Media Analysis of Digital Literacy Trainings for Older adults in South Korea

This is Short Title of the paper, used in page headers

This is the subtitle of the paper, this document both explains and embodies the submission format for authors using Word

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Although there is no distinctive header, this is the abstract. This submission template allows authors to submit their papers for review to an ACM Conference or Journal without any output design specifications incorporated at this point in the process. The ACM manuscript template is a single column document that allows authors to type their content into the pre-existing set of paragraph formatting styles applied to the sample placeholder text here. Throughout the document you will find further instructions on how to format your text. If your conference’s review process will be double-blind: The submitted document should not include author information and should not include acknowledgments, citations or discussion of related work that would make the authorship apparent. Submissions containing author identifying information may be subject to rejection without review. Upon acceptance, the author and affiliation information must be added to your paper.

CCS CONCEPTS • Insert your first CCS term here • Insert your second CCS term here • Insert your third CCS term here

**Additional Keywords and Phrases:** Insert comma delimited author-supplied keyword list, Keyword number 2, Keyword number 3, Keyword number 4d

.

1. Introduction

Digital divide refers the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities. [1] (OECD 2001)

Age is one of the demographic factors that is most frequently linked to digital divide. [2, 3] (United Nations [2012](https://link.springer.com/article/10.1007/s10796-020-10012-9#ref-CR70)) ( Lythreatis, Sophie, Sanjay Kumar Singh, and Abdul-Nasser El-Kassar. "The digital divide: A review and future research agenda." Technological Forecasting and Social Change 175 (2022): 121359. )

~~According to the latest Digital Economy Outlook Report from the Organization for Economic Cooperation and Development (OECD), 62.8% of 55–74-year-olds are now connected to the internet, as are 96.5% of 16–24-year-olds [3].~~

A major source of the age-related digital divide is shortcomings in older adults’ digital literacy. Digital literacy refers to a mindset that enables users to perform tasks in digital environments and to both easily and effectively access the wide range of knowledge embedded in the digital environment (Blažič, Borka Jerman, and Andrej Jerman Blažič. "Overcoming the digital divide with a modern approach to learning digital skills for the elderly adults." Education and Information Technologies 25 (2020): 259-279.; Martin 2008; Van Laar et al. 2017)

In case of South Korea, 디지털 리터러시가 높을수록 사회활동 만족도가 높아지는 것으로 나타났다.

I55세 이상 장･노년층의 디지털 정보화 수준은 일반 국민의 63.1%정도에 불과한 것으로 나타났다. 김학실, and 심준섭. "노인의 디지털 리터러시와 사회활동." 정책분석평가학회보 30.2 (2020): 153-180. , (과학기술정보통신부와 한국정보화진흥원이 4대 정보취약계층(장애인, 장노년층, 농어민, 저소득층)을 대상으로 실시한 2018년 디지털정보격차 실태조사에) 노인의 디지털 리터러시 수준이 매우 취약한 것으로 나타났다. 스마트폰을 이용한 온라인 뱅킹, 각종 앱의 다운로드 및 활용 등은 사실상 이용률이 1%에도 미치지 못하는 것으로 나타났다. 노인의 디지털 리터러시를 향상하기 위한 정책적 대안 마련이 시급하다. 디지털 교육의 중요성은 아무리 강조해도 지나치지 않으며, 이제는 디지털 소외를 넘어 ‘디지털 포용’의 사회로 나아가야 한다

There’s absence of review on the trend and contents of older adults’ digital literacy trainings.

Proportion of older adult population is high in rural areas. Infrastructure is bad. Evaluation of if digital literacy programs are in good regional 분배 is required.

Digital environment is rapidly evolving. Platforms: PC, smartphone, tablet, kiosk… Kiosk is large. Also, digital tech. is applied across various domains; public service, commercials. Digital literacy trainings are also required to make good cover of various platforms and domains.

This paper aims to build a database of new articles on reporting digital literacy trainings for older adults, which could open opportunity for detailed analysis on trend and finding political implications. Word embedding techniques were applied for the search to make approximately comprehensive coverage of the relevant articles. Also, overall trend of the training programs and their media deliveries were analyzed in aspect of regional base, hosting institution, and the digital platform targeted in the training.

1. Related work

The next subsections provide instructions on how to insert figures, tables, and equations in your document.

1. method
   1. Preliminary Search

News articles published online in Korean by Korean news media since 2020.01.01 and before 2024.11.01 were searched from Bigkinds database. (한국언론진흥재단 빅카인즈 [www.bigkinds.or.kr](http://www.bigkinds.or.kr)) Table 1 shows the search keywords. Keywords are selected in three different classes implying that the article is reporting about 1. digital literacy, 2. training, and 3. Older adults each.

Table 1: Search Keywords

| Class | Keywords\* |
| --- | --- |
| Digital literacy | 디지털 (digital), IT (information technology) (2) |
| Training | 교육 (education), 교실 (class), 학습 (learning) (3) |
| Older adults | 노인 (older adult), 어르신 (elderly), 고령 (old age), 노년 (old age), 시니어 (senior) (5) |

\*Korean keywords were used in search

* 1. Relevant Article Identification

Generally, online news article consists of many elements, such as headline, lead and body section (main text) (Dai, Taneja, & Huang, 2018), in which, the length of text in the body section is longer than that in the headline or lead, and thus the topics included in the body section is inherently noisy and heterogeneous (Liu, Morstatter, Tang, & Zafarani, 2016). In this paper, we notice that, in journalism, the headline can be an abstract of the full article for highlighting the main point of that article (Nir, 1993) and leads emphasize grabbing the attention of the reader by summarizing the key event in the story took place (Spark & Harris, 2011). To reduce the uncertainty of business event detection, this paper aims at extracting business events from massive headline and lead of online news rather than from the whole news article (León, 1997).

Articles were divided into sentences for relevant lead sentence search. Sentences reporting the event of digital literacy training for older adults were searched using same group of keywords and method with the article search. News article was defined as relevant and included for further analysis only if it included at least one relevant lead sentence.

* 1. Approximation of comprehensive search

Key sentences are semantically clustered. Centroid is identified and radius of cluster is defined as the maximum similarity of the centroid and a sentence in a cluster. Sentences within the cluster radius are added to the cluster.

* 1. Event Identification by Article Clustering

Relevant한 article의 데이터셋에서 같은 이벤트(훈련 프로그램)에 대한 article이 한 cluster에 위치하도록 clustering을 진행했다. 각 article 에서 다른 feature를 이용해 2번의 클러스터링을 진행했다. 첫 번째 클러스터링은 기사의 문장 그대로와 semantic feature를 사용한 클러스팅으로, Screening 단계에서 사용된 요약 문장을 semantic representation 으로 변환한 후 토픽 모델링을 진행했다. sematnic Representation 으로는 Bert 기반 Sentence Encoding이 사용되었다.

두 번째 클러스터링은 task의 특성을 고려해서 진행되었다. 각 훈련 프로그램을 설명하는 뉴스 기사는 의미적인 차이가 크지 않을 수 있으며, 훈련 프로그램의 장소, 주최 기관, 이름 등의 고유한 토큰이 서로 다른 이벤트를 구분하는 주요한 feature 로 작용할 수 있다. 따라서 Named Entity Recognition 을 통해 각 기사에서 발견된 위치 이름 및 기관 이름들로 단어를 구성한 후 각 뉴스를 TF-IDF 벡터로 표현해 클러스터링을 진행했다.

* 1. Data Extraction

Manual Data Extraction 을 통해 각 Event 에 대해 <표> 와 같은 정보를 extract 했다. 이 과정에서 뉴스 기사에 등장한 위치 이름 및 기관 이름에 대한Named Entity Recognition 결과가 프로그램의 주최 및 후원 기관 data extraction 을 보조하는데 쓰였다.

1. Results

The next subsections provide instructions on how to insert figures, tables, and equations in your document.

* 1. Approximation of comprehensive search

Tables are “float elements” which should be inserted after their first text reference and have specific styles for identification. Do not use images to concepts

Table 1: Preliminary Search Result

| Class | Keywords\* |
| --- | --- |
| Number of Articles | 디지털(digital), 디지털(digital), |
| Training | 디지털(digital), 디지털(digital), |
| Older adults | 디지털(digital), 디지털(digital), |

\*Korean keywords were used in search

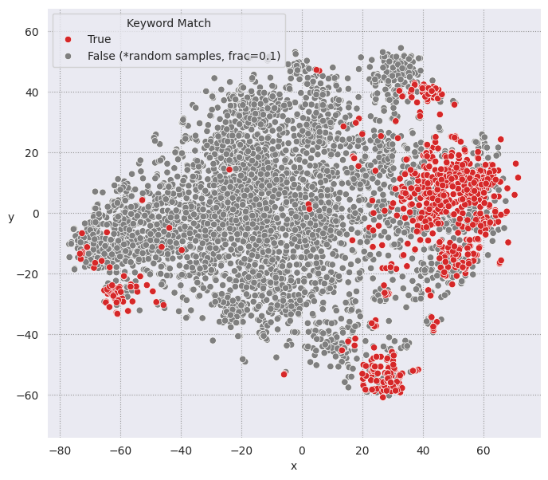


Figure 1: Sentence Bert Representations of sentences with keyword match (red, all representation plotted) and sentences without keyword match (gray, randomly sampled with frac=0.1). Bert model: paraphrase-multilingual-mpnet-base-v2



Figure 2: Clusters of preliminarily searched lead sentences.

* 1. Related Organizations

Tables are “float elements” which should be inserted after their first text reference and have specific styles for identification. Do not use images to concepts

* 1. Training Deliveries

Tables are “float elements” which should be inserted after their first text reference and have specific styles for identification. Do not use images to concepts

1. discussion

The next subsections provide instructions on how to insert figures, tables, and equations in your document.

* 1. Tables

Tables are “float elements” which should be inserted after their first text reference and have specific styles for identification. Do not use images to

which should be inserted after their first text reference and have specific styles for identification. Do not use images to present tables, or they will be inaccessible to readers using assistive technologies.

Tables can be very difficult for people using screen reader technology to understand unless they include markup that explicitly defines the relationships between all the parts (i.e.: headers and data cells). *A key to making data tables accessible to screen reader users is to clearly identify column and row headers.* In Word, authors should identify which row or rows contain column headers. Below are the steps to do this:

1. Select that table’s row, then right-click the row and select “Table Properties”;
2. In the *Table Properties* window, click the *Row* tab and select the box that says “Repeat as header row at the top of each page.”

Or

Apply the “table head” style by highlighting the respective row and applying the “**TableHead**” style found in the “Body Element” section of the ACM Master Article Template.

* 1. Figures

Figures are “float elements” which should be inserted after their first text reference, and have specific styles for identification. Insert a figure and apply the “**Image**” paragraph style to it. For the figure caption, apply the style “**FigureCaption.**”

To accommodate readers with color vision differences, figures should still be usable when printed in grayscale. Refer to elements of the figure with non-color terms, for example “indicated as squares” instead of “indicated in blue”. Use different patterns in bar charts, different line patterns in graphs, and different shapes in plots to distinguish groups of elements and reinforce color differences.

* + 1. Half Width Figures.

Figure 1 is an example of a figure and caption spanning the half-page width (one column in a two column format) with the styles applied. If your figure contains third-party material, you must clearly identify it as such, as shown in the example below.



Figure 1: 1907 Franklin Model D roadster. Photograph by Harris & Ewing, Inc. [Public domain], via Wikimedia Commons. (https://goo.gl/VLCRBB)

* + 1. Full Width Figures.

Figure 2 is an example of a figure and caption spanning the full-page width with the styles applied. If your figure contains third-party material, you must clearly identify it as such, as shown in the examples.



Figure 2: Mockup of a bombe machine at Bletchley Part. Photograph by Sarah Hartwell. [Public domain], via Wikimedia Commons. (<https://commons.wikimedia.org/wiki/File:TuringBombeBletchleyPark.jpg>)

* + 1. Multi-part figure.

Authors can also insert a multi-part figure above a single caption. Every inserted figure must have the “Image” style applied. Below are instructions regarding how to insert a multi-part figure in your paper.

* If the author wants to insert two multi-part images, they must draw a one row and one column table and insert the images one-by-one in the cells.
* If the author wants to insert three multi-part images, they must draw a one-row and three-column table and insert the images one by one in all three cells.
* If the author wants to insert four multi-part images, they must draw a two-row and two-column table and insert the images one-by-one in all four cells. (see the following example):

| Figure 2: The layout of multipart images should be as per the above example within the table in image 1. | Figure 2: The layout of multipart images should be as per the above example within the table in image 2. |
| --- | --- |
| Figure 2: The layout of multipart images should be as per the above example within the table in image 3. | Figure 2: The layout of multipart images should be as per the above example within the table in image 4. |

Figure 3: The layout of multipart images should be as per the above example within the table. All images must have the “Image” style applied.

* + 1. Figure Descriptions.

Every figure should have a figure description unless it is purely decorative. These descriptions convey what’s in the image to someone who cannot see it. They are also used by search engine crawlers for indexing images, and when images cannot be loaded.

A figure description must be unformatted plain text less than xxx characters long. Figure descriptions should not repeat the figure caption – their purpose is to capture important information that is not already provided in the caption or the main text of the paper. For figures that convey important and complex new information, a short plain text description may not be adequate. More complex alternative descriptions can be placed in an appendix and referenced in a short figure description. For example, provide a data table capturing the information in a bar chart, or a structured list representing a graph. For additional information regarding how best to write figure descriptions and why doing this is so important, please see [https://www.acm.org/accessibility.](https://www.acm.org/accessibility)

The instructions below describe the required steps authors need to follow in order to insert descriptive text for figures (alt-txt value) in **MS Word 2019 on Windows or Word 2016 and later on Mac**:

1. Insert a picture in the document.
2. Right-click the image and select “Edit Alt Text”.
3. In the “alt text” section, provide your text description of the image.

Below are the steps to insert figure descriptions in **MS Word 2013 and 2016**:

1. Insert a picture in the document.
2. Right click on the inserted picture and select the **Format Picture** option.
3. In the settings at the right side of the window, click on the “Layout & Properties” icon (3rd option).
4. Expand **Alt Txt** option.
5. In the “Title” and “Description” text boxes, type the text you want to represent the figure, and then click “Close.”

Below are steps to insert the alt-txt value in **MS Word 2010/2011 for Windows\***:

1. Insert a picture in the document.
2. Right click on the inserted picture and select the **Format Picture** option.
3. Select the **Alt Txt** option from the left-side panel options.
4. In the “Title” and “Description” text boxes, type the text you want to represent the picture, and then click “Close.”  
   \* The Mac 2011 version 14.0.0 and later allows the option for inserting “alt-text.” In the MAC version of Word 2016, right-click on the image and select “Edit Alt Text” from the pop-up menu and then enter the description for the alt text.
   1. Quotations and Extracts

There are styles for block quotations, which should be used for quotes that are separated from in-line text. Below is an example.

“Microsoft tried to revive the idea of an assistant with Clippy, who began popping up in Microsoft Office in 1997. Its creator, Kevan Atteberry, was actually contracted by Microsoft to design Clippy, which, funnily enough, he did on a Mac … Sure, people could disable Clippy, but the fact he was on by default angered people.” [10]

* 1. Equations

There are two types of math equations: the *numbered display math equation* and the *un-numbered display math equation*. Below are examples of both.

* + 1. DisplayFormula.

The **DisplayFormula** style is applied in the numbered math equation. A numbered display equation always has an equation number (label) on the right.

(1)

* + 1. DisplayFormula.Unnum.

The **DisplayFormulaUnnum** style is applied only in unnumbered equations. An unnumbered display equation never contains an equation number Bertot and Grimes (2012) on the right—this element distinguishes it from the numbered equation.

Please note: the subsequent text after the **DisplayFormula** (numbered equation) or **DisplayFormulaUnnum** (unnumbered equation) must have the paragraph style **ParaContinue** applied.

* 1. Math statements

Math statements should have the “Statement” style applied.

**Theorem/Proof/Lemma.** Math statements should have the “**Statement**” style applied. This paragraph is an example of the “**Statement**” style.

* 1. Algorithms

Algorithms use the styles “AlgorithmCaption” and “Algorithm”.

ALGORITHM 1: Iterative Algorithm

current\_position center

current\_direction up

current\_position is inside circle

while current\_position is inside circle, do

neighborhood all grid hexes within two hexes from current\_position

for each hex in neighborhood, do

for each neuron in hex do

convert neuron\_orientation to vector

scale vector by neuron\_excitation

vector\_sum vector\_sum + vector

end

end

normalize vector\_sum

end

1. COMPUTER CODE

Display Computer codes can be inserted using “ComputerCode” style.

CHAT Start

SAY Welcome to my world

WAIT 1.2

SAY Thanks for Visiting

ASK Do you want to play a game?

OPT Sure

OPT No Thanks

Similary, this is an example of intext code text.

Similary, this is an example of intext code text.

1. Citing Related Work

This section cites a variety of journal [5, 15], conference [1, 6, 8, 12, 13], and magazine [3] articles to illustrate how they appear in the references section. It also cites books [9, 10], a technical report [7], a PhD dissertation [4], an online reference [14], a software artifact [11], and a dataset [2].

As you build your article, you should note where you will be placing citations. If you are using numbered citations and references, the reference number - "...as shown in [5]..." is sufficient. If you are using the "author year" style, a reasonable placeholder is the primary author's last name and the year of publication - "...as shown in [Harel 1978]..." - we will be updating this placeholder later in the process with the citation label as generated by the Word macros in the "master template.

ACKNOWLEDGMENTS

Acknowledgments are placed before the references. Add information about grants, awards, or other types of funding that you have received to support your research. Author can capture the **grant sponsor information**, by selecting the grant sponsor text and apply style ‘GrantSponsor’. After this, select grant no and apply ‘GrantNumber’ from style panel. Example of Grant sponsor: Competitive Research Programme and example of Grant no: CRP 10-2012-03.

1. HISTORY DATES

In case of submissions being prepared for Journals or PACMs, please add history dates after References as (*please note revised date is optional*):

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A  APPENDICES

In the appendix section, three levels of Appendix headings are available.

A.1 General Guidelines (AppendixH2)

1. Save as you go and backup your file regularly.
2. Do not work on files that are saved in a cloud directory. To avoid problems such as MS Word crashing, please only work on files that are saved locally on your machine.
3. Equations should be created with the built-in Microsoft® Equation Editor included with your version of Word. (Please check the compatibility at <http://tinyurl.com/lzny753> for using MathType.)
4. Please save all files in DOCX format, as the DOC format is only supported for the Mac 2011 version.
5. Tables should be created with Word’s “Insert Table” tool and placed within your document. (Tables created with spaces or tabs will have problems being properly typeset. To ensure your table is published correctly, Word’s table tool must be used.)
6. Do not copy-and-paste elements into the submission document from Excel such as charts and tables.
7. Footnotes should be inserted using Word’s “Insert Footnote” feature.
8. Do not use Word’s “Insert Shape” function to create diagrams, etc.
9. Do not have references appear in a table/cells format as it will produce an error during the layout generation process.
10. MS Word does not consistently allow the original formatting to be modified in the text. In these cases, it is best to copy all the document’s text from the specific file and paste into a new MS Word document and then save it.
11. At times there are font problems such as “odd” stuff/junk characters that appear in the text, usually in the references. This can be caused by a variety of reasons such as copying-and-pasting from another file, file transfers, etc. Please review your text prior to submission to make sure it reads correctly.

A.1.1 Preparing Graphics (AppendixH3)

1. Accepted image file formats: TIFF (.tif), JPEG (.jpg).
2. Scalable vector formats (i.e., SVG, EPS and PS) are greatly preferred.
3. Application files (e.g., Corel Draw, MS Word, MS Excel, PPT, etc.) are NOT recommended.
4. Images created in Microsoft Word using text-box, shapes, clip-art are NOT recommended.
5. IMPORTANT: All fonts must be embedded in your figure files.
6. Set the correct orientation for each graphics file.

A.2 Placeholder Text

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