

# Summary of nonparametric statistics analysis for Gain in Skill/Knowledge as the latent trait estimates in the first study for signed up students

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Table 1: Summary of Scheirer-Ray-Hare results for Gain in Skill/Knowledge as the latent trait estimates in the first study for signed up students

	Df	Sum Sq	H	p.value	Sig
gain.theta					
gain.theta:Type	1	0.281	0.001	0.975	
gain.theta:CLRole	1	3459.620	12.558	0.000	**
gain.theta:Type:CLRole	1	475.858	1.727	0.189	
gain.theta:Residuals	53	11492.240			

Signif. codes: 0 “\*\*” 0.01 “\*” 0.05

Table 2: Descriptive statistic of the pair wilcoxon analysis for Gain in Skill/Knowledge as the latent trait estimates in the first study for signed up students

	Group	N	Median	Mean.Ranks	Sum.Ranks	U	Z	p.value	r	magnitude
Type:CLRole.greater.1	non-gamified.Apprentice	13	0.58	19.31	251	160	2.88	0.002	0.544	large
Type:CLRole.greater.2	ont-gamified.Master	15	0.34	10.33	155	160	2.88	0.002	0.544	large
Type:CLRole.two.sided.1	non-gamified.Apprentice	13	0.58	19.31	251	160	2.88	0.003	0.544	large
Type:CLRole.two.sided.2	ont-gamified.Master	15	0.34	10.33	155	160	2.88	0.003	0.544	large
Type:CLRole.less.1	non-gamified.Master	14	0.31	11.64	163	58	-2.05	0.021	0.381	medium
Type:CLRole.less.2	ont-gamified.Apprentice	15	0.66	18.13	272	58	-2.05	0.021	0.381	medium
Type:CLRole.two.sided.11	non-gamified.Master	14	0.31	11.64	163	58	-2.05	0.041	0.381	medium
Type:CLRole.two.sided.21	ont-gamified.Apprentice	15	0.66	18.13	272	58	-2.05	0.041	0.381	medium
Type:CLRole.greater.11	ont-gamified.Apprentice	15	0.66	21.13	317	197	3.50	0.000	0.640	large
Type:CLRole.greater.21	ont-gamified.Master	15	0.34	9.87	148	197	3.50	0.000	0.640	large
Type:CLRole.two.sided.12	ont-gamified.Apprentice	15	0.66	21.13	317	197	3.50	0.000	0.640	large
Type:CLRole.two.sided.22	ont-gamified.Master	15	0.34	9.87	148	197	3.50	0.000	0.640	large

Table 3: Full descriptive statistic of the pair wilcoxon analysis for Gain in Skill/Knowledge as the latent trait estimates in the first study for signed up students

	Group	N	Median	Mean.Ranks	Sum.Ranks	U	Z	p.value	r	magnitude
Type.less.1	non-gamified	27	0.50	28.93	781	403	-0.03	0.491	0.004	none
Type.less.2	ont-gamified	30	0.45	29.07	872	403	-0.03	0.491	0.004	none
Type.greater.1	non-gamified	27	0.50	28.93	781	403	-0.03	0.516	0.004	none
Type.greater.2	ont-gamified	30	0.45	29.07	872	403	-0.03	0.516	0.004	none
Type.two.sided.1	non-gamified	27	0.50	28.93	781	403	-0.03	0.981	0.004	none
Type.two.sided.2	ont-gamified	30	0.45	29.07	872	403	-0.03	0.981	0.004	none
Type:CLRole.less.1	non-gamified.Apprentice	13	0.58	16.15	210	119	1.36	0.915	0.261	small
Type:CLRole.less.2	non-gamified.Master	14	0.31	12.00	168	119	1.36	0.915	0.261	small
Type:CLRole.greater.1	non-gamified.Apprentice	13	0.58	16.15	210	119	1.36	0.093	0.261	small
Type:CLRole.greater.2	non-gamified.Master	14	0.31	12.00	168	119	1.36	0.093	0.261	small
Type:CLRole.two.sided.1	non-gamified.Apprentice	13	0.58	16.15	210	119	1.36	0.185	0.261	small
Type:CLRole.two.sided.2	non-gamified.Master	14	0.31	12.00	168	119	1.36	0.185	0.261	small
Type:CLRole.less.11	non-gamified.Apprentice	13	0.58	12.38	161	70	-1.27	0.109	0.239	small
Type:CLRole.less.21	ont-gamified.Apprentice	15	0.66	16.33	245	70	-1.27	0.109	0.239	small
Type:CLRole.greater.11	non-gamified.Apprentice	13	0.58	12.38	161	70	-1.27	0.900	0.239	small
Type:CLRole.greater.21	ont-gamified.Apprentice	15	0.66	16.33	245	70	-1.27	0.900	0.239	small
Type:CLRole.two.sided.11	non-gamified.Apprentice	13	0.58	12.38	161	70	-1.27	0.217	0.239	small
Type:CLRole.two.sided.21	ont-gamified.Apprentice	15	0.66	16.33	245	70	-1.27	0.217	0.239	small
Type:CLRole.less.12	non-gamified.Apprentice	13	0.58	19.31	251	160	2.88	0.999	0.544	large
Type:CLRole.less.22	ont-gamified.Master	15	0.34	10.33	155	160	2.88	0.999	0.544	large
Type:CLRole.greater.12	non-gamified.Apprentice	13	0.58	19.31	251	160	2.88	0.002	0.544	large
Type:CLRole.greater.22	ont-gamified.Master	15	0.34	10.33	155	160	2.88	0.002	0.544	large
Type:CLRole.two.sided.12	non-gamified.Apprentice	13	0.58	19.31	251	160	2.88	0.003	0.544	large
Type:CLRole.two.sided.22	ont-gamified.Master	15	0.34	10.33	155	160	2.88	0.003	0.544	large
Type:CLRole.less.13	non-gamified.Master	14	0.31	11.64	163	58	-2.05	0.021	0.381	medium
Type:CLRole.less.23	ont-gamified.Apprentice	15	0.66	18.13	272	58	-2.05	0.021	0.381	medium
Type:CLRole.greater.13	non-gamified.Master	14	0.31	11.64	163	58	-2.05	0.982	0.381	medium
Type:CLRole.greater.23	ont-gamified.Apprentice	15	0.66	18.13	272	58	-2.05	0.982	0.381	medium
Type:CLRole.two.sided.13	non-gamified.Master	14	0.31	11.64	163	58	-2.05	0.041	0.381	medium
Type:CLRole.two.sided.23	ont-gamified.Apprentice	15	0.66	18.13	272	58	-2.05	0.041	0.381	medium
Type:CLRole.less.14	non-gamified.Master	14	0.31	15.71	220	115	0.44	0.674	0.081	none
Type:CLRole.less.24	ont-gamified.Master	15	0.34	14.33	215	115	0.44	0.674	0.081	none
Type:CLRole.greater.14	non-gamified.Master	14	0.31	15.71	220	115	0.44	0.341	0.081	none
Type:CLRole.greater.24	ont-gamified.Master	15	0.34	14.33	215	115	0.44	0.341	0.081	none
Type:CLRole.two.sided.14	non-gamified.Master	14	0.31	15.71	220	115	0.44	0.683	0.081	none
Type:CLRole.two.sided.24	ont-gamified.Master	15	0.34	14.33	215	115	0.44	0.683	0.081	none
Type:CLRole.less.15	ont-gamified.Apprentice	15	0.66	21.13	317	197	3.50	1.000	0.640	large

Table 3: *(continued)*

	Group	N	Median	Mean.Ranks	Sum.Ranks	U	Z	p.value	r	magnitude
Type:CLRole.less.25	ont-gamified.Master	15	0.34	9.87	148	197	3.50	1.000	0.640	large
Type:CLRole.greater.15	ont-gamified.Apprentice	15	0.66	21.13	317	197	3.50	0.000	0.640	large
Type:CLRole.greater.25	ont-gamified.Master	15	0.34	9.87	148	197	3.50	0.000	0.640	large

Table 3: *(continued)*

	Group	N	Median	Mean.Ranks	Sum.Ranks	U	Z	p.value	r	magnitude
Type:CLRole.two.sided.15	ont-gamified.Apprentice	15	0.66	21.13	317	197	3.50	0.000	0.640	large
Type:CLRole.two.sided.25	ont-gamified.Master	15	0.34	9.87	148	197	3.50	0.000	0.640	large