

## รายการอ้างอิง

### ภาษาไทย

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--- t-tests for paired samples ---

Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
CAL0				7.2895	1.521	.349
	19	.768	.000			
CAL3				5.0263	1.252	.287

Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
2.2632	.977	.224	10.10	18	.000
95% CI (1.792, 2.734)					

Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
CAL3				5.0263	1.252	.287
	19	.808	.000			
CAL6				5.2105	1.146	.263



## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
-1.1842	.749	.172	-1.07	18	.298
95% CI (-.545, .177)					

Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
CAL0				7.2895	1.521	.349
	19	.839	.000			
CAL6				5.2105	1.146	.263

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
2.0789	.838	.192	10.82	18	.000
95% CI (1.675, 2.483)					

--- t-tests for paired samples ---

Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
PD3				2.5526	.797	.183
	19	.366	.123			
PDO				5.6316	.831	.191

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
-3.0789	.917	.210	-14.64	18	.000
95% CI (-3.521, -2.637)					

## Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
PD3			2.5526	.797	.183	
	19	.698	.001			
PD6			2.8947	.809	.186	

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
-.3421	.625	.143	-2.39	18	.028
95% CI (-.643, -.041)					

## Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
PD6			2.8947	.809	.186	
	19	.435	.063			
PDO			5.6316	.831	.191	

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
-2.7368	.872	.200	-13.68	18	.000
95% CI (-3.157, -2.316)					

## --- t-tests for paired samples ---

Variable	Number of		Corr	Sig	Mean	SD	SE of Mean
	pairs	2-tail					
R3			2.4737		1.124	.258	
	19	.812	.000				
RO			1.6579		1.131	.259	

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
.8158	.691	.159	5.14	18	.000
95% CI (.482, 1.149)					

## Number of 2-tail

Variable	Number of		Corr	Sig	Mean	SD	SE of Mean
	pairs	2-tail					
R3			2.4737		1.124	.258	
	19	.931	.000				
R6			2.3158		1.044	.239	

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
.1579	.410	.094	1.68	18	.111
95% CI (-.040, .356)					

## Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
R6				2.3158	1.044	.239
	19	.826	.000			
RO				1.6579	1.131	.259

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
.6579	.647	.148	4.43	18	.000
95% CI (.346, .970)					

## ----- Wilcoxon Matched-Pairs Signed-Ranks Test

PI0  
with PI3

## Mean Rank Cases

2.00	3 - Ranks (PI3 LT PI0)
.00	0 + Ranks (PI3 GT PI0)
16	Ties (PI3 EQ PI0)
--	
19	Total

Z = -1.6036      2-Tailed P = .1088

----- Wilcoxon Matched-Pairs Signed-Ranks Test

PI0  
with PI6

Mean Rank    Cases

7.50	3 - Ranks (PI6 LT PI0)
6.17	9 + Ranks (PI6 GT PI0)
7	Ties (PI6 EQ PI0)
--	
19	Total

Z = -1.2944      2-Tailed P = .1955

----- Wilcoxon Matched-Pairs Signed-Ranks Test

SBI  
with SBI3

Mean Rank    Cases

3.50	5 - Ranks (SBI3 LT SBI)
3.50	1 + Ranks (SBI3 GT SBI)
13	Ties (SBI3 EQ SBI)
--	
19	Total

Z = -1.4676      2-Tailed P = .1422

## ----- Wilcoxon Matched-Pairs Signed-Ranks Test

SBI

with SBI6

Mean Rank	Cases
2.50	4 - Ranks (SBI6 LT SBI)
.00	0 + Ranks (SBI6 GT SBI)
	15 Ties (SBI6 EQ SBI)
--	
	19 Total
Z = -1.8257	2-Tailed P = .0679

## --- Wilcoxon Matched-Pairs Signed-Ranks Test

PI3

with PI6

Mean Rank	Cases
.00	0 - Ranks (PI6 LT PI3)
5.00	9 + Ranks (PI6 GT PI3)
	10 Ties (PI6 EQ PI3)
--	
	19 Total
Z = -2.6656	2-Tailed P = .0077

## ----- Wilcoxon Matched-Pairs Signed-Ranks Test

SBI3

with SBI6

Mean Rank	Cases
3.50	3 - Ranks (SBI6 LT SBI3)
3.50	3 + Ranks (SBI6 GT SBI3)
	13 Ties (SBI6 EQ SBI3)

19 Total  
 Z = .0000 2-Tailed P = 1.0000

--- t-tests for paired samples ---

Variable	Number of pairs	Corr	Sig	Mean	SD	SE of Mean
CAL0	32	.593	.000	7.1875	1.312	.232
CAL3				5.4063	1.434	.253

Paired Differences						
Mean	SD	SE of Mean	t-value	df	2-tail Sig	
1.7813	1.244	.220	8.10	31	.000	
95% CI (1.333, 2.230)						

Variable	Number of pairs	Corr	Sig	Mean	SD	SE of Mean
CAL3	32	.720	.000	5.4063	1.434	.253
CAL6				5.5156	1.495	.264

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
-.1094	1.098	.194	-.56	31	.577
95% CI (-.505, .287)					

## Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
CAL0				7.1875	1.312	.232
	32	.656	.000			
CAL6				5.5156	1.495	.264

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
1.6719	1.175	.208	8.05	31	.000
95% CI (1.248, 2.096)					

--- t-tests for paired samples ---

## Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
PD3				2.5781	.976	.173
	32	.495	.004			
PDO				5.5156	.798	.141



## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
-2.9375	.905	.160	-18.37	31	.000
95% CI (-3.264, -2.611)					

## Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
PD3				2.5781	.976	.173
	32	.459	.008			
PD6				2.7656	.889	.157

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
-.1875	.973	.172	-1.09	31	.284
95% CI (-.539, .164)					

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## Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
PD6				2.7656	.889	.157
	32	.358	.044			
PDO				5.5156	.798	.141

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
-2.7500	.959	.169	-16.22	31	.000
95% CI (-3.096, -2.404)					

--- t-tests for paired samples ---

Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
R3			2.8281	1.440	.255	
	32	.705	.000			
RO			1.6719	1.119	.198	

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
1.1563	1.027	.182	6.37	31	.000
95% CI (.786, 1.527)					

Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
R3			2.8281	1.440	.255	
	32	.843	.000			
R6			2.7500	1.212	.214	

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
.0781	.774	.137	.57	31	.572
95% CI (-.201, .357)					

## Number of 2-tail

Variable	pairs	Corr	Sig	Mean	SD	SE of Mean
R6			2.7500	1.212	.214	
	32	.663	.000			
RO			1.6719	1.119	.198	

## Paired Differences |

Mean	SD	SE of Mean	t-value	df	2-tail Sig
1.0781	.960	.170	6.35	31	.000
95% CI (.732, 1.424)					

----- Wilcoxon Matched-Pairs Signed-Ranks Test

PI0  
with PI3

## Mean Rank Cases

.00	0 - Ranks (PI3 LT PI0)
5.00	9 + Ranks (PI3 GT PI0)
23	Ties (PI3 EQ PI0)
--	
32	Total

Z = -2.6656      2-Tailed P = .0077

----- Wilcoxon Matched-Pairs Signed-Ranks Test

PI0

with PI6

Mean Rank	Cases
.00	0 - Ranks (PI6 LT PI0)
11.50	22 + Ranks (PI6 GT PI0)
	10 Ties (PI6 EQ PI0)
--	
	32 Total

Z = -4.1069      2-Tailed P = .0000

----- Wilcoxon Matched-Pairs Signed-Ranks Test

SBI

with SBI3

Mean Rank	Cases
7.00	12 - Ranks (SBI3 LT SBI)
7.00	1 + Ranks (SBI3 GT SBI)
	19 Ties (SBI3 EQ SBI)
--	
	32 Total

Z = -2.6906      2-Tailed P = .0071

## ----- Wilcoxon Matched-Pairs Signed-Ranks Test

SBI

with SBI6

Mean Rank Cases

1.50 2 - Ranks (SBI6 LT SBI)

.00 0 + Ranks (SBI6 GT SBI)

30 Ties (SBI6 EQ SBI)

--

32 Total

Z = -1.3416 2-Tailed P = .1797

## ----- Wilcoxon Matched-Pairs Signed-Ranks Test

PI3

with PI6

Mean Rank Cases

12.50 5 - Ranks (PI6 LT PI3)

12.50 19 + Ranks (PI6 GT PI3)

8 Ties (PI6 EQ PI3)

--

32 Total

Z = -2.5000 2-Tailed P = .0124

## ----- Wilcoxon Matched-Pairs Signed-Ranks Test

SBI3

with SBI6

Mean Rank Cases

8.00 3 - Ranks (SBI6 LT SBI3)

8.00 12 + Ranks (SBI6 GT SBI3)

17 Ties (SBI6 EQ SBI3)

--

32 Total

Z = -2.0447      2-Tailed P = .0409

t-tests for independent samples of TREAT

Variable	Number of Cases	Mean	SD	SE of Mean
CAL0				
TREAT 1	19	7.2895	1.521	.349
TREAT 2	32	7.1875	1.312	.232

Mean Difference = .1020

Levene's Test for Equality of Variances: F = .295 P = .589

t-test for Equality of Means      95%

Variances	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal	.25	49	.801	.403	(-.709, .913)
Unequal	.24	33.61	.809	.419	(-.750, .954)

Variable	Number of Cases	Mean	SD	SE of Mean
CAL3				
TREAT 1	19	5.0263	1.252	.287
TREAT 2	32	5.4063	1.434	.253

Mean Difference = -.3799

Levene's Test for Equality of Variances:  $F = .930$   $P = .340$

t-test for Equality of Means 95%

Variances	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal	-.96	49	.343	.397	(-1.177, .418)
Unequal	-.99	42.10	.327	.383	(-1.153, .393)

t-tests for independent samples of TREAT

Variable	Number of Cases	Mean	SD	SE of Mean
CAL6				
TREAT 1	19	5.2105	1.146	.263
TREAT 2	32	5.5156	1.495	.264

Mean Difference = -.3051

Levene's Test for Equality of Variances: F= .551 P= .462

t-test for Equality of Means		95%			
Variances	t-value	df	2-Tail Sig.	SE of Diff	CI for Diff
Equal	-.77	49	.448	.399	(-1.107, .496)
Unequal	-.82	45.66	.417	.373	(-1.056, .445)

Variable	Number		Mean	SD	SE of Mean
	of Cases				
CAL0_3					
TREAT 1	19		2.2632	.977	.224
TREAT 2	32		1.7813	1.244	.220

Mean Difference = .4819

Levene's Test for Equality of Variances: F= 1.865 P= .178

t-test for Equality of Means		95%			
Variances	t-value	df	2-Tail Sig.	SE of Diff	CI for Diff
Equal	1.44	49	.155	.334	(-.189, 1.153)
Unequal	1.53	45.08	.132	.314	(-.151, 1.115)



## t-tests for independent samples of TREAT

Variable	Number of Cases	Mean	SD	SE of Mean
CAL0_6				
TREAT 1	19	2.0789	.838	.192
TREAT 2	32	1.6719	1.175	.208

Mean Difference = .4071

Levene's Test for Equality of Variances: F= 2.345 P= .132

t-test for Equality of Means		95%			
Variances	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal	1.32	49	.192	.308	(-.212, 1.026)
Unequal	1.44	47.21	.157	.283	(-.162, .977)

Variable	Number of Cases	Mean	SD	SE of Mean
CAL3_6				
TREAT 1	19	-.1842	.749	.172
TREAT 2	32	-.1094	1.098	.194

Mean Difference = -.0748

Levene's Test for Equality of Variances:  $F = 2.199$   $P = .145$

t-test for Equality of Means		95%			
Variances	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal	-.26	49	.794	.285	(-.648, .498)
Unequal	-.29	47.92	.774	.259	(-.596, .447)

t-tests for independent samples of TREAT

Variable	Number		Mean	SD	SE of Mean
	of Cases				
PDO					
TREAT 1	19		5.6316	.831	.191
TREAT 2	32		5.5156	.798	.141

Mean Difference = .1160

Levene's Test for Equality of Variances:  $F = .237$   $P = .629$

t-test for Equality of Means 95%

Variances t-value df 2-Tail Sig SE of Diff CI for Diff

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Equal	.49	49	.623	.235	(-.356, .588)
Unequal	.49	36.73	.628	.237	(-.365, .596)

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Variable	Number		Mean	SD	SE of Mean
	of Cases				
PD3					
TREAT 1	19		2.5526	.797	.183
TREAT 2	32		2.5781	.976	.173

Mean Difference = -.0255

Levene's Test for Equality of Variances: F= .602 P= .441

t-test for Equality of Means 95%

Variances t-value df 2-Tail Sig SE of Diff CI for Diff

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Equal	-.10	49	.924	.265	(-.558, .507)
Unequal	-.10	44.04	.920	.252	(-.533, .482)

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t-tests for independent samples of TREAT

Variable	Number of Cases	Mean	SD	SE of Mean
PD6				
TREAT 1	19	2.8947	.809	.186
TREAT 2	32	2.7656	.889	.157

Mean Difference = .1291

Levene's Test for Equality of Variances: F = .388 P = .536

t-test for Equality of Means. 95%

Variances	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal	.52	49	.607	.249	(-.372, .630)
Unequal	.53	40.85	.598	.243	(-.362, .620)

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Variable	Number of Cases	Mean	SD	SE of Mean
PD0_3				
TREAT 1	19	3.0789	.917	.210
TREAT 2	32	2.9375	.905	.160

Mean Difference = .1414

Levene's Test for Equality of Variances: F= .009 P= .925

t-test for Equality of Means 95%

Variances	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal	.54	49	.594	.263	(-.388, .671)
Unequal	.54	37.54	.596	.264	(-.394, .677)

t-tests for independent samples of TREAT

Variable	Number of Cases	Mean	SD	SE of Mean
PD0_6				
TREAT 1	19	2.7368	.872	.200
TREAT 2	32	2.7500	.959	.169

Mean Difference = -.0132

Levene's Test for Equality of Variances: F= .018 P= .893

t-test for Equality of Means 95%

	Variates	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal		-.05	49	.961	.269	(-.553, .527)
Unequal		-.05	40.89	.960	.262	(-.543, .516)

Variable	Number		Mean	SD	SE of Mean
	of Cases				
PD3_6					
TREAT 1	19		-.3421	.625	.143
TREAT 2	32		-.1875	.973	.172

Mean Difference = -.1546

Levene's Test for Equality of Variances: F= 2.503 P= .120

t-test for Equality of Means 95%

	Variates	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal		-.62	49	.539	.250	(-.656, .347)
Unequal		-.69	48.63	.493	.224	(-.605, .296)

## t-tests for independent samples of TREAT

Variable	Number		Mean	SD	SE of Mean
	of Cases				
RO					
TREAT 1	19		1.6579	1.131	.259
TREAT 2	32		1.6719	1.119	.198

Mean Difference = -.0140

Levene's Test for Equality of Variances: F= .213 P= .647

t-test for Equality of Means 95%

	Variates	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal		-.04	49	.966	.325	(-.668, .640)
Unequal		-.04	37.62	.966	.326	(-.675, .647)

Variable	Number		Mean	SD	SE of Mean
	of Cases				
R3					
TREAT 1	19		2.4737	1.124	.258
TREAT 2	32		2.8281	1.440	.255

Mean Difference = -.3544

Levene's Test for Equality of Variances:  $F = .898$   $P = .348$

t-test for Equality of Means 95%

Variances	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal	-.92	49	.363	.386	(-1.130, .421)
Unequal	-.98	45.24	.333	.362	(-1.084, .376)

t-tests for independent samples of TREAT

Variable	Number		Mean	SD	SE of Mean
	of Cases				
R6					
TREAT 1	19		2.3158	1.044	.239
TREAT 2	32		2.7500	1.212	.214

Mean Difference = -.4342

Levene's Test for Equality of Variances:  $F = .289$   $P = .593$

t-test for Equality of Means 95%



	Variances	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal	-1.30	49	.199	.334	(-1.105, .237)	
Unequal	-1.35	42.52	.184	.321	(-1.082, .214)	

Variable	Number of Cases	Mean	SD	SE of Mean
R0_3				
TREAT 1	19	-.8158	.691	.159
TREAT 2	32	-1.1563	1.027	.182

Mean Difference = .3405

Levene's Test for Equality of Variances:  $F = 1.880$   $P = .177$

t-test for Equality of Means 95%

	Variances	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal	1.28	49	.207	.266	(-.194, .875)	
Unequal	1.41	48.11	.164	.241	(-.144, .825)	

## t-tests for independent samples of TREAT

Variable	Number of Cases	Mean	SD	SE of Mean
R0_6				
TREAT 1	19	-.6579	.647	.148
TREAT 2	32	-1.0781	.960	.170

Mean Difference = .4202

Levene's Test for Equality of Variances: F= 1.321 P= .256

t-test for Equality of Means 95%

Variances	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal	1.69	49	.097	.249	(-.079, .920)
Unequal	1.86	48.10	.068	.225	(-.033, .873)

Variable	Number of Cases	Mean	SD	SE of Mean
R3_6				
TREAT 1	19	.1579	.410	.094
TREAT 2	32	.0781	.774	.137

Mean Difference = .0798

Levene's Test for Equality of Variances:  $F = 3.333$   $P = .074$

t-test for Equality of Means 95%

Variances	t-value	df	2-Tail Sig	SE of Diff	CI for Diff
Equal	.42	49	.680	.192	(-.307, .466)
Unequal	.48	48.55	.633	.166	(-.254, .413)

--- Mann-Whitney U - Wilcoxon Rank Sum W Test

PI0

by TREAT

Mean Rank Cases

28.53 19 TREAT = 1

24.50 32 TREAT = 2

--

51 Total

Corrected for ties

U	W	Z	2-Tailed P
256.0	542.0	-2.2932	.0218

----- Mann-Whitney U - Wilcoxon Rank Sum W Test

PI3

by TREAT

Mean Rank Cases

21.50 19 TREAT = 1

28.67 32 TREAT = 2

--

51 Total

Corrected for ties			
U	W	Z	2-Tailed P
218.5	408.5	-2.5222	.0117

----- Mann-Whitney U - Wilcoxon Rank Sum W Test

PI6  
by TREAT

Mean Rank	Cases
22.92	19 TREAT = 1
27.83	32 TREAT = 2
--	
51	Total

Corrected for ties			
U	W	Z	2-Tailed P
245.5	435.5	-1.3107	.1899

----- Mann-Whitney U - Wilcoxon Rank Sum W Test

SBI  
by TREAT

Mean Rank	Cases
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26.00	19 TREAT = 1
26.00	32 TREAT = 2
--	
51	Total

Corrected for ties			
U	W	Z	2-Tailed P
304.0	494.0	.0000	1.0000

----- Mann-Whitney U - Wilcoxon Rank Sum W Test

SBI3

by TREAT

Mean Rank Cases

27.95 19 TREAT = 1

24.84 32 TREAT = 2

--

51 Total

Corrected for ties			
U	W	Z	2-Tailed P
267.0	531.0	-.8518	.3943

----- Mann-Whitney U - Wilcoxon Rank Sum W Test

SBI6

by TREAT

Mean Rank Cases

23.63 19 TREAT = 1

27.41 32 TREAT = 2

--

51 Total

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Corrected for ties			
U	W	Z	2-Tailed P
259.0	449.0	-1.5707	.1163

--- Mann-Whitney U - Wilcoxon Rank Sum W Test

BONE6  
by TREAT

Mean Rank Cases

16.70 15 TREAT = 1  
19.79 21 TREAT = 2

--

36 Total

U	W	Exact	Corrected for ties	
		2-Tailed P	Z	2-Tailed P
130.5	250.5	.3910	-.9487	.3428

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### ประวัติผู้เขียน

นางสาวชนกพรหม ตุกนธ์พันธุ์ เกิดวันที่ 14 พฤษภาคม พ.ศ.2510 ที่จังหวัด กรุงเทพมหานคร สำเร็จการศึกษาปริญญาตรี ทัศนศึกษาบัณฑิต จากคณะทัศนศึกษา จุฬาลงกรณ์มหาวิทยาลัย ในปีการศึกษา 2535 หลังจากจบการศึกษา ได้เข้ารับราชการที่โรงพยาบาล เขมราฐ จังหวัด อุบลราชธานี ในปีพ.ศ.2535-2536 และย้ายมารับราชการต่อที่โรงพยาบาลบางละมุง จังหวัด ชลบุรี ในปีพ.ศ. 2536-2537 ได้เข้าศึกษาต่อในหลักสูตร วิทยาศาสตร์มหาบัณฑิต สาขา ทัศนศึกษา ที่จุฬาลงกรณ์มหาวิทยาลัย เมื่อพ.ศ.2537



สถาบันวิทยบริการ  
จุฬาลงกรณ์มหาวิทยาลัย