

Statistical Analysis in the third study for students with effective participation

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

	Sum Sq	Df	F value	Pr(>F)	Sig	Df	Sum Sq	H	p.value	Sig
gain.theta.(Intercept)	0.026	1	5.277	0.028						
gain.theta.Type	0.029	1	5.837	0.021	*	1	1040.474	7.251	0.007	**
gain.theta.CLRole	0.044	1	9.001	0.005	**	1	668.969	4.662	0.031	*
gain.theta.Type:CLRole	0.003	1	0.711	0.405		1	0.004	0.000	0.996	
gain.theta.Residuals	0.177	36				37	4030.053			

Signif. codes: 0 “***” 0.01 “**” 0.05

Table 2: Summary of Tukey post-hoc in the third study for students with effective participation

	N	mean	lsmean	SE	df	lwr.CI	upr.CI	t.ratio	p.value	p.adj	g	sig	mag
ont-gamified - w/o-gamified	40	0.071	0.059	0.024		0.026	0.116	2.416	0.021	0.003	0.904	**	large
ont-gamified.Apprentice - w/o-gamified.Apprentice	28	0.079	0.079	0.027		0.007	0.151	2.954	0.006	0.027	1.160	*	large

Table 3: Summary of Pair wilcoxon in the third study for students with effective participation

	Group	N	Median	Mean.Ranks	Sum.Ranks	U	Z	p.value	r	magnitude
gain.theta.Type.greater.1	ont-gamified	23	0.04	25.46	585.5	309.5	2.69	0.003	0.421	medium
gain.theta.Type.greater.2	w/o-gamified	18	-0.05	15.31	275.5	309.5	2.69	0.003	0.421	medium
gain.theta.Type.two.sided.1	ont-gamified	23	0.04	25.46	585.5	309.5	2.69	0.006	0.421	medium
gain.theta.Type.two.sided.2	w/o-gamified	18	-0.05	15.31	275.5	309.5	2.69	0.006	0.421	medium
gain.theta.Type:CLRole.greater.1	ont-gamified.Apprentice	16	0.07	17.97	287.5	151.5	2.58	0.004	0.487	medium
gain.theta.Type:CLRole.greater.2	w/o-gamified.Apprentice	12	-0.03	9.88	118.5	151.5	2.58	0.004	0.487	medium
gain.theta.Type:CLRole.two.sided.1	ont-gamified.Apprentice	16	0.07	17.97	287.5	151.5	2.58	0.009	0.487	medium
gain.theta.Type:CLRole.two.sided.2	w/o-gamified.Apprentice	12	-0.03	9.88	118.5	151.5	2.58	0.009	0.487	medium
gain.theta.Type:CLRole.greater.11	ont-gamified.Apprentice	16	0.07	13.94	223.0	87.0	2.88	0.001	0.613	large
gain.theta.Type:CLRole.greater.21	w/o-gamified.Master	6	-0.08	5.00	30.0	87.0	2.88	0.001	0.613	large
gain.theta.Type:CLRole.two.sided.11	ont-gamified.Apprentice	16	0.07	13.94	223.0	87.0	2.88	0.002	0.613	large
gain.theta.Type:CLRole.two.sided.21	w/o-gamified.Master	6	-0.08	5.00	30.0	87.0	2.88	0.002	0.613	large
gain.theta.Type:CLRole.greater.12	w/o-gamified.Apprentice	12	-0.03	11.33	136.0	58.0	2.06	0.021	0.486	medium
gain.theta.Type:CLRole.greater.22	w/o-gamified.Master	6	-0.08	5.83	35.0	58.0	2.06	0.021	0.486	medium
gain.theta.Type:CLRole.two.sided.12	w/o-gamified.Apprentice	12	-0.03	11.33	136.0	58.0	2.06	0.041	0.486	medium
gain.theta.Type:CLRole.two.sided.22	w/o-gamified.Master	6	-0.08	5.83	35.0	58.0	2.06	0.041	0.486	medium