

# Summary of correlation analysis between participants' motivation and learning outcomes in the first empirical study

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## 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	-0.0508	-0.2039	-0.1007	0.0030	0.1992
Intrinsic Motivation	-0.0508	1.0000	0.7666	0.6814	-0.4823	0.2973
Interest/Enjoyment	-0.2039	0.7666	1.0000	0.4537	-0.2752	0.0919
Perceived Choice	-0.1007	0.6814	0.4537	1.0000	-0.1699	0.0238
Pressure/Tension	0.0030	-0.4823	-0.2752	-0.1699	1.0000	0.2793
Effort/Importance	0.1992	0.2973	0.0919	0.0238	0.2793	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	0.7404	0.1790	0.5105	0.9844	0.1895
Intrinsic Motivation	0.7404	0.0000	0.0000	0.0000	0.0008	0.0473
Interest/Enjoyment	0.1790	0.0000	0.0000	0.0017	0.0673	0.5481
Perceived Choice	0.5105	0.0000	0.0017	0.0000	0.2644	0.8767
Pressure/Tension	0.9844	0.0008	0.0673	0.2644	0.0000	0.0632
Effort/Importance	0.1895	0.0473	0.5481	0.8767	0.0632	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	0.2962	0.1404	0.1912	0.0052	0.4230
Intrinsic Motivation	0.2962	1.0000	0.7333	0.8186	-0.4635	0.3110
Interest/Enjoyment	0.1404	0.7333	1.0000	0.4807	-0.1594	0.2560
Perceived Choice	0.1912	0.8186	0.4807	1.0000	-0.6142	0.0254
Pressure/Tension	0.0052	-0.4635	-0.1594	-0.6142	1.0000	0.5172
Effort/Importance	0.4230	0.3110	0.2560	0.0254	0.5172	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	0.2320	0.5784	0.4472	0.9837	0.0803
Intrinsic Motivation	0.2320	0.0000	0.0005	0.0000	0.0527	0.2090
Interest/Enjoyment	0.5784	0.0005	0.0000	0.0434	0.5277	0.3052
Perceived Choice	0.4472	0.0000	0.0434	0.0000	0.0067	0.9202
Pressure/Tension	0.9837	0.0527	0.5277	0.0067	0.0000	0.0279
Effort/Importance	0.0803	0.2090	0.3052	0.9202	0.0279	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	-0.2000	-0.3458	-0.2030	-0.0222	0.0858
Intrinsic Motivation	-0.2000	1.0000	0.7448	0.5214	-0.5216	0.2976
Interest/Enjoyment	-0.3458	0.7448	1.0000	0.3570	-0.4095	-0.0396

method: spearman

Table 5: (continued)

round	Gains in Skill/Knowledge	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Perceived Choice	-0.2030	0.5214	0.3570	1.0000	0.0830	-0.0702
Pressure/Tension	-0.0222	-0.5216	-0.4095	0.0830	1.0000	0.1657
Effort/Importance	0.0858	0.2976	-0.0396	-0.0702	0.1657	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	0.3172	0.0773	0.3098	0.9127	0.6703
Intrinsic Motivation	0.3172	0.0000	0.0000	0.0053	0.0053	0.1317
Interest/Enjoyment	0.0773	0.0000	0.0000	0.0675	0.0339	0.8446
Perceived Choice	0.3098	0.0053	0.0675	0.0000	0.6808	0.7278
Pressure/Tension	0.9127	0.0053	0.0339	0.6808	0.0000	0.4089
Effort/Importance	0.6703	0.1317	0.8446	0.7278	0.4089	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 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	-0.1571	-0.1013	-0.1525	0.0092	0.3175
Intrinsic Motivation	-0.1571	1.0000	0.8190	0.7564	-0.4295	0.2524
Interest/Enjoyment	-0.1013	0.8190	1.0000	0.6094	-0.1920	0.0632
Perceived Choice	-0.1525	0.7564	0.6094	1.0000	-0.1960	-0.0112
Pressure/Tension	0.0092	-0.4295	-0.1920	-0.1960	1.0000	0.1239
Effort/Importance	0.3175	0.2524	0.0632	-0.0112	0.1239	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	0.4723	0.6455	0.4873	0.9668	0.1398
Intrinsic Motivation	0.4723	0.0000	0.0000	0.0000	0.0408	0.2452
Interest/Enjoyment	0.6455	0.0000	0.0000	0.0020	0.3801	0.7746
Perceived Choice	0.4873	0.0000	0.0020	0.0000	0.3701	0.9595
Pressure/Tension	0.9668	0.0408	0.3801	0.3701	0.0000	0.5733
Effort/Importance	0.1398	0.2452	0.7746	0.9595	0.5733	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	-0.1469	-0.3459	-0.1628	-0.0560	-0.0465
Intrinsic Motivation	-0.1469	1.0000	0.7674	0.5926	-0.4853	0.3009
Interest/Enjoyment	-0.3459	0.7674	1.0000	0.3066	-0.3686	0.1228
Perceived Choice	-0.1628	0.5926	0.3066	1.0000	-0.0235	0.1647
Pressure/Tension	-0.0560	-0.4853	-0.3686	-0.0235	1.0000	0.4441
Effort/Importance	-0.0465	0.3009	0.1228	0.1647	0.4441	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	0.5142	0.1148	0.4691	0.8044	0.8373
Intrinsic Motivation	0.5142	0.0000	0.0000	0.0037	0.0220	0.1735
Interest/Enjoyment	0.1148	0.0000	0.0000	0.1651	0.0914	0.5863
Perceived Choice	0.4691	0.0037	0.1651	0.0000	0.9174	0.4638
Pressure/Tension	0.8044	0.0220	0.0914	0.9174	0.0000	0.0384
Effort/Importance	0.8373	0.1735	0.5863	0.4638	0.0384	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	0.2121	0.4970	-0.0671	-0.1223	0.1529
Intrinsic Motivation	0.2121	1.0000	0.8160	0.7500	-0.5627	0.0917
Interest/Enjoyment	0.4970	0.8160	1.0000	0.5432	-0.4768	0.0991
Perceived Choice	-0.0671	0.7500	0.5432	1.0000	-0.6892	-0.2277
Pressure/Tension	-0.1223	-0.5627	-0.4768	-0.6892	1.0000	0.5648
Effort/Importance	0.1529	0.0917	0.0991	-0.2277	0.5648	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	0.5599	0.1439	0.8539	0.7364	0.6732
Intrinsic Motivation	0.5599	0.0000	0.0040	0.0125	0.0904	0.8010
Interest/Enjoyment	0.1439	0.0040	0.0000	0.1046	0.1635	0.7854
Perceived Choice	0.8539	0.0125	0.1046	0.0000	0.0275	0.5269
Pressure/Tension	0.7364	0.0904	0.1635	0.0275	0.0000	0.0889
Effort/Importance	0.6732	0.8010	0.7854	0.5269	0.0889	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	0.3095	0.0614	0.2857	0.0988	0.7470
Intrinsic Motivation	0.3095	1.0000	0.6874	0.8095	-0.5436	0.6386
Interest/Enjoyment	0.0614	0.6874	1.0000	0.5524	-0.2612	0.4286
Perceived Choice	0.2857	0.8095	0.5524	1.0000	-0.6795	0.3615
Pressure/Tension	0.0988	-0.5436	-0.2612	-0.6795	1.0000	0.1375
Effort/Importance	0.7470	0.6386	0.4286	0.3615	0.1375	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	0.4618	0.8852	0.5008	0.8159	0.0332
Intrinsic Motivation	0.4618	0.0000	0.0596	0.0218	0.1638	0.0883
Interest/Enjoyment	0.8852	0.0596	0.0000	0.1557	0.5321	0.2893
Perceived Choice	0.5008	0.0218	0.1557	0.0000	0.0638	0.3790
Pressure/Tension	0.8159	0.1638	0.5321	0.0638	0.0000	0.7453
Effort/Importance	0.0332	0.0883	0.2893	0.3790	0.7453	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 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	1.0000	-0.5110	-0.4319	-0.2826	0.3194	0.3152
Intrinsic Motivation	-0.5110	1.0000	0.7730	0.6925	-0.3530	0.3850
Interest/Enjoyment	-0.4319	0.7730	1.0000	0.6380	-0.1734	0.0740
Perceived Choice	-0.2826	0.6925	0.6380	1.0000	0.2356	0.0844
Pressure/Tension	0.3194	-0.3530	-0.1734	0.2356	1.0000	-0.0598
Effort/Importance	0.3152	0.3850	0.0740	0.0844	-0.0598	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	0.0776	0.1405	0.3496	0.2874	0.2941
Intrinsic Motivation	0.0776	0.0000	0.0019	0.0087	0.2367	0.1940
Interest/Enjoyment	0.1405	0.0019	0.0000	0.0190	0.5710	0.8101
Perceived Choice	0.3496	0.0087	0.0190	0.0000	0.4383	0.7840
Pressure/Tension	0.2874	0.2367	0.5710	0.4383	0.0000	0.8463
Effort/Importance	0.2941	0.1940	0.8101	0.7840	0.8463	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 ont-gamified.Master between participants' motivation and learning outcomes in the first empirical study

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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

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