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Does the medium affect the message? The influence of text representation format on critical thinking

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Abstract. The proliferation of digital information resources in recent years challenges consumers with the need to employ critical thinking skills in reading news. This paper suggests an updated perspective to the expression that "the medium is the message" by comparing the ability of high-school and college students to exercise critical thinking skills in reading news in print and digital formats. The most important finding is the better performance of the younger participants (high school students) in reading digital news formats, and the better performance of the college students when reading news in a print format. The findings of this exploratory study are discussed through the lenses of three perspectives: a usability perspective, a cognitive perspective and an information economics perspective in order to stimulate further research that may provide designers, researchers and educators with useful guidelines for designing effective messages in the information age.

Keywords: Information literacy, critical thinking, information representation, disinformation and bias, real value of information, human computer interaction

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1. Introduction

In recent years, information consumers face a rapid growth in the availability of digital information in lieu of printed information, as evident from the proliferation of online newspapers and news sites, electronic

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books, electronic encyclopedias, online academic journals and blogs [11,60]. Some recent reports, e.g. [47], suggest that digital information consumption almost equals the consumption of information in a print format, and others, e.g. [50] predict that within a decade, more than 70% of the information will be available in a digital format, whereas only 30% will be available in print. The proliferation of digital information in the last decade has presented readers and designers of digital texts with new cognitive, ergonomic and design challenges and led to extensive research efforts to characterize the nature of digital reading and learning, and compare it with reading from print format (e.g. [7,10, 44,45,48,53,57]), in order to establish standards for effective information design formats (e.g. [12]).

As most readability studies have pointed out, reading from a digital display is significantly slower than reading from a printed format (e.g. [31,45,57]) and online reading creates a higher cognitive load on the reader compared to reading from print [18,43,51]. Accordingly, readers remember information from print more than they remember from a digital display [1,5, 29]. Studies that explored reading modes (e.g. [48]) report that people who preferred digital reading tend to be more non-linear-scanner readers, whereas people who preferred print reading tend to be more methodological and linear readers. Many readers of digital text report that they suffer from severe disorientation and knowledge-construction problems that result from the non-linear structure of the text-design [4,37]. It was also reported that readers of digital text develop a lower sense of ownership, engagement and willingness to learn, compared to readers of printed text, due to the ability to add annotations and the flexible navigation [4,33,45]. Regarding the relationships between reading format and learning achievements, the research literature has reported contradicting results. For example, Rouet et al. [51] found that learning from digital text leads to lower understanding compared to learning from a print format. The opposite is reported by Chang and Ley [18], who found that online reading leads to higher-achievements compared to learning from print. Empirical findings obtained by Ackerman and Goldsmith [1] revealed a gap between self-judgment of learning and actual performance of digital readers, compared to print readers. They found that the perceived learning of digital readers was higher than their actual knowledge compared to print readers. Haseltine [35] reported that learning-directed and high-achieving students had a higher preference for the print and linear format, whereas the goal-directed and lower-achieving students preferred the non-linear digital text. Ackerman and Goldsmith [1] found lower achievements in learning from the computer display compared to the achievements in learning from print.

From the growing amount of contradicting reports concerning digital versus print reading, some of which were cited above, it is evident that the major factors that control effective and meaningful reading and learning in digital environments are not yet clear, and more research is needed, especially in comparing between digital and print reading [57].

With the rapid growth in access to information, the ability of users to evaluate and use it wisely has become a key issue in creating educated information consumers [8,13,52]. Of course, the need to effectively evaluate information is not unique to the digital era; it has always been central to the creation of reliable knowledge. However, in the modern era, with the unlimited exposure to digital information, which can be published easily and manipulated without difficulty, the ability to evaluate and assess information properly has become a "survival skill" for scholars and information consumers [16,17,27].

The major problems in assessing information lie in the difficulty of assessing the credibility and originality of information and the professional integrity of its presentation [21,25,36,49]. In the absence of effective mechanisms for information evaluation, how can readers decide which of the infinite and conflicting bits of information to choose and which to doubt? [23,24,41]. The term *information literacy* [8,39] refers to the cognitive skills that consumers employ to critically assess information in an educated and effective manner. Information literacy works as a filter: It identifies erroneous, irrelevant, falsified or biased information, and prevents its infiltration into the learner's system of considerations [6,27,30,46]. Information-literate people think critically, and are always ready to doubt the quality of information. They are not tempted to take information for granted, even when it seems "authoritative", well-designed and valid.

As pointed out in many studies of information literacy, information in "objective" resources, such as academic journals and news information resources, but especially in commercials, can be manipulative, biased or even falsified, using a wide range of text and visual design manipulations that affect the information consumers' decisions, positions or knowledge [13,25,42, 64]. Griffith et al. [33] described the kinds of message-design manipulations made on consumers' decisions in designing online and printed catalogs, and Edwards et

al. [26] described how a manipulative presentation of medical data can affect patients' decisions. Dor [23,24] investigated the manipulative role of news headlines and news-items design in framing the public opinion, and estimated that more than 50% of the "objective" news in mainstream newspapers is actually biased. In his study of newspaper headlines, Dor created the News Manipulation Classification, which consists of reasonably-objective, moderately-biased, biased and falsified news-items, according to the degree of manipulation they contain.

The recognition of the essential role of critical thinking in educated information consumption has led to a wide range of studies that focused on various aspects of information literacy and critical thinking among different groups of information consumers (e.g. [6,16,21, 25]). Most of these studies revealed a low level of critical thinking skills in consuming information wisely, among both children and adults, although in general, the younger information consumers were found to be less critical thinkers. This was illustrated by Eshet-Alkalai and Amichai-Hamburger [28], who found that young information consumers (high-school students) had the lowest critical thinking skills in assessing political news, compared to university students and adults. A low level of critical thinking among information consumers was found in most academic disciplines in higher education [14,32,36,49].

Unfortunately, despite awareness among researchers regarding the above mentioned two problems that concern educated information consumption in the digital era, i.e. reading from digital displays and the lack of critical thinking among information consumers, there are no available studies that compared application of critical thinking skills in reading information in print versus digital formats.

With the wide penetration of digital and communication technologies into the everyday work of most organizations and academic institutes, understanding the ability of information consumers to employ critical thinking in reading from diverse formats has become of paramount importance as demonstrated in the following three examples:

(1) The conflict that commercial organizations face in deciding whether to advertise products digitally or in print [33], (2) the decision that professional training institutes and distance-learning universities should make whether to base the academic reading on print or on digital formats (e.g. [44,57]), and (3) the conflict of organizations' managers as to the ability of workers to perform effectively in conditions that require communication via digital platforms [56].

The print and digital formats can be regarded as two alternative information systems [2,3] that consumers can choose to use. From an information economics perspective, the ability of consumers to employ critical thinking can be used to measure the real value (i.e., their performance) as opposed to the perceived value (i.e., their satisfaction with the system) they assign to the information. Unfortunately, except for the Minnesota Experiments [22], which found no significant differences in the performance of users who read reports from a screen and those who read them in print, there are no recent studies that explore the impact of reading format on the real and the perceived value of information. The present study contributes to the field of information economics by providing new findings on the impact of format on the real value of information.

This paper compares the critical thinking skills of print versus digital news consumers. It investigates the ability of high school and college students to employ critical thinking skills in reading news-items that appear in print and digital format. The results shed light on the nature of critical information consumption in the information era.

2. Methodology: A task-oriented approach

This research used a task-oriented research approach, in which participants were required to perform real-life authentic tasks [61,62], in order to compare critical thinking skills in print and digital news formats. In information economics terms, the reader's critical thinking grade was used to measure the real value of each information system [2,3].

2.1. Participants

The participants of the research were 80 individuals with a similar demographic background: They all live in the Upper Galilee, Israel, in agricultural communities (kibbutz or moshav) or a small town. All participants read a printed newspaper at least four times per week; they all had a computer and broadband Internet connection at home and in school, and they used it to read the news on a daily basis. All were proficient in other basic computer skills such as using *Office* programs and email, participating in discussion groups and surfing the Internet. All participants were selected randomly and volunteered for the research. Research participants consisted of the following two groups:

- 40 eleventh grade students (average age 16.5) from a regional high school.
- 40 third year college students (average age 26.4) from an academic college, all from the Department of Education.

Each group was composed of 20 males and 20 females.

2.2. Tasks

Participants were divided into two equal groups:

- **Print (P) group**, consisting of 20 high-school students (10 males and 10 females) and 20 college students (10 males and 10 females).
- **Digital (D) group**, consisting of 20 high-school students (10 males and 10 females) and 20 college students (10 males and 10 females).

Before administering the tasks, one of the authors gave each group a short introduction on the manipulative nature of information design in newspapers, including representative examples of using text and images to affect the audience. After this introduction, each group received the same set of five news-items that were published by the national newspaper *Haaretz*, and appeared both in print and in the newspaper's Internet site (www.haaretz.co.il). The news items contained exactly the same text, but were designed differently:

- The print items had the traditional newspaper design, with very few black-and-white images.
- The digital items had the common online newspaper design, with many color images and graphs that illustrate and support the text. The items contained numerous hyperlinks that linked the item to other related topics. Hyperlinks occurred in both images and the text. Sliders, menu-bars and toolbars helped the readers navigate within the news-items. Pop-up commercials appeared randomly and temporarily obscured the news-item.

The news items that were assigned for critical analysis belonged to five different subject areas (one item from each area): politics, science, economy, sport and art. Participants had no prior formal academic training in these areas. Special attention was paid to select news-items that were written in simple language and to avoid items that required prior or professional knowledge.

The print (P) group received the news items as excerpts from the newspaper whereas the digital (D) group read the same news items sitting in front of a computer. After reading the five news-items (in either print or digital format), participants were asked to list and explain all the biased, falsified or manipulative elements they could identify in each news-item (e.g. manipulative use of text, graphics, pictures, headlines, special design-elements), and to write a short critical overview summary that evaluates the overall quality and reliability of the item.

2.3. Grading

Participants' performance in each task was assessed and graded by the authors, aided by a list of evaluation guidelines based on Dor [23,24], which is presented in Table 1. The reliability of the assignments' grading process was validated by a random selection of 20% of the participants' reports which were graded by two independent referees who used the same guidelines for evaluation. The close similarity between the referees' grades and the grades given by the authors (Pearson Correlation range 0.809 to 0.997, all significant at the 0.01 level, two-tailed) suggests a high coherence of the evaluation criteria utilized in the present research.

Table 1
Grading guidelines

	Grading guidelines
General	• Overall assessment of report. • Manipulative use of readers' misconceptions and prejudice. • Manipulative use of readers' common knowledge. • Manipulative use of readers' schemas and mental models.
Text	• Manipulative use of headlines. • Manipulative use of specific words to create bias. • Manipulative use of sentence structure to create bias. • Manipulative use of principles of message-design to create bias. • Manipulative use of hypertext to create bias.
Graphics	• Using photographic manipulations to create bias (e.g. selecting angle of photography or a specific image). • Manipulative use of page or screen layout to create bias (e.g. proximal placement of text and image). • Manipulative use of visual design elements to create bias (e.g. color, centering, emphasizing). • Using hypermedia links to images or text to create bias.

3. Results

A series of analysis of variance (ANOVA) tests were conducted on the obtained data, in order to examine the influence of the reading format on critical thinking. Table 2 presents the average critical thinking grades for the different subject areas, by format, age and gender. The table also presents ANOVA results of critical thinking in print versus digital formats for the high school students (H group; $n = 40$), the col-

Table 2
Average critical thinking grades and analysis of variance results

Age group	Gender	Topic	Politics			Science			Economy			Sport			Art		
		Format	Print	Digital	Total	Print	Digital	Total	Print	Digital	Total	Print	Digital	Total	Print	Digital	Total
High school	Male	n	10	10	20	10	10	20	10	10	20	10	10	20	10	10	20
		Mean	46	53	50	74	81	78	34	40	37	80	92	86	72	79	75
		Std. D.	5.5	3.6	5.9	3.7	4.1	5.5	3.4	2.4	4.5	2.3	3.1	6.4	4.1	3.6	5.1
		F		**13.1**	**		**19.6**	**		**25.8**	**		**88.6**	**		**15.8**	**
	Female	n	10	10	20	10	10	20	10	10	20	10	10	20	10	10	20
		Mean	57	64	60	65	74	69	50	59	55	73	80	77	77	85	81
		Std. D.	4.8	3.5	5.5	6.0	4.3	6.7	4.5	2.6	5.9	2.8	2.9	4.7	4.1	3.1	5.2
		F		**14.1**	**		**13.3**	**		**31.2**	**		**32.3**	**		**21.1**	**
	Total	N	20	20	40	20	20	40	20	20	40	20	20	40	20	20	40
		Mean	51	59	55	69	78	74	42	50	46	77	86	81	75	82	78
		Std. D.	7.5	6.5	7.9	6.5	5.7	7.3	9.2	9.8	10.2	4.5	6.5	7.3	4.8	4.5	5.9
		F		**10.8**	**		**17.4**	**		**6.7**	*		**27.8**	**		**23.6**	**
College	Male	n	10	10	20	10	10	20	10	10	20	10	10	20	10	10	20
		Mean	83	75	79	73	65	69	77	70	74	92	85	88	81	74	78
		Std. D.	4.2	4.8	6.1	5.5	5.1	6.4	3.4	2.8	4.7	2.4	3.3	4.6	3.3	2.6	4.5
		F		**17.2**	**		**9.3**	**		**24.6**	**		**29.2**	**		**26.7**	**
	Female	N	10	10	20	10	10	20	10	10	20	10	10	20	10	10	20
		Mean	90	86	88	72	57	65	87	78	83	70	65	67	91	83	87
		Std. D.	3.3	4.3	4.3	3.8	5.2	8.8	4.6	3.1	6.0	3.5	3.0	4.1	3.1	3.4	5.2
		F		**5.7**	*		**53.3**	**		**27.2**	**		**12.6**	**		**32.4**	**
	Total	n	20	20	40	20	20	40	20	20	40	20	20	40	20	20	40
		Mean	87	81	84	72	61	67	82	74	78	81	75	78	86	79	82
		Std. D.	5.1	7.3	7.0	4.6	6.6	8.0	6.4	4.9	6.9	11.7	10.8	11.5	5.8	5.1	6.6
		F		**9.7**	**		**37.9**	**		**19.7**	**		2.9			**19.1**	**
Total	Male	n	20	20	40	20	20	40	20	20	40	20	20	40	20	20	40
		Mean	65	64	64	73	73	73	56	55	56	86	88	87	77	77	77
		Std. D.	19.9	11.9	16.2	4.6	9.4	7.3	22.6	15.6	19.2	6.4	4.7	5.6	5.9	3.8	4.9
		F		0.0			0.0			0.0			1.5			0.0	
	Female	n	20	20	40	20	20	40	20	20	40	20	20	40	20	20	40
		Mean	74	75	74	69	65	67	69	69	69	71	72	72	84	84	84
		Std. D.	17.7	12.1	15.0	6.0	9.7	8.1	19.6	10.2	15.4	3.5	8.5	6.4	7.7	3.4	5.9
		F		0.1			1.6			0.0			0.3			0.0	
	Total	n	40	40	80	40	40	80	40	40	80	40	40	80	40	40	80
		Mean	69	70	69	71	69	70	62	62	62	79	80	80	80	80	80
		Std. D.	19.1	13.1	16.3	5.8	10.2	8.3	21.9	14.6	18.5	9.0	10.5	9.7	7.8	5.0	6.5
		F		0.0			0.7			0.0			0.6			0.0	

The numbers present F values, the degrees of freedom can be computed from the n (number of observations) data. Level of significance: $^{**}p < 0.01$, $^{*}p < 0.05$.

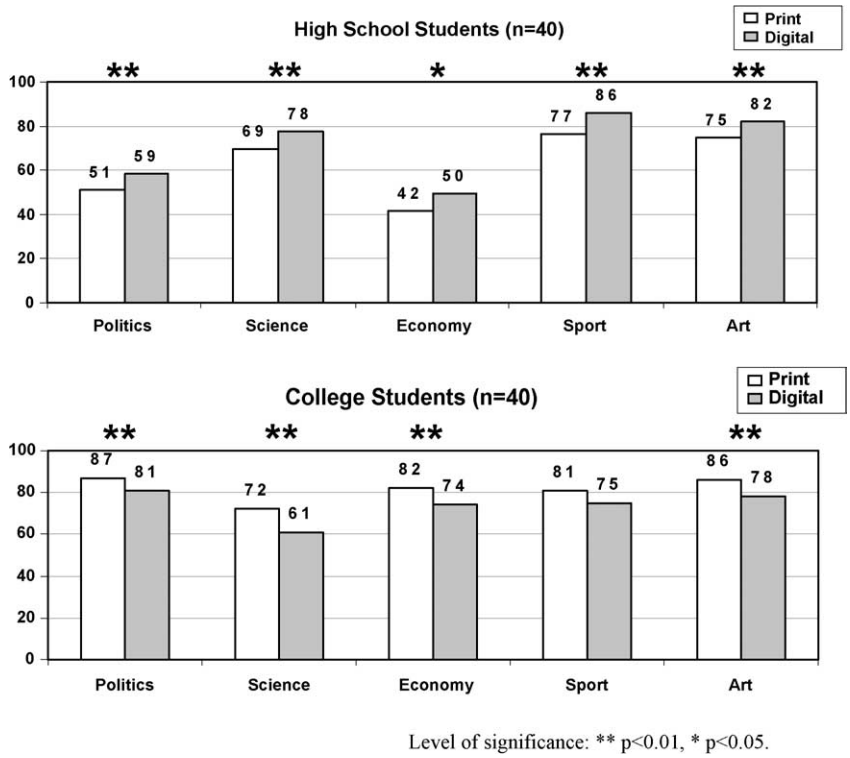

Fig. 1. Print versus digital: Age effect on critical thinking.

lege students (C group; $n = 40$), and the total group ($n = 80$), and the respective sub-groups, such as high school males (HM) who read the print version (HM-P; $n = 10$) and high school males (HM) who read the digital version (HM-D; $n = 10$).

3.1. Print versus digital groups

As shown in Table 2, there were no significant differences in the total sample between those who read the news items in print (P group) and those who read them in a digital format (D group), regardless of the news subject area. For instance, the average grade of all the 40 participants of the P group who read the politics news item is 69, whereas the average grade of the D group for the same item is 70, and the F value is insignificant. In addition, the format had no significant influence on the average grade in the total male and total female groups.

However, when examining the high school and college groups separately, the format was found to significantly influence the average grade in all the subject areas (except for sport in the C group). Hence, the results suggest that there is an interaction effect between age and format.

Nevertheless, the most prominent and noteworthy finding, which is illustrated in Fig. 1, is the significantly better performance of the H group in the digital format, compared to their performance in the print format, as opposed to the significantly better performance of the C group in the print format compared to their performance in the digital format tasks.

Although this paper focuses on comparing critical thinking in print and digital formats, the obtained data provided some additional significant results, which are presented in Sections 3.2 and 3.3, and may be used as possible directions for further research.

3.2. Males versus females groups

As shown in Table 2, there was no significant interaction between gender and format. However, significant differences between males (M) and females (F), regardless of the format, were found in the major groups (except for science in the C group), as well as in most of the sub-groups (i.e. PH, PC, DH, DC) as detailed in Table 3 (the average grades of the subgroups data are presented in Table 2).

Table 3
Analysis of variance results – Males (M) vs. Females (F)

	n	Politics	Science	Economy	Sport	Art
Total	80	8.1 **	13.6 **	11.3 **	127.3 **	35.5 **
High School (H)	40	35.7 **	18.0 **	111.3 **	27.8 **	11.9 **
College (C)	40	29.8 **	3.4	26.7 **	238.5 **	32.3 **
Print – High School (PH)	20	22.8 **	15.0 **	83.5 **	40.5 **	8.4 **
Print – College (PC)	20	17.3 **	0.1	29.8 **	275.2 **	45.2 **
Digital – High School (DH)	20	43.8 **	17.3 **	277.0 **	72.2 **	16.1 **
Digital – College (DC)	20	30.3 **	12.8 **	34.8 **	206.3 **	36.2 **

Level of significance $^{**}p < 0.01$, $^{*}p < 0.05$. The numbers present F values, the degrees of freedom can be computed from the n (number of observations) data.

Table 4
Analysis of variance results – High school (H) vs. College (C)

	n	Politics	Science	Economy	Sport	Art
Total	80	302.5 **	15.1 **	277.5 **	2.6	8.2 **
Males (M)	40	244.2 **	20.3 **	648.5 **	1.9	2.5
Females (F)	40	322.0 **	3.8	225.3 **	45.9 **	11.2 **
Print – Males (PM)	20	300.1 **	0.2	813.9 **	124.6 **	31.0 **
Print – Females (PF)	20	329.9 **	9.5 **	339.8 **	5.1 *	68.4 **
Digital – Males (DM)	20	132.4 **	59.0 **	670.5 **	22.4 **	10.0 **
Digital – Females (DF)	20	160.7 **	59.9 **	226.6 **	142.2 **	2.5

Level of significance $^{**}p < 0.01$, $^{*}p < 0.05$. The numbers present F values, the degrees of freedom can be computed from the n (number of observations) data.

3.3. High-school versus college groups

ANOVA tests, which compared the high school (H) and college (C) groups, regardless of the news format (see Table 4), revealed significant differences in the total group (except sport), in the males group (except sport and art) and in the females group (except science). Significant differences were also found in most of the sub-groups (PM, PF, DM and DF), as shown in Table 4 (the average grades of the sub-groups data are presented in Table 2). These findings are beyond the scope of this paper, and are presented here in order to stimulate further research on the implication of these findings to pedagogical aspects of teaching curricular topics, as suggested by Grafstein [32].

4. Discussion

The ambiguity in the current literature, regarding the effectiveness of reading and learning from digital

displays, and of the ability of information consumers to employ critical thinking [13,15,48], which is enhanced by reports that point to a constant decrease in information literacy of contemporary information consumers [6,28], illustrates the need for a comparative study of the nature of effective information consumption in print versus digital formats [13,39,45].

The empirical results of this paper contribute to our understanding of critical information consumption in the digital era by comparing the ability of information consumers from different age-groups and gender to employ critical thinking in reading print and digital news in diverse subject areas. The results shed light on the growing challenge of consuming digital information critically, in print and in digital formats, and provide information designers [7,10], researchers and educators [32,36,46] with important information-design insights. The findings of this research suggest a contemporary view on the impact of the medium on the "message", as a paraphrase of McLuhan and McLuhan's [40] expression that "the medium is the message".

The major finding of this study, i.e., that the younger participants are better critical readers of digital information, and that the older participants are better critical readers of print information, has, to the best of our knowledge, never been reported in the research literature before. This finding can be discussed in terms of three different perspectives: the usability perspective, the cognitive perspective and the information economics perspective. Due to the pioneering nature of this research, the results are discussed here in general terms and the authors plan to conduct further studies that will elaborate on the role of each of these perspectives in print versus digital reading.

According to the usability perspective, these research findings could be interpreted in terms of usage proficiency and generation differences [34], following claims that the experience and comfort that users feel in a digital environment play a pivotal role in their ability to become educated users [37,45,54]. As has been reported by so many studies, young people are significantly more proficient and comfortable in digital environments than adults, especially in working in hypermedia environments (e.g. [9,17,19,20,59]). Furthermore, recent reports (e.g. [44,53,57]) indicate that adults have a higher preference for the print format to obtain information, whereas youths have a higher preference for the digital one. Accordingly, it could be argued that the present research findings relate to the experience of each age group with a specific format – print for the older participants, and digital for the younger ones. The findings of Eshet-Alkalai and Amichai-Hamburger [28] that younger participants performed better than adults in both operating computer software interfaces and in analyzing Internet news provide further support for this claim.

The cognitive perspective is based on claims, made by many scholars (e.g. [1,29,41,43,63]), that the level of critical reading of text depends mainly on the interaction between the structure of the text and the cognitive capability of the reader, and that the structural differences between the print and the digital formats have a dramatic effect on the way learners read them, and on the cognitive challenges they pose to readers (e.g. [1,37,51,58]). Unlike the linear reading and learning dictated by a printed text, the digital, hypermedia-based text requires the reader to master a high level of non-linear branching reading and thinking capabilities [27,38,51,55,58]. Smilowitz [55], Lazar et al. [37], Lee and Hsu [38] and Rigmor and Rosemary [49] describe the abilities to create mental models and metaphors as crucial for "surviving" the intricate hypermedia structure of information representation in the web, and employing critical thinking skills. In most of these studies, younger people are described as more effective non-linear Internet learners and readers than adults.

In addition, many studies report that the Internet-hypermedia digital format creates a higher cognitive load on the reader, compared to the printed format [1,18,43,51]. Reports on the better performance of high school students compared to adults in hypermedia environments and in environments that put a high cognitive load on the user [49,51,52] can be used to explain the higher critical thinking scores of the high school students in digital text found in the present study. A further support for this claim can be drawn from Eshet-Alkalai and Amichai-Hamburger [28], who found that high school students were significantly better learners in non-linear hypermedia environments compared to adults who had a similar experience.

The results of this study confirm the basic premise of information economics, that information does not have an absolute universal value [2,3], so people differ in their preferences for information formats, and their performance is affected by the information representation format [56]. Due to the lack of current information economics research literature on the interaction effect of age and information format, it seems that information economics cannot offer a conclusive explanation to our findings. In this respect, the claims of Davitt

Maughan [21] and of Saranto and Hovenga [52], that the familiarity of information consumers with the information format increases the real value of information, might suggest a feasible explanation. Nevertheless, our findings improve the understanding of the effect of format on the real value of information to different age-groups.

The research literature on gender differences in reading from print versus digital formats is sparse, and contains conflicting results. This ambiguity can be illustrated by comparing the findings of Haseltine [35], that female students had a higher preference for the print format whereas male students had a higher preference for the more cognitive load-demanding hypermedia format, with the findings of Niederhauser et al. [43] who studied the impact of cognitive load on learning from hypermedia and reported that gender did not contribute significant variance. Similarly, Rouet et al. [51] did not find significant differences between boys and girls in online text comprehension. Our findings, that there were no significant gender differences in print and digital critical thinking are in agreement with Niederhauser et al. [43] and Rouet et al. [51]. More comparative research is required to better understand the nature of gender differences in critical reading in print and digital formats.

5. Conclusions

This research sheds light on the ability of different groups of information consumers to read information critically, which has become a crucial skill in today's information-overload environments. The paper presents a contemporary view on McLuhan' expression [40], that "the medium is the message" by comparing the impact of the information representation medium (print and digital) on the ability of users to analyze information critically. The major finding of this exploratory study is that younger participants (high-school students) performed significantly better in critically reading news in a digital format, while the older participants (college students) performed significantly better in a print format environment. A variety of other significant differences found in the research, are also discussed in the paper. The paper outlines several interpretation approaches and directions for further research. More research is required in order to confirm the validity of the findings and to provide practical guidelines for information designers, educators and researchers.

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