Statistical Analysis in the first study for students with effective participation

Table 1: Two-way ANOVA and Scheirer-Ray-Hare in the first study for students with effective participation

	Sum Sq	Df	F value	Pr(>F)	Sig	Df	Sum Sq	H	p.value	Sig
difScore.(Intercept)	101.714	1	37.278	0.000						
difScore.Type	0.255	1	0.093	0.761		1	1.789	0.010	0.922	
difScore.CLRole	30.625	1	11.224	0.002	**	1	2531.806	13.469	0.000	**
difScore.Type:CLRole	5.620	1	2.060	0.158		1	286.291	1.523	0.217	
difScore.Residuals	117.327	43				43	5827.114			

Signif. codes: 0 “**” 0.01 “*” 0.05

Table 2: Summary of Pair wilcoxon in the first study for students with effective participation

	Group	N	Median	Mean.Ranks	Sum.Ranks	U	Z	p.value	r	magnitude
difScore.Type:CLRole.greater.1	non-gamified.Apprentice	10	1.66	16.15	161.5	106.5	2.14	0.016	0.436	medium
difScore.Type:CLRole.greater.2	ont-gamified.Master	14	0.30	9.89	138.5	106.5	2.14	0.016	0.436	medium
difScore.Type:CLRole.two.sided.1	non-gamified.Apprentice	10	1.66	16.15	161.5	106.5	2.14	0.032	0.436	medium
difScore.Type:CLRole.two.sided.2	ont-gamified.Master	14	0.30	9.89	138.5	106.5	2.14	0.032	0.436	medium
difScore.Type:CLRole.less.1	non-gamified.Master	9	0.66	7.67	69.0	24.0	−2.46	0.006	0.512	large
difScore.Type:CLRole.less.2	ont-gamified.Apprentice	14	2.72	14.79	207.0	24.0	−2.46	0.006	0.512	large
difScore.Type:CLRole.two.sided.11	non-gamified.Master	9	0.66	7.67	69.0	24.0	−2.46	0.013	0.512	large
difScore.Type:CLRole.two.sided.21	ont-gamified.Apprentice	14	2.72	14.79	207.0	24.0	−2.46	0.013	0.512	large
difScore.Type:CLRole.greater.11	ont-gamified.Apprentice	14	2.72	20.21	283.0	178.0	3.68	0.000	0.695	large
difScore.Type:CLRole.greater.21	ont-gamified.Master	14	0.30	8.79	123.0	178.0	3.68	0.000	0.695	large
difScore.Type:CLRole.two.sided.12	ont-gamified.Apprentice	14	2.72	20.21	283.0	178.0	3.68	0.000	0.695	large
difScore.Type:CLRole.two.sided.22	ont-gamified.Master	14	0.30	8.79	123.0	178.0	3.68	0.000	0.695	large

1 Assumptions for Parametric Tests

Table 3: Univariate normality test in the first study for students with effective participation

	normality.fail	W	p.value
difScore	FALSE	0.957	0.078

Table 4: Notes to be taken into account about sample size in the first study for students with effective participation

	code	description
difScore.Type.1	WARN: sample.size	current size is 10 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: 'ont-gamified:Apprentice'.
difScore.Type.3	WARN: sample.size	current size is 9 and recommended size is 15 for the group: 'non-gamified:Master'.
difScore.Type.4	WARN: sample.size	current size is 14 and recommended size is 15 for the group: 'ont-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.