## Summary of Correlation Analysis

July 6, 2018

1 Gains in Skills/Knowledge and Motivation

Table 1: Correlation matrix of Gains in Skills/Knowledge and Motivation between motivation factors and in the third empirical study

	ound Gains in Skills/Knowledge Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance	Level of Motivation
Gains in Skills/Knowledge	1.0000	-0.0387	-0.2761	0.0681	0.0845	0.2336
Intrinsic Motivation	-0.0387	1.0000	0.5719	0.7804	-0.4514	0.3574
Interest/Enjoyment	-0.2761	0.5719	1.0000	0.2813	0.0205	-0.0995
Perceived Choice	0.0681	0.7804	0.2813	1.0000	-0.3622	0.1183
Pressure/Tension	0.0845	-0.4514	0.0205	-0.3622	1.0000	-0.1196
Effort/Importance	0.2336	0.3574	-0.0995	0.1183	-0.1196	1.0000
Level of Motivation	-0.0745	0.6146	0.7473	0.3690	0.0612	0.1801
Attention	-0.1175	0.3167	0.6965	0.1383	0.1945	-0.0681
Relevance	0.1354	0.6683	0.2263	0.5547	-0.3265	0.2608
Satisfaction	0.0212	0.6182	0.6293	0.3732	0.0744	0.3181

Table 2: Correlation matrix with p-values of Gains in Skills/Knowledge and Motivation between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivati	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice Pressure/Tension	Pressure/Tension		Effort/Importance Level of Motivation
Gains in Skills/Knowledge	0.0000	0.7983	0.0632	0.6530	0.5766	0.1182
Intrinsic Motivation	0.7983	0.0000	0.0000	0.0000	0.0016	0.0147
$\operatorname{Interest}/\operatorname{Enjoyment}$	0.0632	0.0000	0.0000	0.0582	0.8926	0.5106
Perceived Choice	0.6530	0.0000	0.0582	0.0000	0.0134	0.4334
Pressure/Tension	0.5766	0.0016	0.8926	0.0134	0.0000	0.4286
m Effort/Importance	0.1182	0.0147	0.5106	0.4334	0.4286	0.0000
Level of Motivation	0.6227	0.0000	0.0000	0.0116	0.6863	0.2311
Attention	0.4369	0.0320	0.0000	0.3593	0.1952	0.6528
Relevance	0.3698	0.0000	0.1304	0.0001	0.0268	0.0800
Satisfaction	0.8889	0.0000	0.0000	0.0106	0.6231	0.0312
method: spearman						

2 Gains in Skills/Knowledge and Motivation for the group ont-gamified

Table 3: Correlation matrix of Gains in Skills/Knowledge and Motivation for the group ont-gamified between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivation	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	${ m Effort/Importance}$	Level of Motivation
Gains in Skills/Knowledge	1.0000	0.0753	-0.1743	0.0806	-0.0678	0.2440
Intrinsic Motivation	0.0753	1.0000	0.5411	0.8047	-0.1981	0.2644
Interest/Enjoyment	-0.1743	0.5411	1.0000	0.1580	0.2587	-0.1704
Perceived Choice	0.0806	0.8047	0.1580	1.0000	-0.3037	0.1172
Pressure/Tension	-0.0678	-0.1981	0.2587	-0.3037	1.0000	-0.0484
m Effort/Importance	0.2440	0.2644	-0.1704	0.1172	-0.0484	1.0000
Level of Motivation	0.0857	0.5593	0.7890	0.2363	0.4104	0.1460
Attention	0.0390	0.4342	0.8138	0.1021	0.4061	-0.0056
Relevance	0.0749	0.7135	0.2769	0.6849	-0.1862	-0.1355
Satisfaction	0.2308	0.4454	0.6163	0.1741	0.5129	0.3458
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Table 4: Correlation matrix with p-values of Gains in Skills/Knowledge and Motivation for the group ont-gamified between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivation	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance	Level of Motivation
Gains in Skills/Knowledge	0.0000	0.7454	0.4500	0.7284	0.7704	0.2864
Intrinsic Motivation	0.7454	0.0000	0.0113	0.0000	0.3893	0.2469
Interest/Enjoyment	0.4500	0.0113	0.0000	0.4939	0.2575	0.4602
Perceived Choice	0.7284	0.0000	0.4939	0.0000	0.1808	0.6129
Pressure/Tension	0.7704	0.3893	0.2575	0.1808	0.0000	0.8350
${ m Effort/Importance}$	0.2864	0.2469	0.4602	0.6129	0.8350	0.0000
Level of Motivation	0.7117	0.0084	0.0000	0.3023	0.0646	0.5277
Attention	0.8667	0.0492	0.0000	0.6595	0.0678	0.9808
Relevance	0.7470	0.0003	0.2244	0.0006	0.4190	0.5582
Satisfaction	0.3141	0.0430	0.0029	0.4504	0.0174	0.1246
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3 Gains in Skills/Knowledge and Motivation for the group w/o-gamified

Table 5: Correlation matrix of Gains in Skills/Knowledge and Motivation for the group  $\rm w/o\textsc{-}gamifed$  between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivati	Intrinsic Motivation	Interest/Enjoyment Perceived Choice Pressure/Tension	Perceived Choice	Pressure/Tension	Effort/Importance	Effort/Importance Level of Motivation
Gains in Skills/Knowledge	1.0000	-0.3489	-0.5229	-0.1528	0.3022	0.0237
Intrinsic Motivation	-0.3489	1.0000	0.6022	0.7306	-0.6753	0.3322
Interest/Enjoyment	-0.5229	0.6022	1.0000	0.3371	-0.1730	0.0019
Perceived Choice	-0.1528	0.7306	0.3371	1.0000	-0.4735	-0.0806
Pressure/Tension	0.3022	-0.6753	-0.1730	-0.4735	1.0000	-0.1244
m Effort/Importance	0.0237	0.3322	0.0019	-0.0806	-0.1244	1.0000
Level of Motivation	-0.3617	0.6543	0.6990	0.4376	-0.2626	0.2736
Attention	-0.2876	0.3059	0.6219	0.2384	-0.0015	0.0369
Relevance	0.0379	0.6238	0.1290	0.3839	-0.5435	0.3852
Satisfaction	-0.4126	0.7364	0.6586	0.4328	-0.3437	0.3006
method: spearman						

Table 6: Correlation matrix with p-values of Gains in Skills/Knowledge and Motivation for the group  $\rm w/o\textsc{-}gamified$  between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivati	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance	Level of Motivation
Gains in Skills/Knowledge	0.0000	0.0874	0.0073	0.4658	0.1421	0.9103
Intrinsic Motivation	0.0874	0.0000	0.0014	0.0000	0.0002	0.1047
$\operatorname{Interest}/\operatorname{Enjoyment}$	0.0073	0.0014	0.0000	0.0993	0.4082	0.9927
Perceived Choice	0.4658	0.0000	0.0993	0.0000	0.0168	0.7016
Pressure/Tension	0.1421	0.0002	0.4082	0.0168	0.0000	0.5536
m Effort/Importance	0.9103	0.1047	0.9927	0.7016	0.5536	0.0000
Level of Motivation	0.0756	0.0004	0.0001	0.0287	0.2048	0.1857
Attention	0.1632	0.1370	0.000	0.2511	0.9941	0.8608
Relevance	0.8571	0.0009	0.5387	0.0581	0.0050	0.0572
Satisfaction	0.0404	0.0000	0.0003	0.0307	0.0925	0.1443

4 Gains in Skills/Knowledge and Motivation for the group Apprentice

Table 7: Correlation matrix of Gains in Skills/Knowledge and Motivation for the group Apprentice between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivation	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	m Effort/Importance	Level of Motivation
Gains in Skills/Knowledge	1.0000	-0.1482	-0.3262	-0.0853	0.1641	0.1264
Intrinsic Motivation	-0.1482	1.0000	0.6225	0.7542	-0.3550	0.3817
Interest/Enjoyment	-0.3262	0.6225	1.0000	0.2415	-0.0142	-0.0940
Perceived Choice	-0.0853	0.7542	0.2415	1.0000	-0.3343	0.1597
Pressure/Tension	0.1641	-0.3550	-0.0142	-0.3343	1.0000	-0.1216
${ m Effort/Importance}$	0.1264	0.3817	-0.0940	0.1597	-0.1216	1.0000
Level of Motivation	-0.1221	0.6716	0.7721	0.3487	0.0526	0.1709
Attention	-0.1367	0.3851	0.7502	0.1121	0.1541	-0.1000
Relevance	0.0802	0.6293	0.2153	0.5275	-0.2013	0.1884
Satisfaction	0.0143	0.7112	0.6901	0.3776	0.0850	0.3614
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Table 8: Correlation matrix with p-values of Gains in Skills/Knowledge and Motivation for the group Apprentice between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivati	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance	Level of Motivation
Gains in Skills/Knowledge	0.0000	0.4184	0.0684	0.6426	0.3694	0.4905
Intrinsic Motivation	0.4184	0.0000	0.0001	0.0000	0.0462	0.0311
Interest/Enjoyment	0.0684	0.0001	0.0000	0.1830	0.9387	0.6089
Perceived Choice	0.6426	0.0000	0.1830	0.0000	0.0615	0.3825
Pressure/Tension	0.3694	0.0462	0.9387	0.0615	0.0000	0.5074
${ m Effort/Importance}$	0.4905	0.0311	0.6089	0.3825	0.5074	0.0000
Level of Motivation	0.5056	0.0000	0.0000	0.0505	0.7751	0.3496
Attention	0.4557	0.0295	0.0000	0.5414	0.3996	0.5859
Relevance	0.6626	0.0001	0.2367	0.0019	0.2691	0.3018
Satisfaction	0.9380	0.0000	0.0000	0.0331	0.6435	0.0421

 ${\bf 5} \quad {\bf Gains\ in\ Skills/Knowledge\ and\ Motivation\ for} \\ \quad {\bf the\ group\ Master}$ 

Table 9: Correlation matrix of Gains in Skills/Knowledge and Motivation for the group Master between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivation	Intrinsic Motivation	Interest/Enjoyment		Perceived Choice Pressure/Tension	Effort/Importance	Effort/Importance Level of Motivation
Gains in Skills/Knowledge	1.0000	0.3168	0.0265	0.5347	-0.5118	0.2343
Intrinsic Motivation	0.3168	1.0000	0.4229	0.7731	-0.6452	0.4614
Interest/Enjoyment	0.0265	0.4229	1.0000	0.4029	0.2226	-0.0199
Perceived Choice	0.5347	0.7731	0.4029	1.0000	-0.4810	0.0288
Pressure/Tension	-0.5118	-0.6452	0.2226	-0.4810	1.0000	-0.4171
${ m Effort/Importance}$	0.2343	0.4614	-0.0199	0.0288	-0.4171	1.0000
Level of Motivation	0.2126	0.4070	0.7233	0.5138	0.1084	0.0950
Attention	0.0033	0.0397	0.4972	0.1867	0.4491	0.0266
Relevance	0.3642	0.8027	0.1680	0.5967	-0.5577	0.5670
Satisfaction	0.0553	0.3978	0.5150	0.4164	-0.1223	0.0999

Table 10: Correlation matrix with p-values of Gains in Skills/Knowledge and Motivation for the group Master between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivati	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance	Level of Motivation
Gains in Skills/Knowledge	0.0000	0.2697	0.9285	0.0488	0.0614	0.4202
Intrinsic Motivation	0.2697	0.0000	0.1319	0.0012	0.0127	0.0968
Interest/Enjoyment	0.9285	0.1319	0.0000	0.1532	0.4443	0.9461
Perceived Choice	0.0488	0.0012	0.1532	0.0000	0.0816	0.9222
Pressure/Tension	0.0614	0.0127	0.4443	0.0816	0.0000	0.1379
Effort/Importance	0.4202	0.0968	0.9461	0.9222	0.1379	0.0000
Level of Motivation	0.4657	0.1486	0.0035	0.0602	0.7122	0.7466
Attention	0.9910	0.8928	0.0704	0.5227	0.1072	0.9281
Relevance	0.2004	0.0005	0.5660	0.0243	0.0382	0.0345
Satisfaction	0.8510	0.1590	0.0595	0.1386	0.6769	0.7340

6 Gains in Skills/Knowledge and Motivation for the group ont-gamified.Apprentice

Table 11: Correlation matrix of Gains in Skills/Knowledge and Motivation for the group ont-gamified. Apprentice between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivation	Intrinsic Motivation	Interest/Enjoyment	Perceived	Pressure/Tension	Effort/Importance	Effort/Importance Level of Motivation
Gains in Skills/Knowledge	1.0000	-0.2659	-0.0687	-0.1720	0.1545	-0.1879
Intrinsic Motivation	-0.2659	1.0000	0.6541	0.7652	0.4746	0.2305
Interest/Enjoyment	-0.0687	0.6541	1.0000	0.1802	0.6303	0.0474
Perceived Choice	-0.1720	0.7652	0.1802		0.1406	-0.0505
Pressure/Tension	0.1545	0.4746	0.6303	0.1406	1.0000	0.0865
Effort/Importance	-0.1879	0.2305	0.0474	-0.0505	0.0865	1.0000
Level of Motivation	0.0990	0.6315	0.8591	0.2638	0.7702	0.1086
Attention	8960.0	0.5435	0.9301	0.1071	0.7083	0.0325
Relevance	-0.0597	0.6195	0.2634	0.5794	0.5022	-0.2061
Satisfaction	0.1257	0.6417	0.8343	0.2511	0.7497	0.1852
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Table 12: Correlation matrix with p-values of Gains in Skills/Knowledge and Motivation for the group ont-gamified. Apprentice between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivati	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Perceived Choice Pressure/Tension		Effort/Importance Level of Motivation
Gains in Skills/Knowledge	0.0000	0.3573	0.8154	0.5566	0.5979	0.5199
Intrinsic Motivation	0.3573	0.0000	0.0112	0.0014	0.0864	0.4280
Interest/Enjoyment	0.8154	0.0112	0.0000	0.5376	0.0157	0.8721
Perceived Choice	0.5566	0.0014	0.5376	0.0000	0.6315	0.8638
Pressure/Tension	0.5979	0.0864	0.0157	0.6315	0.0000	0.7687
m Effort/Importance	0.5199	0.4280	0.8721	0.8638	0.7687	0.0000
Level of Motivation	0.7363	0.0154	0.0001	0.3621	0.0013	0.7116
Attention	0.7420	0.0446	0.0000	0.7156	0.0046	0.9122
Relevance	0.8393	0.0181	0.3629	0.0299	0.0672	0.4796
Satisfaction	0.6685	0.0134	0.0002	0.3865	0.0020	0.5262
method: spearman						

7 Gains in Skills/Knowledge and Motivation for the group ont-gamified.Master

Table 13: Correlation matrix of Gains in Skills/Knowledge and Motivation for the group ont-gamified.Master between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivati	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance	Level of Motivation
Gains in Skills/Knowledge	1.0000	0.8929	-0.1441	0.9286	-0.8895	0.7388
Intrinsic Motivation	0.8929	1.0000	0.0180	0.9643	-0.9636	0.8829
Interest/Enjoyment	-0.1441	0.0180	1.0000	-0.1622	0.0748	0.0636
Perceived Choice	0.9286	0.9643	-0.1622	1.0000	-0.9636	0.8469
Pressure/Tension	-0.8895	-0.9636	0.0748	-0.9636	1.0000	-0.8415
Effort/Importance	0.7388	0.8829	0.0636	0.8469	-0.8415	1.0000
Level of Motivation	0.3214	0.4286	0.4685	0.2857	-0.2594	0.6667
Attention	-0.0180	-0.0180	0.1273	-0.0721	0.2057	0.3000
Relevance	0.7568	0.7748	-0.3455	0.8829	-0.8602	0.5727
Satisfaction	0.4505	0.4505	0.4909	0.3063	-0.2805	0.5636

Table 14: Correlation matrix with p-values of Gains in Skills/Knowledge and Motivation for the group ont-gamified.Master between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivation	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Perceived Choice Pressure/Tension	Effort/Importance	Effort/Importance Level of Motivation
Gains in Skills/Knowledge	0.0000	0.0123	0.7578	0.0067	0.0073	0.0579
Intrinsic Motivation	0.0123	0.0000	0.9694	0.0028	0.0005	0.0085
Interest/Enjoyment	0.7578	0.9694	0.0000	0.7283	0.8734	0.8922
Perceived Choice	0.0067	0.0028	0.7283	0.0000	0.0005	0.0162
Pressure/Tension	0.0073	0.0005	0.8734	0.0005	0.0000	0.0176
${ m Effort/Importance}$	0.0579	0.0085	0.8922	0.0162	0.0176	0.0000
Level of Motivation	0.4976	0.3536	0.2890	0.5560	0.5742	0.1019
Attention	0.9694	0.9694	0.7857	0.8780	0.6582	0.5133
Relevance	0.0489	0.0408	0.4479	0.0085	0.0130	0.1790
Satisfaction	0.3104	0.3104	0.2633	0.5040	0.5423	0.1876

8 Gains in Skills/Knowledge and Motivation for the group w/o-gamified. Apprentice

Table 15: Correlation matrix of Gains in Skills/Knowledge and Motivation for the group  $\rm w/o\text{-}gamified.Apprentice}$  between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivati	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance	Level of Motivation
Gains in Skills/Knowledge	1.0000	-0.2473	-0.7037	-0.1149	9980.0	0.0804
Intrinsic Motivation	-0.2473	1.0000	0.6049	0.7469	-0.9039	0.4071
Interest/Enjoyment	-0.7037	0.6049	1.0000	0.2129	-0.4590	-0.0057
Perceived Choice	-0.1149	0.7469	0.2129	1.0000	-0.7869	0.1300
Pressure/Tension	0.0866	-0.9039	-0.4590	-0.7869	1.0000	-0.2665
Effort/Importance	0.0804	0.4071	-0.0057	0.1300	-0.2665	1.0000
Level of Motivation	-0.4669	0.6846	0.6537	0.3811	-0.6475	0.3648
Attention	-0.4901	0.3294	0.5784	0.1389	-0.3365	0.0698
Relevance	0.1585	0.6712	0.1327	0.4849	-0.7353	0.3685
Satisfaction	-0.3892	0.7465	0.6326	0.3398	-0.6019	0.4109

Table 16: Correlation matrix with p-values of Gains in Skills/Knowledge and Motivation for the group  $\rm w/o$ -gamified. Apprentice between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivation	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	Effort/Importance	Level of Motivation
Gains in Skills/Knowledge	0.0000	0.3225	0.0011	0.6498	0.7325	0.7513
Intrinsic Motivation	0.3225	0.0000	0.0078	0.0004	0.0000	0.0936
Interest/Enjoyment	0.0011	0.0078	0.0000	0.3963	0.0554	0.9821
Perceived Choice	0.6498	0.0004	0.3963	0.0000	0.0001	0.6073
Pressure/Tension	0.7325	0.0000	0.0554	0.0001	0.0000	0.2850
m Effort/Importance	0.7513	0.0936	0.9821	0.6073	0.2850	0.0000
Level of Motivation	0.0508	0.0017	0.0033	0.1187	0.0037	0.1366
Attention	0.0389	0.1820	0.0119	0.5825	0.1722	0.7833
Relevance	0.5300	0.0023	0.5996	0.0414	0.0005	0.1324
Satisfaction	0.1104	0.0004	0.0048	0.1678	0.0082	0.0903
method: spearman						

9 Gains in Skills/Knowledge and Motivation for the group w/o-gamified. Master

Table 17: Correlation matrix of Gains in Skills/Knowledge and Motivation for the group  $\rm w/o\mbox{-}gamified\mbox{.}Master$  between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivation	Intrinsic Motivation	Interest/Enjoyment	Perceived Choice	Pressure/Tension	m Effort/Importance	Level of Motivation
Gains in Skills/Knowledge	1.0000	-0.6307	0.0545	-0.0091	0.5964	-0.2883
Intrinsic Motivation	-0.6307	1.0000	0.6307	0.3964	-0.1773	0.1071
Interest/Enjoyment	0.0545	0.6307	1.0000	0.6364	0.5467	-0.0721
Perceived Choice	-0.0091	0.3964	0.6364	1.0000	0.0994	-0.7207
Pressure/Tension	0.5964	-0.1773	0.5467	0.0994	1.0000	0.1773
Effort/Importance	-0.2883	0.1071	-0.0721	-0.7207	0.1773	1.0000
Level of Motivation	0.0901	0.5357	0.8829	0.5946	0.6502	-0.0357
Attention	0.2342	0.3571	0.7928	0.4144	0.7881	0.1071
Relevance	-0.4220	0.6183	0.1284	-0.1927	-0.1806	0.4910
Satisfaction	-0.3784	0.7143	0.7388	0.7748	0.1970	-0.1786

Table 18: Correlation matrix with p-values of Gains in Skills/Knowledge and Motivation for the group  $\rm w/o\text{-}gamified$ .Master between motivation factors and in the third empirical study

round Gains in Skills/Knowledge Intrinsic Motivation	Intrinsic Motivation	Interest/Enjoyment Perceived Choice Pressure/Tension	Perceived Choice	Pressure/Tension	m Effort/Importance	Effort/Importance Level of Motivation
Gains in Skills/Knowledge	0.0000	0.1289	0.9075	0.9846	0.1575	0.5307
Intrinsic Motivation	0.1289	0.0000	0.1289	0.3786	0.7037	0.8397
Interest/Enjoyment	0.9075	0.1289	0.0000	0.1244	0.2041	0.8780
Perceived Choice	0.9846	0.3786	0.1244	0.0000	0.8321	0.0676
Pressure/Tension	0.1575	0.7037	0.2041	0.8321	0.0000	0.7037
${ m Effort/Importance}$	0.5307	0.8397	0.8780	0.0676	0.7037	0.0000
Level of Motivation	0.8477	0.2357	0.0085	0.1591	0.1139	0.9635
Attention	0.6132	0.4444	0.0334	0.3553	0.0353	0.8397
Relevance	0.3456	0.1389	0.7837	0.6790	0.6984	0.2632
Satisfaction	0.4026	0.0881	0.0579	0.0408	0.6720	0.7131