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Visualization of Understanding of Media Characteristics Using Analytic Hierarchy Process

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Abstract: The purpose of this study is to design a tool, adapted to students' individual contexts and to enable students to reflect on their understanding of media characteristics. AHP (analytic hierarchy process) is a structured technique for organizing and analyzing complex decisions. Using AHP, students have to define appropriate criteria and priorities for using media. It is expected that students' understanding of the characteristics of different types of media will emerge through reflection. Seventy two university students took part in this research. They were asked to prioritize their ways of obtaining information about current affairs using sets of media such as TV, books, newspapers and web pages, Twitter and Facebook. AHP enables us to visualize a "real" understanding of media characteristics and students can reflect on that basis. As far as "information sources and media" is concerned, a few students indicated that it was the information source itself that was important rather than the type of media. Our tool fulfils the role of encouraging this type of reflection.

Key words: Media literacy, visualization, understanding of media characteristics.

1. Introduction

With the spread of information technology, the importance of media education is increasing.

Students use various types of media, such as TV, books, newspapers and the Internet, in the classroom, at home and in their own rooms.

According to Sakamoto, there are three components in media literacy, namely: understanding of characteristics of media and critical viewing; media utilization skills and construction and production of media [1]. Considering the spread of the Internet, Nakahashi and Mizukoshi arranged the components of media literacy into the following: (1) making full use of media; (2) understanding media's special characteristics; (3) interpretation and critical understanding; (4) representation and (5) dialog and communicate on Ref. [2].

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In this paper, the authors focus on students' understanding of media characteristics. It is important that students know about media characteristics and make full use of this knowledge. Each type of media has its own particular characteristics and an understanding of these characteristics is an important factor in media literacy. Is it enough to warn students about the dangers of the Internet or to tell them about the process by which messages from the mass media are constructed? The authors believe that it is virtually impossible to "teach" media characteristics because these depend on the following three contexts. The first context is "users' needs". In this paper, the authors define media characteristics by identifying five aspects: accuracy, timeliness, enjoyment, ease-of-use and search function [3]. Different individuals give priority to different aspects. While someone might emphasize accuracy, someone else might consider timeliness more important.

The second context is "information sources and media". For example, let us consider the massive

earthquake in Japan on March 11, 2011. Many different types of media provided a wide variety of information about the danger of the tsunami and the situation in the nuclear power station at Fukushima. Some people believed false information provided by Twitter. Can we teach students that social networking sites such as Twitter and Facebook are not reliable? Of course, such sites do also provide useful information. For example, my colleagues provide me with useful and up-to-date information using Facebook. In this case, the important factor is not only the type of media, but the reliability of the source or person who provides the information.

The third context is "students". On investigating Japanese people's information-related activities, Hashimoto discovered that utilization of TV, PC-based Internet and mobile phones had increased between 2005 and 2010, while the total time spent reading newspapers had decreased [4]. Hashimoto and his group also proposed a new concept of "neo-digital native" to refer to the generation born around 1996 [5]. So-called "neo-digital natives" are defined as people who are perfectly at home with smart phones, and are capable of editing movie files and producing attractive videos with ease.

To summarize, there are various ways of understanding media characteristics and these depend on context. On the basis of the above, the authors attempted to design a tool, adapted to each student's individual context and to enable students to reflect on their understanding of media characteristics.

2. Method

The authors used the AHP as a tool for simulating students' decision-making in their use of media. AHP is a structured technique for organizing and analyzing complex decisions. Using AHP, students have to define appropriate criteria and priorities for using media. It is expected that students' understanding of the characteristics of different types of media will emerge through reflection. Seventy two university students took part in this research and they were asked to prioritize their ways of obtaining information about current affairs using sets of media such as TV, books, newspapers, web pages, Twitter and Facebook. Fig. 1 shows AHP hierarchy as follow:

- Objective: to identify the ideal balance in the use of different media in order to obtain information about current affairs for business and study;
- Criteria: accuracy, timeliness, enjoyment, ease-of-use and search function;
- Alternatives: TV, books, newspapers, web pages, Twitter and Facebook.

The objective relates to the first context, i.e., users' needs. In line with this objective, students are asked to prioritize criteria and alternatives. Through these activities, students should be able to recollect the second context, i.e., information sources and media. Some students will neglect the need to consider information sources and senders. Participants in this study belong to the "digital native" generation born around 1986 and "native" in terms of Internet and PC.

Esumi Excel conjoint analysis/AHP Ver. 1 was used as the analysis tool. Students were asked to reply to questionnaires and the paired comparison method was used. The visualization of media characteristics can display not only average entire samples but also individual students. Students were asked to write reflective reports as they viewed their individual visualizations. Overall tendencies and some individual cases are examined on the basis of these data.

3. Results

3.1 Overall Tendencies

The CI (consistency index) was examined in order to identify consistency. The CI shows that there is sufficient consistency in the data from the research. As far as media characteristics are concerned, the most important aspect in this context is accuracy (0.41) followed by ease-of-use (0.18), search function (0.17), timeliness (0.15) and enjoyment (0.08). The most important type of media is the web, and search function, ease-of-use and timeliness all make an important contribution.

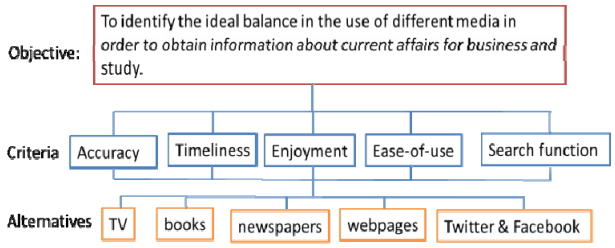

Fig. 1 AHP hierarchy.

On the other hand, the level of accuracy is not particularly high. Newspapers are reliable, but the contribution of timeliness and ease-of-use is fairly low. Books are similar to newspapers. Compared to the U.S. and South Korea, digital books and digital newspapers are not widely used in Japan. Students must actually go to the library to read highly reliable media such as newspapers and books. Ease-of-use is not a characteristic of reliable media. There is ambivalence among accuracy, timeliness and ease-of-use. TV is relatively reliable, timely and easy to use. Twitter and Facebook are timely, easy to use and enjoyable, and students are also aware that social networking sites have limited reliability. The results of overall tendencies coincide with common sense.

3.2 Case Studies

In this section the authors introduce four types of student who prioritize accuracy, ease-of-use, search function and timeliness in their use of media.

3.2.1 Student Assigns High Priority to Accuracy

Student A's priorities in terms of media characteristics are as follows: accuracy 0.54, search function 0.14, ease-of-use 0.11, enjoyment 0.11 and timeliness 0.10. For student A, books are the most important type of media, followed by newspapers, web, Twitter and Facebook and then TV (Fig. 2).

Student A's reflective report is as follows:

"When I choose media, I assign the highest priority to accuracy. To me, newspapers are the most reliable media. The web is an up-to-date medium, but compared to newspapers, it is not very reliable.

Since I use the web frequently, it is important to select reliable information from the web. From the point of view of search function, the web is a very useful medium. We can obtain all sorts of information using web search engines, and this is extremely helpful. Compared to books and newspapers, the web and Twitter are easy-to-use media."

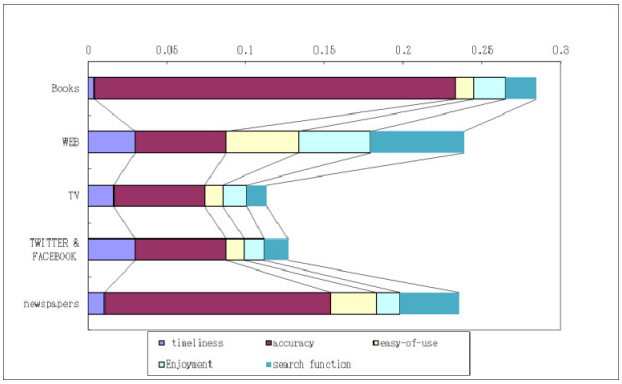

Fig. 2 Example of a student who assigns high priority to accuracy.

3.2.2 Student Assigns High Priority to Ease-of-Use

Student B's priorities in terms of media characteristics are as follows: ease-of-use 0.49, search function 0.26, enjoyment 0.14, timeliness 0.07 and accuracy 0.04. For student B, the most important type of media is the web, followed by Twitter and Facebook, books, TV and newspapers (Fig. 3).

Student B's reflective report is as follows:

"I find that reading newspapers is hard and unfamiliar and it takes too much time to obtain useful information. I feel disheartened by newspapers because of these inherent characteristics. For this reason, I combine reading newspapers with using the web in order to remain motivated. The web has very good search functions and is easy to use."

3.2.3 Student Assigns High Priority to Ease-of-Use

Student C's priorities in terms of media characteristics are as follows: search function 0.36, accuracy 0.36, timeliness 0.13, ease-of-use 0.11, and enjoyment 0.04. For student C, the most important type of media is the web, followed by TV, Twitter and Facebook, newspapers and books (Fig. 4).

Student C's reflective report is as follows:

"The web has very powerful search functions and we can find the information we want immediately.

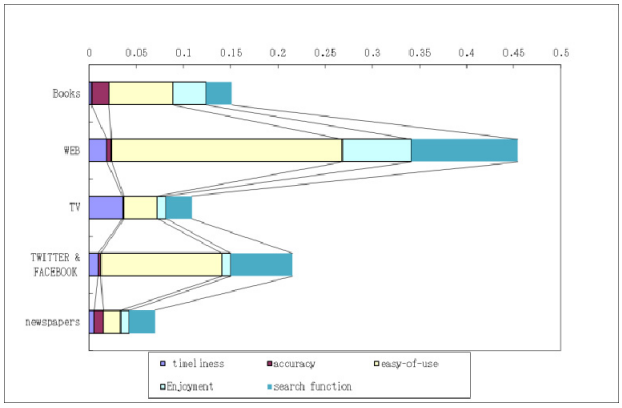

Fig. 3 Example of a student who assigns high priority to search function.

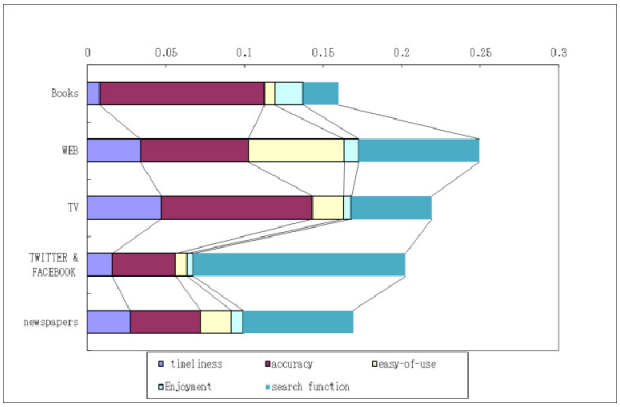

Fig. 4 Example of a student who assigns high priority to search function.

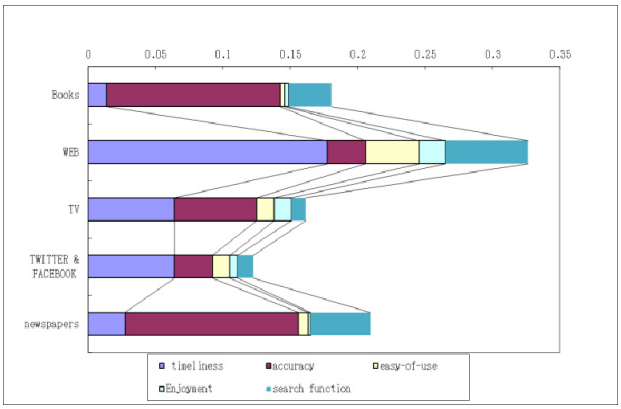

Fig. 5 Example of a student who gives high priority to timeliness.

I find it difficult to read newspapers because I am not familiar with reading text. Whereas we have to go to booksellers or libraries in order to read books and newspapers, I can use the web in my own room. I also prefer to find information using web search engines. These are my reasons for using the web frequently."

3.2.4 Gives High Priority to Timeliness

Student D's priorities in terms of media characteristics are as follows: accuracy 0.37, timeliness 0.34, search function 0.16, ease-of-use 0.08 and enjoyment 0.04. For student D, the most important type of media is the web, followed by newspapers, books, TV, Twitter and Facebook. Student D's reflective report is as follows:

"In the information society we have the opportunity to choose various types of media. In my opinion, the most important factor is timeliness. TV is a timely or up-to-date medium but it has to be watched while programs are being broadcast. The web provides up-to-date information whenever we want. As far as accuracy is concerned, newspapers and books are reliable, but the information they provide is not the latest information available. The ideal would be a good balance in media use between timely and accurate media."

4. Conclusions

The purpose of this study is to design a tool, adapted to students' individual contexts, to enable students to reflect on their understanding of media characteristics. The authors proposed three contexts for media utilization: "users' needs", "information sources and media" and "students". In relation to "users' needs", the tool we provided adapted to different types of needs and made it possible to visualize an understanding of media characteristics. One student emphasized accuracy while others emphasized timeliness. Although the objective was "to identify the ideal balance in the use of different media in order to obtain information about current affairs for business and study", in reality, ease-of-use turned out to be an important factor. From the point of view of objective achievement, ease-of-use could probably be ranked lower. AHP enables us to visualize a "real" understanding of media characteristics and students can reflect on that basis. As far as "information sources

and media" is concerned, a few students indicated that it was the information source itself that was important rather than the type of media.

Our tool fulfils the role of encouraging this type of reflection. In the context of "students", the tool is adapted to various types of student. Using AHP, students can reflect on their media utilization tendencies, reading ability, media environment and so on. Students prefer to use the PC-based web and social networking sites because such students belong to the "digital native" generation.

This situation will soon change. In the near future digital textbooks and digital newspapers will gain in popularity in Japan. When this happens, perceptions of newspapers and books will be altered since students will easily be able to read new books and newspapers in their own rooms. Our next project is to develop a learning unit based on students' understanding of media characteristics. The activity of reflection using this tool will foster students' media literacy. We have already developed learning modules which enhance knowledge of media construction and critical thinking. This new research project will concentrate on integrating these modules and examining their effects.

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