

Statistical Analysis of the Cognitive Domain Taxonomy Table

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BIOSTAT 2017, Croatia, 8–10 June

Revised Bloom Taxonomy (Teacher's table)

Table : Taxonomy table of cognitive domain (Anderson and Krathwohl, 2001)

	Processes					
	Remembers	Understands	Applies	Analyzes	Evaluates	Creates
Knowledge						
A. Factual						
B. Conceptual		C1,C2			C4	
C. Procedural		C5	C1,C2		C1	
D. Metacognitive			C6	C3		

C1–C6 — teaching goals.

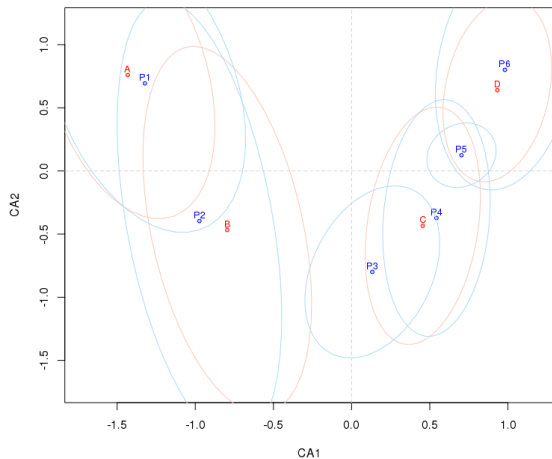
Revised Bloom Taxonomy (Students' table)

Table : Taxonomy table (TaxTable) — frequencies

Knowledge	Processes					
	Remembers	Understands	Applies	Analyzes	Evaluates	Creates
A. Factual	9	3				
B. Conceptual	3	11	3	1	1	
C. Procedural	1	1	8	10	8	2
D. Metacognitive				3	8	9

F_{ij} — Cell frequencies. The number of students which classify their knowledge in the certain cell (one to many).

CA (Greenacre, 1984)



χ^2 decomposition	
%	
D1	0.5981142
D2	0.8454247
D3	1.0000000

Figure : Biplot. Classical Correspondence analysis.

DCA (Hill and Gauch, 1980)

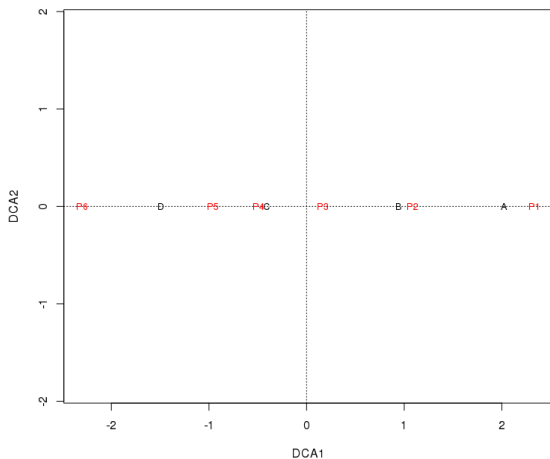


Figure : Biplot. Detrended Correspondence analysis.

Questions.

- 1 Knowledge¹ is **one-dimensional**.
- 2 We (teachers) are functioning quite well with 1-5 point scale.
- 3 Someone is terrorizing the school teachers with silly ideas?
- 4 This convention is just for fun?

¹and may be the other two domains too

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Lets go further.

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DCA (scales)

Table : Scales² for dimensions *knowledge* and *processes* in DCA.

knowledge					
A	B	C	D		
0	1.08	2.44	3.52		
processes					
P1	P2	P3	P4	P5	P6
0	1.25	2.17	2.83	3.30	4.64

The scales may be used to define distance of the (particular) cell from the top-left cell in the TaxTable (cell value).

²shifted

Distance matrix generated by DCA scales. Taxi matrix³.

Table : Cell values of the TaxTable

	P1	P2	P3	P4	P5	P6
	1	2	3	4	5	6
A	0	3	5	7	8	11
B	3	6	8	10	11	14
C	6	9	11	13	14	17
D	9	12	14	16	17	20

```
> make_score("B3", table=TaxTable)
> 8
> achievements <- c("A3", "A3", "B5", "C3", "D6")
> make_score(achievements, table=TaxTable)
> 52
```

³Maximal value is 20.

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THANK YOU

Bibliography

- Anderson, L. W. and Krathwohl, D. (2001). *A taxonomy for learning, teaching and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman, New York.
- Greenacre, M. (1984). *Theory and Applications of Correspondence Analysis*. Academic Press, London.
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