Factors explaining instructor integration of student mobile technology use at an institution of higher education--

A mLearning student perspective

Factors explaining instructor integration of student **mobile technology** use at an institution of higher education:

A mLearning student perspective

TEAM

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Stephen SIVO

Francisco GARCIA

BACKGROUND

Prior Study

To what degree is perceived academic success achieved through the adopted course management system or CMS (variable named, SVC) predicted by university support of CMS (USC), instructor communication through CMS (ICC), instructor use of CMS (IUC) and student affinity for technology (AFF)?

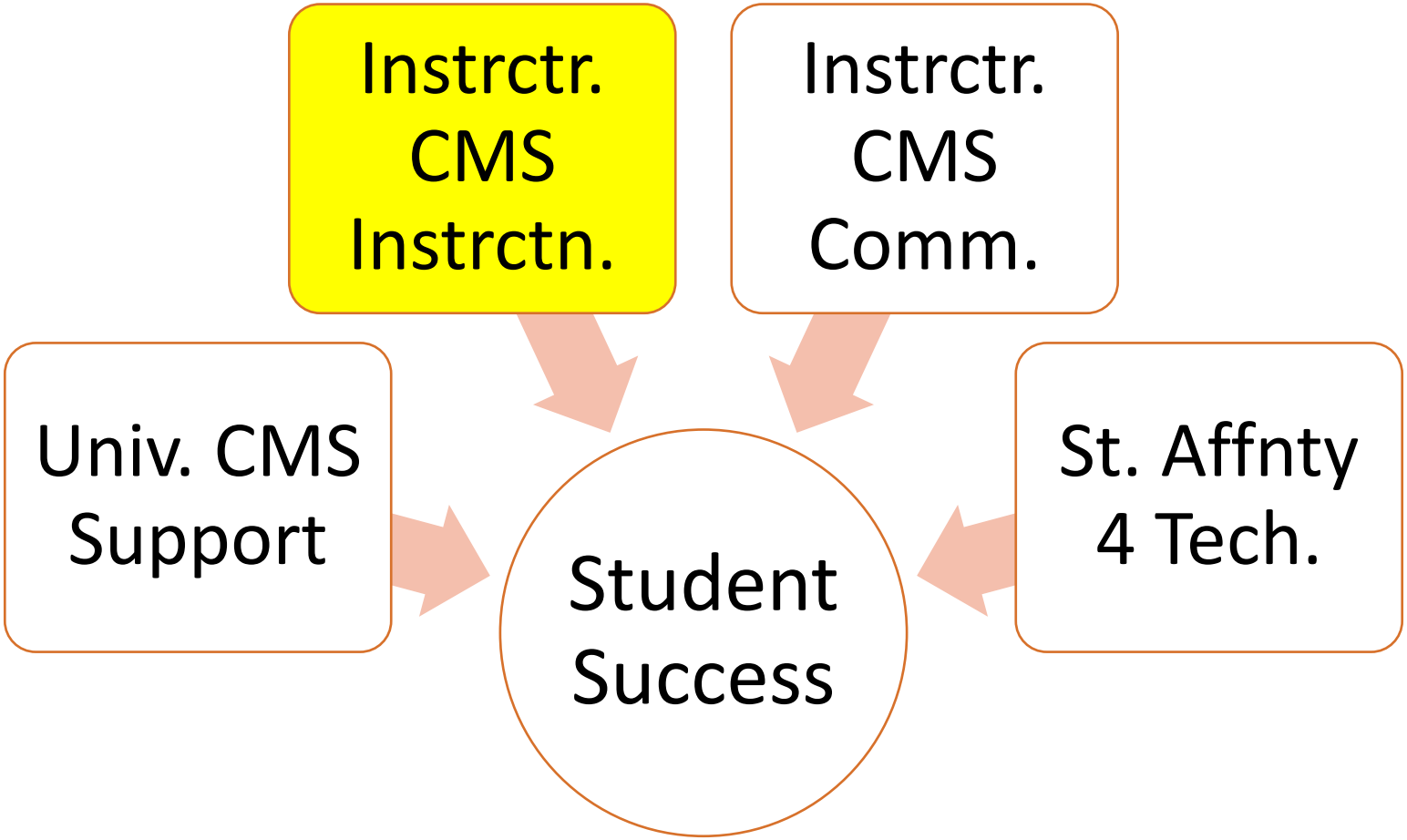
$SVC_i = \alpha + \beta_1 * USC_i + \beta_2 * ICC_i + \beta_3 * IUC_i + \beta_4 * AFF_i + \sigma_I$

$SVC = .07 * USC + .06 * ICC + .17 * IUC + .02 * AFF + 2.45$

$R^2 = .21$, adjusted $R^2 = .20$, $F(4, 1683) = 108.96$, $p < .01$

Pan, C, Sivo, S., & Goldsmith, C. (in press). *TechTrends.*

Predictors	Correlation between each predictor and SVC	Correlation between each predictor and SVC controlling for all other predictors
University support of CMS (USC)	.204**	.130**
Instructor communication through CMS (ICC)	.274**	.105**
Instructor use of CMS (IUC)	.367**	.241**
Student affinity for technology (AFF)	.311**	.200**
** p < .01		



Pan, C, Sivo, S., & Goldsmith, C. (in press). *TechTrends.*

Mobile Device Ownership

Pearson Student Mobile Device Survey 2015
National Report: College Students

Support & Training

Baiyun Chen, Ryan Seilhamer, Luke Bennett, and Sue Bauer.
Educause Review Online, 2015

Usability

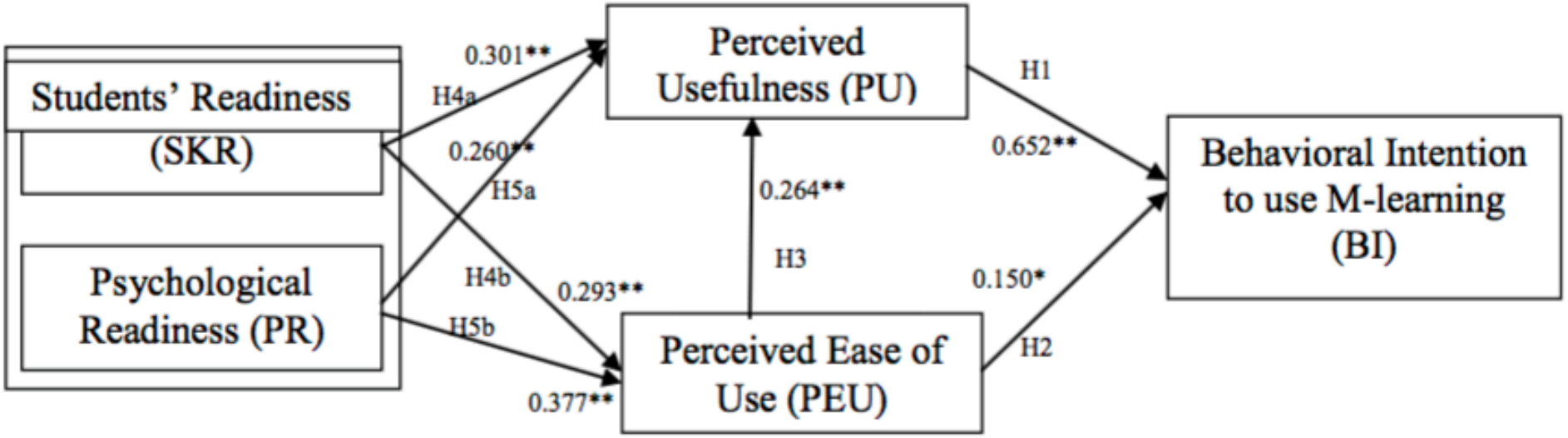


Figure 2. Results of structural modeling analysis (**significant at 0.001 level; *significant at .05 level)

Shakeel Iqbal, Zeeshan Ahmed Bhatti, 2015, IRRODL, 16(4)

Goal

“Which learner group(s) will require more attention of the university administration in optimizing limited resources and creating efficient incentives resulting into a social outcome that is efficient and makes all concerned parties better off?

Questions

1. To what degree do eLearning students' USC, IUC, ICC, and AFF contribute to the most plausible learner profile?

2. What does the sought learner profile mean in the context of IIT?

METHOD

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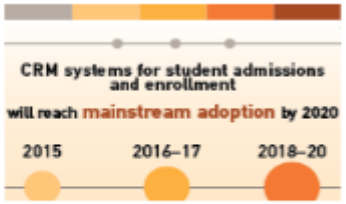

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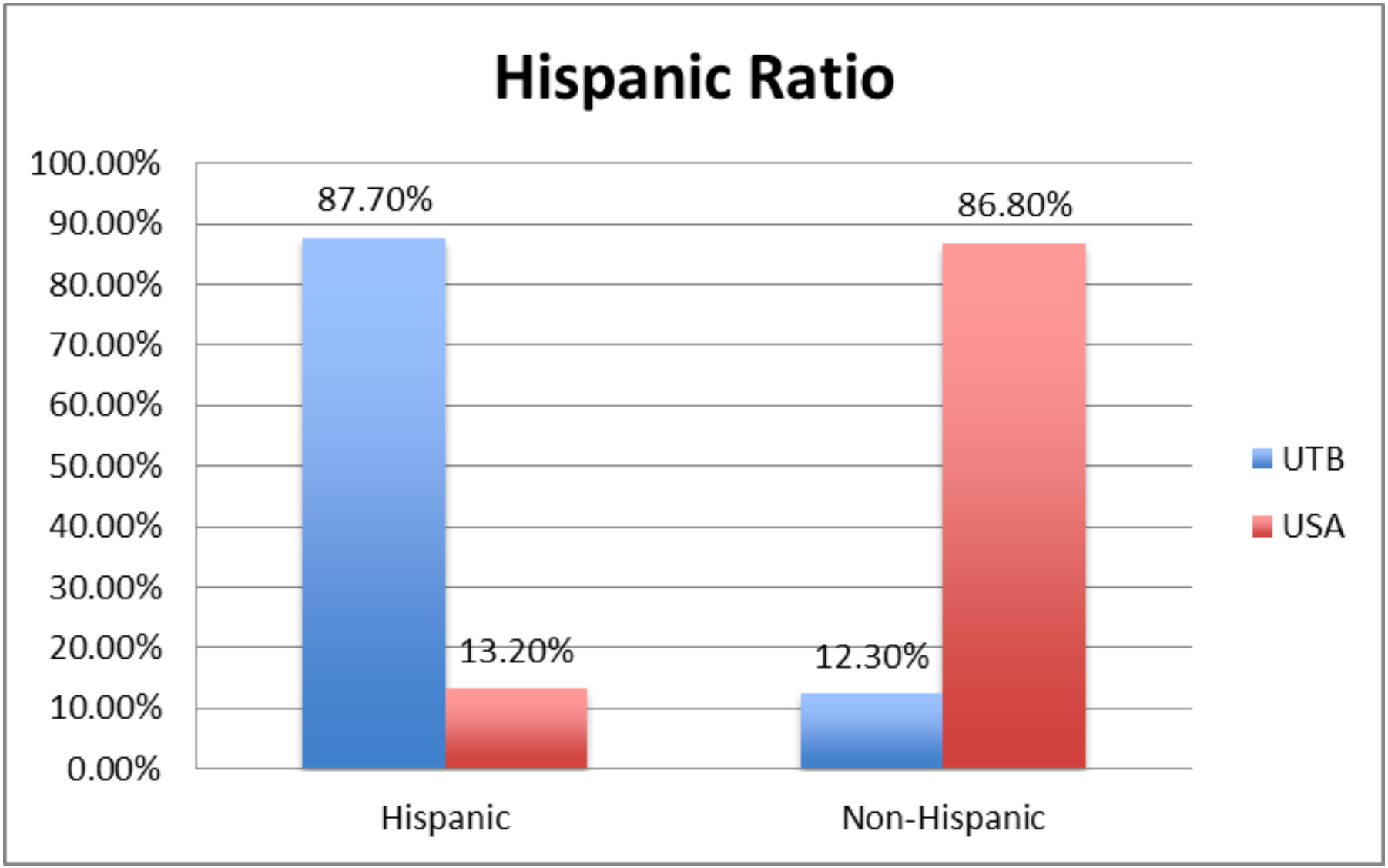
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90.00%
80.00%
70.00%
60.00%
50.00%
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20.00%
10.00%
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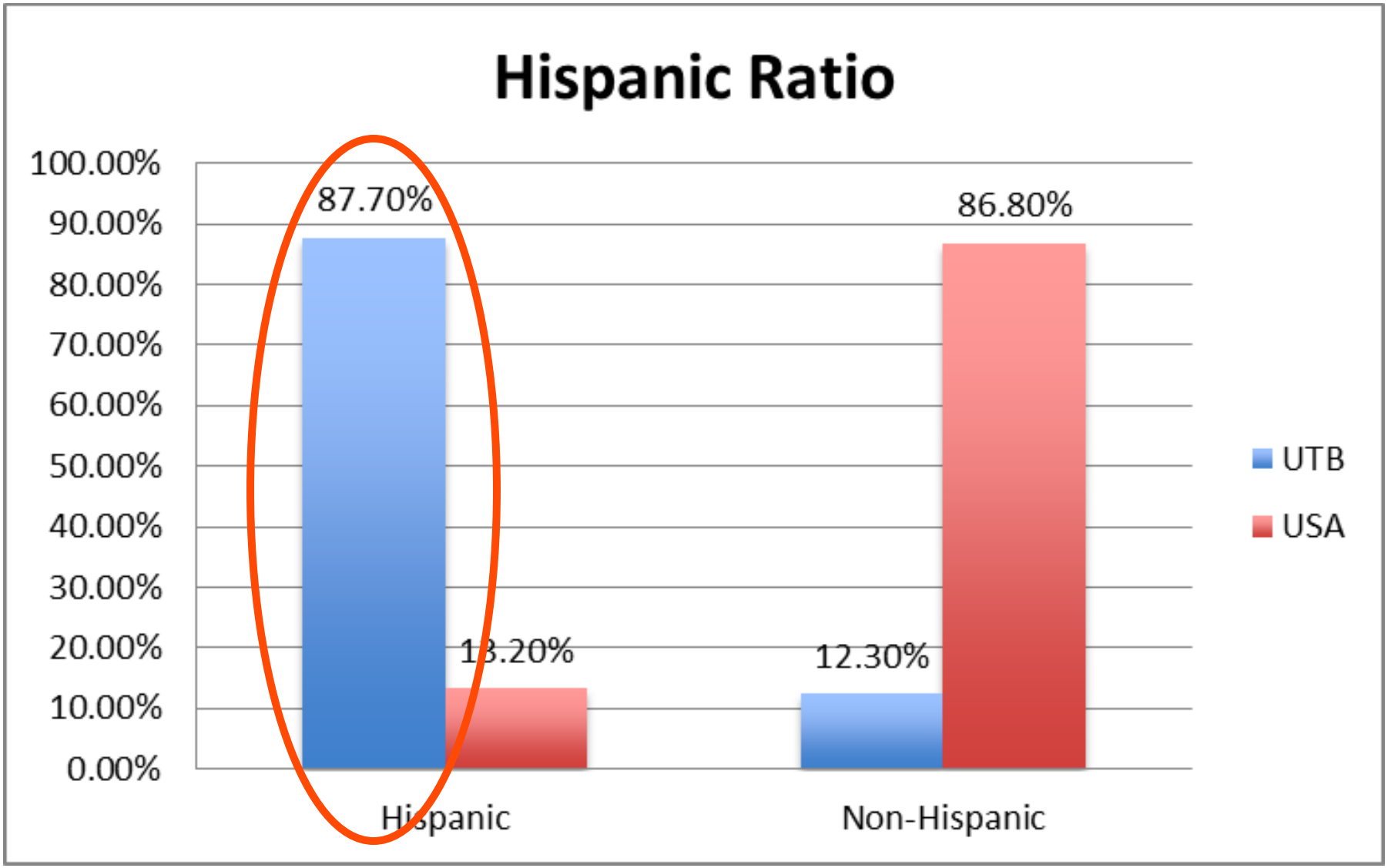
12.30%
86.80%
Hispanic
Non-Hispanic
UTB
USA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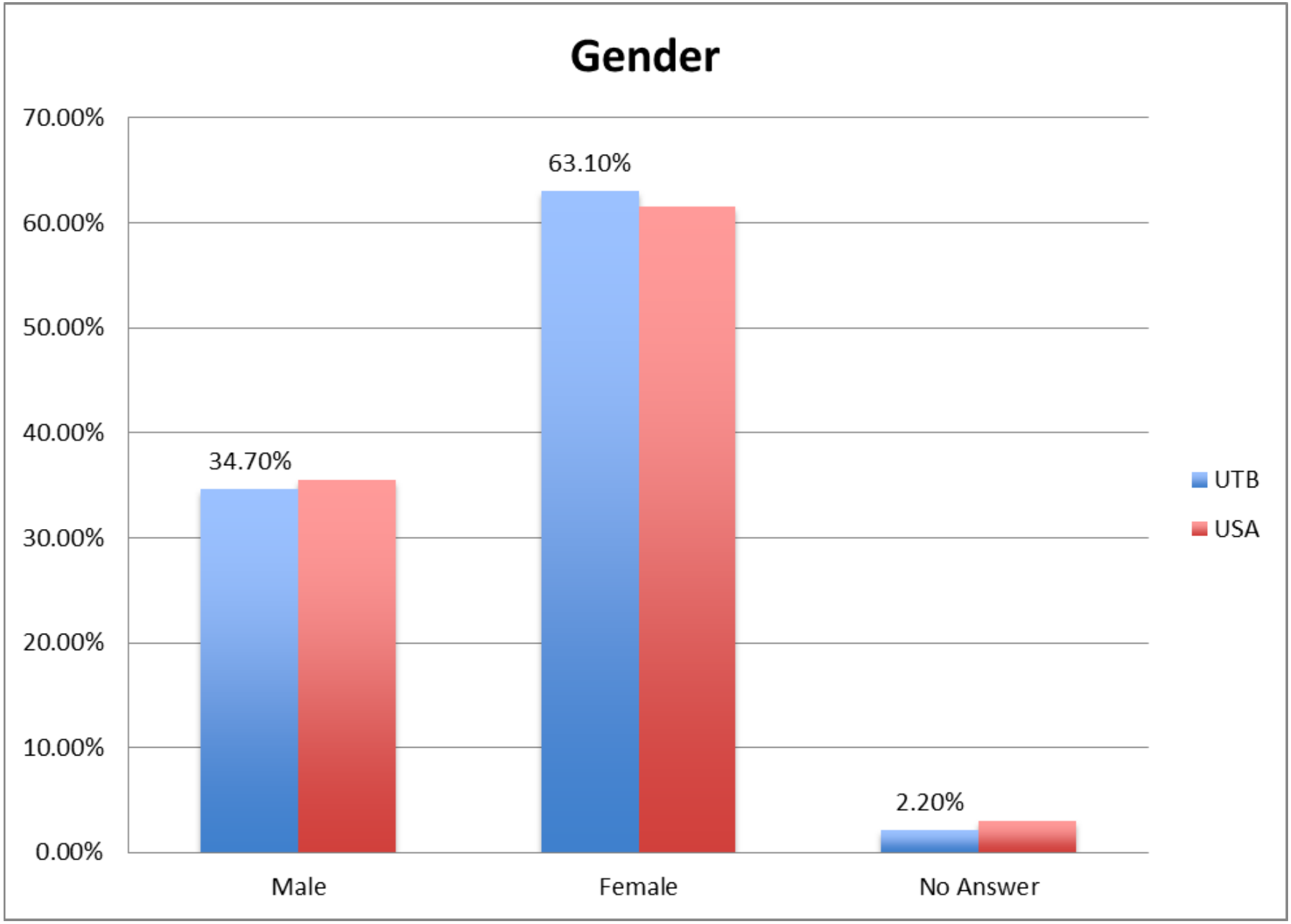
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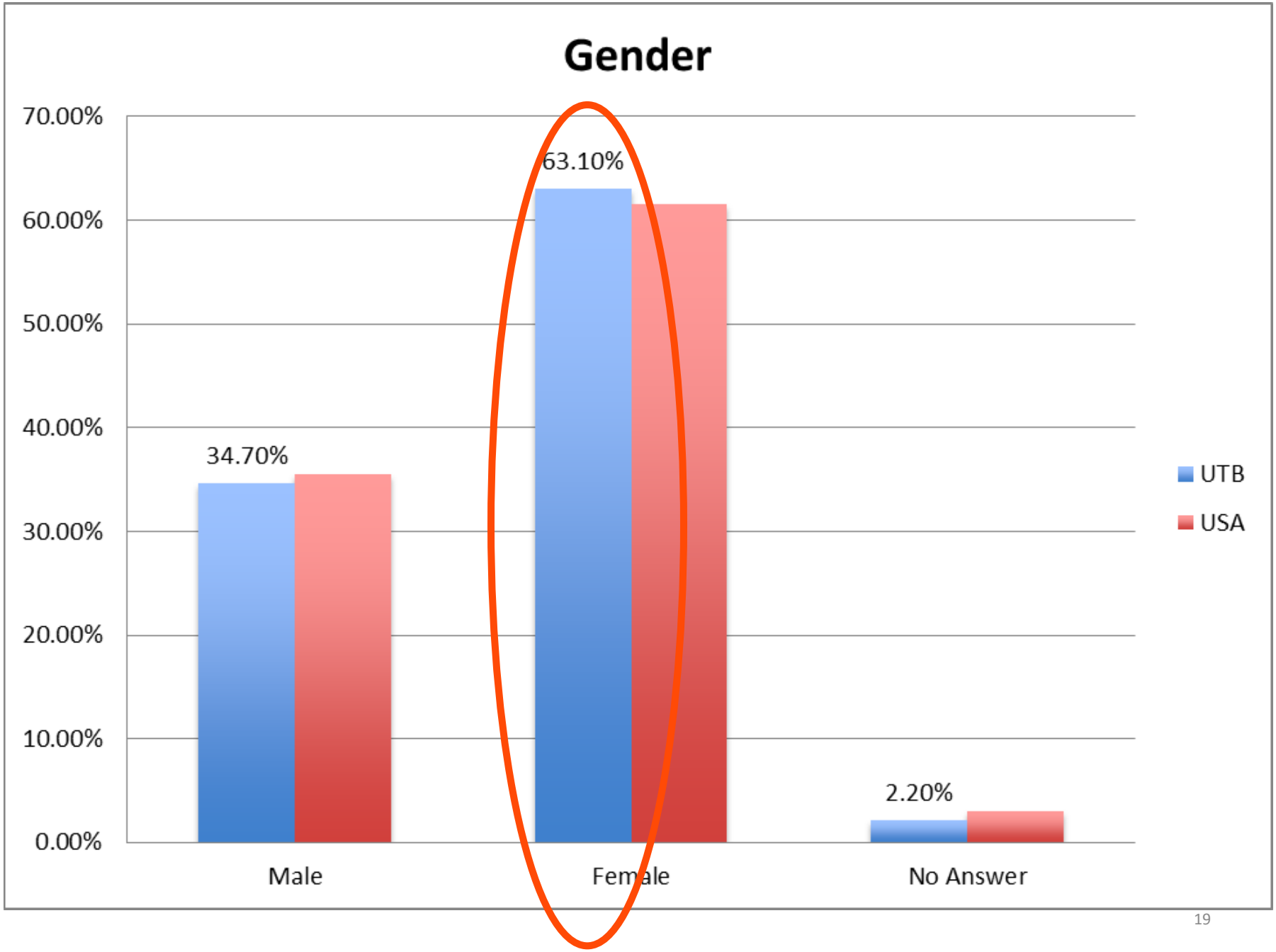
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Female
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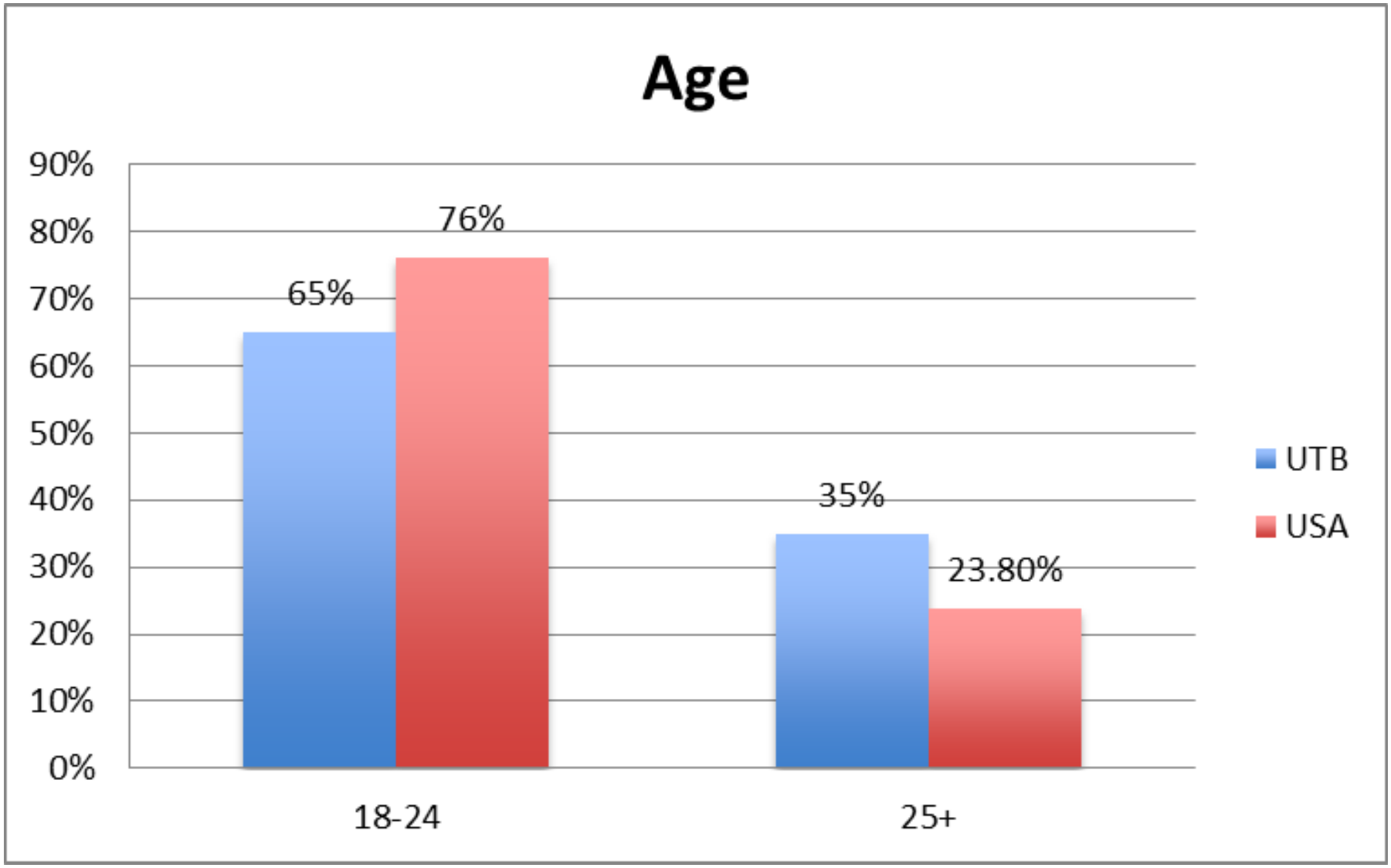
USA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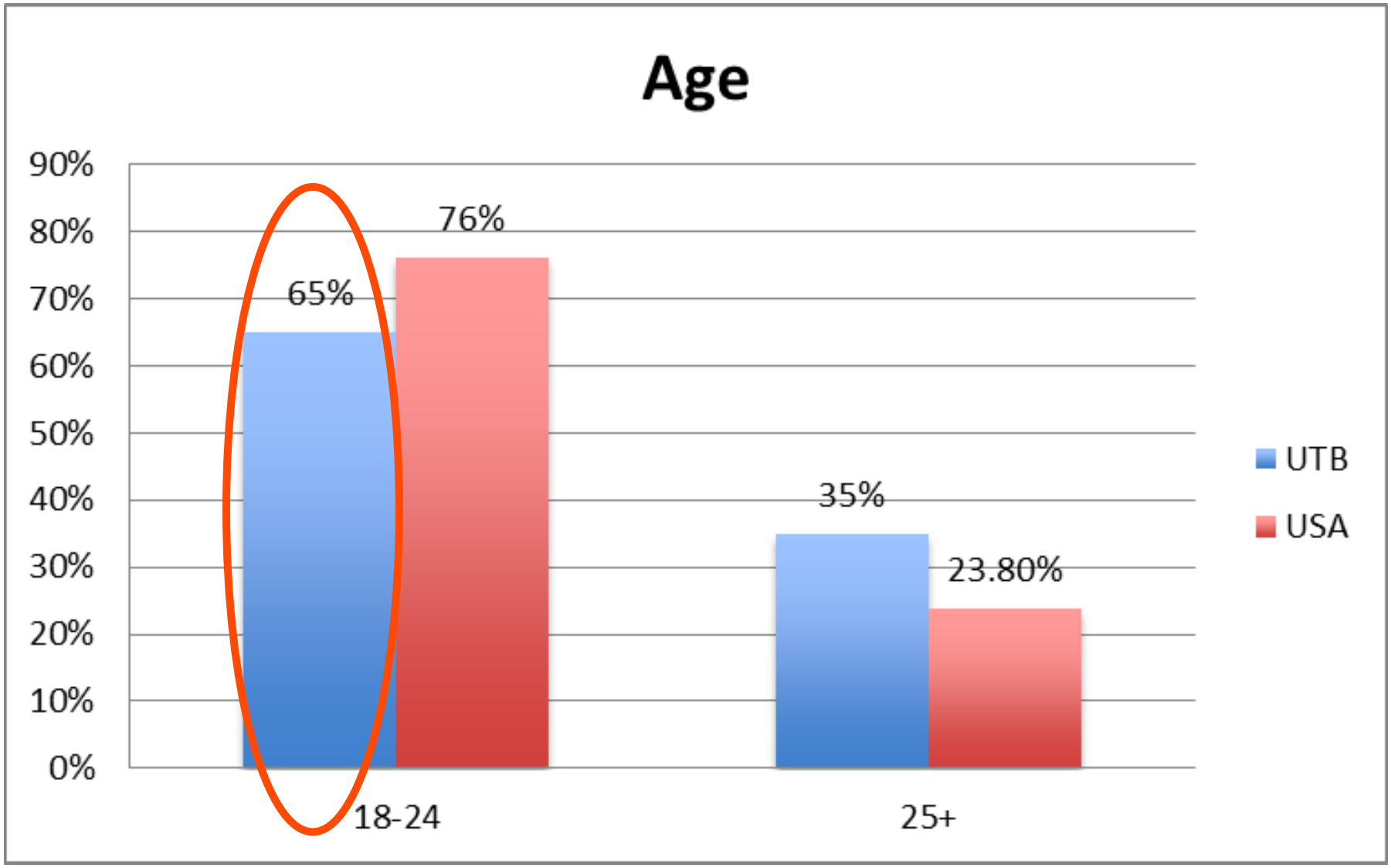
23.80%
18-24
25+
UTB
USA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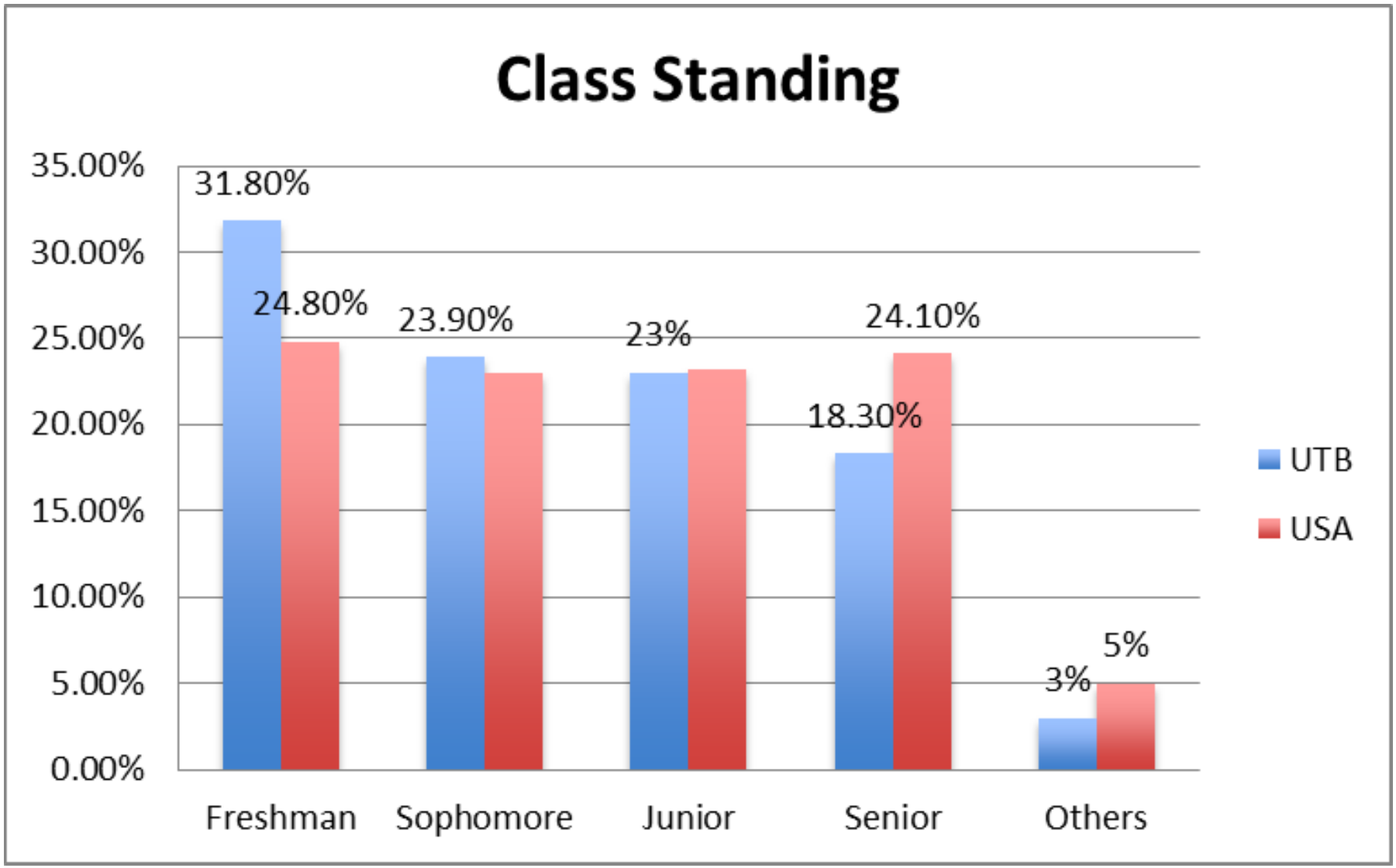
18-24
25+
UTB
USA


Class Standing
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15.00%
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0.00%
31.80%
24.80%
23.90%
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18.30%
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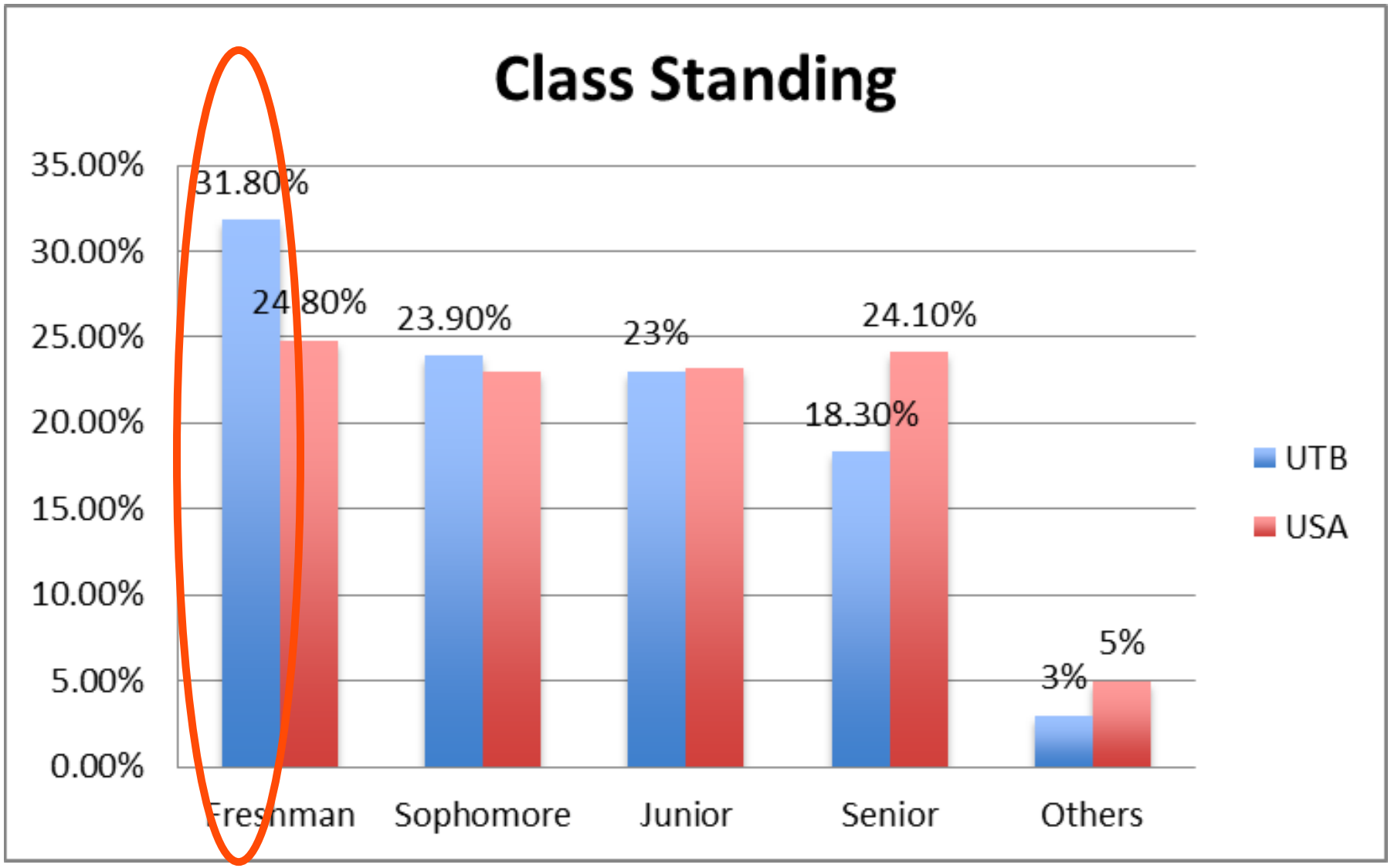
3%
5%
Freshman
Sophomore
Junior
Senior
Others
UTB
USA


Class Standing
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23%
18.30%
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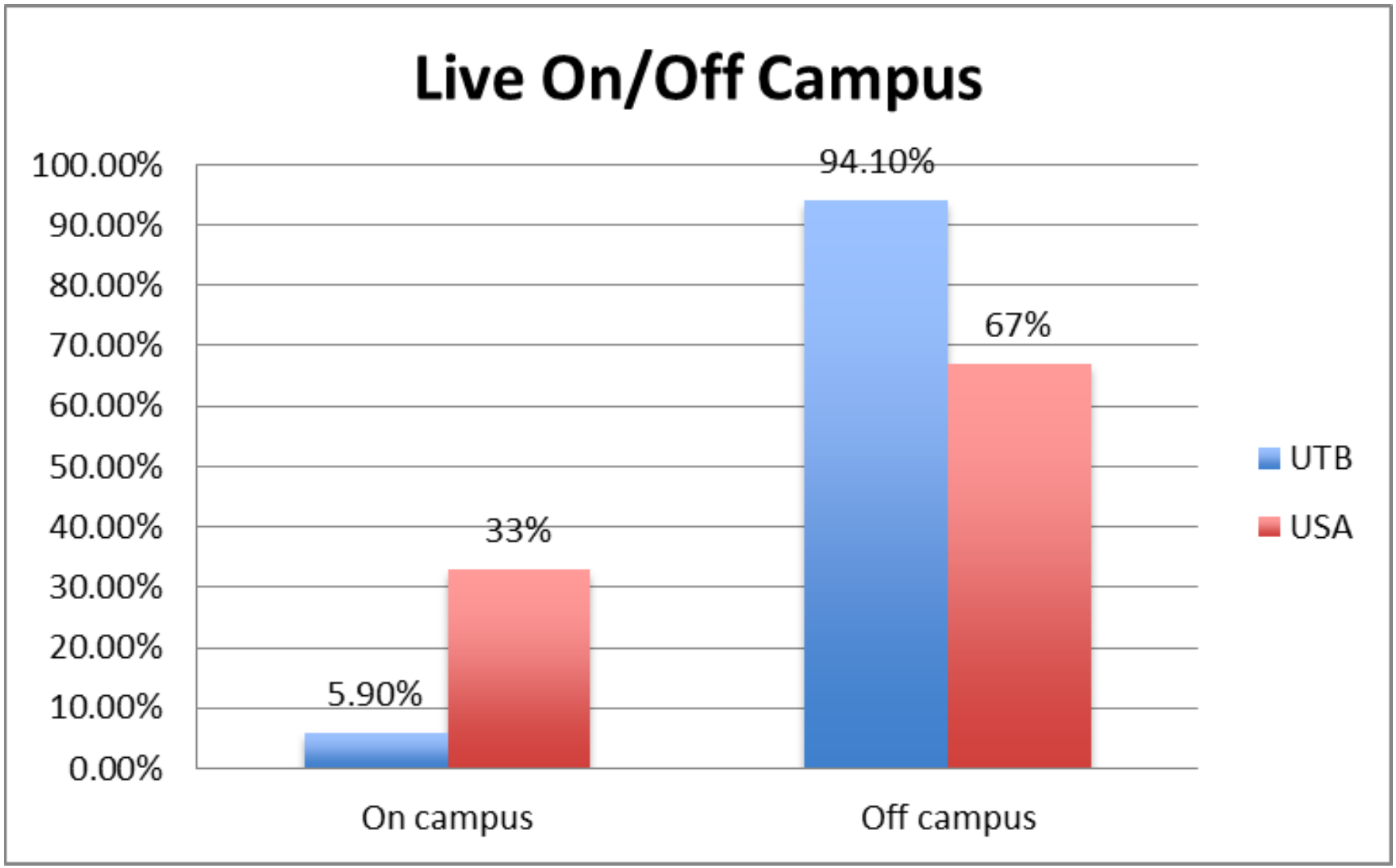
3%
5%
Freshman
Sophomore
Junior
Senior
Others
UTB
USA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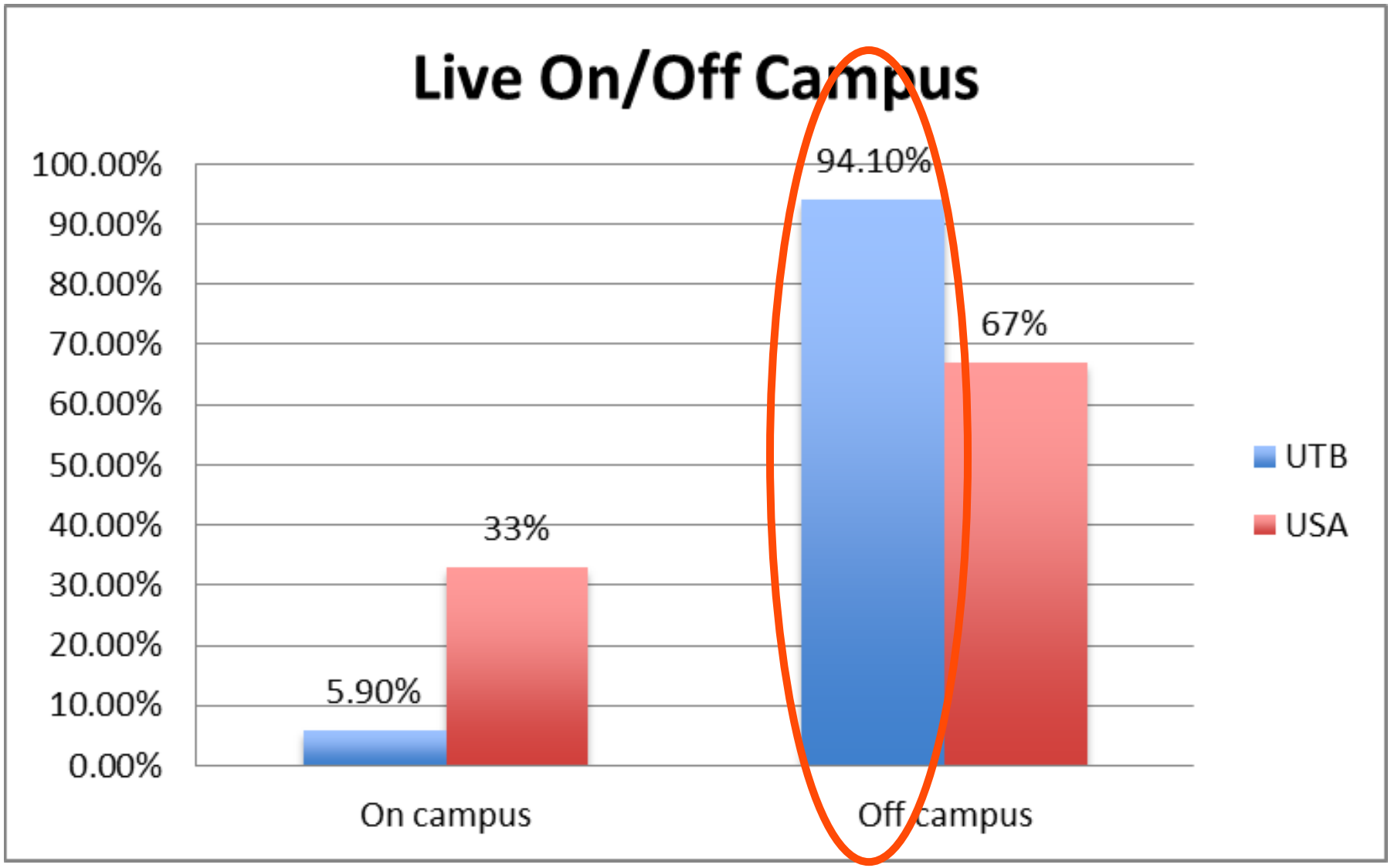
On campus
Off campus
UTB
USA


Live On/Off Campus
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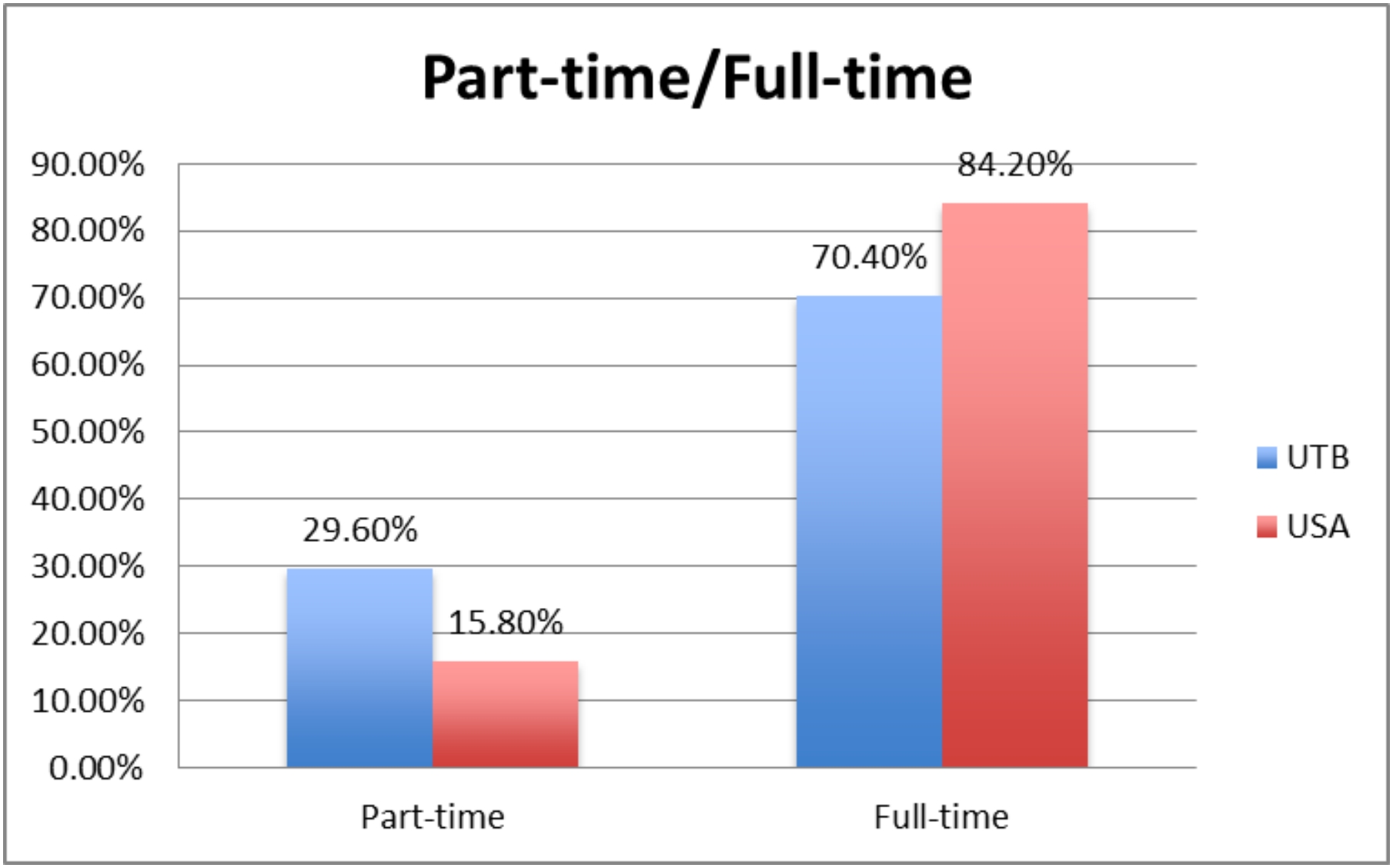
94.10%
67%
On campus
Off campus
UTB
USA


Part-time/Full-time
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0.00%
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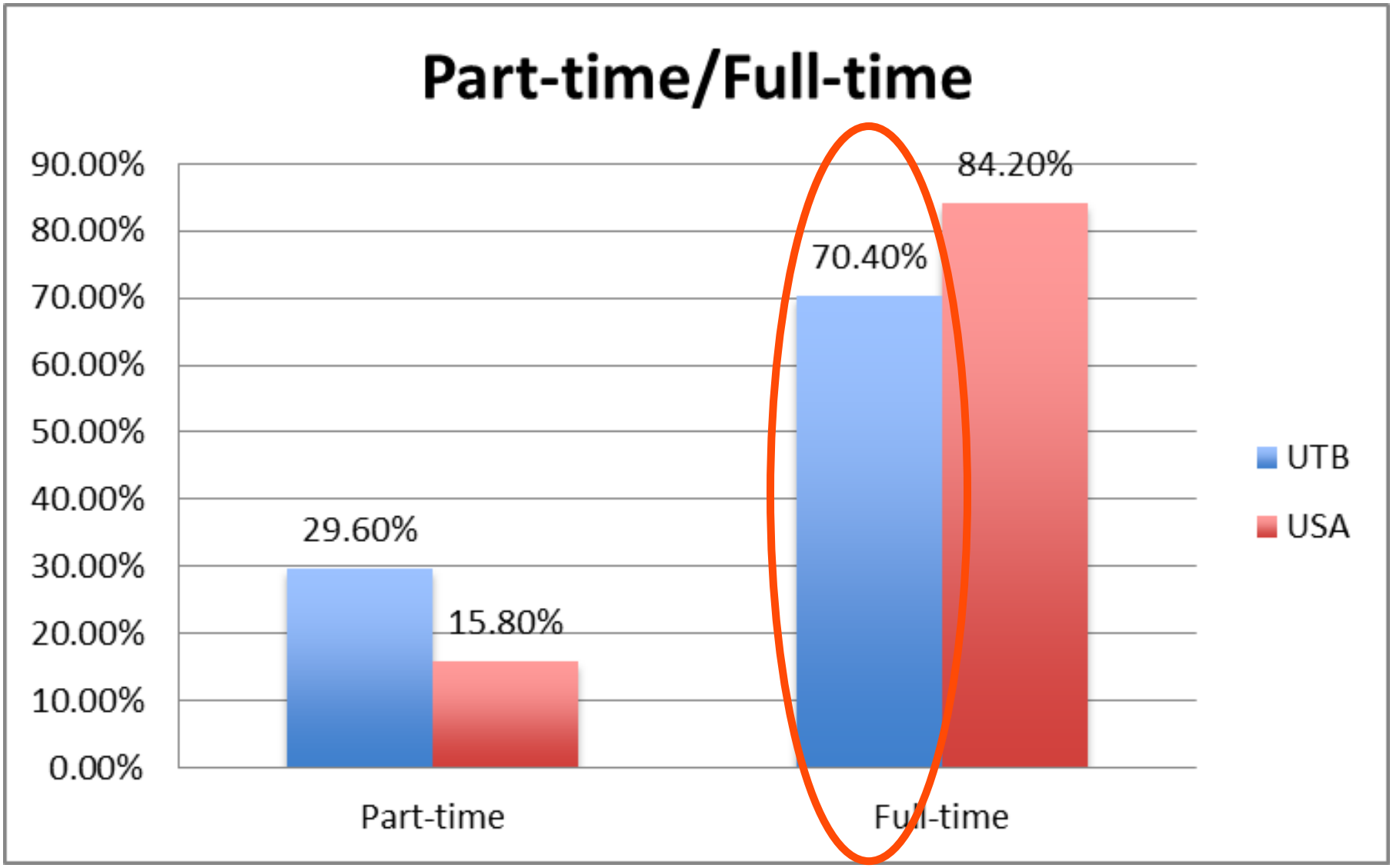
70.40%
84.20%
Part-time
Full-time
UTB
USA


Part-time/Full-time
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29.60%
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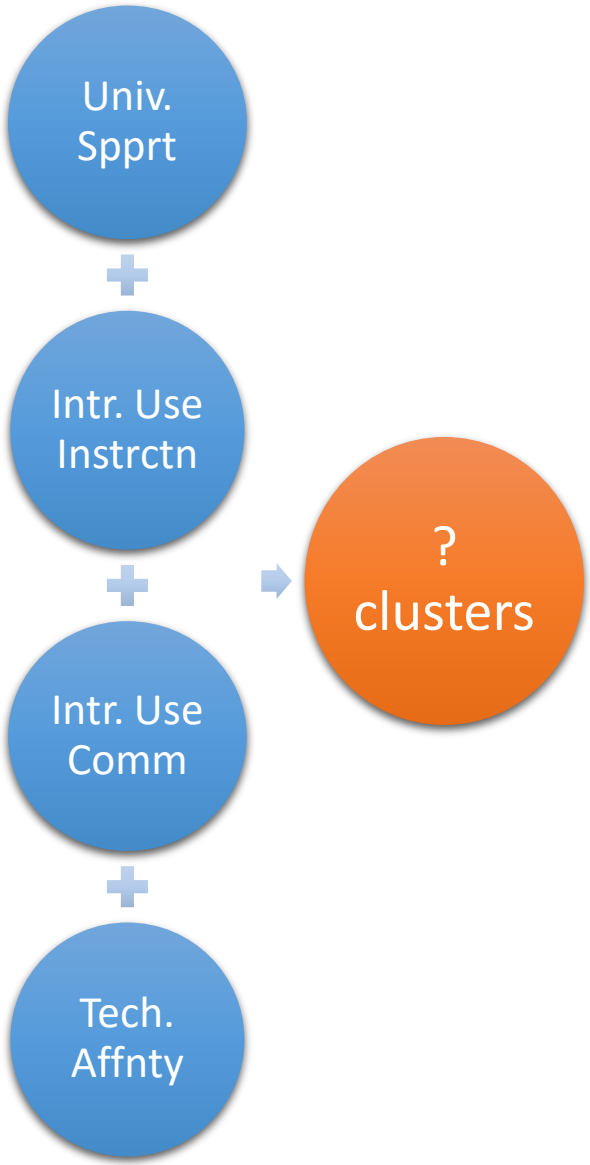
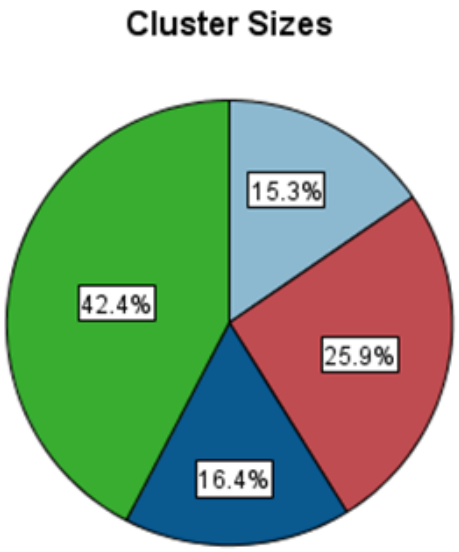
70.40%
84.20%
Part-time
Full-time
UTB
USA

RESULTS

Question

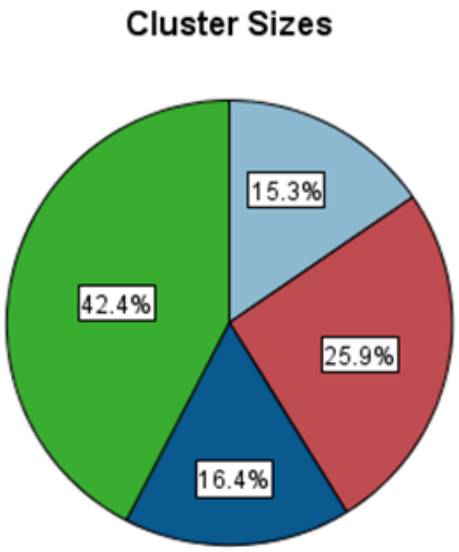
1. To what degree do eLearning students' USC, IUC, ICC, and AFF contribute to the most plausible learner profile?


Univ.
Spprt
Intr. Use
Instrctn
Intr. Use
Comm
Tech.
Affnty
?
clusters



n = 1,675
Algorithm= Two-step Cluster Analysis
Inputs =4
Clusters = 4
Cluster Quality = Fair
Average Silhouette = .4

Size of Smallest Cluster	257 (15.3%)
Size of Largest Cluster	710 (42.4%)
Ratio of Sizes: Largest Cluster to Smallest Cluster	2.76



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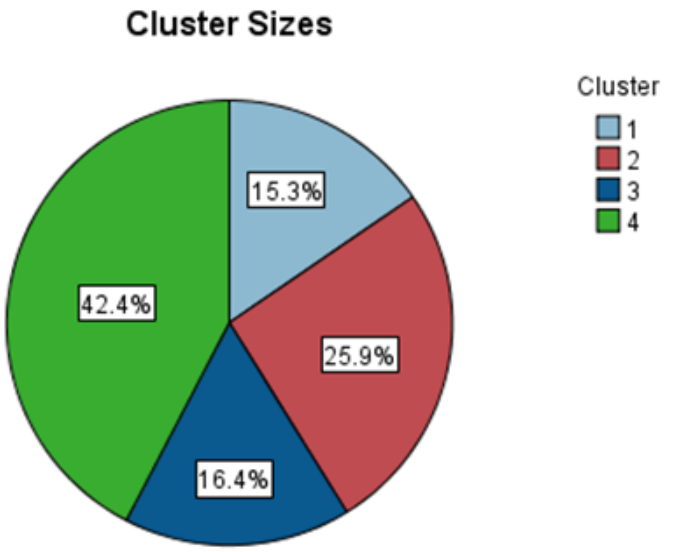

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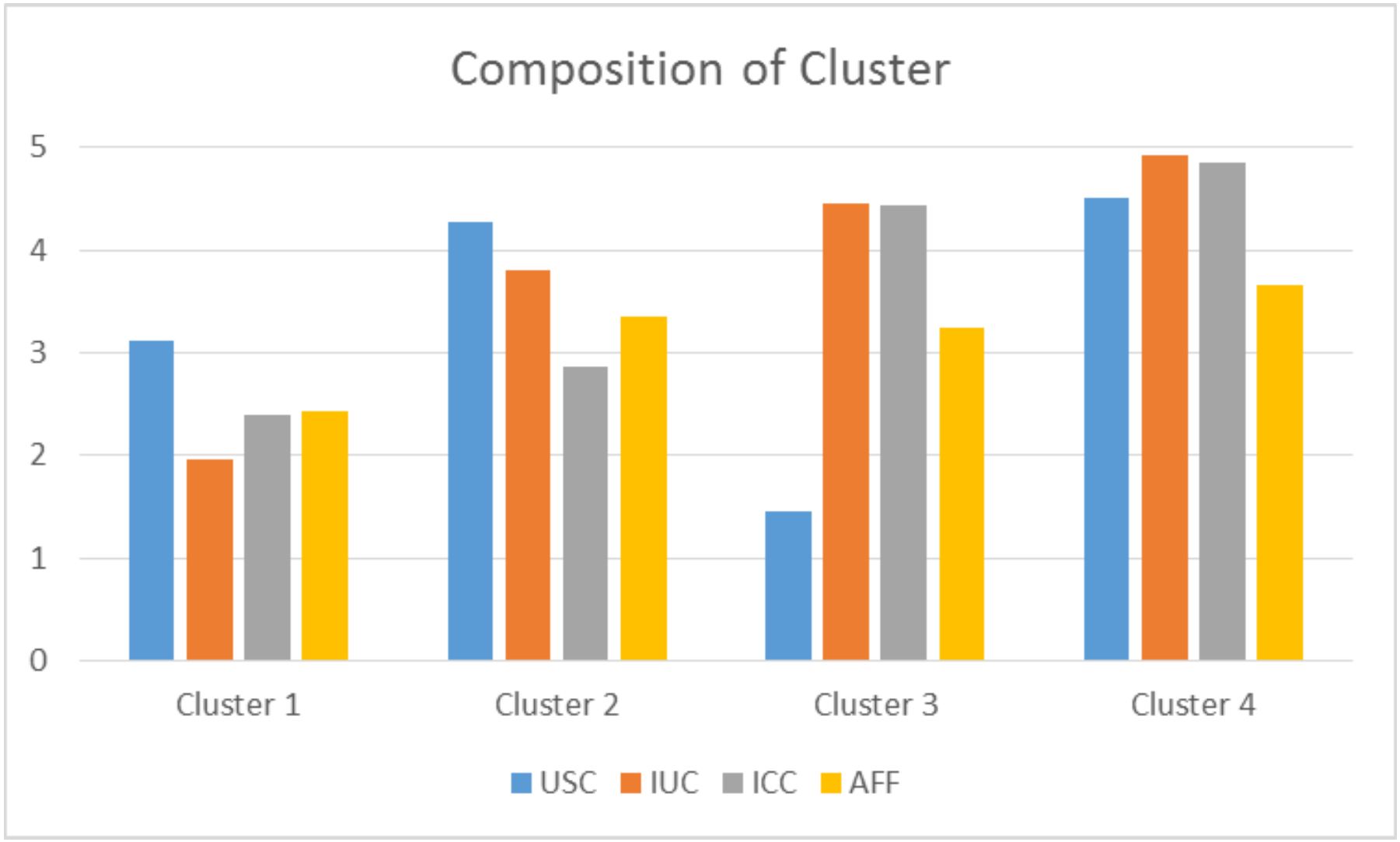
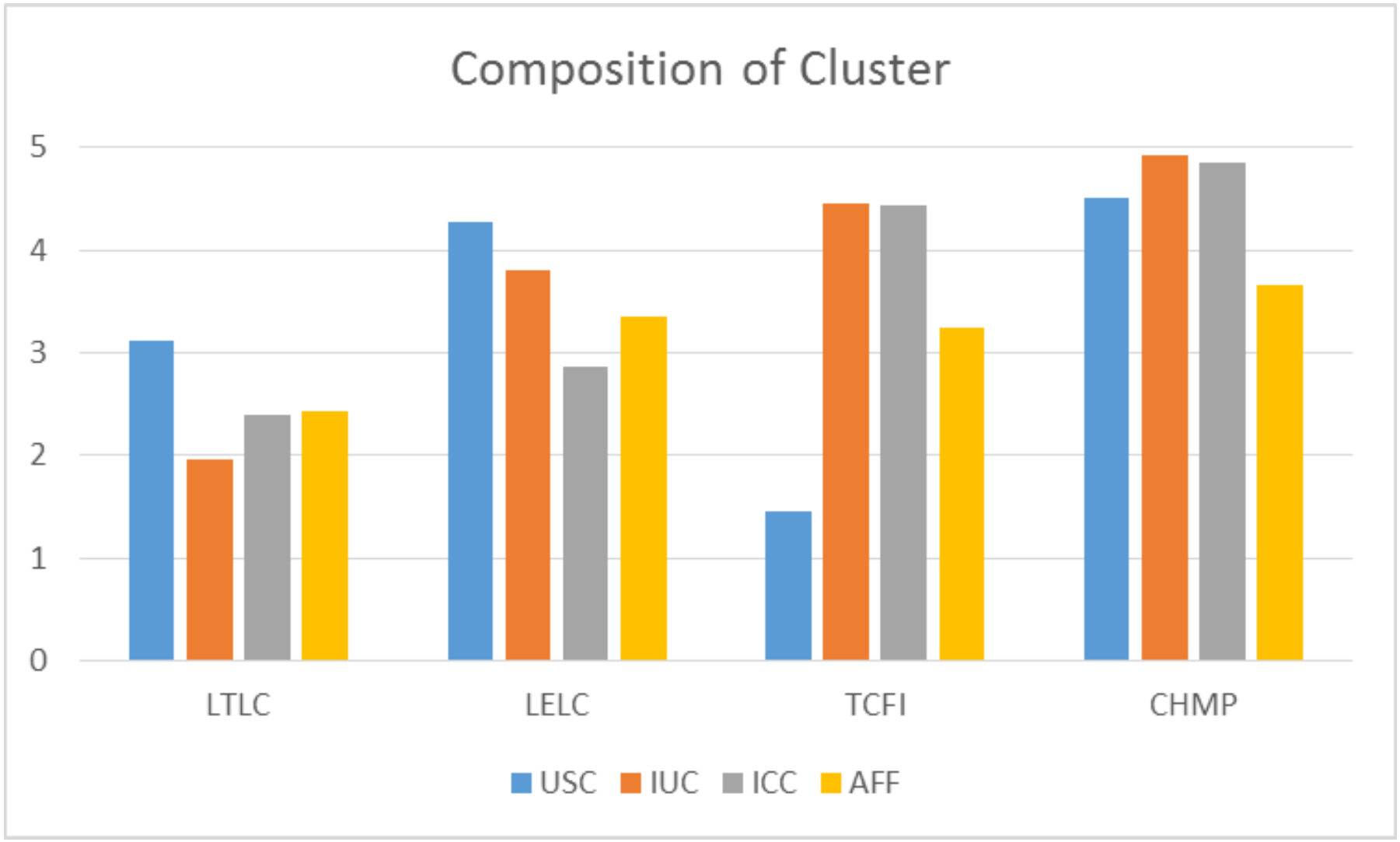

Composition of Cluster
5
4
3
2
1
0
Cluster 1
Cluster 2
Cluster 3
Cluster 4
USC
IUC
ICC
AFF


Composition of Cluster
5
4
3
2
1
0
LTLC
LELC
TCFI
CHMP
USC
IUC
ICC
AFF

Question

2. What does the sought learner profile mean in the context of IIT?

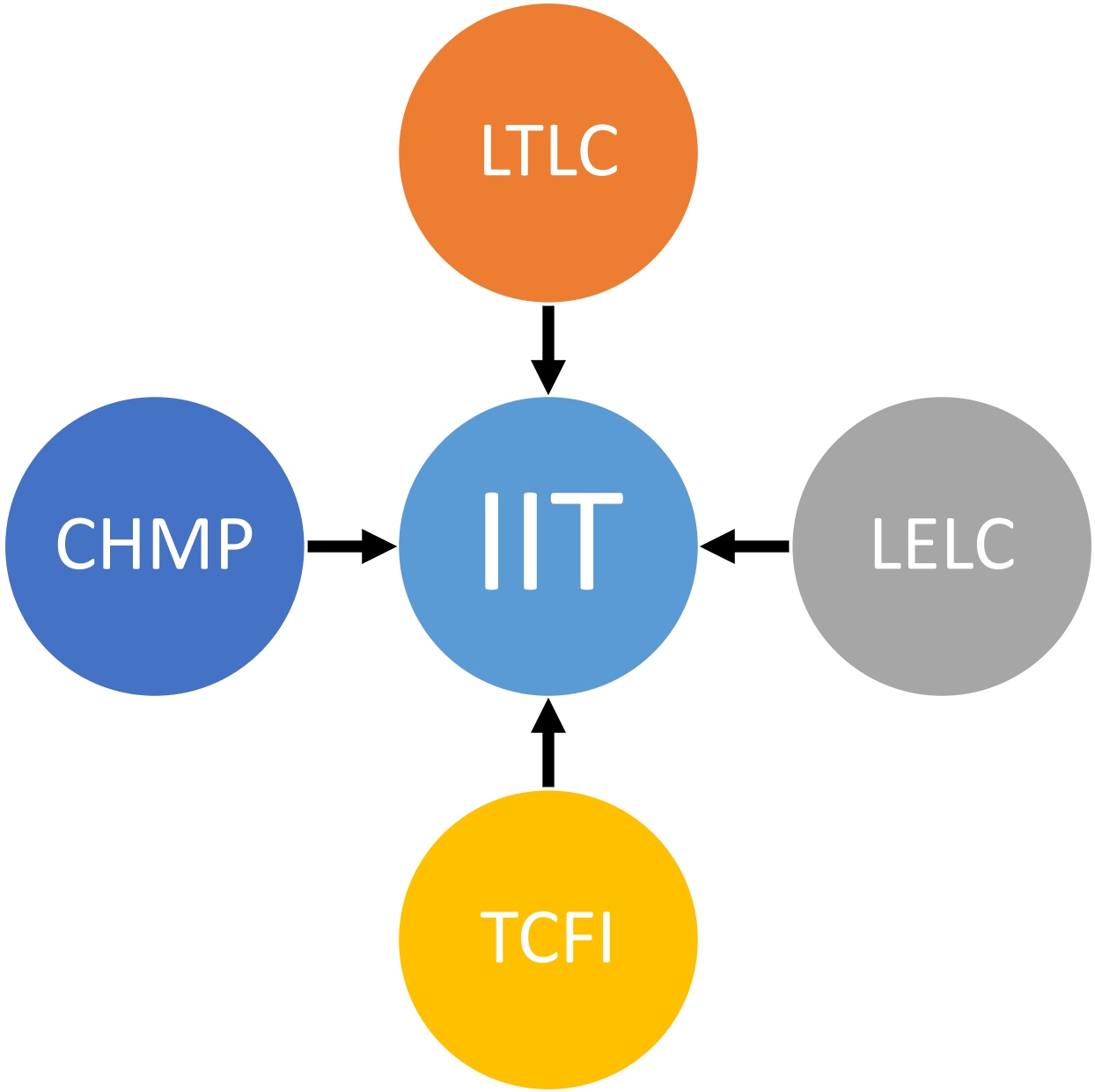

LTLC
CHMP
IIT
LELC
TCFI

Table 1

Means and Standard Deviations on IIT as a Function of Learner Profile

Learner Profile	n	IIT score	
		M	SD
LTLC	250	1.75	1.60
LELC	424	2.71	1.48
TCFI	272	2.73	1.63
CHMP	699	3.35	1.65

Note. The maximum score is 5.

$F(3, 1641) = 64.107, p < .001, \eta 2 = .105$

Table 2

One-Way Analysis of Variance of Perceived Instructor Integrated Use of Mobile Technology by Learner Profile

Source	df	SS	MS	F	P
Between groups	3	489.72	163.24	64.11	.000
Within groups	1641	4178.59	2.55		
Total	1644	4668.31			

$F(3, 1641) = 64.107, p < .001, \eta 2 = .105$ → **M/L**

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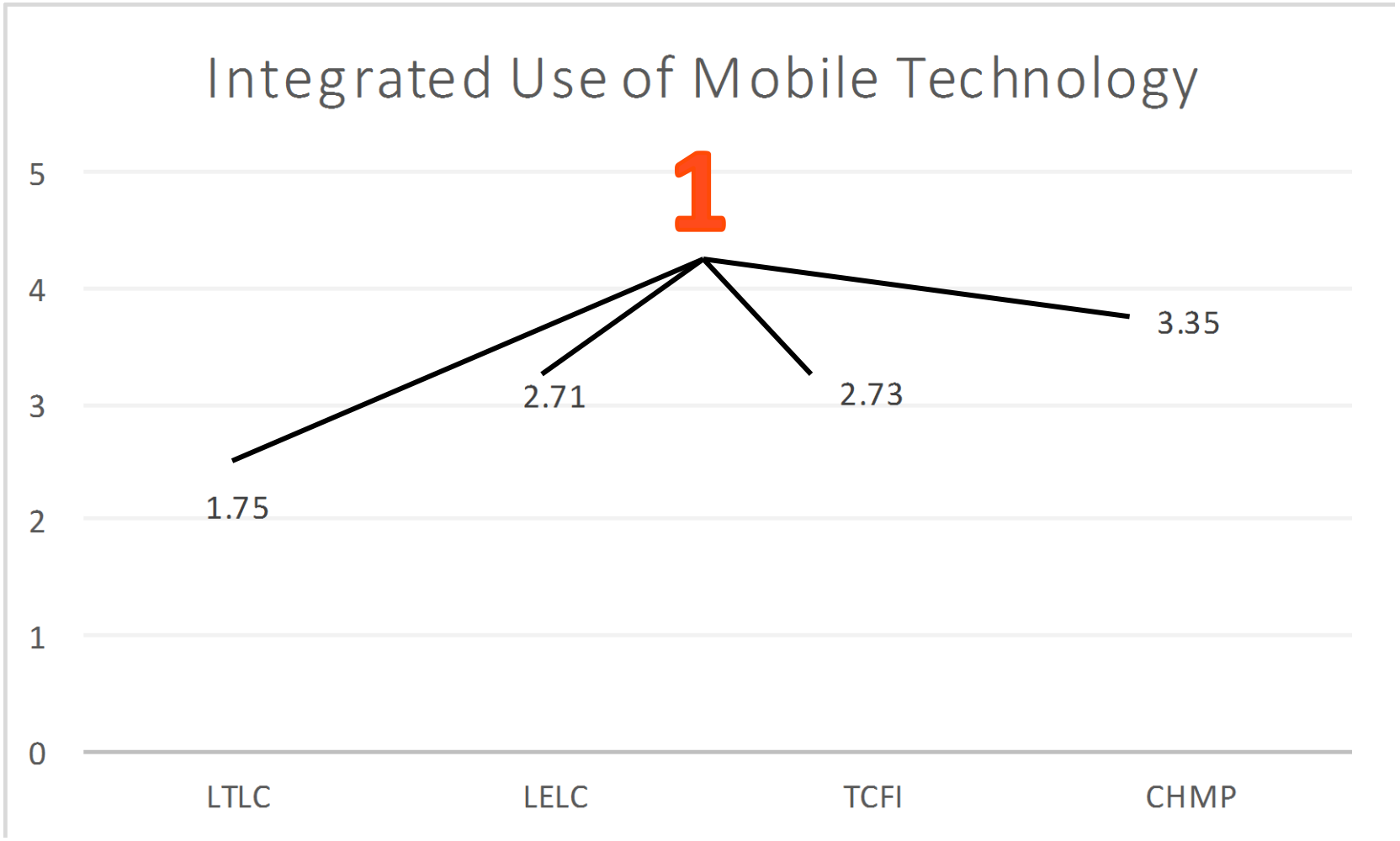
Welch's T-Test
Brown-Forsythe Test

Welch's T-Test
Brown-Forsythe Test

Significant Different

Tukey HSD Test

Games-Howell Test


Integrated Use of Mobile Technology
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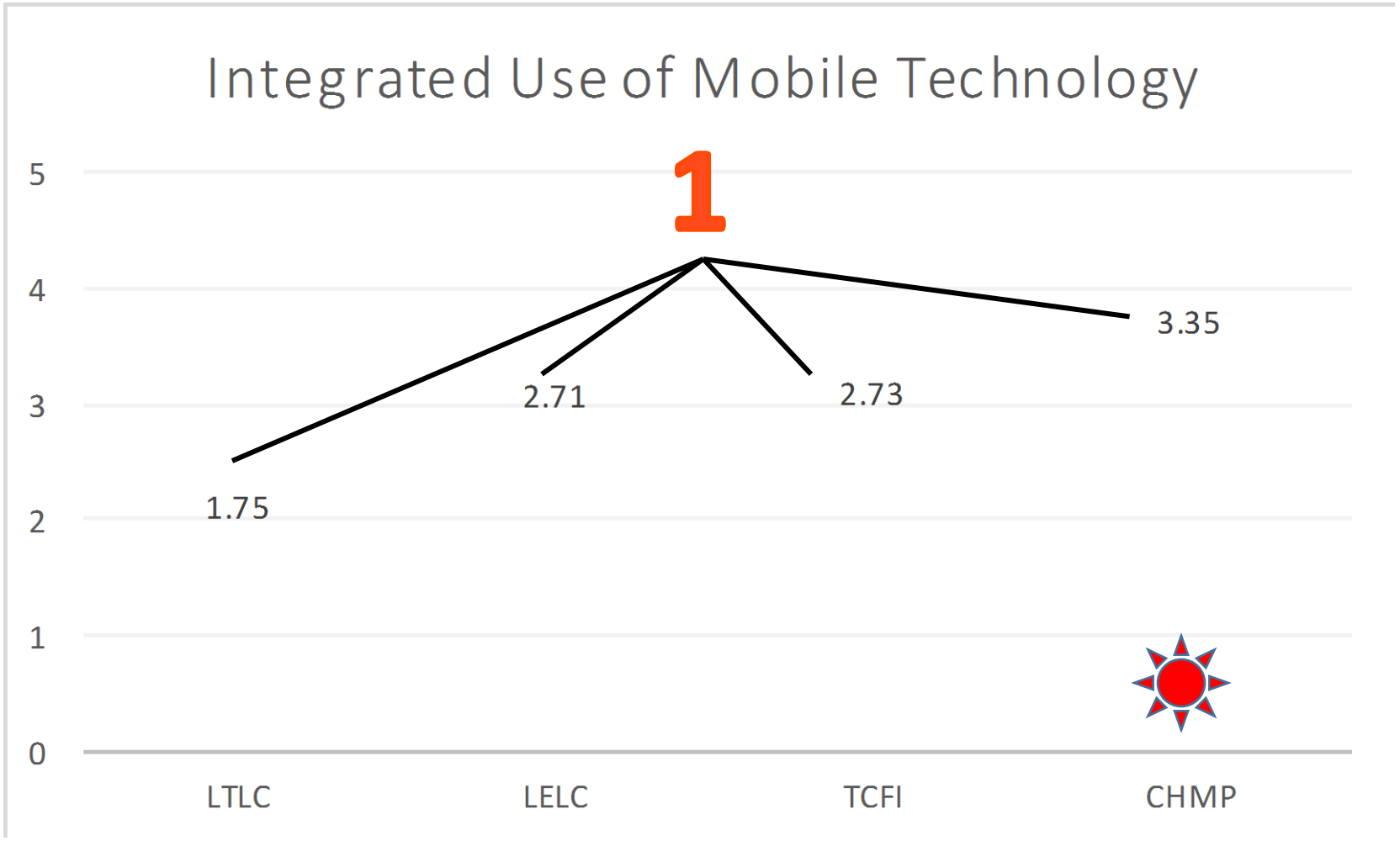
1.75
2.71
2.73
3.35
LTLC
LELC
TCFI
CHMP


Integrated Use of Mobile Technology
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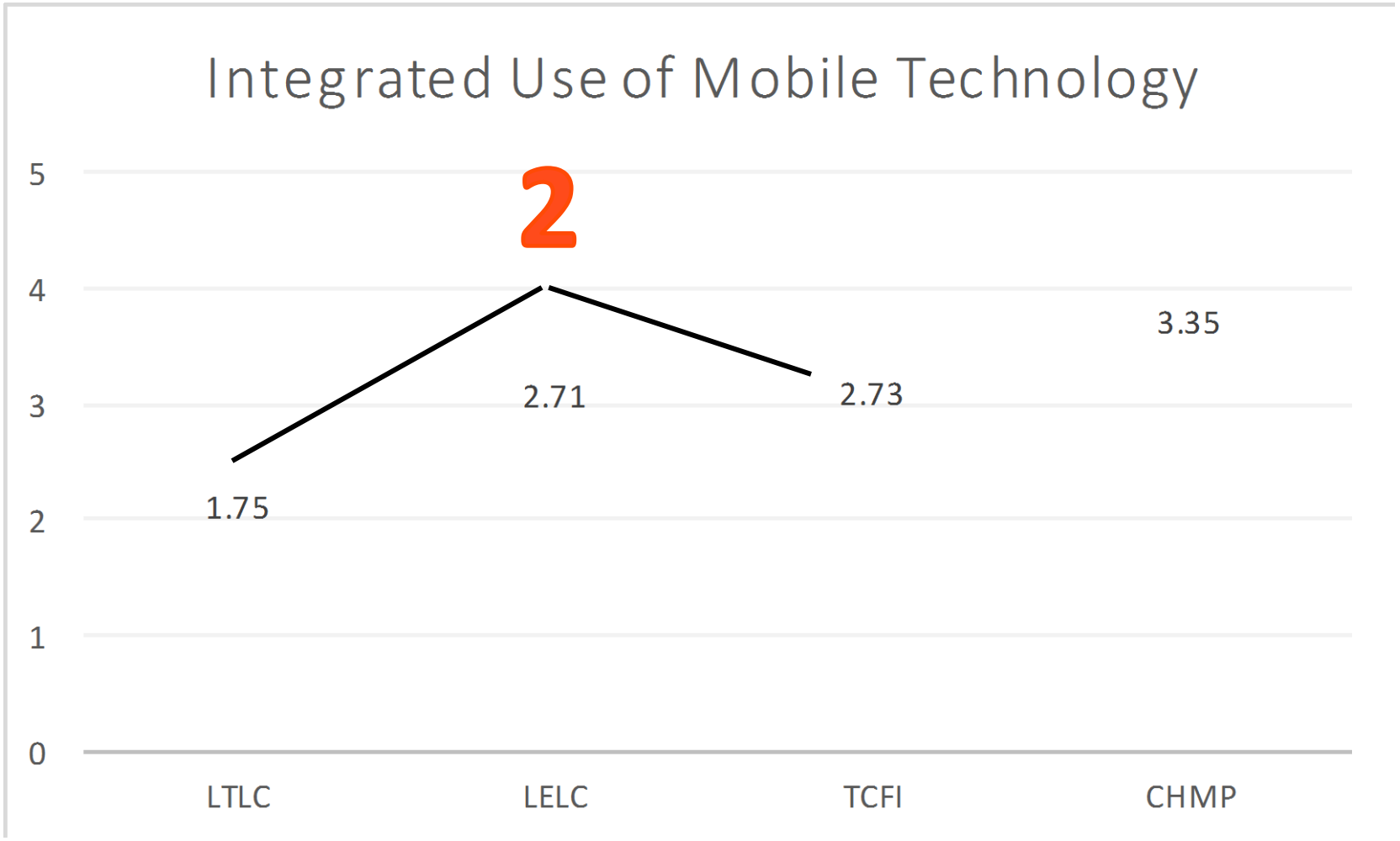
LTLC
LELC
TCFI
CHMP


Integrated Use of Mobile Technology
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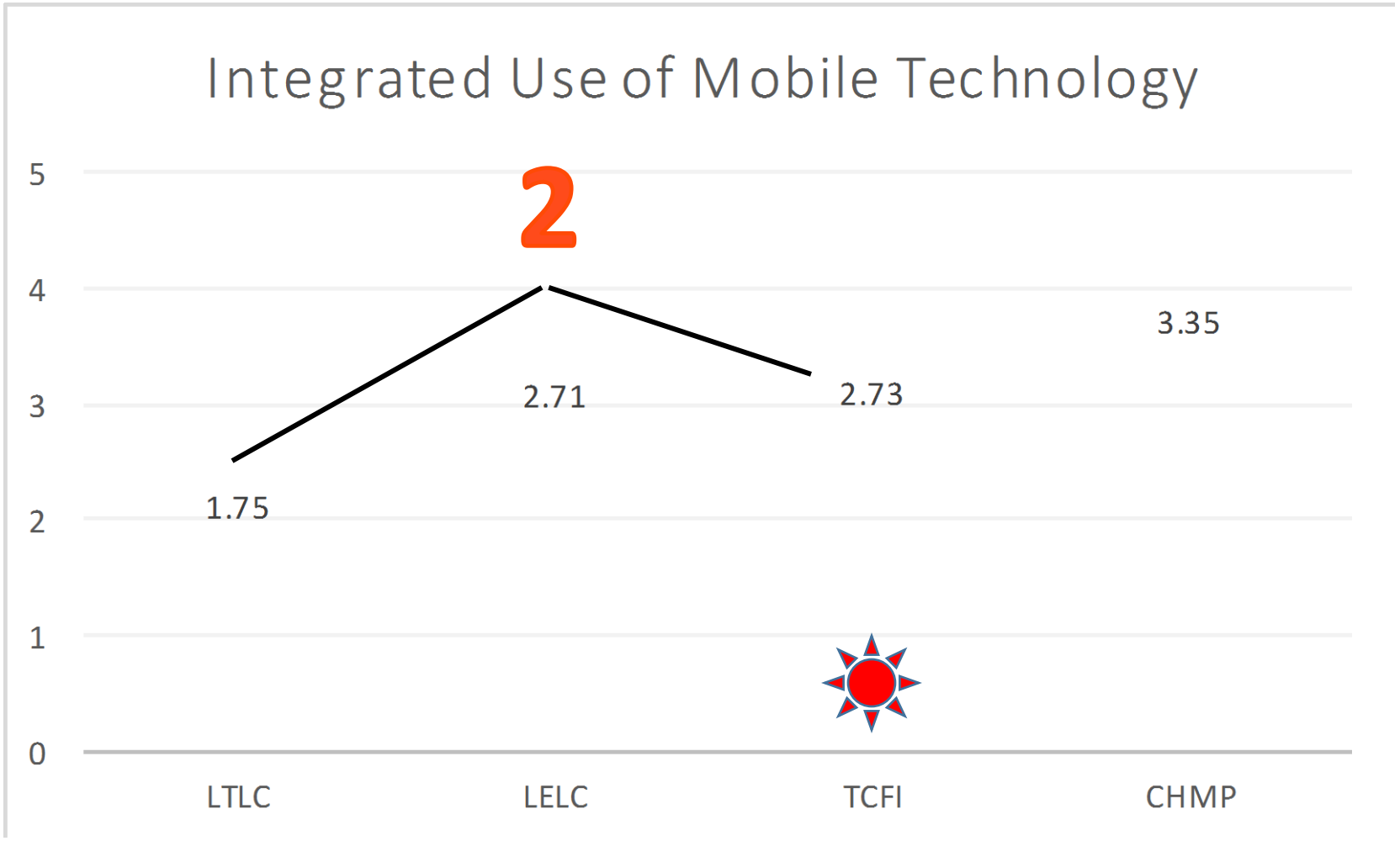
Integrated Use of Mobile Technology
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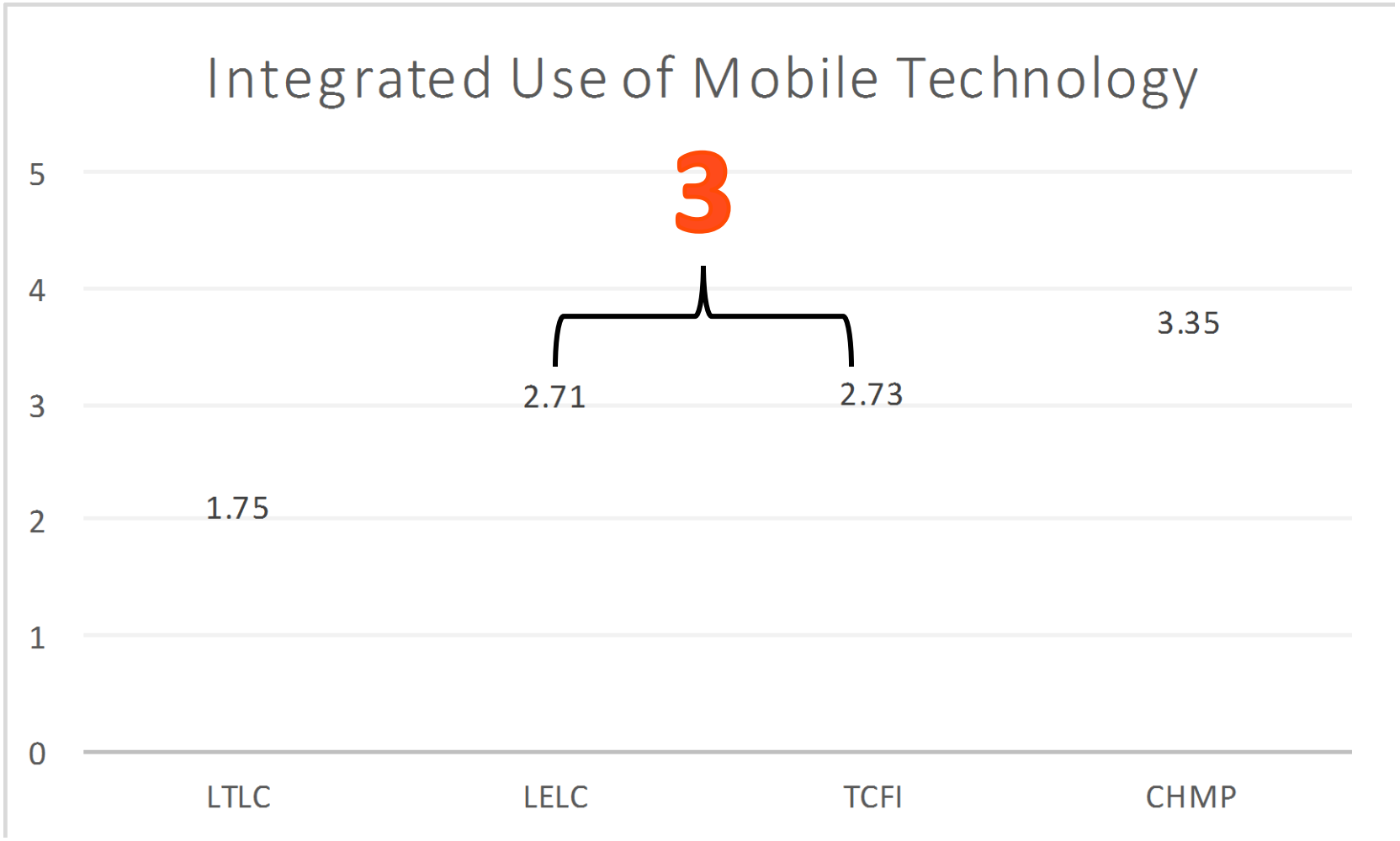
LTLC
LELC
TCFI
CHMP


Integrated Use of Mobile Technology
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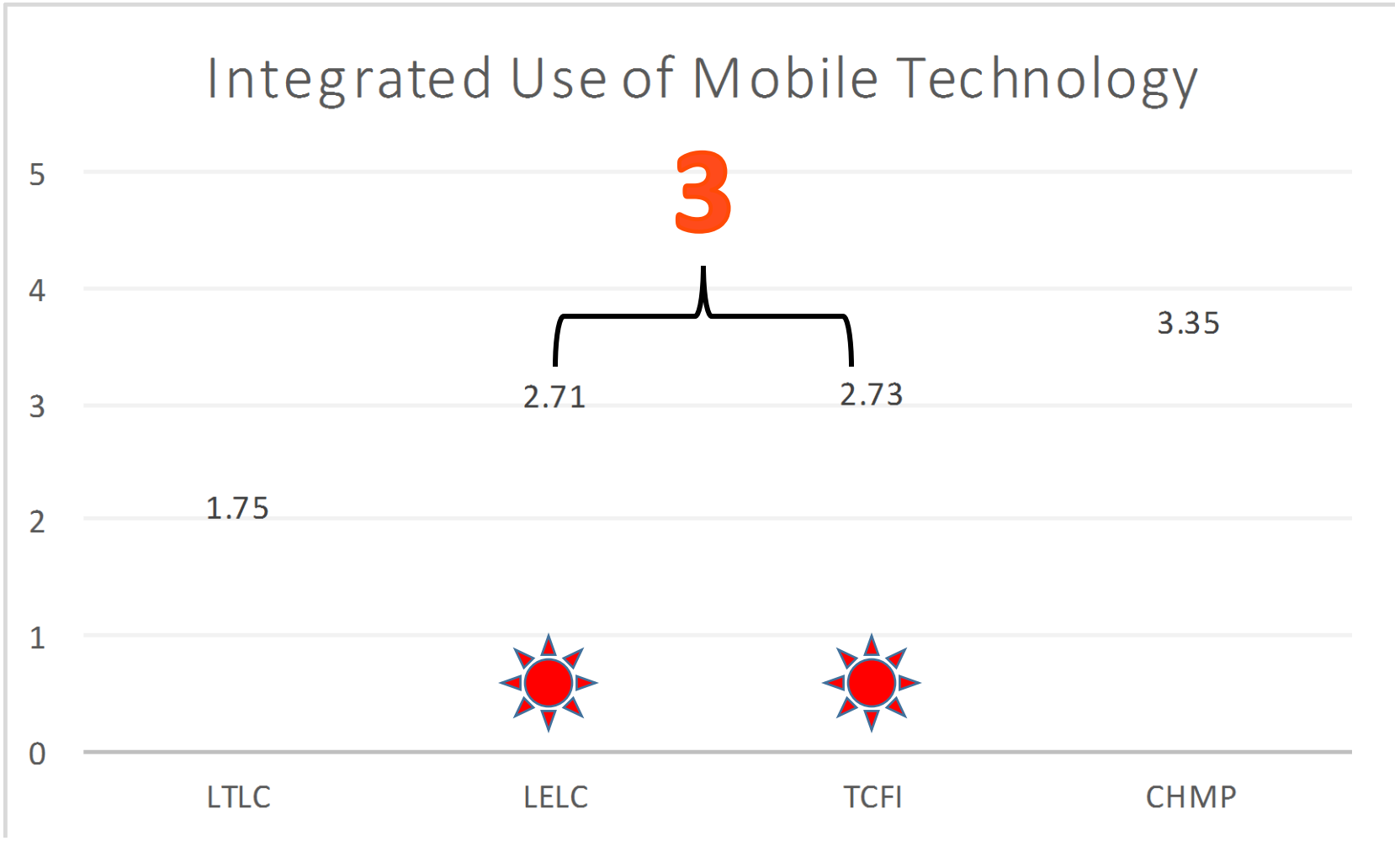
Integrated Use of Mobile Technology
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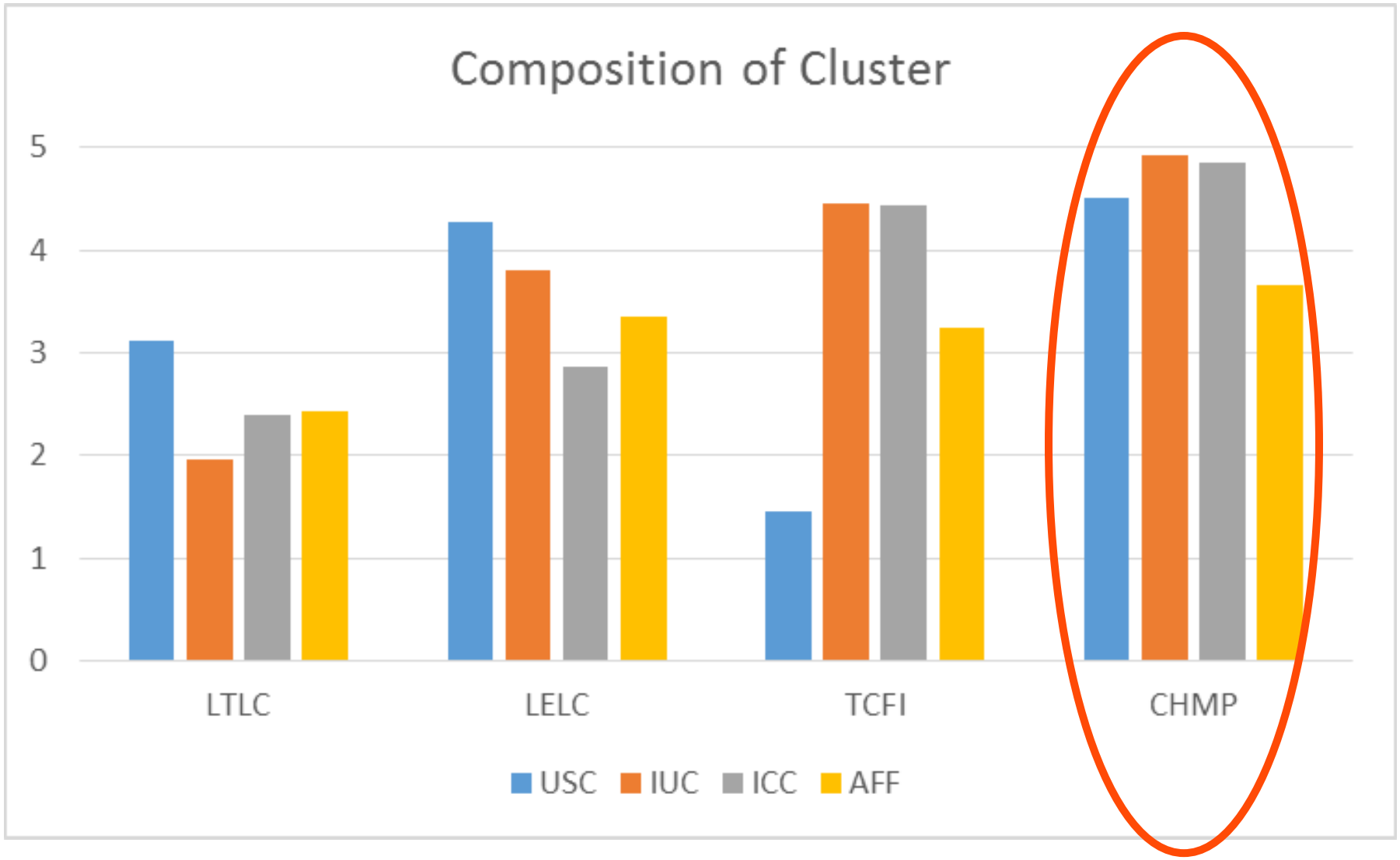
TCFI
CHMP


Composition of Cluster
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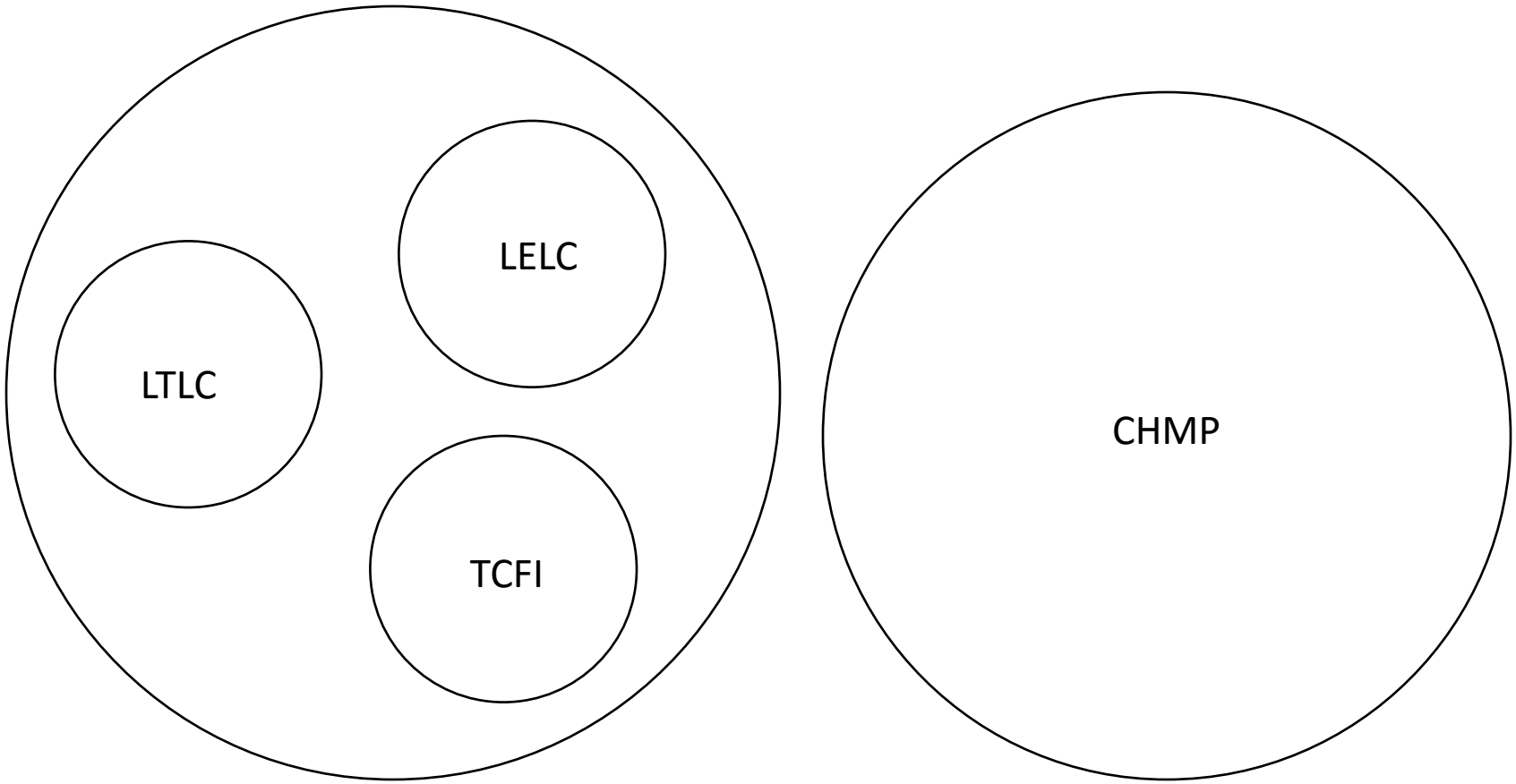
LTLC
LELC
TCFI
CHMP
USC
IUC
ICC
AFF


LELC
LTLC
TCFI
CHMP

Non-CHMP

CHMP

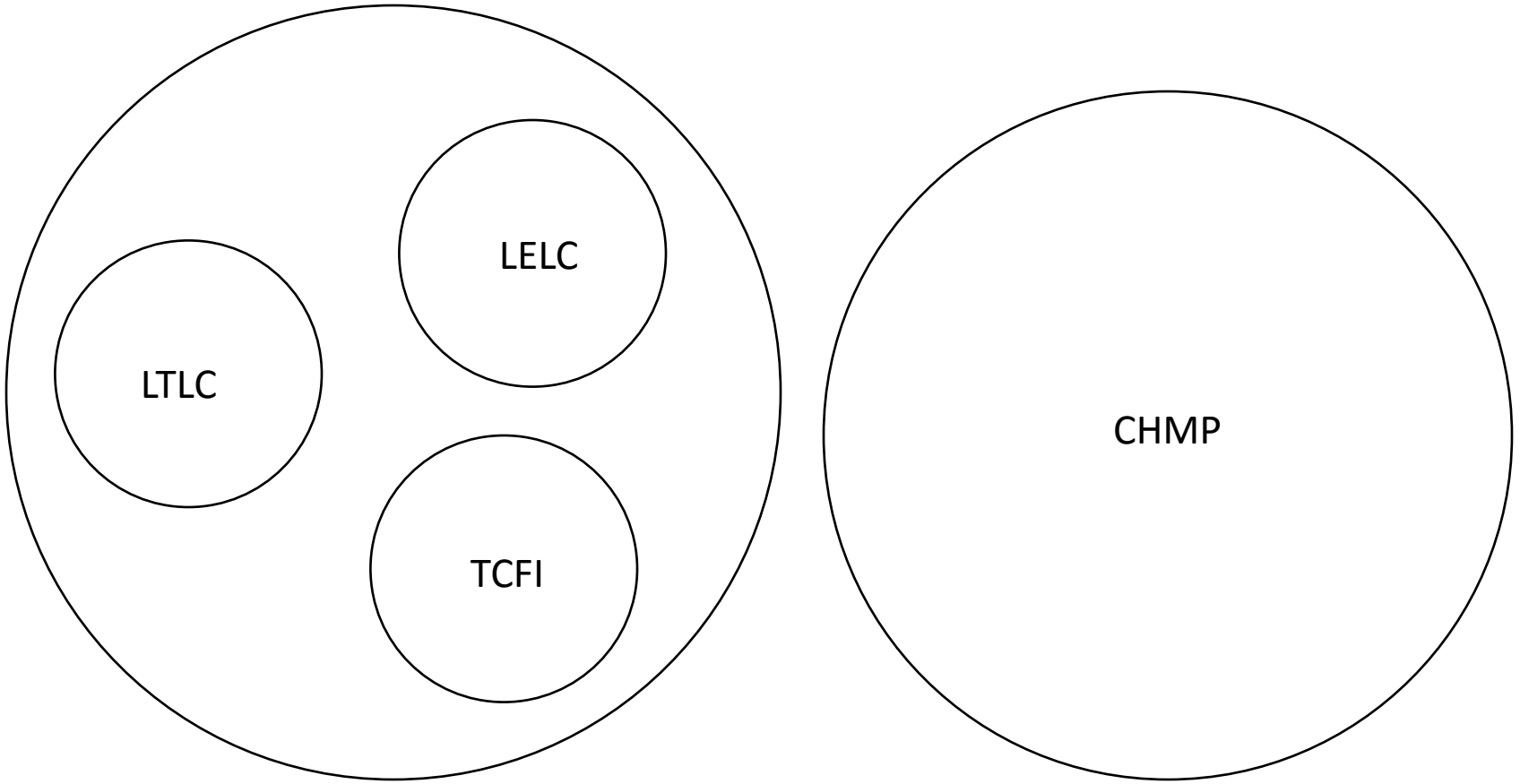


Table 3

Relationship Between Learner Clusters (CHMP vs. Non-CHMP) and Mobile Device Ownership

Type of mobile device	Pearson X^2	*df*	*N*	*p*	Cramér's *V*
Laptop	.002	1	1675	.961	.001
Tablet/iPad	7.684	1	1675	.006	.068
Smartphone	4.432	1	1675	.035	.051

Laptop Ownership * CHMP or Not Crosstabulation

			CHMP or Not		
			Non-CHMP	CHMP	Total
Laptop Ownership	No Laptop	Count	149	109	258
		Expected Count	148.6	109.4	258.0
		% within Laptop Ownership	57.8%	42.2%	100.0%
	Own Laptop	Count	816	601	1417
		Expected Count	816.4	600.6	1417.0
		% within Laptop Ownership	57.6%	42.4%	100.0%
Total		Count	965	710	1675
		Expected Count	965.0	710.0	1675.0
		% within Laptop Ownership	57.6%	42.4%	100.0%

Tablet/iPad Ownership * CHMP or Not Crosstabulation

			CHMP or Not		
			Non-CHMP	CHMP	Total
Tablet/iPad Ownership	No Tablet/iPad	Count	615	405	1020
		Expected Count	587.6	432.4	1020.0
		% within Tablet/iPad Ownership	60.3%	39.7%	100.0%
	Own Tablet/iPad	Count	350	305	655
		Expected Count	377.4	277.6	655.0
		% within Tablet/iPad Ownership	53.4%	46.6%	100.0%
Total		Count	965	710	1675
		Expected Count	965.0	710.0	1675.0
		% within Tablet/iPad Ownership	57.6%	42.4%	100.0%

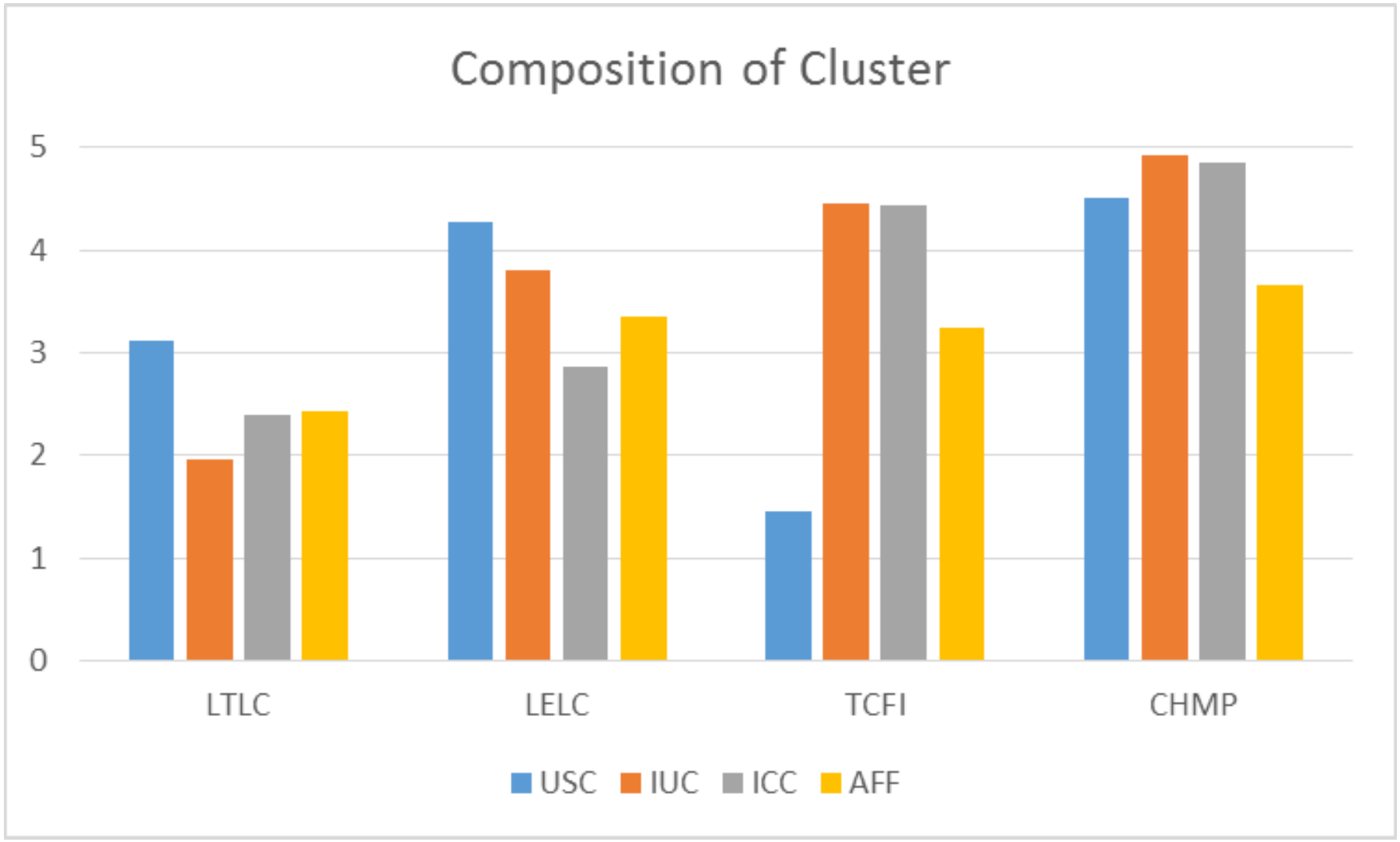
Smartphone Ownership * CHMP or Not Crosstabulation

			CHMP or Not		Total
			Non-CHMP	CHMP	
Smartphone Ownership	No Smartphone	Count	274	169	443
		Expected Count	255.2	187.8	443.0
		% within Smartphone Ownership	61.9%	38.1%	100.0%
	Own Smartphone	Count	691	541	1232
		Expected Count	709.8	522.2	1232.0
		% within Smartphone Ownership	56.1%	43.9%	100.0%
Total		Count	965	710	1675
		Expected Count	965.0	710.0	1675.0
		% within Smartphone Ownership	57.6%	42.4%	100.0%

CONCLUSIONS

If...

Then…


Composition of Cluster
5
4
3
2
1
0
LTLC
LELC
TCFI
CHMP
USC
IUC
ICC
AFF

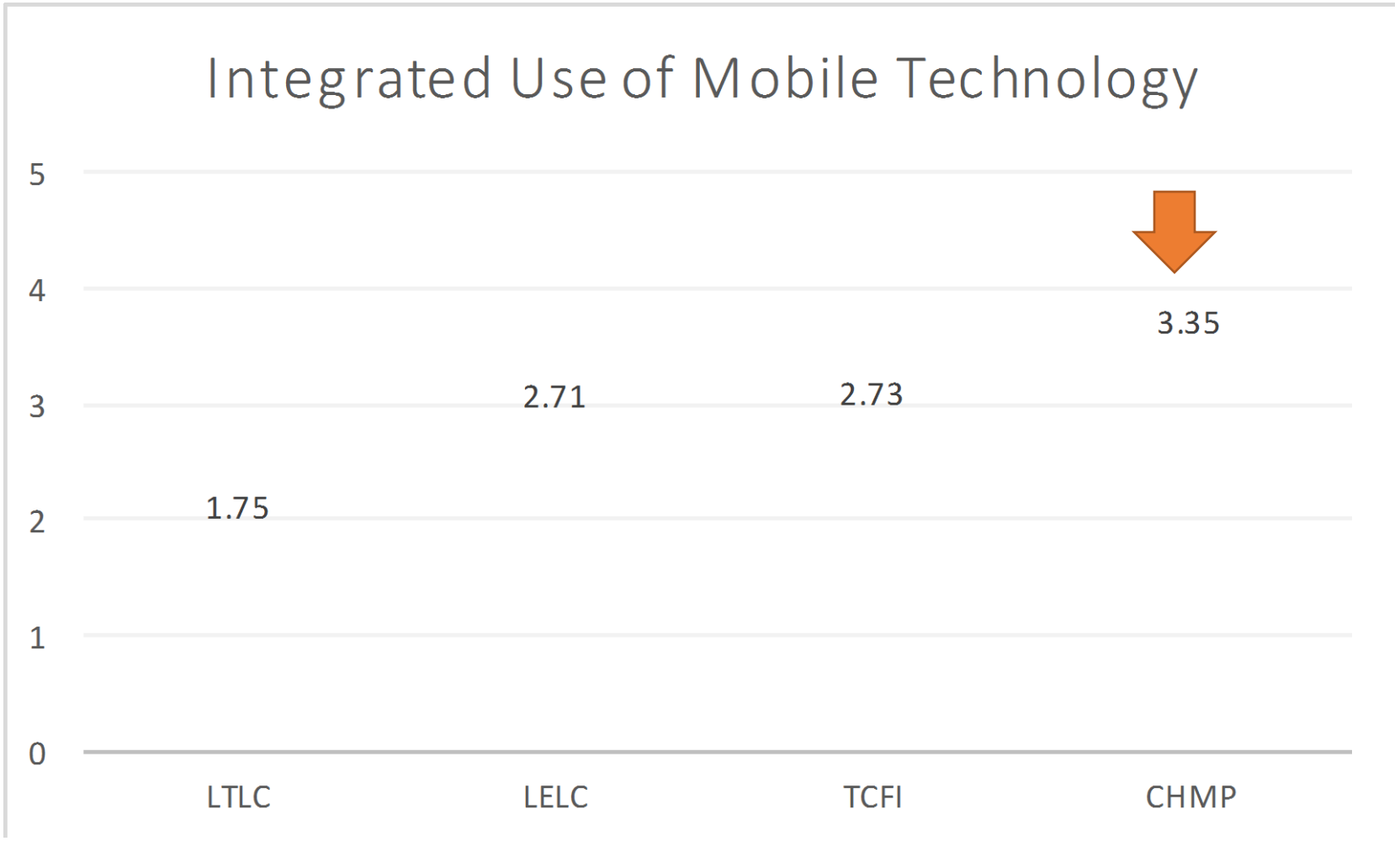
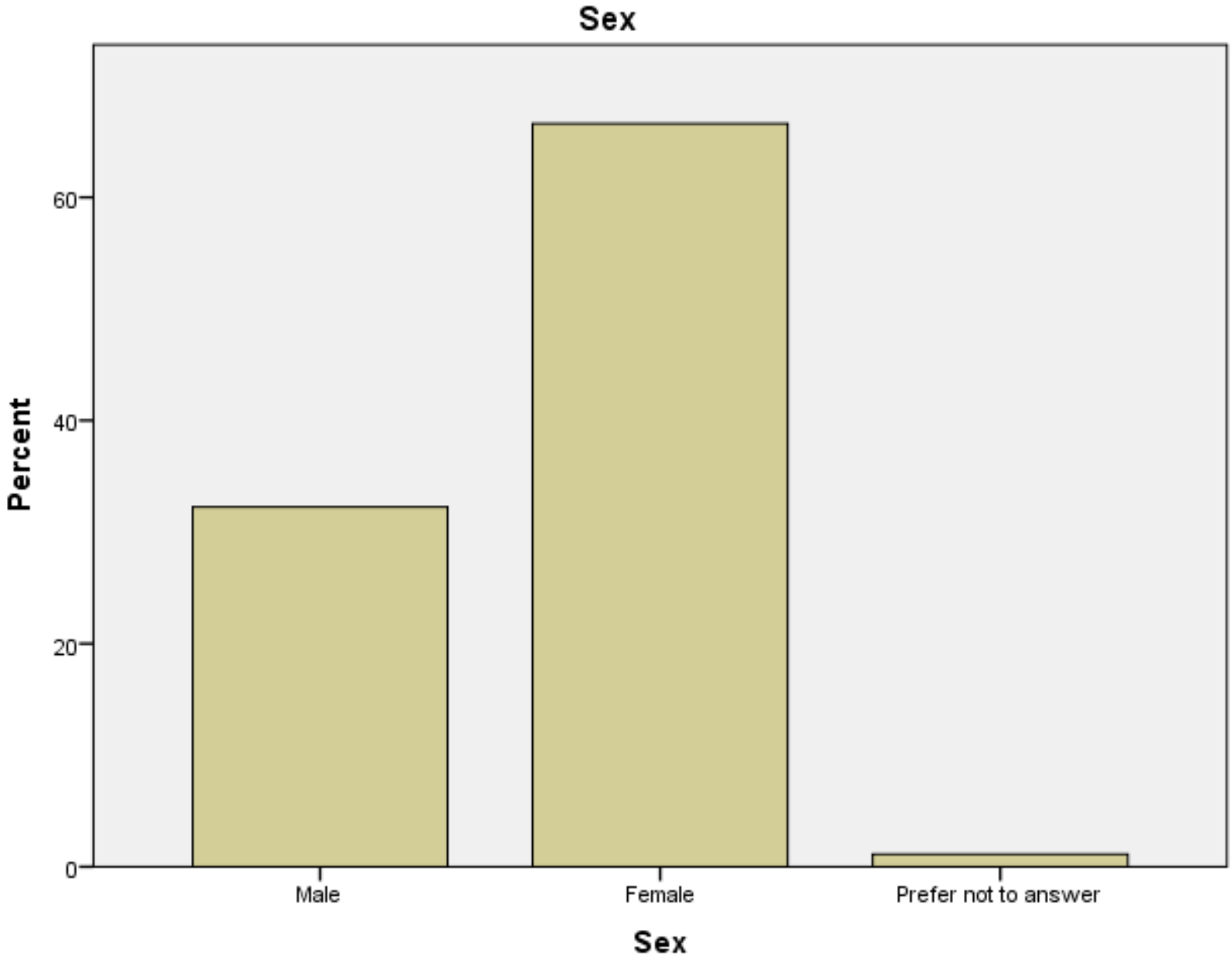
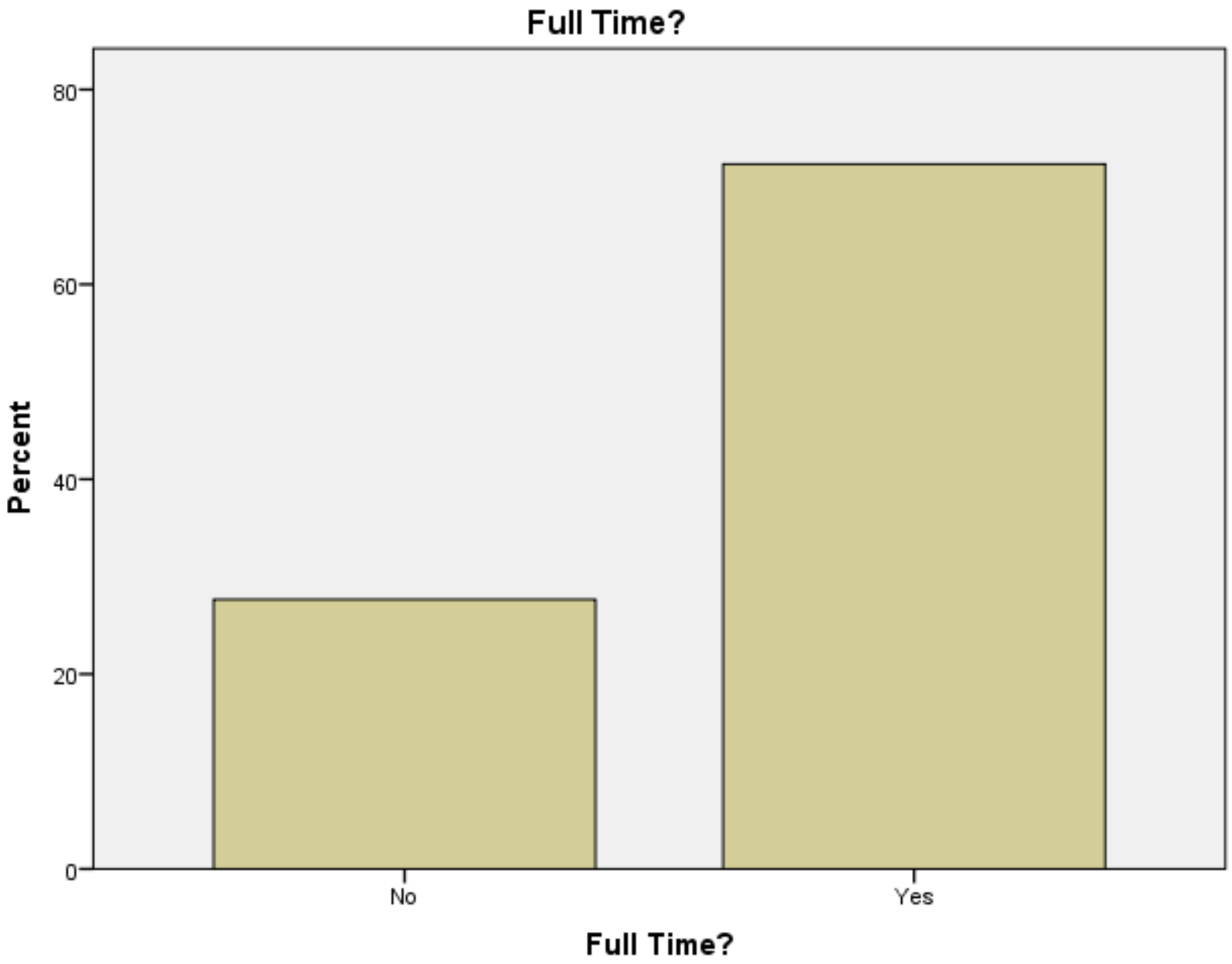

Integrated Use of Mobile Technology
5
4
3
2
1
0
1.75
2.71
2.73
3.35
LTLC
LELC
TCFI
CHMP

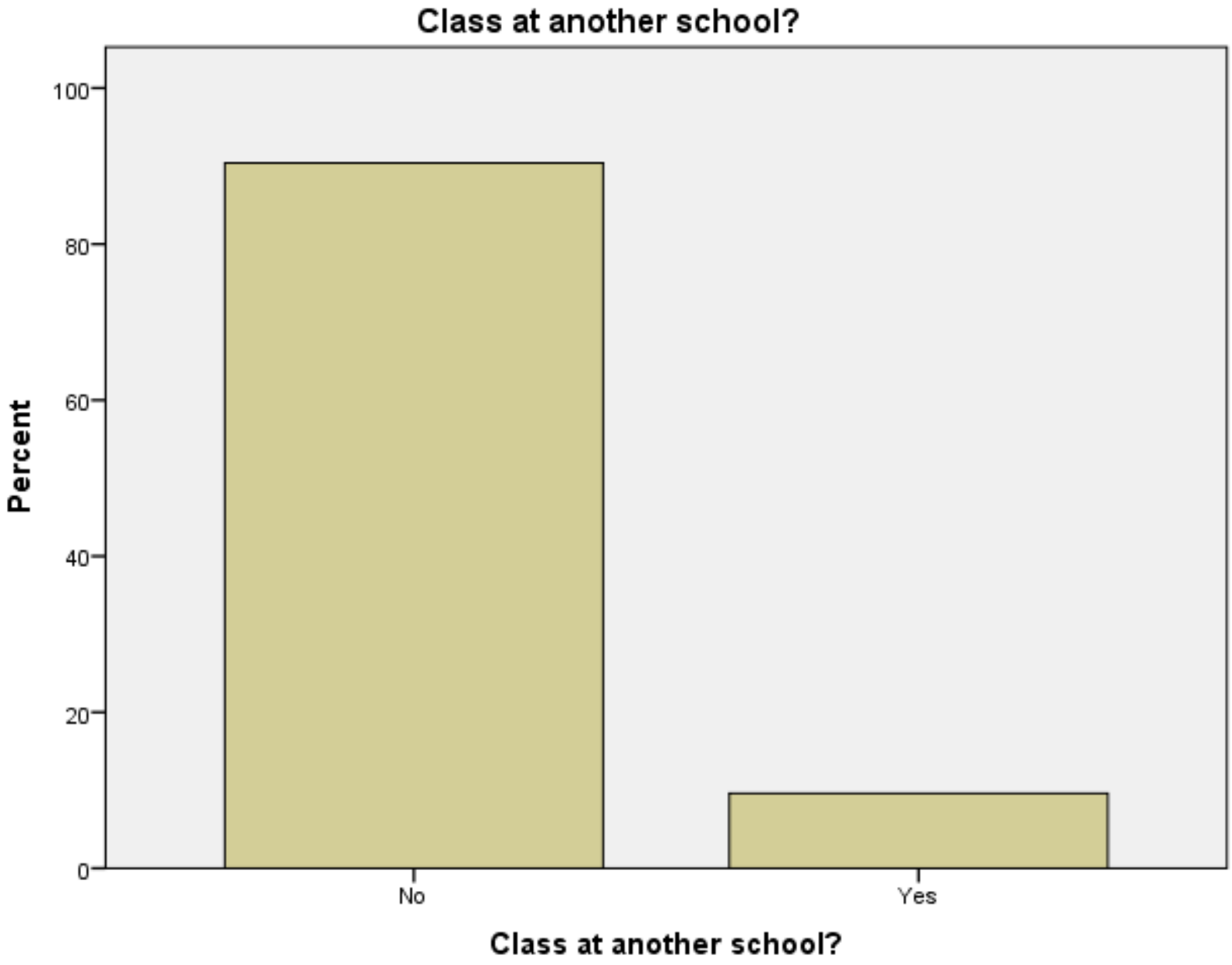
Table 4

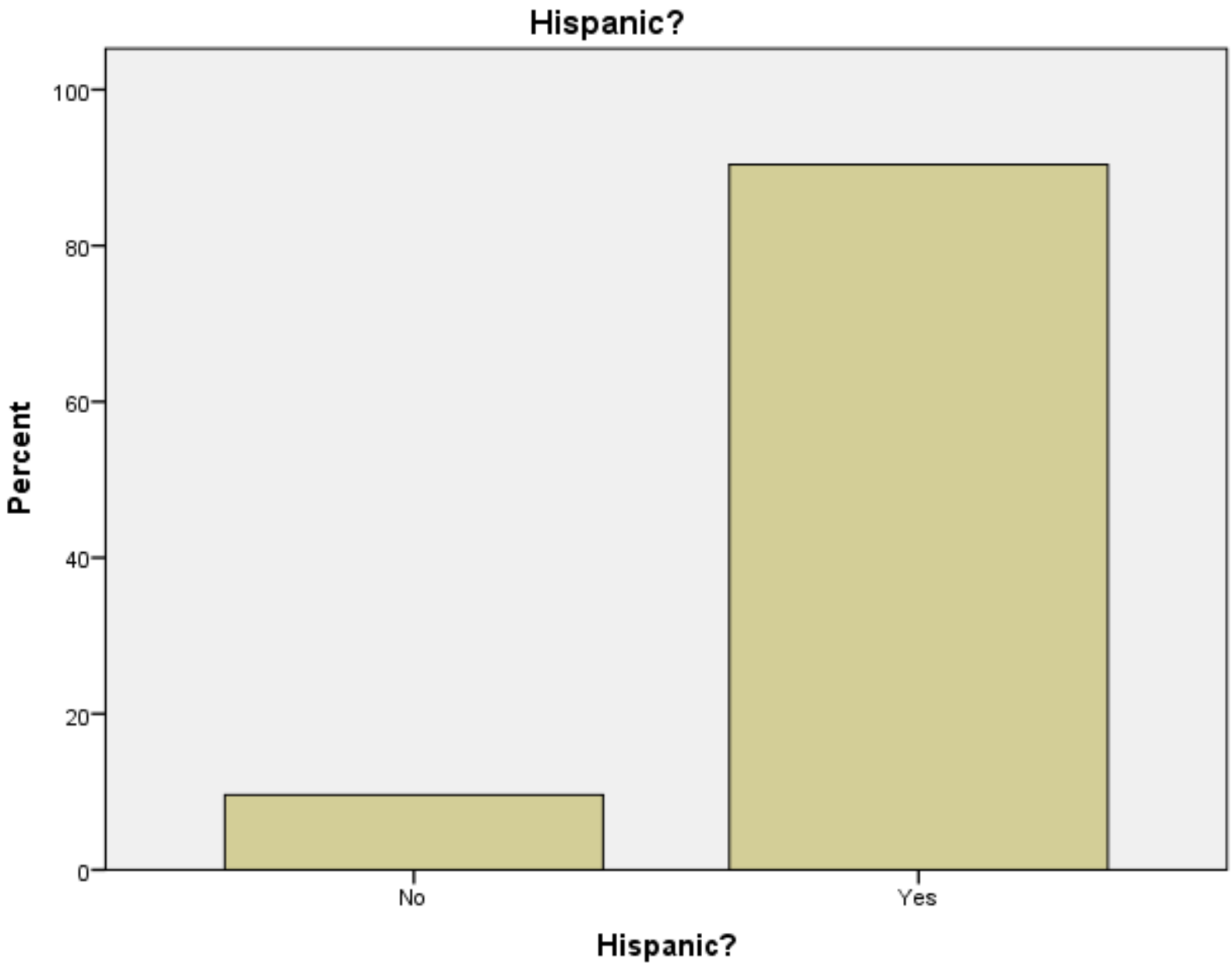
Probability of Mobile Device Ownership within CHMP

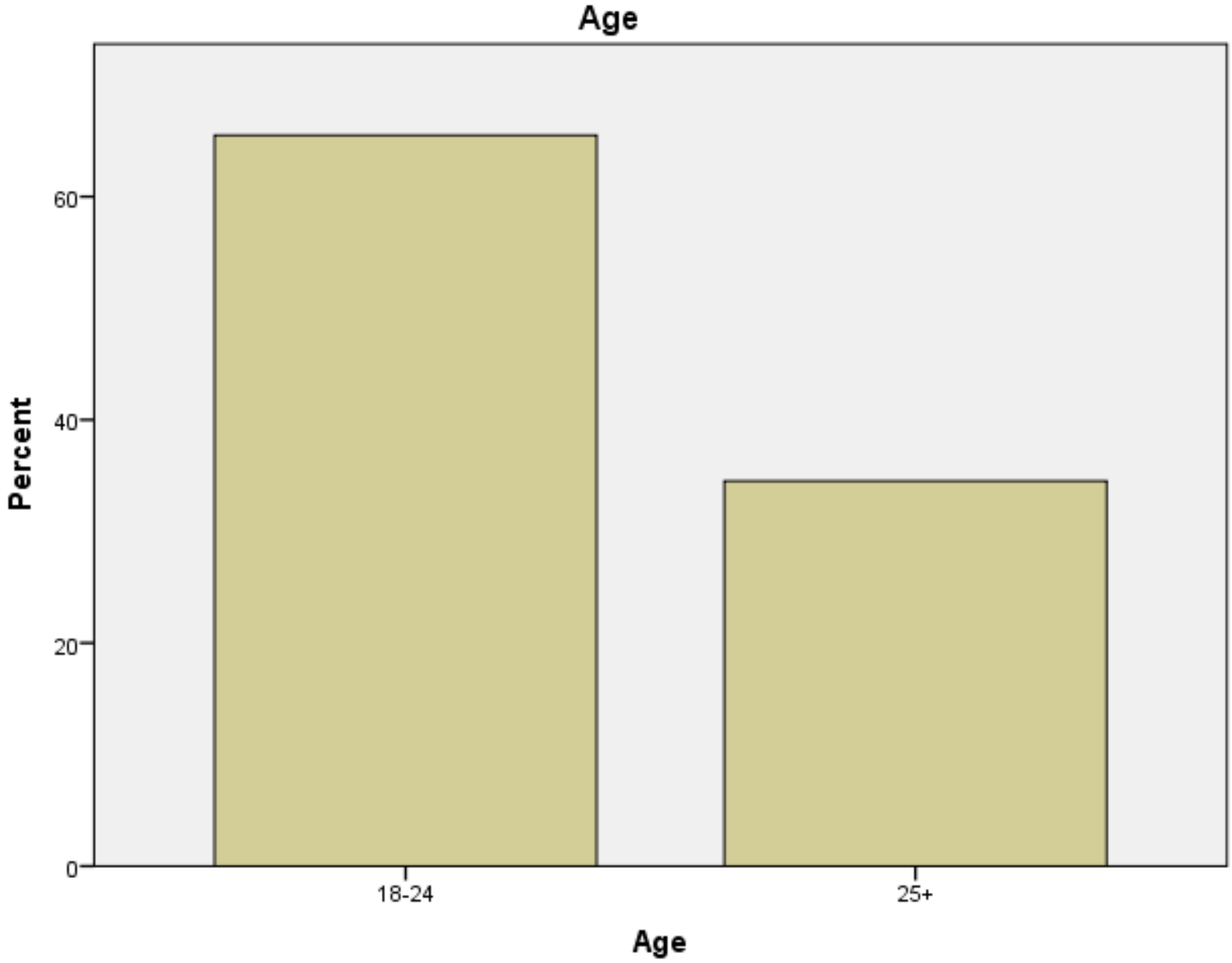
	% within device ownership		
Type of mobile device	With	Without	Probability
Laptop	42.4	42.2	1.01
Tablet/iPad	46.6	39.7	1.17
Smartphone	43.9	38.1	1.15

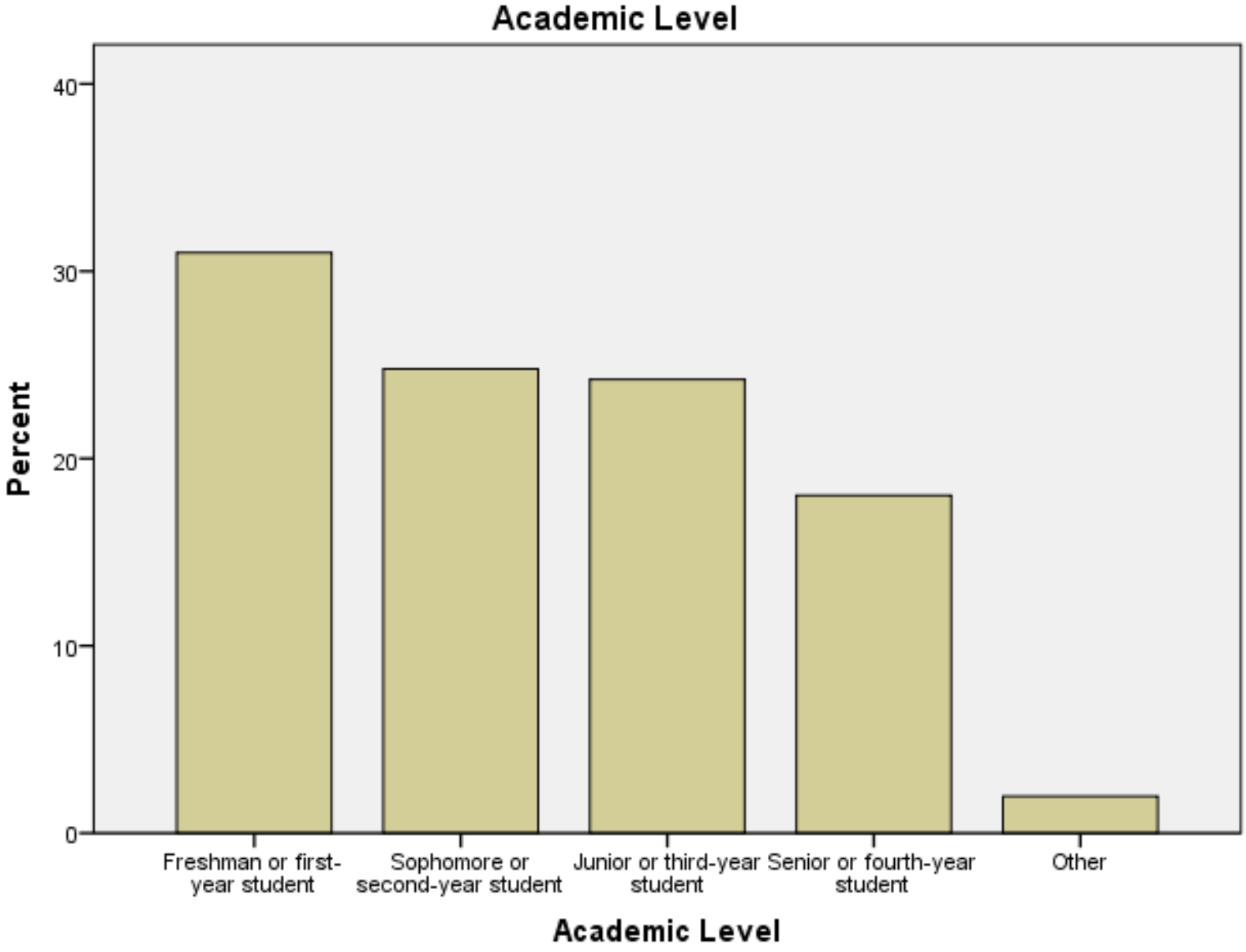

Sex
Percent
60
40
20
0
Male
Female
Prefer not to answer
Sex

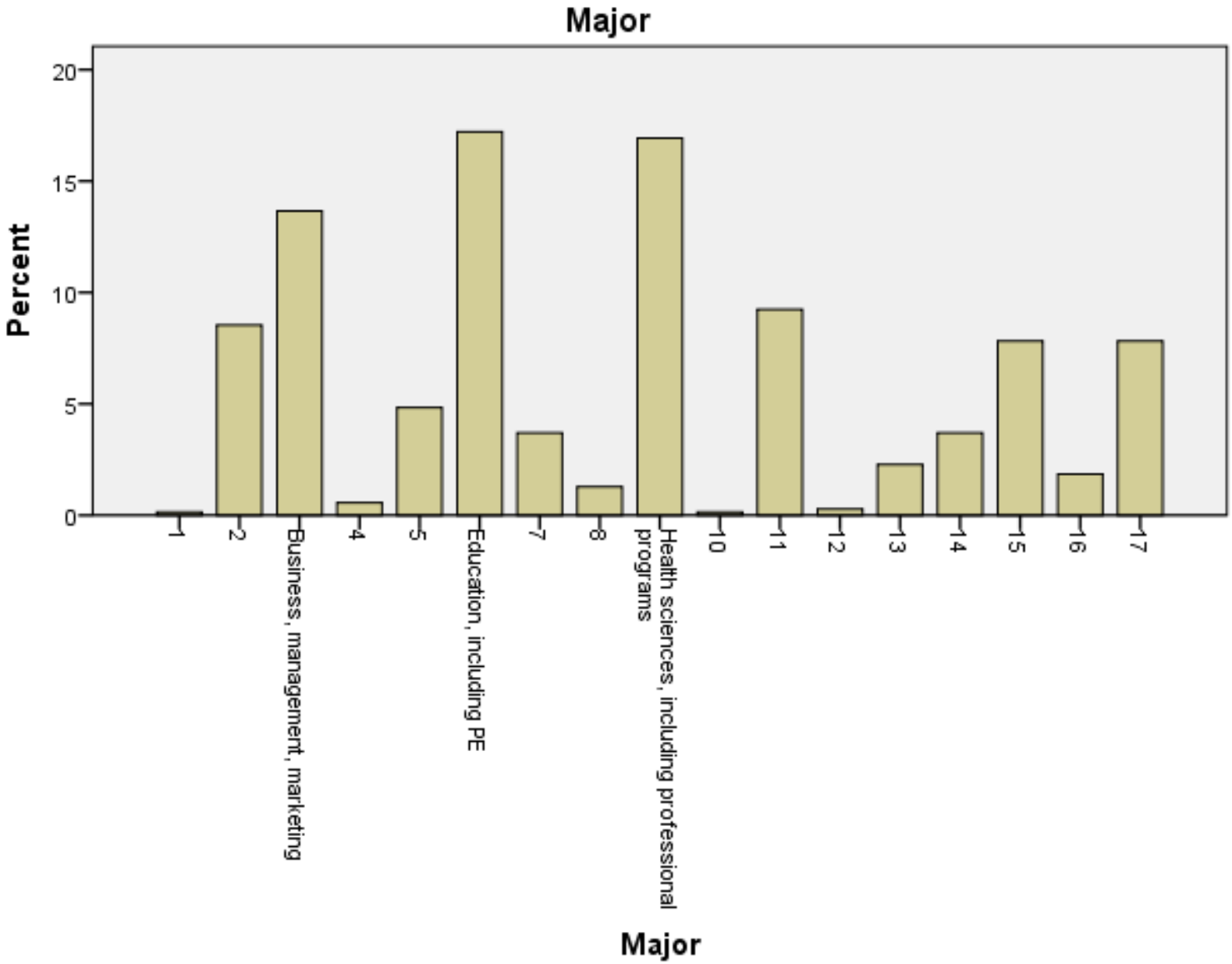

Full Time?
Percent
80
60
40
20
0
No
Yes
Full Time?

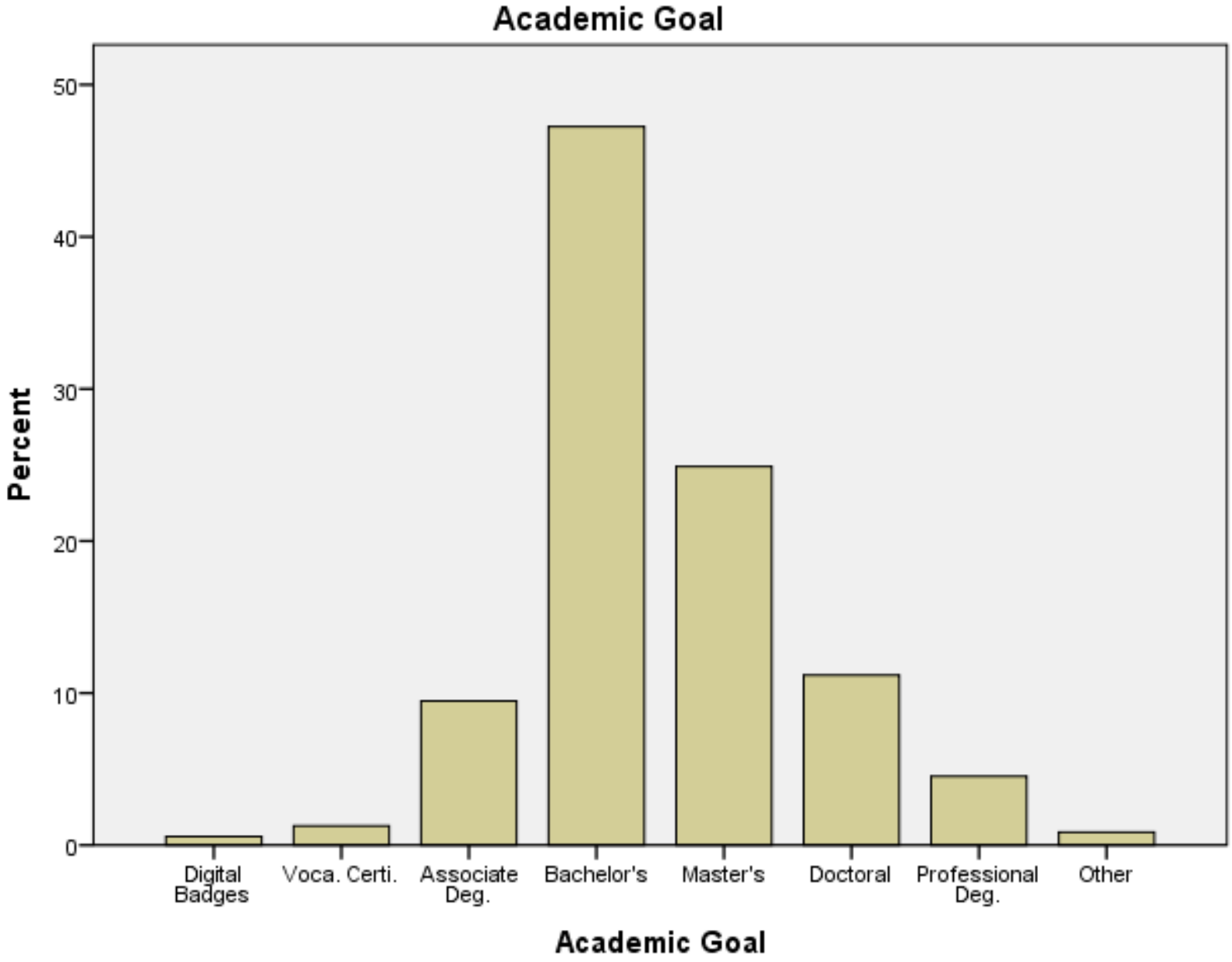

Class at another school?
Percent
100
80
60
40
20
0
No
Yes
Class at another school?

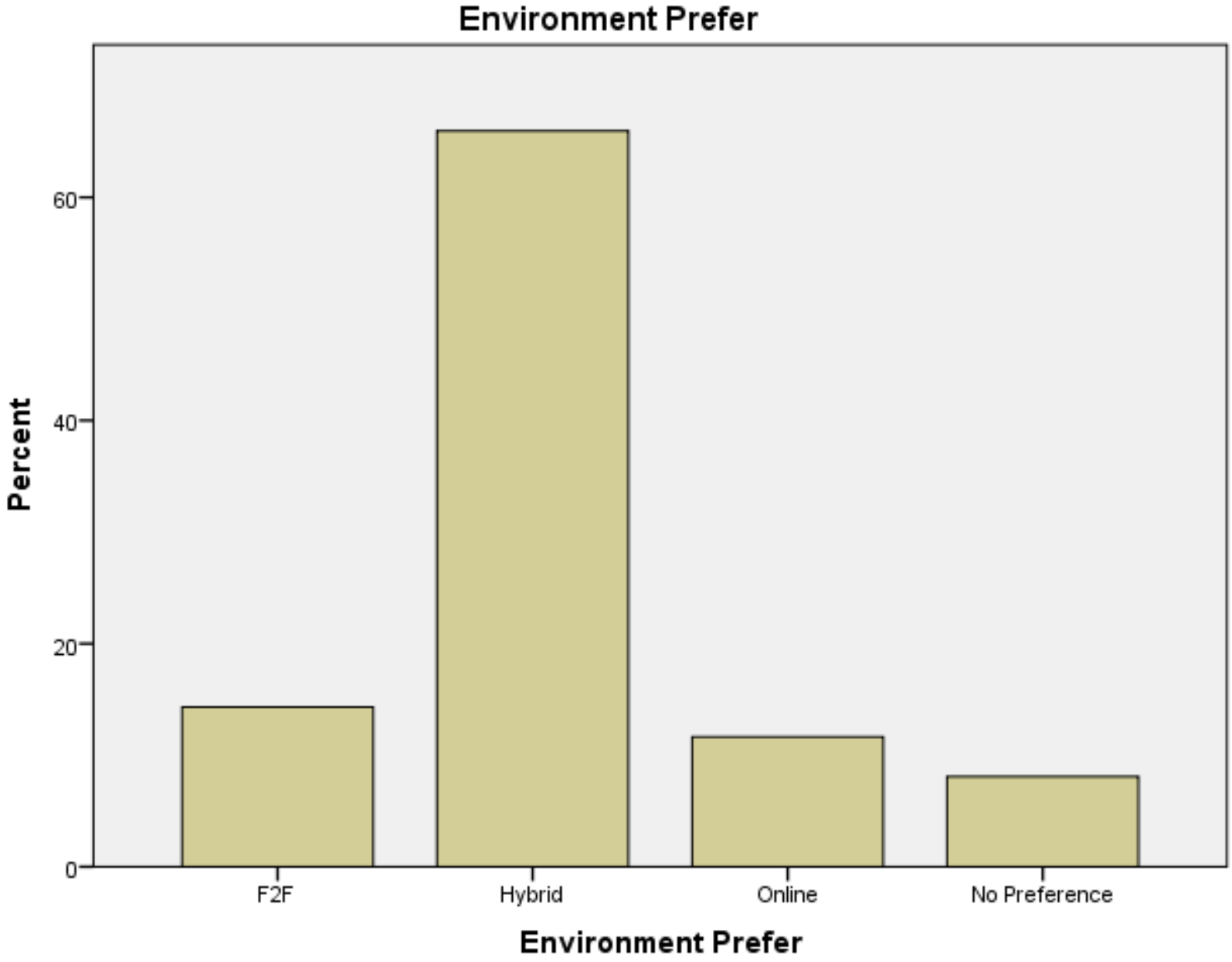

Hispanic?
Percent
100
80
60
40
20
0
No
Yes
Hispanic?


Age
Percent
60
40
20
0
18-24
25+
Age


Academic Level
Percent
40
30
20
10
0
Freshman or first-year student
Sophomore or second-year student
Junior or third-year student
Senior or fourth-year student
Other
Academic Level


Major
Percent
20
15
10
5
0
1
2
Business, management, marketing
4
5
Education, including PE
7
8
Health sciences, including professional programs
10
11
12
13
14
15
16
17
Major


Academic Goal
Percent
50
40
30
20
10
0
Digital Badges
Voca. Certi.
Associate Deg.
Bachelor's
Master's
Doctoral
Professional Deg.
Other
Academic Goal


Environment Prefer
Percent
60
40
20
0
F2F
Hybrid
Online
No Preference
Environment Prefer

PRIMARY CONTACT

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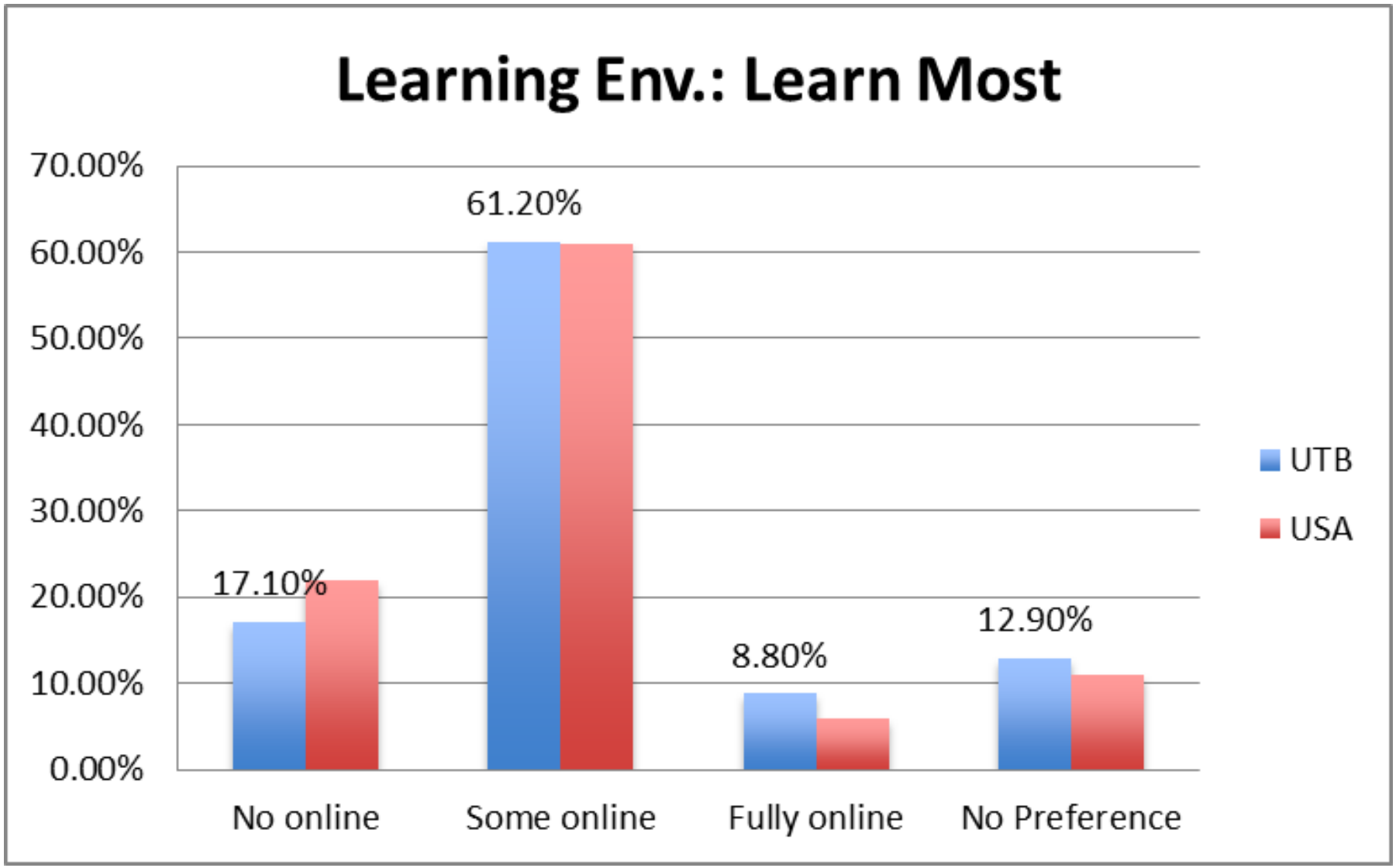
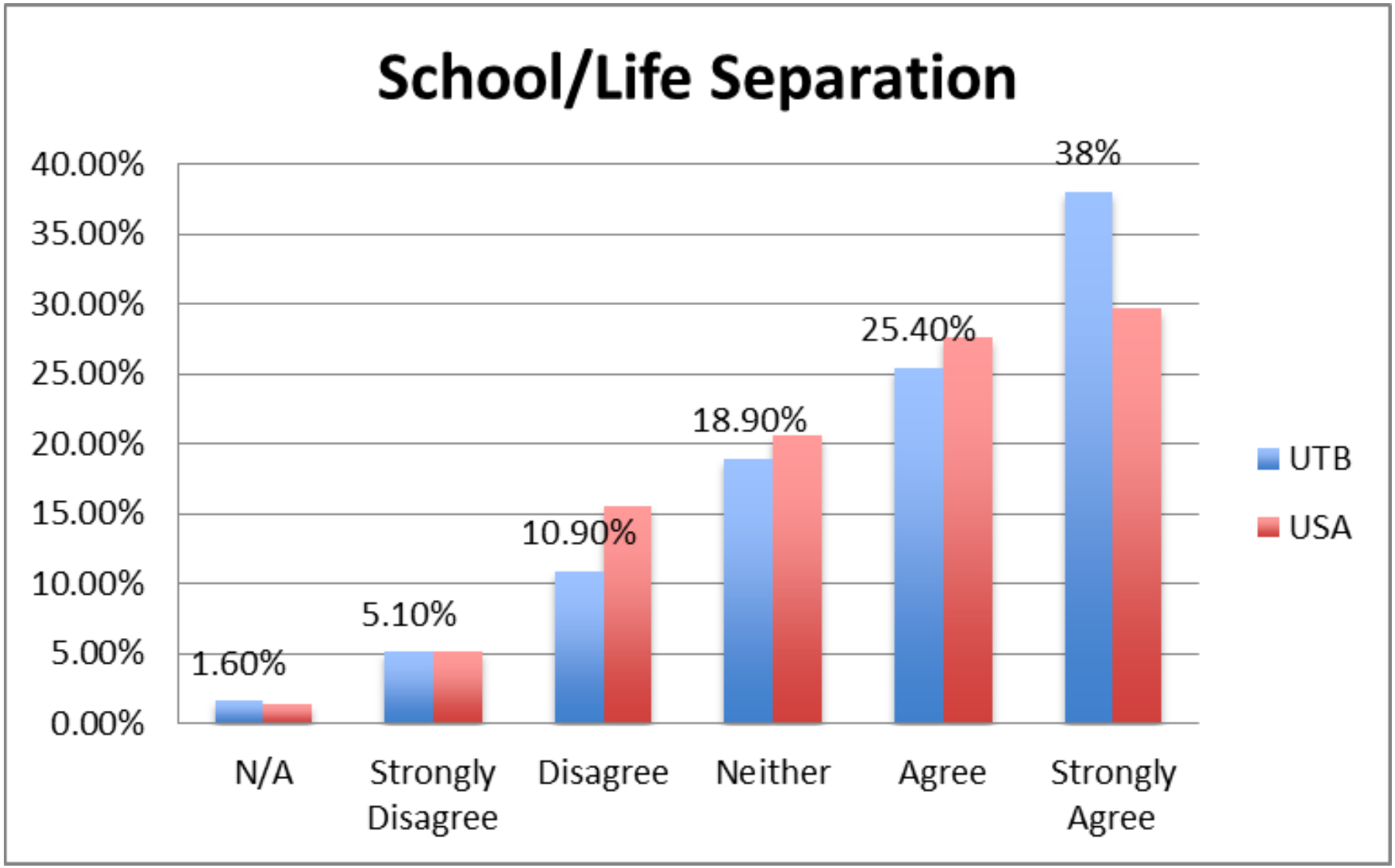
sam.pan@utrgv.edu

956-882-7805

Supplemental Materials


Learning Env.: Learn Most
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
61.20%
17.10%
8.80%
12.90%
No online
Some online
Fully online
No Preference
UTB
USA


School/Life Separation
40.00%
35.00%
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
1.60%
5.10%
10.90%
18.90%
25.40%
38%
N/A
Strongly Disagree
Disagree
Neither
Agree
Strongly Agree
UTB
USA

CMS is rated **very or extremely** important tool to achieve the academic success

UTB 85% (U.S.A. 70%)

Tests of Between-Subjects Effects

Dependent Variable: IIT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	489.723[a]	3	163.241	64.107	.000	.105
Intercept	9690.289	1	9690.289	3805.536	.000	.699
TSC_4100	489.723	3	163.241	64.107	.000	.105
Error	4178.587	1641	2.546			
Total	17926.000	1645				
Corrected Total	4668.310	1644				

a. R Squared = .105 (Adjusted R Squared = .103)

Levene's Test of Equality of Error Variances[a]

Dependent Variable: IIT

F	df1	df2	Sig.
4.727	3	1641	.003

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + TSC_4100

Robust Tests of Equality of Means

IIT

	Statistic[a]	df1	df2	Sig.
Welch	62.451	3	693.153	.000
Brown-Forsythe	64.652	3	1225.600	.000

a. Asymptotically F distributed.

Who's up for eLearning?

- Skilled in learning and communication technologies
- Having strong academic self-concept
- Appreciative of collaborative learning
- Good at time management and cognitive strategies

Who's a "happy" e-Learner?

- Facilitating learning
- Communicating ideas & info
- Respecting "me"

Test of Homogeneity of Variances
Levene Statistic, p = .003

Robust Tests of Equality of Means
Welch p < .001
Brown-Forsythe, p <.001

Games-Howell post doc test