Queensland  12
Other                                       11
Human Resources                              6
Corporate Strategy and Peformance            5
Early Childhood Education and Care           3
Policy, Research, Legislation                2
Infrastructure                               2
Finance                                      1
Calliope State School                        1
Indigenous Education and Training Futures    1
Corporate Procurement                        1
Pacific Pines SHS                            1
Name: Business Unit, dtype: int64
```

In [115]:

```
dete_survey = dete_survey.drop(columns='Business Unit')
```

mostly empty and not relevant to the brief

Gender

In [116]:

```
dete_survey['Gender'].value_counts(dropna=False)
```

Out[116]:

```
Female    573
Male      225
NaN        24
Name: Gender, dtype: int64
```

In [117]:

```
dete_survey['Gender'] = dete_survey['Gender'].fillna('Female')
```

In [118]:

```
dete_survey['Gender'].value_counts(dropna=False)
```

Out[118]:

```
Female    597
Male      225
Name: Gender, dtype: int64
```

Age

In [119]:

```
dete_survey['Age'].value_counts(dropna=False)
```

Out[119]:

```
61 or older      222
56-60            174
51-55            103
46-50             63
41-45             61
26-30             57
36-40             51
21-25             40
31-35             39
NaN               11
20 or younger      1
Name: Age, dtype: int64
```

In [120]:

```
dete_survey['Age'] = dete_survey['Age'].fillna('61 or older')
```

In [121]:

```
dete_survey['Age'].value_counts(dropna=False)
```

Out[121]:

```
61 or older      233
56-60            174
51-55            103
46-50             63
41-45             61
26-30             57
```

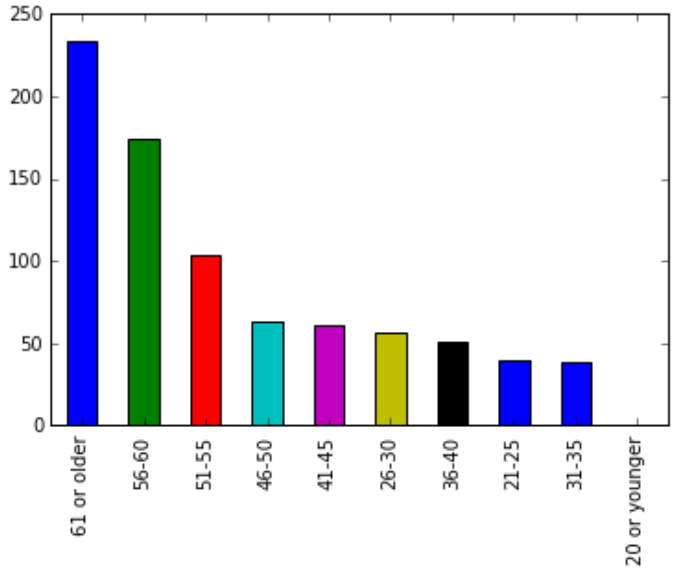
```
36-40              51
21-25              40
31-35              39
20 or younger       1
Name: Age, dtype: int64
```

In [122]:

```
dete_survey['Age'].value_counts(dropna=False).plot(kind='bar')
```

Out[122]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f4f7e010438>
```



Torres Strait

In [123]:

```
dete_survey['Torres Strait'].value_counts(dropna=False)
```

Out[123]:

```
NaN    819
Yes      3
Name: Torres Strait, dtype: int64
```

In [124]:

```
dete_survey = dete_survey.drop(columns='Torres Strait')
```

Three people is not enough to do a visual analysis on. If info is required, read the 3 files

South Sea

In [125]:

```
dete_survey['South Sea'].value_counts(dropna=False)
```

Out[125]:

```
NaN    815
Yes      7
Name: South Sea, dtype: int64
```

In [126]:

```
dete_survey['South Sea'] = dete_survey['South Sea'].fillna(False)
```

In [127]:

```
dete_survey['South Sea'] = dete_survey['South Sea'].replace('Yes', True)
```

In [128]:

```
dete_survey['South Sea'].value_counts(dropna=False)
```

Out[128]:

```
False    815
True       7
Name: South Sea, dtype: int64
```

Disability

In [129]:

```
dete_survey['Disability'].value_counts(dropna=False)
```

Out[129]:

```
NaN    799
Yes     23
Name: Disability, dtype: int64
```

In [130]:

```
dete_survey['Disability'] = dete_survey['Disability'].fillna(False)
```

In [131]:

```
dete_survey['Disability'] = dete_survey['Disability'].replace('Yes', True)
```

In [132]:

```
dete_survey['Disability'].value_counts(dropna=False)
```

Out[132]:

```
False    799
True      23
Name: Disability, dtype: int64
```

NESB

In [133]:

```
dete_survey['NESB'].value_counts(dropna=False)
```

Out[133]:

```
NaN    790
Yes     32
Name: NESB, dtype: int64
```

In [134]:

```
dete_survey['NESB'] = dete_survey['NESB'].fillna(False)
```

In [135]:

```
dete_survey['NESB'] = dete_survey['NESB'].replace('Yes', True)
```

In [136]:

```
dete_survey['NESB'].value_counts(dropna=False)
```

Out[136]:

```
False    790
True      32
```

```
Name: NESB, dtype: int64
```

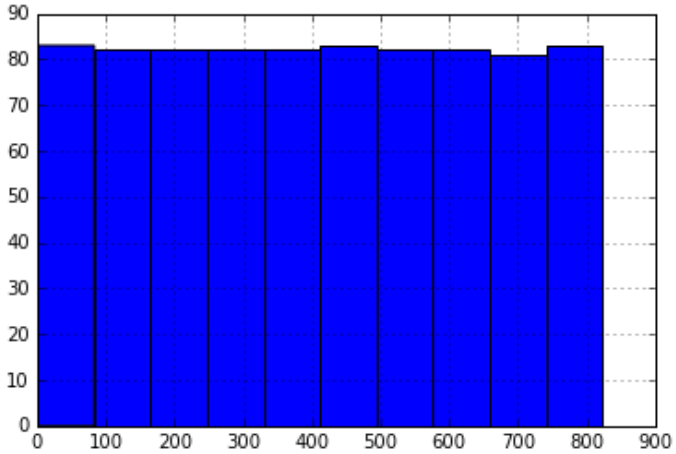
ID

In [137]:

```
dete_survey['ID'].hist()
```

Out[137]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f4f7dff0cc0>
```



Seperation Type

In [138]:

```
dete_survey['SeparationType'].value_counts()
```

Out[138]:

```
Age Retirement                          285
Resignation-Other reasons               150
Resignation-Other employer               91
Resignation-Move overseas/interstate     70
Voluntary Early Retirement (VER)         67
Ill Health Retirement                    61
Other                                    49
Contract Expired                         34
Termination                              15
Name: SeparationType, dtype: int64
```

Cease Date

In [139]:

```
dete_survey['Cease Date'].value_counts()
```

Out[139]:

```
2012          344
2013          200
01/2014        43
12/2013        40
Not Stated     34
09/2013        34
06/2013        27
07/2013        22
10/2013        20
11/2013        16
08/2013        12
05/2013         7
05/2012         6
02/2014         2
07/2014         2
```

```
07/2014          2
04/2013          2
04/2014          2
08/2012          2
09/2014          1
2010             1
07/2006          1
09/2010          1
11/2012          1
07/2012          1
2014             1
Name: Cease Date, dtype: int64
```

A lot more cleaning needs to be done here, but a quick one is to set the 'Not Stated' to 2012

In [140]:

```
dete_survey['Cease Date'] = dete_survey['Cease Date'].replace('Not Stated', '2012')
```

In [141]:

```
pattern = r"(2[0-9]{3})"
```

In [142]:

```
dates = dete_survey['Cease Date'].str.extract(pattern)
```

```
/dataquest/system/env/python3/lib/python3.4/site-packages/ipykernel/__main__.py:1: FutureWarning:

currently extract(expand=None) means expand=False (return Index/Series/DataFrame) but in a future version of pandas this will be changed to expand=True (return DataFrame)
```

In [143]:

```
dete_survey['Cease Date'] = dates
```

In [144]:

```
dete_survey['Cease Date'].value_counts()
```

Out[144]:

```
2012    388
2013    380
2014     51
2010      2
2006      1
Name: Cease Date, dtype: int64
```

In [145]:

```
dete_survey['Cease Date'] = dete_survey['Cease Date'].astype('int')
```

DETE Start Date

In [146]:

```
dete_survey['DETE Start Date'].value_counts().sort_index()
```

Out[146]:

```
1963           4
1965           1
1966           1
1967           2
1968           3
1969          10
1970          21
1971          10
```

```
1971           10
1972           12
1973            8
1974           14
1975           21
1976           15
1977           11
1978           15
1979           14
1980           14
1981            9
1982            4
1983            9
1984           10
1985            8
1986           12
1987            7
1988           15
1989           17
1990           20
1991           18
1992           18
1993           13
1994           10
1995           14
1996           19
1997           14
1998           14
1999           19
2000           18
2001           10
2002           15
2003           15
2004           18
2005           20
2006           23
2007           34
2008           31
2009           24
2010           27
2011           40
2012           27
2013           21
Not Stated     73
Name: DETE Start Date, dtype: int64
```

In [147]:

```
dete_survey['DETE Start Date'] = dete_survey['DETE Start Date'].replace('Not Stated', np
.NaN)
```

In [148]:

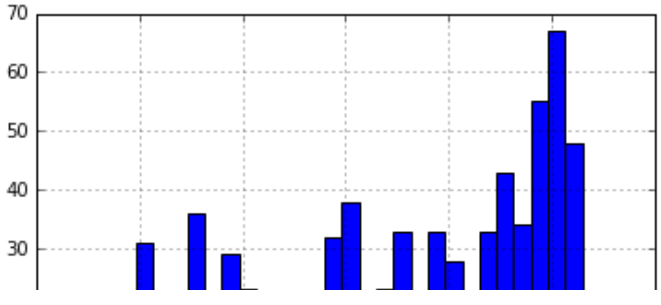
```
dete_survey['DETE Start Date'] = dete_survey['DETE Start Date'].astype('float')
```

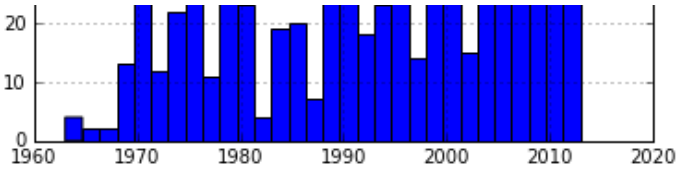
In [149]:

```
dete_survey['DETE Start Date'].hist(bins=30)
```

Out[149]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f4f7deb9be0>
```





I can't drop 70 values into a particular year. More data to be analysed before I can estimate start date

Role Start Date

In [150]:

```
dete_survey['Role Start Date'].value_counts().sort_index()
```

Out[150]:

```
1970           2
1971           1
1972           1
1973           1
1974           1
1975          12
1976           9
1977           2
1978           9
1979           7
1980           3
1981           5
1982           4
1983           5
1984           4
1985           6
1986          11
1987           5
1988          14
1989          18
1990          12
1991           8
1992          17
1993           9
1994           7
1995          13
1996          19
1997          13
1998          15
1999          19
200            1
2000          20
2001          15
2002          16
2003          20
2004          22
2005          20
2006          25
2007          41
2008          45
2009          38
2010          46
2011          57
2012          65
2013          41
Not Stated    98
Name: Role Start Date, dtype: int64
```

In [151]:

```
dete_survey['Role Start Date'] = dete_survey['Role Start Date'].replace('Not Stated', np
.NaN)
```

In [152]:

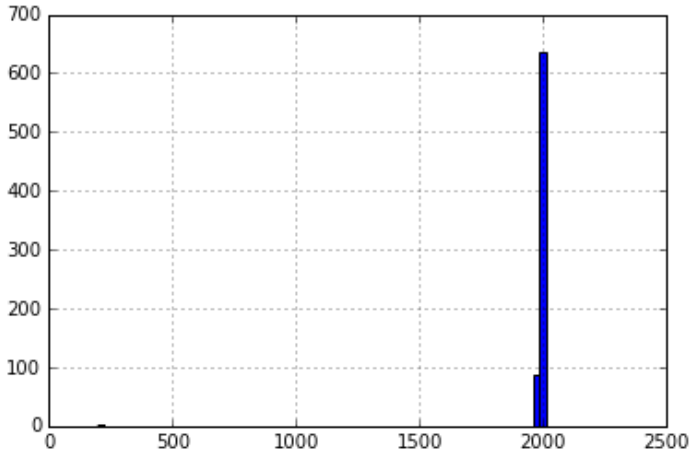
```
dete_survey['Role Start Date'] = dete_survey['Role Start Date'].astype('float')
```

In [153]:

```
dete_survey['Role Start Date'].hist(bins=70)
```

Out[153]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f4f7de99748>
```



Outlier at year 200

In [154]:

```
dete_survey[dete_survey['Role Start Date']==200]
```

Out[154]:

	ID	SeparationType	Cease Date	DETE Start Date	Role Start Date	Position	Region	Employment Status	Career move to public sector	Career move to private sector	...	Traumatic incident	Work life balance
390	391	Resignation-Other employer	2013	2000.0	200.0	Teacher	Central Queensland	Permanent Full-time	False	True	...	False	False

1 rows × 32 columns

In [155]:

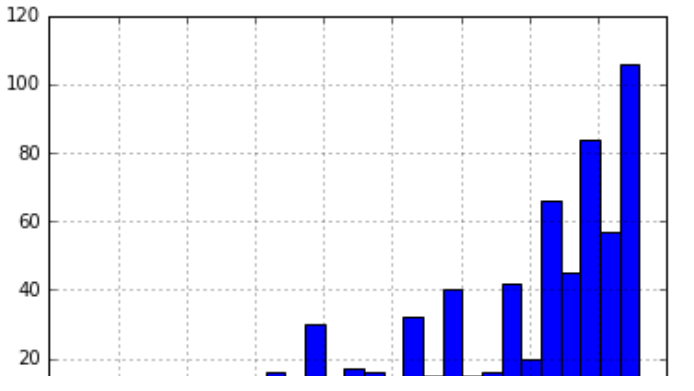
```
dete_survey.loc[dete_survey['Role Start Date']==200, 'Role Start Date'] = 2000
```

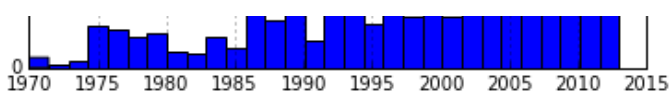
In [156]:

```
dete_survey['Role Start Date'].hist(bins=30)
```

Out[156]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f4f7de07748>
```





I don't think Role Start Date is important in this analysis, since the department as a whole is looking at dissatisfaction.

In [157]:

```
dete_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 822 entries, 0 to 821
Data columns (total 32 columns):
ID                                     822 non-null int64
SeparationType                         822 non-null object
Cease Date                             822 non-null int64
DETE Start Date                        749 non-null float64
Role Start Date                        724 non-null float64
Position                               822 non-null object
Region                                 822 non-null object
Employment Status                      822 non-null object
Career move to public sector           822 non-null bool
Career move to private sector          822 non-null bool
Interpersonal conflicts                822 non-null bool
Job dissatisfaction                    822 non-null bool
Dissatisfaction with the department    822 non-null bool
Physical work environment              822 non-null bool
Lack of recognition                    822 non-null bool
Lack of job security                   822 non-null bool
Work location                          822 non-null bool
Employment conditions                  822 non-null bool
Maternity/family                       822 non-null bool
Relocation                             822 non-null bool
Study/Travel                           822 non-null bool
Ill Health                             822 non-null bool
Traumatic incident                     822 non-null bool
Work life balance                      822 non-null bool
Workload                               822 non-null bool
None of the above                      822 non-null bool
Gender                                 822 non-null object
Age                                    822 non-null object
Aboriginal                             822 non-null object
South Sea                              822 non-null bool
Disability                             822 non-null bool
NESB                                   822 non-null bool
dtypes: bool(21), float64(2), int64(2), object(7)
memory usage: 87.6+ KB
```

In [158]:

```
dete_survey.loc[dete_survey['DETE Start Date'].isnull(), 'Role Start Date'].value_counts
(dropna=False)
```

Out[158]:

```
NaN        69
 2011.0     2
 1997.0     1
 2003.0     1
Name: Role Start Date, dtype: int64
```

checking if any of the null DETE start dates have a numerical role start date, and copying it over

In [159]:

```
dete_survey.loc[dete_survey['DETE Start Date'].isnull(), 'DETE Start Date'] = dete_surve
y.loc[dete_survey['DETE Start Date'].isnull(), 'Role Start Date']
```

In [160]:

```
dete_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 822 entries, 0 to 821
Data columns (total 32 columns):
ID                                     822 non-null int64
SeparationType                         822 non-null object
Cease Date                             822 non-null int64
DETE Start Date                        753 non-null float64
Role Start Date                        724 non-null float64
Position                               822 non-null object
Region                                 822 non-null object
Employment Status                      822 non-null object
Career move to public sector           822 non-null bool
Career move to private sector          822 non-null bool
Interpersonal conflicts                822 non-null bool
Job dissatisfaction                    822 non-null bool
Dissatisfaction with the department    822 non-null bool
Physical work environment              822 non-null bool
Lack of recognition                    822 non-null bool
Lack of job security                   822 non-null bool
Work location                          822 non-null bool
Employment conditions                  822 non-null bool
Maternity/family                       822 non-null bool
Relocation                             822 non-null bool
Study/Travel                           822 non-null bool
Ill Health                             822 non-null bool
Traumatic incident                     822 non-null bool
Work life balance                      822 non-null bool
Workload                               822 non-null bool
None of the above                      822 non-null bool
Gender                                 822 non-null object
Age                                    822 non-null object
Aboriginal                             822 non-null object
South Sea                              822 non-null bool
Disability                             822 non-null bool
NESB                                   822 non-null bool
dtypes: bool(21), float64(2), int64(2), object(7)
memory usage: 87.6+ KB
```

Institute Service

In [161]:

```
dete_survey['institute_service'] = dete_survey['Cease Date'] - dete_survey['DETE Start D
ate']
```

In [162]:

```
dete_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 822 entries, 0 to 821
Data columns (total 33 columns):
ID                                     822 non-null int64
SeparationType                         822 non-null object
Cease Date                             822 non-null int64
DETE Start Date                        753 non-null float64
Role Start Date                        724 non-null float64
Position                               822 non-null object
Region                                 822 non-null object
Employment Status                      822 non-null object
Career move to public sector           822 non-null bool
Career move to private sector          822 non-null bool
Interpersonal conflicts                822 non-null bool
Job dissatisfaction                    822 non-null bool
Dissatisfaction with the department    822 non-null bool
Physical work environment              822 non-null bool
Lack of recognition                    822 non-null bool
Lack of job security                   822 non-null bool
```

```
Work location                          822 non-null bool
Employment conditions                  822 non-null bool
Maternity/family                       822 non-null bool
Relocation                             822 non-null bool
Study/Travel                           822 non-null bool
Ill Health                             822 non-null bool
Traumatic incident                     822 non-null bool
Work life balance                      822 non-null bool
Workload                               822 non-null bool
None of the above                      822 non-null bool
Gender                                 822 non-null object
Age                                    822 non-null object
Aboriginal                             822 non-null object
South Sea                              822 non-null bool
Disability                             822 non-null bool
NESB                                   822 non-null bool
institute_service                      753 non-null float64
dtypes: bool(21), float64(3), int64(2), object(7)
memory usage: 94.0+ KB
```

In [163]:

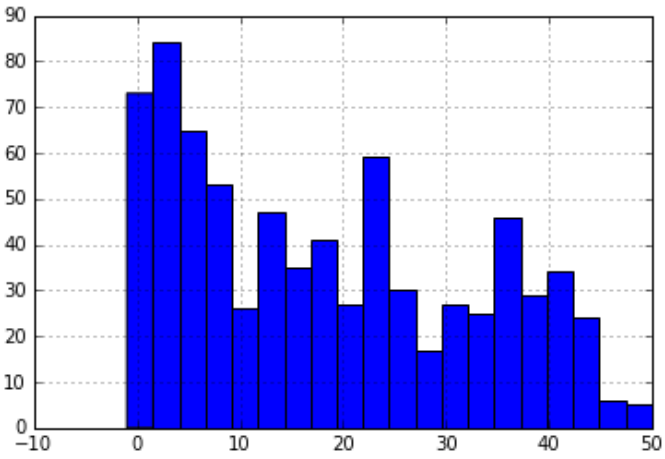
```
dete_survey = dete_survey.drop(columns='Role Start Date')
```

In [164]:

```
dete_survey['institute_service'].hist(bins=20)
```

Out[164]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f4f7dc18c88>
```



I still can't replace the missing values with anything without distorting the graph, so I am going to drop any row with a null start date/institute service column

In [165]:

```
dete_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 822 entries, 0 to 821
Data columns (total 32 columns):
ID                                     822 non-null int64
SeparationType                         822 non-null object
Cease Date                             822 non-null int64
DETE Start Date                        753 non-null float64
Position                               822 non-null object
Region                                 822 non-null object
Employment Status                      822 non-null object
Career move to public sector           822 non-null bool
Career move to private sector          822 non-null bool
Interpersonal conflicts                822 non-null bool
Job dissatisfaction                    822 non-null bool
Dissatisfaction with the department    822 non-null bool
Physical work environment              822 non-null bool
Lack of recognition                    822 non-null bool
```

```
Lack of job security                   822 non-null bool
Work location                          822 non-null bool
Employment conditions                  822 non-null bool
Maternity/family                       822 non-null bool
Relocation                             822 non-null bool
Study/Travel                           822 non-null bool
Ill Health                             822 non-null bool
Traumatic incident                     822 non-null bool
Work life balance                      822 non-null bool
Workload                               822 non-null bool
None of the above                      822 non-null bool
Gender                                 822 non-null object
Age                                    822 non-null object
Aboriginal                             822 non-null object
South Sea                              822 non-null bool
Disability                             822 non-null bool
NESB                                   822 non-null bool
institute_service                      753 non-null float64
dtypes: bool(21), float64(2), int64(2), object(7)
memory usage: 87.6+ KB
```

In [166]:

```
dete_survey = dete_survey.dropna()
```

In [167]:

```
dete_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 753 entries, 0 to 820
Data columns (total 32 columns):
ID                                     753 non-null int64
SeparationType                         753 non-null object
Cease Date                             753 non-null int64
DETE Start Date                        753 non-null float64
Position                               753 non-null object
Region                                 753 non-null object
Employment Status                      753 non-null object
Career move to public sector           753 non-null bool
Career move to private sector          753 non-null bool
Interpersonal conflicts                753 non-null bool
Job dissatisfaction                    753 non-null bool
Dissatisfaction with the department    753 non-null bool
Physical work environment              753 non-null bool
Lack of recognition                    753 non-null bool
Lack of job security                   753 non-null bool
Work location                          753 non-null bool
Employment conditions                  753 non-null bool
Maternity/family                       753 non-null bool
Relocation                             753 non-null bool
Study/Travel                           753 non-null bool
Ill Health                             753 non-null bool
Traumatic incident                     753 non-null bool
Work life balance                      753 non-null bool
Workload                               753 non-null bool
None of the above                      753 non-null bool
Gender                                 753 non-null object
Age                                    753 non-null object
Aboriginal                             753 non-null object
South Sea                              753 non-null bool
Disability                             753 non-null bool
NESB                                   753 non-null bool
institute_service                      753 non-null float64
dtypes: bool(21), float64(2), int64(2), object(7)
memory usage: 86.0+ KB
```

In [168]:

```
dete_survey.to_csv('dete_survey_first_clean.csv', index=False)
```

TAFE

In [169]:

```
tafe_survey = pd.read_csv('tafe_survey.csv')
```

In [170]:

```
cols = {'Record ID': 'id',
'CESSATION YEAR': 'cease_date',
'Reason for ceasing employment': 'separationtype',
'Gender. What is your Gender?': 'gender',
'CurrentAge. Current Age': 'age',
'Employment Type. Employment Type': 'employment_status',
'Classification. Classification': 'position',
'LengthofServiceOverall. Overall Length of Service at Institute (in years)': 'institute_s
ervice'}
```

In [171]:

```
tafe_survey.rename(columns=cols, inplace=True)
```

In [172]:

```
tafe_survey = tafe_survey.drop(columns = tafe_survey.columns[17:66])
```

In [173]:

```
tafe_survey = tafe_survey.drop(columns='LengthofServiceCurrent. Length of Service at curr
ent workplace (in years)')
```

In [174]:

```
tafe_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 702 entries, 0 to 701
Data columns (total 22 columns):
id                                                  702 non-null float64
Institute                                           702 non-null object
WorkArea                                            702 non-null object
cease_date                                          695 non-null float64
separationtype                                      701 non-null object
Contributing Factors. Career Move - Public Sector   437 non-null object
Contributing Factors. Career Move - Private Sector  437 non-null object
Contributing Factors. Career Move - Self-employment 437 non-null object
Contributing Factors. Ill Health                    437 non-null object
Contributing Factors. Maternity/Family              437 non-null object
Contributing Factors. Dissatisfaction               437 non-null object
Contributing Factors. Job Dissatisfaction           437 non-null object
Contributing Factors. Interpersonal Conflict        437 non-null object
Contributing Factors. Study                         437 non-null object
Contributing Factors. Travel                        437 non-null object
Contributing Factors. Other                         437 non-null object
Contributing Factors. NONE                          437 non-null object
gender                                              596 non-null object
age                                                 596 non-null object
employment_status                                   596 non-null object
position                                            596 non-null object
institute_service                                   596 non-null object
dtypes: float64(2), object(20)
memory usage: 120.7+ KB
```

First Clean

Institute

In [175]:

```
tafe_survey['Institute'].value_counts()
```

Out[175]:

```
Brisbane North Institute of TAFE         161
Southern Queensland Institute of TAFE    142
Central Queensland Institute of TAFE     108
Sunshine Coast Institute of TAFE          91
Tropical North Institute of TAFE          70
SkillsTech Australia                      57
Southbank Institute of Technology         43
Barrier Reef Institute of TAFE            14
Mount Isa Institute of TAFE               12
Wide Bay Institute of TAFE                 2
Metropolitan South Institute of TAFE       1
The Bremer Institute of TAFE               1
Name: Institute, dtype: int64
```

Work Area

In [176]:

```
tafe_survey['WorkArea'].value_counts(dropna=False)
```

Out[176]:

```
Non-Delivery (corporate)    432
Delivery (teaching)         270
Name: WorkArea, dtype: int64
```

Cease Date

In [177]:

```
tafe_survey['cease_date'].value_counts(dropna=False)
```

Out[177]:

```
 2011.0    268
 2012.0    235
 2010.0    103
 2013.0     85
NaN          7
 2009.0      4
Name: cease_date, dtype: int64
```

In [178]:

```
tafe_survey['cease_date'] = tafe_survey['cease_date'].fillna(2011.0)
```

In [179]:

```
tafe_survey['cease_date'].value_counts(dropna=False)
```

Out[179]:

```
2011.0    275
2012.0    235
2010.0    103
2013.0     85
2009.0      4
Name: cease_date, dtype: int64
```

Seperation Type

In [180]:

```
tafe_survey['separationtype'].value_counts(dropna=False)
```

Out[180]:

```
Resignation                 340
Contract Expired            127
Retrenchment/ Redundancy    104
Retirement                   82
Transfer                     25
Termination                  23
NaN                           1
Name: separationtype, dtype: int64
```

In [181]:

```
tafe_survey['separationtype'] = tafe_survey['separationtype'].fillna('Resignation')
```

In [182]:

```
tafe_survey['separationtype'].value_counts(dropna=False)
```

Out[182]:

```
Resignation                 341
Contract Expired            127
Retrenchment/ Redundancy    104
Retirement                   82
Transfer                     25
Termination                  23
Name: separationtype, dtype: int64
```

In [183]:

```
cols = {'Contributing Factors. Career Move - Public Sector ' : 'Career move to public se
ctor',
'Contributing Factors. Career Move - Private Sector ' : 'Career move to private sector',
'Contributing Factors. Career Move - Self-employment' : 'Career move to self employed',
'Contributing Factors. Ill Health' : 'Ill Health',
'Contributing Factors. Maternity/Family' : 'Maternity/family',
'Contributing Factors. Dissatisfaction' : 'Dissatisfaction',
'Contributing Factors. Job Dissatisfaction' : 'Job dissatisfaction',
'Contributing Factors. Interpersonal Conflict' : 'Interpersonal conflicts',
'Contributing Factors. Study' : 'Study',
'Contributing Factors. Travel' :  'Travel',
'Contributing Factors. Other' :  'Other',
'Contributing Factors. NONE' : 'None of the above'}
```

In [184]:

```
tafe_survey.rename(columns=cols, inplace=True)
```

In [185]:

```
tafe_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 702 entries, 0 to 701
Data columns (total 22 columns):
id                                  702 non-null float64
Institute                           702 non-null object
WorkArea                            702 non-null object
cease_date                          702 non-null float64
separationtype                      702 non-null object
Career move to public sector        437 non-null object
Career move to private sector       437 non-null object
Career move to self employed        437 non-null object
Ill Health                          437 non-null object
Maternity/family                    437 non-null object
Dissatisfaction                     437 non-null object
Job dissatisfaction                 437 non-null object
Interpersonal conflicts             437 non-null object
Study                               437 non-null object
Travel                              437 non-null object
```

```
Travel                                437 non-null object
Other                                 437 non-null object
None of the above                     437 non-null object
gender                                596 non-null object
age                                   596 non-null object
employment_status                     596 non-null object
position                              596 non-null object
institute_service                     596 non-null object
dtypes: float64(2), object(20)
memory usage: 120.7+ KB
```

In [186]:

```
tafe_survey['Career move to public sector'].value_counts(dropna=False)
```

Out[186]:

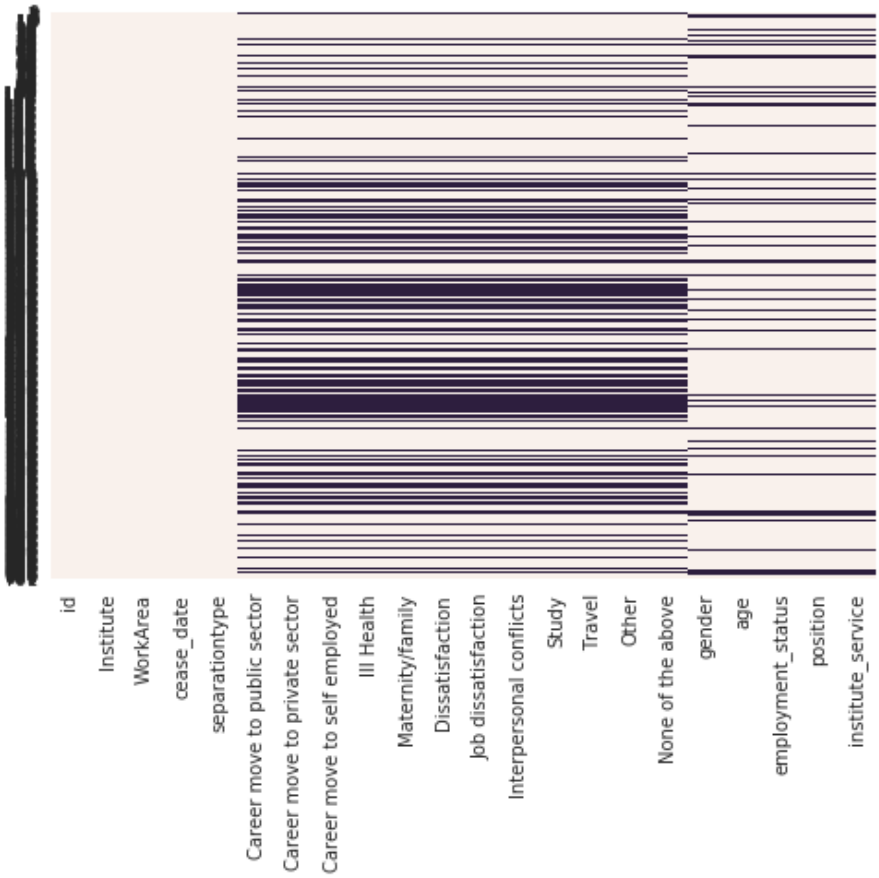
```
-                                 375
NaN                               265
Career Move - Public Sector        62
Name: Career move to public sector, dtype: int64
```

In [187]:

```
import seaborn as sns
sns.heatmap(tafe_survey.isnull(), cbar=False)
```

Out[187]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f4f76156fd0>
```



Since the surveys that are missing dissatisfaction data are missing the entire survey, I am going to remove them, as I believe some of them may have been dissatisfied and were not given the survey, and to mark them false would reduce the dissatisfaction rate artifically

In [188]:

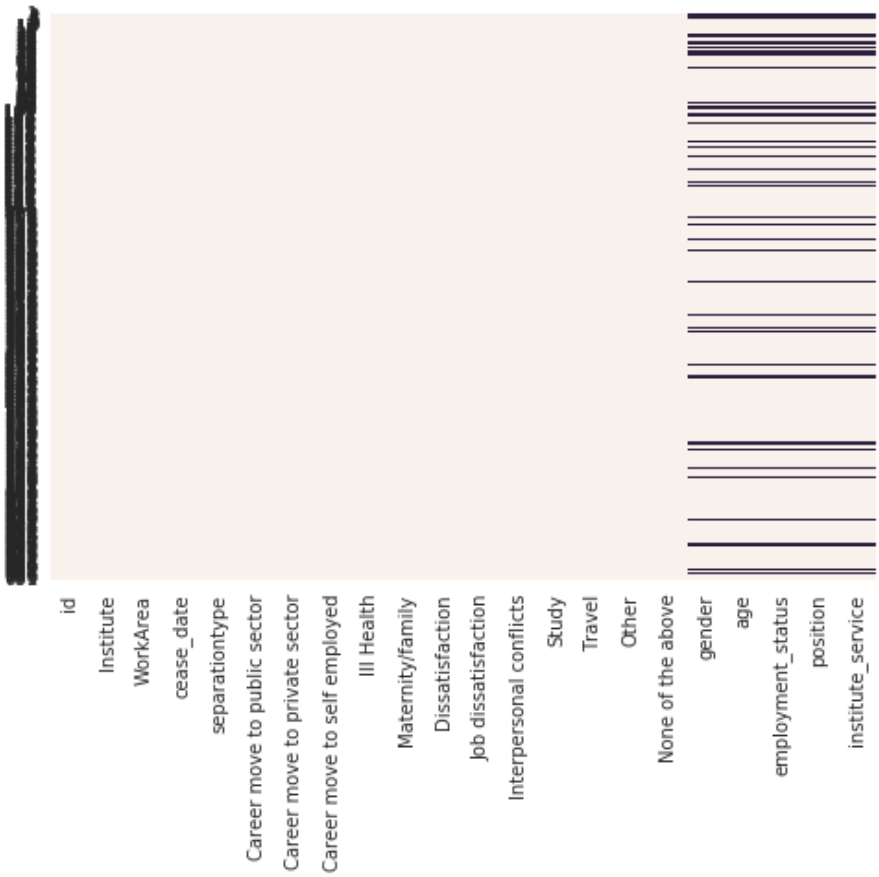
```
tafe_survey = tafe_survey.loc[tafe_survey['Career move to public sector'].notnull()]
```

In [189]:

```
sns.heatmap(tafe_survey.isnull(), cbar=False)
```

Out[189]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f4f755e2cc0>
```



In [190]:

```
tafe_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 437 entries, 1 to 701
Data columns (total 22 columns):
id                                  437 non-null float64
Institute                           437 non-null object
WorkArea                            437 non-null object
cease_date                          437 non-null float64
separationtype                      437 non-null object
Career move to public sector        437 non-null object
Career move to private sector       437 non-null object
Career move to self employed        437 non-null object
Ill Health                          437 non-null object
Maternity/family                    437 non-null object
Dissatisfaction                     437 non-null object
Job dissatisfaction                 437 non-null object
Interpersonal conflicts             437 non-null object
Study                               437 non-null object
Travel                              437 non-null object
Other                               437 non-null object
None of the above                   437 non-null object
gender                              380 non-null object
age                                 380 non-null object
employment_status                   380 non-null object
position                            380 non-null object
institute_service                   380 non-null object
dtypes: float64(2), object(20)
memory usage: 78.5+ KB
```

Gender

In [191]:

```
tafe_survey['gender'].value_counts(dropna=False)
```

Out[191]:

```
Female    244
Male      136
NaN        57
Name: gender, dtype: int64
```

In [192]:

```
tafe_survey['gender']=tafe_survey['gender'].fillna('Female')
```

In [193]:

```
tafe_survey['gender'].value_counts(dropna=False)
```

Out[193]:

```
Female    301
Male      136
Name: gender, dtype: int64
```

Age

In [194]:

```
tafe_survey['age'].value_counts(dropna=False)
```

Out[194]:

```
56 or older      95
NaN              57
51-55            49
41  45           46
46  50           42
31  35           35
26  30           35
36  40           35
21  25           34
20 or younger     9
Name: age, dtype: int64
```

This analysis is actually adding more distortion than I would like. To drop from 437 to 380 is a loss of 13% of the original data but means there is no distortion for any group. That seems preferable.

In [195]:

```
tafe_survey = tafe_survey.dropna()
```

In [196]:

```
tafe_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 380 entries, 4 to 701
Data columns (total 22 columns):
id                                  380 non-null float64
Institute                           380 non-null object
WorkArea                            380 non-null object
cease_date                          380 non-null float64
separationtype                      380 non-null object
Career move to public sector        380 non-null object
Career move to private sector       380 non-null object
Career move to self employed        380 non-null object
Ill Health                          380 non-null object
Maternity/family                    380 non-null object
Dissatisfaction                     380 non-null object
Job dissatisfaction                 380 non-null object
Interpersonal conflicts             380 non-null object
Study                               380 non-null object
Travel                              380 non-null object
```

```
Travel                              380 non-null object
Other                               380 non-null object
None of the above                   380 non-null object
gender                              380 non-null object
age                                 380 non-null object
employment_status                   380 non-null object
position                            380 non-null object
institute_service                   380 non-null object
dtypes: float64(2), object(20)
memory usage: 68.3+ KB
```

Age

In [197]:

```
tafe_survey['age'].value_counts(dropna=False)
```

Out[197]:

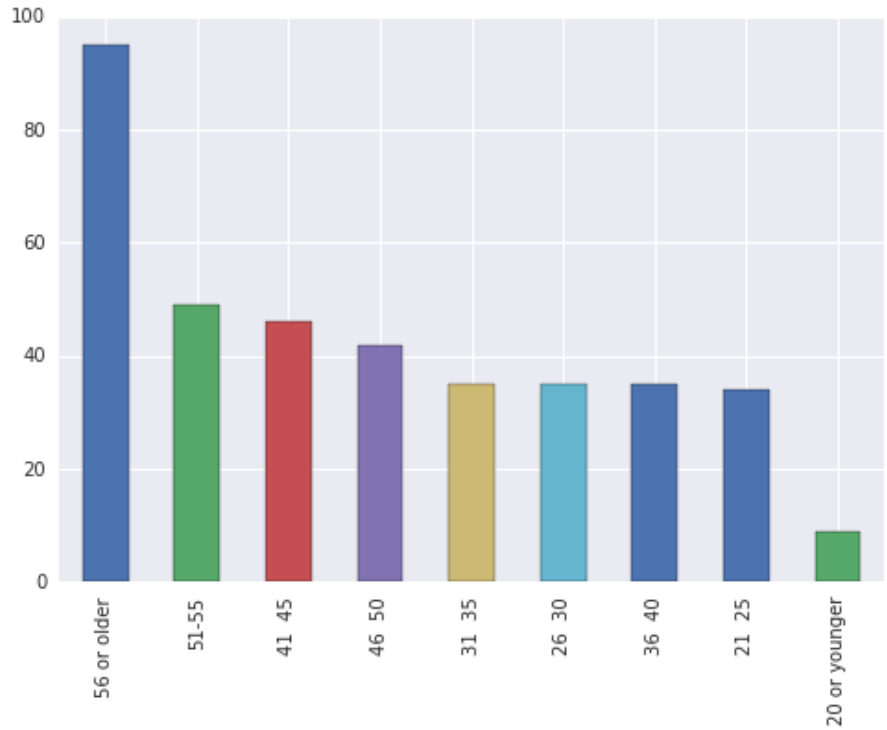
```
56 or older      95
51-55            49
41  45           46
46  50           42
31  35           35
26  30           35
36  40           35
21  25           34
20 or younger     9
Name: age, dtype: int64
```

In [198]:

```
tafe_survey['age'].value_counts().plot(kind='bar')
```

Out[198]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f4f753b85c0>
```



Gender

In [199]:

```
tafe_survey['gender'].value_counts(dropna=False)
```

Out[199]:

```
Female    244
```

```
Female     244
Male       136
Name: gender, dtype: int64
```

Employment Status

In [200]:

```
tafe_survey['employment_status'].value_counts(dropna=False)
```

Out[200]:

```
Permanent Full-time    158
Temporary Full-time    120
Permanent Part-time     44
Contract/casual         30
Temporary Part-time     28
Name: employment_status, dtype: int64
```

Position

In [201]:

```
tafe_survey['position'].value_counts(dropna=False)
```

Out[201]:

```
Administration (AO)            188
Teacher (including LVT)        134
Professional Officer (PO)       21
Operational (OO)                16
Workplace Training Officer       6
Tutor                            5
Executive (SES/SO)               5
Technical Officer (TO)           5
Name: position, dtype: int64
```

Institute Service

In [202]:

```
tafe_survey['institute_service'].value_counts(dropna=False).sort_index()
```

Out[202]:

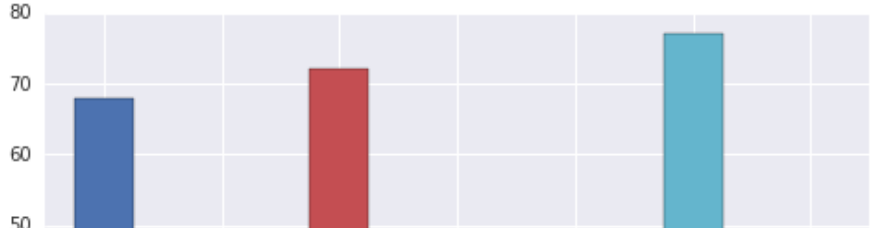
```
1-2                   68
11-20                 49
3-4                   72
5-6                   36
7-10                  30
Less than 1 year      77
More than 20 years    48
Name: institute_service, dtype: int64
```

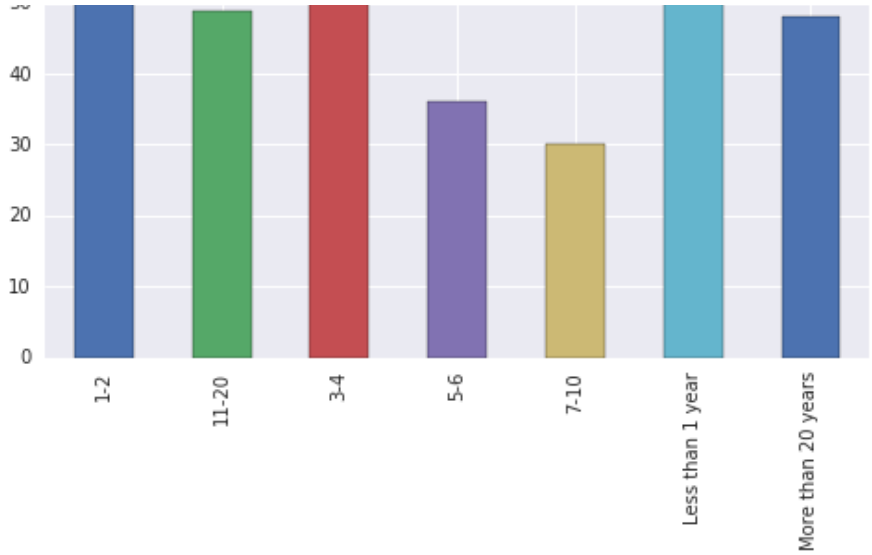
In [203]:

```
tafe_survey['institute_service'].value_counts(dropna=False).sort_index().plot(kind='bar'
)
```

Out[203]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f4f75427a90>
```





Contributing Factors

In [204]:

```
tafe_survey['Career move to private sector'].value_counts(dropna=False)
```

Out[204]:

```
-                                 286
Career Move - Private Sector       94
Name: Career move to private sector, dtype: int64
```

In [205]:

```
def contributing_factors(val):
    if val == '-':
        return False
    else:
        return True
```

In [206]:

```
for i in range(5,17):
    tafe_survey.iloc[:,i] = tafe_survey.iloc[:,i].apply(contributing_factors)
```

In [207]:

```
tafe_survey.iloc[:,4:19].head()
```

Out[207]:

	separationtype	Career move to public sector	Career move to private sector	Career move to self employed	Ill Health	Maternity/family	Dissatisfaction	Job dissatisfaction	Interpersonal conflicts	Study	Tr
4	Resignation	False	True	False	False	False	False	False	False	False	F
5	Resignation	False	False	False	False	False	False	False	False	False	F
6	Resignation	False	True	False	False	True	False	False	False	False	F
7	Resignation	False	False	False	False	False	False	False	False	False	F
8	Resignation	False	False	False	False	False	False	False	False	False	F

In [208]:

```
tafe_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 380 entries, 4 to 701
Data columns (total 22 columns):
id                                  380 non-null float64
Institute                           380 non-null object
WorkArea                            380 non-null object
cease_date                          380 non-null float64
separationtype                      380 non-null object
Career move to public sector        380 non-null bool
Career move to private sector       380 non-null bool
Career move to self employed        380 non-null bool
Ill Health                          380 non-null bool
Maternity/family                    380 non-null bool
Dissatisfaction                     380 non-null bool
Job dissatisfaction                 380 non-null bool
Interpersonal conflicts             380 non-null bool
Study                               380 non-null bool
Travel                              380 non-null bool
Other                               380 non-null bool
None of the above                   380 non-null bool
gender                              380 non-null object
age                                 380 non-null object
employment_status                   380 non-null object
position                            380 non-null object
institute_service                   380 non-null object
dtypes: bool(12), float64(2), object(8)
memory usage: 37.1+ KB
```

In [209]:

```
tafe_survey.to_csv('tafe_survey_first_clean.csv', index=False)
```

Second Clean

In [210]:

```
dete_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 753 entries, 0 to 820
Data columns (total 32 columns):
ID                                     753 non-null int64
SeparationType                         753 non-null object
Cease Date                             753 non-null int64
DETE Start Date                        753 non-null float64
Position                               753 non-null object
Region                                 753 non-null object
Employment Status                      753 non-null object
Career move to public sector           753 non-null bool
Career move to private sector          753 non-null bool
Interpersonal conflicts                753 non-null bool
Job dissatisfaction                    753 non-null bool
Dissatisfaction with the department    753 non-null bool
Physical work environment              753 non-null bool
Lack of recognition                    753 non-null bool
Lack of job security                   753 non-null bool
Work location                          753 non-null bool
Employment conditions                  753 non-null bool
Maternity/family                       753 non-null bool
Relocation                             753 non-null bool
Study/Travel                           753 non-null bool
Ill Health                             753 non-null bool
Traumatic incident                     753 non-null bool
Work life balance                      753 non-null bool
Workload                               753 non-null bool
None of the above                      753 non-null bool
Gender                                 753 non-null object
Age                                    753 non-null object
Aboriginal                             753 non-null object
```

```
South Sea                              753 non-null bool
Disability                             753 non-null bool
NESB                                   753 non-null bool
institute_service                      753 non-null float64
dtypes: bool(21), float64(2), int64(2), object(7)
memory usage: 86.0+ KB
```

In [211]:

```
tafe_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 380 entries, 4 to 701
Data columns (total 22 columns):
id                                  380 non-null float64
Institute                           380 non-null object
WorkArea                            380 non-null object
cease_date                          380 non-null float64
separationtype                      380 non-null object
Career move to public sector        380 non-null bool
Career move to private sector       380 non-null bool
Career move to self employed        380 non-null bool
Ill Health                          380 non-null bool
Maternity/family                    380 non-null bool
Dissatisfaction                     380 non-null bool
Job dissatisfaction                 380 non-null bool
Interpersonal conflicts             380 non-null bool
Study                               380 non-null bool
Travel                              380 non-null bool
Other                               380 non-null bool
None of the above                   380 non-null bool
gender                              380 non-null object
age                                 380 non-null object
employment_status                   380 non-null object
position                            380 non-null object
institute_service                   380 non-null object
dtypes: bool(12), float64(2), object(8)
memory usage: 37.1+ KB
```

Column Renaming

In [212]:

```
dete_survey.columns = (dete_survey.columns
                       .str.strip()
                       .str.lower()
                       .str.replace(' ','_'))
```

In [213]:

```
tafe_survey.columns = (tafe_survey.columns
                       .str.strip()
                       .str.lower()
                       .str.replace(' ','_'))
```

Category Equivalents

Study/Travel

In [214]:

```
tafe_survey['study/travel'] = tafe_survey['travel'] | tafe_survey['study']
```

In [215]:

```
tafe_survey['study/travel'].value_counts()
```

Out[215]:

```
False    349
True      31
Name: study/travel, dtype: int64
```

In [216]:

```
tafe_survey['study'].value_counts()
```

Out[216]:

```
False    364
True      16
Name: study, dtype: int64
```

In [217]:

```
tafe_survey = tafe_survey.drop(columns=['study','travel'])
```

Dissatisfaction

In [218]:

```
tafe_survey['dissatisfaction'].value_counts()
```

Out[218]:

```
False    327
True      53
Name: dissatisfaction, dtype: int64
```

In [219]:

```
tafe_survey['dissatisfaction'] = (tafe_survey['dissatisfaction'] | tafe_survey['job_diss
atisfaction']) | (tafe_survey['interpersonal_conflicts'])
```

In [220]:

```
tafe_survey['dissatisfaction'].value_counts()
```

Out[220]:

```
False    274
True     106
Name: dissatisfaction, dtype: int64
```

In [221]:

```
tafe_survey = tafe_survey.drop(columns=['job_dissatisfaction', 'interpersonal_conflicts'
])
```

In [222]:

```
dete_survey['dissatisfaction'] = (dete_survey['job_dissatisfaction'] |
                    dete_survey['dissatisfaction_with_the_department'] |
                    dete_survey['physical_work_environment'] |
                    dete_survey['lack_of_recognition'] |
                    dete_survey['lack_of_job_security'] |
                    dete_survey['work_location'] |
                    dete_survey['employment_conditions'] |
                    dete_survey['work_life_balance'] |
                    dete_survey['workload'])
```

In [223]:

```
dete_survey['dissatisfaction'].value_counts()
```

Out[223]:

```
False    396
True     357
```

```
Name: dissatisfaction, dtype: int64
```

In [224]:

```
dete_survey = (dete_survey.drop(columns=['job_dissatisfaction',
                    'dissatisfaction_with_the_department',
                    'physical_work_environment',
                    'lack_of_recognition',
                    'lack_of_job_security',
                    'work_location',
                    'employment_conditions',
                    'work_life_balance',
                    'workload']))
```

Seperation Type

In [225]:

```
tafe_survey.rename(columns={'separationtype':'separation_type'}, inplace=True)
```

In [226]:

```
dete_survey.rename(columns={'separationtype':'separation_type'}, inplace=True)
```

In [227]:

```
tafe_survey['cease_date'] = tafe_survey['cease_date'].astype(int)
```

In [228]:

```
dete_survey['separation_type'].value_counts()
```

Out[228]:

```
Age Retirement                          264
Resignation-Other reasons               138
Resignation-Other employer               83
Voluntary Early Retirement (VER)         65
Resignation-Move overseas/interstate     63
Ill Health Retirement                    50
Other                                    43
Contract Expired                         33
Termination                              14
Name: separation_type, dtype: int64
```

In [229]:

```
tafe_survey['separation_type'].value_counts()
```

Out[229]:

```
Resignation    290
Retirement      70
Transfer        20
Name: separation_type, dtype: int64
```

In [230]:

```
cols = ['Resignation-Other reasons', 'Resignation-Other employer', 'Resignation-Move over
seas/interstate']
```

In [231]:

```
resign_bool = dete_survey['separation_type'].isin(cols)
```

In [232]:

```
dete_survey.loc[resign_bool, 'separation_type'] = 'Resignation'
```

In [233]:

```
cols = (['Age Retirement','Voluntary Early Retirement (VER)',
         'Ill Health Retirement'])
```

In [234]:

```
retire_bool = dete_survey['separation_type'].isin(cols)
```

In [235]:

```
dete_survey.loc[retire_bool, 'separation_type'] = 'Retirement'
```

In [236]:

```
dete_survey['separation_type'].value_counts()
```

Out[236]:

```
Retirement          379
Resignation         284
Other                43
Contract Expired     33
Termination          14
Name: separation_type, dtype: int64
```

Age

In [237]:

```
tafe_survey['age'].value_counts().sort_index()
```

Out[237]:

```
20 or younger     9
21  25           34
26  30           35
31  35           35
36  40           35
41  45           46
46  50           42
51-55            49
56 or older      95
Name: age, dtype: int64
```

In [238]:

```
dete_survey['age'].value_counts().sort_index()
```

Out[238]:

```
20 or younger      1
21-25             38
26-30             52
31-35             38
36-40             48
41-45             60
46-50             57
51-55             98
56-60            152
61 or older      209
Name: age, dtype: int64
```

In [239]:

```
mappings = ({'46  50' : '46-50', '41  45' : '41-45',
             '36  40' : '36-40', '31  35' : '31-35',
             '26  30' : '26-30', '21  25' : '21-25',
            '20 or younger' : '20 or younger', '51-55' : '51-55',
            '56 or older' : '56-60'})
```

In [240]:

```
tafe_survey['age'] = tafe_survey['age'].map(mappings, na_action='ignore')
```

In [241]:

```
tafe_survey['age'].value_counts().sort_index()
```

Out[241]:

```
20 or younger     9
21-25            34
26-30            35
31-35            35
36-40            35
41-45            46
46-50            42
51-55            49
56-60            95
Name: age, dtype: int64
```

In [242]:

```
dete_survey['age'].value_counts().sort_index()
```

Out[242]:

```
20 or younger      1
21-25             38
26-30             52
31-35             38
36-40             48
41-45             60
46-50             57
51-55             98
56-60            152
61 or older      209
Name: age, dtype: int64
```

Institute Service

According to https://www.businesswire.com/news/home/20171108006002/en/Age-Number-Engage-Employees-Career-Stage, service time will be catagorized in 4 areas:
New < 3 years
Experienced < 6 years
Established < 10 years
Veteran > 11 years

In [243]:

```
dete_survey['institute_service'] = dete_survey['institute_service'].astype(int)
```

In [247]:

```
dete_survey.loc[(dete_survey['institute_service'] == -1),
                'institute_service'] = 0
```

In [248]:

```
dete_survey['institute_service'].value_counts().sort_index()
```

Out[248]:

```
0     34
1     39
2     25
3     31
4     28
5     35
6     30
```

```
7     18
8     14
9     21
10    13
11    13
12    15
13    18
14    14
15    19
16    16
17    17
18    11
19    13
20    12
21    15
22    25
23    17
24    17
25    11
26    11
27     8
28     9
29     8
30     4
31    11
32    12
33    11
34    14
35    15
36     8
37    23
38    15
39    14
40     9
41    11
42    14
43    17
44     7
45     5
46     1
48     1
49     3
50     1
Name: institute_service, dtype: int64
```

In [249]:

```
tafe_survey['institute_service'].value_counts().sort_index()
```

Out[249]:

```
1-2                   68
11-20                 49
3-4                   72
5-6                   36
7-10                  30
Less than 1 year      77
More than 20 years    48
Name: institute_service, dtype: int64
```

In [250]:

```
pattern = r'([0-9]?[0-9])'
```

In [251]:

```
tafe_survey['institute_service'] = (tafe_survey['institute_service']
                                    .str.extract(pattern))
```

```
/dataquest/system/env/python3/lib/python3.4/site-packages/ipykernel/__main__.py:2: FutureWarning:
```

```
currently extract(expand=None) means expand=False (return Index/Series/DataFrame) but in
a future version of pandas this will be changed to expand=True (return DataFrame)
```

In [252]:

```
tafe_survey['institute_service'].value_counts().sort_index()
```

Out[252]:

```
1     145
11     49
20     48
3      72
5      36
7      30
Name: institute_service, dtype: int64
```

In [253]:

```
def age_cat(val):
    if val >=11:
        return 'Veteran'
    elif val >= 7:
        return 'Established'
    elif val >= 3:
        return 'Experienced'
    else:
        return 'New'
```

In [254]:

```
tafe_survey['institute_service'] = tafe_survey['institute_service'].astype(int)
```

In [255]:

```
tafe_survey['institute_service'] = tafe_survey['institute_service'].apply(age_cat)
```

In [256]:

```
tafe_survey['institute_service'].value_counts()
```

Out[256]:

```
New            145
Experienced    108
Veteran         97
Established     30
Name: institute_service, dtype: int64
```

In [257]:

```
dete_survey['institute_service'] = dete_survey['institute_service'].apply(age_cat)
```

In [258]:

```
dete_survey['institute_service'].value_counts()
```

Out[258]:

```
Veteran        465
Experienced    124
New             98
Established     66
Name: institute_service, dtype: int64
```

Employment Status

In [271]:

```
dete_survey['employment_status'].value_counts()
```

Out[271]:

```
Permanent Full-time    408
Permanent Part-time    275
Temporary Full-time     40
Temporary Part-time     20
Casual                  10
Name: employment_status, dtype: int64
```

In [274]:

```
tafe_survey['employment_status'].value_counts()
```

Out[274]:

```
Permanent Full-time    158
Temporary Full-time    120
Permanent Part-time     44
Contract/casual         30
Temporary Part-time     28
Name: employment_status, dtype: int64
```

In [279]:

```
tafe_survey.loc[tafe_survey['employment_status'] == 'Contract/casual', 'employment_status
'] = 'Casual'
```

In [280]:

```
tafe_survey['employment_status'].value_counts()
```

Out[280]:

```
Permanent Full-time    158
Temporary Full-time    120
Permanent Part-time     44
Casual                  30
Temporary Part-time     28
Name: employment_status, dtype: int64
```

Combination

In [259]:

```
dete_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 753 entries, 0 to 820
Data columns (total 24 columns):
id                                   753 non-null int64
separation_type                      753 non-null object
cease_date                           753 non-null int64
dete_start_date                      753 non-null float64
position                             753 non-null object
region                               753 non-null object
employment_status                    753 non-null object
career_move_to_public_sector         753 non-null bool
career_move_to_private_sector        753 non-null bool
interpersonal_conflicts              753 non-null bool
maternity/family                     753 non-null bool
relocation                           753 non-null bool
study/travel                         753 non-null bool
ill_health                           753 non-null bool
traumatic_incident                   753 non-null bool
none_of_the_above                    753 non-null bool
gender                               753 non-null object
age                                  753 non-null object
aboriginal                           753 non-null object
south_sea                            753 non-null bool
disability                           753 non-null bool
```

```
nesb                                753 non-null bool
institute_service                   753 non-null object
dissatisfaction                     753 non-null bool
dtypes: bool(13), float64(1), int64(2), object(8)
memory usage: 80.2+ KB
```

In [266]:

```
tafe_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 380 entries, 4 to 701
Data columns (total 19 columns):
id                                  380 non-null float64
institute                           380 non-null object
workarea                            380 non-null object
cease_date                          380 non-null int64
separation_type                     380 non-null object
career_move_to_public_sector        380 non-null bool
career_move_to_private_sector       380 non-null bool
career_move_to_self_employed        380 non-null bool
ill_health                          380 non-null bool
maternity/family                    380 non-null bool
dissatisfaction                     380 non-null bool
other                               380 non-null bool
none_of_the_above                   380 non-null bool
gender                              380 non-null object
age                                 380 non-null object
employment_status                   380 non-null object
position                            380 non-null object
institute_service                   380 non-null object
study/travel                        380 non-null bool
dtypes: bool(9), float64(1), int64(1), object(8)
memory usage: 36.0+ KB
```

In [281]:

```
dete_survey['institute'] = 'DETE'
```

In [282]:

```
tafe_survey['institute'] = 'TAFE'
```

In [283]:

```
tafe_survey.to_csv('tafe_survey_second_clean.csv', index=False)
```

In [284]:

```
dete_survey.to_csv('dete_survey_second_clean.csv', index=False)
```

In [291]:

```
combined = pd.concat([dete_survey, tafe_survey])
```

In [292]:

```
combined.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1133 entries, 0 to 701
Data columns (total 28 columns):
aboriginal                          753 non-null object
age                                 1133 non-null object
career_move_to_private_sector       1133 non-null bool
career_move_to_public_sector        1133 non-null bool
career_move_to_self_employed        380 non-null object
cease_date                          1133 non-null int64
dete_start_date                     753 non-null float64
disability                          753 non-null object
dissatisfaction                     1133 non-null bool
```

```
employment_status                 1133 non-null object
gender                            1133 non-null object
id                                1133 non-null float64
ill_health                        1133 non-null bool
institute                         1133 non-null object
institute_service                 1133 non-null object
interpersonal_conflicts           753 non-null object
maternity/family                  1133 non-null bool
nesb                              753 non-null object
none_of_the_above                 1133 non-null bool
other                             380 non-null object
position                          1133 non-null object
region                            753 non-null object
relocation                        753 non-null object
separation_type                   1133 non-null object
south_sea                         753 non-null object
study/travel                      1133 non-null bool
traumatic_incident                753 non-null object
workarea                          380 non-null object
dtypes: bool(7), float64(2), int64(1), object(18)
memory usage: 202.5+ KB
```

Combined Cleaning

In [297]:

```
combined = combined.dropna(axis='columns')
```

In [298]:

```
combined.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1133 entries, 0 to 701
Data columns (total 16 columns):
age                               1133 non-null object
career_move_to_private_sector     1133 non-null bool
career_move_to_public_sector      1133 non-null bool
cease_date                        1133 non-null int64
dissatisfaction                   1133 non-null bool
employment_status                 1133 non-null object
gender                            1133 non-null object
id                                1133 non-null float64
ill_health                        1133 non-null bool
institute                         1133 non-null object
institute_service                 1133 non-null object
maternity/family                  1133 non-null bool
none_of_the_above                 1133 non-null bool
position                          1133 non-null object
separation_type                   1133 non-null object
study/travel                      1133 non-null bool
dtypes: bool(7), float64(1), int64(1), object(7)
memory usage: 96.3+ KB
```

In [299]:

```
combined.to_csv('combined_data.csv', index=False)
```