Analyze_And_Clean_Employee_Exit_Surveys

March 19, 2020

1 Brief Project Summary.

- In this guided project, we'll work with exit surveys from employees of the Department of Education, Training and Employment (DETE) and the Technical and Further Education (TAFE) institute in Queensland, Australia.
- In this project, we'll play the role of data analyst and pretend our stakeholders want to know the following:
  - Are employees who only worked for the institutes for a short period of time resigning due to some kind of dissatisfaction? What about employees who have been there longer?
  - Are younger employees resigning due to some kind of dissatisfaction? What about older employees?

[1]:
```
import pandas as pd
import numpy as np

#Read the data.
dete_survey = pd.read_csv('dete-exit-survey-january-2014.csv',␣
 ↪encoding='Latin-1')
tafe_survey = pd.
 ↪read_csv('tafe-employee-exit-survey-access-database-december-2013.csv',␣
 ↪encoding='Latin-1')
```

[2]:
```
# A quick display 150 columns max to prevent truncated display of columns.
pd.options.display.max_columns = 150
dete_survey.head()
```

[2]:
```
   ID                    SeparationType Cease Date DETE Start Date  \
0   1             Ill Health Retirement    08/2012            1984
1   2  Voluntary Early Retirement (VER)    08/2012      Not Stated
2   3  Voluntary Early Retirement (VER)    05/2012            2011
3   4         Resignation-Other reasons    05/2012            2005
4   5                   Age Retirement    05/2012            1970

  Role Start Date                                  Position  \
0            2004                          Public Servant
1      Not Stated                          Public Servant
2            2011                        Schools Officer
```

```
3           2006                                    Teacher
4           1989  Head of Curriculum/Head of Special Education

  Classification             Region                      Business Unit  \
0       A01-A04      Central Office  Corporate Strategy and Peformance
1       A05-A07      Central Office  Corporate Strategy and Peformance
2           NaN      Central Office               Education Queensland
3       Primary  Central Queensland                                NaN
4           NaN          South East                                NaN

    Employment Status  Career move to public sector  \
0  Permanent Full-time                         True
1  Permanent Full-time                        False
2  Permanent Full-time                        False
3  Permanent Full-time                        False
4  Permanent Full-time                        False

   Career move to private sector  Interpersonal conflicts  \
0                          False                    False
1                          False                    False
2                          False                    False
3                           True                    False
4                          False                    False

   Job dissatisfaction  Dissatisfaction with the department  \
0                 True                                False
1                False                                False
2                False                                False
3                False                                False
4                False                                False

   Physical work environment  Lack of recognition  Lack of job security  \
0                      False                 True                 False
1                      False                False                 False
2                      False                False                 False
3                      False                False                 False
4                      False                False                 False

   Work location  Employment conditions  Maternity/family  Relocation  \
0          False                  False             False       False
1          False                  False             False       False
2          False                  False             False       False
3          False                  False             False       False
4          False                  False             False       False

   Study/Travel  Ill Health  Traumatic incident  Work life balance  Workload  \
0         False       False               False              False     False
```

1	False	False	False	False	False
2	False	False	False	False	False
3	False	False	False	False	False
4	False	False	False	True	False

	None of the above	Professional Development	Opportunities for promotion	\
0	True	A	A	
1	False	A	A	
2	True	N	N	
3	False	A	N	
4	False	A	A	

	Staff morale	Workplace issue	Physical environment	Worklife balance	\
0	N	N	N	A	
1	N	N	N	N	
2	N	N	N	N	
3	N	N	A	A	
4	N	N	D	D	

	Stress and pressure support	Performance of supervisor	Peer support	\
0	A	A	A	
1	A	A	A	
2	N	N	N	
3	N	N	A	
4	N	A	A	

	Initiative	Skills	Coach	Career Aspirations	Feedback	Further PD	\
0	N	N	N	A	A	A	
1	N	N	N	A	A	A	
2	N	N	N	N	N	N	
3	A	A	A	A	A	A	
4	A	A	A	A	SA	SA	

	Communication	My say	Information	Kept informed	Wellness programs	\
0	N	A	A	N	N	
1	N	A	A	N	N	
2	A	A	N	N	N	
3	A	A	A	A	N	
4	D	D	A	N	A	

	Health & Safety	Gender	Age	Aboriginal	Torres Strait	South Sea	\
0	N	Male	56-60	NaN	NaN	NaN	
1	N	Male	56-60	NaN	NaN	NaN	
2	N	Male	61 or older	NaN	NaN	NaN	
3	A	Female	36-40	NaN	NaN	NaN	
4	M	Female	61 or older	NaN	NaN	NaN	

```
  Disability NESB
0        NaN  Yes
1        NaN  NaN
2        NaN  NaN
3        NaN  NaN
4        NaN  NaN
```

[3]:
```
dete_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 822 entries, 0 to 821
Data columns (total 56 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
Professional Development               808 non-null object
Opportunities for promotion            735 non-null object
Staff morale                           816 non-null object
Workplace issue                        788 non-null object
Physical environment                   817 non-null object
Worklife balance                       815 non-null object
Stress and pressure support            810 non-null object
```

```
Performance of supervisor              813 non-null object
Peer support                           812 non-null object
Initiative                             813 non-null object
Skills                                 811 non-null object
Coach                                  767 non-null object
Career Aspirations                     746 non-null object
Feedback                               792 non-null object
Further PD                             768 non-null object
Communication                          814 non-null object
My say                                 812 non-null object
Information                            816 non-null object
Kept informed                          813 non-null object
Wellness programs                      766 non-null object
Health & Safety                        793 non-null object
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(37)
memory usage: 258.6+ KB
```

As you can see, many of these columns contain a lot of `NaN` or `null` values. However, to determine if the employees who worked for a short period of time resigned due to a dissatisfaction, we don't need a lot of these columns.

[4]:
```
tafe_survey.head()
```

[4]:

	Record ID	Institute	WorkArea	CESSATION YEAR	Reason for ceasing employment	Contributing Factors. Career Move - Public Sector
0	634133009996094000	Southern Queensland Institute of TAFE	Non-Delivery (corporate)	2010.0	Contract Expired	NaN
1	634133654064531000	Mount Isa Institute of TAFE	Non-Delivery (corporate)	2010.0	Retirement	-
2	634138845606563000	Mount Isa Institute of TAFE	Delivery (teaching)	2010.0	Retirement	-
3	634139903350000000	Mount Isa Institute of TAFE	Non-Delivery (corporate)	2010.0	Resignation	
4	634146578511788000	Southern Queensland Institute of TAFE	Delivery (teaching)	2010.0	Resignation	

```
3                                                   -
4                                                   -

  Contributing Factors. Career Move - Private Sector   \
0                                                 NaN
1                                                   -
2                                                   -
3                                                   -
4                         Career Move - Private Sector

  Contributing Factors. Career Move - Self-employment  \
0                                                 NaN
1                                                   -
2                                                   -
3                                                   -
4                                                   -

  Contributing Factors. Ill Health Contributing Factors. Maternity/Family  \
0                               NaN                                   NaN
1                                 -                                     -
2                                 -                                     -
3                                 -                                     -
4                                 -                                     -

  Contributing Factors. Dissatisfaction  \
0                                   NaN
1                                     -
2                                     -
3                                     -
4                                     -

  Contributing Factors. Job Dissatisfaction  \
0                                       NaN
1                                         -
2                                         -
3                                         -
4                                         -

  Contributing Factors. Interpersonal Conflict Contributing Factors. Study  \
0                                         NaN                           NaN
1                                           -                             -
2                                           -                             -
3                                           -                             -
4                                           -                             -

  Contributing Factors. Travel Contributing Factors. Other  \
0                          NaN                         NaN
```

```
1                      Travel                          -
2                           -                          -
3                      Travel                          -
4                           -                          -

  Contributing Factors. NONE  \
0                       NaN
1                         -
2                      NONE
3                         -
4                         -

  Main Factor.     Which of these was the main factor for leaving?  \
0                                                      NaN
1                                                      NaN
2                                                      NaN
3                                                      NaN
4                                                      NaN

  InstituteViews. Topic:1. I feel the senior leadership had a clear vision and
direction  \
0                                                  Agree
1                                                  Agree
2                                                  Agree
3                                                  Agree
4                                                  Agree

  InstituteViews. Topic:2. I was given access to skills training to help me do
my job better  \
0                                                  Agree
1                                                  Agree
2                                                  Agree
3                                                  Agree
4                                                  Agree

  InstituteViews. Topic:3. I was given adequate opportunities for personal
development  \
0                                                  Agree
1                                                  Agree
2                                                  Agree
3                                                  Agree
4                                       Strongly Agree

  InstituteViews. Topic:4. I was given adequate opportunities for promotion
within %Institute]Q25LBL%  \
0                                                Neutral
1                                                  Agree
```

```
2                                          Agree
3                                          Agree
4                                          Agree

  InstituteViews. Topic:5. I felt the salary for the job was right for the
responsibilities I had  \
0                                          Agree
1                                          Agree
2                                          Agree
3                                          Agree
4                                   Strongly Agree

  InstituteViews. Topic:6. The organisation recognised when staff did good work
\
0                                          Agree
1                                   Strongly Agree
2                                          Agree
3                                          Agree
4                                   Strongly Agree

  InstituteViews. Topic:7. Management was generally supportive of me  \
0                                          Agree
1                                   Strongly Agree
2                                   Strongly Agree
3                                          Agree
4                                   Strongly Agree

  InstituteViews. Topic:8. Management was generally supportive of my team  \
0                                          Agree
1                                          Agree
2                                          Agree
3                                          Agree
4                                   Strongly Agree

  InstituteViews. Topic:9. I was kept informed of the changes in the
organisation which would affect me  \
0                                          Agree
1                                   Strongly Agree
2                                          Agree
3                                          Agree
4                                          Agree

  InstituteViews. Topic:10. Staff morale was positive within the Institute  \
0                                          Agree
1                                          Agree
2                                          Agree
3                                          Agree
```

```
4                                    Strongly Agree

  InstituteViews. Topic:11. If I had a workplace issue it was dealt with quickly
\
0                                              Agree
1                                              Agree
2                                              Agree
3                                              Agree
4                                    Strongly Agree

  InstituteViews. Topic:12. If I had a workplace issue it was dealt with
efficiently  \
0                                              Agree
1                                              Agree
2                                            Neutral
3                                              Agree
4                                              Agree

  InstituteViews. Topic:13. If I had a workplace issue it was dealt with
discreetly  \
0                                              Agree
1                                           Disagree
2                                            Neutral
3                                              Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:14. I was satisfied with the quality of the management
and supervision within my work unit  \
0                                              Agree
1                                    Strongly Agree
2                                    Strongly Agree
3                                    Strongly Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:15. I worked well with my colleagues  \
0                                              Agree
1                                    Strongly Agree
2                                    Strongly Agree
3                                    Strongly Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:16. My job was challenging and interesting  \
0                                              Agree
1                                    Strongly Agree
2                                              Agree
3                                    Strongly Agree
4                                    Strongly Agree
```

```
  WorkUnitViews. Topic:17. I was encouraged to use my initiative in the course
of my work  \
0                                    Strongly Agree
1                                             Agree
2                                             Agree
3                                    Strongly Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:18. I had sufficient contact with other people in my job
\
0                                             Agree
1                                             Agree
2                                             Agree
3                                    Strongly Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:19. I was given adequate support and co-operation by my
peers to enable me to do my job  \
0                                             Agree
1                                             Agree
2                                             Agree
3                                    Strongly Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:20. I was able to use the full range of my skills in my
job  \
0                                             Agree
1                                    Strongly Agree
2                                             Agree
3                                    Strongly Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:21. I was able to use the full range of my abilities in
my job. ; Category:Level of Agreement; Question:YOUR VIEWS ABOUT YOUR WORK UNIT]
\
0                                             Agree
1                                             Agree
2                                             Agree
3                                    Strongly Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:22. I was able to use the full range of my knowledge in
my job  \
0                                             Agree
1                                             Agree
2                                             Agree
```

```
3                                    Strongly Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:23. My job provided sufficient variety  \
0                                             Agree
1                                             Agree
2                                             Agree
3                                    Strongly Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:24. I was able to cope with the level of stress and
pressure in my job  \
0                                             Agree
1                                    Strongly Agree
2                                             Agree
3                                    Strongly Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:25. My job allowed me to balance the demands of work and
family to my satisfaction  \
0                                             Agree
1                                             Agree
2                                             Agree
3                                    Strongly Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:26. My supervisor gave me adequate personal recognition
and feedback on my performance  \
0                                             Agree
1                                    Strongly Agree
2                                             Agree
3                                    Strongly Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:27. My working environment was satisfactory e.g.
sufficient space, good lighting, suitable seating and working area  \
0                                             Agree
1                                    Strongly Agree
2                                             Agree
3                                    Strongly Agree
4                                    Strongly Agree

  WorkUnitViews. Topic:28. I was given the opportunity to mentor and coach
others in order for me to pass on my skills and knowledge prior to my cessation
date  \
0                                           Neutral
1                                             Agree
```

```
2                                          Agree
3                                 Strongly Agree
4                                 Strongly Agree

  WorkUnitViews. Topic:29. There was adequate communication between staff in my
unit  \
0                                          Agree
1                                          Agree
2                                          Agree
3                                 Strongly Agree
4                                 Strongly Agree

  WorkUnitViews. Topic:30. Staff morale was positive within my work unit  \
0                                          Agree
1                                 Strongly Agree
2                                          Agree
3                                 Strongly Agree
4                                 Strongly Agree

  Induction. Did you undertake Workplace Induction?  \
0                                           Yes
1                                            No
2                                            No
3                                           Yes
4                                           Yes

  InductionInfo. Topic:Did you undertake a Corporate Induction?  \
0                                            Yes
1                                            NaN
2                                            NaN
3                                             No
4                                            Yes

  InductionInfo. Topic:Did you undertake a Institute Induction?  \
0                                            Yes
1                                            NaN
2                                            NaN
3                                            Yes
4                                            Yes

  InductionInfo. Topic: Did you undertake Team Induction?  \
0                                            Yes
1                                            NaN
2                                            NaN
3                                            Yes
4                                            Yes
```

```
  InductionInfo. Face to Face Topic:Did you undertake a Corporate Induction;
Category:How it was conducted?  \
0                                       Face to Face
1                                                NaN
2                                                NaN
3                                                  -
4                                                  -

  InductionInfo. On-line Topic:Did you undertake a Corporate Induction;
Category:How it was conducted?  \
0                                                  -
1                                                NaN
2                                                NaN
3                                                  -
4                                                  -

  InductionInfo. Induction Manual Topic:Did you undertake a Corporate Induction?
\
0                                                  -
1                                                NaN
2                                                NaN
3                                                  -
4                                    Induction Manual

  InductionInfo. Face to Face Topic:Did you undertake a Institute Induction?  \
0                                       Face to Face
1                                                NaN
2                                                NaN
3                                                NaN
4                                       Face to Face

  InductionInfo. On-line Topic:Did you undertake a Institute Induction?  \
0                                                  -
1                                                NaN
2                                                NaN
3                                                  -
4                                                  -

  InductionInfo. Induction Manual Topic:Did you undertake a Institute Induction?
\
0                                                  -
1                                                NaN
2                                                NaN
3                                                  -
4                                                  -

  InductionInfo. Face to Face Topic: Did you undertake Team Induction; Category?
```

```
\
0                                    Face to Face
1                                             NaN
2                                             NaN
3                                               -
4                                    Face to Face

  InductionInfo. On-line Topic: Did you undertake Team Induction?process you
undertook and how it was conducted.]  \
0                                               -
1                                             NaN
2                                             NaN
3                                               -
4                                               -

  InductionInfo. Induction Manual Topic: Did you undertake Team Induction?  \
0                                               -
1                                             NaN
2                                             NaN
3                                               -
4                                               -

  Workplace. Topic:Did you and your Manager develop a Performance and
Professional Development Plan (PPDP)?  \
0                                             Yes
1                                             Yes
2                                             Yes
3                                             Yes
4                                             Yes

  Workplace. Topic:Does your workplace promote a work culture free from all
forms of unlawful discrimination?  \
0                                             Yes
1                                             Yes
2                                             Yes
3                                             Yes
4                                             Yes

  Workplace. Topic:Does your workplace promote and practice the principles of
employment equity?  \
0                                             Yes
1                                             Yes
2                                             Yes
3                                             Yes
4                                             Yes

  Workplace. Topic:Does your workplace value the diversity of its employees?  \
```

```
0                                                 Yes
1                                                 Yes
2                                                 Yes
3                                                 Yes
4                                                 Yes

  Workplace. Topic:Would you recommend the Institute as an employer to others?
\
0                                                 Yes
1                                                 Yes
2                                                 Yes
3                                                 Yes
4                                                 Yes

  Gender.     What is your Gender? CurrentAge.     Current Age  \
0                          Female                      26   30
1                             NaN                         NaN
2                             NaN                         NaN
3                             NaN                         NaN
4                            Male                      41   45

  Employment Type.     Employment Type Classification.     Classification  \
0                Temporary Full-time                Administration (AO)
1                                NaN                                NaN
2                                NaN                                NaN
3                                NaN                                NaN
4                Permanent Full-time           Teacher (including LVT)

  LengthofServiceOverall. Overall Length of Service at Institute (in years)  \
0                                                 1-2
1                                                 NaN
2                                                 NaN
3                                                 NaN
4                                                 3-4

  LengthofServiceCurrent. Length of Service at current workplace (in years)
0                                                 1-2
1                                                 NaN
2                                                 NaN
3                                                 NaN
4                                                 3-4
```

[5]:
```
tafe_survey.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 702 entries, 0 to 701
Data columns (total 72 columns):
```

```
Record ID
702 non-null int64
Institute
702 non-null object
WorkArea
702 non-null object
CESSATION YEAR
695 non-null float64
Reason for ceasing employment
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
Main Factor.     Which of these was the main factor for leaving?
113 non-null object
InstituteViews. Topic:1. I feel the senior leadership had a clear vision and
direction
608 non-null object
InstituteViews. Topic:2. I was given access to skills training to help me do my
job better
613 non-null object
InstituteViews. Topic:3. I was given adequate opportunities for personal
development
610 non-null object
InstituteViews. Topic:4. I was given adequate opportunities for promotion within
%Institute]Q25LBL%
608 non-null object
```

InstituteViews. Topic:5. I felt the salary for the job was right for the responsibilities I had
615 non-null object
InstituteViews. Topic:6. The organisation recognised when staff did good work
607 non-null object
InstituteViews. Topic:7. Management was generally supportive of me
614 non-null object
InstituteViews. Topic:8. Management was generally supportive of my team
608 non-null object
InstituteViews. Topic:9. I was kept informed of the changes in the organisation which would affect me
610 non-null object
InstituteViews. Topic:10. Staff morale was positive within the Institute
602 non-null object
InstituteViews. Topic:11. If I had a workplace issue it was dealt with quickly
601 non-null object
InstituteViews. Topic:12. If I had a workplace issue it was dealt with efficiently
597 non-null object
InstituteViews. Topic:13. If I had a workplace issue it was dealt with discreetly
601 non-null object
WorkUnitViews. Topic:14. I was satisfied with the quality of the management and supervision within my work unit
609 non-null object
WorkUnitViews. Topic:15. I worked well with my colleagues
605 non-null object
WorkUnitViews. Topic:16. My job was challenging and interesting
607 non-null object
WorkUnitViews. Topic:17. I was encouraged to use my initiative in the course of my work
610 non-null object
WorkUnitViews. Topic:18. I had sufficient contact with other people in my job
613 non-null object
WorkUnitViews. Topic:19. I was given adequate support and co-operation by my peers to enable me to do my job
609 non-null object
WorkUnitViews. Topic:20. I was able to use the full range of my skills in my job
609 non-null object
WorkUnitViews. Topic:21. I was able to use the full range of my abilities in my job. ; Category:Level of Agreement; Question:YOUR VIEWS ABOUT YOUR WORK UNIT]
608 non-null object
WorkUnitViews. Topic:22. I was able to use the full range of my knowledge in my job
608 non-null object
WorkUnitViews. Topic:23. My job provided sufficient variety
611 non-null object
WorkUnitViews. Topic:24. I was able to cope with the level of stress and

pressure in my job
610 non-null object
WorkUnitViews. Topic:25. My job allowed me to balance the demands of work and family to my satisfaction
611 non-null object
WorkUnitViews. Topic:26. My supervisor gave me adequate personal recognition and feedback on my performance
606 non-null object
WorkUnitViews. Topic:27. My working environment was satisfactory e.g. sufficient space, good lighting, suitable seating and working area
610 non-null object
WorkUnitViews. Topic:28. I was given the opportunity to mentor and coach others in order for me to pass on my skills and knowledge prior to my cessation date
609 non-null object
WorkUnitViews. Topic:29. There was adequate communication between staff in my unit
603 non-null object
WorkUnitViews. Topic:30. Staff morale was positive within my work unit
606 non-null object
Induction. Did you undertake Workplace Induction?
619 non-null object
InductionInfo. Topic:Did you undertake a Corporate Induction?
432 non-null object
InductionInfo. Topic:Did you undertake a Institute Induction?
483 non-null object
InductionInfo. Topic: Did you undertake Team Induction?
440 non-null object
InductionInfo. Face to Face Topic:Did you undertake a Corporate Induction; Category:How it was conducted?
555 non-null object
InductionInfo. On-line Topic:Did you undertake a Corporate Induction; Category:How it was conducted?
555 non-null object
InductionInfo. Induction Manual Topic:Did you undertake a Corporate Induction?
555 non-null object
InductionInfo. Face to Face Topic:Did you undertake a Institute Induction?
530 non-null object
InductionInfo. On-line Topic:Did you undertake a Institute Induction?
555 non-null object
InductionInfo. Induction Manual Topic:Did you undertake a Institute Induction?
553 non-null object
InductionInfo. Face to Face Topic: Did you undertake Team Induction; Category?
555 non-null object
InductionInfo. On-line Topic: Did you undertake Team Induction?process you undertook and how it was conducted.]
555 non-null object
InductionInfo. Induction Manual Topic: Did you undertake Team Induction?
555 non-null object

```
Workplace. Topic:Did you and your Manager develop a Performance and Professional
Development Plan (PPDP)?
608 non-null object
Workplace. Topic:Does your workplace promote a work culture free from all forms
of unlawful discrimination?
594 non-null object
Workplace. Topic:Does your workplace promote and practice the principles of
employment equity?
587 non-null object
Workplace. Topic:Does your workplace value the diversity of its employees?
586 non-null object
Workplace. Topic:Would you recommend the Institute as an employer to others?
581 non-null object
Gender.     What is your Gender?
596 non-null object
CurrentAge.     Current Age
596 non-null object
Employment Type.     Employment Type
596 non-null object
Classification.     Classification
596 non-null object
LengthofServiceOverall. Overall Length of Service at Institute (in years)
596 non-null object
LengthofServiceCurrent. Length of Service at current workplace (in years)
596 non-null object
dtypes: float64(1), int64(1), object(70)
memory usage: 395.0+ KB
```

[6]:
```
dete_survey.isnull()
```

[6]:

	ID	SeparationType	Cease Date	DETE Start Date	Role Start Date	\
0	False	False	False	False	False	
1	False	False	False	False	False	
2	False	False	False	False	False	
3	False	False	False	False	False	
4	False	False	False	False	False	
..	…	…	…	…	…	
817	False	False	False	False	False	
818	False	False	False	False	False	
819	False	False	False	False	False	
820	False	False	False	False	False	
821	False	False	False	False	False	

	Position	Classification	Region	Business Unit	Employment Status	\
0	False	False	False	False	False	
1	False	False	False	False	False	
2	False	True	False	False	False	

```
3       False           False   False           True              False
4       False            True   False           True              False
..        …              …     …             …                 …
817     False           False   False           True              False
818     False           False   False           True              False
819     False           False   False          False              False
820     False           False   False           True              False
821     False            True   False           True               True

     Career move to public sector  Career move to private sector  \
0                           False                           False
1                           False                           False
2                           False                           False
3                           False                           False
4                           False                           False
..                            …                             …
817                         False                           False
818                         False                           False
819                         False                           False
820                         False                           False
821                         False                           False

     Interpersonal conflicts  Job dissatisfaction  \
0                      False                False
1                      False                False
2                      False                False
3                      False                False
4                      False                False
..                       …                  …
817                    False                False
818                    False                False
819                    False                False
820                    False                False
821                    False                False

     Dissatisfaction with the department  Physical work environment  \
0                                  False                       False
1                                  False                       False
2                                  False                       False
3                                  False                       False
4                                  False                       False
..                                   …                         …
817                                False                       False
818                                False                       False
819                                False                       False
820                                False                       False
821                                False                       False
```

```
     Lack of recognition  Lack of job security  Work location  \
0                  False                 False          False
1                  False                 False          False
2                  False                 False          False
3                  False                 False          False
4                  False                 False          False
..                   …                     …              …
817                False                 False          False
818                False                 False          False
819                False                 False          False
820                False                 False          False
821                False                 False          False

     Employment conditions  Maternity/family  Relocation  Study/Travel  \
0                    False             False       False         False
1                    False             False       False         False
2                    False             False       False         False
3                    False             False       False         False
4                    False             False       False         False
..                     …                 …           …             …
817                  False             False       False         False
818                  False             False       False         False
819                  False             False       False         False
820                  False             False       False         False
821                  False             False       False         False

     Ill Health  Traumatic incident  Work life balance  Workload  \
0         False              False              False     False
1         False              False              False     False
2         False              False              False     False
3         False              False              False     False
4         False              False              False     False
..          …                  …                  …         …
817       False              False              False     False
818       False              False              False     False
819       False              False              False     False
820       False              False              False     False
821       False              False              False     False

     None of the above  Professional Development  Opportunities for promotion  \
0                False                      False                         False
1                False                      False                         False
2                False                      False                         False
3                False                      False                         False
4                False                      False                         False
..                 …                          …                             …
```

```
817             False                    False                        False
818             False                    False                        False
819             False                    False                        False
820             False                    False                        False
821             False                     True                         True

     Staff morale  Workplace issue  Physical environment  Worklife balance  \
0           False            False                 False             False
1           False            False                 False             False
2           False            False                 False             False
3           False            False                 False             False
4           False            False                 False             False
..            …                …                     …                 …
817         False            False                 False             False
818         False            False                 False             False
819         False            False                 False             False
820         False            False                 False             False
821          True             True                  True              True

     Stress and pressure support  Performance of supervisor  Peer support  \
0                          False                      False         False
1                          False                      False         False
2                          False                      False         False
3                          False                      False         False
4                          False                      False         False
..                           …                          …             …
817                        False                      False         False
818                        False                      False         False
819                        False                      False         False
820                        False                      False         False
821                         True                       True          True

     Initiative  Skills  Coach  Career Aspirations  Feedback  Further PD  \
0         False   False  False               False     False       False
1         False   False  False               False     False       False
2         False   False  False               False     False       False
3         False   False  False               False     False       False
4         False   False  False               False     False       False
..          …     …    …                     …         …           …
817       False   False  False               False     False       False
818       False   False  False               False     False       False
819       False   False  False               False     False       False
820       False   False  False               False     False       False
821        True    True   True                True      True        True

     Communication  My say  Information  Kept informed  Wellness programs  \
0            False   False        False          False              False
```

```
1            False   False        False          False              False
2            False   False        False          False              False
3            False   False        False          False              False
4            False   False        False          False              False
..             …     …          …              …                  …
817          False   False        False          False              False
818          False   False        False          False              False
819          False   False        False          False              False
820          False   False        False          False              False
821           True    True         True           True               True

     Health & Safety  Gender    Age  Aboriginal  Torres Strait  South Sea  \
0              False   False  False        True           True       True
1              False   False  False        True           True       True
2              False   False  False        True           True       True
3              False   False  False        True           True       True
4              False   False  False        True           True       True
..               …     …    …          …              …          …
817            False   False  False        True           True       True
818            False   False  False        True           True       True
819            False   False  False        True           True       True
820            False   False  False        True           True       True
821             True    True   True        True           True       True

     Disability   NESB
0          True  False
1          True   True
2          True   True
3          True   True
4          True   True
..          …    …
817        True   True
818        True   True
819        True   True
820        True   True
821        True   True

[822 rows x 56 columns]
```

In the `tafe_survey` dataframe, there are a lot of columns that contain many `NaN` values. There are even some that have values that are Not Stated. But like the `dete_survey` dataframe, there are a lot of columns we don't need to use to analyze whether or not short-term employees resigned because of a dissatisfaction. I also found that both dataframes contain many of the same columns. There were many columns in the dataframes that tells us that a certain number of employees resigned because of some sort of dissatisfaction.

2 Simplifying the Dataframes.

Re-reading the datasets as dataframes but this time we will also be replacing `Nan` Values with `Not Stated`.

[7]:
```
dete_survey = pd.read_csv('dete-exit-survey-january-2014.csv',␣
↪encoding='Latin-1', na_values= 'Not Stated')

#Dropping the columns we don't need for our analysis.
dete_survey_updated = dete_survey.drop(dete_survey.columns[28:49], axis=1)
tafe_survey_updated = tafe_survey.drop(tafe_survey.columns[17:66], axis=1)
```

[8]:
```
# Print all the column names we need to make our analysis.
print(dete_survey_updated.columns)
print(tafe_survey_updated.columns)
```

```
Index(['ID', 'SeparationType', 'Cease Date', 'DETE Start Date',
       'Role Start Date', 'Position', 'Classification', 'Region',
       'Business Unit', 'Employment Status', 'Career move to public sector',
       'Career move to private sector', 'Interpersonal conflicts',
       'Job dissatisfaction', 'Dissatisfaction with the department',
       'Physical work environment', 'Lack of recognition',
       'Lack of job security', 'Work location', 'Employment conditions',
       'Maternity/family', 'Relocation', 'Study/Travel', 'Ill Health',
       'Traumatic incident', 'Work life balance', 'Workload',
       'None of the above', 'Gender', 'Age', 'Aboriginal', 'Torres Strait',
       'South Sea', 'Disability', 'NESB'],
      dtype='object')
Index(['Record ID', 'Institute', 'WorkArea', 'CESSATION YEAR',
       'Reason for ceasing employment',
       'Contributing Factors. Career Move - Public Sector ',
       'Contributing Factors. Career Move - Private Sector ',
       'Contributing Factors. Career Move - Self-employment',
       'Contributing Factors. Ill Health',
       'Contributing Factors. Maternity/Family',
       'Contributing Factors. Dissatisfaction',
       'Contributing Factors. Job Dissatisfaction',
       'Contributing Factors. Interpersonal Conflict',
       'Contributing Factors. Study', 'Contributing Factors. Travel',
       'Contributing Factors. Other', 'Contributing Factors. NONE',
       'Gender.     What is your Gender?', 'CurrentAge.     Current Age',
       'Employment Type.     Employment Type',
       'Classification.     Classification',
       'LengthofServiceOverall. Overall Length of Service at Institute (in
years)',
       'LengthofServiceCurrent. Length of Service at current workplace (in
years)'],
      dtype='object')
```

Since some `tafe_survey` dataframe had columns contained 'Not Stated' values, we also had to make sure we did the same thing for our `dete_survey` dataframe as well since it's likely that we will have to merge these two dataframes into one. We also made sure to drop the columns in both dataframes that we didn't need in order to narrow our focus down to all the important datapoints we will need to complete our analysis.

3 Updating and Re-naming columns.

[9]:
```
dete_survey_updated.columns = dete_survey_updated.columns.str.
 ↪replace('\s+','_').str.replace(' ','').str.lower()
dete_survey_updated.columns
```

[9]:
```
Index(['id', 'separationtype', 'cease_date', 'dete_start_date',
       'role_start_date', 'position', 'classification', 'region',
       'business_unit', 'employment_status', 'career_move_to_public_sector',
       'career_move_to_private_sector', 'interpersonal_conflicts',
       'job_dissatisfaction', 'dissatisfaction_with_the_department',
       'physical_work_environment', 'lack_of_recognition',
       'lack_of_job_security', 'work_location', 'employment_conditions',
       'maternity/family', 'relocation', 'study/travel', 'ill_health',
       'traumatic_incident', 'work_life_balance', 'workload',
       'none_of_the_above', 'gender', 'age', 'aboriginal', 'torres_strait',
       'south_sea', 'disability', 'nesb'],
      dtype='object')
```

[10]:
```
#First 5 rows of dete_survey_updated.
dete_survey_updated.head()
```

[10]:

	id	separationtype	cease_date	dete_start_date	\
0	1	Ill Health Retirement	08/2012	1984.0	
1	2	Voluntary Early Retirement (VER)	08/2012	NaN	
2	3	Voluntary Early Retirement (VER)	05/2012	2011.0	
3	4	Resignation-Other reasons	05/2012	2005.0	
4	5	Age Retirement	05/2012	1970.0	

	role_start_date	position	\
0	2004.0	Public Servant	
1	NaN	Public Servant	
2	2011.0	Schools Officer	
3	2006.0	Teacher	
4	1989.0	Head of Curriculum/Head of Special Education	

	classification	region	business_unit	\
0	A01-A04	Central Office	Corporate Strategy and Peformance	
1	A05-A07	Central Office	Corporate Strategy and Peformance	
2	NaN	Central Office	Education Queensland	
3	Primary	Central Queensland	NaN	

```
4           NaN          South East                                    NaN

     employment_status  career_move_to_public_sector  \
0  Permanent Full-time                          True
1  Permanent Full-time                         False
2  Permanent Full-time                         False
3  Permanent Full-time                         False
4  Permanent Full-time                         False

   career_move_to_private_sector  interpersonal_conflicts  \
0                          False                   False
1                          False                   False
2                          False                   False
3                           True                   False
4                          False                   False

   job_dissatisfaction  dissatisfaction_with_the_department  \
0                 True                                 False
1                False                                 False
2                False                                 False
3                False                                 False
4                False                                 False

   physical_work_environment  lack_of_recognition  lack_of_job_security  \
0                      False                 True                 False
1                      False                False                 False
2                      False                False                 False
3                      False                False                 False
4                      False                False                 False

   work_location  employment_conditions  maternity/family  relocation  \
0          False                  False             False       False
1          False                  False             False       False
2          False                  False             False       False
3          False                  False             False       False
4          False                  False             False       False

   study/travel  ill_health  traumatic_incident  work_life_balance  workload  \
0         False       False               False              False     False
1         False       False               False              False     False
2         False       False               False              False     False
3         False       False               False              False     False
4         False       False               False               True     False

   none_of_the_above  gender          age aboriginal torres_strait south_sea  \
0               True    Male        56-60        NaN           NaN       NaN
1              False    Male        56-60        NaN           NaN       NaN
```

```
2              True    Male  61 or older        NaN           NaN       NaN
3             False  Female        36-40        NaN           NaN       NaN
4             False  Female  61 or older        NaN           NaN       NaN

  disability nesb
0        NaN  Yes
1        NaN  NaN
2        NaN  NaN
3        NaN  NaN
4        NaN  NaN
```

The `tafe_survey_updated` dataframe has a lot of the same columns as the `dete_survey_updated` dataframe except they have different names. There are columns in both dataframes we will need to make our final analysis so to make it easier, we renamed some of the columns in the `tafe_survey_updated` dataframe to the names in their respective identical columns in the `dete_survey_updated` dataframe.

[11]:
```
#Using the column names as column indexes wasn't working so I had to use their␣
 ↪numerical indexes.
mapping = {tafe_survey_updated.columns[0]: 'id', tafe_survey_updated.columns[3]:
 ↪ 'cease_date',
                                tafe_survey_updated.columns[4]: 'separationtype',
               tafe_survey_updated.columns[17]: 'gender',
               tafe_survey_updated.columns[18]: 'age',
       tafe_survey_updated.columns[19]: 'employment_status',
      tafe_survey_updated.columns[20]: 'position',
       tafe_survey_updated.columns[21]: 'institute_service',
       tafe_survey_updated.columns[22]: 'role_service'}
tafe_survey_updated = tafe_survey_updated.rename(columns=mapping)
tafe_survey_updated.columns
```

[11]:
```
Index(['id', 'Institute', 'WorkArea', 'cease_date', 'separationtype',
       'Contributing Factors. Career Move - Public Sector ',
       'Contributing Factors. Career Move - Private Sector ',
       'Contributing Factors. Career Move - Self-employment',
       'Contributing Factors. Ill Health',
       'Contributing Factors. Maternity/Family',
       'Contributing Factors. Dissatisfaction',
       'Contributing Factors. Job Dissatisfaction',
       'Contributing Factors. Interpersonal Conflict',
       'Contributing Factors. Study', 'Contributing Factors. Travel',
       'Contributing Factors. Other', 'Contributing Factors. NONE', 'gender',
       'age', 'employment_status', 'position', 'institute_service',
       'role_service'],
      dtype='object')
```

[12]:
```
#First 5 rows of tafe_survey_updated.
tafe_survey_updated.head()
```

[12]:

```
                   id                                Institute  \
0  634133009996094000  Southern Queensland Institute of TAFE
1  634133654064531000            Mount Isa Institute of TAFE
2  634138845606563000            Mount Isa Institute of TAFE
3  634139903350000000            Mount Isa Institute of TAFE
4  634146578511788000  Southern Queensland Institute of TAFE

                   WorkArea  cease_date    separationtype  \
0  Non-Delivery (corporate)      2010.0  Contract Expired
1  Non-Delivery (corporate)      2010.0        Retirement
2       Delivery (teaching)      2010.0        Retirement
3  Non-Delivery (corporate)      2010.0       Resignation
4       Delivery (teaching)      2010.0       Resignation

  Contributing Factors. Career Move - Public Sector   \
0                                                NaN
1                                                  -
2                                                  -
3                                                  -
4                                                  -

  Contributing Factors. Career Move - Private Sector   \
0                                                NaN
1                                                  -
2                                                  -
3                                                  -
4                      Career Move - Private Sector

  Contributing Factors. Career Move - Self-employment  \
0                                                NaN
1                                                  -
2                                                  -
3                                                  -
4                                                  -

  Contributing Factors. Ill Health Contributing Factors. Maternity/Family  \
0                              NaN                                     NaN
1                                -                                       -
2                                -                                       -
3                                -                                       -
4                                -                                       -

  Contributing Factors. Dissatisfaction  \
0                                   NaN
```

```
1                                    -
2                                    -
3                                    -
4                                    -

  Contributing Factors. Job Dissatisfaction  \
0                                       NaN
1                                         -
2                                         -
3                                         -
4                                         -

  Contributing Factors. Interpersonal Conflict Contributing Factors. Study  \
0                                          NaN                           NaN
1                                            -                             -
2                                            -                             -
3                                            -                             -
4                                            -                             -

  Contributing Factors. Travel Contributing Factors. Other  \
0                          NaN                         NaN
1                       Travel                           -
2                            -                           -
3                       Travel                           -
4                            -                           -

  Contributing Factors. NONE  gender      age    employment_status  \
0                        NaN  Female  26   30  Temporary Full-time
1                          -     NaN      NaN                  NaN
2                       NONE     NaN      NaN                  NaN
3                          -     NaN      NaN                  NaN
4                          -    Male  41   45  Permanent Full-time

                 position institute_service role_service
0      Administration (AO)               1-2          1-2
1                      NaN               NaN          NaN
2                      NaN               NaN          NaN
3                      NaN               NaN          NaN
4  Teacher (including LVT)               3-4          3-4
```

[13]:
```
#Reviewing unique values in the 'seperationtype' column in dete_survey_updated.
dete_survey_updated['separationtype'].value_counts()
```

[13]:
```
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
```

[14]:
```
#Reviewing unique values in the 'seperationtype' column in tafe_survey_updated.
tafe_survey_updated['separationtype'].value_counts()
```

[14]:
```
Resignation                 340
Contract Expired            127
Retrenchment/ Redundancy    104
Retirement                   82
Transfer                     25
Termination                  23
Name: separationtype, dtype: int64
```

4 Filtering data based on Resignation.

The `dete_survey_updated` dataframe has 3 types of Resignations whereas `tafe_survey_updated` dataframe has only 1. Since we have to merge both frames together, we have to ensure that all the identical columns from both frames have the same exact name and values.

[15]:
```
#Replacing all 3 types of Resignations into 1.
dete_survey_updated['separationtype'] = dete_survey_updated['separationtype'].
 ↪str.split('-').str[0]
dete_survey_updated['separationtype'].value_counts()
```

[15]:
```
Resignation                         311
Age Retirement                      285
Voluntary Early Retirement (VER)     67
Ill Health Retirement                61
Other                                49
Contract Expired                     34
Termination                          15
Name: separationtype, dtype: int64
```

As you can see from the information above, we were able to combine all of 3 different types of Resignations in `dete_survey_updated` into one Resignation type.

[16]:
```
#Filtering both dataframes to rows whose 'separationtype' column is␣
 ↪'Resignation' only.
dete_resignations =␣
 ↪dete_survey_updated[dete_survey_updated['separationtype']=='Resignation']
tafe_resignations =␣
 ↪tafe_survey_updated[tafe_survey_updated['separationtype']=='Resignation']
```

5 Filtering dates and creating Visualizations.

Here we'll focus on verifying that the years in the `cease_date` and `dete_start_date` columns make sense based on these criterias: - Since the cease_date is the last year of the person's employment and the dete_start_date is the person's first year of employment, it wouldn't make sense to have years after the current date. - Given that most people in this field start working in their 20s, it's also unlikely that the dete_start_date was before the year 1940.

[17]:
```
#Reviewing unique values in the 'cease_date' column in dete_resignations.
dete_resignations['cease_date'].value_counts()
```

[17]:
```
2012       126
2013        74
01/2014     22
12/2013     17
06/2013     14
09/2013     11
11/2013      9
07/2013      9
10/2013      6
08/2013      4
05/2013      2
05/2012      2
2010         1
09/2010      1
07/2006      1
07/2012      1
Name: cease_date, dtype: int64
```

[18]:
```
#Reviewing unique values in the 'dete_start_date' column in dete_resignations.
dete_resignations['dete_start_date'].value_counts()
```

[18]:
```
2011.0    24
2008.0    22
2007.0    21
2012.0    21
2010.0    17
2005.0    15
2004.0    14
2009.0    13
2006.0    13
2013.0    10
2000.0     9
1999.0     8
1996.0     6
2002.0     6
1992.0     6
1998.0     6
```

```
2003.0     6
1994.0     6
1993.0     5
1990.0     5
1980.0     5
1997.0     5
1991.0     4
1989.0     4
1988.0     4
1995.0     4
2001.0     3
1985.0     3
1986.0     3
1983.0     2
1976.0     2
1974.0     2
1971.0     1
1972.0     1
1984.0     1
1982.0     1
1987.0     1
1975.0     1
1973.0     1
1977.0     1
1963.0     1
Name: dete_start_date, dtype: int64
```

[19]:
```
#Using string methods to extact the years in the 'cease_date' and␣
↪'dete_start_date' columns.

dete_resignations = dete_resignations.copy() #Using .copy() method to get␣
↪around 'SettingWithCopy' warning.

dete_resignations['cease_date'] = dete_resignations['cease_date'].str.split('/
↪').str[-1]

#Displaying years as a float data type.
dete_resignations['cease_date'] = dete_resignations['cease_date'].
↪astype('float')
```

[20]:
```
dete_resignations['cease_date'].value_counts().sort_values(ascending=False)
```

[20]:
```
2013.0    146
2012.0    129
2014.0     22
2010.0      2
2006.0      1
```

```
Name: cease_date, dtype: int64
```

[21]:
```
dete_resignations['dete_start_date'].value_counts().sort_values(ascending=False)
```

[21]:
```
2011.0    24
2008.0    22
2007.0    21
2012.0    21
2010.0    17
2005.0    15
2004.0    14
2006.0    13
2009.0    13
2013.0    10
2000.0     9
1999.0     8
1996.0     6
2002.0     6
1992.0     6
1998.0     6
2003.0     6
1994.0     6
1990.0     5
1993.0     5
1980.0     5
1997.0     5
1991.0     4
1989.0     4
1988.0     4
1995.0     4
2001.0     3
1985.0     3
1986.0     3
1976.0     2
1983.0     2
1974.0     2
1982.0     1
1973.0     1
1975.0     1
1987.0     1
1977.0     1
1984.0     1
1972.0     1
1971.0     1
1963.0     1
Name: dete_start_date, dtype: int64
```

[22]:
```
#Reviewing unique values in the 'cease_date' column in tafe_resignations.
tafe_resignations['cease_date'].value_counts().sort_index()
```

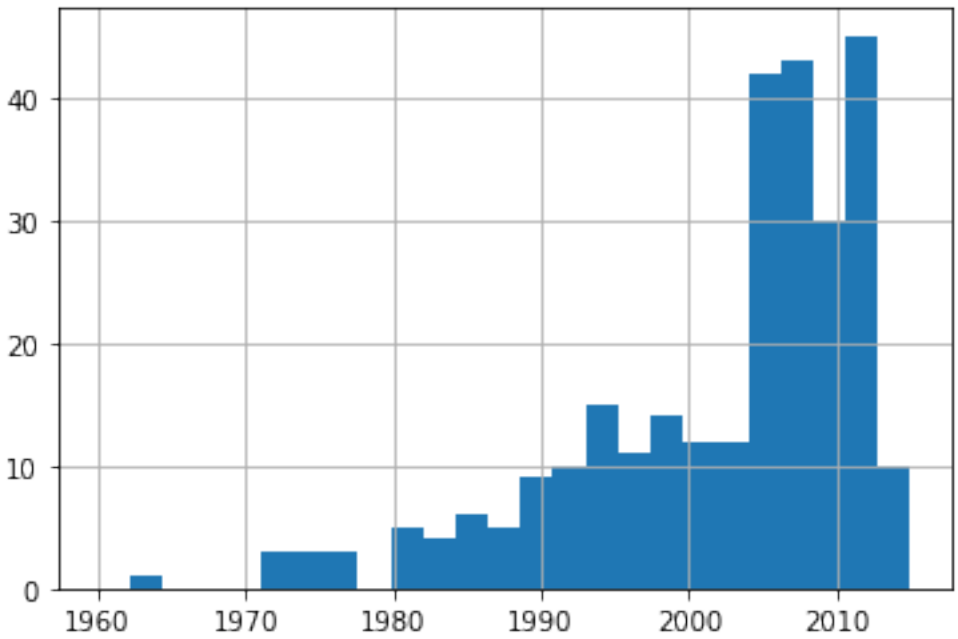
[22]:
```
2009.0      2
2010.0     68
2011.0    116
2012.0     94
2013.0     55
Name: cease_date, dtype: int64
```

[23]:
```
#Creating visualizations for our data to find out what may have went wrong.
import matplotlib.pyplot as plt
dete_resignations['cease_date'].hist(bins=25, range = (2005,2015))
```

[23]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x11e501350>
```

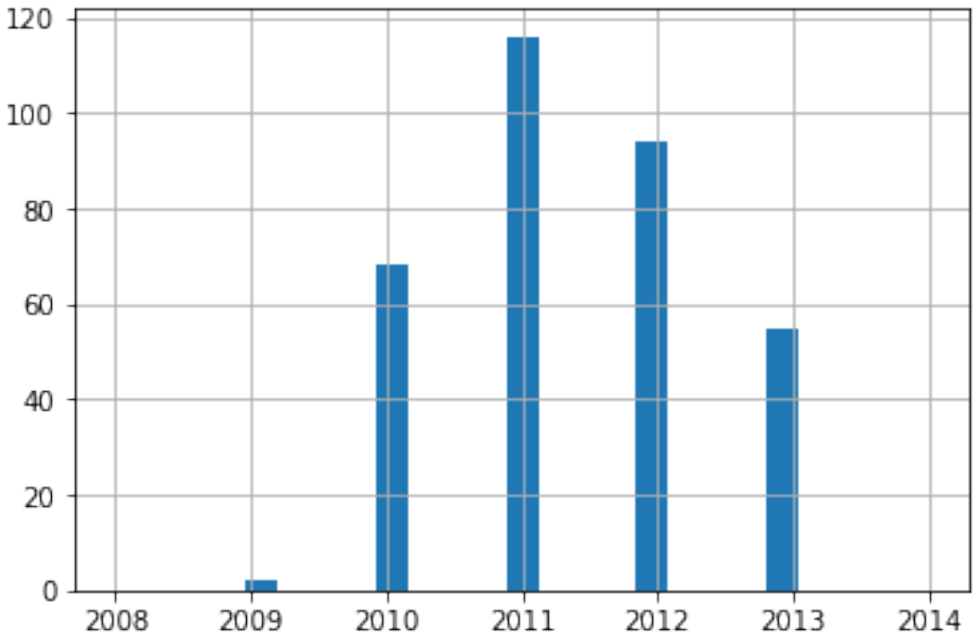
[24]:
```
dete_resignations['dete_start_date'].hist(bins=25, range = (1960,2015))
```

[24]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x1206d1a50>
```



[25]:
```
tafe_resignations['cease_date'].hist(bins=25, range = (2008, 2014))
```

[25]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x120f49090>
```



From the visualizations created above, I found that the dates don't completely align. The only years that align in the `cease_date` column for both dataframes are: 2010, 2012, and 2013. Additionally, the visual for the `cease_date` column in the `tafe_resignations` dataframe shows a higher count in 2010 than the `cease_date` column in the `dete_resignations` column for that same year. This still isn't a major issue though. We should still be able to work with this.

6 Creating a new column in `dete_resginations`.

Recall that our end goal is to answer the following question:

- Are employees who have only worked for the institutes for a short period of time resigning due to some kind of dissatisfaction? What about employees who have been at the job longer?

In the Human Resources field, the length of time an employee spent in a workplace is referred to as their years of service.

You may have noticed that the `tafe_resignations` dataframe already contains a `service` column, which we renamed to `institute_service`. In order to analyze both surveys together, we'll have to create a corresponding `institute_service` column in dete_resignations.

[26]:
```
#Creating a new column called 'institute_service' which contains the number of␣
 ↪years each employee was employed for.
dete_resignations['institute_service'] = dete_resignations['cease_date'] -␣
 ↪dete_resignations['dete_start_date']
```

[27]:
```
#A quick review of our results.
dete_resignations['institute_service'].head()
```

[27]:
```
3      7.0
5     18.0
8      3.0
9     15.0
11     3.0
Name: institute_service, dtype: float64
```

7 Updating values in all Dissatisfaction columns and creating a new column.

Below are the columns we'll use to categorize employees as "dissatisfied" from each dataframe. - For `tafe_resignations`: - Contributing Factors. Dissatisfaction - Contributing Factors. Job Dissatisfaction

- For `dete_resignations`:
  - job_dissatisfaction
  - dissatisfaction_with_the_department
  - physical_work_environment
  - lack_of_recognition
  - lack_of_job_security
  - work_location
  - employment_conditions
  - work_life_balance
  - workload

If the employee indicated that there were dissatisfying factors that caused him/her to resign, we would mark their response down in a newly created column called `dissatisfaction`. In that column, the employee's response would be listed as either `True`, `False`, or `NaN`. `True`: indicating that the employee resigned because of a dissatisfaction. `False`: indicating that the employee did not resign because of an dissatisfactions. `Nan`: indicating that the employee resigned but did not indicated whether or not it was because of any dissatisfactions.

[28]:
```
#Reviewing all the unique values in both the Dissatisfaction columns of␣
↪tafe_resignations.
tafe_resignations['Contributing Factors. Dissatisfaction'].value_counts()
```

[28]:
```
-                                     277
Contributing Factors. Dissatisfaction      55
Name: Contributing Factors. Dissatisfaction, dtype: int64
```

[29]:
```
tafe_resignations['Contributing Factors. Job Dissatisfaction'].value_counts()
```

[29]:
```
-                     270
Job Dissatisfaction     62
Name: Contributing Factors. Job Dissatisfaction, dtype: int64
```

[30]:
```
#Creating a function that updates the values in the 'dissatisfaction' columns␣
↪to True, False, or Nan.
def update_vals(row_value):
    if row_value == '-':
        return False
    elif pd.isnull(row_value):
        return np.nan
    else:
        return True
tafe_resignations['dissatisfied'] = tafe_resignations[['Contributing Factors.␣
↪Dissatisfaction',
                                                       'Contributing Factors.␣
↪Job Dissatisfaction'
                                                      ]].applymap(update_vals).
↪any(axis=1, skipna=False)
tafe_resignations_up = tafe_resignations.copy()
dete_resignations['dissatisfied'] =␣
↪dete_resignations[['job_dissatisfaction','dissatisfaction_with_the_department',
                                                                          ␣
↪'physical_work_environment','lack_of_recognition',
                                                                          ␣
↪'lack_of_job_security','work_location','employment_conditions',
                                                                          ␣
↪'work_life_balance','workload']].any(axis=1, skipna=False)
dete_resignations_up = dete_resignations.copy()
```

```
/opt/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:11:
SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: http://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  # This is added back by InteractiveShellApp.init_path()
```

[31]:
```
tafe_resignations_up['dissatisfied'].value_counts(dropna=False)
```

[31]:
```
False    241
True      91
NaN        8
Name: dissatisfied, dtype: int64
```

[32]:
```
dete_resignations_up['dissatisfied'].value_counts(dropna=False)
```

[32]:
```
False    162
True     149
Name: dissatisfied, dtype: int64
```

8 Creating a new column and dropping columns we don't need.

Below, we created a new column called `institute` identifying which dataframe each row came from before combining both dataframes together. We then combined our dataframes and then dropped all the columns that we won't need for our analysis.

[33]:
```
#Creating a new column in each dataframe and filling it values identifying␣
 ↪which dataframe the row came from.
dete_resignations_up['institute'] = 'DETE'
tafe_resignations_up['institute'] = 'TAFE'

#Combining both dataframes.
combined = pd.concat([dete_resignations_up, tafe_resignations_up],␣
 ↪ignore_index=True)
```

```
/opt/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:6:
FutureWarning: Sorting because non-concatenation axis is not aligned. A future
version
of pandas will change to not sort by default.

To accept the future behavior, pass 'sort=False'.

To retain the current behavior and silence the warning, pass 'sort=True'.
```

[34]:
```
#Checking for the sum of non-null values to identify which columns should be␣
 ↪dropped.
combined.notnull().sum().sort_values()
```

[34]:
```
torres_strait                          0
south_sea                              3
aboriginal                             7
disability                             8
nesb                                   9
business_unit                         32
classification                       161
region                               265
role_start_date                      271
dete_start_date                      283
role_service                         290
career_move_to_public_sector         311
employment_conditions                311
work_location                        311
lack_of_job_security                 311
job_dissatisfaction                  311
dissatisfaction_with_the_department  311
workload                             311
```

```
lack_of_recognition                                 311
interpersonal_conflicts                             311
maternity/family                                    311
none_of_the_above                                   311
physical_work_environment                           311
relocation                                          311
study/travel                                        311
traumatic_incident                                  311
work_life_balance                                   311
career_move_to_private_sector                       311
ill_health                                          311
Contributing Factors. Career Move - Private Sector  332
Contributing Factors. Other                         332
Contributing Factors. Career Move - Public Sector   332
Contributing Factors. Career Move - Self-employment 332
Contributing Factors. Travel                        332
Contributing Factors. Study                         332
Contributing Factors. Dissatisfaction               332
Contributing Factors. Ill Health                    332
Contributing Factors. NONE                          332
Contributing Factors. Maternity/Family              332
Contributing Factors. Job Dissatisfaction           332
Contributing Factors. Interpersonal Conflict        332
WorkArea                                            340
Institute                                           340
institute_service                                   563
gender                                              592
age                                                 596
employment_status                                   597
position                                            598
cease_date                                          635
dissatisfied                                        643
id                                                  651
separationtype                                      651
institute                                           651
dtype: int64
```

[35]:
```
#Dropping columns with less than 500 non-null values.
combined_updated = combined.dropna(thresh = 500, axis = 1)

#Checking to make sure the right columns got dropped.
combined_updated.notnull().sum().sort_values()
```

[35]:
```
institute_service    563
gender               592
age                  596
employment_status    597
```

```
position             598
cease_date           635
dissatisfied         643
id                   651
institute            651
separationtype       651
dtype: int64
```

9 Cleaning up our `institute_service` column.

Before we can perform any kind of analysis, we have to clean up the `institute_service` column. It's a bit tricky cleaning up this column as its values come in the following forms: - NaN 88 - Less than 1 year 73 - 1-2 64 - 3-4 63 - 5-6 33 - 11-20 26 - 5.0 23 - 1.0 22 - 7-10 21 - 0.0 20 ...

So we have to seperate values into several different categories before we make an analysis. The categories is as follows: - New: Less than 3 years at a company - Experienced: 3-6 years at a company - Established: 7-10 years at a company - Veteran: 11 or more years at a company

[36]:
```
#Checking for unique values in 'institute_service' column
combined_updated['institute_service'].value_counts(dropna=False)
```

[36]:
```
NaN                  88
Less than 1 year     73
1-2                  64
3-4                  63
5-6                  33
11-20                26
5.0                  23
1.0                  22
7-10                 21
0.0                  20
3.0                  20
6.0                  17
4.0                  16
2.0                  14
9.0                  14
7.0                  13
More than 20 years   10
8.0                   8
13.0                  8
15.0                  7
20.0                  7
10.0                  6
12.0                  6
14.0                  6
22.0                  6
17.0                  6
```

```
18.0                    5
16.0                    5
11.0                    4
23.0                    4
24.0                    4
19.0                    3
32.0                    3
21.0                    3
39.0                    3
30.0                    2
25.0                    2
26.0                    2
28.0                    2
36.0                    2
38.0                    1
49.0                    1
42.0                    1
41.0                    1
29.0                    1
35.0                    1
34.0                    1
33.0                    1
27.0                    1
31.0                    1
Name: institute_service, dtype: int64
```

[37]:
```
#Change the value type for this column to type 'str'.
combined_updated = combined_updated.copy()

#Extract only the numbers in the string values in the 'institute_service'␣
↪column.
combined_updated['institute_service_updated'] =␣
↪combined_updated['institute_service'].astype('str').str.extract(r'(\d+)')
combined_updated['institute_service_updated'] =␣
↪combined_updated['institute_service_updated'].astype('float')
```

[38]:
```
#Check values to make sure they are floats.
combined_updated['institute_service_updated'].value_counts().sort_index()
```

[38]:
```
0.0      20
1.0     159
2.0      14
3.0      83
4.0      16
5.0      56
6.0      17
7.0      34
```

```
8.0       8
9.0      14
10.0      6
11.0     30
12.0      6
13.0      8
14.0      6
15.0      7
16.0      5
17.0      6
18.0      5
19.0      3
20.0     17
21.0      3
22.0      6
23.0      4
24.0      4
25.0      2
26.0      2
27.0      1
28.0      2
29.0      1
30.0      2
31.0      1
32.0      3
33.0      1
34.0      1
35.0      1
36.0      2
38.0      1
39.0      3
41.0      1
42.0      1
49.0      1
Name: institute_service_updated, dtype: int64
```

[39]:
```python
#Creating a function that maps each value to the career stage definition listed␣
 ↪in the markup above.
def mapvalue(val):
    if pd.isnull(val):
        return np.nan
    elif 3 <= val <= 6:
        return 'Experienced'
    elif 7 <= val <= 10:
        return 'Established'
    elif val >= 11:
        return 'Veteran'
```

```
    else:
        return 'New'

#Applying function to the 'institute_service' column.
combined_updated['service_cat'] = combined_updated['institute_service_updated'].
 ↪apply(mapvalue)
```

[40]:
```
#Check for unique values in the column 'service_cat'.
combined_updated['service_cat'].value_counts()
```

[40]:
```
New            193
Experienced    172
Veteran        136
Established     62
Name: service_cat, dtype: int64
```

10 Initializing our Analysis.

[41]:
```
#Confirming the number of True and False values in the 'dissatisfied' column.
combined_updated['dissatisfied'].value_counts(dropna=False)
```

[41]:
```
False    403
True     240
NaN        8
Name: dissatisfied, dtype: int64
```

[42]:
```
#Filling in the missing values with the True or False values that occurs more␣
 ↪frequently, which is False.
combined_updated['dissatisfied'] = combined_updated['dissatisfied'].
 ↪fillna(False)
```

[62]:
```
#Re-confirming the number of True and False values in the 'dissatisfied' column.
combined_updated['dissatisfied'].value_counts()
```

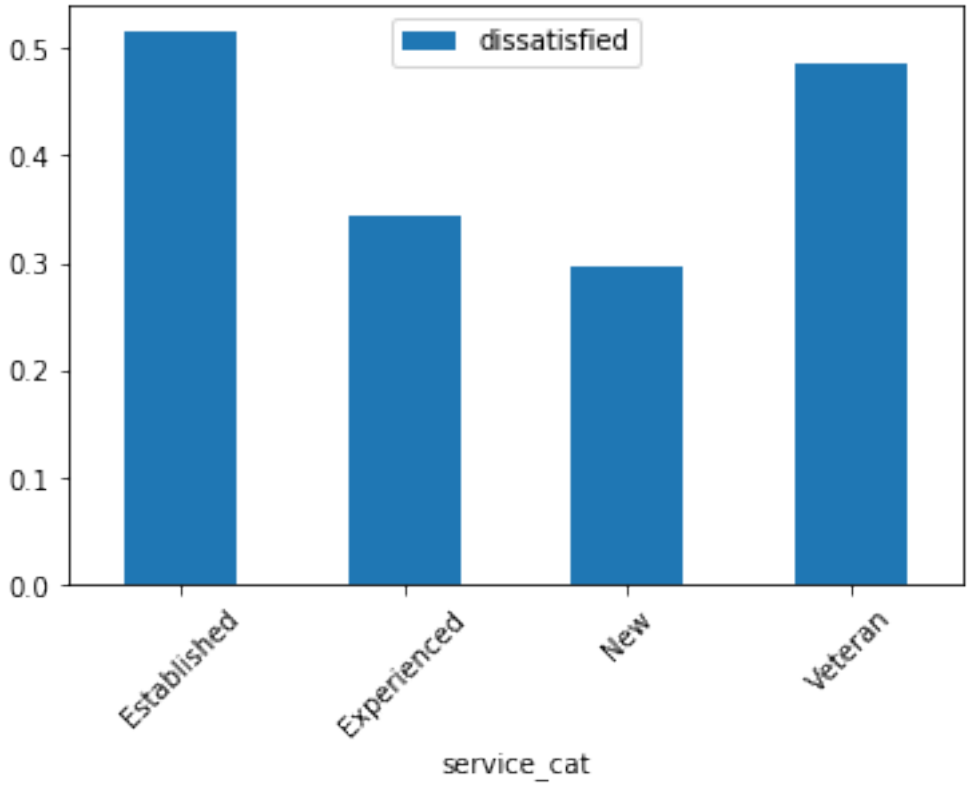
[62]:
```
False    411
True     240
Name: dissatisfied, dtype: int64
```

[63]:
```
diss_pct
```

[63]:
```
             dissatisfied
service_cat
Established      0.516129
Experienced      0.343023
New              0.295337
Veteran          0.485294
```

[49]:
```
diss_pct = combined_updated.pivot_table(index='service_cat',␣
↪values='dissatisfied')
%matplotlib inline
diss_pct.plot(kind='bar', rot=45)
```

[49]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x11f8ca5d0>
```



We've found that over 50% of Established employees of 7-10 years of service resigned because of a dissatisfaction alongside about 50% of Veteran employees with 11 years or more of service, about 35% of Experienced employees with 3-6 years of service, and a little under 30% of New employees with service of less than 3 years.

11 Cleaning the Age Column.

[50]:
```
combined_updated['age'].value_counts(dropna=False)
```

[50]:
```
51-55          71
NaN            55
41-45          48
41   45        45
46-50          42
```

```
36-40            41
46   50          39
26-30            35
21   25          33
31   35          32
26   30          32
36   40          32
56 or older      29
31-35            29
21-25            29
56-60            26
61 or older      23
20 or younger    10
Name: age, dtype: int64
```

Here we have to decide what to do with our data in the `age` column. - Do we drop all rows containing `NaN` values? Yes. - Do we fill the `NaN` values with an age? No. - How do we categorize the data? There is one way that comes to mind. First, there are some unique values that appear to be unique but are actually the same as some other unique values in the column. We need to use string methods to combine those values into one type of unique value, and then categorize them accordingly before we make our analyses.

[53]:
```
combined_updated = combined_updated.copy()
combined_updated['age'] = combined_updated['age'].astype('str').str.
 ↪extract(r'(\d+)')
combined_updated['age'] = combined_updated['age'].astype('float')
```

[57]:
```
combined_updated['age'].value_counts().sort_index()
```

[57]:
```
20.0    10
21.0    62
26.0    67
31.0    61
36.0    73
41.0    93
46.0    81
51.0    71
56.0    55
61.0    23
Name: age, dtype: int64
```

We seperated values in the`age` column into several different categories before making an analysis and a visual. We've decided to seperate them into the following categories: - Young Adults: Employees between the ages of 20 and 30 years old. - Middle Age: Employees between the ages of 31 and 50 years old. - Older Adults: Employees between the ages of 51 and 60 years old. - Elderly: Employees 61 years and older.

[60]:
```
#Function that categorizes the age column.
def map_age(age):
    if pd.isnull(age):
        return np.nan
    elif 20 <= age <= 30:
        return 'Young Adults'
    elif 31 <= age <= 50:
        return 'Middle Age'
    elif 51 <= age <= 60:
        return 'Older Adults'
    else:
        return 'Elderly'

combined_updated['age_cat'] = combined_updated['age'].apply(map_age)
```

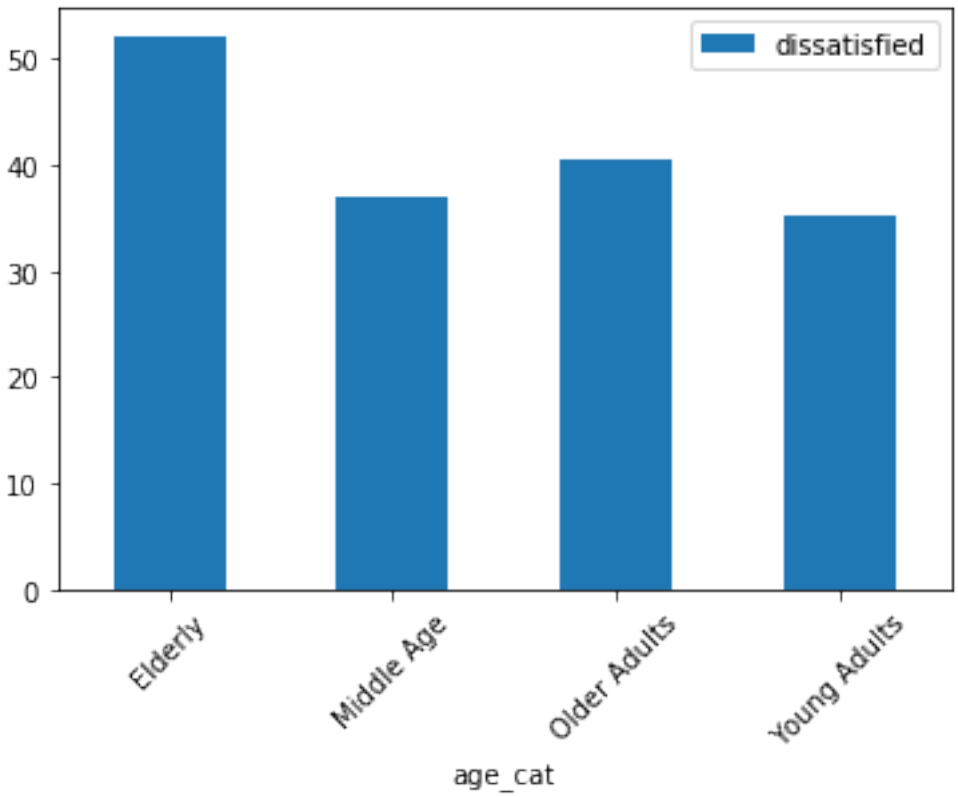
[70]:
```
age_diss_pct = combined_updated.pivot_table(index='age_cat',␣
↪values='dissatisfied')*100
age_diss_pct
```

[70]:

age_cat	dissatisfied
Elderly	52.173913
Middle Age	37.012987
Older Adults	40.476190
Young Adults	35.251799

[69]:
```
#Visual representation of the different age groups that were dissatisfied.
age_diss_pct = combined_updated.pivot_table(index='age_cat',␣
↪values='dissatisfied')*100
%matplotlib inline
age_diss_pct.plot(kind='bar', rot=45)
```

[69]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x122826650>
```



According to the visual above, over 50% of elderly employees ages 61 years or older were dissatisfied. Additionally, over 40% of older adults between the ages of 51-60 years old were dissatisfied, under 40% of Middle-Age adults between the ages of 31 and 50, and about 35% of Young Adults between the ages of 21 and 30 years old.

12 Checking to see which Survey had more resignations due to Dissatisfactions

Since we've already created a column in each survey dataframe that identifies which of the resigning employees belong to which survey before combining both dataframes into 1, we can use that column to identify which survey contains to most resigations that were the result of some dissatisfaction.

[66]:
```
#Displaying unique values in the 'institute' column in combined_updated.
combined_updated['institute'].value_counts(dropna=False)
```

[66]:
```
TAFE    340
DETE    311
Name: institute, dtype: int64
```

[71]:
```
```

```
#Creating a pivot table to see which survey has the most resignations resulting␣
 ↪from some dissatisfaction.
survey_diss_pct = combined_updated.pivot_table(index='institute',␣
 ↪values='dissatisfied')*100

#Displaying pivot table
survey_diss_pct
```

[71]:

institute	dissatisfied
DETE	47.909968
TAFE	26.764706

Approximately 47.9% of all resignations for dissatisfactions belonged to the `DETE` survey dataframe, approximately 26.8% to the `TAFE` survey dataframe, and the rest were resignations for other reason other than for dissatisfactions. We can clearly see that `DETE` has the most resignations for dissatisfactions out of the 2 surveys since it has the higher percentage of resignations.

[ ]: