

A Study on Gamification Consumer Perception Analysis Using Big Data

Se-won Jeon*, Youn Ju Ahn**, Gi-Hwan Ryu***

* Ph. D Student, Department of Immersive Content Convergence, Graduate School, Kwangwoon University, Korea

** Ph. D Student, Department of Public Administration, Graduate School, Kwangwoon University, Korea

***Professor, Department of Tourism and Food Industry, Graduate School of Smart Convergence, Kwangwoon University, Seoul, Korea
E-mail {sw2947, 20ayk, allryu}@kw.ac.kr

Abstract

The purpose of the study was to analyze consumers' perceptions of gamification. Based on the analyzed data, we would like to provide data by systematically organizing the concept, game elements, and mechanisms of gamification. Recently, gamification can be easily found around medical care, corporate marketing, and education. This study collected keywords from social media portal sites Naver, Daum, and Google from 2018 to 2023 using TEXTOM, a social media analysis tool. In this study, data were analyzed using text mining, semantic network analysis, and CONCOR analysis methods. Based on the collected data, we looked at the relevance and clusters related to gamification. The clusters were divided into a total of four clusters: 'Awareness of Gamification', 'Gamification Program', 'Future Technology of Gamification', and 'Use of Gamification'. Through social media analysis, we want to investigate and identify consumers' perceptions of gamification use, and check market and consumer perceptions to make up for the shortcomings. Through this, we intend to develop a plan to utilize gamification.

Keywords: Gamification, Gamify, Big data, Text mining, Semantic network analysis

1. Introduction

Recently, with the advent of digital-based media, the use of gamification that consumers can share and experience in person is increasing[1,2]. Gamification is mainly approached from a marketing point of view, and has been applied to bring about voluntary participation, fun experiences, and positive memory effects when consumers use products or services[3,4]. Gamification and combination form a close bond with the functional gaming domain[5]. This paper analyzed gamification keywords to confirm consumers' perceptions of gamification. Based on this, the concept of gamification and game elements and mechanisms are analyzed to provide data for the development of gamification utilization plans. Through social media big data analysis, we intend to analyze consumer awareness and current status of gamification use. In this paper, we collect data and analyze gamification keywords using social media information. The purpose is to identify the market and consumer awareness using gamification and develop it by supplementing the lacking part. In addition, it is

Manuscript received: August 3, 2023 / revised: August 21, 2023 / accepted: August 29, 2023

Corresponding Author: allryu@kw.ac.kr

Tel:*** - **** - **** Fax: +82-2-940-5443

Professor, Department of Tourism and Food Industry, Graduate School of Smart Convergence, Kwangwoon University, Seoul, Korea

necessary to identify the positive impact of gamification on consumers.

2. Related Work

2.1 Gamification

Gamification is defined as utilizing the design elements of the game in a context other than a game, and is used by combining the concept of gamification in various fields such as education, health, research, and marketing. Research on this is being actively conducted. As the importance of non-face-to-face education grows due to COVID-19, the educational method of using gamification is drawing attention[6]. In a non-game environment, it refers to encouraging users' actions and satisfying human psychological motivations and demands through gamification and interesting factors. In the game mindset, designers form an intense drive when they fuse game elements such as social, narrative, unknown, and missionary into design. As a result, it is possible to awaken the user's emotions and increase the user's viscosity[7].

2.2 Text Mining

Text mining is the extraction of high-quality information by applying mining techniques to text data, which is one of the unstructured data[8]. Text analysis technology is divided into frequency analysis results, clustering, and classification. TF-IDF is the most widely used method for term vectorization of documents and is based on the frequency of appearance of terms[9]. Text mining using social media big data can derive more detailed and specific characteristics by using Internet information prepared and accumulated by users compared to survey methods targeting a large number of people[10].

3. Research Methods

This paper aims to analyze gamification keywords using social media big data Textom to identify recent trends and perceptions of consumers and trends in gamification. It is collected from major social media such as Naver, Daum, Google's supplementary service cafe, blog, and knowledge in, and Facebook linked to Google. Collect keywords that appear together with gamification keywords and conduct frequency analysis through frequency of appearance. Words such as conjunctions were deleted[11]. In order to analyze consumers' perceptions in more depth and detail, we apply CONCOR analysis that classifies structural equivalence based on correlation between keywords[12]. Through this, clusters with similar attributes related to keywords are formed, and the meaning and characteristics of the clusters are explained. In this paper, we collect SNS data excluding the keyword 'gamification', derive key keywords based on the words derived through the data refinement process, and analyze the relationship between them[13,14].

In this paper, the data collection period was set from January 1, 2018 to January 1, 2023. Data for the last five years were selected to check recent consumer trends. Specifically, the research procedure used the Textom program to analyze frequency and then refine it to delete pronouns, such as 'something', 'year', 'month', etc.

4. Semantic Network Analysis

This study conducted text mining using data collected in relation to 'gamification'. As a result of the analysis, 9,818 'gamification' appeared. Among them, the results of the top 30 are summarized in <Table 1>.

High-frequency words were identified in the order of games, education, metaverse, learning, content, elements, development, edutech corporation, Kakao, and companies.

Table 1. Gamification keyword frequency analysis

Keyword	Frequency	Keyword	Frequency	Keyword	Frequency
Game	7468	Application	857	Platform	509
Education	3680	Service	804	Program	452
Metaverse	2442	Class	764	Culture	430
Learning	1288	Marketing	637	Online	419
Contents	1245	Digital	627	Fun	398
Element	1045	Experience	599	Introduction	394
Development	1023	Use	578	Future	393
Edutech Corporation	1016	Industry	559	Strategy	392
Kakao	870	Grafting	555	Effect	390
Corporation	858	Skill	533	Experience	389

Figure 1 shows the results of semantic network analysis to collect keywords related to gamification and confirm structural analysis between keywords based on the results of keyword frequency analysis. The size of the node and the thickness of the line between the two words mean the frequency of words, the frequency of simultaneous appearance between words, and the strength of the connection between keywords[15]. Specifically, it can be seen that nodes such as games, education, and metaverse are large except for gamification, which is a keyword, and the lines between them are thick.

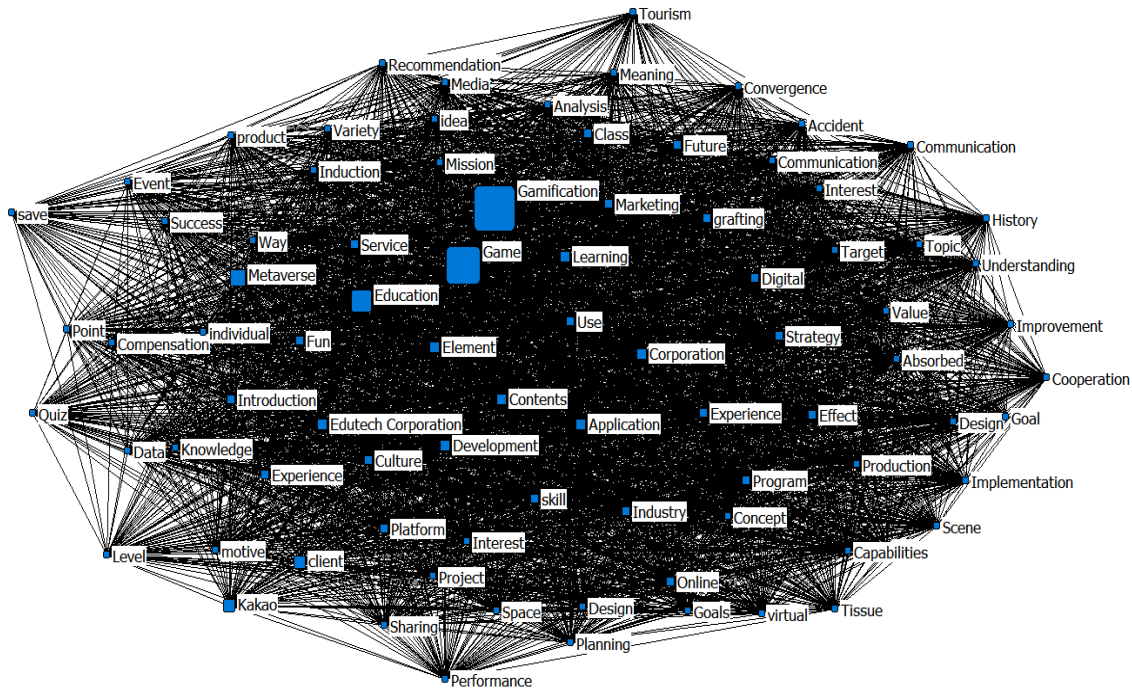


Figure 1. Network visualization

Figure 2 shows the correlation analysis by confirming the isotropy of the network data used in the study as a result of visualizing CONCOR analysis, finding similar groups.

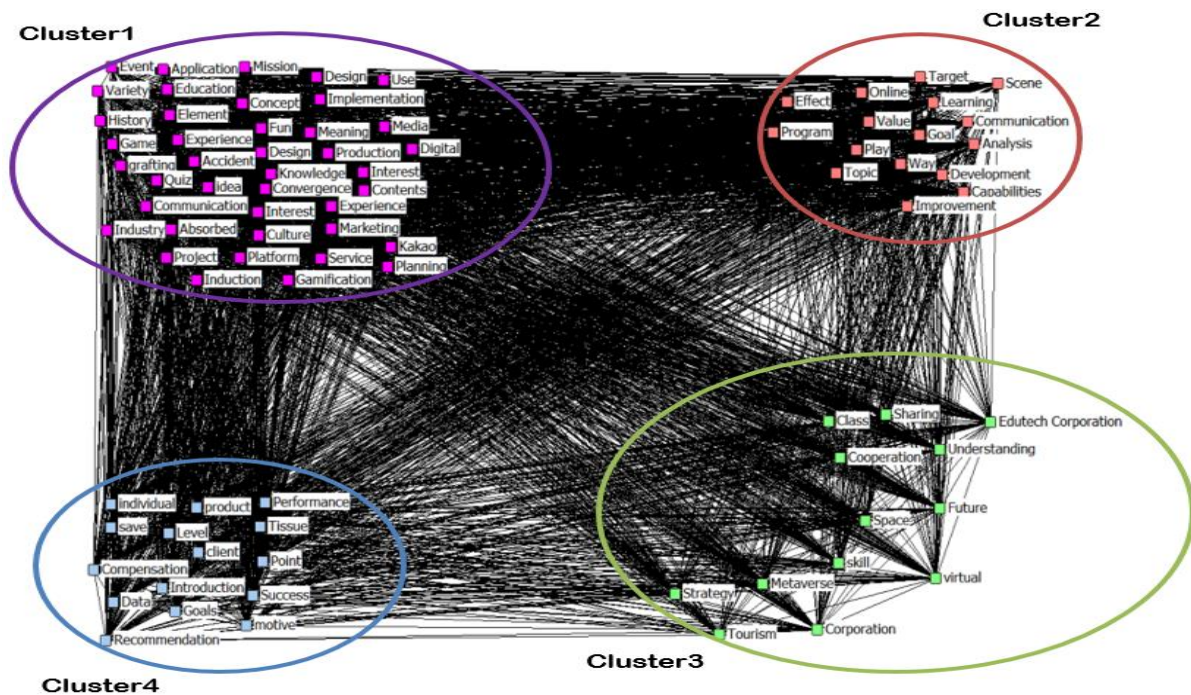


Figure 2. CONCOR Analysis

As a result of conducting CONCOR analysis, it was divided into a total of four clusters.

Cluster 1 was divided into communication, content, convergence, application, quiz, concept, event, design, planning, experience, production, and marketing, and was named 'game recognition'. Through the original data, it can be seen that companies apply gamification as marketing and plan it, and continue to induce customer participation so that consumers can experience it, thereby increasing brand loyalty.

Cluster 2 was named as a "program" by dividing it into online, field, play, learning, topic, effect, field, communication, target, topic, and improvement. Through the original data, it can be seen that it creates an educational program so that learning can be felt as a playground according to the subject so that it can be effectively understood and improves concentration on the object.

Cluster 3 was divided into sharing, future, metaverse, enterprise, strategy, virtual, space, understanding, and tourism and named as 'technology'. It should be seen as a future strategy to create a new economy through original data. Digital literacy is important as a new growth engine that drives the future economy that coexists and understands games such as business, tourism, and education.

Cluster 4 was named 'game use' by dividing it into goals, data, customers, accumulation, points, success, introduction, recommended products, and rewards. It is used to collect customer data by introducing recommendations and rewards as a recommendation strategy based on gamification application and advanced analysis through original data.

5. Conclusion

This paper was intended to analyze the characteristics of gamification and consumers' perceptions. Key words related to gamification were collected and analyzed from major portal sites Naver, Daum, and Google through Textom. The collection period collected data accumulated from major portal sites for a total of five years from January 1, 2018 to January 1, 2023. CONCOR analysis was conducted based on the collected data, and the research results of this paper were visualized and conducted to help understanding.

As a result of cluster analysis through CONCOR analysis, it was confirmed that a total of four meaningful clusters were classified. In the form of a cluster with four meanings, it was confirmed that Cluster 1 formed 'Awareness of Gamification', Cluster 2 formed 'Gamification Program', Cluster 3 formed 'Future Technology of Gamification', and Cluster 4 formed 'Use of Gamification'.

Gamification identified concepts, service-level components, and mechanisms, and identified how gamification techniques were applied in the service area. Based on the analysis results, this paper shows that gamification is used in various fields such as finance, health, and tourism, and rewards are high among game element challenge, competition, achievement, reward, and relationship. Theoretical and practical implications for how to use gamification were provided. Therefore, gamification needs to establish the concept of game mechanics accurately and utilize them for the development of corporate and industrial strategies. When using gamification in future research, it is necessary to find a way not to lose the essential purpose due to excessive immersion due to game elements. Gamification will grow rapidly in a positive direction and will be an opportunity to create new markets for industrial development.

References

- [1] Kang Sung-ho, Lee Han-geun and Jo Bo-gyeong, "The Effects of Mobile Advertising on Advertising Engagement and Advertising Attitude: Evidence from Gamification Advertising," *Korean Business Education Review*, Vol. 34, No. 2, pp. 283-303, 2019. DOI: <https://doi.org/10.23839/kabe.2019.34.2.283>
- [2] Wan-Min Kim, Seongho Kang and Hangeun Lee, "The Effects of Consumer Experiences toward Gamification Advertising on Brand Attitude," *Korean Journal of Business Administration*, Vol. 33, No. 6, pp. 1019-1040, 2020.
- [3] Anna Han, "A Systematic Literature Review of Research Trends in Domestic Gamification," *The Korea Contents Association*, Vol. 18, No. 5, pp. 566-578, 2018. DOI: <https://doi.org/10.5392/JKCA.2018.18.0.566>
- [4] Dongyeop Lee, "Future Game Market Outlook Based on Gamification's Definition and Case Analysis," *Journal of Digital Design*, Vol. 11, No. 4, pp. 450-457, 2011.
- [5] Boh-Youn Kwon and Chul-Gyun Lyou, "The meta-analysis of domestic gamification research : status and suggest," *Korea Humanities Content Society*, Vol. 39, pp. 97-124, 2015. DOI: <https://doi.org/10.18658/humancon.2015.12.39.97>
- [6] ChangSeop Rhee and SeungBum Soh, "A Case Study of Social Enterprises Using Gamification: Treeplanet," *Journal of Korea Game Society*, Vol. 23, No. 2, pp. 45-54, 2023. DOI: <https://doi.org/10.7583/JKGS.2023.23.2.45>
- [7] Li YongKang, "A Study on the Application of Gamification in Fitness Apps Based on Octalysis Framework," *A Journal of Brand Design Association of Korea*, Vol. 20, No. 4, pp. 59-70, 2022. DOI: <https://doi.org/10.18852/bdak.2022.20.4.5>

- [8] Deuk-Hee Park, "A comparative analysis of public perception and tourist needs of Andong before and after of COVID-19 outbreak: Text mining and semantic network analysis using big data on social media," *Korean Journal of Hospitality and Tourism*, Vol. 30, No. 5, pp. 231-246, 2021. DOI: <https://doi.org/10.24992/KJHT.2021.7.30.05.231>
- [9] JinMyeong Chung and YoungHo Park, "Social Media Bigdata Analysis Based on Information Security Keyword Using Text Mining," *Journal of the Korea Industrial Information Systems Research*, Vol. 27, No. 5, pp. 37-48, 2022. DOI: <https://doi.org/10.9723/jksis.2022.27.5.037>
- [10] Junghan Sung and Lee Kyungjin, "Outdoor Healing Places Perception Analysis Using Named Entity Recognition of Social Media Big Data," Vol. 50, No. 5, pp. 90-102, 2022. DOI: <https://doi.org/10.9715/KILA.2022.50.5.090>
- [11] Jang-Heon Han and Heon Seo, "A Study on the Activation Plans of Yeosu Tourism and Perception on Yeosu Tourism by Analyzing Social Big Data," *The Korea Academic Society Of Tourism And Leisure*, Vol. 31, No. 7, pp. 81-96, 2019.
- [12] Park Tae-su, "A Study on the Perception of Ulsan Tourism and the Promotion Plans for the Future through the Analysis of Social Big Data : Focused on CONCOR Analysis Methodology," *Tourism Institute of Northeast Asia*, Vol. 16, No. 3, pp. 109-126, 2020.
- [13] Se-Won Jeon, Gi-Hwan Ryu and Seok-Jae Moon, "Museum Gamification Design using Story Elements," *International Journal of Advanced Culture Technology*, Vol. 8, No. 4, pp. 25-32, 2020. DOI: <https://doi.org/10.17703/IJACT.2020.8.4.25>
- [14] JinHo Lee, AeSook Kim, Chi-Gon Hwang and GiHwan Ryu, "A Study on the Promotion of Yakseon Food Using Big Data," *International Journal of Internet, Broadcasting and Communication*, Vol. 14, No. 4, pp. 41-46, 2022. DOI: <https://doi.org/10.7236/IJIBC.2022.14.4.41>
- HongYeol Choi and Eunkyung Park, "An Analysis of Solo Travel Trends using Social Media Big Data: Focused on Jeju Island," Vol. 23, No. 1, pp. 45-64, 2019. DOI: <https://doi.org/10.18604/tmro.2019.23.1.3>