ISSN 1330-3651 (Print), ISSN 1848-6339 (Online)
https://doi.org/10.17559/TV-20171117130325
Original scientific paper

Impact of Position and Layout of News Articles inside Simulated iPad Newspaper Application on Reading

Darijo ČEREPINKO, Dean VALDEC, Petar MILJKOVIĆ, Krunoslav HAJDEK

Abstract: The research was conducted using the simulation of the iPad's daily newspaper application. Results show that the position of the article compared to the same article in different position, as well as photography or other multimedia formats added to the article, is not of crucial importance to the selection of article by readers. On pages with no dominant visual elements readers prefer the upper left corner of the screen.

Keywords: article layout; iPad newspaper; reading

1 INTRODUCTION

With the appearance of tablet devices which combine multiple media contents in a unique and easy-to-use intuitive device, the first news applications started to be downloaded on tablets. The initial research on how readers consume content on tablets has shown that it is a device users spend a relatively long time with, with peak hours mostly in the mornings and evenings on working days and throughout Saturday and Sunday [1], contrary to other devices whose use increases during the day and decreases in the evening. The research on the use of tablets for news exposure shows that more than a half of tablet users use the device to, among other things, read news, both long stories and short stories equally. More than three-quarters of users use their tablets every day [2].

Meanwhile, since the appearance of iPad devices, a number of new moments have shown that newspapers are slowly disappearing, while more and more users consume news through other, mostly digital sources [3]. Due to the fact that the tablet application for daily news is considered one of the possible solutions for the survival of daily newspapers in the digital space, and the fact that the previous research [4] shows that users do not change their habits easily, there is a justified reason for further research of newspaper editions in the new media, especially in the field of information organization and graphic design.

2 RESEARCH ON USE OF TABLET APPLICATION

Due to a relatively short time of the presence of new technology and the inability to access user data as well as problems with experimental design of research, there are relatively few research articles regarding the visual organization of information and its impact on tablet application users. Čerepinko, Mrvac and Milković [5] have shown that the users of daily newspapers application for tablets view the content in the same or similar way as the printed editions. Entry into the page is still initiated by the dominant visual element (mostly a photo), and large titles which are more appealing than smaller photos, titles, and a paratext.

It has also been shown that reading from a tablet device can under certain circumstances compete, regarding user's speed and reading difficulty, with reading the text on paper [6], which means that there are technical pre-conditions (without prejudice to other dominant technological trends in the economy and media industries) for tablet editions to replace printed newspapers. Some authors have already foreseen such a future. Garcia, looking at user habits, points out four possible options of different versions of daily newspaper editions: smartphone application, web page, printed edition, and tablet application, whereby smartphone and web page are according to the way and speed of usage called the lean forward platforms, whereas printed and tablet editions are referred to as lean-back platforms [1].

In 2012 Quinn et al. conducted for Pointer Institute a survey of eye movements on users of tablet devices [7, 8], comprising a group of 36 users who were shown three prototypes of iPad application for fictional newspapers: the traditional one which corresponds to the classic design of broadsheet newspaper, a carousel layout providing a moving photo gallery with article titles, and a flipboard design made of four larger photos that mark the sections which contained all the news displayed. All three prototypes contained same 20 stories in different variants. The stories were accompanied with additional multimedia content: a photo, an illustration, a photo gallery, a video or a pop-up window. The survey showed that most of the test users (61%) developed a very close connection with the device and carefully read the content offered in both cases - when the text was spread accros the full page, or when they read it by scrolling down after reading several lines. In addition, most of the test users (70%) preferred to hold the device in a horizontal (landscape) position, though most of them adapted the device's orientation to the content they were reading, which was especially apparent when viewing a video content.

Concerning the type of layout, 50% of the test users preferred the carousel design, 35% preferred the traditional, and only 15% liked the flipboard design. Before deciding to read the first article, the test users looked at as many as 18 articles on average (some multiple times), and research has shown that they are most likely to lose interest after 78 seconds of reading, but on the average, the content of the first chosen article was being read fairly more – more than a minute and a half (98.3 s). As in earlier research, especially those of printed media, a visit to the page in this case was initiated by the visual element, mostly a photo, whereby the faces or people in the photos aroused more interest, which coincides with the previous findings [6] and

with the coresponding findings regarding the research of layout in printed newspapers [9-13].

A horizontal sliding was most frequently used for navigation regardless of whether the device was horizontally or vertically oriented. Besides, users prefered navigational tools they were already familiar with, even though the tools specifically designed for the research prototype were on disposal. Again, this fact shows the importance of using the model which readers are used to, at least in the first phase of attracting users. Although the research was conducted on two different age groups of test users (young people born in the digital age and the elderly, who developed their habit of media content consumption in the age of printed newspapers, radio and television), the authors did not state any significant differences between the groups either in the way the device was used or in the content consumption.

Anthropological approach to research of HCI is also well documented by Horst and Miller [22] and was used as orientation while deciding on the methodological approach and expected outcomes of the experiments.

2.1 Research Methodology

In order to investigate the impact of the article's position on the page and to analyse the effect of the multimedia formats acompanying the article, following previous research [5-7], a simulation of the tablet application was made according to the theoretical requirements [14] and in accordance with the basic presumptions of experimenting in the field of mobile technologies and interaction design [15-17]. The simulation consisted of three pages with a total of 21 positions, i.e. 21 articles verbatim copied from the existing news portals. Each article was marked by its position with the possibility of alternating the position by changes in the CMS of the simulation. The simulation was made using the WordPress platform (Fig. 1). In order to gain authenticity plug-ins were used for display in native app mode. User activity is recorded by page analytics.

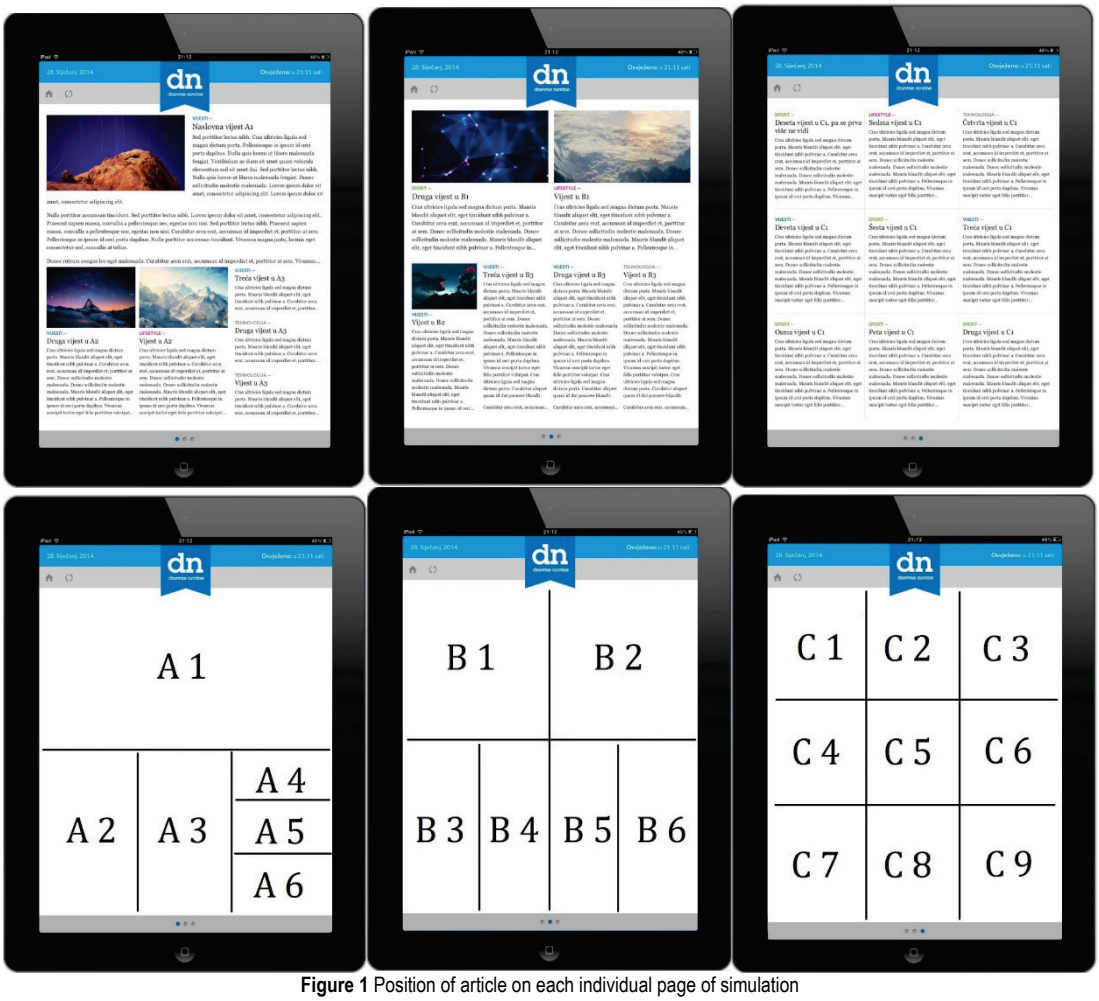

Figure 1 Position of article on each individual page of simulation

The research was performed during two consecutive days. After the first day of measurement the positions were changed as follows: A1 to A4, A2 to A5, A3 to A6, B1 to B5, B2 to B6, B3 to B4, C1 to C3, C4 to C6 and C7 to C9. The articles on C2, C5, and C8 retained their positions but multimedia elements were added or subtracted, as listed in the title of the article: a photo was added to the article C2, a video was added to the article C5. In the article C8 the animation was left out. 50 test users (25 each day), students with experience in using tablets or similar technology, participated in the research. The test users were given the task to check out and give the opinion on the new application with no time limits.

3 RESULTS AND DISCUSSION

The aggregate results of the test users' activities are presented in Tab. 1 and Tab. 2. The average users were using the application for 3 minutes and 31 seconds on the first day and 3 minutes and 55 seconds on the second day. The test users viewed 115 articles on the first and 95 articles on the second day, or 4.6 articles per test user on the first and 3.8 papers per test user on the second day of the research. The number of visits to the home page as well as to the second and third pages was not included in the calculation.

Table 1 Results of first day of application usage

ARTICLE HEADLINE	P	Σ
FIRST DAY ROSTER		115
STAGNATION IS DEATH: Digital books shouldn't just be a PDF versions of the printed ones (VIDEO)	A 1	6
Apple Smart Watch to be crazy expensive	A 2	13
IN VARAŽDIN: Two paintings by 15 years old Miljenko Stančić exibited	A 3	4
WEAPON OF THE FUTURE: Tank that can camouflage as a car or completely disappear	A 4	6
Valter shall defend Sarajevo again	A 5	2
3D printers soon in every home	A 6	7
Superstring Theory depicts exciting world of modern physics	B 1	10
Your passwords are safe but the oversight is to be dealt with no earlier than 2020	B 2	10
Željezara Sisak to become a workhouse of culture	B 3	2
Science fiction worlds on the river Sava bank	B 4	2
LAST THEORY OF EINSTEIN PROVEN TRUE: Echo of Big Bang discovered	B 5	3
MANI GOTOVAC: 'We live in a time when theater is in a nook'	B 6	2
VIDEO: EYESIGHT IMPROVED? With help from 'GlassesOff' App train your eyes and ditch your glasses	C 1	19
Croatian woman great success in world architecture	C 2	3
HUFF POST PICK: Korčula an undiscovered pearl (PHOTO)	C 3	4
USERS WITHOUT OPTIONS Facebook Appp to eliminate messaging option	C 4	10
Worlds best destinations declared	C 5	5
Steel Justice: Blazing dawns of American hinterlands (REVIEW)	C 6	2
Books on memory you shouldn't miss	C 7	1
How big is the Universe? (ANIMATION)	C 8	4
Gateway into the future: Superior Croatian contemporary artist now under the same roof (PHOTO)	C 9	0

Table 2 Results of second day of application usage

ARTICLE HEADLINE	P	Σ
SECOND DAY ROSTER		95
WEAPON OF THE FUTURE: Tank that can camouflage as a car or completely disappear	A 1	11
Valter shall defend Sarajevo again	A 2	1
3D printers soon in every home	A 3	9
STAGNATION IS DEATH: Digital books shouldn't just be a PDF versions of the printed ones (VIDEO)	A 4	3
Apple Smart Watch to be crazy expensive	A 5	9
IN VARAŽDIN: Two paintings by 15 years old Miljenko Stančić exibited	A 6	1
LAST THEORY OF EINSTEIN PROVEN TRUE: Echo of Big Bang discovered	B 1	7
MANI GOTOVAC: 'We live in a time when theater is in a nook'	B 2	4
Science fiction worlds on the river Sava bank	B 3	3
Željezara Sisak to become a workhouse of culture	B 4	1
Superstring Theory depicts exciting world of modern physics	B 5	3
Your passwords are safe but the oversight is to be dealt with no earlier than 2020	B 6	3
HUFF POST PICK: Korčula an undiscovered pearl (PHOTO)	C 1	17
Croatian woman great success in world architecture (PHOTO)	C 2	5
VIDEO: EYESIGHT IMPROVED? With help from 'GlassesOff' App train your eyes and ditch your glasses	C 3	3
Steel Justice: Blazing dawns of American hinterlands (REVIEW)	C 4	5
Worlds best destinations declared (VIDEO)	C 5	5
USERS WITHOUT OPTIONS Facebook Appp to eliminate messaging option	C 6	1
Gateway into the future: Superior Croatian contemporary artist now under the same roof (PHOTO)	C 7	2
How big is the Universe?	C 8	1
Books on memory you shouldn't miss	C 9	1

The statistical analysis of the data has shown (Tab. 3) that regardless of the position and features of the article there was no statistically significant difference in the patterns of reading individual articles (frequency and distribution of reads) with null hypotesis that there would be no difference at the level of $p \leq 0{,}05$.

The results of C4 - C6 pair and of C1 - C3 i.e. C3 - C1 pair are almost bordering statistical significance, potentialy suggesting that a longer use of the application and a larger number of data would make this difference statistically significant.

Table 3 Pairs of Articles Tests

Chi-Square Tests Pair A1-A4					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1,091	2	,580	1,000	
Fisher's Exact Test	1,119			1,000	
Linear-by-Linear Ass.	,810	1	,368	,633	,317

Table 3 Pairs of Articles Tests (continuation)

Chi-Square Tests Pair A4-A1					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2,667	4	,615	1,000	
Fisher's Exact Test	2,715			1,000	
Linear-by-Linear Ass.	,717	1	,397	,545	,272
Chi-Square Tests Pair A2-A5					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3,444	4	,486	,658	
Fisher's Exact Test	3,343			,720	
Linear-by-Linear Ass.	,265	1	,607	,759	,379
Chi-Square Tests Pair A5-A2					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,400	1	,527	1,000	,500
Fisher's Exact Test				1,000	,500
Linear-by-Linear Ass.	,378	1	,539	1,000	,500
Chi-Square Tests Pair A3-A6					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3,444	3	,328	,451	
Fisher's Exact Test	3,102			,513	
Linear-by-Linear Ass.	,191	1	,662	,834	,417
Chi-Square Tests Pair A6-A3					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1,619	2	,445	,576	
Fisher's Exact Test	1,621			,576	
Linear-by-Linear Ass.	1,515	1	,218	,453	,226
Chi-Square Tests Pair B1-B5					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2,485	3	,478	,487	
Fisher's Exact Test	2,531			,487	
Linear-by-Linear Ass.	2,141	1	,143	,225	,112
Chi-Square Tests Pair B5-B1					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3,000	3	,392	,576	
Fisher's Exact Test	2,818			,576	
Linear-by-Linear Ass.	,819	1	,365	,589	,294
Chi-Square Tests Pair B2-B6					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7,091	3	,069	,076	
Fisher's Exact Test	5,965			,076	
Linear-by-Linear Ass.	2,360	1	,125	,191	,095
Chi-Square Tests Pair B6-B2					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1,077	2	,584	1,000	
Fisher's Exact Test	1,141			1,000	
Linear-by-Linear Ass.	,630	1	,427	,718	,359
Chi-Square Tests Pair B3-B4					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,400	1	,527	1,000	,500
Fisher's Exact Test				1,000	,500
Linear-by-Linear Ass.	,378	1	,539	1,000	,500
Chi-Square Tests Pair B4-B3					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,277	1	,599	1,000	,500
Fisher's Exact Test				1,000	,500
Linear-by-Linear Ass.	,262	1	,609	1,000	,500
Chi-Square Tests Pair C1-C3					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5,429	5	,366	,496	
Fisher's Exact Test	5,124			,496	
Linear-by-Linear Ass.	4,117	1	,042	,048	,024
Chi-Square Tests Pair C3-C1					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5,778	4	,216	,153	
Fisher's Exact Test	5,423			,153	
Linear-by-Linear Ass.	3,432	1	,064	,036	,018
Chi-Square Tests C4-C6					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6,273	3	,099	,082	
Fisher's Exact Test	5,657			,110	
Linear-by-Linear Ass.	5,358	1	,021	,029	,015

Table 3 Pairs of Articles Tests (continuation)

Chi-Square Tests Pair C6-C4					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2,104	1	,147	,335	,167
Fisher's Exact Test				,335	,167
Linear-by-Linear Ass.	1,987	1	,159	,335	,167
Chi-Square Tests Pair C7-C9					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,000	1	1,000	1,000	,765
Fisher's Exact Test				1,000	,765
Linear-by-Linear Ass.	,000	1	1,000	1,000	,765
Chi-Square Tests Pair C9-C7					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2,250	1	,134	,471	,235
Fisher's Exact Test				,471	,235
Linear-by-Linear Ass.	2,125	1	,145	,471	,235
Chi-Square Tests Pair C2-C2					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,900	1	,343	,637	,319
Fisher's Exact Test				,637	,319
Linear-by-Linear Ass.	,850	1	,357	,637	,319
Chi-Square Tests Pair C5-C5					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1,424	2	,491	,658	
Fisher's Exact Test	1,447			,658	
Linear-by-Linear Ass.	,000	1	1,000	1,000	,614
Chi-Square Tests Pair C8-C8					
	Value	*df*	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2,492	1	,114	,294	,147
Fisher's Exact Test				,294	,147
Linear-by-Linear Ass.	2,354	1	,125	,294	,147

4 CONCLUSION

The research results have shown that content is still more important to the readers than the form. Accordingly, the specific multimedia formats do not necessarily influence the interest of the test users per se, similar to the results of previous research on the transition of printed newspaper to the online pages [18, 19] according to which readers see text and multimedia as one unit of information. Thus, readers decide on the basis of some other factor rather than the article's added multimedia formats or position, although it could attract inital attention.

The results have also shown that the consumption of the content on the tablet newspaper page follows the previously established reading patterns [20] in which, if there are no dominant visual elements on the page, the dominant content is in the upper left corner and then the content is read towards the opposite corner and further, depending on the reader's preferences. This is similar to the results of other research [21] showing that dominant titles attract more attention if they are located in the upper left corner of the page being watched, followed by the articles in the middle and the bottom quarter of a page (later apearing as the last appealing one). The limitation of this research was a relatively small number of test users and limited options for the interaction with application simulation. However, it may still point to the potential trends, especially due to the fact that they are in accordance with the existing theoretical framework.

5 REFERENCES

[1] Garcia, M. (2012). *iPad Design Lab - Basic: Storytelling in the Age of the Tablet*, Blue Ash, OH: HOW Books.

[2] Mitchell, A., Christian, L., & Rosenstiel, T. (2011). *A Tablet Revolution: How People Use Tablets and What it Means for the Future of News*. Pew Research Center Oct. 25.

[3] Newman, N. (2017). *Journalism, Media, and Technology Trends and Predictions 2017*. Reuters Institute for the Study of Journalism: Digital News Reports.

[4] Allen, R. B. (1997). *Mental Models and User Models, Handbook of Human-Computer Interaction*, Amsterdam, NL, 49-64. https://doi.org/10.1016/B978-044481862-1.50069-8

[5] Čerepinko, D., Mrvac, N., & Milković, M. (2015). Determination of Visual Interest Points of Graphical User Interfaces for Tablet Newspapers Application. T*ehnički vjesnik, 22*(3), 659-665. https://doi.org/10.17559/TV-20140408095301

[6] Čerepinko, D., Keček, D., & Periša, M. (2017). Text Readability and Legibility on iPad with comparison to Paper and Computer Screen. *Tehnički vjesnik, 24*(4), 1197-1201. https://doi.org/10.17559/TV-20160225140202

[7] Kiuttu, S. (2013). *Integrate multimedia, make fingers happy: Journalistic storytelling on tablets*. Reuters Institute for the Study of Journalism, University of Oxford. http://www.hssaatio.fi/images/stories/Saila_Kiuttu_Integrate_multimedia.

[8] Quinn, S. (2012). *New Poynter Eyetrack research reveals how people read news on tablets*, Poynter.org, http://www.poynter.org/how-tos/newsgathering-storytelling/visualvoice/191875/new-poynter-eyetrack-research-reveals-how-people-read-news-on-tablets/

[9] Click, J. W. & Baird, R. N. (1994). *Magazine Editing & Production*, Dubuque, IA: Brown & Benchmark Publishers.

[10] Wanta, W. & Gao, D. (1994). Young Readers and the Newspaper. *Journalism and Mass Communication Quarterly, 71*(4), 926-936. https://doi.org/10.1177/107769909407100416

[11] Geraci, P. (1984). Newspaper Illustrations and Readership: Is USA Today on Target? *Journalism Quarterly*, 61, 409-413. https://doi.org/10.1177/107769908406100225

[12] Barnhurst, K. G. & Nerone, J. (2001). *The Form of News: A History*, New York: The Guilford Press.

[13] Haskins, J. B. & Flynne, L. (1974). Effects of headline typeface variation on reader interest. *Journalism Quarterly, 51*(4), 677-682. https://doi.org/10.1177/107769907405100415
[14] Houde, S. & Hill, C. (1997). *What do Prototypes Prototype?* Handbook of Human-Computer Interaction, Amsterdam, NL, Elsevier Science BV, 367-382. https://doi.org/10.1016/B978-044481862-1.50082-0
[15] Hornbæk, K. (2011). Some Whys and Hows of Experiments in Human–Computer Interaction. *Foundations and Trends in Human–Computer Interaction, 5*(4), 299-373. https://doi.org/10.1561/1100000043
[16] Hagen, P., Robertson, T., Kan, M., & Sadler, K. (2005). Emerging Research Methods for Understanding Mobile Technology Use. *Proceedings of OZCHI 2005*, Canberra, Australia.
[17] Koskinen, I., Zimmerman, J., Binder, T., Redström, J., & Wensveen, S. (2011). *Design Research through Practice – From the Lab, Field, and Showroom*, Waltham, MA: Morgan Kaufmann. https://doi.org/10.1016/B978-0-12-385502-2.00006-7
[18] Quinn, S. (2005). *Convergent Journalism: The Fundamentals of Multimedia Reporting*, New York: Peter Lang Publishing.
[19] Salwen, M. B., Garrison, B., Driscoll, P. D. (2005). *The Baseline Survey Projects: Exploring Questions, Online News and the Public*, New Jersey, Lawrence Erlbaum Associates, 47-79. https://doi.org/10.4324/9781410611611
[20] Garcia, M. & Stark Adam, P. (1991). *Eyes on the News*, St Petersburg, FL: The Poynter Institute.
[21] Outing, S. & Ruel, L. (2004). *The Best of Eyetrack III: What We Saw When We Looked Through Their Eyes*. Published on Poynter Institute (not dated).
[22] Horst, H. A. & Miller, D. (eds.). (2012). *Digital anthropology*, Berg, London, New York.

Contact information:

Darijo ČEREPINKO, Assis. Prof., PhD
University North
Trg dr. Žarka Dolinara 1
48000 Koprivnica, Croatia
darijo.cerepinko@unin.hr

Dean VALDEC, Assis. Prof., PhD
University North
Trg dr. Žarka Dolinara 1
48000 Koprivnica, Croatia
dean.valdec@unin.hr

Petar MILJKOVIĆ, Assis. Prof., PhD
University North
Trg dr. Žarka Dolinara 1
48000 Koprivnica, Croatia
petar.miljkovic@unin.hr

Krunoslav HAJDEK, Assis. Prof., PhD
University North
Trg dr. Žarka Dolinara 1
48000 Koprivnica, Croatia
krunoslav.hajdek@unin.hr