

Summary of nonparametric statistics analysis for Differences of Scores in the third study for students with effective participation

Table 1: Summary of Scheirer-Ray-Hare results for Differences of Scores in the third study for students with effective participation

	Df	Sum Sq	H	p.value	Sig
difScore					
difScore:Type	1	1449.954	10.104	0.001	**
difScore:CLRole	1	730.485	5.090	0.024	*
difScore:Type:CLRole	1	5.159	0.036	0.850	
difScore:Residuals	37	3554.402			

Signif. codes: 0 ‘***’ 0.01 ‘**’ 0.05

Table 2: Descriptive statistic of the pair wilcoxon analysis for Differences of Scores in the third study for students with effective participation

	Group	N	Median	Mean.Ranks	Sum.Ranks	U	Z	p.value	r	magnitude
Type.greater.1	ont-gamified	23	2.24	26.26	604	328	3.18	0.001	0.496	medium
Type.greater.2	w/o-gamified	18	-1.15	14.28	257	328	3.18	0.001	0.496	medium
Type.two.sided.1	ont-gamified	23	2.24	26.26	604	328	3.18	0.001	0.496	medium
Type.two.sided.2	w/o-gamified	18	-1.15	14.28	257	328	3.18	0.001	0.496	medium
Type:CLRole.greater.1	ont-gamified.Apprentice	16	2.58	18.12	290	154	2.69	0.003	0.509	large
Type:CLRole.greater.2	w/o-gamified.Apprentice	12	-0.60	9.67	116	154	2.69	0.003	0.509	large
Type:CLRole.greater.21	ont-gamified.Apprentice	16	2.58	18.12	290	154	2.69	0.006	0.509	large
Type:CLRole.two.sided.2	w/o-gamified.Apprentice	12	-0.60	9.67	116	154	2.69	0.006	0.509	large
Type:CLRole.greater.11	ont-gamified.Apprentice	16	2.58	14.19	227	91	3.17	0.000	0.676	large
Type:CLRole.greater.21	w/o-gamified.Master	6	-3.31	4.33	26	91	3.17	0.000	0.676	large
Type:CLRole.two.sided.11	ont-gamified.Apprentice	16	2.58	14.19	227	91	3.17	0.001	0.676	large
Type:CLRole.two.sided.21	w/o-gamified.Master	6	-3.31	4.33	26	91	3.17	0.001	0.676	large
Type:CLRole.greater.12	ont-gamified.Master	7	1.06	9.29	65	37	2.29	0.011	0.634	large
Type:CLRole.greater.22	w/o-gamified.Master	6	-3.31	4.33	26	37	2.29	0.011	0.634	large
Type:CLRole.two.sided.12	ont-gamified.Master	7	1.06	9.29	65	37	2.29	0.022	0.634	large
Type:CLRole.two.sided.22	w/o-gamified.Master	6	-3.31	4.33	26	37	2.29	0.022	0.634	large
Type:CLRole.greater.13	w/o-gamified.Apprentice	12	-0.60	11.25	135	57	1.97	0.026	0.464	medium
Type:CLRole.greater.23	w/o-gamified.Master	6	-3.31	6.00	36	57	1.97	0.026	0.464	medium

Table 3: Full descriptive statistic of the pair wilcoxon analysis for Differences of Scores in the third study for students with effective participation

	Group	N	Median	Mean.Ranks	Sum.Ranks	U	Z	p.value	r	magnitude
Type.less.1	ont-gamified	23	2.24	26.26	604	328	3.18	1.000	0.496	medium
Type.less.2	w/o-gamified	18	-1.15	14.28	257	328	3.18	1.000	0.496	medium
Type.greater.1	ont-gamified	23	2.24	26.26	604	328	3.18	0.001	0.496	medium
Type.greater.2	w/o-gamified	18	-1.15	14.28	257	328	3.18	0.001	0.496	medium
Type.two.sided.1	ont-gamified	23	2.24	26.26	604	328	3.18	0.001	0.496	medium
Type.two.sided.2	w/o-gamified	18	-1.15	14.28	257	328	3.18	0.001	0.496	medium
Type:CLRole.less.1	ont-gamified.Apprentice	16	2.58	13.50	216	80	1.60	0.949	0.334	medium
Type:CLRole.less.2	ont-gamified.Master	7	1.06	8.57	60	80	1.60	0.949	0.334	medium
Type:CLRole.greater.1	ont-gamified.Apprentice	16	2.58	13.50	216	80	1.60	0.059	0.334	medium
Type:CLRole.greater.2	ont-gamified.Master	7	1.06	8.57	60	80	1.60	0.059	0.334	medium
Type:CLRole.two.sided.1	ont-gamified.Apprentice	16	2.58	13.50	216	80	1.60	0.118	0.334	medium
Type:CLRole.two.sided.2	ont-gamified.Apprentice	7	1.06	8.57	60	80	1.60	0.118	0.334	medium
Type:CLRole.less.11	ont-gamified.Apprentice	16	2.58	18.12	290	154	2.69	0.997	0.509	large
Type:CLRole.less.21	w/o-gamified.Apprentice	12	-0.60	9.67	116	154	2.69	0.997	0.509	large
Type:CLRole.greater.11	ont-gamified.Apprentice	16	2.58	18.12	290	154	2.69	0.003	0.509	large
Type:CLRole.greater.21	w/o-gamified.Apprentice	12	-0.60	9.67	116	154	2.69	0.003	0.509	large
Type:CLRole.two.sided.11	ont-gamified.Apprentice	16	2.58	18.12	290	154	2.69	0.006	0.509	large
Type:CLRole.two.sided.21	w/o-gamified.Apprentice	12	-0.60	9.67	116	154	2.69	0.006	0.509	large
Type:CLRole.less.12	ont-gamified.Apprentice	16	2.58	14.19	227	91	3.17	1.000	0.676	large
Type:CLRole.less.22	w/o-gamified.Master	6	-3.31	4.33	26	91	3.17	1.000	0.676	large
Type:CLRole.greater.12	ont-gamified.Apprentice	16	2.58	14.19	227	91	3.17	0.000	0.676	large
Type:CLRole.greater.22	w/o-gamified.Master	6	-3.31	4.33	26	91	3.17	0.000	0.676	large
Type:CLRole.two.sided.12	ont-gamified.Apprentice	16	2.58	14.19	227	91	3.17	0.001	0.676	large
Type:CLRole.two.sided.22	w/o-gamified.Master	6	-3.31	4.33	26	91	3.17	0.001	0.676	large
Type:CLRole.less.13	ont-gamified.Master	7	1.06	10.57	74	46	0.34	0.645	0.078	none
Type:CLRole.less.23	w/o-gamified.Apprentice	12	-0.60	9.67	116	46	0.34	0.645	0.078	none
Type:CLRole.greater.13	ont-gamified.Master	7	1.06	10.57	74	46	0.34	0.387	0.078	none
Type:CLRole.greater.23	w/o-gamified.Apprentice	12	-0.60	9.67	116	46	0.34	0.387	0.078	none
Type:CLRole.two.sided.13	ont-gamified.Master	7	1.06	10.57	74	46	0.34	0.773	0.078	none
Type:CLRole.two.sided.23	w/o-gamified.Apprentice	12	-0.60	9.67	116	46	0.34	0.773	0.078	none
Type:CLRole.less.14	ont-gamified.Master	7	1.06	9.29	65	37	2.29	0.993	0.634	large
Type:CLRole.less.24	w/o-gamified.Master	6	-3.31	4.33	26	37	2.29	0.993	0.634	large
Type:CLRole.greater.14	ont-gamified.Master	7	1.06	9.29	65	37	2.29	0.011	0.634	large
Type:CLRole.greater.24	w/o-gamified.Master	6	-3.31	4.33	26	37	2.29	0.011	0.634	large
Type:CLRole.two.sided.14	ont-gamified.Master	7	1.06	9.29	65	37	2.29	0.022	0.634	large

Table 3: *(continued)*

	Group	N	Median	Mean.Ranks	Sum.Ranks	U	Z	p.value	r	magnitude
Type:CLRole.two.sided.24	w/o-gamified.Master	6	-3.31	4.33	26	37	2.29	0.022	0.634	large
Type:CLRole.less.15	w/o-gamified.Apprentice	12	-0.60	11.25	135	57	1.97	0.979	0.464	medium
Type:CLRole.less.25	w/o-gamified.Master	6	-3.31	6.00	36	57	1.97	0.979	0.464	medium
Type:CLRole.greater.15	w/o-gamified.Apprentice	12	-0.60	11.25	135	57	1.97	0.026	0.464	medium
Type:CLRole.greater.25	w/o-gamified.Master	6	-3.31	6.00	36	57	1.97	0.026	0.464	medium

Table 3: *(continued)*

	Group	N	Median	Mean.Ranks	Sum.Ranks	U	Z	p.value	r	magnitude
Type:CLRole.two.sided.15	w/o-gamified.Apprentice	12	-0.60	11.25	135	57	1.97	0.053	0.464	medium
Type:CLRole.two.sided.25	w/o-gamified.Master	6	-3.31	6.00	36	57	1.97	0.053	0.464	medium