

Methods for Analyzing the Reading Ability of Children on Social Media

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Abstract: Schoolchildren are obtaining various information via social media. With so many adolescents and adults now encountering social media, various studies have reported about what happens in such encounters and what activities occur therein. In addition, research methods continue to accumulate for investigating technology and analyzing the new phenomena that it has caused. However, there is still no clear answer regarding the best methods by which to analyze and construe how schoolchildren are interpreting the information that they obtain through social media. In this presentation, we provide an overview of the analytical methods, organize the findings, and clarify through prior research the methods that will be effective or necessary in accordance with the purpose. We also address the question of what we must focus on to successfully guide schoolchildren to acquire the ability to interpret such information

Keywords: Analytical method , Reading skill, Social media

INTRODUCTION

Along with the development of artificial intelligence (AI), the nature of work and the job skills that are sought by employers will continue to change in the future. For that reason, it has long been said that it is necessary to examine the abilities that will be required of present-day children when they enter the workforce. The University of Tokyo robot project has been undertaking research activities on passing the University of Tokyo entrance examination in the fiscal year 2021, with the key role being played by the National Institute of Informatics (Research Organization of Information and Systems of the Inter-University Research Institute Corporation). The robot project has been working to improve the precision of each technology underlying artificial intelligence that has been accumulated to date as well as to link this to the creation of future value in the information technology field; it has also been promoting comprehensive understanding related to human thinking. The project leader, Prof. Arai, has pointed out that it is precisely the reading comprehension ability of children that is crucial when the study results and related survey results are viewed (see the article in *Nihon Keizai Shinbun* dated August 4, 2016).1)

The Program for International Student Assessment (PISA), whose subjects were first-year senior high school students (as they are called in the Japanese school system), completely transitioned from written surveys to computer-based surveys by 2015

(computer-based surveys were introduced in 2009, digital reading in 2009, and problem-solving ability began in 2012). In Japan, the ranking for reading comprehension ability fell in the 2015 survey, and the possibility was raised that there might be problems with students' ability to interpret articles and data on a computer as well as to think deeply and express their thoughts.2)

Moreover, the Ministry of Education, Culture, Sports, Science, and Technology undertook a computer survey related to the ability to use information, the subjects of which were elementary and middle school students in the fiscal year 2013, and the results thereof were announced in March 2015 (Kurogami et al. 2015); the results of a survey the subjects of which were pupils in higher education were made public in January 2017.3)

Therein, the interpreting, processing, and expressing of information “in familiar circumstances and with clear conditions (in accordance with clear conditions, in accordance with one condition)” can be done relatively easily, but based on the results for compulsory education, it is clear that there are problems in (1) finding and associating a specific piece of information according to its purpose from a multilevel webpage that has several pieces of information and (2) organizing several pieces of information using a viewpoint tailored to the conditions, expressing an opinion based upon them, and aiming at finding a solution in response to “unfamiliar circumstances and unclear conditions.”

Accordingly, in the present study, we seek to identify the approach needed in order to teach

children to be able to interpret the information of a computer effectively. Concern has been shown regarding how we should think about the relationship between the nurturing of children's ability to use information from computers and their reading comprehension ability, moreover the relationship of these with the nurturing of their cooperative problem-solving ability. In particular, owing to changes in the media environment, social media has become familiar to children. Amidst this, attention has focused on how schoolchildren are reading information through social media, what is needed to enable children to handle social media well, what can be done to cope with it at schools, and whether it is possible to link together and support the efforts both at school and at activities that take place outside of school.

However, when it comes to the question of how to interpret a child's social media activities, we believe that we are still groping for appropriate analysis and interpretation methods.

Owing to this, in the present research report, we provide an overview of the analytical methods, and we organize the findings while clarifying through prior research the methods that will be most effective or necessary in accordance with the purpose.

REVIEW OF RELATED STUDIES AND AIMS

Using ERIC, the database of international research related to education research, and CiNii, the database related to academic articles in Japan, the number of articles containing the words "social media" and "research method(s)" in the title or abstract were identified, and the changes that they exhibited between time periods are shown in Figure 1.

First, when it comes to "social media," we can see that both international and Japanese research show a large increase starting in 2009. In international research, when we focus our attention on the contents that are raised as education research on social media, as shown in Figure 2, studies that focus on or employ the "social network" were most numerous, and it was varied up to the tackling of "e-learning." Stated broadly, it was understood that education research that focuses on the interactions between participants in "social network" technologies is classified as educational research on "social media." Educational research on international social media continues to

increase as of 2016, and the high interest in the subject is evident. However, educational research on social media peaked in 2012, and the number of such studies greatly decreased as of 2016.

Next, if we focus our attention on the "research methods" of educational research and examine the kind of changes it has undergone, as can be seen in Figure 1, internationally this increased since 2003. In Japan, there was some waxing and waning of interest, but it grew starting in 2007, and then the number of such studies greatly decreased in 2016. When it comes to what "research methods" of international education research have been focused on, we can see that while there are many studies that were undertaken while conducting quantitative processing, such as questionnaires and statistical analyses, there is much qualitative research that relates the interpretations of events that were observed and the appearance of a person's transformation through thick description, such as interviews and case studies (see Figure 3).

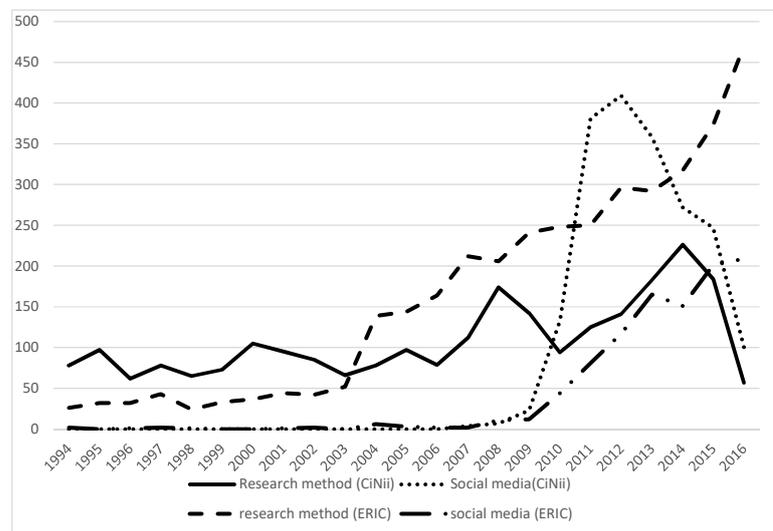


Figure 1 Trends in Educational Research on the Social Media in ERIC and CiNii

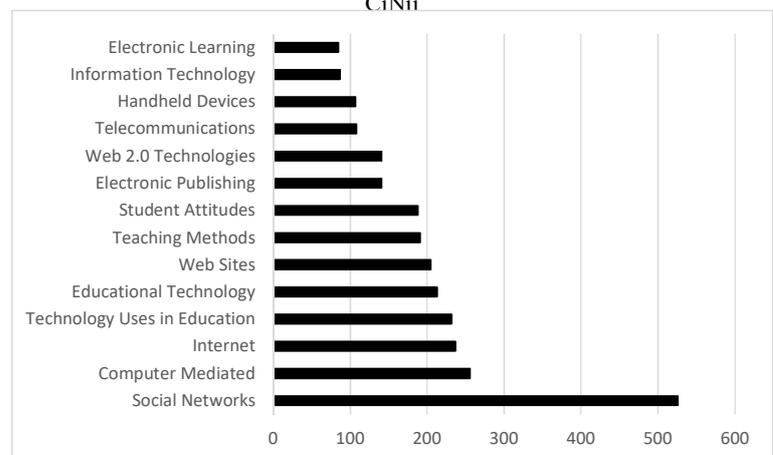


Figure 2 Characteristics of Educational Research on Social Media in ERIC

Similar tendencies are observed in the methods used for educational research about international social media as well. There are many studies that promote qualitative research and that raise questions that have arisen from records of the interactions being undertaken to employ social media and the discourse observed in the learning outcomes therein as well as the learning process. There are also many studies employing questionnaires to conduct attitude surveys.

At the Japan Society for Educational Technology (JSET), what were the trends during this period in research that was focused on “research on social media” and “research methods”? In order to get a grasp of the big picture, a survey was done on the changes in the numbers of such studies using the JSET’s database. The results indicated first of all that the pursuit of “social media” peaked in 2008 (see Figure 4). The data can be broken down and interpreted as indicating that attention was focused first on studies that employed “BBS,” second on those that employed “blogs,” and third on those that employed the term “SNS.” Research using the term “social media” has appeared since 2010. Twitter has reached its peak recently in research related to social media (see Figure 5).

On the other hand, when it comes to studies on research methods, attention has been focused on those

that examined direct research methods when qualitative research methods became a topic in 1996–1997 as well as on the research methods involved in the evaluation of learning via e-communities. After that, when it comes to debates about both the quantitative and qualitative methods surrounding research on classroom teaching, the methods involved in the assessment of efforts that employed blended learning and social media were examined from 2010 onward; however, there were few of these, and there were many studies that focused on higher education.

In other words, Japanese education has become concerned with identifying the efforts that are required to teach children to effectively interpret information received from computers, determining how we should consider the relationship between nurturing children’s ability to use such information and their reading comprehension, and the ascertaining how we should regard the relationship of the aforementioned items with the nurturing of their cooperative problem-solving abilities. However, viewing the research trends of academic societies both internationally and domestically in Japan reveals that little research on these points is presently being conducted.

Table 1 Digital Tools for Analysis

Analysis approach	Description	Ex. of DIGITAL TOOLS
Social network analysis	It is used to examine relationships within social networks, predominantly using quantitative data.	Gephi
Analytic induction	Identifies similarities between phenomena in order to develop categories and subcategories of understanding.	NVivo
Critical discourse Analysis	Focuses on how inequality and power are produced, reproduced and resisted in discourse.	Wordsmith Tools
Interpretive phenomenological analysis	Visual methods to examine how individuals make sense of a phenomenon in a specific context.	Multimethod qualitative software that supports coding
Narrative analysis	Analysis approaches that treat data as “storied” and interpretive social products.	Multimethod qualitative software for note-taking on digital stories
Content analysis	A set of techniques that involve the categorization and classification of data (textual, visual, spoken, or other) and provision of a quantitative representation of that content.	Natural language processing tools
Keyword analysis	It is sometimes referred to as content analysis. Identification of words with meaning, such as counting words with higher frequency.	Wordle to automate identification of frequency of words in interviews
Thematic analysis	Identification and reviewing of patterns in the data and emphasis on holistic understanding of the data	MindMap

Based on the trends of the related studies above, this study focuses on those efforts in elementary and mid-level education that employ social media broadly as well as on clarifying the methods used to analyze and evaluate those efforts. This research aims at contributing by clarifying aspects that are currently weak.

RESEARCH APPROACHES AND TOOLS USED IN EDUCATIONAL RESEARCH FOCUSED ON SOCIAL MEDIA

As noted above, tools falling under the rubric of social media have been employed in educational activities by our association as well, and at the same time, studies that analyze the events, learning process, communication process, and products of learning that are occurring there have been undertaken. In addition, system development has been carried out, and several studies on the degree of satisfaction with and ease of use of that system have been undertaken as well as operational assessments on items such as the relationship between the methods of use and the learning effects. Even though there are many studies focusing on higher education, providing an overview of the kinds of approaches and tools that are employed therein is an effective approach to thinking about the selection methods and tools for analyzing the similar efforts in elementary and mid-level education.

Accordingly, we have attempted to put the approaches and tools that are frequently employed in educational research focusing on social media in order. The following items refer to Savin-Baden and Tombs (2017) (Table 1).

According to them, the approaches and tools vary depending on the type of information that you want to obtain from the exchanges on social media:

- (1) when you want to see information about personal characteristics (profile, identity)
- (2) when you want to see the work that concerns the participants at various levels and what it looks like when they are engaged therein

- (3) when you want to obtain information about what has happened in line with the series of activities there
- (4) when you want to obtain information about the connections between individuals that are happening there

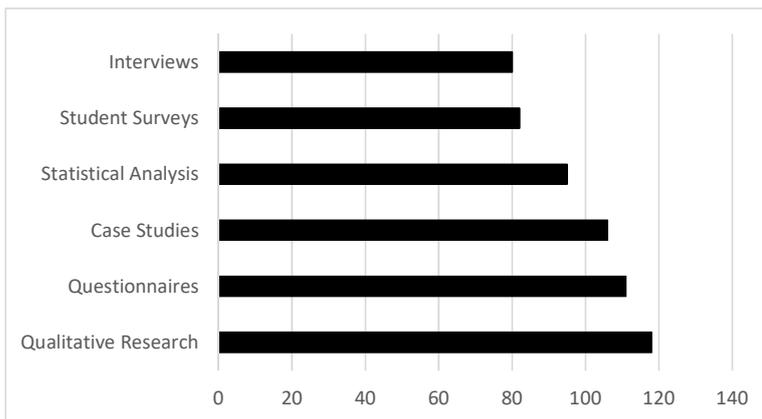


Figure 3 Characteristics of Research Methods in ERIC

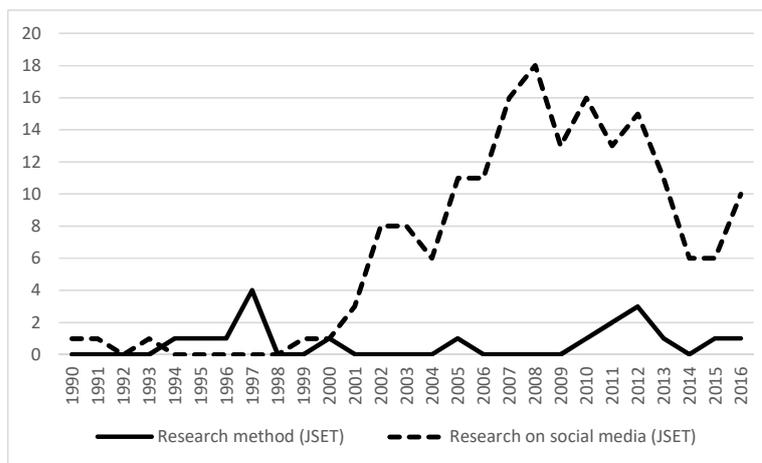


Figure 4 Trends in Educational Research on Social Media in JSET

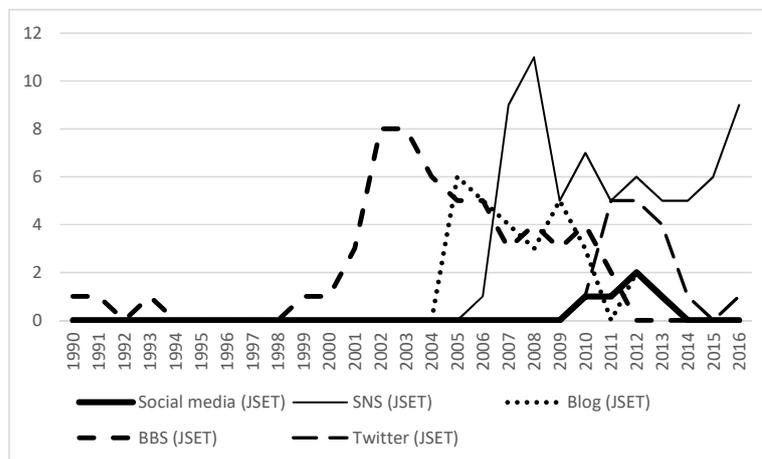


Figure 5 Transition of Research Contents on Social Media in JSET

(5) when you want to obtain information about the sort of content and the interactions that can be seen based on the individuals or a certain group thereof

(6) when you want to see what kind of knowledge has been obtained or created there.

In addition, it is noted that there are many cases involving the way in which the information is collected:

(1) when information is collected by having people respond to inquiries on the Web

(2) when information is collected by sending inquiries to the mobile devices of each person

(3) when information is collected by using the information recorded in social media as the data

(4) when information is collected by using as the data the information recorded by exchanges that use an avatar (as a variation on item 3)

(5) when information is collected through comment-based interviews and the like (among a response relation).

Moreover, it has been noted that the information being collected and the method for doing so with these approaches and tools are affected by your standpoint, such as (1) empiricism, (2) post-empiricism, (3) critical social theory, (4) pragmatism, (5) phenomenology, (6) post-structuralism and postmodernism, (5) constructionism, and (6) constructivism.

However, in educational research that involves digital information such as social media, it is important to undertake a design firmly in accordance with the purpose of the research, but many points will be overlooked if the methodology or researcher too strongly adheres to a certain standpoint. To avoid this, we have pointed out while citing examples from other studies that employing methodologies that have a gradual convergence (viral methodologies) may be beneficial.

When it comes to studies on social media by this association, as was touched on above, and when social media is utilized for a certain purpose, there are many studies that examine (1) what happened, (2) what effects were obtained, and (3) how it was received by the participants.

Then, if the approaches that are employed were to be crossed with one another according to the above-mentioned points, many that employ the following could be observed:

(1) Social network analysis could be used for viewing the events that occur (when you want to obtain information about what has happened in line with the series of activities there and when you want to obtain information about the connections between individuals there).

(2) Content analysis and keyword analysis could be used to view the results of certain efforts (when you want to obtain information about the sort of content and interactions that can be seen based on the

individuals or a certain group thereof) (Sugai et al. 2015).

METHODS FOR ANALYZING HOW SCHOOLCHILDREN ARE INTERPRETING INFORMATION THROUGH SOCIAL MEDIA

What prior studies are there, what findings are obtained therefrom, and what research methods have been adopted in regards to the main subject of this report—the methods for interpreting schoolchildren's ability to comprehend the information they are reading in social media?

Jones et al. (2015) examined the manner in which adolescents handle social media and have analyzed what happens therein with the focus on discourse.

Accordingly, they interpreted through discourse analysis (Gee 2018) the processes whereby the participating adolescents generated meaning for each other, and they recounted the new phenomena that had been created and developed in the networks between actors, between actors and the media, and between connected media.

They then focus not only on the efforts made at school but those outside school and underscore the importance of paying attention to the relationship between the two.

Recently, in connection with learning guidance, it has been said that attention is being given not only to children's cognitive aspects but also to their non-cognitive aspects (emotional dimension, etc.).

Then, when we examine the reading comprehension ability of schoolchildren pertaining to information accessed through social media, we should pay attention to identifying the following items:

(1) the problem setting, the form of the information (words, figures, moving pictures, simulations, etc.), the manner of speaking, and the kind of authority being granted

(2) the kind of moderating that can construct a social media environment wherein reading comprehension is easier to promote and think about

(3) the attention that is paid to social media discourses, a before-and-after comparison regarding the efforts, the words that are used in that venue, etc.

(4) the elements that promote or hinder reading comprehension and that lead to deeper reading comprehension (to the curation level).

It is thought to be important not just to examine the responses to questions and the thinking processes used in formulating such responses but also to promote surveys that include the discourse that is exchanged in the surrounding area:

CONCLUSION

Today, if we take a retrospective look, efforts like “re-schooling,” which attempts to use social media to nurture those attributes and abilities that will be sought by employers moving forward (including 21st century skills), and efforts like “de-schooling,” which employs social media as a supportive tool to encourage learning based on an adaptive-learning curriculum, may be discussed as a complete whole.

Carefully examining points, such as identifying the standpoint from which the educational use of social media is being discussed or will continue to be discussed, is important and/or will become necessary.

It is also important to contemplate this point when further considering educational research on social media. To promote such meta-research, it is believed that studies on the research methods that meet the purposes of accumulating definite findings are necessary.

ACKNOWLEDGEMENTS

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NOTES

- 1) <http://www.nikkei.com/article/DGKKZO99025570Z20C16A3TCQ000/>
- 2) <http://www.nier.go.jp/kokusai/pisa/#PISA2015>
- 3) http://www.mext.go.jp/a_menu/shotou/zyouhou/1356188.htm; http://www.mext.go.jp/a_menu/shotou/zyouhou/detail/1381046.htm

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