Team Tie

Investigation into Elm City Stories' MiniGame Design

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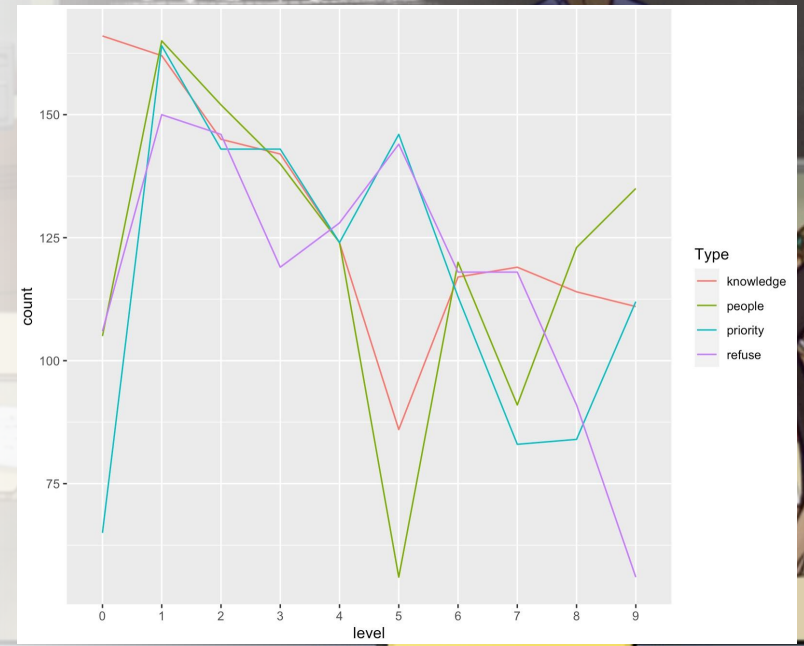
Data Understanding & Cleaning

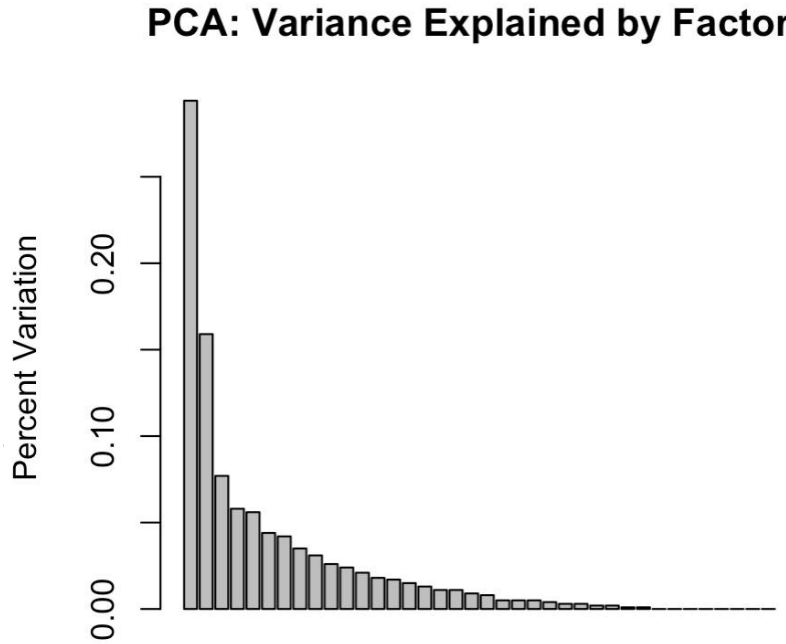
- **Define playing state by event_id and perform EDA to see playing time across levels**

index	event_id	event_description	event_time_dbl	playing_state
308549	1003	Player enters Level Select menu	1068	na
308550	1004	Player selects minigame level	1069	na
308551	900	Player closes intro panel to start game	1071	start_people
308552	901	Player selects an NPC	1076	playing_people
308553	901	Player selects an NPC	1077	playing_people
308554	904	Player starts drag on NPC	1077	playing_people
308555	904	Player starts drag on NPC	1077	playing_people
308556	901	Player selects an NPC	1082	playing_people
308557	904	Player starts drag on NPC	1082	end_people
308558	1002	Player exits game through top bar back arrow	1086	na
308559	1003	Player enters Level Select menu	1087	na



MiniGame Category Differentiation Evaluation

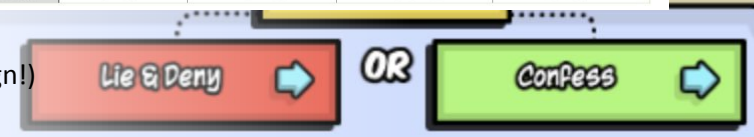
❖ **Choosing Principal Components by variance contribution rate**



loading of PCA

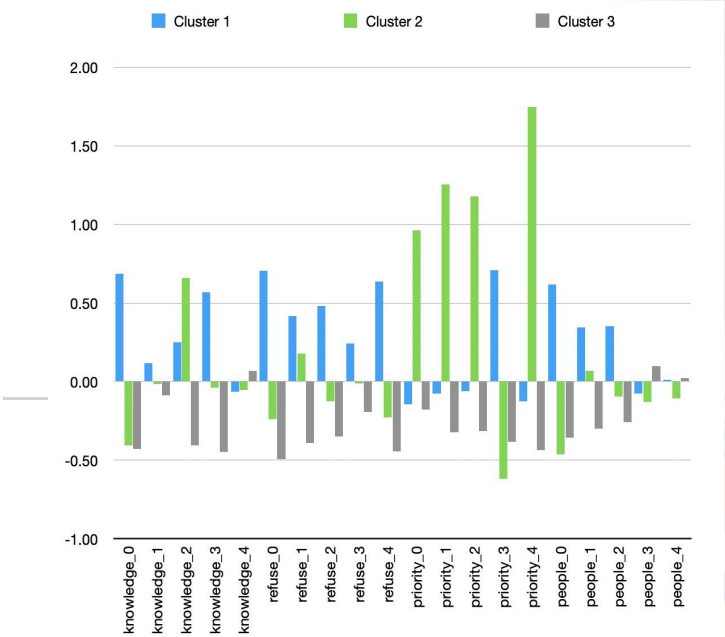
	PC1	PC2	PC3	PC4
knowledge_0	-0.0667	0.0660	0.2797	0.1814
knowledge_1	-0.0079	-0.0477	0.1186	-0.2382
knowledge_2	0.0729	-0.0416	-0.1495	-0.1425
knowledge_3	0.1160	-0.1724	-0.0291	-0.0348
knowledge_4	0.1026	-0.2306	-0.1475	0.0231
knowledge_5	0.1053	-0.1968	0.0037	0.2026
knowledge_6	0.1808	-0.2169	0.0873	-0.1480
knowledge_7	0.0982	-0.2885	-0.0556	-0.0428
knowledge_8	0.0777	-0.2632	-0.0565	-0.1619
knowledge_9	0.0680	-0.2734	-0.0456	-0.1781
refuse_0	-0.0137	0.1994	0.1407	0.1024
refuse_1	-0.2691	-0.1488	-0.0186	-0.0154
refuse_2	-0.2677	-0.1528	-0.0247	-0.0200
refuse_3	-0.2680	-0.1516	-0.0238	-0.0183
refuse_4	-0.2720	-0.1316	-0.0049	-0.0205
refuse_5	-0.2681	-0.1514	-0.0236	-0.0216
refuse_6	-0.2662	-0.1565	-0.0213	-0.0246
refuse_7	-0.2673	-0.1536	-0.0228	-0.0189
refuse_8	-0.2675	-0.1531	-0.0277	-0.0197
refuse_9	-0.2683	-0.1507	-0.0249	-0.0189
priority_0	-0.0070	-0.0815	-0.0849	0.1339
priority_1	0.0006	-0.1038	0.2089	0.2245
priority_2	-0.0027	-0.1289	0.2467	0.3179
priority_3	0.0923	-0.1012	-0.0260	-0.0214
priority_4	-0.0101	-0.0262	0.2972	0.1273
priority_5	0.1070	-0.0903	-0.0595	0.0689
priority_6	0.1001	-0.1910	-0.2493	0.1621
priority_7	0.1177	-0.1713	-0.1150	0.1786
priority_8	0.1170	-0.1692	-0.0695	0.0281
priority_9	0.0252	-0.1759	0.0617	0.3448
people_0	-0.0455	0.0857	0.2073	-0.1479
people_1	-0.0561	-0.0225	0.2027	0.4142
people_2	0.0720	-0.0958	0.3984	-0.0934
people_3	0.0893	-0.2329	0.0913	-0.0097
people_4	0.2264	0.0670	-0.1605	-0.0098
people_5	0.0856	-0.1583	0.2850	-0.3058
people_6	0.2202	-0.0616	-0.0502	0.0563
people_7	0.1275	-0.2361	0.2032	-0.0311
people_8	0.1038	-0.0436	0.3633	-0.2526
people_9	0.2087	-0.1105	-0.0175	0.1382

- From PCA's rotation view, each PC generally represents one category of minigame
- Each category is distinct from the others, having its own emphasis.
- Inside the category, different levels of minigames have similar functions (good design!)



MiniGame Design Evaluation by Category

❖ **Clustering users by MiniGame time within K-means clustering**



- The time spent on Priority Game have high volatility among users
- It might be too hard/easy for certain type of users; probably needs redesigning

❖ **Regression of Principal Components on the S5_score decrease from week 0 to week n**

	Estimate	Std. Error	t value	Pr(>|t|)	nweeks	Sig
(Intercept)	-0.0511	0.0662	-0.7718	0.4445	3	
PCA1	0.0099	0.0214	0.4630	0.6458	3	
PCA2	-0.0309	0.0260	-1.1855	0.2425	3	
PCA3	0.0248	0.0329	0.7549	0.4545	3	
PCA4	0.0555	0.0441	1.2594	0.2149	3	
(Intercept)	-0.0713	0.0544	-1.3114	0.1968	6	
PCA1	-0.0002	0.0177	-0.0114	0.9910	6	
PCA2	0.0432	0.0212	2.0374	0.0479	6	*
PCA3	-0.0040	0.0276	-0.1438	0.8863	6	
PCA4	-0.0393	0.0364	-1.0795	0.2865	6	
(Intercept)	-0.0318	0.0516	-0.6161	0.5414	12	
PCA1	-0.0038	0.0168	-0.2244	0.8236	12	
PCA2	-0.0015	0.0237	-0.0617	0.9511	12	
PCA3	-0.0215	0.0294	-0.7336	0.4676	12	
PCA4	-0.0365	0.0323	-1.1300	0.2654	12	
(Intercept)	0.0111	0.0607	0.1830	0.8564	24	
PCA1	0.0071	0.0183	0.3865	0.7028	24	
PCA2	0.0027	0.0254	0.1074	0.9154	24	
PCA3	0.0252	0.0330	0.7636	0.4532	24	
PCA4	-0.0239	0.0360	-0.6649	0.5130	24	

- The relationship is not clear/significant:
  Too much other factors & noise; Too few data
- Future investigation: More survey + Finding more factors