

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

## 1 Difference in Scores and Motivation

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	1.0000	0.2059	0.1429	0.0726	-0.2700	0.1871
Intrinsic Motivation	0.2059	1.0000	0.8414	0.7070	-0.4809	0.3133
Interest/Enjoyment	0.1429	0.8414	1.0000	0.4528	-0.2872	0.2130
Perceived Choice	0.0726	0.7070	0.4528	1.0000	-0.2664	0.0172
Pressure/Tension	-0.2700	-0.4809	-0.2872	-0.2664	1.0000	0.1394
Effort/Importance	0.1871	0.3133	0.2130	0.0172	0.1394	1.0000

method: spearman

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	0.0000	0.1852	0.3607	0.6435	0.0799	0.2297
Intrinsic Motivation	0.1852	0.0000	0.0000	0.0000	0.0011	0.0408
Interest/Enjoyment	0.3607	0.0000	0.0000	0.0023	0.0619	0.1703
Perceived Choice	0.6435	0.0000	0.0023	0.0000	0.0842	0.9127
Pressure/Tension	0.0799	0.0011	0.0619	0.0842	0.0000	0.3727
Effort/Importance	0.2297	0.0408	0.1703	0.9127	0.3727	0.0000

method: spearman

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

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	1.0000	0.4613	0.5757	0.1758	-0.2077	0.4156
Intrinsic Motivation	0.4613	1.0000	0.7147	0.8387	-0.5065	0.2442
Interest/Enjoyment	0.5757	0.7147	1.0000	0.3893	-0.2594	0.2862
Perceived Choice	0.1758	0.8387	0.3893	1.0000	-0.4810	0.1255
Pressure/Tension	-0.2077	-0.5065	-0.2594	-0.4810	1.0000	0.4614
Effort/Importance	0.4156	0.2442	0.2862	0.1255	0.4614	1.0000

method: spearman

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	0.0000	0.0557	0.0124	0.4853	0.4082	0.0863
Intrinsic Motivation	0.0557	0.0000	0.0009	0.0000	0.0319	0.3289
Interest/Enjoyment	0.0124	0.0009	0.0000	0.1103	0.2986	0.2497
Perceived Choice	0.4853	0.0000	0.1103	0.0000	0.0433	0.6199
Pressure/Tension	0.4082	0.0319	0.2986	0.0433	0.0000	0.0539
Effort/Importance	0.0863	0.3289	0.2497	0.6199	0.0539	0.0000

method: spearman

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

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	1.0000	-0.0158	-0.1486	0.0218	-0.3655	0.0539
Intrinsic Motivation	-0.0158	1.0000	0.8838	0.5862	-0.4023	0.2252
Interest/Enjoyment	-0.1486	0.8838	1.0000	0.4474	-0.2295	0.0499
Perceived Choice	0.0218	0.5862	0.4474	1.0000	0.0100	-0.1623
Pressure/Tension	-0.3655	-0.4023	-0.2295	0.0100	1.0000	-0.0090
Effort/Importance	0.0539	0.2252	0.0499	-0.1623	-0.0090	1.0000

method: spearman

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	0.0000	0.9404	0.4783	0.9176	0.0724	0.7982
Intrinsic Motivation	0.9404	0.0000	0.0000	0.0021	0.0462	0.2792
Interest/Enjoyment	0.4783	0.0000	0.0000	0.0249	0.2699	0.8127
Perceived Choice	0.9176	0.0021	0.0249	0.0000	0.9622	0.4383
Pressure/Tension	0.0724	0.0462	0.2699	0.9622	0.0000	0.9659
Effort/Importance	0.7982	0.2792	0.8127	0.4383	0.9659	0.0000

method: spearman

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

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	1.0000	0.1643	0.2023	0.0385	-0.1523	-0.0080
Intrinsic Motivation	0.1643	1.0000	0.8660	0.8115	-0.4235	0.2184
Interest/Enjoyment	0.2023	0.8660	1.0000	0.6316	-0.2181	0.1207
Perceived Choice	0.0385	0.8115	0.6316	1.0000	-0.3062	-0.0906
Pressure/Tension	-0.1523	-0.4235	-0.2181	-0.3062	1.0000	0.1247
Effort/Importance	-0.0080	0.2184	0.1207	-0.0906	0.1247	1.0000

method: spearman

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	0.0000	0.4632	0.3665	0.8650	0.4986	0.9719
Intrinsic Motivation	0.4632	0.0000	0.0000	0.0000	0.0495	0.3289
Interest/Enjoyment	0.3665	0.0000	0.0000	0.0016	0.3295	0.5925
Perceived Choice	0.8650	0.0000	0.0016	0.0000	0.1657	0.6885
Pressure/Tension	0.4986	0.0495	0.3295	0.1657	0.0000	0.5803
Effort/Importance	0.9719	0.3289	0.5925	0.6885	0.5803	0.0000

method: spearman

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

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	1.0000	0.2644	0.0336	0.4593	-0.3570	0.0418
Intrinsic Motivation	0.2644	1.0000	0.8308	0.5213	-0.4639	0.5015
Interest/Enjoyment	0.0336	0.8308	1.0000	0.2258	-0.3757	0.2841
Perceived Choice	0.4593	0.5213	0.2258	1.0000	-0.1852	0.2058
Pressure/Tension	-0.3570	-0.4639	-0.3757	-0.1852	1.0000	0.2159
Effort/Importance	0.0418	0.5015	0.2841	0.2058	0.2159	1.0000

method: spearman

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	0.0000	0.2468	0.8849	0.0362	0.1121	0.8572
Intrinsic Motivation	0.2468	0.0000	0.0000	0.0154	0.0342	0.0206
Interest/Enjoyment	0.8849	0.0000	0.0000	0.3250	0.0933	0.2120
Perceived Choice	0.0362	0.0154	0.3250	0.0000	0.4216	0.3709
Pressure/Tension	0.1121	0.0342	0.0933	0.4216	0.0000	0.3473
Effort/Importance	0.8572	0.0206	0.2120	0.3709	0.3473	0.0000

method: spearman

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

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	1.0000	0.3818	0.6074	-0.0183	-0.3587	-0.1101
Intrinsic Motivation	0.3818	1.0000	0.7792	0.7622	-0.5413	0.1590
Interest/Enjoyment	0.6074	0.7792	1.0000	0.5432	-0.3759	0.0991
Perceived Choice	-0.0183	0.7622	0.5432	1.0000	-0.6237	-0.2277
Pressure/Tension	-0.3587	-0.5413	-0.3759	-0.6237	1.0000	0.5431
Effort/Importance	-0.1101	0.1590	0.0991	-0.2277	0.5431	1.0000

method: spearman

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	0.0000	0.2790	0.0625	0.9600	0.3087	0.7621
Intrinsic Motivation	0.2790	0.0000	0.0079	0.0104	0.1061	0.6608
Interest/Enjoyment	0.0625	0.0079	0.0000	0.1046	0.2844	0.7854
Perceived Choice	0.9600	0.0104	0.1046	0.0000	0.0540	0.5269
Pressure/Tension	0.3087	0.1061	0.2844	0.0540	0.0000	0.1047
Effort/Importance	0.7621	0.6608	0.7854	0.5269	0.1047	0.0000

method: spearman

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

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	1.0000	0.8810	0.5784	0.8743	-0.4788	0.7832
Intrinsic Motivation	0.8810	1.0000	0.7952	0.7545	-0.5401	0.6627
Interest/Enjoyment	0.5784	0.7952	1.0000	0.3455	-0.4908	0.2012
Perceived Choice	0.8743	0.7545	0.3455	1.0000	-0.3087	0.8667
Pressure/Tension	-0.4788	-0.5401	-0.4908	-0.3087	1.0000	0.0559
Effort/Importance	0.7832	0.6627	0.2012	0.8667	0.0559	1.0000

method: spearman

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	0.0000	0.0072	0.1331	0.0045	0.2301	0.0215
Intrinsic Motivation	0.0072	0.0000	0.0183	0.0305	0.1670	0.0733
Interest/Enjoyment	0.1331	0.0183	0.0000	0.4020	0.2169	0.6328
Perceived Choice	0.0045	0.0305	0.4020	0.0000	0.4569	0.0053
Pressure/Tension	0.2301	0.1670	0.2169	0.4569	0.0000	0.8954
Effort/Importance	0.0215	0.0733	0.6328	0.0053	0.8954	0.0000

method: spearman

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

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	1.0000	-0.2587	-0.2242	-0.0106	0.1943	0.1284
Intrinsic Motivation	-0.2587	1.0000	0.8932	0.8099	-0.3239	0.3102
Interest/Enjoyment	-0.2242	0.8932	1.0000	0.7143	-0.1298	0.1518
Perceived Choice	-0.0106	0.8099	0.7143	1.0000	0.1305	0.0844
Pressure/Tension	0.1943	-0.3239	-0.1298	0.1305	1.0000	-0.3633
Effort/Importance	0.1284	0.3102	0.1518	0.0844	-0.3633	1.0000

method: spearman

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	0.0000	0.4169	0.4837	0.9740	0.5451	0.6909
Intrinsic Motivation	0.4169	0.0000	0.0001	0.0014	0.3044	0.3264
Interest/Enjoyment	0.4837	0.0001	0.0000	0.0091	0.6877	0.6376
Perceived Choice	0.9740	0.0014	0.0091	0.0000	0.6861	0.7943
Pressure/Tension	0.5451	0.3044	0.6877	0.6861	0.0000	0.2457
Effort/Importance	0.6909	0.3264	0.6376	0.7943	0.2457	0.0000

method: spearman

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

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	1.0000	-0.0055	-0.0208	0.3260	-0.0538	-0.1403
Intrinsic Motivation	-0.0055	1.0000	0.8769	0.2924	-0.5247	0.1914
Interest/Enjoyment	-0.0208	0.8769	1.0000	0.1069	-0.5554	-0.0209
Perceived Choice	0.3260	0.2924	0.1069	1.0000	-0.1016	-0.3705
Pressure/Tension	-0.0538	-0.5247	-0.5554	-0.1016	1.0000	0.3447
Effort/Importance	-0.1403	0.1914	-0.0209	-0.3705	0.3447	1.0000

method: spearman

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

round	Difference in Scores	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance
Difference in Scores	0.0000	0.9858	0.9463	0.2771	0.8614	0.6476
Intrinsic Motivation	0.9858	0.0000	0.0001	0.3323	0.0656	0.5310
Interest/Enjoyment	0.9463	0.0001	0.0000	0.7280	0.0488	0.9458
Perceived Choice	0.2771	0.3323	0.7280	0.0000	0.7413	0.2127
Pressure/Tension	0.8614	0.0656	0.0488	0.7413	0.0000	0.2488
Effort/Importance	0.6476	0.5310	0.9458	0.2127	0.2488	0.0000

method: spearman