## Summary of nonparametric statistics analysis for the latent trait estimates of Interest/Enjoyment in the first study for signed up students

## October 1, 2018

Table 1: Summary of Scheirer-Ray-Hare results for the latent trait estimates of Interest/Enjoyment in the first study for signed up students

	Df	Sum Sq	Н	p.value	Sig
Type					
Type:Type	1	1135.350	3.741	0.053	
Type:CLRole	1	32.781	0.108	0.742	
Type:Type:CLRole	1	456.963	1.506	0.220	
Type:Residuals	56	16281.406			

Signif. codes: 0 "\*\*" 0.01 "\*" 0.05

Table 2: Descriptive statistic of the pair wilcoxon analysis for the latent trait estimates of Interest/Enjoyment 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	30	-0.79	26.15	784.5	319.5	-1.93	0.027	0.250	small
Type.less.2	ont-gamified	30	0.05	34.85	1045.5	319.5	-1.93	0.027	0.250	small
Type:CLRole.less.1	non-gamified.Master	16	-0.94	12.53	200.5	64.5	-2.20	0.013	0.395	medium
Type:CLRole.less.2	ont-gamified.Master	15	0.19	19.70	295.5	64.5	-2.20	0.013	0.395	medium
Type:CLRole.two.sided.1	non-gamified.Master	16	-0.94	12.53	200.5	64.5	-2.20	0.027	0.395	medium
Type:CLRole.two.sided.2	ont-gamified.Master	15	0.19	19.70	295.5	64.5	-2.20	0.027	0.395	medium

Table 3: Full descriptive statistic of the pair wilcoxon analysis for the latent trait estimates of Interest/Enjoyment in the first study for signed up students

Type.less.1											
Type_cless.2         ont-gamified         30         0.05         34.85         1045.5         319.5         -1.93         0.027         0.250         small           Type_greater.2         ont-gamified         30         -0.05         34.85         1045.5         319.5         -1.93         0.974         0.250         small           Type_two.sided.1         non-gamified         30         -0.07         26.15         784.5         319.5         -1.93         0.974         0.250         small           Type.two.sided.1         non-gamified         30         -0.07         26.15         784.5         319.5         -1.93         0.053         0.250         small           Type.CLRole.less.1         non-gamified. Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.866         0.202         small           Type.CLRole.greater.1         non-gamified. Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.10         0.06         0.202         small           Type.CLRole.greater.1         non-gamified. Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.10         0.02         <		Group					-				magnitude
Type_greater.1         non-gamified         30         -0.79         26.15         78.45         319.5         -1.93         0.974         0.250         small           Type_two.sided.1         ont-gamified         30         0.05         34.85         1045.5         319.5         -1.93         0.053         0.250         small           Type.tCLRole.less.1         ont-gamified         30         0.05         34.85         1045.5         319.5         -1.93         0.053         0.250         small           Type.CLRole.less.2         non-gamified.Apprentice         14         -0.79         17.39         243.5         138.5         1.11         0.866         0.202         small           Type.CLRole.less.2.1         non-gamified.Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.866         0.202         small           Type.CLRole.less.2.1         non-gamified.Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.139         0.202         small           Type.CLRole.less.2.1         non-gamified.Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.276         0.114         s	Type.less.1	non-gamified	30	-0.79	26.15	784.5	319.5	-1.93	0.027	0.250	small
Type.greater.2         ont-gamified         30         0.05         34.85         1045.5         31.95         -1.93         0.974         0.250         small           Type.two.sided.2         ont-gamified         30         -0.79         26.15         784.5         31.95         -1.93         0.053         0.250         small           Type.CLRole.less.2         ono-gamified.Apprentice         14         -0.79         17.39         243.5         13.85         1.11         0.866         0.202         small           Type.CLRole.less.2         non-gamified.Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.180         0.0202         small           Type.CLRole.greater.2         non-gamified.Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.190         0.0202         small           Type.CLRole.two.sided.1         non-gamified.Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.1276         0.114         small           Type.CLRole.two.sided.12         non-gamified.Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.1276         0.1	Type.less.2		30	0.05	34.85	1045.5	319.5	-1.93	0.027	0.250	small
Type:two.sided.1	Type.greater.1	non-gamified	30	-0.79	26.15	784.5	319.5	-1.93	0.974	0.250	small
Type:CLRole.less.1	Type.greater.2	ont-gamified	30	0.05	34.85	1045.5	319.5	-1.93	0.974	0.250	small
Type:CLRole.less.1	Type.two.sided.1	non-gamified	30	-0.79	26.15	784.5	319.5	-1.93	0.053	0.250	small
Type:CLRole.less.2         non-gamified.Master         16         -0.94         13.84         221.5         13.85         1.11         0.866         0.202         small           Type:CLRole.greater.1         non-gamified.Apprentice         14         -0.79         17.39         243.5         138.5         1.11         0.139         0.202         small           Type:CLRole.two.sided.1         non-gamified.Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.139         0.202         small           Type:CLRole.two.sided.1         non-gamified.Apprentice         16         -0.99         13.84         221.5         138.5         1.11         0.128         0.202         small           Type:CLRole.less.11         non-gamified.Apprentice         14         -0.79         14.00         196.0         91.0         -0.61         0.276         0.114         small           Type:CLRole.less.12         ont-gamified.Apprentice         14         -0.79         14.00         196.0         91.0         -0.61         0.731         0.114         small           Type:CLRole.two.sided.11         Type:CLRole.two.sided.12         non-gamified.Apprentice         15         -0.11         15.93         239.0         91.0	Type.two.sided.2	ont-gamified	30	0.05	34.85	1045.5	319.5	-1.93	0.053	0.250	small
Type:CLRole_greater.1		non-gamified.Apprentice	14	-0.79	17.39	243.5	138.5	1.11	0.866	0.202	small
Type:CLRole.greater.2         non-gamified.Master         16         -0.94         13.84         221.5         138.5         1.11         0.139         0.202         small           Type:CLRole.two.sided.1         non-gamified.Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.278         0.202         small           Type:CLRole.two.sided.21         non-gamified.Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.278         0.202         small           Type:CLRole.less.21         ont-gamified.Apprentice         16         -0.94         13.84         221.5         138.5         1.11         0.276         0.114         small           Type:CLRole.less.21         ont-gamified.Apprentice         15         -0.11         15.93         239.0         91.0         -0.61         0.731         0.114         small           Type:CLRole.greater.12         non-gamified.Apprentice         14         -0.79         14.00         196.0         91.0         -0.61         0.552         0.114         small           Type:CLRole.two.sided.12         non-gamified.Apprentice         15         -0.11         15.93         239.0         91.0         -0.61	Type:CLRole.less.2	non-gamified.Master	16	-0.94	13.84	221.5	138.5	1.11	0.866	0.202	small
Type:CLRole.two.sided.1	Type:CLRole.greater.1	non-gamified.Apprentice	14	-0.79	17.39	243.5	138.5	1.11	0.139	0.202	$\operatorname{small}$
Type:CLRole.two.sided.2   non-gamified.Master   16   -0.94   13.84   221.5   138.5   1.11   0.278   0.202   small   Type:CLRole.less.11   non-gamified.Apprentice   15   -0.11   15.93   239.0   91.0   -0.61   0.276   0.114   small   Type:CLRole.greater.21   non-gamified.Apprentice   15   -0.11   15.93   239.0   91.0   -0.61   0.276   0.114   small   Type:CLRole.greater.21   non-gamified.Apprentice   15   -0.11   15.93   239.0   91.0   -0.61   0.731   0.114   small   Type:CLRole.greater.21   non-gamified.Apprentice   15   -0.11   15.93   239.0   91.0   -0.61   0.731   0.114   small   Type:CLRole.two.sided.11   non-gamified.Apprentice   15   -0.11   15.93   239.0   91.0   -0.61   0.552   0.114   small   Type:CLRole.two.sided.21   non-gamified.Apprentice   15   -0.11   15.93   239.0   91.0   -0.61   0.552   0.114   small   Type:CLRole.less.12   non-gamified.Apprentice   14   -0.79   13.50   189.0   84.0   -0.92   0.184   0.171   small   Type:CLRole.greater.12   non-gamified.Apprentice   14   -0.79   13.50   189.0   84.0   -0.92   0.184   0.171   small   Type:CLRole.two.sided.12   non-gamified.Master   15   0.19   16.40   246.0   84.0   -0.92   0.822   0.171   small   Type:CLRole.two.sided.12   non-gamified.Master   15   0.19   16.40   246.0   84.0   -0.92   0.368   0.171   small   Type:CLRole.less.13   non-gamified.Master   16   -0.94   13.50   189.0   84.0   -0.92   0.368   0.171   small   Type:CLRole.less.23   non-gamified.Master   16   -0.94   13.50   216.0   80.0   -1.58   0.058   0.285   small   Type:CLRole.two.sided.13   non-gamified.Master   16   -0.94   13.50   216.0   80.0   -1.58   0.94   0.285   small   Type:CLRole.two.sided.13   non-gamified.Master   16   -0.94   13.50   216.0   80.0   -1.58   0.94   0.285   small   Type:CLRole.two.sided.13   non-gamified.Master   16   -0.94   13.50   216.0   80.0   -1.58   0.94   0.285   small   Type:CLRole.two.sided.14   non-gamified.Master   16   -0.94   13.50   216.0   80.0   -1.58   0.116   0.285   small   Type:CLRole.two.sided.14   non-gamified.Master   16   -0.	Type:CLRole.greater.2	non-gamified.Master	16	-0.94	13.84	221.5	138.5	1.11	0.139	0.202	$\operatorname{small}$
Type:CLRole.less.11         non-gamified.Apprentice         14         -0.79         14.00         196.0         91.0         -0.61         0.276         0.114         small           Type:CLRole.less.21         ont-gamified.Apprentice         14         -0.79         14.00         196.0         91.0         -0.61         0.731         0.114         small           Type:CLRole.greater.21         ont-gamified.Apprentice         15         -0.11         15.93         239.0         91.0         -0.61         0.731         0.114         small           Type:CLRole.two.sided.21         ont-gamified.Apprentice         15         -0.11         15.93         239.0         91.0         -0.61         0.552         0.114         small           Type:CLRole.two.sided.21         ont-gamified.Apprentice         15         -0.11         15.93         239.0         91.0         -0.61         0.552         0.114         small           Type:CLRole.two.sided.22         ont-gamified.Apprentice         15         -0.11         15.93         239.0         91.0         -0.61         0.552         0.114         small           Type:CLRole.less.12         non-gamified.Apprentice         15         0.19         16.40         246.0         84.0         -0.92	Type:CLRole.two.sided.1	non-gamified.Apprentice	14	-0.79	17.39	243.5	138.5	1.11	0.278	0.202	$\operatorname{small}$
Type:CLRole.less.21	Type:CLRole.two.sided.2	non-gamified.Master	16	-0.94	13.84	221.5	138.5	1.11	0.278	0.202	small
Type:CLRole greater.11         non-gamified.Apprentice         14         -0.79         14.00         196.0         91.0         -0.61         0.731         0.114         small           Type:CLRole greater.21         ont-gamified.Apprentice         15         -0.11         15.93         239.0         91.0         -0.61         0.552         0.114         small           Type:CLRole two.sided.21         ont-gamified.Apprentice         15         -0.11         15.93         239.0         91.0         -0.61         0.552         0.114         small           Type:CLRole less.12         non-gamified.Apprentice         14         -0.79         13.50         189.0         84.0         -0.92         0.184         0.171         small           Type:CLRole greater.12         non-gamified.Master         15         0.19         16.40         246.0         84.0         -0.92         0.184         0.171         small           Type:CLRole greater.12         non-gamified.Apprentice         14         -0.79         13.50         189.0         84.0         -0.92         0.822         0.171         small           Type:CLRole two.sided.12         non-gamified.Master         15         0.19         16.40         246.0         84.0         -0.92 <td< td=""><td>Type:CLRole.less.11</td><td>non-gamified.Apprentice</td><td>14</td><td>-0.79</td><td>14.00</td><td>196.0</td><td>91.0</td><td>-0.61</td><td>0.276</td><td>0.114</td><td><math>\operatorname{small}</math></td></td<>	Type:CLRole.less.11	non-gamified.Apprentice	14	-0.79	14.00	196.0	91.0	-0.61	0.276	0.114	$\operatorname{small}$
Type:CLRole greater.11         non-gamified.Apprentice         14         -0.79         14.00         196.0         91.0         -0.61         0.731         0.114         small           Type:CLRole greater.21         ont-gamified.Apprentice         15         -0.11         15.93         239.0         91.0         -0.61         0.552         0.114         small           Type:CLRole two.sided.21         ont-gamified.Apprentice         15         -0.11         15.93         239.0         91.0         -0.61         0.552         0.114         small           Type:CLRole less.12         non-gamified.Apprentice         14         -0.79         13.50         189.0         84.0         -0.92         0.184         0.171         small           Type:CLRole greater.12         non-gamified.Master         15         0.19         16.40         246.0         84.0         -0.92         0.184         0.171         small           Type:CLRole greater.12         non-gamified.Apprentice         14         -0.79         13.50         189.0         84.0         -0.92         0.822         0.171         small           Type:CLRole two.sided.12         non-gamified.Master         15         0.19         16.40         246.0         84.0         -0.92 <td< td=""><td>Type:CLRole.less.21</td><td>ont-gamified. Apprentice</td><td>15</td><td>-0.11</td><td>15.93</td><td>239.0</td><td>91.0</td><td>-0.61</td><td>0.276</td><td>0.114</td><td><math>\operatorname{small}</math></td></td<>	Type:CLRole.less.21	ont-gamified. Apprentice	15	-0.11	15.93	239.0	91.0	-0.61	0.276	0.114	$\operatorname{small}$
Type:CLRole.two.sided.11 non-gamified.Apprentice 14	Type:CLRole.greater.11		14	-0.79	14.00	196.0	91.0	-0.61	0.731	0.114	$\operatorname{small}$
Type:CLRole.two.sided.21 ont-gamified.Apprentice 15	Type:CLRole.greater.21	ont-gamified. Apprentice	15	-0.11	15.93	239.0	91.0	-0.61	0.731	0.114	$\operatorname{small}$
Type:CLRole.less.12 non-gamified.Apprentice 14 -0.79 13.50 189.0 84.0 -0.92 0.184 0.171 small rype:CLRole.less.22 ont-gamified.Master 15 0.19 16.40 246.0 84.0 -0.92 0.184 0.171 small rype:CLRole.greater.12 non-gamified.Apprentice 14 -0.79 13.50 189.0 84.0 -0.92 0.822 0.171 small rype:CLRole.greater.22 ont-gamified.Master 15 0.19 16.40 246.0 84.0 -0.92 0.822 0.171 small rype:CLRole.two.sided.12 non-gamified.Apprentice 14 -0.79 13.50 189.0 84.0 -0.92 0.822 0.171 small rype:CLRole.two.sided.12 non-gamified.Master 15 0.19 16.40 246.0 84.0 -0.92 0.368 0.171 small rype:CLRole.two.sided.22 not-gamified.Master 15 0.19 16.40 246.0 84.0 -0.92 0.368 0.171 small rype:CLRole.less.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.058 0.285 small rype:CLRole.greater.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.058 0.285 small rype:CLRole.greater.23 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.944 0.285 small rype:CLRole.greater.23 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.944 0.285 small rype:CLRole.two.sided.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.944 0.285 small rype:CLRole.two.sided.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.116 0.285 small rype:CLRole.less.24 non-gamified.Master 16 -0.94 12.53 200.5 64.5 -2.20 0.013 0.395 medium rype:CLRole.greater.14 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.987 0.395 medium rype:CLRole.greater.24 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.987 0.395 medium rype:CLRole.greater.24 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium rype:CLRole.two.sided.14 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium rype:CLRole.two.sided.24 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium rype:CLRole.two.sided.24 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium rype:CLRole.two.sided.24 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium rype:CLRole.two.sided.14 non-gamified.Apprentice 15 0.19 19.70 295.5 64.5 -2.2	Type:CLRole.two.sided.11	non-gamified.Apprentice	14	-0.79	14.00	196.0	91.0	-0.61	0.552	0.114	$\operatorname{small}$
Type:CLRole.less.22         ont-gamified.Master         15         0.19         16.40         246.0         84.0         -0.92         0.184         0.171         small           Type:CLRole.greater.12         non-gamified.Apprentice         14         -0.79         13.50         189.0         84.0         -0.92         0.822         0.171         small           Type:CLRole.greater.22         ont-gamified.Master         15         0.19         16.40         246.0         84.0         -0.92         0.822         0.171         small           Type:CLRole.two.sided.12         non-gamified.Apprentice         14         -0.79         13.50         189.0         84.0         -0.92         0.368         0.171         small           Type:CLRole.two.sided.22         ont-gamified.Master         16         -0.19         16.40         246.0         84.0         -0.92         0.368         0.171         small           Type:CLRole.less.13         non-gamified.Master         16         -0.94         13.50         216.0         80.0         -1.58         0.058         0.285         small           Type:CLRole.greater.13         non-gamified.Apprentice         15         -0.11         18.67         280.0         80.0         -1.58         0.944	Type:CLRole.two.sided.21	ont-gamified.Apprentice	15	-0.11	15.93	239.0	91.0	-0.61	0.552	0.114	$\operatorname{small}$
Type:CLRole.greater.12         non-gamified.Apprentice ont-gamified.Master         14         -0.79         13.50         189.0         84.0         -0.92         0.822         0.171         small small           Type:CLRole.greater.22         ont-gamified.Master         15         0.19         16.40         246.0         84.0         -0.92         0.822         0.171         small           Type:CLRole.two.sided.12         non-gamified.Apprentice         14         -0.79         13.50         189.0         84.0         -0.92         0.368         0.171         small           Type:CLRole.two.sided.12         ont-gamified.Master         15         0.19         16.40         246.0         84.0         -0.92         0.368         0.171         small           Type:CLRole.less.13         non-gamified.Master         16         -0.94         13.50         216.0         80.0         -1.58         0.058         0.285         small           Type:CLRole.less.23         ont-gamified.Apprentice         15         -0.11         18.67         280.0         80.0         -1.58         0.058         0.285         small           Type:CLRole.greater.23         ont-gamified.Master         16         -0.94         13.50         216.0         80.0         -1.58 </td <td>Type:CLRole.less.12</td> <td>non-gamified.Apprentice</td> <td>14</td> <td>-0.79</td> <td>13.50</td> <td>189.0</td> <td>84.0</td> <td>-0.92</td> <td>0.184</td> <td>0.171</td> <td><math>\operatorname{small}</math></td>	Type:CLRole.less.12	non-gamified.Apprentice	14	-0.79	13.50	189.0	84.0	-0.92	0.184	0.171	$\operatorname{small}$
Type:CLRole.greater.22 ont-gamified.Master 15 0.19 16.40 246.0 84.0 -0.92 0.822 0.171 small rype:CLRole.two.sided.12 non-gamified.Apprentice 14 -0.79 13.50 189.0 84.0 -0.92 0.368 0.171 small rype:CLRole.two.sided.22 ont-gamified.Master 15 0.19 16.40 246.0 84.0 -0.92 0.368 0.171 small rype:CLRole.less.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.058 0.285 small rype:CLRole.greater.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.058 0.285 small rype:CLRole.greater.23 ont-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.944 0.285 small rype:CLRole.greater.23 ont-gamified.Apprentice 15 -0.11 18.67 280.0 80.0 -1.58 0.944 0.285 small rype:CLRole.two.sided.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.944 0.285 small rype:CLRole.two.sided.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.944 0.285 small rype:CLRole.two.sided.23 ont-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.116 0.285 small rype:CLRole.less.14 non-gamified.Master 15 0.11 18.67 280.0 80.0 -1.58 0.116 0.285 small rype:CLRole.less.24 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.013 0.395 medium rype:CLRole.greater.14 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.013 0.395 medium rype:CLRole.greater.24 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.0987 0.395 medium rype:CLRole.two.sided.24 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium rype:CLRole.two.sided.24 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium rype:CLRole.less.25 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium rype:CLRole.less.25 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium rype:CLRole.less.25 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium rype:CLRole.less.25 ont-gamified.Master 15 0.19 16.77 251.5 93.5 -0.79 0.221 0.144 small rype:CLRole.less.25 ont-gamified.Apprentice 15 0.19 16.77 251.5 93.5 -0.79 0.221 0.144 small rype:CLRole.less.25 ont-gamified.Apprentice 15 0.11 14.23 213.5 93.5 -0.79 0.21 0.144 small ryp	Type:CLRole.less.22	ont-gamified.Master	15	0.19	16.40	246.0	84.0	-0.92	0.184	0.171	$\operatorname{small}$
Type:CLRole.two.sided.12 non-gamified.Apprentice 14 -0.79 13.50 189.0 84.0 -0.92 0.368 0.171 small Type:CLRole.two.sided.22 ont-gamified.Master 15 0.19 16.40 246.0 84.0 -0.92 0.368 0.171 small Type:CLRole.less.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.058 0.285 small Type:CLRole.less.23 ont-gamified.Apprentice 15 -0.11 18.67 280.0 80.0 -1.58 0.058 0.285 small Type:CLRole.greater.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.944 0.285 small Type:CLRole.greater.23 ont-gamified.Apprentice 15 -0.11 18.67 280.0 80.0 -1.58 0.944 0.285 small Type:CLRole.two.sided.13 non-gamified.Apprentice 15 -0.11 18.67 280.0 80.0 -1.58 0.944 0.285 small Type:CLRole.two.sided.23 ont-gamified.Apprentice 15 -0.11 18.67 280.0 80.0 -1.58 0.116 0.285 small Type:CLRole.less.14 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.116 0.285 small Type:CLRole.less.14 non-gamified.Master 16 -0.94 12.53 200.5 64.5 -2.20 0.013 0.395 medium Type:CLRole.greater.14 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.013 0.395 medium Type:CLRole.greater.24 ont-gamified.Master 16 -0.94 12.53 200.5 64.5 -2.20 0.987 0.395 medium Type:CLRole.greater.24 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.987 0.395 medium Type:CLRole.two.sided.14 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.two.sided.24 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.15 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.25 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.25 ont-gamified.Master 15 0.19 16.77 251.5 93.5 -0.79 0.221 0.144 small Type:CLRole.greater.15 ont-gamified.Apprentice 15 -0.11 14.23 213.5 93.5 -0.79 0.221 0.144 small Type:CLRole.greater.15 ont-gamified.Apprentice 15 -0.11 14.23 213.5 93.5 -0.79 0.786 0.144 small	Type:CLRole.greater.12	non-gamified.Apprentice	14	-0.79	13.50	189.0	84.0	-0.92	0.822	0.171	$\operatorname{small}$
Type:CLRole.two.sided.22 ont-gamified.Master 15 0.19 16.40 246.0 84.0 -0.92 0.368 0.171 small Type:CLRole.less.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.058 0.285 small Type:CLRole.less.23 ont-gamified.Apprentice 15 -0.11 18.67 280.0 80.0 -1.58 0.058 0.285 small Type:CLRole.greater.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.944 0.285 small Type:CLRole.greater.23 ont-gamified.Apprentice 15 -0.11 18.67 280.0 80.0 -1.58 0.944 0.285 small Type:CLRole.two.sided.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.944 0.285 small Type:CLRole.two.sided.23 ont-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.116 0.285 small Type:CLRole.less.14 non-gamified.Master 16 -0.94 12.53 200.5 64.5 -2.20 0.013 0.395 medium Type:CLRole.less.24 ont-gamified.Master 16 -0.94 12.53 200.5 64.5 -2.20 0.013 0.395 medium Type:CLRole.greater.14 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.987 0.395 medium Type:CLRole.greater.24 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.987 0.395 medium Type:CLRole.two.sided.14 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.two.sided.24 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.two.sided.24 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.15 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.15 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.25 ont-gamified.Master 15 0.19 16.77 251.5 93.5 -0.79 0.221 0.144 small Type:CLRole.greater.15 ont-gamified.Apprentice 15 -0.11 14.23 213.5 93.5 -0.79 0.221 0.144 small Type:CLRole.greater.15 ont-gamified.Apprentice 15 -0.11 14.23 213.5 93.5 -0.79 0.221 0.144 small Type:CLRole.greater.15 ont-gamified.Apprentice 15 -0.11 14.23 213.5 93.5 -0.79 0.79 0.786 0.144 small	Type:CLRole.greater.22	ont-gamified.Master	15	0.19	16.40	246.0	84.0	-0.92	0.822	0.171	$\operatorname{small}$
Type:CLRole.less.13         non-gamified.Master         16         -0.94         13.50         216.0         80.0         -1.58         0.058         0.285         small           Type:CLRole.less.23         ont-gamified.Apprentice         15         -0.11         18.67         280.0         80.0         -1.58         0.058         0.285         small           Type:CLRole.greater.13         non-gamified.Master         16         -0.94         13.50         216.0         80.0         -1.58         0.944         0.285         small           Type:CLRole.greater.23         ont-gamified.Apprentice         15         -0.11         18.67         280.0         80.0         -1.58         0.944         0.285         small           Type:CLRole.two.sided.13         non-gamified.Master         16         -0.94         13.50         216.0         80.0         -1.58         0.944         0.285         small           Type:CLRole.two.sided.23         ont-gamified.Master         16         -0.94         13.50         216.0         80.0         -1.58         0.944         0.285         small           Type:CLRole.less.14         non-gamified.Master         16         -0.94         12.53         200.5         64.5         -2.20         0.013	Type:CLRole.two.sided.12	non-gamified.Apprentice	14	-0.79	13.50	189.0	84.0	-0.92	0.368	0.171	$\operatorname{small}$
Type:CLRole.less.23 ont-gamified.Apprentice 15 -0.11 18.67 280.0 80.0 -1.58 0.058 0.285 small Type:CLRole.greater.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.944 0.285 small Type:CLRole.greater.23 ont-gamified.Apprentice 15 -0.11 18.67 280.0 80.0 -1.58 0.944 0.285 small Type:CLRole.two.sided.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.944 0.285 small Type:CLRole.two.sided.23 ont-gamified.Apprentice 15 -0.11 18.67 280.0 80.0 -1.58 0.116 0.285 small Type:CLRole.less.14 non-gamified.Master 16 -0.94 12.53 200.5 64.5 -2.20 0.013 0.395 medium Type:CLRole.greater.14 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.013 0.395 medium Type:CLRole.greater.24 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.987 0.395 medium Type:CLRole.greater.24 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.987 0.395 medium Type:CLRole.two.sided.14 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.two.sided.24 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.two.sided.24 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.15 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.25 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.25 ont-gamified.Master 15 0.19 16.77 251.5 93.5 -0.79 0.221 0.144 small Type:CLRole.greater.15 ont-gamified.Apprentice 15 -0.11 14.23 213.5 93.5 -0.79 0.221 0.144 small Type:CLRole.greater.15 ont-gamified.Apprentice 15 -0.11 14.23 213.5 93.5 -0.79 0.786 0.144 small	Type:CLRole.two.sided.22	ont-gamified.Master	15	0.19	16.40	246.0	84.0	-0.92	0.368	0.171	$\operatorname{small}$
Type:CLRole.greater.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.944 0.285 small Type:CLRole.greater.23 ont-gamified.Apprentice 15 -0.11 18.67 280.0 80.0 -1.58 0.944 0.285 small Type:CLRole.two.sided.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.116 0.285 small Type:CLRole.two.sided.23 ont-gamified.Apprentice 15 -0.11 18.67 280.0 80.0 -1.58 0.116 0.285 small Type:CLRole.less.14 non-gamified.Master 16 -0.94 12.53 200.5 64.5 -2.20 0.013 0.395 medium Type:CLRole.less.24 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.013 0.395 medium Type:CLRole.greater.14 non-gamified.Master 16 -0.94 12.53 200.5 64.5 -2.20 0.987 0.395 medium Type:CLRole.greater.24 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.987 0.395 medium Type:CLRole.greater.24 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.987 0.395 medium Type:CLRole.two.sided.14 non-gamified.Master 16 -0.94 12.53 200.5 64.5 -2.20 0.987 0.395 medium Type:CLRole.two.sided.24 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.15 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.15 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.25 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.25 ont-gamified.Master 15 0.19 16.77 251.5 93.5 -0.79 0.221 0.144 small Type:CLRole.greater.15 ont-gamified.Apprentice 15 -0.11 14.23 213.5 93.5 -0.79 0.221 0.144 small Type:CLRole.greater.15 ont-gamified.Apprentice 15 -0.11 14.23 213.5 93.5 -0.79 0.786 0.144 small	Type:CLRole.less.13	non-gamified.Master	16	-0.94	13.50	216.0	80.0	-1.58	0.058	0.285	$\operatorname{small}$
Type:CLRole.greater.23         ont-gamified.Apprentice         15         -0.11         18.67         280.0         80.0         -1.58         0.944         0.285         small           Type:CLRole.two.sided.13         non-gamified.Master         16         -0.94         13.50         216.0         80.0         -1.58         0.116         0.285         small           Type:CLRole.two.sided.23         ont-gamified.Apprentice         15         -0.11         18.67         280.0         80.0         -1.58         0.116         0.285         small           Type:CLRole.less.14         non-gamified.Master         16         -0.94         12.53         200.5         64.5         -2.20         0.013         0.395         medium           Type:CLRole.less.24         ont-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.987         0.395         medium           Type:CLRole.greater.24         ont-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.987         0.395         medium           Type:CLRole.two.sided.14         non-gamified.Master         16         -0.94         12.53         200.5         64.5         -2.20         0.987 <td>Type:CLRole.less.23</td> <td>ont-gamified. Apprentice</td> <td>15</td> <td>-0.11</td> <td>18.67</td> <td>280.0</td> <td>80.0</td> <td>-1.58</td> <td>0.058</td> <td>0.285</td> <td><math>\operatorname{small}</math></td>	Type:CLRole.less.23	ont-gamified. Apprentice	15	-0.11	18.67	280.0	80.0	-1.58	0.058	0.285	$\operatorname{small}$
Type:CLRole.two.sided.13 non-gamified.Master 16 -0.94 13.50 216.0 80.0 -1.58 0.116 0.285 small Type:CLRole.two.sided.23 ont-gamified.Apprentice 15 -0.11 18.67 280.0 80.0 -1.58 0.116 0.285 small Type:CLRole.less.14 non-gamified.Master 16 -0.94 12.53 200.5 64.5 -2.20 0.013 0.395 medium Type:CLRole.greater.14 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.013 0.395 medium Type:CLRole.greater.24 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.987 0.395 medium Type:CLRole.two.sided.14 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.987 0.395 medium Type:CLRole.two.sided.14 non-gamified.Master 16 -0.94 12.53 200.5 64.5 -2.20 0.987 0.395 medium Type:CLRole.two.sided.24 non-gamified.Master 16 -0.94 12.53 200.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.two.sided.24 non-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.15 ont-gamified.Master 15 0.19 19.70 295.5 64.5 -2.20 0.027 0.395 medium Type:CLRole.less.25 ont-gamified.Master 15 0.19 16.77 251.5 93.5 -0.79 0.221 0.144 small Type:CLRole.greater.15 ont-gamified.Apprentice 15 -0.11 14.23 213.5 93.5 -0.79 0.221 0.144 small Type:CLRole.greater.15 ont-gamified.Apprentice 15 -0.11 14.23 213.5 93.5 -0.79 0.786 0.144 small	Type:CLRole.greater.13	non-gamified.Master	16	-0.94	13.50	216.0	80.0	-1.58	0.944	0.285	$\operatorname{small}$
Type:CLRole.two.sided.23         ont-gamified.Apprentice         15         -0.11         18.67         280.0         80.0         -1.58         0.116         0.285         small           Type:CLRole.less.14         non-gamified.Master         16         -0.94         12.53         200.5         64.5         -2.20         0.013         0.395         medium           Type:CLRole.less.24         ont-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.013         0.395         medium           Type:CLRole.greater.14         non-gamified.Master         16         -0.94         12.53         200.5         64.5         -2.20         0.987         0.395         medium           Type:CLRole.greater.24         ont-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.987         0.395         medium           Type:CLRole.two.sided.14         non-gamified.Master         16         -0.94         12.53         200.5         64.5         -2.20         0.027         0.395         medium           Type:CLRole.two.sided.24         not-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.027	Type:CLRole.greater.23	ont-gamified. Apprentice	15	-0.11	18.67	280.0	80.0	-1.58	0.944	0.285	$\operatorname{small}$
Type:CLRole.less.14         non-gamified.Master         16         -0.94         12.53         200.5         64.5         -2.20         0.013         0.395         medium           Type:CLRole.less.24         ont-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.013         0.395         medium           Type:CLRole.greater.14         non-gamified.Master         16         -0.94         12.53         200.5         64.5         -2.20         0.987         0.395         medium           Type:CLRole.greater.24         ont-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.987         0.395         medium           Type:CLRole.two.sided.14         non-gamified.Master         16         -0.94         12.53         200.5         64.5         -2.20         0.027         0.395         medium           Type:CLRole.two.sided.24         non-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.027         0.395         medium           Type:CLRole.less.15         ont-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.027 <t< td=""><td>Type:CLRole.two.sided.13</td><td>non-gamified.Master</td><td>16</td><td>-0.94</td><td>13.50</td><td>216.0</td><td>80.0</td><td>-1.58</td><td>0.116</td><td>0.285</td><td><math>\operatorname{small}</math></td></t<>	Type:CLRole.two.sided.13	non-gamified.Master	16	-0.94	13.50	216.0	80.0	-1.58	0.116	0.285	$\operatorname{small}$
Type:CLRole.less.14         non-gamified.Master         16         -0.94         12.53         200.5         64.5         -2.20         0.013         0.395         medium           Type:CLRole.less.24         ont-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.013         0.395         medium           Type:CLRole.greater.14         non-gamified.Master         16         -0.94         12.53         200.5         64.5         -2.20         0.987         0.395         medium           Type:CLRole.greater.24         ont-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.987         0.395         medium           Type:CLRole.two.sided.14         non-gamified.Master         16         -0.94         12.53         200.5         64.5         -2.20         0.027         0.395         medium           Type:CLRole.two.sided.24         non-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.027         0.395         medium           Type:CLRole.less.15         ont-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.027 <t< td=""><td>Type:CLRole.two.sided.23</td><td>ont-gamified. Apprentice</td><td>15</td><td>-0.11</td><td>18.67</td><td>280.0</td><td>80.0</td><td>-1.58</td><td>0.116</td><td>0.285</td><td><math>\operatorname{small}</math></td></t<>	Type:CLRole.two.sided.23	ont-gamified. Apprentice	15	-0.11	18.67	280.0	80.0	-1.58	0.116	0.285	$\operatorname{small}$
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Type:CLRole.less.14		16	-0.94	12.53	200.5	64.5	-2.20	0.013	0.395	medium
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Type:CLRole.less.24	ont-gamified.Master	15	0.19	19.70	295.5	64.5	-2.20	0.013	0.395	medium
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Type:CLRole.greater.14	non-gamified.Master	16	-0.94	12.53	200.5	64.5	-2.20	0.987	0.395	medium
Type:CLRole.two.sided.14         non-gamified.Master         16         -0.94         12.53         200.5         64.5         -2.20         0.027         0.395         medium           Type:CLRole.two.sided.24         ont-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.027         0.395         medium           Type:CLRole.less.15         ont-gamified.Apprentice         15         -0.11         14.23         213.5         93.5         -0.79         0.221         0.144         small           Type:CLRole.less.25         ont-gamified.Apprentice         15         0.19         16.77         251.5         93.5         -0.79         0.221         0.144         small           Type:CLRole.greater.15         ont-gamified.Apprentice         15         -0.11         14.23         213.5         93.5         -0.79         0.786         0.144         small			15	0.19	19.70	295.5	64.5	-2.20	0.987	0.395	medium
Type:CLRole.two.sided.24         ont-gamified.Master         15         0.19         19.70         295.5         64.5         -2.20         0.027         0.395         medium           Type:CLRole.less.15         ont-gamified.Apprentice         15         -0.11         14.23         213.5         93.5         -0.79         0.221         0.144         small           Type:CLRole.less.25         ont-gamified.Master         15         0.19         16.77         251.5         93.5         -0.79         0.221         0.144         small           Type:CLRole.greater.15         ont-gamified.Apprentice         15         -0.11         14.23         213.5         93.5         -0.79         0.786         0.144         small		non-gamified.Master	16	-0.94	12.53	200.5	64.5	-2.20	0.027	0.395	medium
Type:CLRole.less.15         ont-gamified.Apprentice         15         -0.11         14.23         213.5         93.5         -0.79         0.221         0.144         small           Type:CLRole.less.25         ont-gamified.Master         15         0.19         16.77         251.5         93.5         -0.79         0.221         0.144         small           Type:CLRole.greater.15         ont-gamified.Apprentice         15         -0.11         14.23         213.5         93.5         -0.79         0.786         0.144         small			15	0.19	19.70	295.5					medium
Type:CLRole.less.25         ont-gamified.Master         15         0.19         16.77         251.5         93.5         -0.79         0.221         0.144         small           Type:CLRole.greater.15         ont-gamified.Apprentice         15         -0.11         14.23         213.5         93.5         -0.79         0.786         0.144         small		ont-gamified.Apprentice	15	-0.11	14.23	213.5	93.5	-0.79	0.221	0.144	$\operatorname{small}$
			15	0.19	16.77	251.5	93.5	-0.79	0.221	0.144	$\operatorname{small}$
	Type:CLRole.greater.15	ont-gamified.Apprentice	15	-0.11	14.23	213.5	93.5	-0.79	0.786	0.144	$\operatorname{small}$
			15	0.19			93.5	-0.79	0.786	0.144	small

## Table 3: (continued)

	Group	N	Median	Mean.Ranks	Sum.Ranks	U	$\mathbf{Z}$	p.value	r	magnitude
Type:CLRole.two.sided.15	ont-gamified.Apprentice	15	-0.11	14.23	213.5	93.5	-0.79	0.441	0.144	small
Type:CLRole.two.sided.25	ont-gamified.Master	15	0.19	16.77	251.5	93.5	-0.79	0.441	0.144	$\operatorname{small}$