

# Summary of Correlation Analysis

July 17, 2018

## **1 Gains in Skill/Knowledge and Motivation**

Table 1: Correlation matrix of Gains in Skill/Knowledge and Motivation between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	1.0000	-0.0684	-0.1179	-0.1588	0.0205	0.1215
Intrinsic Motivation	-0.0684	1.0000	0.7760	0.7141	-0.4856	0.3763
Interest/Enjoyment	-0.1179	0.7760	1.0000	0.5002	-0.2561	0.1465
Perceived Choice	-0.1588	0.7141	0.5002	1.0000	-0.2052	0.0725
Pressure/Tension	0.0205	-0.4856	-0.2561	-0.2052	1.0000	0.1875
Effort/Importance	0.1215	0.3763	0.1465	0.0725	0.1875	1.0000
method: spearman						

Table 2: Correlation matrix with p-values of Gains in Skill/Knowledge and Motivation between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	0.0000	0.6369	0.4147	0.2707	0.8877	0.4005
Intrinsic Motivation	0.6369	0.0000	0.0000	0.0000	0.0004	0.0071
Interest/Enjoyment	0.4147	0.0000	0.0000	0.0002	0.0727	0.3099
Perceived Choice	0.2707	0.0000	0.0002	0.0000	0.1528	0.6169
Pressure/Tension	0.8877	0.0004	0.0727	0.1528	0.0000	0.1922
Effort/Importance	0.4005	0.0071	0.3099	0.6169	0.1922	0.0000
method: spearman						

## **2 Gains in Skill/Knowledge and Motivation for the group non-gamified**

Table 3: Correlation matrix of Gains in Skill/Knowledge and Motivation for the group non-gamified between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	1.0000	0.0600	0.1896	-0.1347	0.1505	0.2631
Intrinsic Motivation	0.0600	1.0000	0.8056	0.7356	-0.4566	0.3383
Interest/Enjoyment	0.1896	0.8056	1.0000	0.4418	-0.1453	0.3306
Perceived Choice	-0.1347	0.7356	0.4418	1.0000	-0.4492	-0.0168
Pressure/Tension	0.1505	-0.4566	-0.1453	-0.4492	1.0000	0.3869
Effort/Importance	0.2631	0.3383	0.3306	-0.0168	0.3869	1.0000
method: spearman						

Table 4: Correlation matrix with p-values of Gains in Skill/Knowledge and Motivation for the group non-gamified between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	0.0000	0.7907	0.3980	0.5501	0.5039	0.2368
Intrinsic Motivation	0.7907	0.0000	0.0000	0.0001	0.0327	0.1236
Interest/Enjoyment	0.3980	0.0000	0.0000	0.0396	0.5188	0.1329
Perceived Choice	0.5501	0.0001	0.0396	0.0000	0.0360	0.9407
Pressure/Tension	0.5039	0.0327	0.5188	0.0360	0.0000	0.0753
Effort/Importance	0.2368	0.1236	0.1329	0.9407	0.0753	0.0000
method: spearman						

### **3 Gains in Skill/Knowledge and Motivation for the group ont-gamified**

Table 5: Correlation matrix of Gains in Skill/Knowledge and Motivation for the group ont-gamified between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	1.0000	-0.1594	-0.3114	-0.1451	-0.0789	0.0066
Intrinsic Motivation	-0.1594	1.0000	0.7243	0.5417	-0.5454	0.3603
Interest/Enjoyment	-0.3114	0.7243	1.0000	0.3686	-0.3930	0.0101
Perceived Choice	-0.1451	0.5417	0.3686	1.0000	-0.0183	-0.1045
Pressure/Tension	-0.0789	-0.5454	-0.3930	-0.0183	1.0000	0.1236
Effort/Importance	0.0066	0.3603	0.0101	-0.1045	0.1236	1.0000
method: spearman						



Table 6: Correlation matrix with p-values of Gains in Skill/Knowledge and Motivation for the group ont-gamified between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	0.0000	0.4179	0.1067	0.4613	0.6898	0.9732
Intrinsic Motivation	0.4179	0.0000	0.0000	0.0029	0.0027	0.0596
Interest/Enjoyment	0.1067	0.0000	0.0000	0.0536	0.0386	0.9591
Perceived Choice	0.4613	0.0029	0.0536	0.0000	0.9265	0.5966
Pressure/Tension	0.6898	0.0027	0.0386	0.9265	0.0000	0.5307
Effort/Importance	0.9732	0.0596	0.9591	0.5966	0.5307	0.0000
method: spearman						

#### **4 Gains in Skill/Knowledge and Motivation for the group Apprentice**

Table 7: Correlation matrix of Gains in Skill/Knowledge and Motivation for the group Apprentices between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	1.0000	-0.0955	-0.0229	-0.1313	0.0023	0.1108
Intrinsic Motivation	-0.0955	1.0000	0.7709	0.7494	-0.5034	0.4107
Interest/Enjoyment	-0.0229	0.7709	1.0000	0.5082	-0.2016	0.1649
Perceived Choice	-0.1313	0.7494	0.5082	1.0000	-0.2531	0.0989
Pressure/Tension	0.0023	-0.5034	-0.2016	-0.2531	1.0000	-0.0306
Effort/Importance	0.1108	0.4107	0.1649	0.0989	-0.0306	1.0000
method: spearman						

Table 8: Correlation matrix with p-values of Gains in Skill/Knowledge and Motivation for the group Apprentice between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	0.0000	0.6424	0.9117	0.5225	0.9912	0.5898
Intrinsic Motivation	0.6424	0.0000	0.0000	0.0000	0.0088	0.0372
Interest/Enjoyment	0.9117	0.0000	0.0000	0.0080	0.3235	0.4208
Perceived Choice	0.5225	0.0000	0.0080	0.0000	0.2123	0.6306
Pressure/Tension	0.9912	0.0088	0.3235	0.2123	0.0000	0.8821
Effort/Importance	0.5898	0.0372	0.4208	0.6306	0.8821	0.0000
method: spearman						

## **5 Gains in Skill/Knowledge and Motivation for the group Master**

Table 9: Correlation matrix of Gains in Skill/Knowledge and Motivation for the group Master between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	1.0000	-0.1166	-0.2411	-0.2194	-0.0910	0.0274
Intrinsic Motivation	-0.1166	1.0000	0.8112	0.6895	-0.4464	0.2553
Interest/Enjoyment	-0.2411	0.8112	1.0000	0.4938	-0.3004	0.1051
Perceived Choice	-0.2194	0.6895	0.4938	1.0000	-0.0502	0.0854
Pressure/Tension	-0.0910	-0.4464	-0.3004	-0.0502	1.0000	0.4188
Effort/Importance	0.0274	0.2553	0.1051	0.0854	0.4188	1.0000
method: spearman						

Table 10: Correlation matrix with p-values of Gains in Skill/Knowledge and Motivation for the group Master between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	0.0000	0.5873	0.2564	0.3031	0.6725	0.8987
Intrinsic Motivation	0.5873	0.0000	0.0000	0.0002	0.0288	0.2286
Interest/Enjoyment	0.2564	0.0000	0.0000	0.0142	0.1538	0.6250
Perceived Choice	0.3031	0.0002	0.0142	0.0000	0.8157	0.6915
Pressure/Tension	0.6725	0.0288	0.1538	0.8157	0.0000	0.0417
Effort/Importance	0.8987	0.2286	0.6250	0.6915	0.0417	0.0000
method: spearman						

## **6 Gains in Skill/Knowledge and Motivation for the group non-gamified.Apprentice**



Table 11: Correlation matrix of Gains in Skill/Knowledge and Motivation for the group non-gamified.Apprentice between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	1.0000	0.1699	0.3899	0.0419	-0.1537	-0.1136
Intrinsic Motivation	0.1699	1.0000	0.7524	0.7135	-0.5981	0.2573
Interest/Enjoyment	0.3899	0.7524	1.0000	0.2954	-0.3165	0.1838
Perceived Choice	0.0419	0.7135	0.2954	1.0000	-0.5426	0.0264
Pressure/Tension	-0.1537	-0.5981	-0.3165	-0.5426	1.0000	0.3585
Effort/Importance	-0.1136	0.2573	0.1838	0.0264	0.3585	1.0000
method: spearman						

Table 12: Correlation matrix with p-values of Gains in Skill/Knowledge and Motivation for the group non-gamified. Apprentice between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	0.0000	0.5789	0.1878	0.8919	0.6161	0.7117
Intrinsic Motivation	0.5789	0.0000	0.0030	0.0062	0.0308	0.3961
Interest/Enjoyment	0.1878	0.0030	0.0000	0.3271	0.2920	0.5477
Perceived Choice	0.8919	0.0062	0.3271	0.0000	0.0554	0.9319
Pressure/Tension	0.6161	0.0308	0.2920	0.0554	0.0000	0.2290
Effort/Importance	0.7117	0.3961	0.5477	0.9319	0.2290	0.0000
method: spearman						

## **7 Gains in Skill/Knowledge and Motivation for the group non-gamified.Master**

Table 13: Correlation matrix of Gains in Skill/Knowledge and Motivation for the group non-gamified.Master between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	1.0000	-0.1500	-0.2510	-0.4790	-0.1881	0.3521
Intrinsic Motivation	-0.1500	1.0000	0.8787	0.7227	-0.1966	0.5582
Interest/Enjoyment	-0.2510	0.8787	1.0000	0.6498	0.0215	0.4915
Perceived Choice	-0.4790	0.7227	0.6498	1.0000	-0.3018	-0.1126
Pressure/Tension	-0.1881	-0.1966	0.0215	-0.3018	1.0000	0.3260
Effort/Importance	0.3521	0.5582	0.4915	-0.1126	0.3260	1.0000
method: spearman						

Table 14: Correlation matrix with p-values of Gains in Skill/Knowledge and Motivation for the group non-gamified.Master between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	0.0000	0.7081	0.5147	0.1920	0.6279	0.3528
Intrinsic Motivation	0.7081	0.0000	0.0018	0.0278	0.6121	0.1183
Interest/Enjoyment	0.5147	0.0018	0.0000	0.0582	0.9563	0.1790
Perceived Choice	0.1920	0.0278	0.0582	0.0000	0.4300	0.7731
Pressure/Tension	0.6279	0.6121	0.9563	0.4300	0.0000	0.3919
Effort/Importance	0.3528	0.1183	0.1790	0.7731	0.3919	0.0000
method: spearman						

## 8 Gains in Skill/Knowledge and Motivation for the group ont-gamified.Apprentice

Table 15: Correlation matrix of Gains in Skill/Knowledge and Motivation for the group on-gamified.Apprentice between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	1.0000	-0.4451	-0.3333	-0.3435	0.2918	0.1365
Intrinsic Motivation	-0.4451	1.0000	0.7466	0.6648	-0.3546	0.5767
Interest/Enjoyment	-0.3333	0.7466	1.0000	0.7278	-0.0991	0.1704
Perceived Choice	-0.3435	0.6648	0.7278	1.0000	0.2025	0.0337
Pressure/Tension	0.2918	-0.3546	-0.0991	0.2025	1.0000	-0.1909
Effort/Importance	0.1365	0.5767	0.1704	0.0337	-0.1909	1.0000
method: spearman						

Table 16: Correlation matrix with p-values of Gains in Skill/Knowledge and Motivation for the group ont-gamified.Apprentice between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	0.0000	0.1298	0.2657	0.2505	0.3333	0.6566
Intrinsic Motivation	0.1298	0.0000	0.0034	0.0132	0.2345	0.0391
Interest/Enjoyment	0.2657	0.0034	0.0000	0.0048	0.7473	0.5778
Perceived Choice	0.2505	0.0132	0.0048	0.0000	0.5070	0.9129
Pressure/Tension	0.3333	0.2345	0.7473	0.5070	0.0000	0.5321
Effort/Importance	0.6566	0.0391	0.5778	0.9129	0.5321	0.0000
method: spearman						



## **9 Gains in Skill/Knowledge and Motivation for the group ont-gamified.Master**

Table 17: Correlation matrix of Gains in Skill/Knowledge and Motivation for the group out-gamified.Master between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	1.0000	-0.0215	-0.1213	-0.0898	-0.1618	-0.2577
Intrinsic Motivation	-0.0215	1.0000	0.7081	0.4919	-0.6983	0.1197
Interest/Enjoyment	-0.1213	0.7081	1.0000	0.0903	-0.6576	-0.0808
Perceived Choice	-0.0898	0.4919	0.0903	1.0000	-0.0731	-0.1580
Pressure/Tension	-0.1618	-0.6983	-0.6576	-0.0731	1.0000	0.3355
Effort/Importance	-0.2577	0.1197	-0.0808	-0.1580	0.3355	1.0000
method: spearman						

Table 18: Correlation matrix with p-values of Gains in Skill/Knowledge and Motivation for the group ont-gamified.Master between participants' motivation and learning outcomes in the first empirical study

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Gains in Skill/Knowledge	0.0000	0.9393	0.6667	0.7502	0.5644	0.3538
Intrinsic Motivation	0.9393	0.0000	0.0031	0.0625	0.0038	0.6710
Interest/Enjoyment	0.6667	0.0031	0.0000	0.7491	0.0077	0.7746
Perceived Choice	0.7502	0.0625	0.7491	0.0000	0.7958	0.5737
Pressure/Tension	0.5644	0.0038	0.0077	0.7958	0.0000	0.2215
Effort/Importance	0.3538	0.6710	0.7746	0.5737	0.2215	0.0000
method: spearman						