

The Effects of Content Type and Presentation Style on User Experiences of Multimedia Content on a Tablet PC

Kari Kallinen¹, Jan Kallenbach², and Niklas Ravaja¹

¹ Aalto University School of Economics, Center for Knowledge and Innovation Research
P.O. Box 2125, FIN-00076 Aalto, Finland

² Aalto University School of Science and Technology, Department of Media Technology
P.O. Box 15500, FIN-00076, Aalto, Finland

{Kari.Kallinen, Jan.Kallenbach, Niklas.Ravaja}@aalto.fi

Abstract. The present study examined how media type, presentation style, and user characteristics moderate people's media experiences while reading on and listening to news messages. We found that content type, presentation modality and user characteristics all moderated the responses to the news messages. We found for example that (1) entertainment news were experienced as more pleasant and activating, but factual news as more interesting, important, and trustworthy, (2) Audio news with text captions elicited better memory performance and higher presence than text or audio only news, (3) fast picture presentation elicited higher activation than slow pictures among younger users whereas slow picture presentation elicited higher activation than fast pictures among older users. The results demonstrate the complex mixture of user (such as age, and level of education), presentation (such as medium, modality, speed), and content (such as fact and entertainment) characteristics in media experiences.

Keywords: eReading, multimedia, user responses, emotion, memory performance, interest, presence.

1 Introduction

It has been suggested that electronic reading will become more widespread among media consumers and little by little paper-based newspapers and magazines will cease to exist. Regardless whether this is true or not: it is evident that reading from various electronic devices such as computers, laptops, mobile phones and electronic book readers has expanded very rapidly in the last few years. Publishers are facing new challenges as more and more of content is delivered to electronic devices.

In many aspects, electronic reading is in different from reading from a paper. The most notable differences are, on the one hand, the fact that readers can interact with the content/device and, on the other hand, that modern devices are becoming multifunctional with rich multimedia content that users are able to look, listen, modify and interact.

Previous studies have examined, for example, how people read text presented on a small display (Juola, Tiritoglu & Pleunis, 1995), how information visualization techniques can support reading of electronic documents (Hornbæk & Frøkjær, 2001), how memory for spatial location can be supported while reading from small displays (O'Hara, Sellen, & Bentley, 1999), and how background music and individual differences moderates the reading speed and experience while reading news from personal digital assistants (PDAs; see Kallinen, 2002; Kallinen, 2004).

However, it seems that most of the previous studies lack a broader theoretical framework for media experiences. In relation to the context of reading from computers (such as small displays), Kallenbach (2009) conceptualizes media experience on the basis of three qualities. First content quality refers to the extent of how well the message of mediated content can be conveyed to the reader or user. The second quality determining media experiences is the presentation quality. It refers to the extent of how contents are presented, displayed, or rendered. The third quality of electronic reading experiences is the quality of use. This refers to the usability of both the reading device itself as well as the interface displaying the reading contents. In addition to the content and medium related factors of media experience, media experience is strongly moderated by the context of the media (e.g., work, leisure, on move, at office etc.) use as well as the subjective factors of the users (e.g., preferences, attitudes, competence, age, profession etc.). Media experience can be seen as an interactive process of various components, such as the content, medium, content presentation and the individual user in a certain context at a certain time. In the present experiment we aimed to examine all these factors in an electronic reading setting. We were interested in the effects of content type (factual vs. entertainment), presentation type (text, audio, or text + audio with no-pictures, slow picture pace or fast picture pace) and individual characteristics of users (e.g., age and level of education) on the responses to news messages presented in a tablet simulation in a laptop. With regard to user responses, generally the factors cognition, emotion, and behavior are of importance when investigating subjective media experiences. We focused on these user responses in our study.

2 Research Problems and Expected Outcome

In the present study we were interested in the following research questions, among other things:

- How is different media content (entertainment vs. factual) experienced in an electronic reading situation?
- How does presentation type (text, audio, text + audio) moderate media experiences?
- What is the suitable presentation speed for pictures (fast vs. slow) for different media content?
- What are the individual differences in the media experiences?

We expected that content type, presentation mode and picture presentation pace all moderate media experiences. In regard to content type, given the nature of the news we expected that entertainment news would be eliciting more pleasantness and activation, whereas factual news would be considered as more important and trustworthy. In regard to the presentation style, given the connotation of daily media use, we expected that audio and pictures (especially fast pictures) would be more suitable for entertainment than factual news, whereas people may prefer factual content in connection with text. We also expected that the results would be moderated by the individual differences of the users (e.g., age and level of education), for example so that people with higher levels of education would have better memory performance than lower educated people in textual condition, given that they are likely more experienced in processing textual material.

3 Method

3.1 Participants

Thirty eight participants with varying fields of profession participated in the study in return for three movie ticket. Fourteen of them were men and twenty four were women; their age ranging from 19 to 46 years ($M = 26.69$). On average, participants had little experience with eReaders or other small hand held devices (excluding mobile phones), but they use computers, and read factual and entertainment news from computers quite frequently. All the subjects were fluent users of computers and had normal vision and hearing.

3.2 Stimuli

The stimuli material consisted of 18 Finnish entertainment (e.g., "Tässä ovat Diilin uudet yllätystuomarit"; "Marja Tyrni myi kultaa" etc.) and 18 Finnish factual (e.g., "EU-maat hyväksyivät Viron eurojäsenyyden"; "Rankkasateet pahentavat edelleen Kiinan tulvia" etc.) news.

The news and the two content types were balanced so that the number of words and paragraphs per individual news item and per category was about equal. The mean word count was 131.00 for the 18 entertainment news and 132.12 for the factual news. On average there were 6.67 paragraphs in entertainment news and 6.82 in factual news. The mean audio length was 86.44 seconds for entertainment news and 91.1 seconds for factual news.

Each news item was presented in form of text, audio, or text with audio. In addition each item was paired with 3 relevant pictures whose pace of appearance on the display varies between a slow picture pace, a fast picture pace, and no picture. Examples from various stimuli presentations are illustrated in Figure 1 and Figure 2.



Fig. 1. A news item containing text with corresponding animated pictures



Fig. 2. A news item containing audio with captions and animated pictures

3.3 Measures

Memory Performance (Immediate and Delayed Recollection). Short term memory performance was measured by two multiple choice questions that were presented right after each news stimuli (immediate recollection). Longer term memory performance was measured by asking the participant list all news items they could remember (from any category) after the experiment (delayed recollection).

Self-Report Responses. In regard to media experience, the subject rated their subjective enjoyment and activation level, understandability, trustworthiness, interest, and importance of the news for themselves, as well as the overall satisfaction

to the news “service” using 5-point Likert scales (from 1, e.g., unpleasant, uninteresting, unimportant etc. to 5, very pleasant, very interesting, very important etc.). In addition we collected various relevant background data of the participants, such as age, gender, level of education, previous experience with eReaders, and how used they are to reading factual and entertainment news from a computer.

Presence. To assess the feeling of presence we used a 7 item scale from the MEC-SPQ Questionnaire (Vorderer, Wirth, Saari, et al., 2004). The items (e.g., “I concentrated on the news”; “I did not notice the passing of time”; “I felt like I was a part of the environment in the news.”) were measured by using a 5-point Likert scale ranging from 1 (I do not agree at all) to 5 (I fully agree).

3.4 Design and Analysis

The study design was Content (2 levels: entertainment, factual) x Presentation Modality (3 levels: text, audio, text and audio) x Picture Presentation (3 levels: no picture, slow pace, fast pace) within-subjects design. In each factors combination we had two news stories to minimize the effect of a particular story. The data for the two individual news stories representing the same category were pooled over and analyzed in SPSS using Liner Mixed Models (LMM).

4 Results and Discussion

The statistical analyses revealed over 40 significant main effects and 2-way interactions. The selected most interesting significant effects are described in the following chapters: main effects for content type, main effects for the content presentation style, interactions between content, modality, and picture presentation, and individual differences in responses.

4.1 Main Effects for Type of Content

The analyses showed main effects for content (factual vs. entertainment) in predicting users’ immediate and delayed memory performance, pleasantness ratings, activation ratings, interest ratings, importance for oneself ratings, understandability ratings, and trustworthiness ratings (in all analyses $p < .001$).

The following Table 1 summarizes the results. The darker fill illustrates higher value and lighter fill lower value for the particular user response named in the most left column. Note that these values are relative between the two news types. For example, the lighter fill does not mean that factual news would be experienced as negative, but it merely illustrates that they are experienced as less pleasant than entertainment news.

As illustrated in the Table 1, entertainment content generated higher self-report pleasantness and activation than factual news. They were also considered as more understandable. Other results were perhaps less obvious: entertainment news elicited better immediate performance than factual news, but factual news were better remembered than entertainment news after a longer period of time. Also interestingly, even though entertainment news were considered as more pleasant, factual news were

regarded as more interesting, important, and trustworthy. We think that these results reflect the nature of the news, and probable due this also the orientation of the participants on the news content (with a favor to factual news). Entertainment news had less important information value, they were perhaps more easily read/listened as they did not contain so much pure facts, and their content was more “harmless”. In contrast, factual news contained more often facts, and some of them were quite negative (e.g., nature catastrophe in china).

Table 1. Illustration of the effects of type of news on user experiences

User response	Content Type	
	Entertain. News	Factual News
MEMORY: Immediate recollection		
MEMORY: Delayed recollection		
PLEASANTNESS		
ACTIVATION		
INTEREST		
IMPORTANCE FOR ONESELF		
UNDERSTANDABILITY		
TRUSTWORTHINESS		

4.2 Main Effects for Content Presentation Style (Modality and Picture Presentation)

The analyses showed main effects for modality (text, audio, caption) in predicting users’ immediate memory performance ($p=.048$), activation ratings ($p=.011$), importance for oneself ratings ($p=0.27$), understandability ratings ($p=.001$), overall satisfaction ratings ($p=.008$), and presence ratings ($p=.001$). The following table illustrates the effects of modality on user experiences (see table 2). The darkest color fill is for the highest mean, second darkest color fill is for the second highest mean and lightest color fill is for the lowest mean. If two means are close to each other, they are illustrated with a same color fill.

As illustrated in the Table 2, the caption (audio + text) modality seems to elicit best short term memory performance, and highest level of activation, satisfaction, presence and positive emotion. Participants also evaluated news as most understandable and important when they were presented as audio with accompanying text. We think that many of these results reflect the task: participants were informed that they should study the material in order to be able to answer the questions about the news content. It was probably easiest to accomplish the task for news items with audio and captions because the information was given in two modalities: auditory and visual, as compared to audio or text only. In regard to presence (immersion into stimuli) it has been shown that usually sensory rich media tend to elicit higher presence than poor ones.

Table 2. Illustration of the effects of modality on user experiences

User response	Modality		
	Caption	Text	Audio
MEMORY: Immediate recollection			
ACTIVATION			
IMPORTANCE FOR ONESELF			
UNDERSTANDABILITY			
OVERALL SATISFACTION			
PRESENCE			

The analyses showed also main effects for picture presentation (no picture, slow picture pace, fast picture pace) in predicting users’ delayed memory performance ($p=.004$), understandability ratings ($p=.029$), trustworthiness ratings ($p=.038$), and overall satisfaction ratings ($p=.023$). The following table illustrates the effects of modality on user experiences (see Table 3).

As illustrated in Table 3, participants rated the news with pictures as more trustworthy, understandable, and satisfactory. Again, the darkest color fill is for the highest mean, second darkest color fill is for the second highest mean and lightest color fill is for the lowest mean. If two means are close to each other, they are illustrated with a same color fill.

We think that, that the reason for this effect is that pictures illustrate the story, link the text/audio with easily remembered images, and create an imagery of the physical place where actions described in the news were taking place. Thus readers may have felt that news with pictures were more understandable. The difference between fast and slow pictures might be explained in terms of task effort: the fast pictures were “too fast”, therefore disturbing the reading/listening whereas the slow pictures were ok (they illustrated the text/audio but did not take too much attention from reading/listening). Interestingly, even though participants considered news with pictures more understandable, their memory performance was worse in connection with news with pictures than news without pictures. It may be that as they were more difficult to understand, they were processed more thoroughly, which then showed in better memorization.

Table 3. Illustration of the effects of picture presentation on user experiences

User response	Picture presentation		
	No	Slow	Fast
MEMORY: Delayed recollection			
UNDERSTANDABILITY			
TRUSTWORTHINESS			
OVERALL SATISFACTION			

4.3 Interactions between Content Type, Modality, and Picture Presentation

Analyses revealed Content Type x Modality interaction in predicting interest ($p=.045$) and presence ratings ($p=.031$).

As illustrated in Figure 3 (left panel), text elicited highest interest ratings within factual news, but lowest for the entertainment news. As also illustrated in figure 3 (right panel), caption elicited highest presence ratings for both factual and entertainment news, but for text and audio the ratings were moderated by the content: for factual news text elicited higher presence than audio whereas for entertainment news audio elicited higher presence than text. We believe that the reasons for these results are related to the connotations of traditional media and media use. Factual news are associated with a “serious” content and more “minimalistic” text-oriented presentation, whereas entertainment news may take more advantage of multimedia and audio forms of presentation.

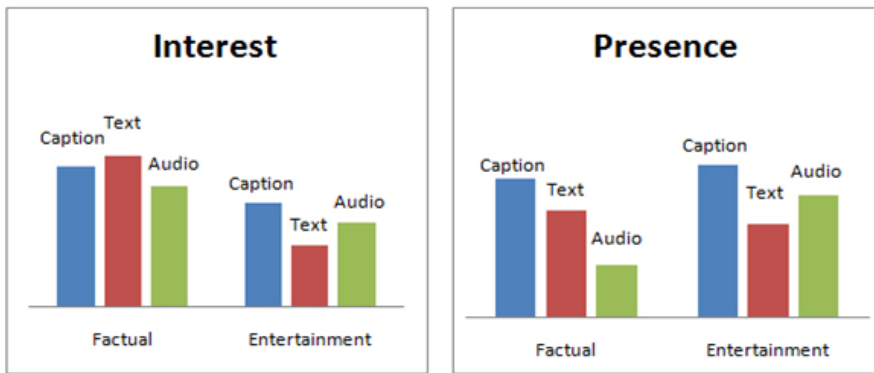


Fig. 3. Interest and presence ratings for factual and entertainment news as a function of presentation modality

4.4 Individual Differences in Responses

We found several individual differences in the responses, most importantly differences owing to participant’s age and level of education. The following interactions were found in connection with the level of education: Content Type x Level of Education interaction in predicting interest ($p=.032$) and importance for oneself ($p=.021$) ratings; Modality x Level of Education in predicting immediate memory performance ($p=.009$), overall satisfaction ($p=.001$) and presence ($p=.024$) ratings. In sum, these interactions indicated the following:

- Factual news elicited more interest and importance than entertainment news especially among the subjects with higher levels of education.
- For higher educated participants caption elicited the best memory performance and highest satisfaction and presence ratings, text condition the second best memory performance and satisfaction and presence ratings, and audio the worst

memory performance and lowest satisfaction and presence ratings, whereas for lower educated the opposite was true: audio elicited better memory performance and higher satisfaction and presence ratings than text and caption.

The aforementioned results implicate that higher educated people are more factual and text oriented whereas in contrast lower educated may prefer entertainment content and auditory presentation.

In regard to individual differences related to age, we found a significant Content Type x Age interaction in predicting pleasant ratings ($p=.019$) and a Picture Presentation x Age interaction in predicting activation ($p=.008$) and understandability ($p=.040$). The results implicate the following:

- Especially young people rated the entertainment news as more pleasant than the factual news.
- For younger subjects fast picture presentation solicited higher activation ratings than slow pictures or no-pictures, whereas for older participants slow picture presentation elicited higher activation ratings than no-pictures or fast pictures.
- Similarly, for younger participants fast pictures elicited higher understandability ratings than slow pictures or no-pictures, whereas for older participants slow pictures elicited higher understandability ratings than fast pictures or no-pictures.

The aforementioned results may implicate a different habituation to news between the younger and the older subjects: young people are more used to and seek fast paced stimuli, whereas older people prefer news with slower picture pace.

5 Conclusions

In general, we found that both content type and presentation style exerted an influence on people's experiences of media stimuli in a situation of consuming eReading contents. We also found that these responses were moderated of individual differences owing to age and level of education. The results show that user responses to media stimuli are a complex mixture of user (such as age, personality, and reading habits), presentation (such as medium, modality, speed), and content (such as factual and entertainment news) characteristics. By examining the interaction of these different factors we can make predictions of user responses and adjust the content and presentation style to elicit more desirable media experience for example in terms of enjoyment, energy and interest. Thus, the result may also have practical value, given that it may make it possible to adjust the presentation of content in eReading devices to a particular user segment to optimize the media experiences. In addition, the results will improve our basic understanding of the different factors influencing on electronic reading related media experiences.

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