

Semantic Network Analysis for VR & Coding Education in Big Data

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Abstract —The purpose of this study is to investigate the informal Big Data to understand the discourse among the members of VR & Coding education. Therefore, we will understand the social meaning of VR & Coding education and discuss VR & Coding education required in society. For this research, we looked at Big Data about 'VR & Coding education' which has been collected through online channel for the last 5 years. We collected 4392 data sets from the online channel, and after refining, we constructed a semantic network with 200 important keywords. When we searched for 'VR + Coding Education', the most frequently appeared keywords were 'Experience', 'Virtual Reality', 'Fourth Industrial Revolution', 'Robot', 'Program'. Degree centrality values were 'experience', 'virtual reality', 'robot', 'fourth industrial revolution', 'infant'. Based on these results, we analyze the implications of VR & Coding education to society.

Keywords-Semantic Network Analysis; VR & Coding Education; Big Data.

I. INTRODUCTION

We live in the age of the fourth industrial revolution. It is clear that the future will change rapidly into the era of artificial intelligence. Currently, 90% of the knowledge learned in elementary, middle, and high schools is said to be obsolete in ten years [1]. Like this, changes in the education that suits the changes of the 4th Industrial Revolution era are necessary. In particular, current society is transforming into a software-oriented society. Companies with software skills are entering a whole new market, dominating the market with new products and services, and introducing new software technologies into existing company systems to increase efficiency.

So how do we go about social change? We need preparation. Prepared individuals will survive in the future, but unprepared individuals can be predicted to decline or become more polarized. Therefore, in education, SW integration ability and creative problem solving ability should be more emphasized. To this end, it is necessary to introduce Software (SW) education for strengthening the capacity of new talent in the digital era in the educational field.

Virtual Reality (VR), which is a core area of the 4th industry, is considered as one of the technologies leading the

fourth industrial revolution. Just as VR technology is applied in various industries such as games, movies, and tourism media, VR can be actively introduced in education. In addition, since coded education improves logical thinking ability and problem solving ability, it can nurture self-empowerment so that the child can actively solve the problem.

Since 2019, coding education has become mandatory in the 5th and 6th grades of elementary schools in Korea, and the importance of coding education is emerging. Therefore, this study aims to examine the social discourse on VR and coding education, which can be expected to improve children's creativity and scientific knowledge through VR and coding education.

In this study, we collected and analyzed informal data such as Youtube and news to see how social discourse about VR and coding education is formed. In addition, this study suggested alternatives to activate VR and coding education. The 'research problem' of this study is 'What is social discourse about VR & coding education of Big Data?'

II. RESEARCH METHOD AND DATA ANALYSIS

We collected data on 'VR and coding education' through YouTube and news and data mining. In particular, we used Textom [5], a large-scale data analysis solution for data analysis and visualization. In addition, we used NetMiner to look at the degree centrality.

The data collection period is from the beginning of the discussion of coding education to the present (July 23, 2014 to April 7, 2019). The final collected data is 4392 cases. Text mining was performed based on data collected from Textom.

III. RESULTS

Keyword frequency analysis and Degree Centrality are summarized in the results.

A. Keyword Frequency Analysis

Based on the Big Data provided by Textom, the frequency analysis of the top 50 keywords through keyword analysis is shown in Figure 1. The result was 'Education', 'infant', 'progress', 'target', 'program', 'computer', 'start', 'software', 'student'. VR was analyzed by keywords such as 'game', 'virtual reality', 'content', 'experience' and so on. Figure 2

shows the result of visualizing with Word Cloud. Word Cloud is a technique for visualizing words that are related to key words [2].

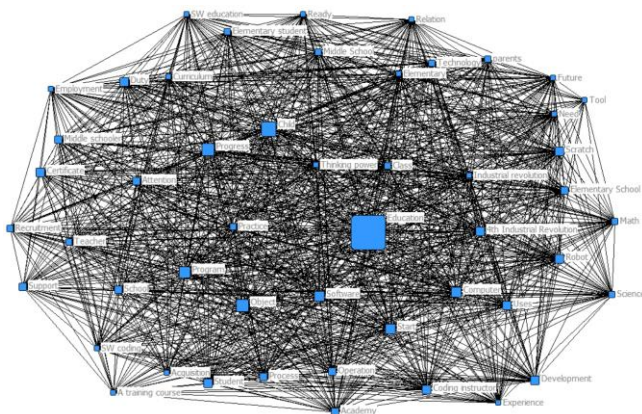


Figure 1. Coding training Frequency analysis of 50 keywords



Figure 2. Visualize VR as a keyword in Word Cloud

B. Degree Centrality.

We conducted a degree centrality analysis to identify the keywords related to 'VR and coding education'. Degree centrality is an indicator of direct connection between nodes, so it increases when there are many direct connections with other nodes [3]. In the analysis of degree of centrality, the keywords with the highest interaction were 'Experience', 'Virtual Reality', 'Robot', 'Fourth Industrial Revolution', 'Child'. We confirmed that common keywords have a significant influence on 'VR and coding education'.

IV. CONCLUSION

We investigated social discourse related to 'VR and coding education'. First, when we look through the keyword frequency analysis, we see many words of 'VR' and 'program'. This can be interpreted as a social atmosphere in which programs are presented based on VR in keeping with the changes in the era of the fourth industrial revolution. In addition, we can see that words such as 'elementary school', 'middle school', 'start' and 'obligation' appear. This means that the mandatory coding will be extended to elementary schools starting from middle and high schools in 2018 and 2019 [4]. In addition, it is understood that the coding education of younger children is also considered because of the mandatory coding education in grades 5 and 6 of elementary school. In particular, the need for content for VR and coding education applications is increasing [4]. Therefore, when one wants to apply the coding education to the younger age, you can consider providing the program using VR. In the course of coding education, we found through semantic network analysis that it is possible to provide contents through experiential education program as well as virtual reality such as VR as well as augmented reality. In other words, positive social perception about VR and coding education was confirmed overall, and it was recognized that application to younger children was considered considering that it is recognized as education suitable for the present age.

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