Statistical Analysis in the first study for signed-up students

Table 1: Two-way ANOVA and Scheirer-Ray-Hare in the first study for signed-up students

	Sum Sq	Df	F value	Pr(>F)	Sig	Df	Sum Sq	H	p.value	Sig
difScore.(Intercept)	122.977	1	46.205	0.000						
difScore.Type	0.718	1	0.270	0.606		1	16.906	0.061	0.804	
difScore.CLRole	51.906	1	19.502	0.000	**	1	5127.194	18.612	0.000	**
difScore.Type:CLRole	1.425	1	0.535	0.468		1	123.516	0.448	0.503	
difScore.Residuals	141.063	53				53	10158.883			

Signif. codes: 0 “**” 0.01 “*” 0.05

Table 2: Summary of Pair wilcoxon in the first study for signed-up students

	Group	N	Median	Mean.Ranks	Sum.Ranks	U	Z	p.value	r	magnitude
difScore.Type:CLRole.greater.1	non-gamified.Apprentice	13	1.81	17.77	231.0	140.0	2.38	0.008	0.458	medium
difScore.Type:CLRole.greater.2	non-gamified.Master	14	0.62	10.50	147.0	140.0	2.38	0.008	0.458	medium
difScore.Type:CLRole.two.sided.1	non-gamified.Apprentice	13	1.81	17.77	231.0	140.0	2.38	0.016	0.458	medium
difScore.Type:CLRole.two.sided.2	non-gamified.Master	14	0.62	10.50	147.0	140.0	2.38	0.016	0.458	medium
difScore.Type:CLRole.greater.11	non-gamified.Apprentice	13	1.81	18.88	245.5	154.5	2.63	0.004	0.496	medium
difScore.Type:CLRole.greater.21	ont-gamified.Master	15	0.43	10.70	160.5	154.5	2.63	0.004	0.496	medium
difScore.Type:CLRole.two.sided.11	non-gamified.Apprentice	13	1.81	18.88	245.5	154.5	2.63	0.007	0.496	medium
difScore.Type:CLRole.two.sided.21	ont-gamified.Master	15	0.43	10.70	160.5	154.5	2.63	0.007	0.496	medium
difScore.Type:CLRole.less.1	non-gamified.Master	14	0.62	9.64	135.0	30.0	−3.27	0.000	0.608	large
difScore.Type:CLRole.less.2	ont-gamified.Apprentice	15	2.37	20.00	300.0	30.0	−3.27	0.000	0.608	large
difScore.Type:CLRole.two.sided.12	non-gamified.Master	14	0.62	9.64	135.0	30.0	−3.27	0.001	0.608	large
difScore.Type:CLRole.two.sided.22	ont-gamified.Apprentice	15	2.37	20.00	300.0	30.0	−3.27	0.001	0.608	large
difScore.Type:CLRole.greater.12	ont-gamified.Apprentice	15	2.37	21.47	322.0	202.0	3.71	0.000	0.678	large
difScore.Type:CLRole.greater.22	ont-gamified.Master	15	0.43	9.53	143.0	202.0	3.71	0.000	0.678	large
difScore.Type:CLRole.two.sided.13	ont-gamified.Apprentice	15	2.37	21.47	322.0	202.0	3.71	0.000	0.678	large
difScore.Type:CLRole.two.sided.23	ont-gamified.Master	15	0.43	9.53	143.0	202.0	3.71	0.000	0.678	large

1 Assumptions for Parametric Tests

Table 3: Univariate normality test in the first study for signed-up students

	normality.fail	W	p.value
difScore	FALSE	0.963	0.077

Table 4: Notes to be taken into account about sample size in the first study for signed-up students

	code	description
difScore.Type.1	WARN: sample.size	current size is 13 and recommended size is 15 for the group: 'non-gamified:Apprentice'.
difScore.Type.2	WARN: sample.size	current size is 14 and recommended size is 15 for the group: 'non-gamified:Master'.

Recent studies carried out through simulations have indicated that ANOVA is reliable even when the data are non-normally distributed and the sample size is greater thatn 15 observations for each group. This size value is based on the Reference: Rana, R. K., Singhal, R., & Dua, P. (2016). Deciphering the dilemma of parametric and nonparametric tests. Journal of the Practice of Cardiovascular Sciences, 2(2), 95.

The sample size to carried out any parametric and non-parametric analysis is 5, and it was established using common sense. The warning and fails indicated in this section should be taking into account when a paper or report will be elaborated.