

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

## 1 Difference of Scores and Motivation

Table 1: Correlation matrix of Difference of Scores and Motivation between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	1.0000	-0.2140	-0.1886	-0.2246	0.1547	0.1548
Intrinsic Motivation	-0.2140	1.0000	0.8341	0.7037	-0.6693	0.3155
Interest/Enjoyment	-0.1886	0.8341	1.0000	0.3724	-0.4591	0.2574
Perceived Choice	-0.2246	0.7037	0.3724	1.0000	-0.4495	0.0958
Pressure/Tension	0.1547	-0.6693	-0.4591	-0.4495	1.0000	0.1162
Effort/Importance	0.1548	0.3155	0.2574	0.0958	0.1162	1.0000
method: spearman						

Table 2: Correlation matrix with p-values of Difference of Scores and Motivation between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	0.0000	0.3790	0.4393	0.3553	0.5271	0.5268
Intrinsic Motivation	0.3790	0.0000	0.0000	0.0008	0.0017	0.1882
Interest/Enjoyment	0.4393	0.0000	0.0000	0.1164	0.0480	0.2874
Perceived Choice	0.3553	0.0008	0.1164	0.0000	0.0535	0.6966
Pressure/Tension	0.5271	0.0017	0.0480	0.0535	0.0000	0.6357
Effort/Importance	0.5268	0.1882	0.2874	0.6966	0.6357	0.0000
method:	spearman					

## 2 Difference of Scores and Motivation for the group non-gamified

Table 3: Correlation matrix of Difference of Scores and Motivation for the group non-gamified between participants’ motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	1.0000	0.0541	0.4685	0.1193	0.1261	0.0545
Intrinsic Motivation	0.0541	1.0000	0.5357	0.7638	-0.6071	0.0901
Interest/Enjoyment	0.4685	0.5357	1.0000	0.0546	0.0000	0.1982
Perceived Choice	0.1193	0.7638	0.0546	1.0000	-0.5455	-0.1376
Pressure/Tension	0.1261	-0.6071	0.0000	-0.5455	1.0000	0.3243
Effort/Importance	0.0545	0.0901	0.1982	-0.1376	0.3243	1.0000
method: spearman						

Table 4: Correlation matrix with p-values of Difference of Scores and Motivation for the group non-gamified between participants’ motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	0.0000	0.9084	0.2890	0.7990	0.7876	0.9075
Intrinsic Motivation	0.9084	0.0000	0.2357	0.0457	0.1667	0.8477
Interest/Enjoyment	0.2890	0.2357	0.0000	0.9075	1.0000	0.6701
Perceived Choice	0.7990	0.0457	0.9075	0.0000	0.2053	0.7686
Pressure/Tension	0.7876	0.1667	1.0000	0.2053	0.0000	0.4779
Effort/Importance	0.9075	0.8477	0.6701	0.7686	0.4779	0.0000
method: spearman						

### 3 Difference of Scores and Motivation for the group ont-gamified

Table 5: Correlation matrix of Difference of Scores and Motivation for the group out-gamified between participants’ motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	1.0000	-0.4140	-0.4491	-0.2769	0.3369	0.2661
Intrinsic Motivation	-0.4140	1.0000	0.8182	0.7346	-0.6856	0.4734
Interest/Enjoyment	-0.4491	0.8182	1.0000	0.4218	-0.5336	0.3453
Perceived Choice	-0.2769	0.7346	0.4218	1.0000	-0.3748	0.2934
Pressure/Tension	0.3369	-0.6856	-0.5336	-0.3748	1.0000	-0.0540
Effort/Importance	0.2661	0.4734	0.3453	0.2934	-0.0540	1.0000
method: spearman						

Table 6: Correlation matrix with p-values of Difference of Scores and Motivation for the group ont-gamified between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	0.0000	0.1809	0.1430	0.3836	0.2843	0.4032
Intrinsic Motivation	0.1809	0.0000	0.0020	0.0065	0.0139	0.1201
Interest/Enjoyment	0.1430	0.0020	0.0000	0.1720	0.0740	0.2717
Perceived Choice	0.3836	0.0065	0.1720	0.0000	0.2300	0.3547
Pressure/Tension	0.2843	0.0139	0.0740	0.2300	0.0000	0.8677
Effort/Importance	0.4032	0.1201	0.2717	0.3547	0.8677	0.0000

method: spearman

## 4 Difference of Scores and Motivation for the group Apprentice

Table 7: Correlation matrix of Difference of Scores and Motivation for the group Apprentice between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	1.0000	0.0110	0.1037	-0.0737	0.1257	0.4670
Intrinsic Motivation	0.0110	1.0000	0.7703	0.5505	-0.6612	0.4113
Interest/Enjoyment	0.1037	0.7703	1.0000	0.1025	-0.4423	0.5001
Perceived Choice	-0.0737	0.5505	0.1025	1.0000	-0.3748	0.1014
Pressure/Tension	0.1257	-0.6612	-0.4423	-0.3748	1.0000	0.1301
Effort/Importance	0.4670	0.4113	0.5001	0.1014	0.1301	1.0000

method: spearman

Table 8: Correlation matrix with p-values of Difference of Scores and Motivation for the group Apprentice between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	0.0000	0.9714	0.7359	0.8109	0.6824	0.1076
Intrinsic Motivation	0.9714	0.0000	0.0021	0.0512	0.0139	0.1627
Interest/Enjoyment	0.7359	0.0021	0.0000	0.7390	0.1302	0.0818
Perceived Choice	0.8109	0.0512	0.7390	0.0000	0.2070	0.7417
Pressure/Tension	0.6824	0.0139	0.1302	0.2070	0.0000	0.6718
Effort/Importance	0.1076	0.1627	0.0818	0.7417	0.6718	0.0000

method: spearman

## 5 Difference of Scores and Motivation for the group Master

Table 9: Correlation matrix of Difference of Scores and Motivation for the group Master between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	1.0000	-0.7247	-0.6957	-0.6912	0.4058	-0.0882
Intrinsic Motivation	-0.7247	1.0000	0.8857	0.9856	-0.7143	0.1449
Interest/Enjoyment	-0.6957	0.8857	1.0000	0.9276	-0.7714	-0.3189
Perceived Choice	-0.6912	0.9856	0.9276	1.0000	-0.7827	0.0147
Pressure/Tension	0.4058	-0.7143	-0.7714	-0.7827	1.0000	0.3189
Effort/Importance	-0.0882	0.1449	-0.3189	0.0147	0.3189	1.0000

method: spearman

Table 10: Correlation matrix with p-values of Difference of Scores and Motivation for the group Master between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	0.0000	0.1032	0.1248	0.1283	0.4247	0.8680
Intrinsic Motivation	0.1032	0.0000	0.0333	0.0003	0.1361	0.7841
Interest/Enjoyment	0.1248	0.0333	0.0000	0.0077	0.1028	0.5379
Perceived Choice	0.1283	0.0003	0.0077	0.0000	0.0657	0.9779
Pressure/Tension	0.4247	0.1361	0.1028	0.0657	0.0000	0.5379
Effort/Importance	0.8680	0.7841	0.5379	0.9779	0.5379	0.0000

method: spearman

## 6 Difference of Scores and Motivation for the group non-gamified.Apprentice

Table 11: Correlation matrix of Difference of Scores and Motivation for the group non-gamified.Apprentice between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	1.0000	0.0513	0.6156	-0.5000	0.3078	0.7895
Intrinsic Motivation	0.0513	1.0000	0.5000	0.6669	-0.7000	-0.0513
Interest/Enjoyment	0.6156	0.5000	1.0000	-0.2052	0.1000	0.6669
Perceived Choice	-0.5000	0.6669	-0.2052	1.0000	-0.9747	-0.3947
Pressure/Tension	0.3078	-0.7000	0.1000	-0.9747	1.0000	0.2052
Effort/Importance	0.7895	-0.0513	0.6669	-0.3947	0.2052	1.0000

method: spearman

Table 12: Correlation matrix with p-values of Difference of Scores and Motivation for the group non-gamified.Apprentice between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	0.0000	0.9347	0.2690	0.3910	0.6144	0.1122
Intrinsic Motivation	0.9347	0.0000	0.4500	0.2189	0.2333	0.9347
Interest/Enjoyment	0.2690	0.4500	0.0000	0.7406	0.9500	0.2189
Perceived Choice	0.3910	0.2189	0.7406	0.0000	0.0048	0.5108
Pressure/Tension	0.6144	0.2333	0.9500	0.0048	0.0000	0.7406
Effort/Importance	0.1122	0.9347	0.2189	0.5108	0.7406	0.0000

method: spearman

## 7 Difference of Scores and Motivation for the group non-gamified.Master

Table 13: Correlation matrix of Difference of Scores and Motivation for the group non-gamified.Master between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	1	-1	1		-1	-1
Intrinsic Motivation	-1	1	-1		1	1
Interest/Enjoyment	1	-1	1		-1	-1
Perceived Choice				1		
Pressure/Tension	-1	1	-1		1	1
Effort/Importance	-1	1	-1		1	1

method: spearman

Table 14: Correlation matrix with p-values of Difference of Scores and Motivation for the group non-gamified.Master between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	0	1	1		1	1
Intrinsic Motivation	1	0	1		1	1
Interest/Enjoyment	1	1	0		1	1
Perceived Choice				0		
Pressure/Tension	1	1	1		0	1
Effort/Importance	1	1	1		1	0

method: spearman

## 8 Difference of Scores and Motivation for the group ont-gamified.Apprentice

Table 15: Correlation matrix of Difference of Scores and Motivation for the group ont-gamified.Apprentice between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	1.0000	-0.2381	0.0000	0.1190	0.3615	0.5455
Intrinsic Motivation	-0.2381	1.0000	0.8333	0.5952	-0.6627	0.3637
Interest/Enjoyment	0.0000	0.8333	1.0000	0.1905	-0.6025	0.5213
Perceived Choice	0.1190	0.5952	0.1905	1.0000	-0.1928	0.2425
Pressure/Tension	0.3615	-0.6627	-0.6025	-0.1928	1.0000	0.1350
Effort/Importance	0.5455	0.3637	0.5213	0.2425	0.1350	1.0000

method: spearman

Table 16: Correlation matrix with p-values of Difference of Scores and Motivation for the group ont-gamified.Apprentice between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	0.0000	0.5821	1.0000	0.7930	0.3790	0.1619
Intrinsic Motivation	0.5821	0.0000	0.0154	0.1323	0.0733	0.3758
Interest/Enjoyment	1.0000	0.0154	0.0000	0.6646	0.1140	0.1852
Perceived Choice	0.7930	0.1323	0.6646	0.0000	0.6474	0.5629
Pressure/Tension	0.3790	0.0733	0.1140	0.6474	0.0000	0.7500
Effort/Importance	0.1619	0.3758	0.1852	0.5629	0.7500	0.0000

method: spearman

## 9 Difference of Scores and Motivation for the group ont-gamified.Master

Table 17: Correlation matrix of Difference of Scores and Motivation for the group ont-gamified.Master between participants' motivation and learning outcomes in the pilot empirical study

round	Diff of Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Diff of Scores	1.0	-0.8	-1.0	-0.8	0.6	0.2
Intrinsic Motivation	-0.8	1.0	0.8	1.0	-0.8	0.4
Interest/Enjoyment	-1.0	0.8	1.0	0.8	-0.6	-0.2
Perceived Choice	-0.8	1.0	0.8	1.0	-0.8	0.4
Pressure/Tension	0.6	-0.8	-0.6	-0.8	1.0	-0.2
Effort/Importance	0.2	0.4	-0.2	0.4	-0.2	1.0

method: spearman

Table 18: Correlation matrix with p-values of Difference of Scores and Motivation for the group ont-gamified.Master between participants' motivation and learning outcomes in the pilot empirical study

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method: spearman