Innovation Adoption in Data Journalism of Communication Arts Students

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ABSTRACT

This quantitative research sought to determine the readiness of undergraduate students majoring in Communication Arts being based in Thailand for learning data journalism. 400 samples were distributed online survey to gather quantitative data. The study indicated that (1) the students still had little knowledge and innovation adoption in data journalism. (2) The students noticed the significance of data journalism as a factor supporting innovation adoption yet they perceived data journalism as difficult-to-learn and inessential subject. (3) the students had average knowledge in data journalism; however, they were weak at analyzing the data. (4) The female students tended to adopt data journalism innovation more easily comparing to males; nevertheless, males tended to have more knowledge in data journalism than females. (5) The level of innovation adoption in data journalism positively correlated with level of knowledge in data journalism.

Keywords: Data Journalism, Innovation Adoption, Media Education.

1. INTRODUCTION

Information and communication technology plays a key role in prompting information society where we are presently living in. Consumers are facilitated with new and modernized communication channels that allow access at any time they desire. Furthermore, consumers can also spread news to the others via those communication channels without having to go through mass media processes making news reporting is no longer a monopoly on professional media. This change consequently has intensified the competition in media industry.

The major issue of news agencies in this era is how to present insightful information to the public in a way that is striking, easily understandable, and immediately applicable. Besides, the news agencies must also be able to generate revenue for business survival from it. Hence, data journalism, as the innovation in news reporting, can potentially be a solution.

Academics and media professionals have defined the meaning of 'data journalism', in conclusion, as the process of reporting news using data as a key factor. The process starts from gathering the data, analyzing, reorganizing, and ultimately, processing it before presenting to the audience in a comprehensible format. In the process, information and communication technology is often used.

As a matter of fact, data journalism does not replace traditional news reporting. it rather adds value to news by making the news, that result from data journalism process, fresh, different from the competitors, and being wanted by the audience. Additionally, data journalism also helps organize the database as a public resource allowing access to the public. This hence promotes public participation in monitoring transparency of both public and private sectors as well as supports democratization in the society.

However, when taking the teaching of journalism in Thailand into consideration, it is still in the early stage and still unable to produce enough skilled personnel to media profession. Hence, the researcher displays interest in researching in the topic of 'Innovation Adoption in Data Journalism of Communication Arts Students' attempting to study about level of readiness of undergraduate students majoring in Communication Arts in Thailand in learning data journalism. The outcomes of this study are expected to contribute to media industry and fundamental knowledge for further research and teaching in data journalism.

2. GENERATION OF THE DATA

2.1. The concepts of data journalism

The term 'data journalism', according to Simon Rogers (Howard, 2014), Google's information editor and former The Guardian newspaper's journalist, was first defined as its current concept in 2006 by Adrian Holovaty, who then was a software developer of Washington Post newspaper. The term was used to describe the integration of data science with news processes.

The general meaning of the term 'data journalism' is still broad. In English, data journalism can be replaced with synonymous words depending on the context; to illustrate, Algorithmic Journalism, Computational Journalism, Computer-Assisted Reporting, Data-Driven Journalism, Database Journalism and Quantitative Journalism.

Furthermore, the definition of data journalism, as defined by many academics and media professionals, also covers various fields of study including journalism, data science, and design.

Cindy Royal and Dale Blasingame (2015), researchers in journalism, Texas State University, conducted a research entitled 'Journalism: an Explication' in attempt to delineate the definition of data journalism by integrating mixed methods research with synthesizing definitions of data journalism as given by academics and journalism professionals. Conclusively, data journalism was defined as a news reporting process using data analysis and presentation to convey stories as well as prompt audience participation

Besides, many academics and journalism professionals agree that, by most definitions of data journalism, the term 'data' in this field of study has a specific definition, that is, the data that can be statistically processed. Hence, data journalism can be defined as quantitative news reporting process using information science consisting of four key processes: get data, clean data, analyze data, and visualize data.

When looking back on journalism profession in 2010, it was found that data-driven news reporting has long been associated with journalism. However, data-driven news reporting in the past faced obstacles in investment worthiness since journalists had to work with excessive amount of information without being assisted by technology.

Data-driven news reporting further developed until the late 19th century. Philip Meyer (2002) had studied and proposed the use of quantitative research methodology to support journalistic work entitled, as he referred to, precision journalism. the definition of precision journalism also included sampling, data collection, systematic analysis, and presentation of concrete outcome. Additionally, computer technology at that time was becoming far-reaching, leading to increased popularity of computer-assisted reporting concept as well as increased effectiveness in making data-driven news by processing data into statistics, tables, graphs, and maps with; for instance, Access, Excel, SPSS software (DeBarros, 2010).

In addition, the growth of information and communication technology in the 2000s assisted journalists in accessing to data as well as providing tools to quickly analyze the data resulting in higher popularity of data-driven news reporting. Besides, in 2010, the trend of data-driven news reporting became even more widespread after WikiLeaks published online the documents regarding the war in Afghanistan and globally well-known media; for instance, New York Times and The Guardian, gathered and reconstructed the data before reporting to the public. That news consequently gained attention worldwide.

Formerly, learning and teaching data journalism was often sorted in investigative journalism course. Until 2010, when data journalism became widely recognized, data journalism course was initiated especially in higher education. Particularly in United States and Europe, data journalism-related courses were offered to media professionals. Furthermore, a collaboration of both academics and journalistic professionals was established for producing data journalism-related textbooks as well as offering Massive Open Online Course: MOOC for interested individuals. The collaboration also assisted by international organizations that put emphasis on data journalism; for instance, Google, UNESCO, and European Journalism Centre (Howard, 2013).

Despite the fact that data journalism was given attention by many parties, learning and teaching data journalism still encountered many challenges. To demonstrate, those who displayed interest in learning data journalism mostly were journalistic students and professionals who were unfamiliar with quantitative research methodology, statistics, and computer programming. Besides, the instructor was often a journalistic expert or a former journalist that was inexperienced in data science. Additionally, data journalism-related curriculum must be modified constantly due to its continual development (Krueger, 2014).

The study of data journalism in United States by Charles Berret and Cheryl Phillips (2016) revealed that even United States, one of the most active country in data journalism, still faced with a problem in offering data journalism course. Only 46 percent from 59 institutes in United States offered the course

whereas most of the institutes were just preliminary. The course generally consisted of critical thinking, data table usage, data association, design concept, statistics, and program concept respectively.

However, when looking back to data journalism in Thailand, although the efforts in compiling basic knowledge about data journalism had been made; to illustrate, conducting elementary research, seminar of professional associations, and future journalism texts, still there was no direct research on data journalism.

2.2. The concepts of innovation adoption

Tidd and Bessant (2009) stated that "innovation" is seeing the connection of things, recognizing the opportunities in it, and utilizing it. The word "Innovation" derived from the combination of "invention" and "seeking new things" bringing about a better change not only individually but also nationally; to demonstrate, innovation for developing national economy.

Adoption was resulted from one's attitude toward things that he or she admitted. Fishbein and Ajzen (1975, as cited in Lutz, 1991) clarified that attitude derived from the inclination of learning in response to one thing while the response could be both positive and negative.

A well-known, widely accepted measurement of innovation adoption is Technology Acceptance Model or TAM developed in 1989 by David. He developed the model from Theory of Reasons Actions by Ajzen and Fishbein, which he had studied in 1975, intending to predict individual's computer usage behavior. As a result, this model became widely accepted as a measurement of individual's intention of innovation adoption.

This model applied fundamental concepts in explaining the association of two key variables:

1. Perceived usefulness refers to the degree to which an individual perceives the usefulness of the innovation used, realizing its capability in elevating the effectiveness of works, while simultaneously earning more profit.

2. Perceived ease of use refers to the degree to which an individual recognizes the easiness and simplicity of the innovation. This variable has direct influence on innovation adoption behavior and behavioral intention to use innovation of an individual. Besides, this variable also has indirect influence on innovation usage behavior transmitted from innovation adoption behavior as well as on perceived usefulness.

Davis (1989) proposed Technology Acceptance Model or TAM, clarifying that attitude toward using innovation was affected by perceived usefulness and perceive ease of use of an individual's innovation. Consequently, it led to behavioral intention to use innovation, ultimately resulting in actual system use.

Thereupon, many researchers had adopted this model and integrated it in the study of innovation adoption in various contexts. As in foreign countries, Lu, Yu, Liu, and Yao (2003) had complied 18 researches that applied TAM model as a research framework. This compilation from 1989 to 2001 revealed that there were five mutual variables consisting of: Perceived usefulness, Perceived ease of use, Attitude toward using, Behavioral intention to use, and Actual system use

2.3. Methodology

400 online surveys were distributed to undergraduate student majoring in Communication Arts living in Thailand for gathering the data for this quantitative research. The surveys were divided into three parts:

Part 1 Demographics and other fundamental questions of the samples

Part 2 Questions regarding innovation adoption in data journalism, asking respondents about their perceived usefulness, perceived ease of use, attitude toward using, behavioral intention to use, and actual system use utilizing five-pointed Likert scale

Part 3 Questions regarding knowledge in data journalism, asking respondents about their knowledge and understanding in get data, clean data, analyze data, visualize data applying five-pointed Likert scale

The surveys were tested and the questions were adjusted to obtain validity and reliability of the tools by:

Step 1: testing content validity by giving the surveys to three experts in the field of communication for verifying IOC: Index of Item Objective Congruence. Finally, the data obtained was brought to the means. the question with 0.50 score or lower must be improved until it was given score of more than 0.66.

Step 2: testing reliability by pre-testing 30 surveys with revised questions from step 1. After that, its reliability was tested with coefficient alpha by Cronbach. The test indicated that the reliability value of questions regarding the level of innovation adoption in data journalism was 0.84 while the reliability value of questions regarding knowledge in data journalism was 0.81. both values apparently exceeded the standard of 0.7, considering reliable.

3. RESULTS

3.1. Innovation Adoption in Data Journalism

Table 1 revealed that the variable having the highest mean of the level of innovation adoption in data journalism of the samples was perceived usefulness, followed by attitude toward using, behavioural intention to use, perceived ease of use and actual system use respectively. In addition, the mean of level of innovation adoption in data journalism in total was 3.52.

Table 1: Innovation Adoption in Data Journalism

Variables	Mean	Std. Deviation
Perceived usefulness	4.60	.553
Perceived ease of use	2.73	.795
Attitude toward using	4.41	.638
Behavioral intention to use	4.22	.902
Actual system use	1.67	.743
Total	3.52	.551

3.2. Knowledge in Data Journalism

Table 2 indicated that the variable having the highest mean of level of knowledge in data journalism of the samples was get data, followed by visualize data, clean data, and analyze data respectively. The mean of level of knowledge in data journalism in total was 3.20.

Table 2: Knowledge in Data Journalism

Variables	Mean	Std. Deviation
Get Data	4.17	.757
Clean Data	3.05	.894
Analyze Data	2.22	.889
Visualize Data	3.36	1.095
Total	3.20	.709

3.3. Paired-samples t-test for Gender and Innovation Adoption in Data Journalism

Table 3 demonstrated that different genders had different means of level of innovation adoption in data journalism at significance level of .01 (Sig. < .01) wherewith male had lower mean of level of innovation adoption in data journalism than female.

Table 3: Paired-samples t-test for Gender and Innovation Adoption in Data Journalism

Gender	Mean	Std. Deviation	t	Sig
Male	3.1705	.70762	-5.740	.000**
Female	3.6276	.45095		

**p < 0.01

3.4. Paired-samples t-test for Gender and Knowledge in Data Journalism

Table 4 illustrated that different genders had different means of level of knowledge in data journalism at significance level of .01 (Sig. < .01) wherewith male had higher mean of level of knowledge in data journalism than female.

Table 4: Paired-samples t-test for Gender and Knowledge in Data Journalism

Gender	Mean	Std. Deviation	t	Sig
Male	3.5114	.92841	3.802	.000**
Female	3.1130	.60764		

**p < 0.01

3.5. Correlation of Innovation Adoption and Knowledge in Data Journalism

Table 5 displayed that level of innovation adoption in data journalism had a positive correlation with level of knowledge in data journalism at significance level of .01 (Sig. < .01) meaning that Communication Arts student with high level of innovation adoption in data journalism had high level of knowledge in data journalism. On the other hand, those with low level of innovation adoption in data journalism had low level of knowledge in data journalism.

Table 5: Correlation of Innovation Adoption and Knowledge in Data Journalism

Variables	**Knowledge in Data Journalism**	
	r	Sig
Innovation Adoption	.443**	.000

**p < 0.01

4. DISCUSSION AND CONCLUSION

Presently, data journalism is a news-making innovation that has received wide attention from various fields including communication field and academic field. However, this study indicated that students majoring in Communication Arts still have insufficient knowledge in data journalism as well as insufficient innovation adoption in data journalism. Since data journalism is still new to Thailand, people therefore have little or no knowledge about it. Besides, the outcome of this study also corresponds with Fan Yang and Ying Roselyn Du (2016)'s research that studied the readiness of Hong Kong students in learning data journalism. Fan Yang and Ying Roselyn Du's research explained that although most of the students recognized the utility and had intention to study data journalism, they did not prefer data-related works.

When considering mean of level of innovation adoption in data journalism of the samples variable by variable, perceived usefulness, attitude toward using and behavioral intention to use are high. On the contrary, perceived ease of use and actual system use are low illustrating that Communication Arts students acknowledge the importance of data journalism as a factor supporting innovation adoption, yet they perceive data journalism as difficult-to-learn and inessential subject. Hence, the curriculum and the teaching of data journalism should be adjusted for better understanding of the students. Additionally, a case study that is relevant to their routines can be used to enhance their understanding.

Aside from that, when considering mean of knowledge in data journalism of the samples variable by variable, Get Data is high, while Clean Data and Visualize Data is moderate, but Analyze data is low. The outcome indicates that even if Communication Arts student have moderate level of knowledge in data journalism, they are still weak at analyzing data which considered to be vital skill. Therefore, to solve this problem, the curriculum and teaching of data journalism should emphasize on analyzing data.

The study also demonstrates that female students majoring in Communication Arts tend to adopt innovation more easily than male. However, male students tend to have more knowledge in data journalism then female. This can be interpreted that gender is also one of an essential factor affecting the readiness in learning data journalism. Thus, the module should be set for both male and female.

Additionally, the study also indicates that level of innovation adoption in data journalism have a positive correlation with level of knowledge in data journalism. This can be concluded that level of innovation adoption is crucial for learning data journalism. Hence, the module should focus on encouraging the students to be more receptive to innovation in order to facilitate learning data journalism.

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