Assessing Lecturer Competency in Hybrid Learning Environments Using Decision Support System Approach Based on Student Feedback Questionnaire

Mengevaluasi Kompetensi Dosen dalam Lingkungan Pembelajaran Hybrid Menggunakan Pendekatan Decision Support System Berdasarkan Kuesioner Umpan Balik Mahasiswa

Dataset Analysis

```
# import csv
import pandas as pd
import numpy as np
import pingouin as pg

# read xls file
df = pd.read_excel('quiz_20221.xlsx')
df
```

	dosen	ta	nim	kdmk	nmmk
0	Prof. Dr. Ir EDI NOERSASONGKO, M.Kom	20221	A11.2017.10120	AF201703	TECHNOPRE
1	Prof. Dr. Ir EDI NOERSASONGKO, M.Kom	20221	A11.2017.10350	AF201703	TECHNOPRE
2	Prof. Dr. Ir EDI NOERSASONGKO, M.Kom	20221	A11.2018.11309	AF201703	TECHNOPRE
3	Prof. Dr. Ir EDI NOERSASONGKO, M.Kom	20221	A11.2019.11618	AF201703	TECHNOPRE
4	Prof. Dr. Ir EDI NOERSASONGKO, M.Kom	20221	A11.2019.11622	AF201703	TECHNOPRE
...	...	...	...	...	...
20092	DIBYO ADI WIBOWO, S.Si., M.Si	20221	A11.2020.80018	A11.54508	STRATEGI A
20093	DIBYO ADI WIBOWO, S.Si., M.Si	20221	A11.2020.80018	A11.54812	METODE NU
20094	DEWI PERGIWATI, S.Kom., M.Kom	20221	A11.2018.11461	AF201704	DASAR DASA

	dosen	ta	nim	kdmk	nmmk
20095	DEWI PERGIWATI, S.Kom., M.Kom	20221	A11.2021.13607	AF201704	DASAR DASA
20096	AYU ASHARI, S.S.T, M.Kes	20221	A11.2020.13081	U201701	DASAR KEW

```
df2 = df.copy()
df2 = df2.drop(['ta','nmmk','saran'], axis=1)
df2
```

	dosen	nim	kdmk	q1	q2	q3	q4	q5
0	Prof. Dr. Ir EDI NOERSASONGKO, M.Kom	A11.2017.10120	AF201703	2	2	2	2	2
1	Prof. Dr. Ir EDI NOERSASONGKO, M.Kom	A11.2017.10350	AF201703	4	4	4	4	4
2	Prof. Dr. Ir EDI NOERSASONGKO, M.Kom	A11.2018.11309	AF201703	4	4	4	4	4
3	Prof. Dr. Ir EDI NOERSASONGKO, M.Kom	A11.2019.11618	AF201703	4	4	4	4	4
4	Prof. Dr. Ir EDI NOERSASONGKO, M.Kom	A11.2019.11622	AF201703	4	4	4	4	4
...	...	...	...	...	...	...	...	...
20092	DIBYO ADI WIBOWO, S.Si., M.Si	A11.2020.80018	A11.54508	4	3	3	4	4
20093	DIBYO ADI WIBOWO, S.Si., M.Si	A11.2020.80018	A11.54812	4	4	4	4	4
20094	DEWI PERGIWATI, S.Kom., M.Kom	A11.2018.11461	AF201704	4	4	4	4	4
20095	DEWI PERGIWATI, S.Kom., M.Kom	A11.2021.13607	AF201704	4	4	4	4	4
20096	AYU ASHARI, S.S.T, M.Kes	A11.2020.13081	U201701	3	3	3	4	3

Check Unique Classes Count

```
df3 = df.copy()
dosen = df3['dosen'].unique()
students = df3['nim'].unique()
classes = df3['kdmk'].unique()

print("unique classes", len(classes))
print("student count", len(students))
print("lecturer count", len(dosen))
```

```
unique classes 42
student count 3143
lecturer count 135
```

Check Overall Cronbach Alpha Based on Selected Aspect

The two aspects that we selected are as follows:
- Knowledge Mastery, how well the lecturer knows about the academic material. Covered by P1,P2,P3,P5,P10 - Teaching Skill, how well the lecturer transfers the knowledge to the students. Covered by P4,P6,P7,P8,P9

```
df_km = df3.copy()
df_km = df_km.drop(['q4','q5','q6','q7','q8','q9','dosen','ta','nim','kdmk','nmmk','saran'
df_km
```

	q1	q2	q3	q10
0	2	2	2	2
1	4	4	4	4
2	4	4	4	4
3	4	4	4	4
4	4	4	4	4
...	...	...	...	...
20092	4	3	3	4
20093	4	4	4	4
20094	4	4	4	4
20095	4	4	4	4
20096	3	3	3	3

```
pg.cronbach_alpha(data=df_km)
```

```
(0.9059330153141515, array([0.904, 0.908]))
```

```
df_ts = df3.copy()
df_ts = df_ts.drop(['q1','q2','q3','q5','q10','dosen','ta','nim','kdmk','nmmk','saran'],ax
df_ts
```

	q4	q6	q7	q8	q9
0	2	2	2	2	2
1	4	4	4	4	4
2	4	4	4	4	4
3	4	4	4	4	4
4	4	4	4	4	4

	q4	q6	q7	q8	q9
...	...	...	...	...	...
20092	4	4	4	4	4
20093	4	4	4	4	4
20094	4	4	4	4	4
20095	4	4	3	3	3
20096	4	3	3	3	3

```
pg.cronbach_alpha(data=df_ts)
```

```
(0.8954850845946283, array([0.893, 0.898]))
```

```
import itertools

df3.drop(['dosen','ta','nim','kdmk','nmmk','saran'], axis=1, inplace=True)

# Create an array of 10 numbers
numbers = ['q1', 'q2', 'q3', 'q4', 'q5', 'q6', 'q7', 'q8', 'q9', 'q10']

df_ca_test = pd.DataFrame(columns=['combination1', 'CA1score', 'combination2', 'CA2score',

# Get all possible permutations of the array
combinations = itertools.combinations(numbers,5)

# Loop through all permutations and print them
for combination1 in combinations:

    #copy original dataframe
    df_ca = df3.copy()

    #extract items from tuple
    combination1 = list(combination1)

    #eliminate combination list from numbers list
    combination2 = numbers.copy()
    for item in combination1:
        combination2.remove(item)

    # #drop columns
```

```
    df_ca1 = df_ca.drop(combination1, axis=1)
    df_ca2 = df_ca.drop(combination2, axis=1)

    #calculate cronbach alpha
    ca_score1 = pg.cronbach_alpha(data=df_ca1)
    ca_score2 = pg.cronbach_alpha(data=df_ca2)

    # round to 2 decimal places
    ca_score1 = round(ca_score1[0], 2)
    ca_score2 = round(ca_score2[0], 2)

    # calculate sum of ca_score
    total_ca = ca_score1 + ca_score2

    #add all data to dataframe
    df_ca_test.loc[len(df_ca_test)] = [combination1, ca_score1, combination2, ca_score2, t


df_ca_test
```

	combination1	CA1score	combination2	CA2score	totalCA
0	[q1, q2, q3, q4, q5]	0.92	[q6, q7, q8, q9, q10]	0.90	1.82
1	[q1, q2, q3, q4, q6]	0.93	[q5, q7, q8, q9, q10]	0.89	1.82
2	[q1, q2, q3, q4, q7]	0.92	[q5, q6, q8, q9, q10]	0.90	1.82
3	[q1, q2, q3, q4, q8]	0.92	[q5, q6, q7, q9, q10]	0.90	1.82
4	[q1, q2, q3, q4, q9]	0.91	[q5, q6, q7, q8, q10]	0.90	1.81
...	...	...	...	...	...
247	[q5, q6, q7, q8, q10]	0.90	[q1, q2, q3, q4, q9]	0.91	1.81
248	[q5, q6, q7, q9, q10]	0.90	[q1, q2, q3, q4, q8]	0.92	1.82
249	[q5, q6, q8, q9, q10]	0.90	[q1, q2, q3, q4, q7]	0.92	1.82
250	[q5, q7, q8, q9, q10]	0.89	[q1, q2, q3, q4, q6]	0.93	1.82
251	[q6, q7, q8, q9, q10]	0.90	[q1, q2, q3, q4, q5]	0.92	1.82

We obtained all the possible combinations of the two-split of 10 questions in our questionnaire. Result shows that there are only 3 variance of the total score (from 2 aspects), and the combinations we chose earlier has the highest total score of 1.82.

The cronbach alpha score for the two aspects of our questionnaire is 0.91 and 0.89. This means the equivalence of each construct in the questionnaire is very high.

```
result = pd.DataFrame(columns=['construct', 'CA score'])

# add some daata to result daataframe
result.loc[len(result)] = ['Knowledge Mastery', 0.91]
result.loc[len(result)] = ['Teaching Skill', 0.89]

result
```

	construct	CA score
0	Knowledge Mastery	0.91
1	Teaching Skill	0.89

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